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A test of a control theory model of work motivation

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REACTIONS TO GOAL SETTING AND FEEDBACK:

A TEST OF A CONTROL THEORY MODEL OF WORK MOTIVATION

By

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ABSTRACT

REACTIONS TO GOAL SETTING AND FEEDBACK:
A TEST OF A CONTROL THEORY MODEL OF WORK MOTIVATION

By

Howard Jay Klein

While the setting of specific, difficult goals generally leads to higher levels of task performance, it cannot be unequivocally predicted in what contexts goal setting will be most effective, if effective at all. This research seeks to clarify the motivational processes underlying goal setting. In doing so, a control theory perspective is adopted and an integrated control theory model of work motivation is presented. Using college students and several dimensions of academic performance, hypotheses were tested concerning the role of attributions, outcome expectancies, and goal hierarchies in determining cognitive and behavioral reactions to feedback regarding goal progress. Results indicate that (a) stability attributions interact with goal performance discrepancies in relating to changes in outcome expectancies, (b) force towards goal attainment relates to goal choice and goal commitment, (c) changes in force relates to changes in goals, (d) force towards the attainment of sub- and end-goals are positively related and, in part, mediated by the attractiveness of sub-goal attainment, (e) end-goals are more resistant to change than are sub-goals, and (f) when a goal in a goal hierarchy is changed, changes in other goals occur to maintain equilibrium. Hypotheses regarding the relationships (a) between specific effort attributions and subsequent changes in effort and (b) between changes in force towards goal attainment and changes in goal commitment were not supported.

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CHAPTER 1: INTRODUCTION

Problem Overview

Goal setting has become one of the most widely applied and researched motivational techniques. Yet interest in goal setting is clearly not new. Goal setting proponents can be found as far back as scientific management (Taylor, 1911) and the early work on aspiration level (Lewin, Dembo, Festinger, & Sears, 1944; Mace, 1935; Ryan, 1958). Goal setting theory holds that once a task goal is accepted, the only logical thing to do is to try one's hardest until the goal is achieved or until one decides to relinquish the goal (Locke, 1968). According to Locke (1968), goals most fundamentally direct attention and action. Additionally, goals mobilize effort in proportion to the perceived requirements of the goal. That effort persists until the goal is either attained or abandoned (Locke, Shaw, Saari, & Latham, 1981).

Considerable evidence substantiates a strong, positive relationship between goal difficulty and task performance. A recent meta-analysis by Mento, Steel, and Karren (1987) revealed a corrected average effect size (d) of 0.58 between goal difficulty and performance level. It has also been frequently demonstrated that specific goals lead to higher levels of output (Locke et al., 1981; Mento et al., 1987), although specificity has usually been confounded with difficulty. Recent evidence suggests that, when separated from difficulty, specificity affects the variability rather than level of performance (Locke, Chah, Harrison, & Lustgarten, 1987). Goal setting research also suggests that feedback is necessary to improve performance and that factors such as participation, incentives, and individual differences impact on performance through goal setting (Locke, et al., 1981).

While Locke et al. (1981) concluded that "the beneficial effect of goal setting on task performance is one of the most robust and replicable findings in the psychological literature" (p. 145), it is not entirely understood why goal setting is so effective. While we know that the setting of specific, difficult goals generally leads to higher levels of task performance, we cannot unequivocally predict where and when it will be most effective, if effective at all. Wood, Mento, and Locke (1986), for example, demonstrated that goal setting is not equally effective across all tasks. As further evidence of the uncertain effectiveness of goal setting, the relationship between goal difficulty and performance has not always been obtained (e.g. Huber, 1985; Motowidlo, Loehr, & Dunnette, 1978; Oldham, 1975, Organ, 1977) and effect sizes have varied greatly across studies, from .68 (Locke, 1966) to .01 (Steers, 1975).

In addition, there are many aspects of goal setting which currently escape adequate explanation, for example, the role of goal choice, goal commitment, participation, monetary incentives, individual differences, task strategies, and multiple goals. Several authors have been calling for a new research emphasis, away from the continued replication of the goal-difficulty effect toward uncovering the underlying mechanisms which explain that relationship (e.g., Campion & Lord, 1982; Hollenbeck & Klein, 1987; Mento, et al., 1987). It is the purpose of this research to clarify the motivational processes underlying goal setting by more clearly ascertaining the effects of several of the aforementioned variables. In hypothesizing how these different variables impact behavior, a control theory perspective is adopted.

Control Theory

Control theory models of behavior have been available for some time (e.g., Hayek, 1952; Miller Galenter, & Pribram, 1960; Wiener, 1948), and control theory has provided a useful framework for theoretical development in numerous fields of inquiry (Carver & Scheier, 1981a, 1982b). While many of the basic tenets of control theory appeared much earlier, Weiner's (1948) book is viewed as the formal beginning of the field (Carver & Scheier, 1981a). The ideas of control theory were introduced to psychologists by Miller et al. (1960) and then greatly expanded upon by Powers (1973). This perspective gained some popularity in the 1960's but an overreliance on a mechanical analogy by early theorists made the model appear overly mechanical and rigid and precluded its gaining widespread support (Bandura, 1978; Locke, Cartledge, & Knerr, 1970; Lord & Hanges, 1987; Powers, 1978).

Control theory has, however, enjoyed a resurgence, with authors (e.g., Lord & Hanges, 1987) arguing that the perceived rigidity of earlier works was a misinterpretation and that control theory can represent a very flexible, nonmechanical view of behavior. As evidence of this resurgence, Carver and Scheier (Carver, 1979; Carver, Antoni, & Scheier, 1985; Carver, Blaney, & Scheier, 1979a, 1979b; Carver & Scheier, 1981a, 1981b, 1982a, 1982b; Scheier & Carver, 1982, 1983), in the field of social psychology, have used control theory extensively for examining self-attention processes, affective reactions to various stimuli, and behavioral withdrawal from aversive situations.

Building upon this foundation, researchers in organizational behavior have found control theory useful for explaining and predicting the linkages between goal setting, task performance, feedback, future

goal setting, job satisfaction, and organizational commitment (Campion & Lord, 1982; Fisher, 1983; Hollenbeck, 1986; Hollenbeck & Brief, in press; Hollenbeck & Williams, 1987; Lord & Hanges, 1987; Lord, Kernan, & Hanges, 1983; Podsakoff & Farh, 1986; Taylor, 1983; Taylor, Fisher, & Ilgen, 1984).

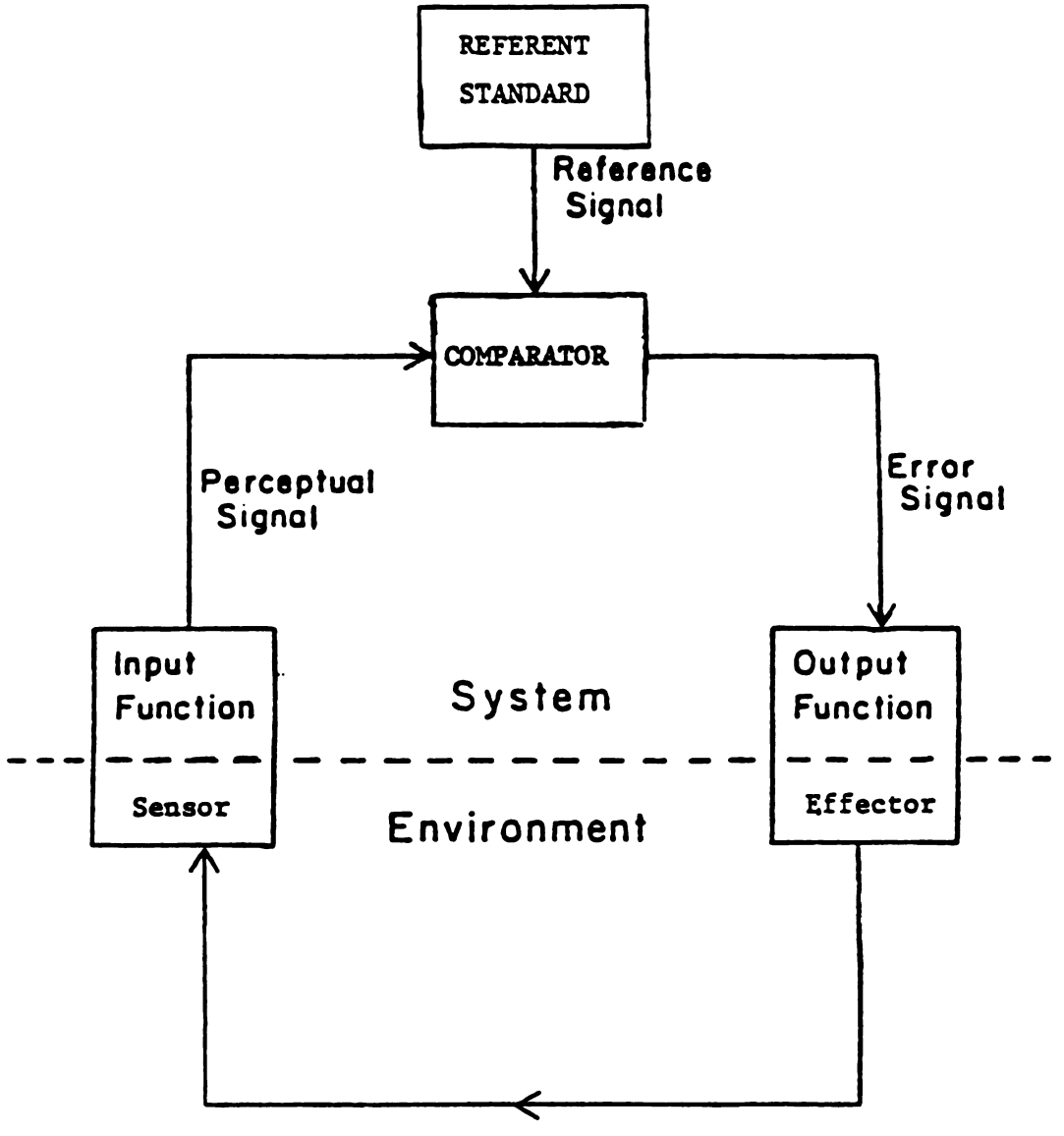
In the paragraphs that follow, the basic elements of control theory are reviewed and Carver & Scheier's (1981a) control theory model of self-regulation is briefly summarized. In addition, the conceptualizations of the three groups of authors who have independently extended control theory into the field of organizational behavior are presented along with the primary advantages of adopting a control theory perspective of goal setting.

Basic Tenets of Control Theory

The cybernetic hypothesis (Wiener, 1948) holds that the feedback loop is the fundamental building block of action. In its simplest form, the feedback loop consists of four elements; a referent standard or goal, a sensor or input function, a comparator, and an effector or output function. In the feedback sequence, illustrated in Figure 1, an input is perceived by the sensor which then sends a signal to the comparator where it is tested against the standard.

If the comparison process reveals that a discrepancy exists, an error signal is generated and the system then "does something" via the effector to reduce the discrepancy. Action, therefore, is initiated by a <u>discrepancy</u> between the current state and the state that is being tested for (Miller, et al., 1960). The standard does not cause behavior. Rather, it is the difference, if any, between that standard and the perceived state which brings about a response. Furthermore, it

Figure 1: The feedback loop.[1]



[1]Adopted from Powers (1973).

is not the objective environmental situation that leads to responses but the situation as perceived by the sensor (Powers, 1973). This process of sensing, comparing and effecting is repeated until the discrepancy no longer exists.

The feedback loop described above, is often referred to in cybernetics as a "negative" feedback loop. It is negative, because the response to an error is always the reduction of that error (Powers, 1973). In cybernetics, "positive" feedback is feedback that results in an enlargement of the discrepancy, and a positive feedback loop to a system which tries to maximize distance from, rather than match, to a standard. The implicit assumption underlying these definitions is that being beyond the standard in either direction is as equally undesirable. While this is true for many mechanical systems, when talking about human behavior, this is not always the case.

This difference between mechanical and human systems raises several interesting questions and different authors have offered different predictions regarding the "overshooting" of standards. These differences will be discussed in more detail in a later section after the views of these authors have been presented. To avoid confusion, the terms positive and negative feedback will not be used in the cybernetic sense, rather they will used as they more commonly are in organizational behavior. That is, positive feedback will refer to information denoting one has met or exceeded a standard, negative feedback to information denoting one has fallen short of a standard. Also for simplification, only the discrepancy reducing feedback loop will be discussed here.

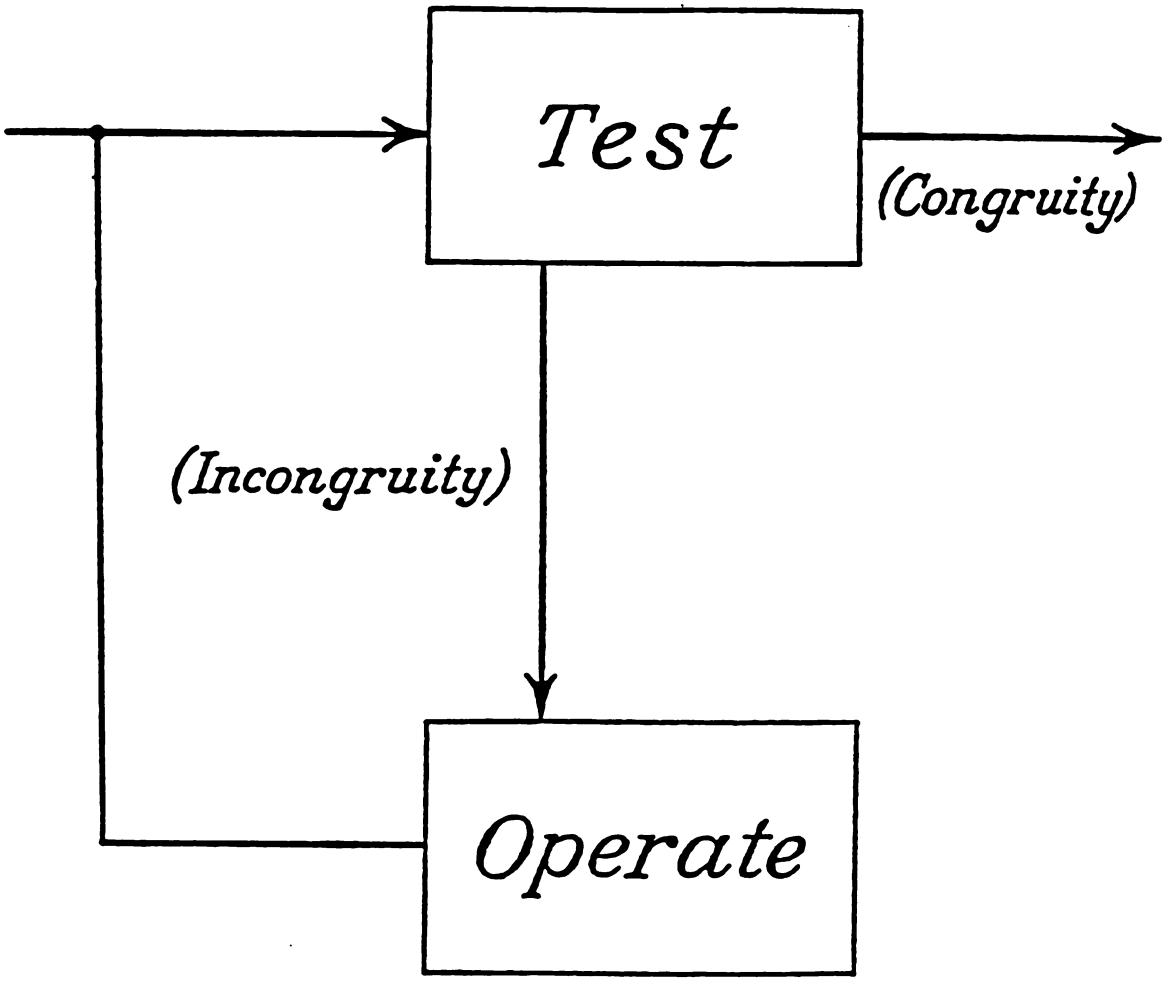
The TOTE Unit

Miller, et al. (1960), described the discrepancy reducing feedback loop as a TOTE (i.e., test-operate-test-exit) unit, illustrated in Figure 2. "Test" in the TOTE unit is analogous to the comparator and comparison process. If there is an incongruity (i.e., an error or discrepancy) then the system "operates" (i.e., takes some action via the effector). When explaining human behavior, the control system becomes slightly more complex, but it operates in the same basic fashion -- utilizing feedback to ensure the attainment of standards or goals. In human control systems, feedback involves much more than the mechanical sensing of the environment. It becomes a complex intra- and interindividual phenomenon (Ilgen et al., 1979). Similarly, goals are not predetermined inflexible standards but are influenced by numerous individual and situational factors (Lord & Hanges, 1987).

Complex behaviors can be explained by hierarchies of TOTE units. The operational phase of a TOTE unit might consist of a string of other TOTE units, and each of these, in turn, may contain still other strings of TOTE's, and so on (Miller et al., 1960). As a brief example, consider the simple act of sawing a board in two, an act similar to that used by Miller et al. (1960) in explicating this notion. A TOTE unit for sawing is illustrated in Figure 3. According to this diagram, the response "Saw" continues as long as the board is whole. When the test indicates that the board is in two pieces, control is transferred elsewhere (Miller et al., 1960).

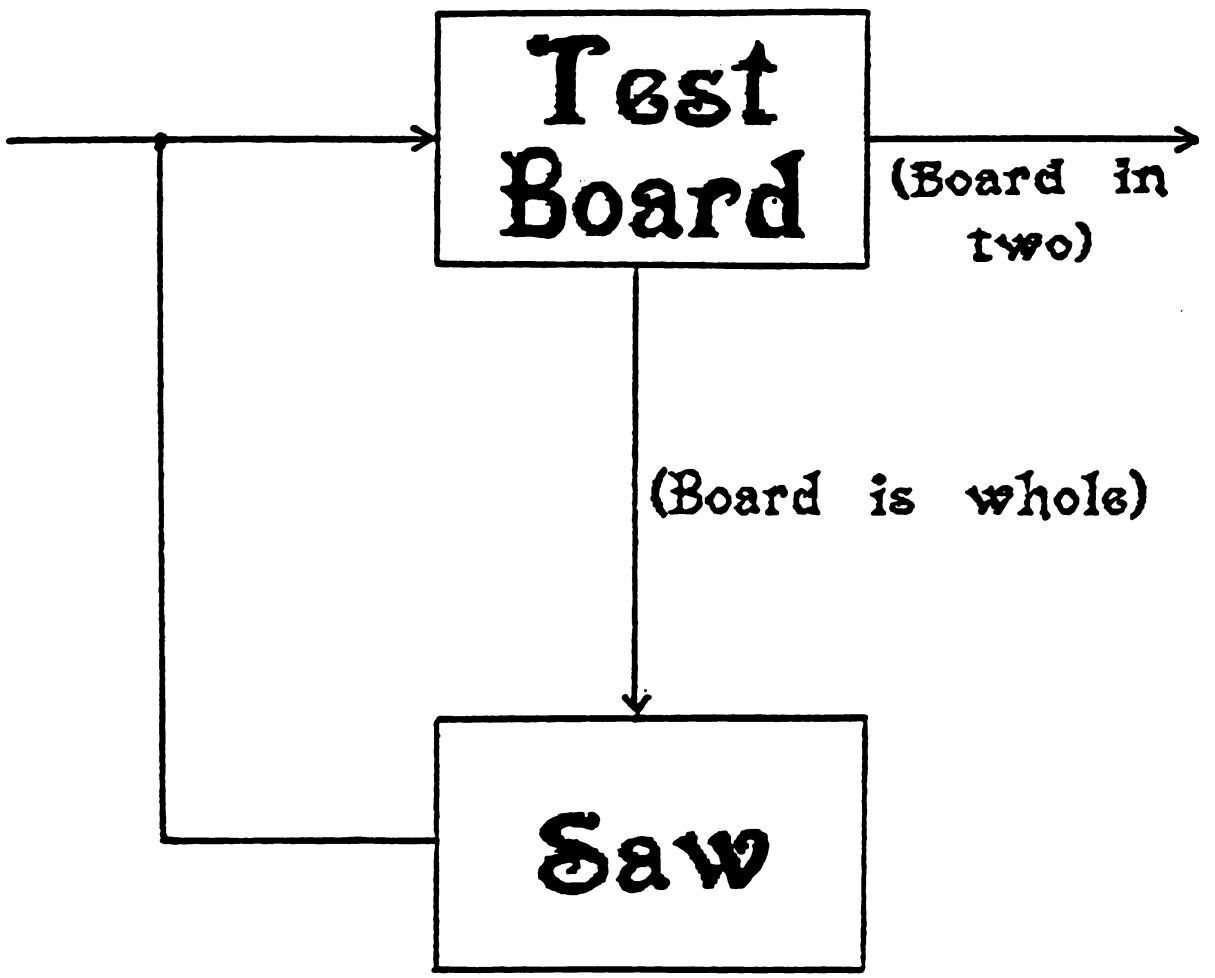
"Sawing", however, actually consists of two actions: drawing the saw into place, and pushing the saw through the board. Thus, upon closer inspection, the operation of sawing, is two TOTE units -- drawing

Figure 2: The TOTE unit. [1]



[1]Adopted from Miller, Galanter, and Pribram (1960).

Figure 3: Sawing as a TOTE unit. 9



and sawing -- each with its own test. The result is a hierarchical plan for sawing shown in Figure 4. If this description of sawing is correct, one would expect a sequence of events in the following order: Test board (Board is whole). Test saw (saw is out). Pull saw back. Test saw (saw is in). Push saw through board. Test saw (saw is out). Test board (Board is whole). Test Saw. And so on, until a test of the board reveals that it is in two pieces (Miller et al., 1960).

This hierarchy of control could be extended further. That is, the action of sawing the board could be part of the output function of another, higher-order standard -- building a bookcase. Building that bookcase may, in itself, be part of the "operate" of a yet higher-order standard -- getting better organized. The sawing hierarchy could also be extended to lower-order TOTE units, down to the level of neural signals and changes in muscle tension. Powers (1973) proposed a detailed hierarchy of such feedback loops which is discussed below.

Powers' Hierarchy of Control

Powers (1973) proposed that the human nervous system embodies a hierarchy of control systems. Each level of this hierarchy is thought to control a different aspect of behavior and a different aspect of perception such that each level uses a separate type of behavioral standard (Carver & Scheier, 1981a). The nine levels in Powers' hierarchy, illustrated in Figure 5, are briefly described below.

At the lowest level of this hierarchy is a control system consisting of sensory nerve endings (the input devices) and muscles and glands (the output devices). This lowest level of analysis, "intensity", deals only with the magnitude of neural stimulation. Yet anything which affects the person must have its effects through these

Figure 4: A hierarchical plan for sawing.

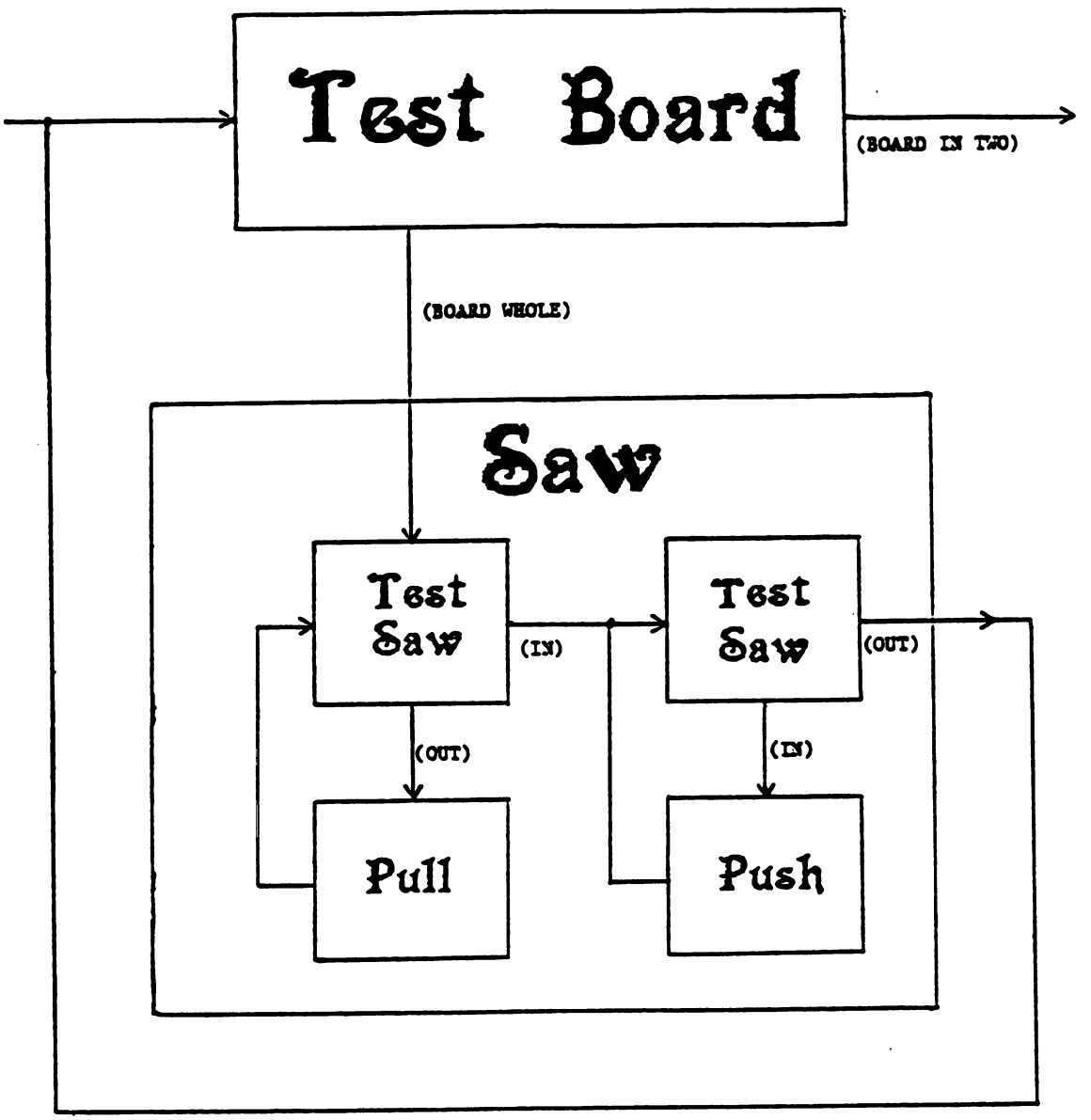
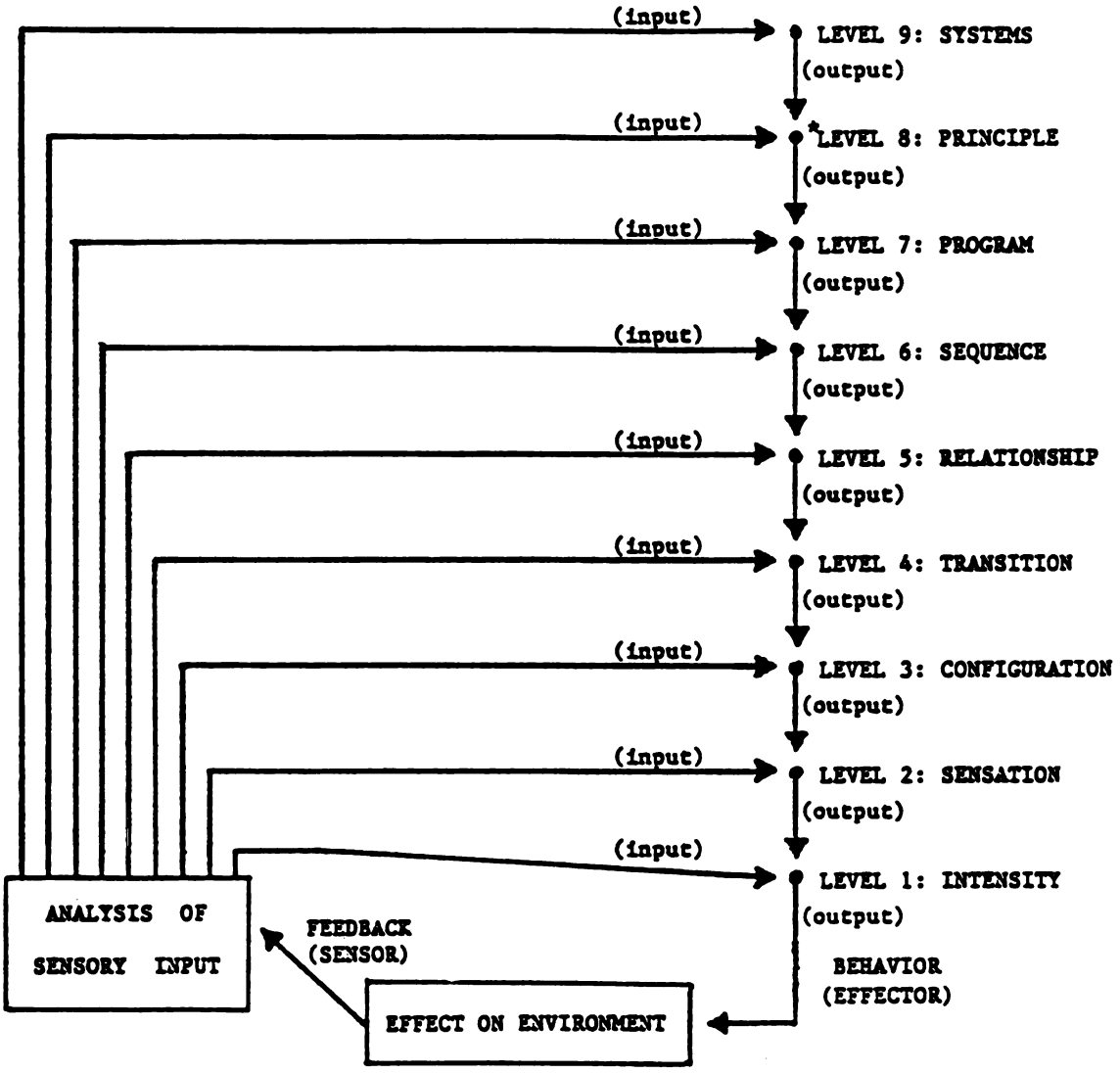


Figure 5: Powers' (1973) hierarchy of control loops. [1]



[1]Adopted from Carver and Scheier (1981a).
*Note that the output from each level constitutes the standard for the next lowest level. Furthermore, one could enter the hierarchy at any given level with control then exerted downward from that level.

input devices and any impact that the person has on the environment will have its effects through these output devices. Only this first-order system actually produces forces that have external consequences (Powers, 1973).

At each succeeding level, an integration or abstraction of signals from the previous levels occurs, leading to more and more complex perceptions and actions. The inputs for the second-order system "sensation" are combinations of first-level intensities. The second order output does not respond to any single local physical event but rather to more general sensations, for example, temperature as opposed to the local flow of heat (Powers, 1973). At the third level, "configuration," these various sensations are combined to yield the perception of objects.

The next system, "transition," combines these perceptions of objects to allow for the detection or instigation of movement or change. Fourth order systems cannot, however, select when or in what combination to produce these changes (Powers, 1973). The fifth-level system is hypothesized to concern "relationships." A perceived relationship results from combining perceived transitions (the inputs). The output of a fifth-order system involves the creation and maintenance of relationships between changing configurations (Powers, 1973). The sixth-order system, "sequence," senses the sequential order among the relationships abstracted from the fifth-order. The noticing or producing of objects, movements, and relationships in proper sequences results in the perception of events or the successful execution of most actions (Powers, 1973).

The seventh level of human organization is concerned with "programs." Programs are strings of sequences, relationships, movements, configurations, sensations, and intensities. A program is not a list or a precise order of sequences. Rather, it is a network of contingencies, a structure. At the nodes of this structure are tests or decision points (Powers, 1973). As such, the specific manner a program is executed is uncertain and depends upon a series of intermediate decisions. (Carver & Scheier, 1981a).

While sixth-order systems are capable of recognizing when events satisfy a certain sequence or relationship (e.g., the traffic light is green or red), the program level is required in order to manipulate these relationships (e.g., if the light is green, drive through; if not, stop, wait until the light turns green and then drive through). Furthermore, programs can themselves be hierarchical in nature. According to Powers (1973), program structures are very much like his overall hierarchical model, although he places the entire program structure within a single level of his larger hierarchy.

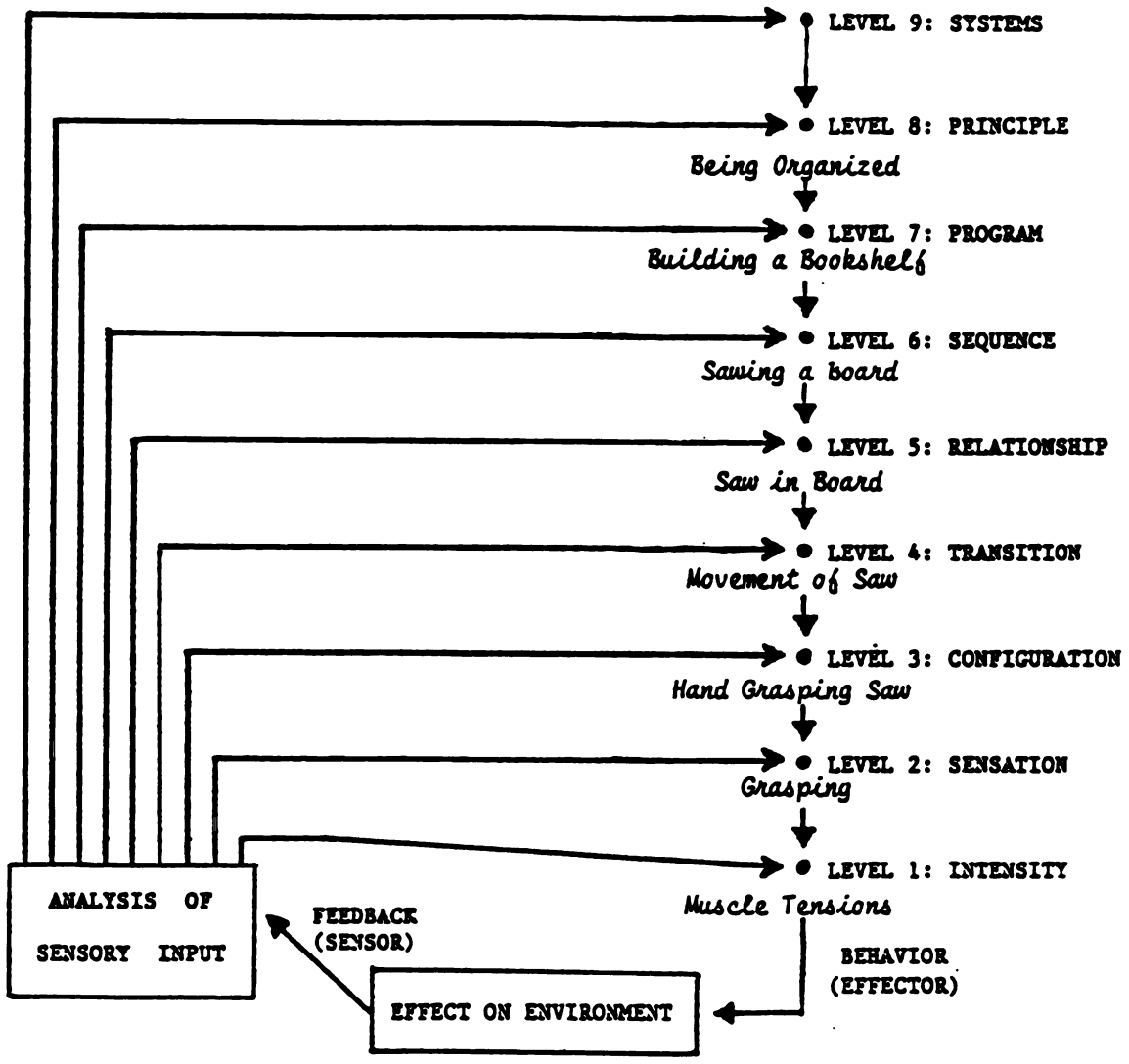
Another level is required in order to permit the choice of programs. The eighth-order system, "principle" deals with the perception and control of programs. According to Powers (1973), the reference values for these programs are determined by the individuals' principles or roles. Individuals employ principles in order to organize and direct their program selection. Prior to this level, the system was unable to learn. Eighth-order perceptions can result in the development of programs to solve problems (Powers, 1973). Powers' (1973) also proposed a ninth-order systems to account for the choice of one set of principles versus another.

Returning to the example of sawing a board, Powers' (1973) hierarchy is used below to analyze the behavior of an individual as he or she is interrupted in mid-saw. An illustration of this hierarchy is presented in Figure 6. The superordinate standard for this individual at the moment is to be organized. The bookcase is being built because the individual perceives him- or herself to be an organized person. This standard can be seen to exist at the level of principles, because it can be achieved in many different ways. One way to be organized, is to have a specific place for everything (a program).

As this individual needs more space for his or her books, the subprogram chosen is "building a bookcase." Note that an alternative subprogram could be to go out and buy a bookshelf. The choice to build rather than buy could be traced to a second principle, perhaps his or her perception of being a "do-it-your-selfer." The bookcase building program consists of a number of discrete behaviors, some of which must be executed in a specific sequence. The boards, for example, must be sawed before they can be put together.

Thus, there are aspects of this activity which must be controlled. These events also imply relationships (e.g., placing the saw on the board) and transitions (e.g., moving the saw through the board). At lower levels of abstraction, there are configurations (e.g., perceiving the saw) and sensations (e.g., grasping). And at the very lowest level, doing all the work, are variations in muscle tensions (Carver & Scheier, 1981a). As can be seen from this example, any complex activity requires a great many subsidiary functions, in which different qualities of the events must be controlled. All involve the specification of standards, and all are occurring simultaneously.

Figure 6: Sawing as a hierarchy of control loops.



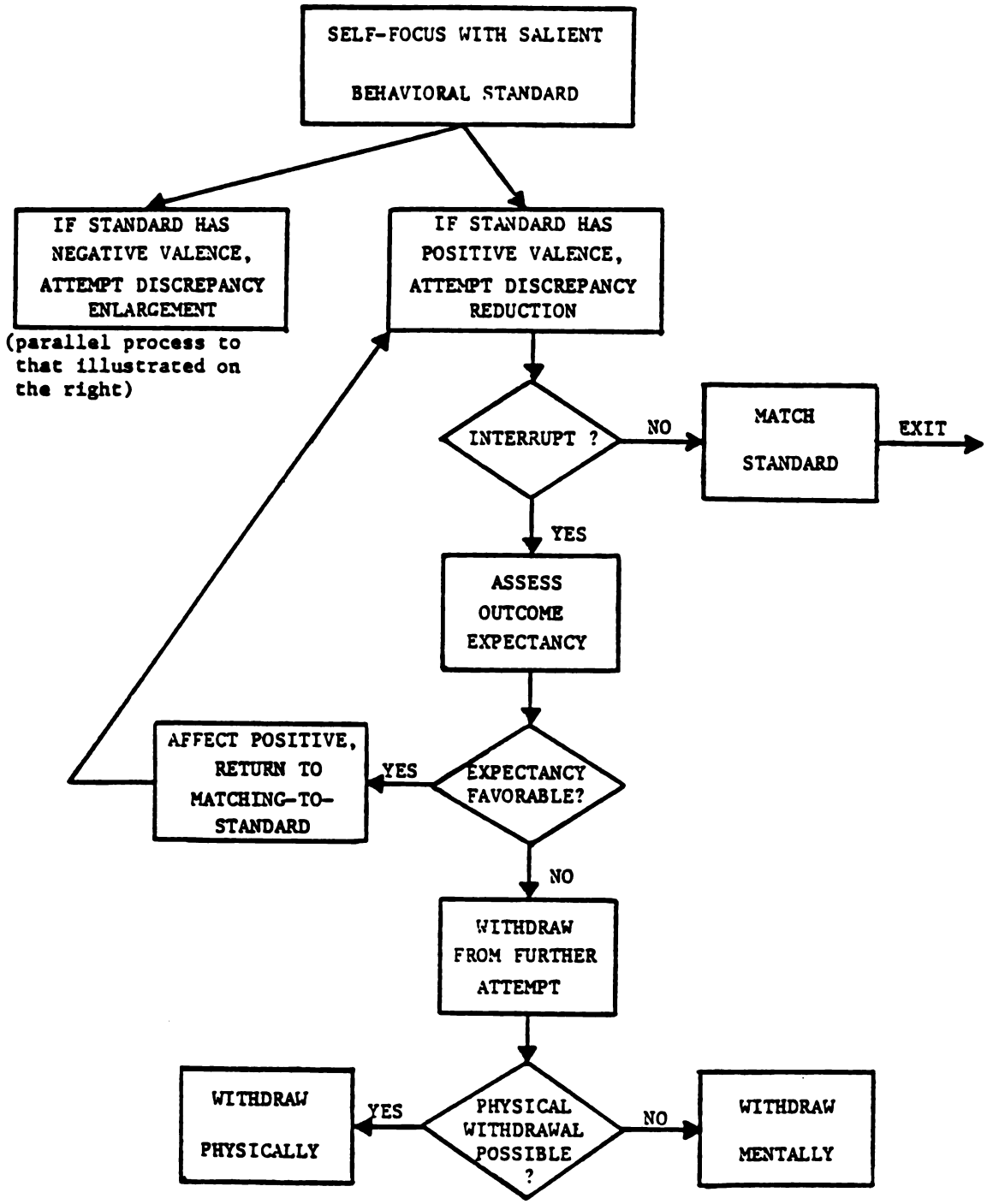
Carver and Scheier's Model

Carver and Scheier's model of behavioral self-regulation (Carver, 1979; Carver, Blaney, & Scheier, 1979b; Carver & Scheier, 1981a, 1981b) is important because it is the first detailed application of control theory to human behavior. When framed as a theory of behavior, control theory has two primary elements; one cognitive, the other affective. The cognitive component consists of internal goals (referent standards) as well as the cognitive process of matching obtained inputs to those standards. The affective component originates from perceived discrepancies between the input and the standards.

Behavior initiates from the desire to resolve the discrepancy in order to alleviate negative affect, which may take the form of dissatisfaction, anger, or frustration (Carver & Scheier, 1981a). Carver and Scheier (1981a) suggest, however, that positive feedback (i.e., being beyond the standard) results in slightly different consequences than does negative feedback. They suggest that the dissatisfaction resulting from not meeting the reference standard may not be present when the standard is over-shot. Carver and Scheier's (1981a) model, illustrated in Figure 7, is based extensively on the work of Powers (1973) and Miller et al. (1960). Their model holds that when behavioral standards are salient and the individual is engaged in self-attention or focus (i.e., aware of his/her current state) a matching-to-standard sequence is evoked, whereby ongoing behavior is adjusted so as to more closely approximate the standard.

Carver and Scheier (1981a) also recognize that a standard can have either a positive or negative valence. A positive valence implies that the standard is taken as a desired goal. A negative valence exists when

Figure 7: A flow chart of Carver and Scheier's (1981a) self-regulation model.[1]



[1]Adopted from Carver and Scheier (1981a) and Carver (1979).

an undesired goal, that is, a state to be avoided, is taken as a standard. In other words, Carver and Scheier use the valence of the standard to distinguish between discrepancy reducing feedback loops (positive valence) and discrepancy enlarging feedback loops (negative valence). Standards are further viewed by Carver and Scheier (1981a) as varying in value or importance to the individual.

According to the Carver and Scheier model, the matching-to-standard (i.e., TOTE) process typically occurs automatically. This automatic self-regulation will be momentarily interrupted, however, whenever a self-aware person experiences, or anticipates experiencing, difficulty adjusting his/her behavioral attempts to match the standard (Carver & Scheier, 1981a). This disruption of the TOTE sequence leads to an assessment of the likelihood of being able to match the standard. This assessment entails cognitively processing the available information, resulting in an "outcome expectancy" -- a subjective estimate of the likelihood that the standard can be more closely approximated given the nature of the situation and the behaviors available to the person (Carver, 1979). Carver and Scheier (1981a) outline a number of factors which may influence outcome expectancies including; prior success and failure, locus of control, social influence, and the causal attributions made for failing to match the standard. Based upon the attribution literature, Carver and Scheier (1981a) concluded that it is the stability of the attributed cause which is important in determining the expectancy shift following success or failure. Regardless, of its antecedents, it is the outcome expectancy that determines which behavioral response will be forthcoming.

The judgment regarding outcome expectancies is thus a critical decision point. The responses following this judgment are suggested by Carver and Scheier (1981a) to fall into one of two categories; renewed effort or withdrawal. If the result of the assessment is a high outcome expectancy, a return to the matching-to-standard sequence is predicted to result, with possibly greater concentration on that attempt. If, on the other hand, the examination of the context and one's resources results in a low subjective probability of being able to alter one's behavior to attain the standard, the behavioral consequence is withdrawal from the attempt.

Given an unfavorable expectancy, physical withdrawal from the situation is predicted to occur if such a response is possible and not associated with aversive consequences of its own (Carver & Scheier, 1981a). Where physical withdrawal is precluded by situational constraints, the withdrawal impetus may be expressed through a mental rather than physical withdrawal from the situation. For example, more accessible goals may be substituted for the original goal (Carver & Scheier, 1981a). This, in effect, results in a withdrawal from the original standard of comparison, but not a withdrawal from the behavioral dimension. Thus, while the Carver and Scheier (1981a) model focuses on behavioral and affective consequences of the matching to standard process, they do recognize cognitive consequences.

Regarding affective reactions, the Carver & Scheier model suggests that, having perceived a discrepancy, it is the person's outcome expectancy that determines the general tone of the emotion that is experienced (Carver & Scheier, 1981a). The perception that one cannot adjust behavior to match a salient standard is predicted to result in

negative affect whereas a favorable expectancy would lead to positive affect. The magnitude of the affect resulting from the expectancy evaluation is thought to be proportionate to the importance of the behavioral standard and to the perceived magnitude of the discrepancy. Carver and Scheier (1981a) further suggest that the magnitude of the affective responses are moderated by the individual's causal attributions for their prior behavioral outcomes (i.e., their failure to match the standard).

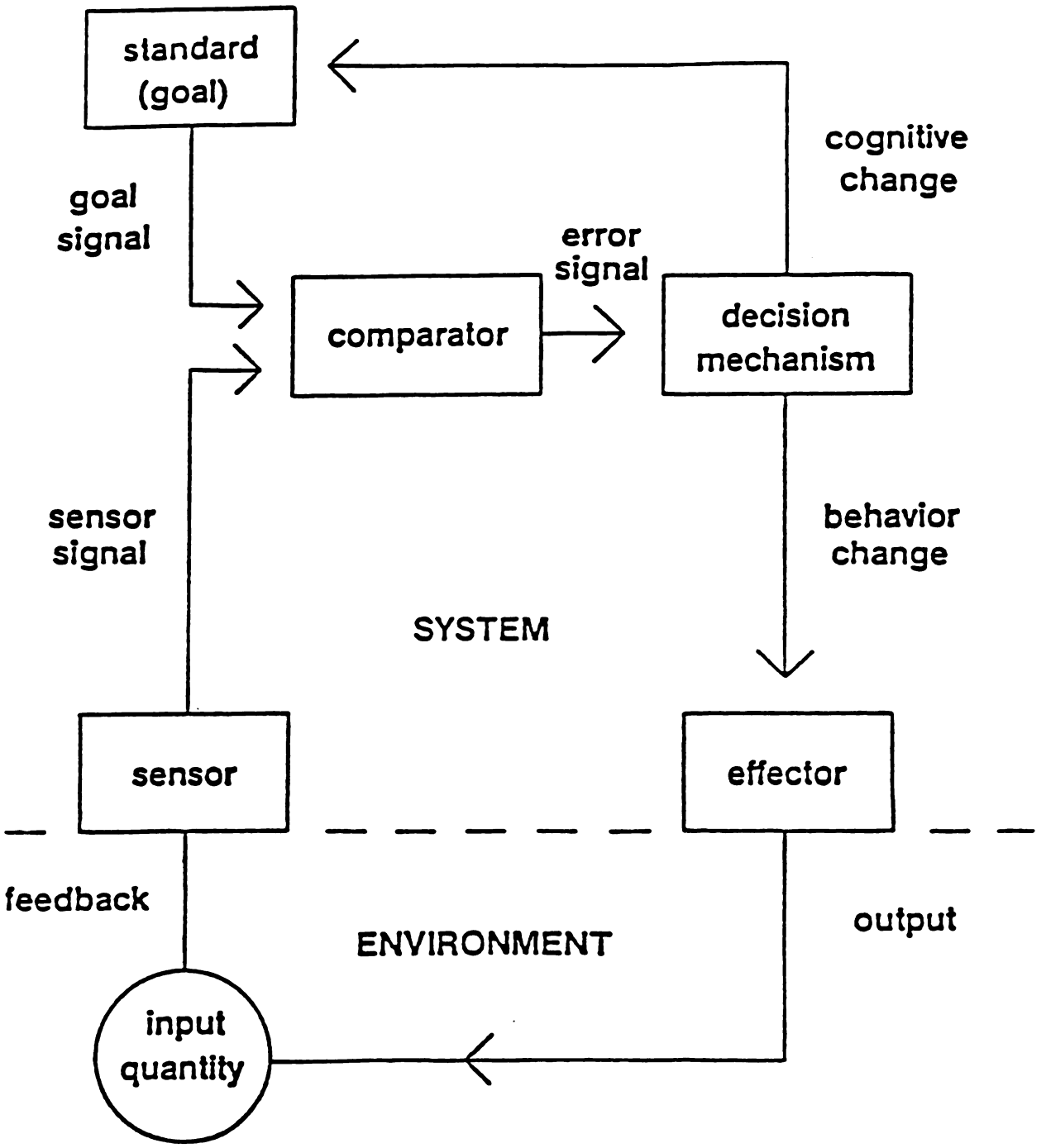
Extensions into Organizational Behavior

Lord and Colleagues

The conceptual model provided by Lord and his colleagues (Campion & Lord, 1982; Lord & Hanges, 1987; Lord et al., 1983) is based primarily on the work of Powers' (1973). According to Lord, the control system contains five distinct components, illustrated in Figure 8. The main difference between Lord's model and that of Powers (1973) (see Figure 1) is the inclusion of a decision mechanism by which the system decides what action to take in order to reduce any discrepancy between the sensed information and the standard.

Depending on the characteristics of the individual and the situation, a decision is made, following the perception of an error, as to whether an attempt will be made to modify the environment via some effector function or whether the referent itself will change. Given this model, errors can be reduced either cognitively or behaviorally. These changes are specified further, as one can behaviorally increase effort or change strategies, or cognitively distort the feedback or lower goals (Lord & Hanges, 1987). It was further suggested that goal change is a "slower acting and long-term solution to discrepancies"

Figure 8: Lord and Hanges' (1987) conceptualization of the feedback loop.



(Campion & Lord, 1982; p. 272) and that alternate responses will often be tried before goals are changed.

The Lord model differs from that provided by Carver and Scheier (1981a) in three respects. First, while Carver & Scheier focus on the behavioral and affective responses to matching-to-standard, the Lord model focuses on behavioral and cognitive reactions. Second, Lord places the decision mechanism within the feedback loop whereas Carver and Scheier suggest that such cognitive evaluations take place only when the feedback loop is interrupted. The first distinction is only a difference in focus and not a fundamental point of contention between the two models. Cognitive changes are referred to in the Carver & Scheier model (Carver & Scheier, 1981a) and affective reactions are assumed in the Lord model (Campion & Lord, 1982). While the second issue appears to reveal an incompatible position regarding a major aspect of the theory, a third position, taken by another set of theorists discussed later, envelopes both of these positions, resolving this apparent discrepancy.

The third difference concerns the primary consequence or choice that follows the reevaluation of outcome expectancies. Carver and Scheier (1981a) contend that high outcome expectancies will result in persistence, (i.e., a return to the discrepancy reduction attempt) while low outcome expectancies will result in a withdrawal attempt. Lord and colleagues, on the other hand, suggest that the result of the expectancy evaluation is either a cognitive change or a behavioral change. Carver and Scheier (1981a) discuss both cognitive and behavioral changes, and withdrawal and persistence are certainly accounted for by Lord's model.

The real distinction, however, is that Lord and his colleagues imply that cognitive and behavioral reactions are exclusive, as behavioral reactions are suggested to follow high outcome expectancies and cognitive reactions from low expectancies (Campion & Lord, 1982; Lord & Hanges, 1987). Carver and Scheier (1981a), on the other hand, suggest that both cognitive and behavioral reactions are possible reactions following either high or low outcome expectancies. The persistence versus withdrawal distinction is preferable to the cognitive versus behavioral distinction because it is a much clearer dichotomy. One must either persist or withdraw, the choice of one precludes the other. In contrast, behaviors and cognitions are often related. Any cognitive change, for example changing the goal, has considerable implications for behavioral changes. As further evidence of the difficulties separating out behavioral changes from cognitive changes, Campion and Lord (1982) considered changes in intermediate or sub-goals behavioral responses, but changes in end goals cognitive responses.

The main focus of the work by Lord and colleagues has been the application of control theory to goal setting processes. As such, they have provided control theory explanations for several aspects of goal setting. According to Campion and Lord (1982), the importance of goal acceptance can be explained by equating goal acceptance with decision to use a goal as a reference signal. Similarly, in using a control theory framework, goal commitment becomes an unwillingness to lower or abandon a referent standard when error signals are perceived (Campion & Lord, 1982). Commitment to difficult goals produces increased effort and higher performance because it restricts the available means of error

reduction. That is, when goal commitment is high, lowering or abandoning the goal is eliminated as a viable solution.

Control theory explains the relationship between goal difficulty and performance by noting that difficult goals will require greater efforts to maintain matching-to-standard. Assuming equal initial performance, an individual with a difficult goal, as compared to an easy goal, will be much more likely to perceive a discrepancy and the need for a corrective response such as increased effort. The goal specificity effect (i.e., that specific difficult goals will lead to higher performance than vague goals) occurs, according to Campion and Lord (1982), because the use of specific standards permits the use of more precise feedback. Vague goals make poor referent signals because there are numerous environmental outcomes which, when perceived, would indicate no discrepancy and therefore no need for corrective action.

Taylor and Colleagues

Whereas Lord and colleagues approached control theory from a goal setting perspective, Taylor and colleagues (Taylor, 1983; Taylor, Fisher, & Ilgen, 1984) have approached control theory from a feedback orientation. Their perspective highlights feedback as a personal resource. In line with Ashford and Cummings (1983), they hold that individuals actively seek out feedback about their current behavior in addition to simply monitoring the environment.

Taylor et al.'s (1984) conceptualization is essentially the same as Lord's, but delineates more specific behavioral and cognitive reactions to feedback and the matching-to-standard process. Taylor et al. (1984) also discuss affective reactions, an issue addressed by Carver & Scheier (1981a) but not by Lord and colleagues. Taylor et al. (1984), in line

with Lord's model, conceptualize the decision mechanism as part of the feedback loop, rather than a process following the interruption of the feedback loop. Their position, is however, somewhat similar to Carver and Scheier's, in that this process is viewed as typically occurring unconsciously except in certain situations.

Taylor et al. (1984) pointed out that the acquisition and processing of information can vary from a highly controlled and conscious series of activities to a virtually automatic and unconscious ones. The form which this process takes (i.e. conscious vs. unconscious) has important implications for the subsequent impact this information has on behavioral, cognitive, and affective reactions. When feedback is acquired and processed unconsciously, it will likely be automatically compared to a standard and any discrepancies will typically be corrected using well learned, habitual responses (Taylor et al., 1984).

Thus, when feedback is processed unconsciously, Taylor et al.'s control process resembles Carver and Scheier's uninterrupted feedback loop. When feedback is processed consciously, the process resembles Lord's control loop with the decision mechanism. As Taylor's position is entirely consistent with the models of both Carver and Scheier and Lord, adopting the Taylor et al. conceptualization renders the discrepancy between those models illusionary. Taylor's position is also more consistent with what is known about information processing (e.g., Bargh, 1982; Logan, 1980; Shiffrin & Schneider, 1977).

According to Taylor et al. (1984), conscious processing is more likely to occur when: (1) an individual is unfamiliar with a situation, (2) the feedback obtained is dramatically incongruent with the

individual's expectations and (3) when others cue the individual to search for feedback. Thus, the impediment of the matching-to-standard would lead to the cognitive processes as suggested by Carver & Scheier (1981a). These processes would also occur, however, under a number of other conditions, for example, when feedback is obtained through formal organizational programs.

In their conceptualization, Taylor, et al. (1984) differ from Carver and Scheier (1981a) by not distinguishing between the perception of feedback indicating that one has met a standard and the perception of feedback indicating that one has exceeded that standard. They point out that most work standards are not symmetrical (i.e., in most instances "more is better"). Individuals may set a minimally acceptable standard, but exceeding that level is usually cause for celebration rather than corrective action (Taylor et al., 1984).

Consistent with Lord and colleagues, Taylor et al. (1984) hold (a) that discrepancies can be reduced either by changing behaviors or by lowering the standard to a level more easily matched by performance and (b) that the choice between these responses is a function of expectancies. Taylor et al. (1984) point out, however, that both personal and situational factors may intervene to raise or lower expectancies such that the same feedback could produce quite different responses in any two recipients. Four distinct behavioral responses were posited, along with the conditions under which they would most likely occur.

The first two possibilities, thought to occur when outcome expectancies remain high, are changes in the direction of behavior and changes the magnitude of effort. It was further suggested that changes

in either direction or intensity of behavior would be most likely to occur when individuals attribute past performance to incorrect behavioral strategies or lack of effort (Taylor et al., 1984). Neither of these first two reactions are unique, however, having been posited by both Lord and Hanges (1987) and Carver and Scheier (1981a). A third response is quitting (essentially the behavioral withdrawal predicted by Carver & Scheier, 1981a). Quitting is predicted to occur if the outcome expectancy decreases to an extremely low level. A final behavioral response suggested by Taylor et al. is to respond against the feedback system, perhaps attacking the feedback source or system itself.

Regarding cognitive reactions, Taylor et al. (1984) point out that there are actually four possible ways in which goal level may change in response to negative discrepancies (i.e., decrease, increase, remain constant, change in nature). They hypothesize that standards change as a function of individuals' outcome expectancies as well as their value for standard attainment. That is, the more important the individual considers a standard to be, the more resistant it will be to change. In predicting affective reactions to the matching to standard process, Taylor, et al. (1984) draw essentially the same conclusions as Carver and Scheier (1981a) discussed earlier.

Hollenbeck and Colleagues

Control theory has been extended to the study of individual reactions to the work environment by Hollenbeck and colleagues (Hollenbeck, 1986; Hollenbeck & Brief, in press; Hollenbeck & Williams, 1987). The Hollenbeck model incorporates three "core elements" of control theory (i.e., discrepancies in controlled quantities, outcome

expectancies, and self-focus) as explanatory variables for organizational behavior constructs. They hypothesize that these factors are useful in predicting affective reactions such as organizational commitment and job satisfaction as well as behavioral withdrawal reactions such as absenteeism and voluntary turnover (Hollenbeck, 1986).

Hollenbeck and colleagues devote considerable attention to transferring the notion of controlled quantities to organizational settings. According to Powers (1973), if very small deviations from the standard elicit corrective action, then control could be called tight. If only large deviations bring forth corrective responses, then the standard is only loosely controlled. If no amount of discrepancy can bring about corrective effort, then the system cannot be considered as controlling for the standard (Hollenbeck, 1986). Within any given individual in the workplace, only discrepancies in perceptions of work facets that are being tightly or closely controlled are going to be subject to self-regulation (Hollenbeck & Brief, in press). Just as a furnace will not turn on the lights in a room that becomes dark (because the thermostat is not controlling for light intensity), a person will not try to attain a performance standard if that standard is not a controlled quantity.

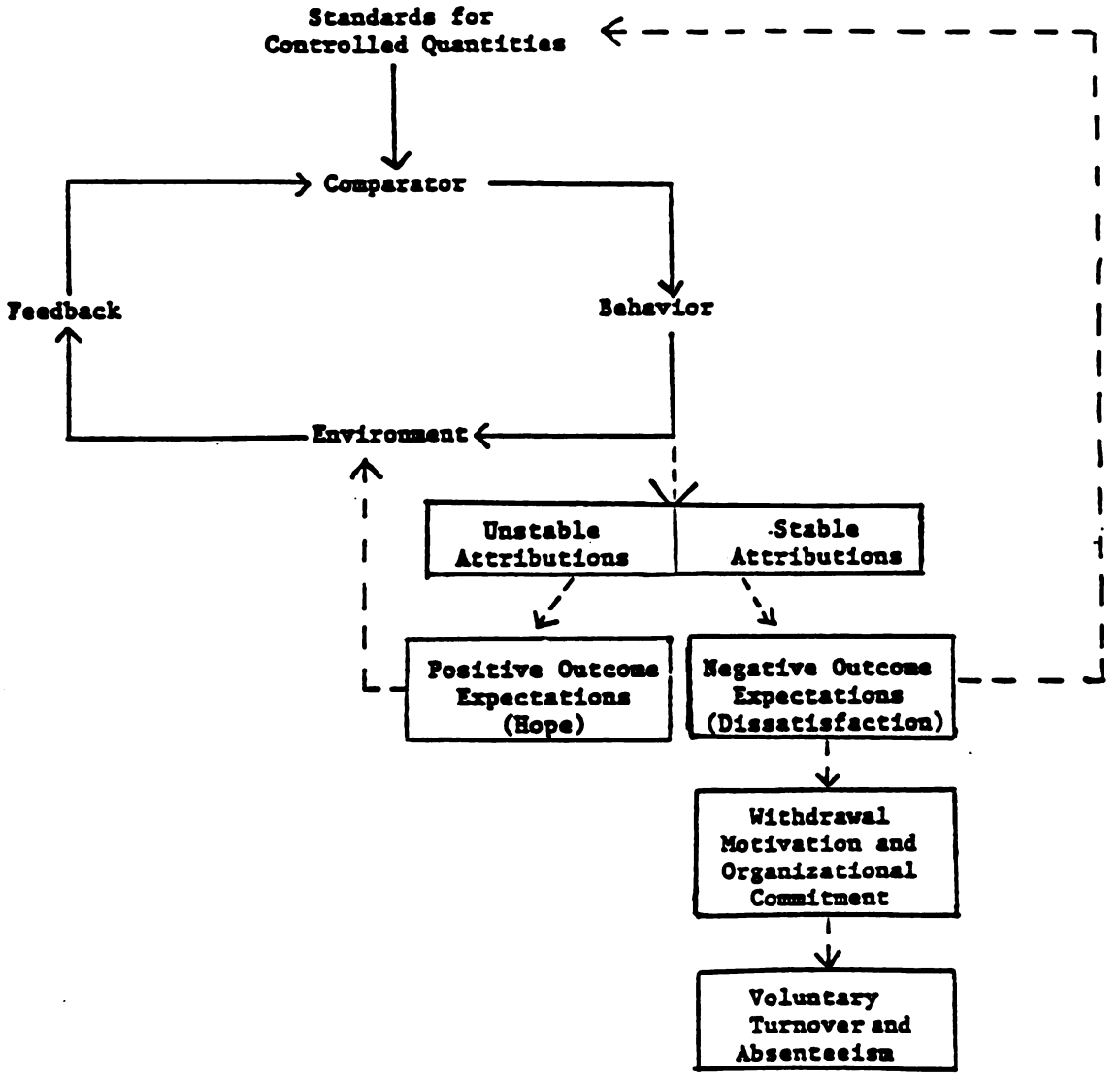
Hollenbeck goes on to stress that just as all perceptions are not controlled quantities, controlled quantities are not being controlled at all times. Carver & Scheier (1981b) have stressed, for example, that the process described by the feedback loop operates only when individuals are engaging in self-focus. For self-regulation to occur, individuals need to be aware of the standard and aware of the negative affect produced by the discrepancy. Self-focus is thus important for

control theory because these "necessary conditions" are more likely to be satisfied for individuals high in self-focus (Hollenbeck, 1986). For individuals low in self-focus, deviations from standard are less likely to be perceived. Furthermore, even if deviations are perceived, the resulting expectancies may not be salient enough to yield accurate predictions of behavior or affect (Hollenbeck & Brief, in press).

Several studies, both in the laboratory and field, have documented the fact that self-focus increases the congruence between standards and behavior (Carver et al., 1985; Carver & Scheier, 1981b; Carver, 1974; Carver, 1975; Gibbons, 1978; Hollenbeck & Williams, 1987; Scheier, Fenigstein, & Buss, 1974). Hollenbeck and Williams (1987), for example, found a three way interaction between goal level, performance control, and self-focus. In that study, the relationship between goal difficulty and performance was significantly higher when the performance goals were salient and occurred in conjunction with high self-focus. This is consistent with the position of Taylor and colleagues as one would expect feedback regarding a salient standard to be processed consciously by a person engaging in self-focus.

Whereas the conceptualizations of Lord and of Taylor only peripherally incorporate the work of Carver and Scheier, Hollenbeck relies heavily on that model. Hollenbeck and colleagues adopt Carver & Scheier's (1981a) position that when conventional behaviors and effort levels are unable to eliminate a discrepancy, an "interruption" in the control sequence occurs, initiating a cognitive evaluation process. According to Hollenbeck's model (Hollenbeck & Brief, in press), illustrated in Figure 9, the aim of this process is to determine the cause or causes for the inability to match the standard.

Figure 9: Hollenbeck and Brief's (in press) model of individual reactions to the work environment.



Hollenbeck and colleagues suggest that behavioral reactions to those outcome expectancies will take essentially the same form as predicted by Carver and Scheier (1981a). Hollenbeck's proposed affective reactions are, again like the Carver and Scheier model, primarily a function of outcome expectancies and attributions. Finally, the Hollenbeck model is in agreement with Carver and Scheier (1981a) regarding reactions to positive discrepancies. That is, while positive errors may differ from negative errors, the positive discrepancy is of little relevance because it quickly resolves itself.

Carver and Scheier, Taylor, Hollenbeck, and their colleagues all recognized that, unlike mechanical systems in which errors on either side of the standard are equally serious, positive deviations are not troublesome and are often desirable states in most human behavior systems. Carver & Scheier (1981a) and Hollenbeck (1986) hold that reactions to negative deviations will be more extreme than positive deviations, but they still differentiated "over-shooting the target" from being "on target." Taylor et al. (1984) take a more extreme position, as they do not make this latter distinction. This is essentially an empirical issue, but one that has not been directly assessed.

Advantages of a Control Theory Perspective

Taking a control theory perspective is useful for a number of reasons. First, while control theory does not, in and of itself, provide a fully developed theory of motivation, it provides a dynamic framework in which other theories can be integrated (Lord & Hanges, 1987). A control theory model of motivation explicitly recognizes the role of feedback, goal setting, expectancy and attribution theories and

can easily be extended to incorporate need theories, equity theory, social learning theory, decision making theory, cognitive dissonance theory, and theories of job satisfaction and turnover (Lord & Hanges, 1987; Hollenbeck & Brief, in press). Most importantly, control theory is parsimonious as it can encompass these theories while still remaining a simple heuristic framework.

Second, control theory is capable of integrating the findings reported by both goal setting and feedback researchers. Despite the fact that researchers in both areas consistently obtain a performance goal by feedback interaction, theoretical and empirical work focusing on goal and feedback effects have developed, and remain, relatively independent of one another (Taylor, 1983; Taylor et al, 1984; Tolchinsky & King, 1980). When these two conditions are systematically varied, neither feedback without standards nor standards without feedback has lasting motivational impact (Bandura & Cervone, 1983; Becker, 1978; Strang, Lawrence, & Fowler, 1978).

Within a control theory framework, self-regulation requires both personal standards and knowledge about one's performance level (Bandura & Cervone, 1986). Control theory implies that without clear standards of comparison, feedback is meaningless. That is, without goals individuals are unable to make use of feedback to modify their behavior in a way that will result in the attainment of valued outcomes. Any feedback received in the absence of standards would likely be perceived as irrelevant and, for the most part, ignored (Taylor, et al., 1984). Similarly, without feedback, individuals are unable to assess goal progress and make appropriate changes in behavior (Taylor, 1983).

Another advantage of adopting a control theory framework is that it provides explanations for important aspects of goal setting which theorists and researchers have been wrestling with for some time. Among these are: the origins of performance goals, the importance of goal commitment and the process by which goal characteristics (e.g., specificity, difficulty) affect behavior (Campion and Lord, 1982; Taylor, 1983). Similarly, control theory can account for consistent findings in feedback research. For example, the positive relationship between frequency of feedback and performance (Cook, 1968; Ivancevich, Donnelly & Lyon, 1970). This relationship is predicted by control theory as the receipt of feedback would stimulate the behavior-standard comparison process and serve to increase motivation to resolve discrepancies between the two (Taylor, 1983).

Control theory can also address other goal setting issues which, while identified as important, have been virtually unexplored (Locke et al., 1981). These include the existence and interplay of sub-goals, goal hierarchies, and task strategies. From a control theory perspective, complex behaviors can be explained by hierarchies of control loops, such as the one suggested earlier for building a bookshelf. In such hierarchies, the <u>means</u> to reduce discrepancies in higher-order control loops become the <u>standards</u> of lower-order loops (Powers, 1973). Such processes highlight a final advantage of taking a control theory perspective. Control theory allows goals to be conceptualized and investigated as <u>dynamic</u> antecedents of behavior. As pointed out by Campion and Lord (1982), the previous theoretical focus has been on static, isolated, and specific goals. Control theory is a

fluid model which can accommodate multiple, competing goals and the modification of goals over time.

While control theory, as applied to motivation, is concerned solely with personal goals, this is not a serious limitation. It has been argued that all concepts of motivation are essentially concepts of self-regulation (Carver and Scheier, 1981a). Furthermore, the effects of externally originating goals are commonly recognized to be mediated by self-set goals. That is, personal goals usually predict performance better than assigned goals (Garland, 1983; Hollenbeck & Williams, 1987; Locke, Fredrick, Buckner, & Bobko, 1984; Locke et al., 1981) This is in line with the evidence indicating that people actively regulate their responses to management attempts at control (e.g., Bandura, 1977; Bolles, 1972, Kanfer, 1971).

Summary

As evidenced above, a number of authors have recognized the potential explanatory power of control theory and have begun to expand the simple TOTE sequence into a control theory of work motivation (Campion & Lord, 1981a; Hollenbeck & Brief, in press; Lord & Hanges, 1987; Taylor et al., 1984). Unfortunately, while these authors have used control theory for explanation and prediction, there have been few empirical investigations of their predictions. Furthermore, while these authors have laid the groundwork for a control theory model of work motivation, this work has been done largely independently.

Although the control theory models discussed here differ in some respects, there are many more similarities among them than substantive disagreements. The main difference among these models is their focus, attributable largely to the different perspectives and interests of the

different theorists. Lord and colleagues focused on issues related to goal setting, Taylor and colleagues keyed on feedback aspects, Hollenbeck and colleagues were more concerned with controlled quantities as related to organizational outcomes such as absenteeism, turnover, and job performance, while Carver and Scheier were concerned with self-attention processes.

Focus aside, there are only a few substantiative differences in the hypothesized operations of the four control theory models of human behavior that have been reviewed. Furthermore, most of these differences are not exclusive, and are combined in the perspective taken here. In the few instances where positions are not reconcilable, the primary consequence of outcome expectancies, for example, arguments have been made for why one position is preferable.

CHAPTER 2: MODEL AND HYPOTHESES

The model presented in Figure 10 is an integration of the work of Carver and Scheier, Lord, Taylor, Hollenbeck, and their colleagues into a composite control theory model of work motivation. This model is described below with detailed attention given the three linkages which will be examined in the current investigation.

Goals and Feedback

In line with the extensive goal setting literature, the standards or goals of an individual (box 1 in Figure 10) are the immediate precursor of behavior (box 2). It is recognized, however, that it is not the standard but discrepancies from this standard that motivate behavior (Miller et al., 1960).

At some point during or after task performance, feedback (box 3) is provided or sought out by the individual. Feedback, as defined by Ilgen et al. (1979), is a message an individual receives from a source which contains information about him or herself. Task feedback is information about the individual's task performance which can be used to denote how well he or she is meeting various task goals. Feedback may be available continuously, intermittently, or only after task completion, depending upon its source. Feedback may originate from other individuals who are in a position to evaluate the individual's behavior, from the task environment, or from within the individual (Greller & Herold, 1975; Ilgen et al., 1979).

Feedback can also be actively sought through inquiry or monitoring to supplement that which is provided (Ashford & Cummings, 1983). Therefore, for practically all tasks, there is some knowledge of

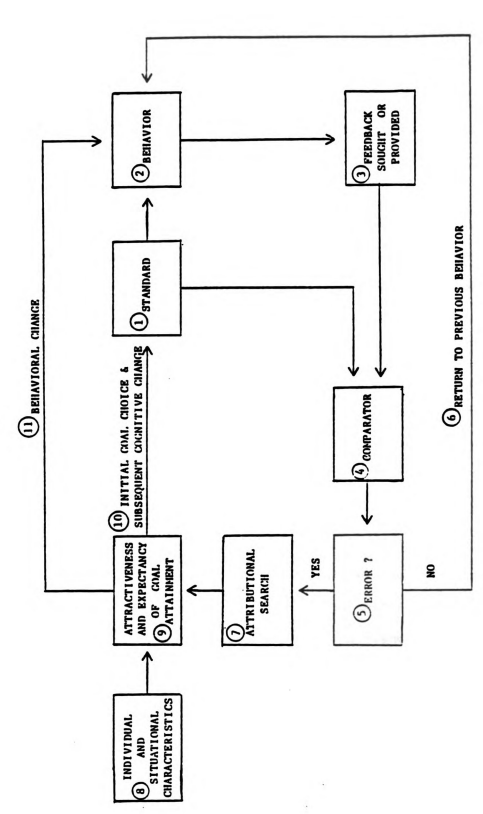


Figure 10: An integrated control theory model of work motivation.

performance available to the individual (Ammons, 1956). All feedback is not, however, treated equally. The feedback that individuals compare to their referent standard, at any given point in time, is likely to be a composite of information obtained from a variety of sources and weighted by the individual's evaluation of its accuracy (Taylor et al., 1984). Furthermore, feedback which is not perceived as accurate will likely receive little weight in individuals' overall assessment of their current status (Taylor et al., 1984).

In addition, the manner in which feedback is acquired and processed varies as to the persons awareness (Taylor et al., 1984). Regardless of its source or the manner in which it is processed (i.e., consciously or unconsciously), when feedback is obtained, it is tested against the standard through a psychological process represented by the comparator (box 4) (Carver, 1979; Miller, et al, 1960). There are three possible outcomes of this performance-standard comparison process (Carver & Scheier, 1981a); (1) the individual is "on target" towards meeting the goal, (2) the individual is "behind schedule" in meeting the goal, or (3) that the individual is "ahead of schedule" in meeting the goal.

If a person is on target, no error (box 5) is detected and the person will, in most instances, return to his or her previous behavior (box 6). According to Powers (1973), if there is nothing in the environment moving the current state away from the standard, there will be no change in the pattern of behavior. In a sense, the failure to detect an error reinforces the assumption that the strategies currently employed are appropriate and they will thus tend to be repeated. There are, however, exceptions. For example, individuals may become bored with their previous behaviors and want to try something new, or they may

anticipate that conditions have changed and thus alter their behavior in preparation for those changes. (Wood & Locke, 1986).

If an error is perceived to exist, several other cognitive processes may be initiated according to this model, if the individual consciously perceives that discrepancy (Taylor et al., 1984). This conscious versus unconscious distinction is analogous to the interrupted versus uninterrupted feedback loop distinction made by Carver and Scheier (1981a) and Hollenbeck and colleagues (Hollenbeck & Brief, in press). Two conditions which are necessary but not sufficient for the conscious perception of discrepancies are (a) salient standards or a "controlled quantity" and (b) self-focus. If the behavioral standard is not salient, or if the individual is not attending to this standard and their relation to it, feedback regarding the standard would not be sought and any feedback received would be ignored.

Role of Attributions

Having become aware of a discrepancy between behavior and standards, the individual will embark on an attributional search (box 7). Attributions, are thus viewed here as one of several factors influencing the expectancy of goal attainment, moderating the influence of past performance on expectancies of future performance (McMahan, 1973; Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum 1971). Based on this causal analysis, and other situational and individual factors (Box 8), the person forms a new expectancy regarding goal attainment which may or may not differ from their previous outcome expectancy.

The major theoretical thrust regarding attributions has been provided by Heider (1958), Jones and colleagues (e.g., Jones & Davis, 1965), and Kelley (1967, 1973). According to Heider (1958), because

people act on the basis of their beliefs, those beliefs, valid or not, must be taken into account in order to understand human behavior. In the area of organizational behavior, researchers (e.g., Mitchell & Wood, 1980; Parsons, Herold, & Leatherwood, 1985) have primarily relied on the model presented by Weiner et al. (1971). That model posits that there are four main causal elements (i.e., ability, effort, luck, and task difficulty) representing the influence of two orthogonal dimensions -- stability and locus of control.

Effects on Outcome Expectancies

It has been demonstrated that individuals do engage in spontaneous attributional search and that such searches are most likely to occur when the outcome of an event is unexpected, that is, when expectancies are disconfirmed (Berlyne, 1960; Pyszczynski & Greenberg, 1981; Wong and Weiner, 1981). Research in the attributional domain has demonstrated that causal ascriptions for past performance are important determinants of goal expectancies. Furthermore, the primary dimension of interest relating to the reevaluation of expectancies appears to be stability (Diener & Dweck, 1978; Dweck, 1975; McMahan, 1973; Meyer, 1980).

Weiner, Heckhausen, Meyer, and Cook (1972) found that following failure, the outcome expectancies of subjects who made attributions to fixed factors were significantly lower than those who did not. Following success, these effects were in the opposite direction. The attribution of an outcome to stable, fixed factors implies a high probability that another encounter with the same task will result in the same outcome. Attributions to variable, unstable factors do not carry this implication (McMahan, 1973). It appears that following a perceived

negative performance-standard discrepancy continued failure will be anticipated, if the causes of that discrepancy are perceived as stable. Ascriptions of an outcome to stable factors will thus likely produce greater shifts in expectancy -- increments following success and decrements following failure -- than do ascriptions to unstable causes.

H1a: Attributions to stable causes will lead to greater changes in outcome expectancies following the detection of performance-standard discrepancies than attributions to unstable causes -- positive shifts following success, negative following failure.

Effects on Behavioral Choice

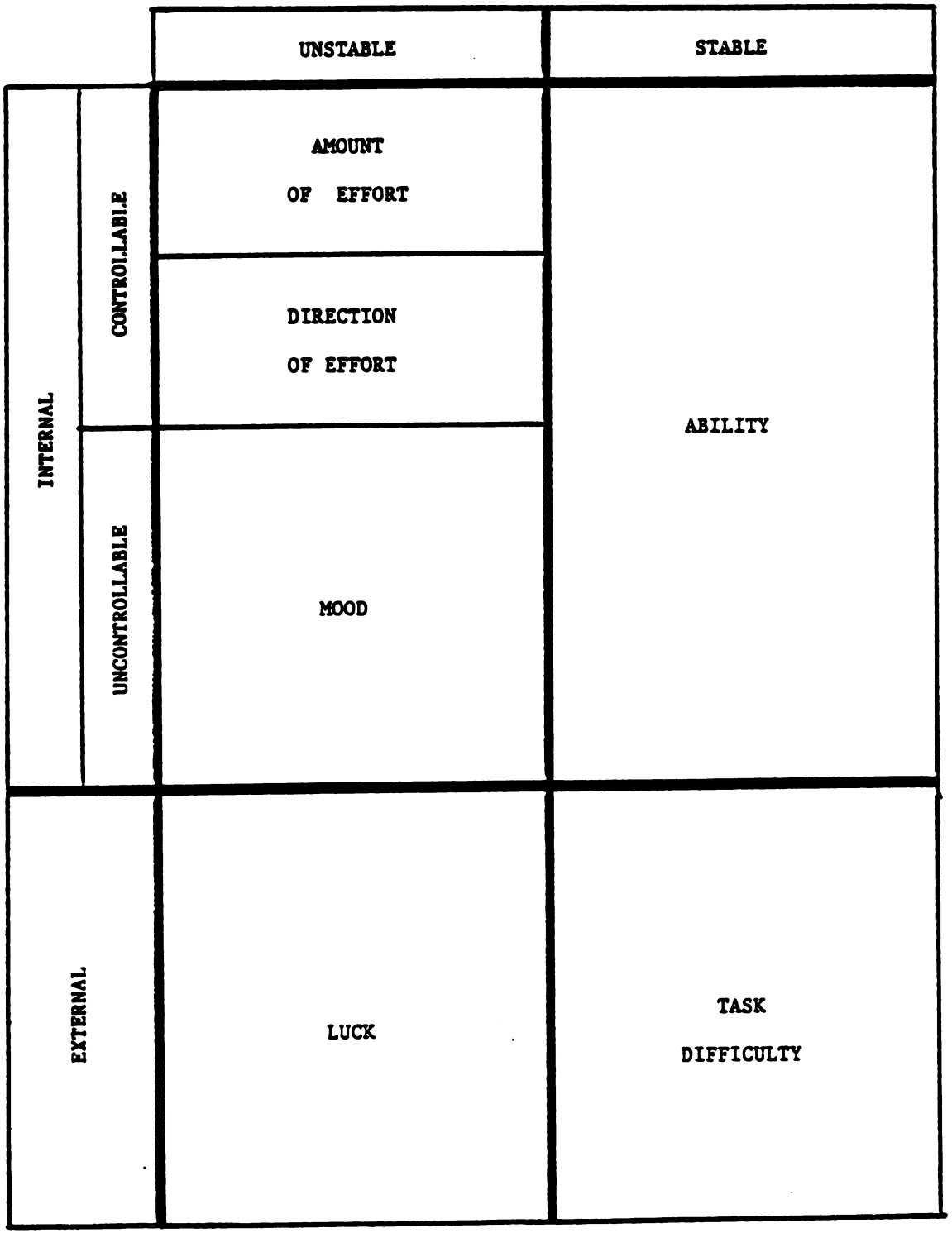
Kelley (1973) suggested that attributions have a more direct influence on behavior than has been discussed up to this point. Specifically, he stated that "causal attributions play an important role in providing the impetus to action and decisions among alternative courses of action" (p. 127). One explanation for why this contention has not received support is that attributions have not been measured specifically enough to predict specific actions. In the vast majority of studies, subjects simply indicate the degree to which four factors (i.e. luck, etc.) were responsible for their performance (Weiner, 1983).

It is conceivable that attributional searches lead to the identification of more specific causes than simply "luck." In providing these four causes of events, however, Weiner et al. (1971) did not intend to convey that those four elements comprehensively represent the possible causal perceptions (Weiner, 1979). Furthermore, open-ended studies of attributions have shown that people often explain performance using other factors (e.g., Elig & Frieze, 1979). Weiner (1983) pointed out the need to identify a complete and relevant list of causes for the specific performance situation under investigation.

Along these lines, Seligman and Darley (1977) found that feedback was most effective when it unequivocally provided information about isolatable determinants of performance. Therefore, the more explicitly those causes which the individual can act upon can be identified and grouped, the more accurate prediction should be of those actions. More recent work suggests that a third general dimension, controllability, is also important in addition to stability and locus of control (Weiner, 1979, 1983). That is, not all internal causes are within the individual's control and thus do not have the same consequences. For example, both "effort" and "not feeling well" are internal, unstable factors. Individuals can increase their effort if they so choose (i.e., it is controllable). Individuals cannot, however, be certain when they will feel better or when they will again fall ill (i.e., it is uncontrollable).

It is not clear, however, whether external or stable causes can be perceived as controllable (Weiner, 1979). A factor analysis reported by Michela, Peplau, and Weeks (1978) supports both this three dimensional view of attributions and suggested that control cannot be paired with externality. Thus, while a third dimension is added, a 2 x 2 x 2 matrix does not emerge. Only the internal-unstable cell is subdivided further into controllable and uncontrollable factors. One way in which the unstable, internal, controllable factors (e.g., effort) can be further broken down is to make a distinction between the amount of effort and the direction of that effort. An expanded classification scheme illustrating both the three dimensions discussed earlier and this further distinction is presented in Figure 11.

Figure 11: Expanded classification scheme for perceived determinants of achievement behavior.



Taylor et al. (1984) hypothesized that "changes in the direction of behavior will only occur when the individual attributes past performance to incorrect behavioral strategies" and that "if past failure is attributed to a noncontrollable factor, then changing behavior would not be seen as potentially effective" (p. 107). It is thus suggested that when individuals decide to persist following a reevaluation of outcome expectancies, the specific causal attributions made (if controllable) will influence the manner in which changes manifest themselves.

H1b: Causal Attributions to the amount (i.e. intensity) of effort expended will be positively related to subsequent changes in the amount of effort expended and causal attributions to the distribution (i.e., direction) of that effort will be positively related to subsequent changes in the distribution of effort.

The Role of Attractiveness and Expectancies

The model shown in Figure 10 further holds that the reduction of a discrepancy can be accomplished behaviorally and/or cognitively (Campion & Lord, 1982; Taylor et al., 1984). These two groups of reactions are not, however, viewed as exclusive, as any cognitive changes are likely to also have behavioral implications. Within the possible cognitive and behavioral changes is the crucial decision to persist or withdraw (Carver & Scheier, 1981a; Hollenbeck & Brief, in press). The decision to persist is viewed here to be a function of the subjective utility of goal attainment to the individual. This utility is construed to be a multiplicative function of the attractiveness (i.e. valence times instrumentality) and expectancy of attaining various goals (box 9).

Previous control theory models have stressed the role of outcome expectancies in determining whether (a) behavioral or cognitive changes take place (Taylor et al., 1984) or (b) whether the individual persists

or withdraws (Carver & Scheier, 1981a; Hollenbeck, 1986). Both Taylor et al. (1984) and Carver and Scheier (1981a), however, also suggested that the importance or value of goals also play a role. Taylor et al. (1984), for example, suggested that an individual's task persistence is determined by the presence of organizational control systems and the individual's higher-order standards, factors which would affect the attractiveness of goal attainment. Using an expectancy theory framework to predict the decision to retain a goal and not change it (i.e., remain committed to it) when confronted with a performance-standard discrepancy is, therefore, consistent with those models.

In addition, Campion & Lord (1982) specifically suggested that valences, expectancies and attributions may impact on motivation through their impact on goal commitment or goal change. Other authors have also suggested using expectancy theory for the prediction of goal commitment (e.g., Hollenbeck & Klein, 1987; Mento, Cartledge, & Locke, 1980). The model presented here holds that initial goal choice and subsequent goal commitment are a function of the attractiveness and expectancy of goal attainment. Thus, while goals may be the most direct determinants of effort and performance, expectancy theory concepts are suggested to affect the choice of a standard and whether or not an individual remains committed to that standard. The attractiveness and expectancy of goal attainment are in turn held to be influenced by a variety of individual (e.g., needs, values, higher-order goals) as well as situational factors (e.g., social influence, reward structure).

While expectancy models may not describe exactly what goes on in a persons head, the variables in the model clearly help in the prediction of behavior (Mitchell, 1982). Furthermore, while there have been many

criticisms of the manner in which expectancy theory has been operationalized and tested (e.g., Behling & Stark, 1973; Mitchell, 1974; Schmidt, 1973), the theory does fairly well when tested as a within subjects model, in a theoretically appropriate manner, and within certain boundary conditions (Mitchell, 1982).

Reactions to Perceived Discrepancies

Positive Discrepancies

Three different conceptualizations have been provided by theorists regarding reactions to positive deviations (i.e., over-shooting the target). The cybernetic hypothesis suggests that positive deviations are errors equally serious and resulting in the same reactions as negative deviations. Taylor et al. (1984) suggested that reactions to positive discrepancies would be exactly the same as perceiving no discrepancy. Carver and Scheier (1981a) and Hollenbeck (1986), on the other hand, suggested that reactions to over-shooting the standard will not be as extreme or direct as when the discrepancy is negative, but do differentiate it from being on standard. Naylor and Ilgen (1984) similarly suggest that the motivational force is different below a goal than it is at or above a goal.

If Taylor et al.'s (1984) position is correct, no significant changes would be expected in the force towards the goal, the goal level, or in behaviors following a positive discrepancy. That is, reactions would be as if no discrepancy was perceived. If this is the case, the cognitive and behavioral reactions suggested above would only take place following negative discrepancies. An alternative hypothesis is that following a positive discrepancy, as with negative discrepancies, the individual will change goals or goal commitment as well as make

accompanying behavioral changes depending upon the force towards the given standard relative to the force towards alternative standards.

This latter position suggests that given a positive discrepancy, if one feels that they can maintain that higher level of performance and if higher levels of performance are perceived as more attractive, then an upward goal change would be expected. If, however, the force towards this higher level of performance is not stronger than the current goal, than no such goal change would be expected. Under these conditions, no direct actions would likely be taken to reduce the deviation. However, through the direction of effort and attention elsewhere, the subsequent reduction of the discrepancy may be a likely outcome (Hollenbeck, 1986).

It is also possible, that in some situations, attaining a higher level of performance is less attractive than the performance level of the goal. For example, with a just in time inventory system, or where there are strong group norms regarding "rate busting", more is not better. In these situations, it is quite possible that the individual will take active steps to reduce that positive discrepancy. It is this latter position, tt reactions to both positive and negative deviations depend upon the force towards the given standard relative to the force towards alternative standards, that is adopted here.

Cognitive Reactions

As stated above, the model presented in Figure 10 suggests that discrepancy reductions can be accomplished behaviorally and/or cognitively. Cognitive reactions may take the form of changes in goal commitment or the abandonment of the goal (Campion & Lord, 1982; Taylor et al., 1984). The decision that individuals make following the

reevaluation of outcome expectancies is essentially whether to persist (i.e., remain committed) or withdraw (i.e., abandon the goal). Hollenbeck and Brief (in press) concluded that the most pressing research needed on organizational applications of control theory is the determination of which response will be initiated. Those authors also suggested goal commitment as one line of research which indirectly addresses this issue.

In general, commitment towards a goal could increase, remain the same, or decrease following the perception of a discrepancy. It is suggested here, that there are instances in which the force (i.e., the expectancy and attractiveness) towards goal attainment changes, but the force towards the current goal is still greater than the force towards alternative goals. Under these circumstances, there will be no change in the goal, but an incremental change in goal commitment.

Other things being equal, individuals are more likely to remain committed to a given goal when they have high expectancies of reaching it, and when the perceived value of goal attainment is high (Dachler & Mobley, 1973; Hollenbeck & Klein, 1987; Matsui, Okada, & Mizuguchi, 1981; Mento et al., 1980). Mento et al. (1980), for example, found that the probability of accepting an assigned goal was affected by subjective probability of success and by the valence of success. Although the probability of goal attainment may be less for difficult goals, this is often offset by their corresponding higher valence (Campbell, 1982).

H2a: The force towards a goal (attractiveness x expectancy) will be positively related to goal commitment and changes in the force towards goal attainment will be positively related to changes in goal commitment.

When the force towards a goal diminishes to a certain level, it in effect becomes inappropriate. That is, the individual is no longer

committed to the goal as it is currently stated and the goal will be abandoned. A similar position was taken by Lewin et al., (1944) who stated that while the decision for a person to continue or stop may be influenced by a great number of factors, the stopping or not stopping ultimately depends upon the force towards that goal. In other words, it is hypothesized that individuals will stop trying for a goal they no longer view as a valued and/or attainable outcome.

H2b: When the force towards a goal becomes less than the force towards an alternative goal, the individual will change the goal.

Behavioral Reactions

The degree and direction of cognitive changes determine, in part, the degree and nature of behavioral changes (box 11). For example, a change in goal commitment would most likely also be associated with a behavioral change, in the same direction. That is, if a person becomes less committed to a goal, a decrease in effort could be hypothesized. Similarly, the changing of a goal would have clear behavioral implications. Physical withdrawal is a clear example of a behavioral response possibly accompanying the abandonment of a goal. Because the absence of cognitive changes also indicates a decision to persist, behavioral reactions may occur in the absence of any cognitive changes.

There are two primary ways in which an individual can change behaviors to try and eliminate a discrepancy. Specifically, the intensity of effort can be altered (i.e., trying harder) or the direction of behavior can be changed (i.e., trying a different strategy) (Carver & Scheier, 1981a; Lord & Hanges, 1987; Taylor et al., 1984). Furthermore, changes in effort and strategy are independent of one

another and may occur in conjunction. That is, a change in effort may or may not accompany a change in strategy. As discussed earlier, the choice to alter intensity or direction of one's behavior is hypothesized to depend upon the causal attributions made for past performance (H2b).

Affective reactions, in this model, are held to depend primarily upon the direction and magnitude of deviations from aspirations or goals. Feedback indicating that one is at or beyond the standard will yield positive emotions, while perceiving one is below standard results in negative affect (Hamner & Harnett, 1974; Ilgen & Hamstra, 1972; Locke, 1967; Locke et al., 1970; Taylor et al., 1984). Outcome expectancies and attributions are also viewed as playing a role in determining the magnitude of the resulting emotions (Carver & Scheier, 1981a; Weiner et al., 1971).

Role of Goal Hierarchies

As noted earlier, any complex activity requires a great many subsidiary functions. The standard shown in Figure 10 is therefore acknowledged to be a behavioral goal at a given level within a tightly organized hierarchy of goals (Carver & Scheier, 1981a; Powers, 1973; Simon, 1967). That is, the attainment of this particular goal is a part of the actions being taken by the individual in the pursuit of achieving a higher-order standard (Powers, 1973). Powers' (1973) conception of a hierarchy of control is thus adopted here to explain the role of multiple goals, sub-goals, and task strategies.

It has been suggested that the behaving person's attention is directed largely to the program level during most behavioral self-regulation, as it is at this level that behavioral sequences are initiated (Carver & Scheier, 1981a; Hollenbeck, 1986; Powers, 1973). At

the sequence level, most behaviors are scripts or habits -- predetermined, sequences of actions, the demands of which are typically well specified, which proceed with little cognitive processing required for their enactment (Carver & Scheier, 1981a; Hollenbeck, 1986; Shank & Abelson, 1977). In contrast to sequences, program level regulation, because of the decision points that it embodies, often requires monitoring (Carver & Scheier, 1981a). Therefore, the emphasis here is primarily on the program level (level 7).

Methods for attaining goals almost always involve chains of instrumental goals (Schank & Abelson, 1977). That is, in order to achieve any given program-level standard, numerous sub-program goals may need to be established. Programs can be hierarchical in nature, with each sub-goal being pursued sequentially as attention shifts from one control loop to another (Lord & Hanges, 1987; Powers, 1973). Control theory suggests that the reference being used does not exist at the level being considered, but instead is provided by higher order systems (Hollenbeck, 1986; Powers, 1973). Locke et al., (1970) suggested that when individuals have end goals on tasks, they will set sub-goals according to their perceived instrumentality in achieving the end-goal.

H3a: The force towards an end-goal will be positively related to the force towards a sub-goal, through its influence on the attractiveness of the sub-goal's attainment.

Sub-programs and the sub-goals associated with them are essentially what are often referred to as task strategies. Task strategies are action plans for the attainment of goals (Locke et al., 1981). Within those action plans are sub-goals, and individuals have strategies for attaining those sub-goals. The strategies for the attainment of those

sub-goals in turn have embedded within them sub-sub-goals, and so on. Thus the recent emphasis on the role of task strategy development in goal setting research (e.g., Campbell, 1986; Earley, Hanson, & Lee, 1986; Huber, 1985; Wood & Locke, 1986) can be viewed as investigations into the operation of the program level of control.

These sub-goals can be hypothesized to be the most flexible in responding to perceived discrepancies as, within the hierarchy of control, it is the lowest-level systems that have the fastest response (Powers, 1973). Campion and Lord (1982), for example, found that following failure, increasing exam goals (a sub-program goal) and increasing effort (a sub-sub-program goal) were common responses while lowering course grades (the program-level standard) occurred only after repeated failure.

H3b: Higher level goals are more resistant to change than are lower level goals such that following the perception of a discrepancy, lower level goals will be altered first. Changes will progress up the goal hierarchy only after changes in lower level goals prove inadequate in redressing the discrepancy.

Furthermore given this hierarchical structure, when a goal progress is impeded or when a goal is changed, a readjustment or redefinition of the other goals in that hierarchy is required. Again using an example from Carver & Lord (1982), if progress is not being made towards a program level standard, sub-program goals may be increased, in the hopes of catching up and eventually reaching the higher-order goal.

H3c: Any change in a goal will result in accompanying changes in lower and/or same level goals to maintain equilibrium.

CHAPTER 3: METHOD

Subjects

Subjects were undergraduate students enrolled in an introductory human resource management (HRM) course. In return for their participation, they received extra credit. To guard against attrition, those subjects completing the entire project were also eligible for a lottery drawing for monetary awards.

In line with Cohen's (1969) recommendations, an analysis was conducted to determine the sample size needed for the desired power for the statistics employed. The analyses requiring the greatest statistical power are those aimed at detecting interactions using moderated regression. In these analyses, the statistic of interest is the one-tailed t-test of the beta weight in the regression equation representing the interaction term.

Assuming that the effect size associated with this interaction explained an increment of at least five percent of the variance in a complete regression equation explaining moderate amounts of variance (i.e., 0.30), 120 subjects would provide a power of 0.80 at the 0.05 level. Estimating an attrition rate of thirty percent, a minimum of 170 subjects were required to attain the desired statistical power. Because of the number of tests for statistical significance to be performed, attempts were made to recruit most of the students enrolled in the course in order to protect the experimentwise error rate.

Of the 397 students enrolled in the course, 387 (97%) filled out at least one of the questionnaires. Forty-three subjects, however, filled out less than one third of the materials. Five of these had dropped the course. The remaining 38 either chose to stop filling out the materials

or had very poor class attendance. Because these individuals participated so infrequently, their responses were unusable in the analyses, and they were removed from the sample. The 344 subjects who did complete at least one third of the materials represents a response rate of 87%. Of these, 252 (65% of the students enrolled in the HRM class) provided complete data sets. Because the responses of subjects completing between 33% and 99% of the materials were usable for many of the analyses, these 92 individuals were retained in the sample.

To assess the representativeness of the sample used in the analyses, comparisons were made between the subjects eliminated and the remaining 344 with regards to grade point average (GPA) for the quarter and grade in the HRM course. On average, subjects dropped from the study obtained a significantly lower quarter GPA (2.16 vs 2.88, $t=6.29$, $df=48$, $p<.01$). The difference in mean HRM grade was even larger (1.76 vs 2.92, $t=7.37$, $p<.01$). Since those subjects completing fewer than one third of the materials were significantly different with regards to their quarter GPA and their grade in the HRM course, it appears that subject attrition was not random with regards to scholastic performance.

Task

The model and hypotheses were tested in an academic setting. The task was course work performed by students longitudinally over the length of the term. Interestingly, Carver & Scheier (1981a), in presenting their interrupted feedback loop, used the example of a student whose standard is a course grade. A scholastic example was also used by Hollenbeck (1986) in delineating reactions to over-shooting one's standard. In addition, this was the setting used by Campion and

Lord (1982). An academic setting provides a unique blend of internal and external validity, as it provides much more control than the typical field study, and yet has much more realism then a laboratory study.

Previous researchers (e.g., Campion & Lord, 1982; Locke & Bryan, 1968) have pointed out many advantages of using the classroom situation for motivational research: (1) The tasks are familiar to the subjects allowing for the setting of meaningful goals. (2) Successful performance is personally important for most students and goals are already often set and maintained by them. (3) The tasks involved are complex, requiring ability, effort, and appropriate strategies for successful performance. (4) Students have to allocate resources not only to scholastic goals, but to competing role demands of employment, family, or social activities. (5) Performance can be measured clearly and objectively and is comparable across individuals. In addition, the learning and performance of students is relatively independent of that of other students. (6) Students receive very clear and usually timely performance feedback on an individual level as well as normative data on the rest of the class. (7) Because tests covering specified material are often given at repeated intervals throughout the course, there are discrete cycles of performance. (8) Finally, using academic performance yields very clear goal hierarchies. Test goals may be derived from course goals which may be derived from goals for an overall GPA which may be derived from career objectives, etc.

Procedure

Pilot Study

Undergraduate students from the same HRM course the previous quarter served as subjects in the pilot study. Ninety subjects were

used in scale development. An independent sample of 100 students was then used to assess the reliability of the new and modified measures. Two weeks prior to the taking of their midterm exam, these 100 subjects were asked to set a goal for their score on that exam. They then completed the various measures prior to the midterm and after receiving feedback on the exam. These measures were then examined for dimensionality and sufficient reliability and variance.

Present Study

Data were collected longitudinally over the ten weeks of the term, referred to here as T1 to T10. This study focuses primarily on the subjects' grade goals for the HRM course and how that goal, and the variables hypothesized to relate to it (i.e., attributions, expectancies) change over the term as feedback on subgoals is received. The measurement of these variables is discussed in detail in the next section, the timing and administration of these measures is outlined below. The primary requirements or performance events for the HRM course included a midterm exam, two quizzes, a paper, and a final exam. Given that these occurred at T5, T3, T8, T6, and T10 respectively, variables were measured at the times indicated below.

Quarter GPA and course grade goals were assessed at T1, T4, T6, and T9 -- when 0%, 10%, 45%, and 66% of the subjects' grades had been determined and fed back to them. Expectancy and attractiveness ratings were obtained prior to the setting of quarter GPA and HRM grade goals each time they were measured. HRM performance event goals were measured at T1 and then again each time the HRM grade goal was reassessed (i.e., T4, T6, and T9). Attributions for past performance were assessed

following the receipt of feedback on each of the two quizzes and the midterm exam (i.e., T4, T5, T8).

The above measures were obtained via questionnaires administered during recitation sections of the HRM course. Scholastic activity inventories and diaries were distributed weekly in the recitation sections and then collected in lecture a week later. Steps were taken to ensure the confidentiality of subjects responses, and it was stressed that none of their answers would be seen by their instructors and hence could not in any way affect their grades. Performance information was compiled immediately following the end of the term. Performance discrepancies were also calculated at that time. Figure 12 summarizes via a time line the assessment of these variables.

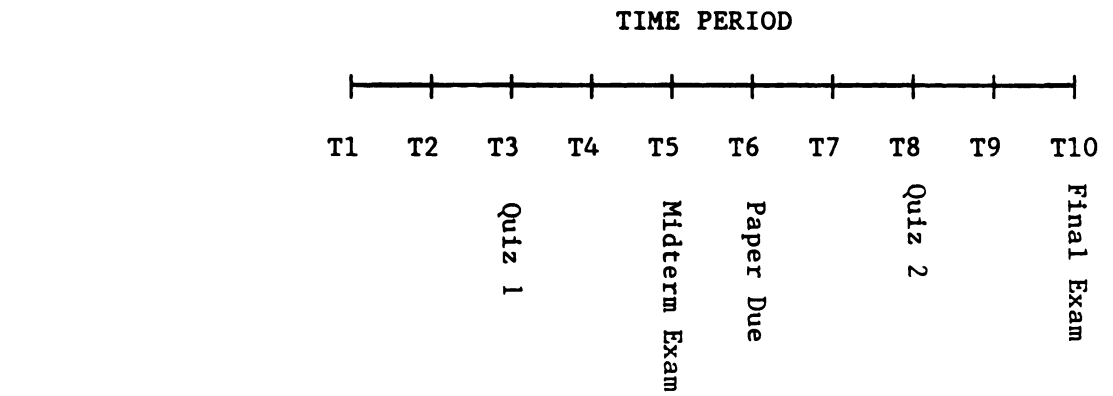
Analysis

Given the exploratory nature of this experiment, no overall test of the model (e.g., a path analysis) was attempted. Rather, each of the specified hypotheses, was tested individually. In doing so, a series of planned comparisons, correlations, partial correlations, and moderated regressions was employed.

Analytical Issues

There are two analytical issues which need to be addressed. The first of these concerns the Type I error rate as a large number of significance tests were performed. Even though there are only seven hypotheses, each one is tested multiple times. While such built in replications strengthen the conclusions which can be made from the data, they also increase the chances of drawing spuriously positive conclusions. Employing a 0.05 level of significance, by definition

Figure 12. Data collection time line.



VARIABLE	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
GOALS	X			X		X			X	
SCHOLASTIC ACTIVITIES		X	X	X	X	X	X	X	X	
ATTRACTIVENESS & EXPECTANCIES	X			X		X			X	
GOAL COMMITMENT	X			X		X			X	
CAUSAL ATTRIBUTIONS				X	X				X	
PERFORMANCE DATA										X
PERFORMANCE-STANDARD DISCREPANCIES										X

suggests that five percent of significant findings could be due to chance alone. It is therefore recognized a priori that if limited support is obtained, it would be erroneous to highlight and interpret those significant results as supportive of the hypotheses.

The second issue revolves around the use of change scores and the problems associated with such scores. One concern is the reliability of change scores. The reliability of change scores may be low despite high reliability for the initial and final scores (Cohen & Cohen, 1983). As a result, correlations will be attenuated, sometimes so much so as to make it difficult to obtain statistical significance. This is compounded when changes in one variable are being correlated with changes in another variable. Rogosa, Brant, and Zimowski (1982), however, point out that this reliability decreases as measurement error increases and that the reliability increases as differences in true change increase. Therefore, when true change among individuals is small, the difference score will have low reliability regardless of the precision with which the variable is measured. Conversely, when "nonnegligible individual differences in change are present, the reliability of the difference score is respectable" (p.735).

While low reliability is a frequent characteristic of change scores, this is not the fundamental problem with them according to Cohen and Cohen (1983). Cohen and Cohen are more concerned with the fact that the difference score contains not only change variance, but variance due to the initial level on the premeasure. To resolve this problem, Cohen and Cohen suggest using regressed change scores, that is partialing out the pre-measure from the post-measure. Rogosa et al. (1982), however, demonstrated that regressed change scores are biased estimators of true

change while difference scores are unbiased estimates regardless of the magnitude of measurement error. Furthermore, the effects of the premeasure are only a critical problem when the change scores are correlated with the initial or final score. In the current analysis, none of the change scores assessed are examined in relation with the initial or final score. Therefore, the problems of part-whole correlations are not an issue and it is not necessary to employ regressed change scores.

The possibility still exists, however, that correlations involving change scores may fail to reach significance. Given this scenario, an alternative explanation for the failure to support the hypotheses is the unreliability of the change score rather than the absence of a true relationship. Unfortunately, the reliabilities of most of the change scores in this study (i.e., changes in expectancies, goals and goal-performance discrepancies) cannot be assessed. This precludes correction for attenuation due to unreliability for relationships with these change scores. To address this problem, all hypotheses involving change scores will be assessed in two ways. In addition to the correlational or regression analysis, planned comparisons will be made between the mean levels of the variables of interest at successive time periods. If the means are significantly different in the hypothesized directions, but the correlational analyses indicate nonsignificant relationships, then there would be evidence for the possibility that nonsignificant findings in the correlational analyses were due to attenuation because of unreliability.

Variables

Goals

The items that make up all of the measures are provided in the Appendices. The items employed in assessing goals are in Appendix A. Subjects were asked to set goals at three different levels of academic performance. The highest level goal was the GPA that subjects' hoped to obtain for that term. Subjects selected their GPA goal from a continuum of grades ranging from 2.0 to 4.0 in 0.25 increments. In Powers' (1973) hierarchy, a GPA goal would be a program level goal.

The other two levels of goals were essentially sub-goals within that program. Second-level, sub-goals were the specific grades the subjects wanted to achieve in each of the classes that they were enrolled in that term. Subjects recorded the name of each of their courses and then for each, selected a grade goal from a continuum ranging from 1.0 to 4.0 in 0.5 increments.

Finally, subjects were asked to set further sub-goals -- goals for each of the performance events (i.e., tests) that contributed to their grade in one particular class, the HRM course from which they were recruited. The goals for these performance events were recorded in terms of the scores subjects realistically hoped to attain. This goal hierarchy is illustrated in Figure 13. All goals were self-set and self-reported.

The means and standard deviations for all of the goals set at the different time periods are presented in Table 1. The intercorrelations among goals at different levels and across time are also provided in that table. The average correlation between the same goal at successive measurement periods (e.g., T1 and T4) was 0.77 for the GPA goal (range:

Figure 13: The hierarchy of goals examined in the current investigation.

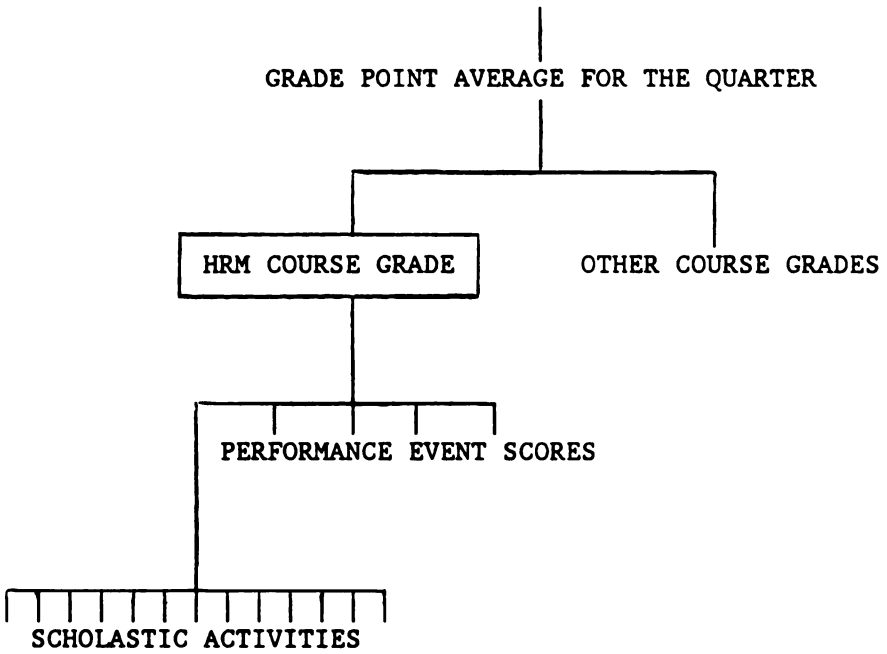


Table 1: Means, standard deviations, and intercorrelations among goals measured across levels and times.

VARIABLE	MEAN	SD	1	2	3	4	5	6	7
TIME 1									
1. GPA[1] GOAL	3.31	0.31							
2. HRM[2] GOAL	3.40	0.42	.72[3]						
3. QUIZ 1 GOAL	26.54	2.18	.37	.45					
4. MIDTERM GOAL	86.74	5.54	.49	.65	.39				
5. PAPER GOAL	36.04	3.29	.11	.25	.30	.21			
6. QUIZ 2 GOAL	26.68	2.10	.36	.40	.78	.36	.32		
7. FINAL GOAL	86.42	5.68	.52	.63	.32	.83	.19	.33	
TIME 4									
8. GPA GOAL	3.26	0.32	.81	.68	.35	.52	.21	.32	.54
9. HRM GOAL	3.32	0.44	.61	.74	.37	.53	.17	.32	.49
10. MIDTERM GOAL	85.03	5.90	.48	.55	.31	.50	.22	.29	.47
11. PAPER GOAL	35.89	2.93	.10	.20	.25	.17	.52	.20	.19
12. QUIZ 2 GOAL	26.78	2.11	.39	.39	.47	.35	.14	.42	.32
13. FINAL GOAL	86.07	5.43	.50	.57	.29	.57	.19	.20	.57
TIME 6									
14. GPA GOAL	3.22	0.36	.78	.68	.31	.49	.14	.25	.49
15. HRM GOAL	3.27	0.48	.60	.63	.27	.44	.09	.23	.40
16. QUIZ 2 GOAL	26.93	2.08	.34	.39	.49	.28	.30	.44	.26
17. FINAL GOAL	85.91	6.17	.52	.57	.36	.48	.25	.36	.47
TIME 9									
18. GPA GOAL	3.16	0.38	.64	.54	.20	.40	.12	.16	.44
19. HRM GOAL	3.20	0.58	.56	.58	.24	.43	.08	.20	.46
20. FINAL GOAL	85.46	5.93	.51	.57	.26	.46	.24	.30	.59

[1]GPA - Quarter Grade Point Average,
[2]HRM - Human Resource Management course grade
[3]$p < .001$ for correlations greater than 0.17, $p < .05$ for correlations greater than 0.09, n ranges from 305 to 339

Table 1 (Cont'd)

VARIABLE	8	9	10	11	12	13	14	15	16	17	18	19
TIME 1												
1. GPA GOAL												
2. HRM GOAL												
3. QUIZ 1 GOAL												
4. MIDTERM GOAL												
5. PAPER GOAL												
6. QUIZ 2 GOAL												
7. FINAL GOAL												
TIME 4												
8. GPA GOAL												
9. HRM GOAL	.71											
10. MIDTERM GOAL	.56	.64										
11. PAPER GOAL	.22	.23	.22									
12. QUIZ 2 GOAL	.46	.48	.42	.38								
13. FINAL GOAL	.56	.63	.68	.25	.43							
TIME 6												
14. GPA GOAL	.86	.66	.51	.15	.42	.49						
15. HRM GOAL	.63	.73	.55	.14	.45	.53	.70					
16. QUIZ 2 GOAL	.38	.40	.40	.30	.55	.37	.34	.33				
17. FINAL GOAL	.54	.53	.57	.25	.37	.57	.50	.57	.51			
TIME 9												
18. GPA GOAL	.78	.63	.47	.14	.38	.49	.85	.67	.27	.47		
19. HRM GOAL	.61	.70	.51	.10	.41	.54	.68	.80	.31	.51	.77	
20. FINAL GOAL	.55	.60	.59	.15	.35	.59	.53	.52	.37	.58	.51	.59

0.66 to 0.85). This average correlation was 0.75 for the HRM grade goal (range: 0.71 to 0.80), but only 0.49 for the performance event goals (range: 0.30 to 0.58).

As for the correlations between goals at different levels assessed at the same time, the average correlation between GPA and HRM grade goals was 0.73 (range: 0.70 to 0.77). The average correlation between HRM and performance event goals was 0.49 (range: 0.23 to 0.65). Interestingly, these relationships were much stronger for the exams, which contributed more to the HRM grade ($\bar{r}$ = 0.62, range: 0.56 to 0.65) than for the other performance events ($\bar{r}$ = 0.36, range: 0.23 to 0.48). The average correlations between the performance event goals and the GPA goal are smaller than those with the HRM goal, but reveal the same pattern. The overall average correlation was 0.42 (range: 0.11 to 0.56) with the exams again yielding higher relationships than the other performance events ($\bar{r}$ = 0.52, range: 0.49 to 0.56 vs. $\bar{r}$ = 0.31, range: 0.11 to 0.46). The average correlations between performance event goals set at the same time was 0.40 (range: 0.22 to 0.83). However, these intercorrelations were much higher among similar events (e.g., the two quizzes) ($\bar{r}$ = 0.76, range: 0.68 to 0.83) than dissimilar ones ($\bar{r}$ = 0.32, range: 0.22 to 0.51). The means and standard deviations for HRM and GPA goal change, from one measurement to the next, are presented in Table 2. On average, subjects lowered their HRM and GPA goals by 0.05 each time these goals were reassessed.

Scholastic Activities

To assess the manner in which subjects tried to attain their performance goals, students' self-reported scholastic activities were recorded. These activities are essentially task strategies -- even

Table 2: Means and standard deviations for HRM and GPA goal changes.

VARIABLE	HRM GOAL MEAN	HRM GOAL SD	GPA GOAL MEAN	GPA GOAL SD
CHANGE IN GOAL T1-4	-0.06[1]	0.32	-0.06	0.19
CHANGE IN GOAL T4-6	-0.06	0.33	-0.04	0.17
CHANGE IN GOAL T6-9	-0.03	0.30	-0.05	0.18
CHANGE IN GOAL T1-9	-0.17	0.46	-0.15	0.28

[1]n ranges from 233 to 266.

lower sub-goals for attaining a certain GPA (see Figure 13). In measuring scholastic activities, both the amount and the direction or distribution of effort in the HRM course was assessed. The amount dimension was measured in terms of time spent, to the nearest half-hour, on all aspects of the course. To assess the number of hours expended on the course, a grid provided by Entwistle and Entwistle (1970) was adopted to help students more accurately keep track of and recall this information. This grid, shown in Appendix B, asks subjects to record their hours on a daily basis and to distribute those hours by the part of the day.

Since these diaries were collected on a weekly basis, it is conceivable that subjects may have been filled out on a weekly rather than daily basis as intended. To determine the accuracy of these self-reports, a sub-sample in a pilot study was asked to report the previous day's studying time. These responses were compared to the responses for that day for the full sample and were not significantly different. A similar check was performed in the present study.

A random subsample of 60 subjects was asked, in one of their questionnaires, about the previous day's activities. These responses were compared to those of the full sample (n = 337) in the diaries (turned in five days later). Members of the subsample reported spending 0 hours on the HRM course in the morning, 0.13 hours in the afternoon, and 0.49 hours in the evening for a total of 0.62 hours for that day. These values are almost identical to those reported by the full sample in the diaries; 0.03 hours in the morning, 0.16 hours in the afternoon, and 0.49 hours in the evening, for a total of 0.68 hours ($t = 1.23$, 0.39, 0.01, and 0.40 respectively, $df = 85$, all n.s.).

These diaries were only aimed at assessing the amount of time people put into the class, not how they spent that time. How that time was spent and changes in how that time was spent was assessed by a second measure, an inventory of scholastic activities. While both of these activity measures were assessed weekly, when used in the analyses, they were taken over two week periods to yield more stable indices of students' scholastic activities between performance events. In responding to the activity inventory, provided in Appendix C, subjects indicated the degree to which several behavioral statements were true of their activities relating to the HRM course over the past week using a five point Likert scale.

The items that make up this instrument were derived, in part, from other measures of study methods and habits (Biggs, 1970; Entwistle & Entwistle, 1970; Eurich, 1930). Unfortunately, none of those scales were acceptable for the aims of this investigation. These previously used measures either (a) assessed stable studying habits rather than variable behaviors, (b) did not assess course specific behaviors, (c) had items which were not relevant for this setting and course, and/or (d) failed to demonstrate adequate psychometric properties.

Twenty items were originally written and/or selected to tap three general aspects of studying behavior. These general strategies related to in-class activities, reading assignments, and studying activities. In the pilot study, four dimensions were evident when these items were factor analyzed. The fourth facet was obtained as those in-class items relating to lecture loaded separately from those relating to the recitation meetings. In the pilot study, these scales yielded alpha reliability estimates of 0.64, 0.67, 0.64, and 0.66 for lecture,

recitation, reading, and studying respectively. Based on these results, several items were rewritten and three additional items added to try and improve upon the reliabilities.

In the present study, when the revised instrument was factor analyzed, three dimensions were consistently obtained. The recitation and lecture activities continued to load separately, but the studying and reading items came out as a single factor. In addition, there were several items that consistently loaded on a fourth, uninterpretable factor which explained trivial amounts of variance. An examination of the scale inter-item correlations also suggested the removal of these items as they correlated extremely low with the other items in the scale. Items removed from scales are indicated in Appendices. Based on these analyses the scholastic activity inventory was treated as three scales in the analyses, with the study and reading items combined. The alpha reliability coefficients of these scales are provided in Table 3. On average, the alphas for these scales were 0.81 for studying (range: 0.75 to 0.84), 0.85 for lecture (range: 0.80 to 0.88), and 0.80 for recitation (range: 0.75 to 0.83).

Table 3 also contains the means, standard deviations, and intercorrelations among the three activity inventory scales and the other dimension of scholastic activities -- hours spent on the HRM course. The average intercorrelation among these four indices assessed at the same time is 0.32 (range: 0.15 to 0.55), with lecture and recitation; and studying and hours consistently correlating the highest. When these correlations are corrected for attenuation due to unreliability (where possible), this average correlation becomes 0.36. The average correlation between the same scale at successive time

Table 3: Means, standard deviations, reliabilities and intercorrelations among measures of scholastic activities.

VARIABLE	MEAN	SD	1	2	3	4	5	6
WEEKS 1 AND 2								
1. STUDYING	3.17	0.60	(.75)[1]					
2. LECTURE	4.41	0.56	.21[2]	(.80)				
3. RECITATION	4.06	0.55	.26	.50	(.75)			
4. HOURS	16.52	5.55	.55	.21	.23	--		
WEEKS 3 AND 4								
5. STUDYING	3.34	0.64	.76	.23	.32	.47	(.81)	
6. LECTURE	4.33	0.58	.16	.44	.38	.21	.25	(.83)
7. RECITATION	3.68	0.57	.20	.30	.59	.31	.32	.48
8. HOURS	22.63	7.98	.38	.07	.16	.62	.49	.15
WEEKS 5 AND 6								
9. STUDYING	2.91	0.68	.65	.22	.19	.41	.70	.21
10. LECTURE	4.27	0.71	.15	.38	.30	.13	.14	.50
11. RECITATION	3.84	0.73	.20	.31	.44	.16	.20	.35
12. HOURS	16.14	6.39	.42	.17	.11	.63	.47	.22
WEEKS 7 AND 8								
13. STUDYING	3.51	0.64	.65	.29	.26	.38	.72	.16
14. LECTURE	4.36	0.65	.22	.41	.32	.24	.26	.38
15. RECITATION	4.07	0.60	.25	.35	.53	.15	.28	.27
16. HOURS	25.97	9.34	.39	.19	.18	.51	.48	.19

[1]Alpha reliability coefficients in parentheses.
[2]$p < .001$ for correlations greater than 0.17, $p < .05$ for correlations greater than 0.09, n ranges from 281 to 330.

Table 3 (Cont'd)

VARIABLE	7	8	9	10	11	12	13	14	15	16
WEEKS 1 AND 2										
1. STUDYING										
2. LECTURE										
3. RECITATION										
4. HOURS										
WEEKS 3 AND 4										
5. STUDYING										
6. LECTURE										
7. RECITATION	(.77)									
8. HOURS	.30	--								
WEEKS 5 AND 6										
9. STUDYING	.24	.34	(.84)							
10. LECTURE	.33	.10	.16	(.88)						
11. RECITATION	.54	.14	.30	.46	(.83)					
12. HOURS	.24	.60	.45	.16	.20	--				
WEEKS 7 AND 8										
13. STUDYING	.22	.35	.69	.15	.19	.45	(.81)			
14. LECTURE	.31	.22	.34	.49	.34	.32	.34	(.87)		
15. RECITATION	.58	.12	.33	.39	.63	.23	.32	.45	(.80)	
16. HOURS	.21	.65	.33	.13	.10	.67	.43	.33	.23	--

periods is 0.60 (range: 0.44 to 0.76), 0.71 when corrected for unreliability.

The means and standard deviations for changes in each of the four scholastic activity dimensions are provided in Table 4, for each of the time comparisons examined in the analyses. The rationale for these comparisons is provided in a later section. On average, hours increased 0.5, studying increased 0.01, lecture decreased 0.09, and recitation decreased 0.05 from one two week period to the next. Also included in Table 4 are the reliability estimates for the three distribution of effort change scores. These reliabilities, averaged across the different time comparisons, are 0.27 for studying, 0.72 for lecture, and 0.49 for recitation. As suggested in discussing analytical issues, the reliabilities of some of these change scores are low due to the small amounts of variance in behavior change.

As with the self-reported time spent, the accuracy of subjects self-reported activities is an issue. To assess the validity of this instrument, three items which lended themselves to unobtrusive confirmation were verified. Attendance in recitation, attendance in lecture, and participation in class discussion were each observed once during different weeks of the term and compared against the subjects self-reports. The recitation attendance check was based upon whether subjects filled out the questionnaire (distributed in recitation) for that week. The mean for this check was not significantly different from the inventory item mean (4.30 vs. 4.41, t=1.07, df=633, n.s.) and the correlation between these two estimates was 0.62.

The lecture attendance check was based on whether or not subjects handed in the prior weeks' diary. This attendance check was

Table 4: Means, standard deviations and reliabilities for changes in scholastic activities.

VARIABLE	MEAN	SD	RELIABILITY
WEEKS 1 & 2 TO WEEKS 3 & 4			
CHANGE IN HOURS	7.25[1]	6.21	--
CHANGE IN STUDYING	0.16	0.44	0.08
CHANGE IN LECTURE	-0.06	0.59	0.66
CHANGE IN RECITATION	-0.39	0.51	0.42
WEEKS 3 & 4 TO WEEKS 6 & 7			
CHANGE IN HOURS	-7.51	6.66	--
CHANGE IN STUDYING	-0.23	0.52	0.38
CHANGE IN LECTURE	-0.09	0.64	0.72
CHANGE IN RECITATION	0.31	0.54	0.50
WEEKS 1 & 2 TO WEEKS 6 & 7			
CHANGE IN HOURS	-0.29	5.18	--
CHANGE IN STUDYING	-0.06	0.55	0.30
CHANGE IN LECTURE	-0.15	0.69	0.74
CHANGE IN RECITATION	-0.10	0.62	0.57
WEEKS 3 & 4 TO WEEKS 7 & 8			
CHANGE IN HOURS	2.60	7.18	--
CHANGE IN STUDYING	0.18	0.48	0.32
CHANGE IN LECTURE	-0.07	0.69	0.76
CHANGE IN RECITATION	0.38	0.53	0.48

[1] n ranges from 262 to 312.

significantly lower than the attendance level reported in the inventory (4.11 vs. 4.55, t=4.021, df=421, $p<.01$) and the correlation between these two assessments was 0.39. To assess participation in recitation, the instructors rated each subject on the item of interest. The mean provided by the instructors was significantly higher than that provided by the subjects on their inventories (3.48 vs 3.21, t=2.12, df=458, $p<.05$) and the correlation between these values was again low (0.39).

While these comparisons seem to suggest that the subjects' self-reports were not very accurate, it should be recognized that the checks may have themselves contained inaccuracies. With lecture attendance, for example, some subjects could have been in attendance and forgotten to bring their diaries while others may have been absent but had another student hand in their diary. Similarly, subjects may have come in late to recitation and missed the questionnaire. As for recitation participation, the instructors may not have interpreted the item the same way as the subjects (i.e., what an instructor perceives to be a high level of participation may be different from the perceptions of the average student). In addition, several of the instructors expressed concern that they did not know their students well enough to have a great deal of confidence in their ratings.

It should also be noted that it is within subject changes in scholastic activities over time that is of interest here. Therefore, even if some subjects are overestimating their attendance or other behaviors, this is not a problem as long as those response biases are constant. Thus, while all concerns regarding the validity of the self-reports cannot be eliminated, there is some evidence to discount the low correspondence with the "objective" measures. As an additional check on

the accuracy of the subject's self reports, their self-reported scores on the HRM course performance events were compared with their actual scores (provided by the instructors). There were no significant differences between the means reported and the actual scores. In addition, the correlations between these values were 0.91, 0.96, 0.90 and 0.90 for the two quizzes, the midterm, and the paper respectfully.

Attractiveness, Expectancy and Force Toward Goal Attainment

The choice model for determining motivational force scores was employed. With the choice model, subjects report the expectancy and attractiveness for several goal levels (Kennedy, Fossum, & White, 1983). The choice model was chosen because: (a) it is theoretically consistent with Vroom's (1964) writings, (b) a subject's score for one difficulty level has meaning only relative to that same person's scores at other levels, and (c) it provides the most information (Kennedy et al., 1983).

Subjects rated their perceived probability of attaining several possible goal difficulty levels. While expectancies have been assessed in different ways, Vroom (1964) conceptualized this variable as a probability. Furthermore, in the vast majority of instances, it has been measured as a subjective probability (Ilgen, Nebeker, & Pritchard, 1981). As shown in Appendix D, these goals ranged from 1.0 to 4.0 in 0.5 increments for both overall quarter GPA and HRM grade goals.

These increments were chosen based upon research indicating that beyond a point, increasing the number of outcomes decreases the accuracy of prediction (Leon, 1979). Mitchell (1974) suggested that a moderate number (5 to 8) would be most predictive. Landy and Becker (1987) drew upon Miller's (1956) seven plus or minus two research on

information processing to suggest a similar range. For each of these possible outcomes, subjects reported the probability (from 0 to 100) that they could attain at least that goal.

Subjects also rated the attractiveness of attaining those same outcomes using a seven point Likert scale ranging from -3 to 3. This is again consistent with Vroom who held that valence should range from positive to negative. To determine the motivational force score for each goal outcome, the expectancy of each was multiplied by its corresponding attractiveness rating. The outcome level with the highest computed motivational force score for each individual was taken as the predicted goal. The reported probability and the rated attractiveness of the goal level chosen by the subject were taken as the expectancy and attractiveness of the subjects' goals. The means and standard deviations for outcome expectancies for chosen HRM and GPA goals at each of the time periods assessed and changes in those expectancies from one time period to the next are provided in Table 5. The means and standard deviations for the force towards chosen HRM and GPA goals and changes in force are presented in Table 6.

Goal Commitment

Goal Commitment was assessed using a self-report measure based on the scale provided by Hollenbeck, Williams and Klein (1986). In that investigation, an alpha reliability coefficient of .88 was obtained, after two items which appeared to assess a different construct were eliminated. Because that scale did not assess the construct as expected, some items were reworded and two additional items added to the instrument. In the pilot study, this modified scale yielded an alpha reliability of only 0.74 and, based on a factor analysis, was still not

Table 5: Means and standard deviations for outcome expectancies and changes in outcome expectancies.

VARIABLE	HRM GOAL MEAN	HRM GOAL SD	GPA GOAL MEAN	GPA GOAL SD
OUTCOME EXPECTANCY FOR GOAL CHOSEN AT TIME 1	58.92[1]	16.31	60.51	17.83
OUTCOME EXPECTANCY FOR TIME 1 GOAL AT TIME 4	57.04	19.22	59.28	17.83
CHANGE IN OUTCOME EXPECTANCY TIME 1-4	-1.92	16.49	-1.41	15.44
OUTCOME EXPECTANCY FOR GOAL CHOSEN AT TIME 4	60.59	17.63	62.07	16.28
OUTCOME EXPECTANCY FOR TIME 4 GOAL AT TIME 6	57.57	21.49	61.63	19.39
CHANGE IN OUTCOME EXPECTANCY TIME 4-6	-3.46	17.75	-0.44	15.32
OUTCOME EXPECTANCY FOR GOAL CHOSEN AT TIME 6	60.11	17.83	62.62	18.19
OUTCOME EXPECTANCY FOR TIME 6 GOAL AT TIME 9	57.32	23.62	59.51	22.76
CHANGE IN OUTCOME EXPECTANCY TIME 6-9	-2.89	21.06	-3.04	19.80
OUTCOME EXPECTANCY FOR TIME 1 GOAL AT TIME 9	50.63	29.30	53.81	24.07
CHANGE IN OUTCOME EXPECTANCY TIME 1-9	-8.26	28.19	-6.73	21.81

[1]n ranges from 235 to 266.

Table 6: Means and standard deviations for force towards chosen goals and changes in force.

VARIABLE	HRM GOAL MEAN	HRM GOAL SD	GPA GOAL MEAN	GPA GOAL SD
T1 GOAL FORCE	127.00[1]	61.33	63.48	90.07
T1 GOAL FORCE AT T4	116.39	59.69	63.83	83.87
CHANGE IN FORCE T1-4	-10.83	53.96	-1.77	72.75
T4 GOAL FORCE	115.83	68.47	42.54	99.30
T4 GOAL FORCE AT T6	110.12	69.49	56.08	92.93
CHANGE IN FORCE T4-6	-7.36	62.49	12.85	75.03
T6 GOAL FORCE	115.75	66.19	51.03	97.66
T6 GOAL FORCE AT T9	111.07	85.29	46.63	96.92
CHANGE IN FORCE T6-9	-7.16	73.67	-5.31	74.73
T1 GOAL FORCE AT T9	99.01	84.42	61.22	79.93
CHANGE IN FORCE T1-9	-28.22	79.28	-5.59	83.08
T9 GOAL FORCE	122.15	77.71	42.21	98.93

[1]n ranges from 233 to 266.

unidimensional. Based on these results further changes were made and one of the new items dropped, yielding a ten-item scale which was employed in the current study (see Appendix E).

In responding to this scale, subjects indicated the degree to which they agreed or disagreed with each of the statements about the goal they had chosen using a five point Likert scale. Commitment towards both the GPA and the HRM course grade goal were assessed each of the four times those goals were set. This revised instrument yielded an average alpha reliability coefficient of 0.79 in the current study, but was again not unidimensional. The factor structure also did not replicate that found by Hollenbeck et al. (1986). In fact, the seven items used by Hollenbeck et al. yielded an average alpha coefficient of only 0.72.

Based on the factor loadings and inter-item correlations, a unidimensional scale was obtained by eliminating four of the items. The alpha reliability coefficients obtained using the resulting six item scale are provided in Table 7 for both goal levels at each of the time periods the scale was administered. Across all eight administrations, the average alpha was 0.80 (range: 0.74 to 0.83). Table 7 also presents the means, standard deviations, and intercorrelations among goal commitment across goal levels and time. The average intercorrelation between commitment to GPA and HRM goals at the same time is 0.82 (range: 0.79 to 0.84). It should be noted that these correlations all are approximately equal to 1.00 when corrected for attenuation due to unreliability.

The average correlation between commitment for the same level at successive time periods is 0.72 (range: 0.66 to 0.76). When these values are corrected for attenuation, this average is 0.89. The means

Table 7: Means, standard deviations, intercorrelations and reliabilities among measures of goal commitment across levels and time.

VARIABLE	MEAN	SD	1	2	3	4	5	6	7	8
TIME 1										
1. GPA[1]	4.47	0.41	(.74)[4]							
2. HRM[2]	4.44	0.44	.79[5]	(.81)						
TIME 4[3]										
3. GPA	4.30	0.45	.66	.66	(.77)					
4. HRM	4.28	0.45	.66	.69	.82	(.82)				
TIME 6										
5. GPA	4.30	0.49	.62	.67	.70	.72	(.82)			
6. HRM	4.30	0.48	.62	.67	.69	.75	.84	(.83)		
TIME 9										
7. GPA	4.27	0.51	.55	.57	.62	.63	.73	.74	(.79)	
8. HRM	4.26	0.50	.56	.56	.59	.64	.73	.76	.83	(.83)

[1]GPA - Commitment to quarter grade point average goal.
[2]HRM - Commitment to human resource management course grade goal.
[3]Note that for any given subject, goals may or may not be the same from one time period to the next.
[4]Coefficient alpha reliabilities in parenthesis.
[5]$p < .001$ for correlations greater than 0.17, n ranges from 309 to 339.

and standard deviations for changes in goal commitment from one period to the next are provided in Table 8. On average, subjects' goal commitment declined 0.11 from one time period to the next. Also included in Table 8 are the reliability estimates for the goal commitment change scores. The reliability of HRM goal commitment change, averaged across the four time comparisons is 0.39. This average is 0.33 for GPA goal commitment change.

Causal Attributions

An inventory was developed for this study to assess possible perceived causes of academic performance. As suggested by Weiner (1983) a complete and relevant list of possible causal attributions was obtained for the specific situation of interest from the population of interest. In developing this scale, subjects in the pilot study were asked to recall either an exam they did very well on, an exam on which they scored very poorly, or simply their most recent exam. These subjects were then asked to think about why they received the score they did and list 5 factors responsible for their performance on that exam. These lists were then content analyzed to obtain a smaller list of the most salient causes.

These causes were then categorized as either internal or external and then as either stable or unstable. Those internal and unstable items were further categorized as either controllable or uncontrollable. Finally, those internal, unstable and controllable items were broken down as either relating to the magnitude or direction of the subjects' effort. In doing so, an inventory was obtained which assesses the three dimensions and the eight cells illustrated in Figure 11. In responding

Table 8: Means, standard deviations and reliabilities for changes in goal commitment.

VARIABLE	HRM GOAL MEAN	HRM GOAL SD	GPA GOAL MEAN	GPA GOAL SD
CHANGE IN GOAL COMMITMENT T1-4[2]	-0.16[1]	0.36 (0.39)[3]	-0.18	0.35 (0.27)
CHANGE IN GOAL COMMITMENT T4-6	-0.01	0.34 (0.28)	-0.02	0.36 (0.30)
CHANGE IN GOAL COMMITMENT T6-9	-0.03	0.33 (0.29)	-0.02	0.35 (0.26)
CHANGE IN GOAL COMMITMENT T1-9	-0.19	0.44 (0.59)	-0.22	0.43 (0.47)

[1]n ranges from 233 to 266.
[2]Change scores only computed for subjects holding their goal constant.
[3]Reliabilties of goal commitment change scores in parentheses.

to this inventory, provided in Appendix F, subjects indicate the degree to which each of the twenty-one items was responsible for their performance using a five-point Likert scale.

Eight scales are derived from this inventory; internal, external, stable, unstable, controllable, uncontrollable, and direction and amount of effort. While theoretically, the constructs of stability, locus, and controllability are usually discussed as unidimensional, it must be recognized that people do not make "stable" or "unstable" attributions. People make attributions to one or more perceived causes which can be categorized as stable or unstable. When multiple causes are perceived some may be stable, others unstable. Therefore, when subjects are asked to evaluate specific possible causes of their performance rather than general dimensions of causes, it cannot be assumed or even expected that those specific causes identified will fall exclusively into those general dimensions. In both the pilot and current study, this conceptualization was supported. When those items which reflect unstable causes are recoded, they correlated negatively with the stable items, resulting in an internally inconsistent and unreliable scale. This same phenomenon is observed with the internal and external items and with the controllable and uncontrollable items.

In the pilot study, the reliability estimates for the eight scales were 0.81 for internal, 0.71 for external, 0.70 for stable, 0.76 for unstable, 0.78 for controllable, 0.76 for uncontrollable, 0.74 for amount of effort, and 0.49 for direction of effort. Three items in the scale were subsequently rewritten to better assess the direction of effort dimension. When the revised inventory was examined, four items consistently demonstrated low inter-item correlations and were deleted.

The resultant scales yielded average alpha reliability estimates of 0.87 for internal (range: 0.86 to 0.89), 0.76 for external (range: 0.78 to 0.80), 0.79 for stable (range: 0.73 to 0.83), 0.86 for unstable (range: 0.83 to 0.89), 0.86 for controllable (range: 0.84 to 0.89), 0.81 for uncontrollable (range: 0.75 to 0.84), 0.79 for amount of effort (range: 0.74 to 0.86), and 0.76 for direction of effort (range: 0.72 to 0.79).

The reliabilities for the scales of interest in this study (stable, unstable, amount, and direction of effort) are presented in Table 9 along with their means, standard deviations, and intercorrelations. Note that the amount and direction scales are subscales of the unstable attribution scale and thus are highly intercorrelated. In the analyses, however, these dimensions are never examined with the same variables. The average correlation between stable and unstable attributions assessed at the same time over the three administrations is 0.44 (range: 0.40 to 0.51). When corrected for attenuation due to unreliability, this average correlation becomes 0.54. Direction and amount of effort attributions correlate 0.74 on average (range: 0.71 to 0.81). Corrected for unreliability, however, the this average intercorrelation is 0.96. The average correlation between the other independent attributions (i.e., those not sharing items) assessed at the same time is 0.36 (range: 0.21 to 0.52). The average correlation between the same attributions at successive time periods is also 0.36 (range: 0.26 to 0.47). When corrected for attenuation, these average correlations are 0.47 and 0.45 respectively.

Performance

The subjects' overall GPA and course grades for the quarter served as the performance indices for the two highest-order goals. Subjects'

Table 9: Means, standard deviations, reliabilities and intercorrelations among attribution measures.

VARIABLE	MEAN	SD	1	2	3	4
QUIZ 1						
1. STABLE	3.37	0.74	(.83)[1]			
2. UNSTABLE	3.65	0.67	.51[2]	(.83)		
3. AMOUNT	3.68	0.89	.31	.89	(.74)	
4. DIRECTION	3.62	0.70	.52	.94	.71	(.72)
MIDTERM						
5. STABLE	3.28	0.80	.46	.27	.19	.24
6. UNSTABLE	3.52	0.80	.17	.26	.24	.22
7. AMOUNT	3.57	1.05	.06	.21	.23	.17
8. DIRECTION	3.48	0.80	.19	.26	.23	.24
QUIZ 2						
9. STABLE	3.25	0.71	.45	.26	.18	.25
10. UNSTABLE	3.50	0.72	.27	.34	.30	.31
11. AMOUNT	3.51	0.93	.17	.28	.32	.21
12. DIRECTION	3.50	0.73	.27	.33	.25	.33

[1]Alpha reliability coefficients in parentheses.
[2]$p < .001$ for correlations greater than 0.17, $p < .05$ for correlations greater than 0.09, n ranges from 320 to 328.

Table 9 (Cont'd)

VARIABLE	5	6	7	8	9	10	11	12
QUIZ 1								
1. STABLE								
2. UNSTABLE								
3. AMOUNT								
4. DIRECTION								
MIDTERM								
5. STABLE	(.72)							
6. UNSTABLE	.42	(.89)						
7. AMOUNT	.30	.92	(.86)					
8. DIRECTION	.41	.96	.81	(.79)				
QUIZ 2								
9. STABLE	.47	.26	.20	.25	(.82)			
10. UNSTABLE	.27	.43	.39	.41	.40	(.85)		
11. AMOUNT	.18	.36	.39	.32	.21	.89	(.76)	
12. DIRECTION	.25	.40	.33	.41	.43	.94	.71	(.76)

scores on each performance event served as the performance measures for the third level goals. Overall GPA and specific course grades for the quarter were accesses from archival records maintained at the University's Registrar's Office. Scores on performance events were obtained from the instructors' records. For two of the performance events split-half reliability estimates were available; 0.86 for the midterm and 0.88 for the final exam. The means and standard deviations for these performance indices are provided in Table 10.

Standard-Performance Discrepancy

The difference between the subjects' self-reported goals and their actual performance was used as an objective measure of the discrepancy between intentions and actual performance at each of the three levels of goals. For performance event goals which were assessed at multiple time periods, the most proximal goal to the event was used in computing the discrepancy score. Similarly, the goals provided at T9 were used in computing the discrepancies for the GPA and HRM course grade goals. The means and standard deviations for these discrepancies are also presented in Table 10.

Table 10: Means and standard deviations for performance measures and goal-performance discrepancies.

	PERFORMANCE			STANDARD-PERFORMANCE DISCREPANCY	
	MEAN	MAX[1]	SD	MEAN	SD
1. GPA	2.88[2]	4	0.60	-.25	0.39
2. HRM GRADE	2.92	4	0.82	-.23	0.49
3. QUIZ 1	24.38	30	3.81	-1.91	4.11
4. MIDTERM	77.94	100	10.06	-6.68	9.59
5. PAPER	33.40	40	4.43	-2.42	5.30
6. QUIZ 2	23.29	30	3.97	-3.37	4.06
7. FINAL	76.87	100	9.31	-8.12	9.34

[1]MAX - The maximum possible value for each performance criteria.
[2]n ranges from 302 to 344.

CHAPTER 4: RESULTS

While not a specific hypothesis of this study, the relationship between goals and performance was examined to determine whether the goal difficulty effect, so prevalent in the literature, was operating in this study. The correlations between goals and performance are provided in Table 11 for all goals at all time periods. It is interesting to note that this relationship is stronger among the GPA and HRM course grade goals ($\bar{r}$ = 0.57 and 0.59 respectively) than for the HRM performance event goals ($\bar{r}$ = 0.20). Furthermore, among the performance event goals, the relationship with performance is stronger for the exams ($\bar{r}$ = 0.33) than for the less important performance events ($\bar{r}$ = .08). It is also evident from Table 11 that the relationship between goals and performance became larger as the goals became more proximal to the performance event or towards the end of the performance period.

Hypothesis 1 - Role of Attributions

Hypothesis 1a

The first hypothesis suggests that there will be greater changes in outcome expectancies following stable attributions than when unstable attributions are made and that these changes will be positive following success and negative following failure. This hypothesis was first tested by comparing mean outcome expectancies, at successive time periods, of subjects who did not change their HRM grade goal and (a) had a positive discrepancy and made stable attributions, (b) had a positive discrepancy and made unstable attributions, (c) had a negative discrepancy and made unstable attributions, and (d) had a negative discrepancy and made stable attributions. Subjects' goal-performance

Table 11: Correlations between goals and performance over time.

GOAL	CORRELATION WITH PERFORMANCE AT: TIME 1	TIME 4	TIME 6	TIME 9
QUARTER GRADE POINT AVERAGE	0.42[1]	0.54	0.56	0.75
HRM COURSE GRADE	0.42	0.52	0.62	0.80
HRM QUIZ 1 (T3)[2]	0.10	--	--	--
HRM MIDTERM EXAM (T5)	0.31	0.35	--	--
HRM PAPER (T6)	0.02	0.14	--	--
HRM QUIZ 2 (T8)	0.00	0.07	0.15	--
HRM FINAL EXAM (T10)	0.33	0.33	0.30	0.32

[1] n ranges from 308 to 339, $p < 0.001$ for correlations greater than 0.15, $p < 0.05$ for correlations greater than 0.09.
[2] Time period in which performance events occurred in parentheses.

discrepancies were considered positive if their score on a performance event was greater than their stated goal for that event. Subjects were taken as having made stable attributions if their score on the stable dimension was greater than their score on the unstable dimension. Negative discrepancies and unstable attributions were similarly determined.

Given the first hypothesis, it was expected that when unstable attributions are made, no significant changes should occur in outcome expectancies, regardless of the sign of the discrepancy. When stable attributions are made, however, outcome expectancies were expected to be significantly higher following success and significantly lower following failure. Multiple t-tests were used to determine whether changes in means were significantly different from one time period to the next. The expected pattern of means is illustrated in Figure 14 for the changes between T1 and T4. This same pattern was expected between T4 and T6, between T6 and T9, and for the overall difference between T1 and T9, for both GPA and HRM grade outcome expectancies.

The aggregated means from these comparisons are provided in Figure 15, as an overall summary of these first analyses. While the exact pattern illustrated in Figure 14 was not obtained, the predicted relationships among attributions and outcome expectancies are present. Outcome expectancies increased following positive discrepancies and decreased when discrepancies were negative for both GPA and HRM goals. Furthermore, these changes were greater when stable attributions were made than when performance was attributed to unstable factors. Changes in outcome expectancies following unstable attributions were, however, much larger than predicted in Figure 14.

Figure 14: Hypothesized relationship between stability attributions, goal-performance discrepancies and changes in outcome expectancies for subjects not changing their goal.

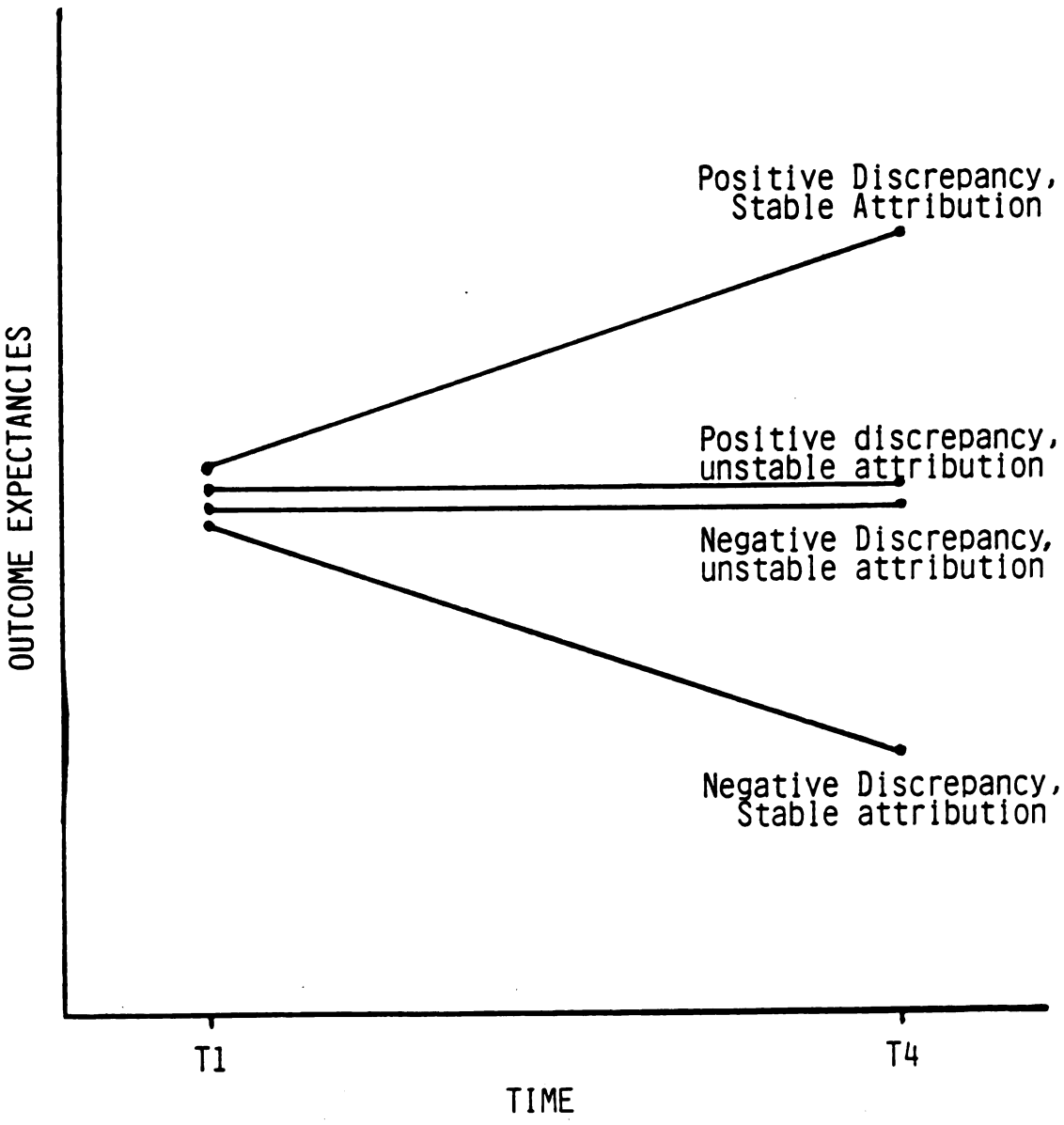
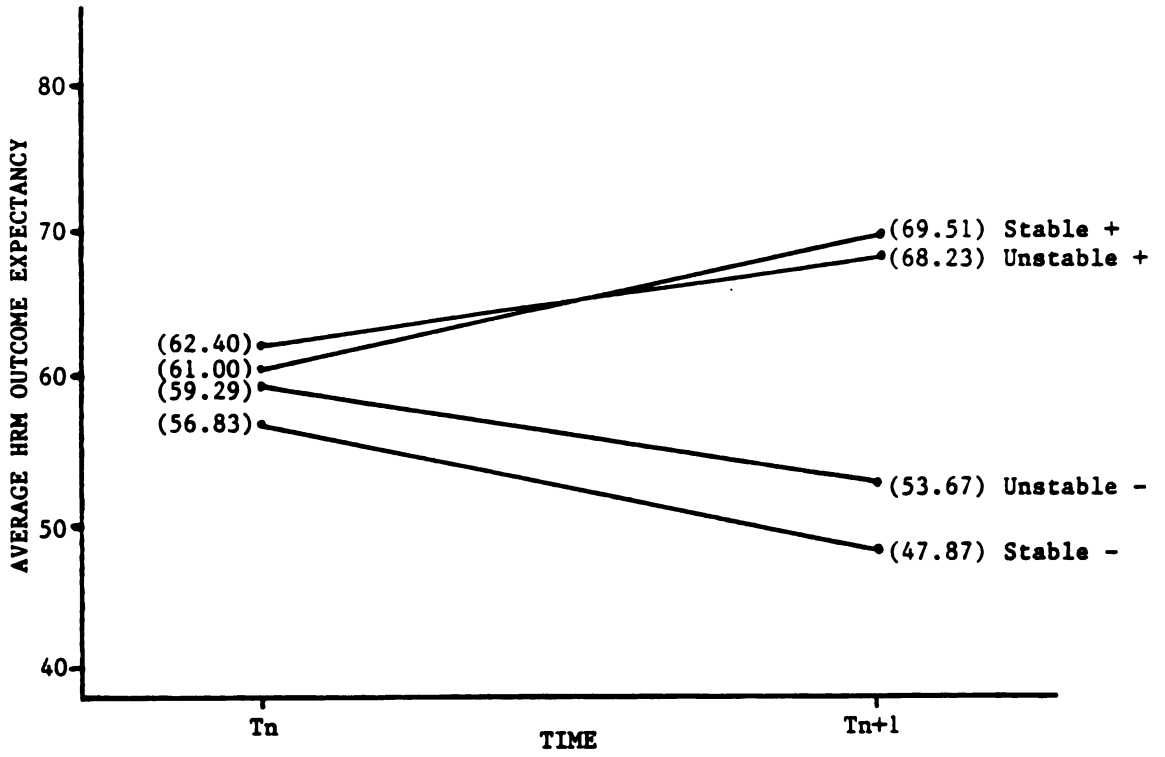
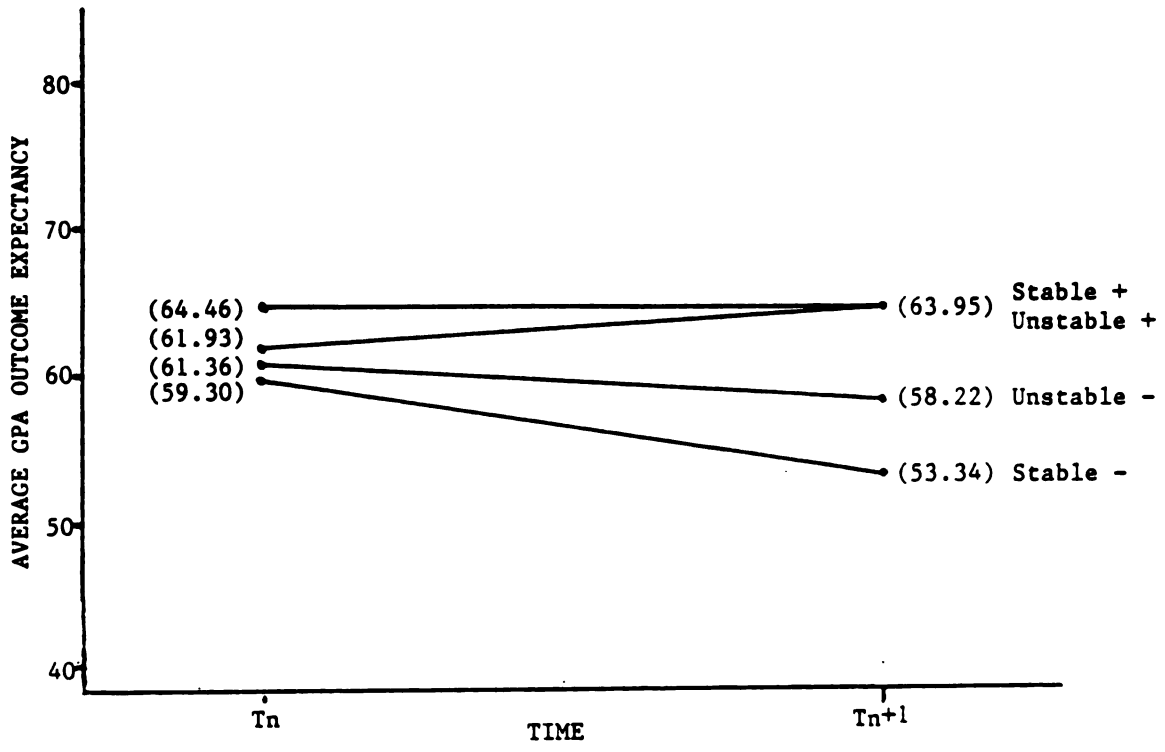


Figure 15: Aggregated observed relationships between stability attributions, goal-performance discrepancies and changes in outcome expectancies for subjects not changing their goal.

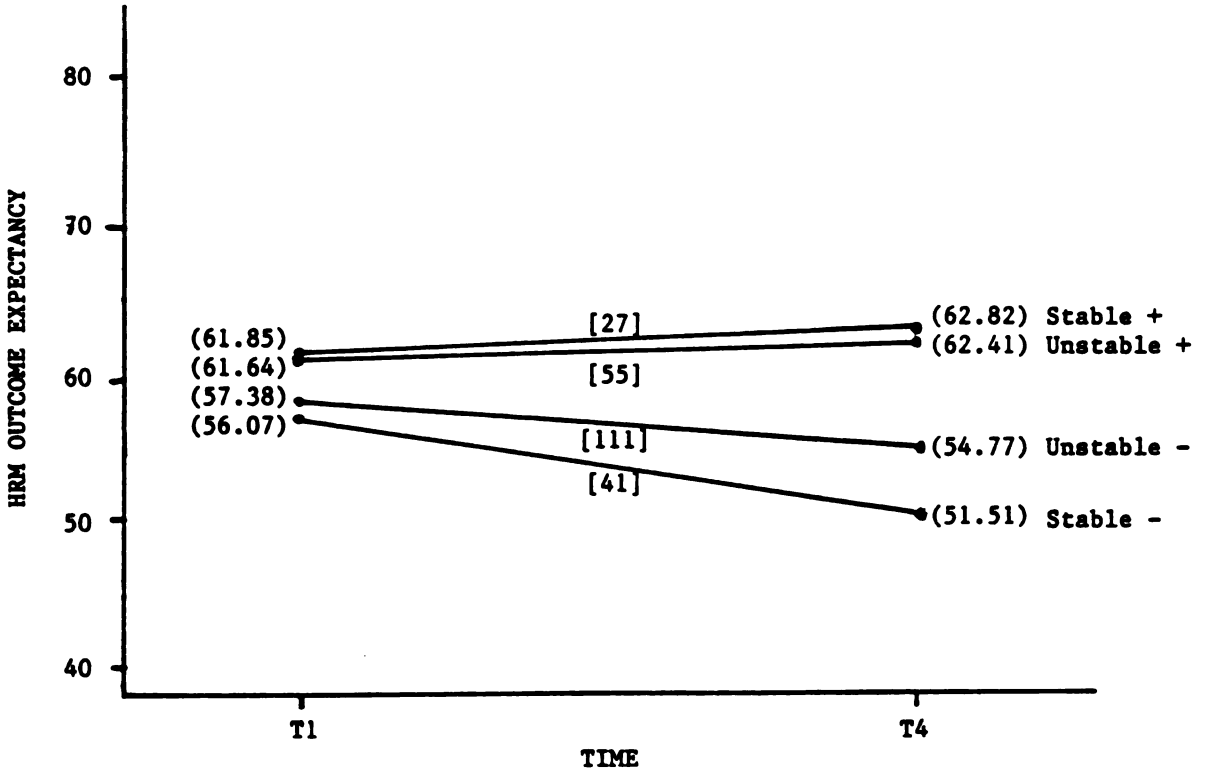


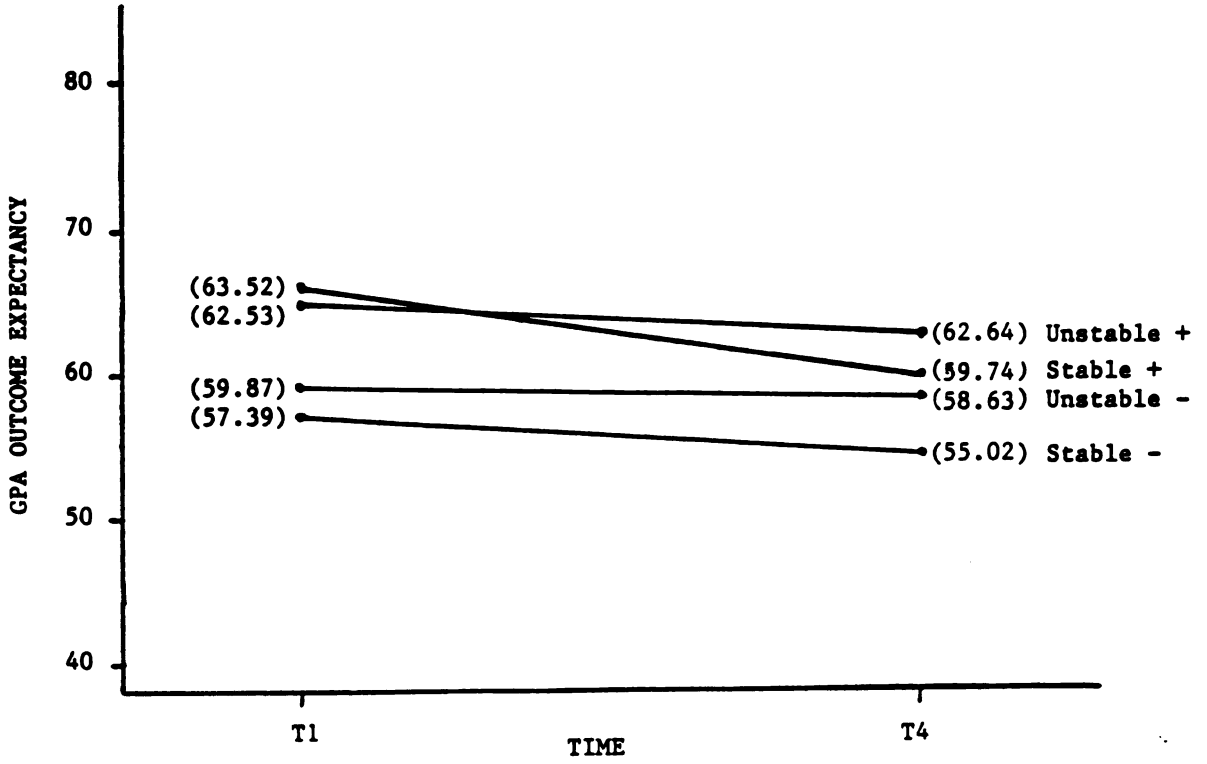


The specific means obtained at each of the four time comparisons are illustrated in Figures 16 to 19. The patterns of means in these Figures, like their aggregate, often approximated and the predicted relationships. In all instances, outcome expectancies fell following negative discrepancies and stable attributions as predicted. In 7 of 8 instances, outcome expectancies increased following positive discrepancies and stable attributions. Secondly, in 13 of the 16 comparisons, changes in outcome expectancies were, as hypothesized, greater for stable attributions than for unstable attributions. In only five instances, however, were the outcome expectancies following stable attributions at the later time period significantly larger than those at the initial time period. Finally, although outcome expectancies following unstable attributions tended to change more in Figures 16 to 19 than predicted, this change was only significant in four instances.

To further test Hypothesis 1a, a series of moderated regression analyses (Cohen & Cohen, 1983; Stone & Hollenbeck, 1984; Zedeck, 1971) were performed. In each of these regressions, the performance-standard discrepancy was entered as the first hierarchical step with change in outcome expectancy serving as the criterion. In the second step, stable and unstable attributions were entered as a set. In a third hierarchical step, the two cross-products of the attributions and the discrepancy, representing the interaction, were entered as a set. This analysis was conducted for changes in expectancies towards both the GPA and HRM grade goals for each of the four time comparisons used above (i.e., T1-T4, T4-T6, T6-T9, and T1-T9). It was expected that there would be a significant main effect for the discrepancy and that the

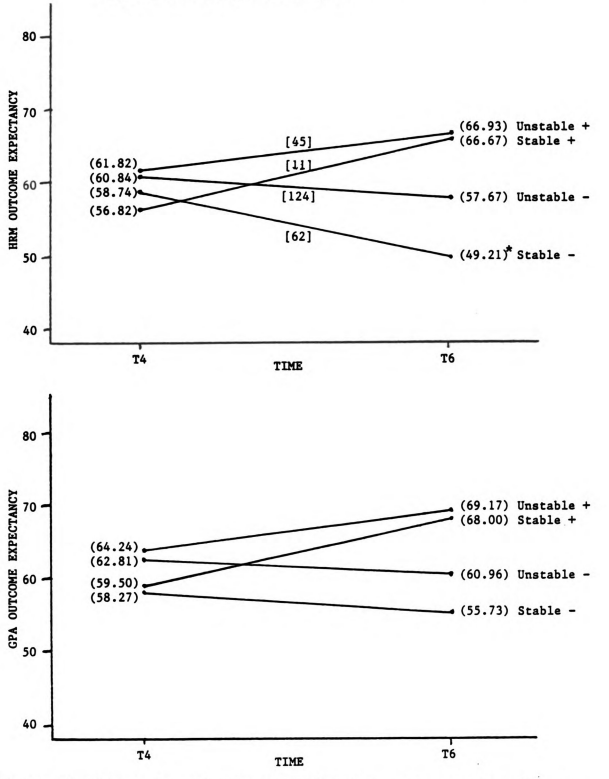
Figure 16: Observed relationships between attributions, discrepancies and changes in outcome expectancies from T1 to T4 for subjects not changing their goal.





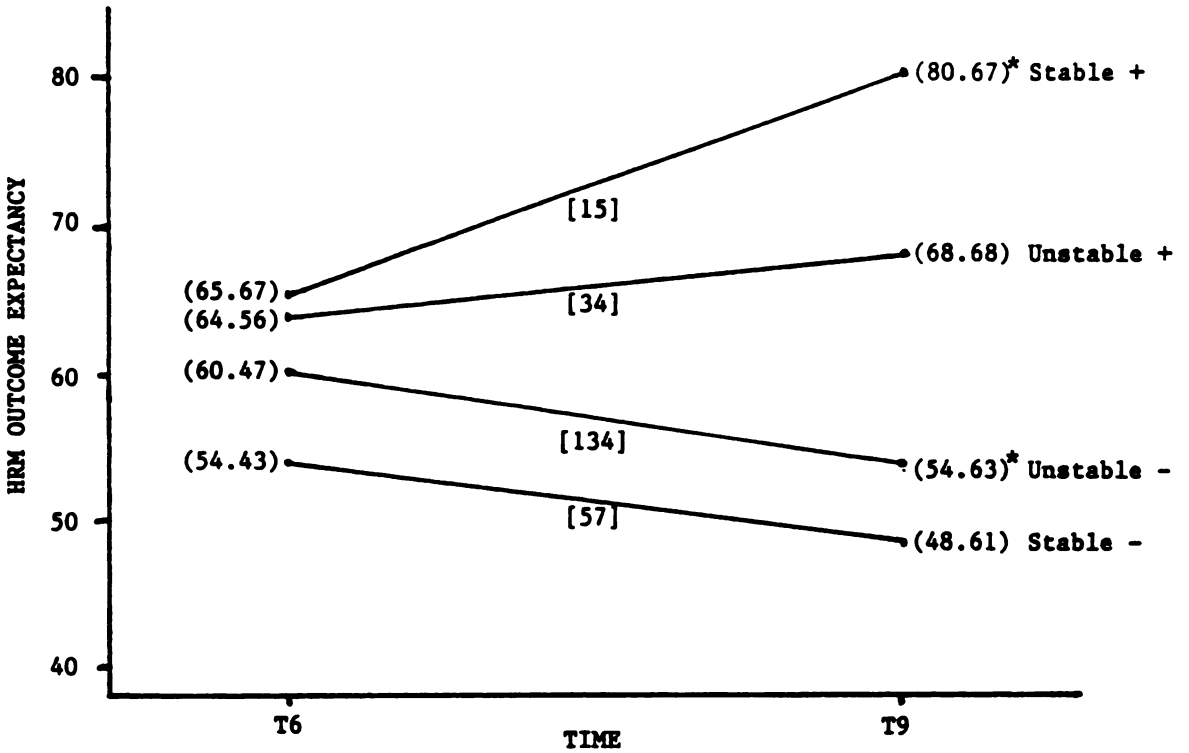
Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

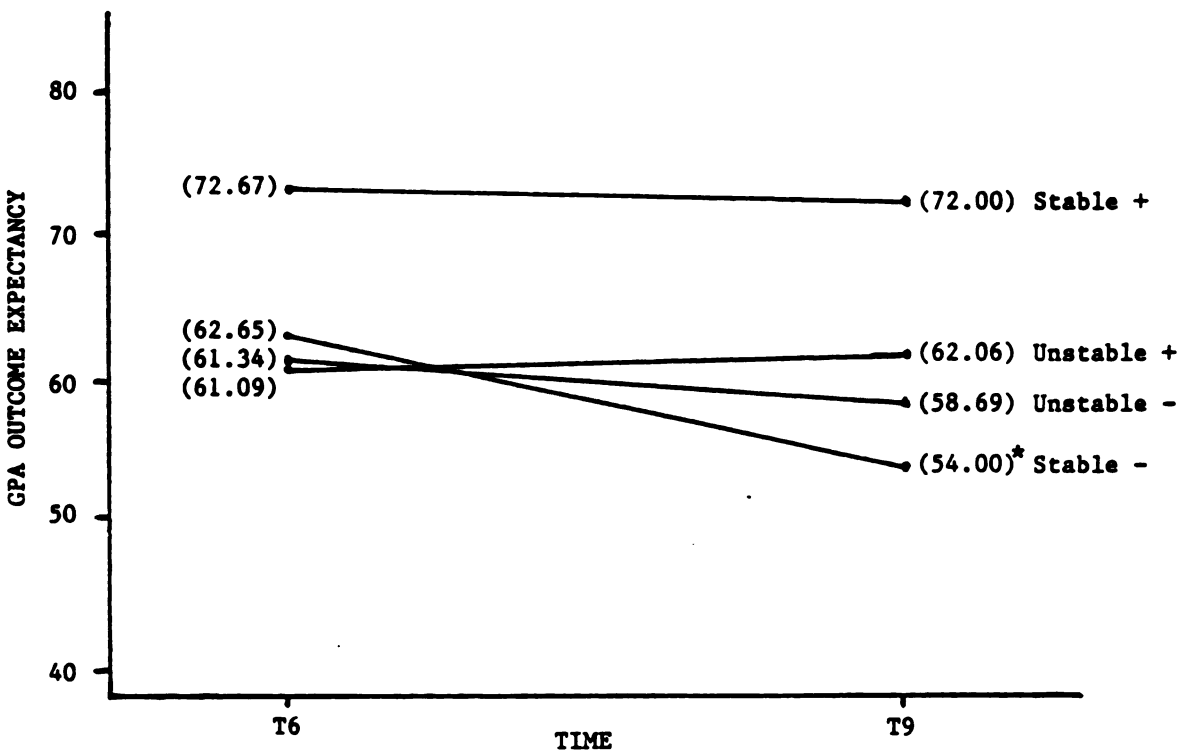
Figure 17: Observed relationships between attributions, discrepancies and changes in outcome expectancies from T4 to T6 for subjects not changin their goal.



Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

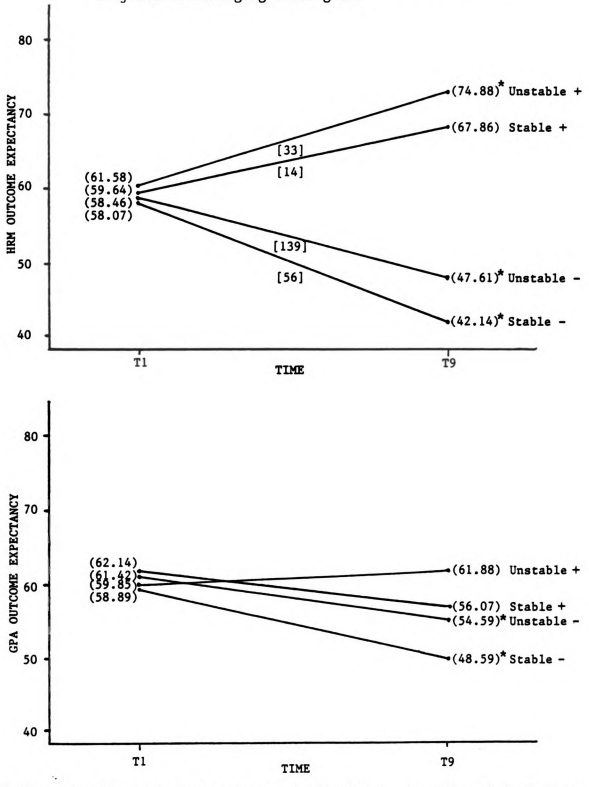
Figure 18: Observed relationships between attributions, discrepancies and changes in outcome expectancies from T6 to T9 for subjects not changing their goal.





Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

Figure 19: Observed relationships between attributions, discrepancies and changes in outcome expectancies from T1 to T9 for subjects not changing their goal.



Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

interaction terms would be significant. No main effects for attributions were expected.

The results of these eight regressions are presented in Table 12. The expected significant main effect for the goal-performance discrepancy was evident in all of the regressions except for changes in GPA and HRM outcome expectancies between T1 and T4. On average, the goal-performance discrepancy accounted for 4% of the variance in changes in GPA outcome expectancies and 17% of the variance in changes in HRM grade expectancies. Unexpectedly, attributions also exhibited a main effect on changes in outcome expectancies. While this main effect was only significant in two of the regressions (both HRM and GPA T4-T6), the attributions accounted for, on average, 2% of the variance in GPA outcome expectancy change and 3% of the variance in HRM change. At least one of the interaction terms was significant in half of the regressions, T1-T4 and T6-T9 for GPA outcome expectancy change and T4-T6 and T6-T9 for HRM grade outcome expectancy change. On average, the interactions accounted for 3% of the change in GPA expectancies and 2% of the variance in change in HRM expectancies.

The expected form of the interaction between attributions and discrepancies is depicted in Figure 20. The observed interactions for both HRM and GPA goals, aggregating the predicted values across all four regressions and combining the two stability attributions (high stable with low unstable and low stable with high unstable) are illustrated in Figure 21. The form of these observed interactions were not precisely as expected, because of the obtained main effect for attributions, but the general relationships hypothesized are evident. The slope for unstable attributions (low stable or high unstable) is smaller than the

Table 12: Results of regressing changes in outcome expectancies on discrepancies, attributions, and their interactions.

Hierarchical Step	Variable	R^2	p of R^2	ΔR^2	p of ΔR^2
DEPENDENT VARIABLE: CHANGE IN GPA OUTCOME EXPECTANCY T1-T4					
1	DISCREPANCY	0.00	n.s.	0.00	n.s.
2	ATTRIBUTIONS		n.s.		
	STABLE	0.00		0.00	n.s.
	UNSTABLE	0.02		0.02	n.s.
3	INTERACTIONS		n.s.		
	STABLE X DISCREP	0.02		0.00	n.s.
	UNSTABLE X DISCREP	0.04		0.02	n.s.
DEPENDENT VARIABLE: CHANGE IN GPA OUTCOME EXPECTANCY T4-T6					
1	DISCREPANCY	0.04	<.01	0.04	<.01
2	ATTRIBUTIONS		<.001		
	STABLE	0.05		0.01	n.s.
	UNSTABLE	0.09		0.04	<.05
3	INTERACTIONS		<.001		
	STABLE X DISCREP	0.09		0.00	n.s.
	UNSTABLE X DISCREP	0.11		0.02	n.s.
DEPENDENT VARIABLE: CHANGE IN GPA OUTCOME EXPECTANCY T6-T9					
1	DISCREPANCY	0.06	<.001	0.06	<.001
2	ATTRIBUTIONS		<.01		
	STABLE	0.06		0.00	n.s.
	UNSTABLE	0.06		0.00	n.s.
3	INTERACTIONS		<.01		
	STABLE X DISCREP	0.07		0.01	n.s.
	UNSTABLE X DISCREP	0.09		0.02	<.01
DEPENDENT VARIABLE: CHANGE IN GPA OUTCOME EXPECTANCY T1-T9					
1	DISCREPANCY	0.07	<.001	0.07	<.001
2	ATTRIBUTIONS		<.001		
	STABLE	0.08		0.01	n.s.
	UNSTABLE	0.09		0.01	n.s.
3	INTERACTIONS		<.001		
	STABLE X DISCREP	0.12		0.03	<.01
	UNSTABLE X DISCREP	0.13		0.01	n.s.

Table 12 (Cont'd)

Hierarchical Step	Variable	R^2	p of R^2	$\triangle R^2$	p of $\triangle R^2$
DEPENDENT VARIABLE: CHANGE IN HRM OUTCOME EXPECTANCY T1-T4					
1	DISCREPANCY	0.02	n.s.	0.02	n.s.
2	ATTRIBUTIONS		<.01		
	STABLE	0.03		0.01	n.s.
	UNSTABLE	0.06		0.03	n.s.
3	INTERACTIONS		n.s.		
	STABLE X DISCREP	0.07		0.01	n.s.
	UNSTABLE X DISCREP	0.07		0.00	n.s.
DEPENDENT VARIABLE: CHANGE IN HRM OUTCOME EXPECTANCY T4-T6					
1	DISCREPANCY	0.18	<.001	0.18	<.001
2	ATTRIBUTIONS		<.001		
	STABLE	0.18		0.00	n.s.
	UNSTABLE	0.21		0.03	n.s.
3	INTERACTIONS		<.001		
	STABLE X DISCREP	0.21		0.00	n.s.
	UNSTABLE X DISCREP	0.24		0.03	<.01
DEPENDENT VARIABLE: CHANGE IN HRM OUTCOME EXPECTANCY T6-T9					
1	DISCREPANCY	0.18	<.001	0.18	<.001
2	ATTRIBUTIONS		<.001		
	STABLE	0.19		0.01	n.s.
	UNSTABLE	0.19		0.00	n.s.
3	INTERACTIONS		<.001		
	STABLE X DISCREP	0.21		0.02	n.s.
	UNSTABLE X DISCREP	0.23		0.02	n.s.
DEPENDENT VARIABLE: CHANGE IN HRM OUTCOME EXPECTANCY T1-T9					
1	DISCREPANCY	0.29	<.001	0.29	<.001
2	ATTRIBUTIONS		<.001		
	STABLE	0.29		0.00	n.s.
	UNSTABLE	0.31		0.02	n.s.
3	INTERACTIONS		<.001		
	STABLE X DISCREP	0.31		0.00	n.s.
	UNSTABLE X DISCREP	0.31		0.00	n.s.

Figure 20: Hypothesized interaction between goal-performance discrepancies and stability attributions on shifts in outcome expectancies for subjects not changing their goal.

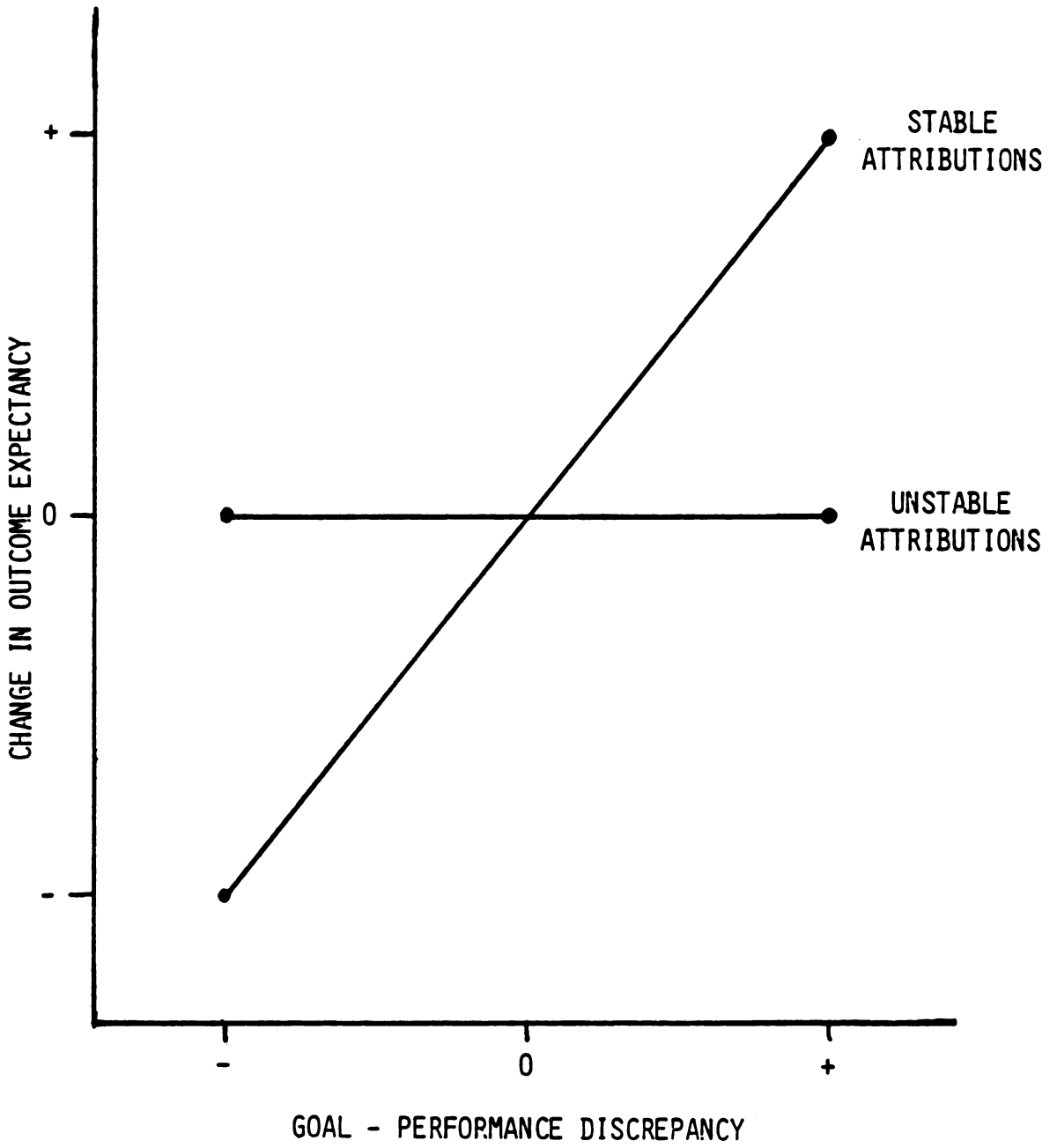
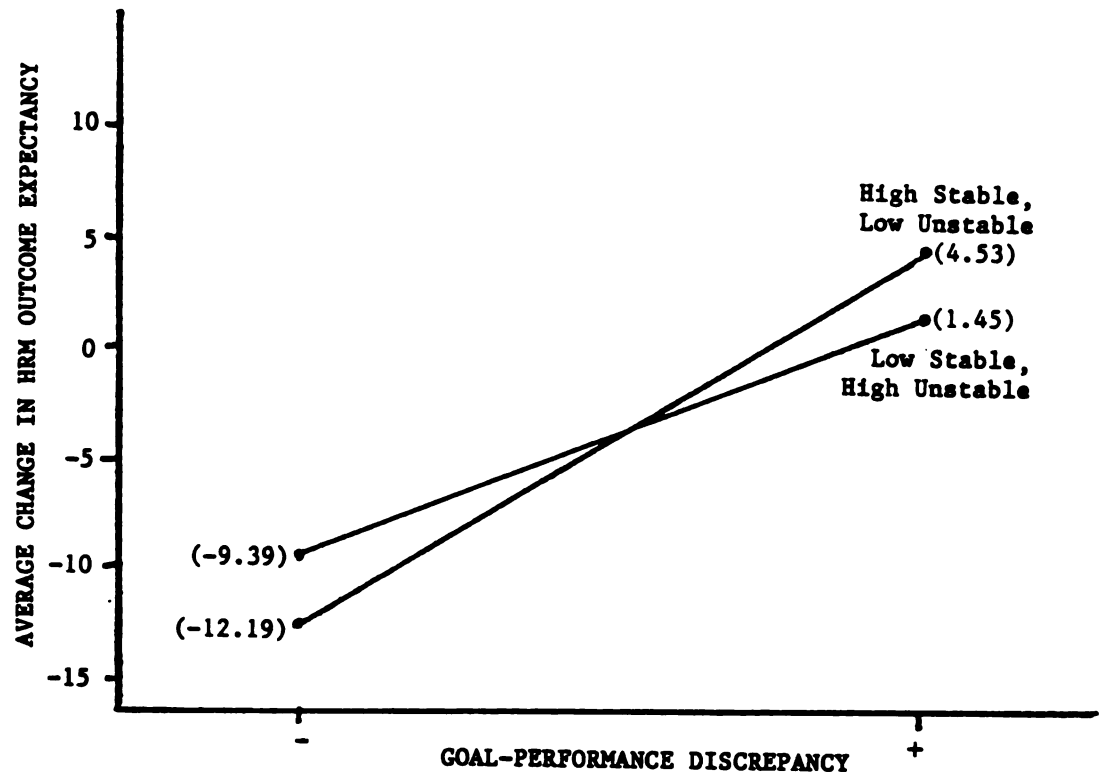
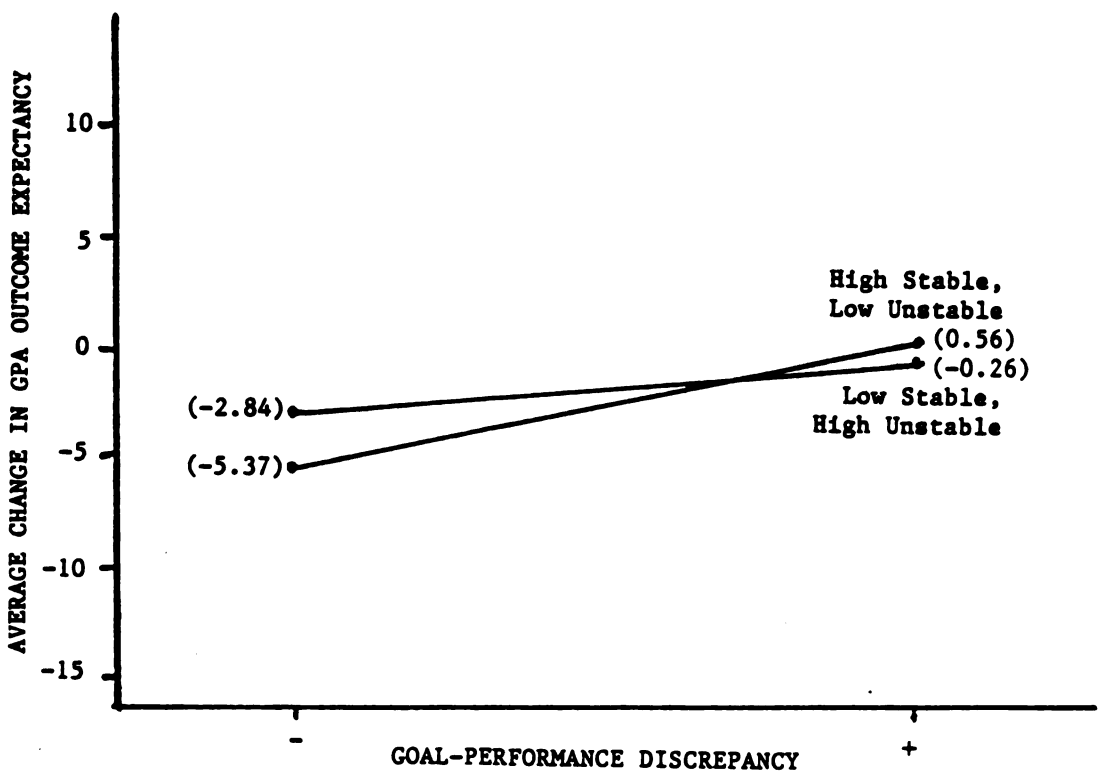


Figure 21: Aggregated observed interactions between discrepancies and attributions on shifts in outcome expectancies for subjects not changing their goal.





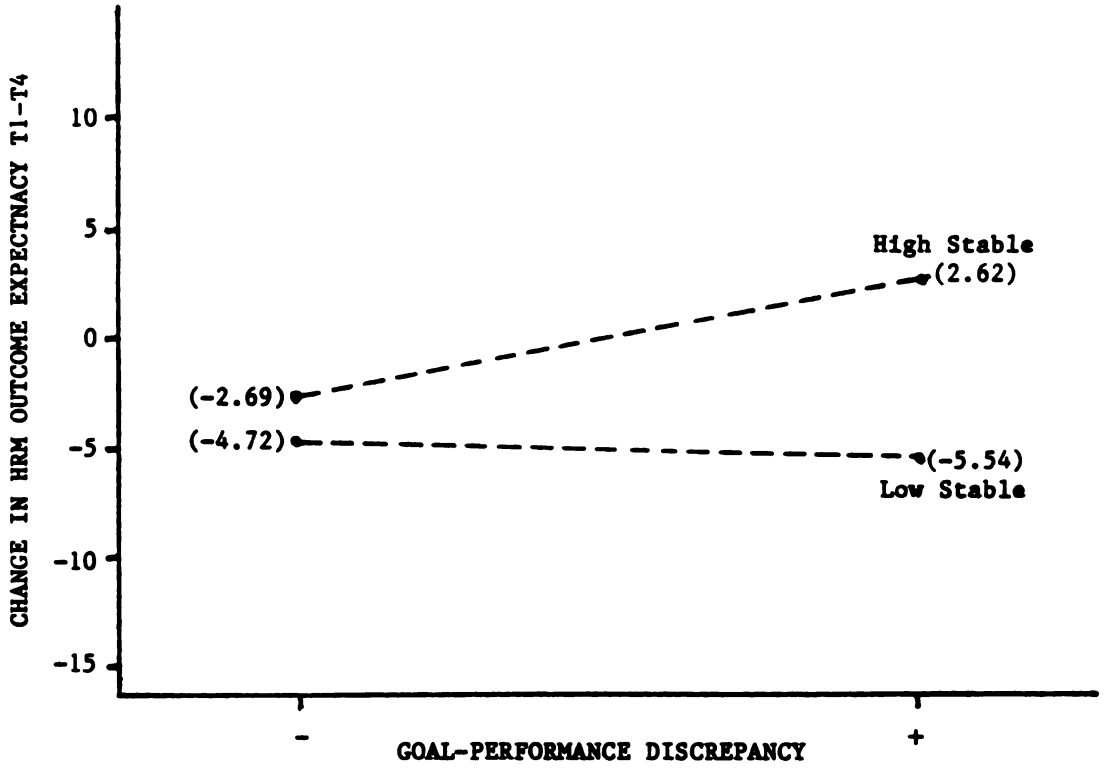
slope for stable attributions (high stable or low unstable) demonstrating the prediction that changes in outcome expectancies will be greater when stable rather than unstable attributions are made.

Returning to the different individual regressions, those interactions which explained at least 1% of the variance in outcome expectancy change are illustrated in Figures 22 to 25, where the goal-performance discrepancy relationship is plotted separately depending on the nature of the attributions. As evident in the aggregated interactions, the hypothesized relationships were observed. In Figures 22 to 25, the slope for unstable attributions (low stable or high unstable) is smaller than the slope for stable attributions (high stable or low unstable) in 8 of 10 instances. Both instances in which unstable attributions had a higher slope than stable attributions were with regards to changes in GPA outcome expectancies (T1-T4 and T1-T9). It is also evident from these figures that discrepancies, attributions, and their interaction account for more change in HRM grade expectancies than in GPA expectancies. This same conclusion is evidenced in Figures 16 to 19, 21, and in the R^2s presented in Table 12.

Hypothesis 1b

The next hypothesis deals with the relationships between behavioral attributions and behavioral changes. Changes in the scholastic activity measures were operationalized as the difference between the two week period prior to a performance event and the two week period preceding the next performance event. To test this hypothesis, comparisons were first made between mean reported amount of effort levels, at successive time periods, for subjects who made high and low amount of effort attributions. Only subjects who had negative discrepancies and did not

Figure 22: Observed interactions between discrepancies and attributions on shifts in outcome expectancies from T1 to T4 for subjects not changing their goal.



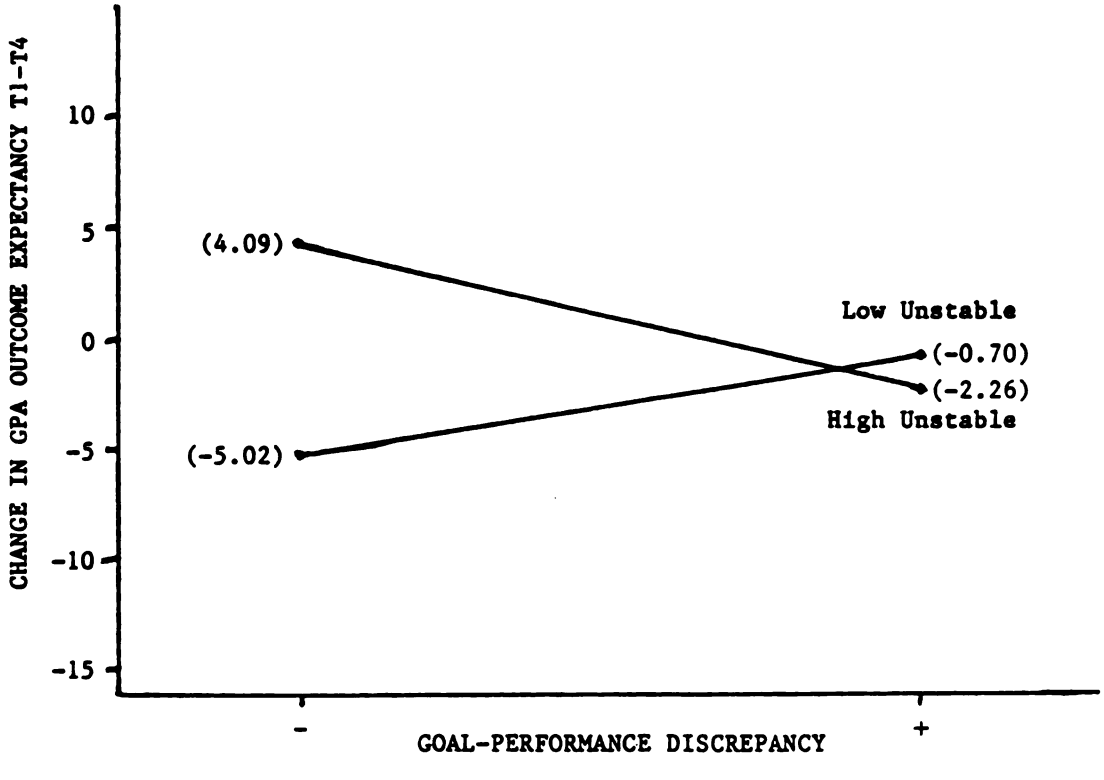
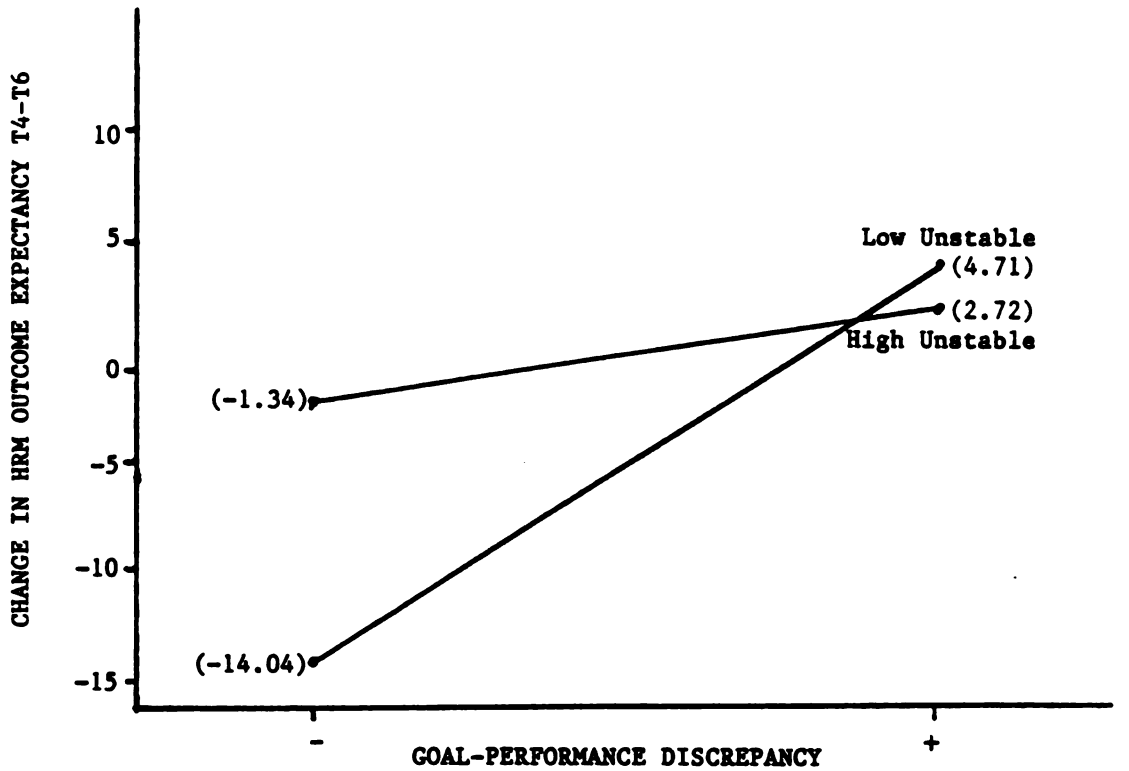


Figure 23: Observed interactions between discrepancies and attributions on shifts in outcome expectancies from T4 to T6 for subjects not changing their goal.



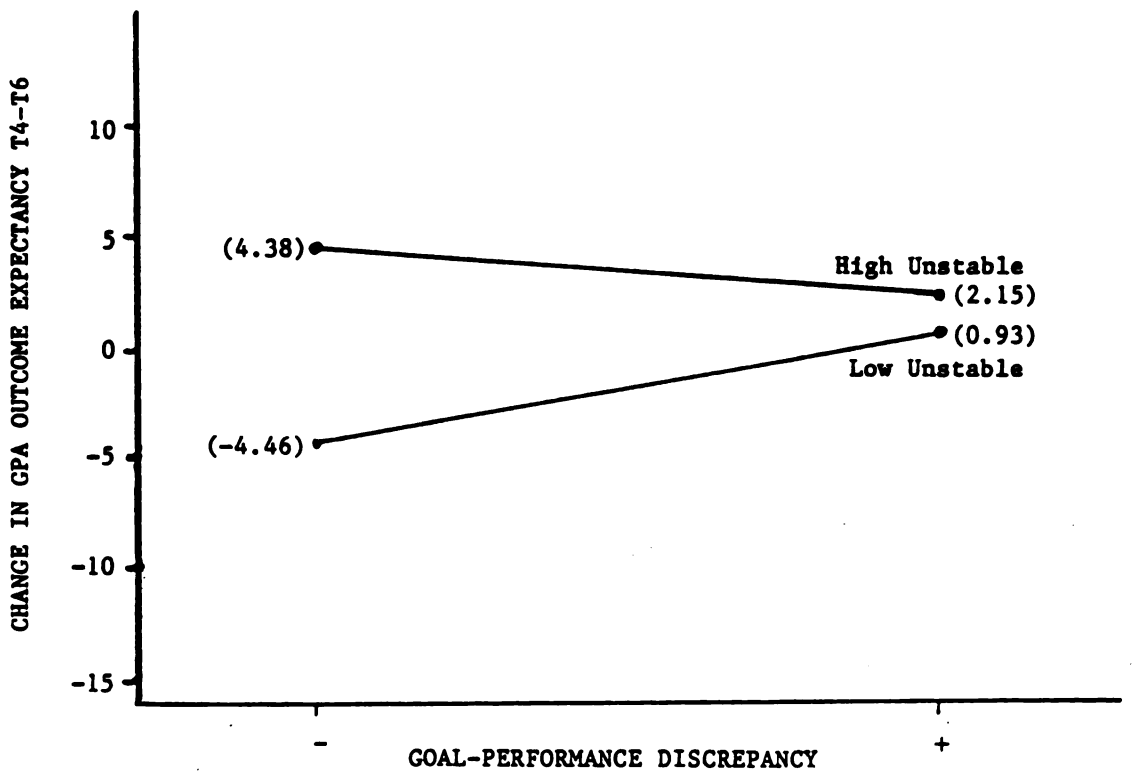
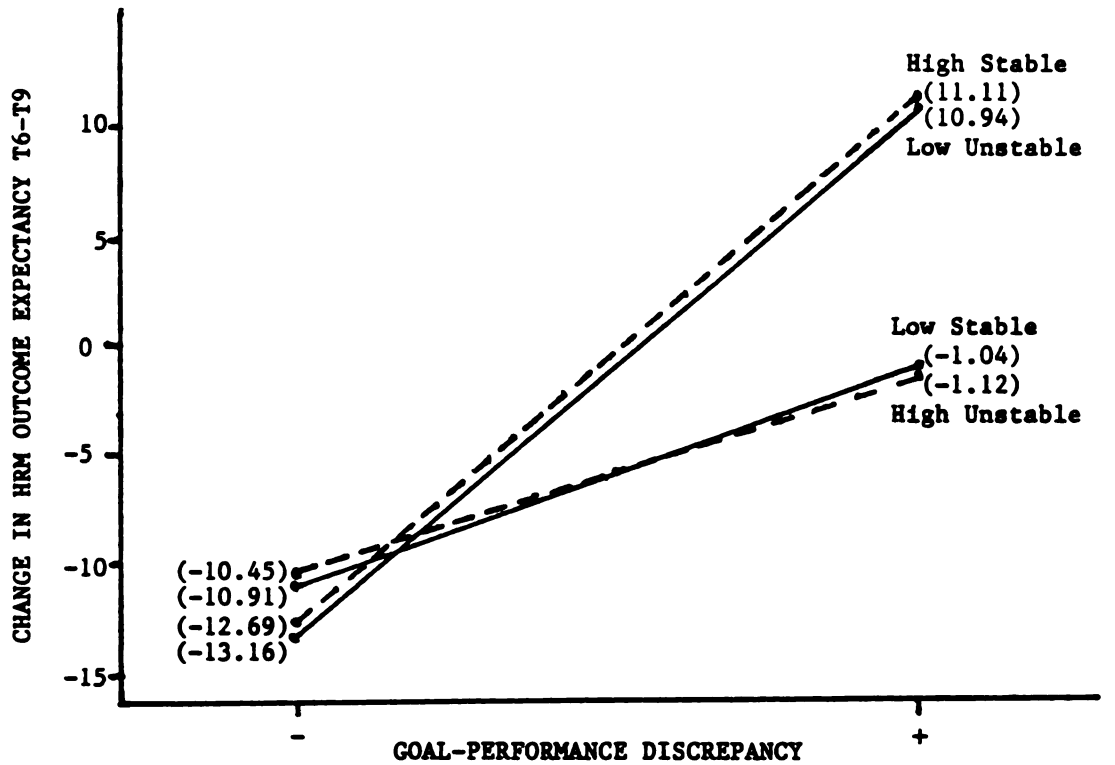


Figure 24: Observed interactions between discrepancies and attributions on shifts in outcome expectancies from T6 to T9 for subjects not changing their goal.



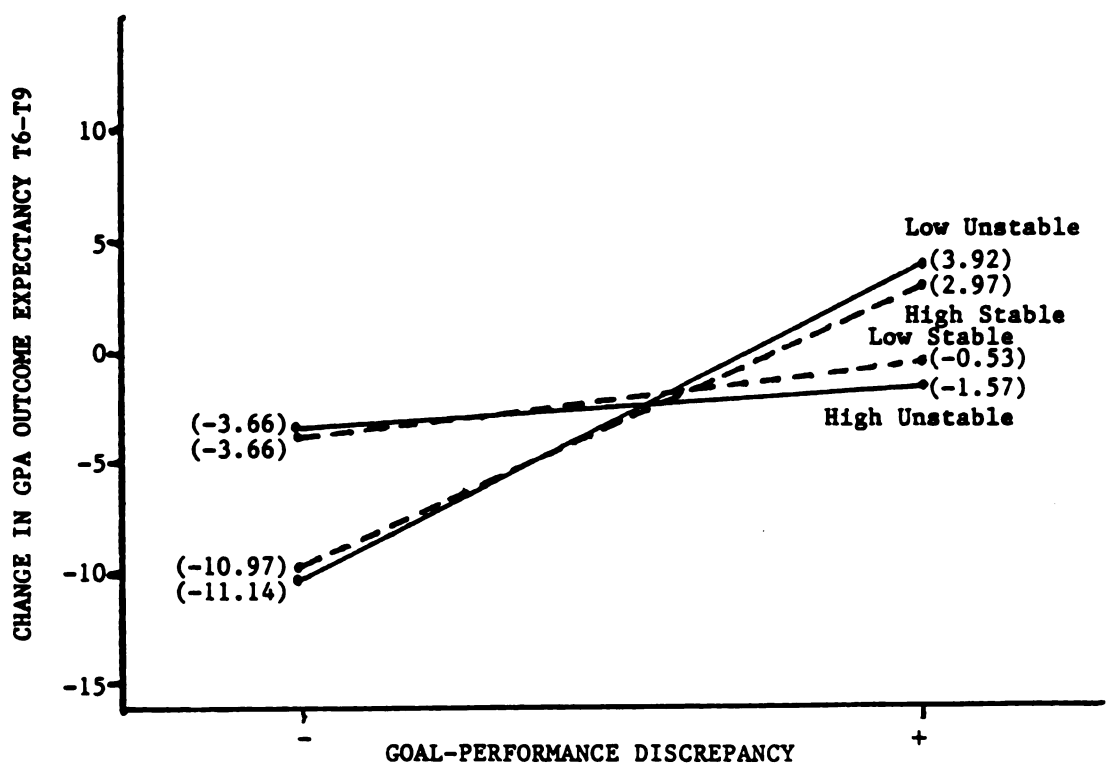
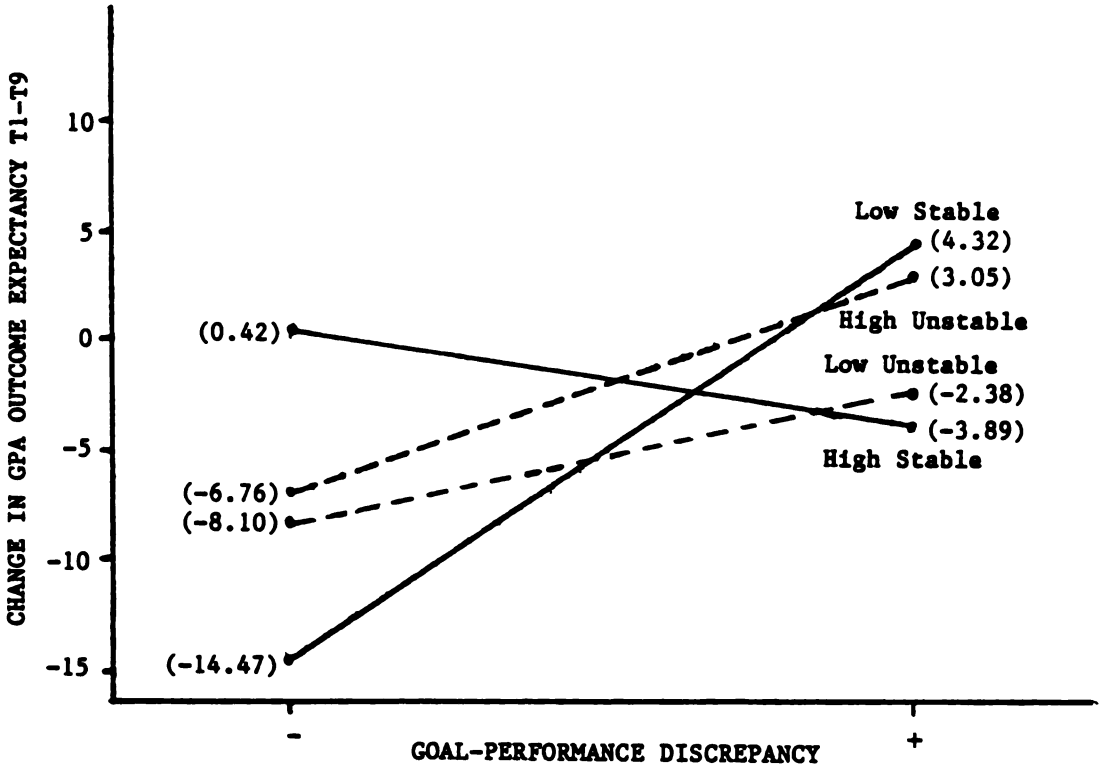


Figure 25: Observed interaction between discrepancies and attributions on shifts in outcome expectancies from T1 to T9 for subjects not changing their goal.

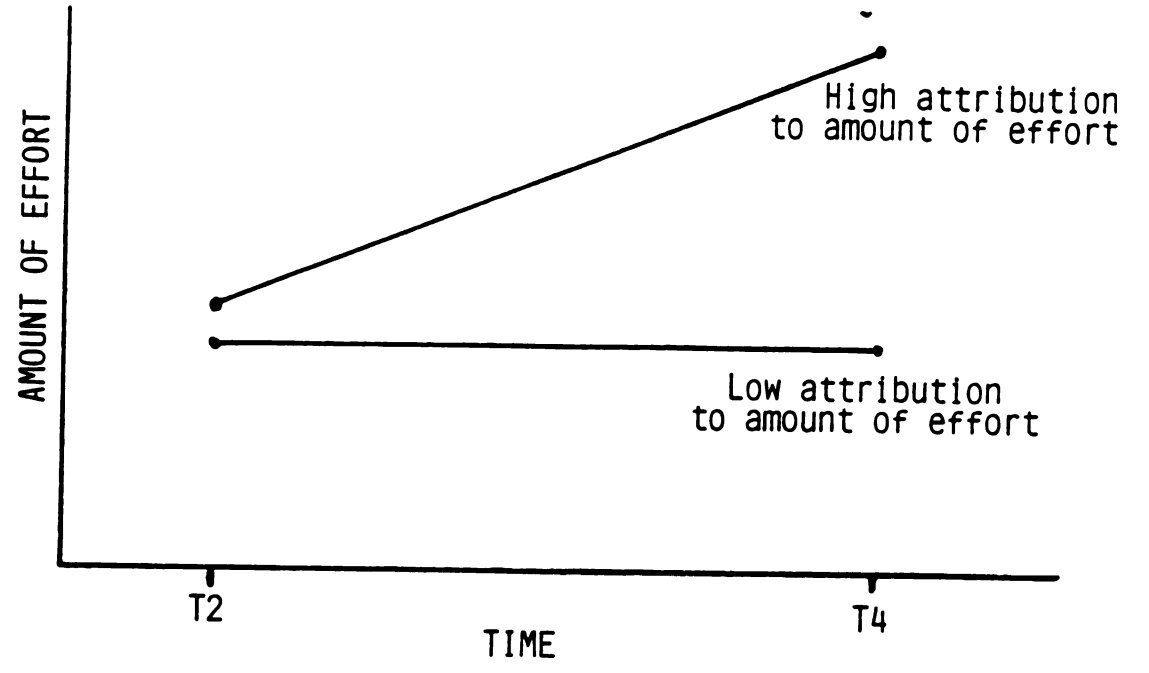


change their HRM course grade goal were included in these analyses. Similar comparisons were made with direction of effort levels and direction of effort attributions. Changes in the amount of effort should be significantly higher when attributions for failure are made to amount of effort. No significant differences should be observed when attributions to amount of effort are low. Similarly, changes in the direction of effort should be significantly greater when attributions for failure are made to the direction of effort but not when attributions to the direction of effort are low.

Mean splits were used in dichotomizing subjects on the attribution measures and multiple t-tests were again employed to assess the difference between means at successive time periods. Figure 26 illustrates these hypothesized changes between the weeks before the first performance event (T1 and T2) and the weeks before the next performance event (T3 and T4). This same pattern would be expected between T3 and T4, and T6 and T7. The observed relationships, aggregated over the two time comparisons and across the three distribution of effort dimensions are illustrated in Figure 27. The suggested relationships were not evident in these mean comparisons, as there is virtually no change in either amount or distribution of self-reported effort, regardless of attributions.

The specific values obtained for each of the scholastic activity dimensions at each of the time comparisons are presented in Figures 28 to 31. As evident in Figure 28, hours expended increased significantly when attributions for failure were made to amount of effort as was predicted. Significant changes in hours expended were also observed, however, when attributions to amount of effort were low. Furthermore,

Figure 26: Hypothesized relationships between effort attributions and changes in effort for subjects with a negative discrepancy and not changing their goal.



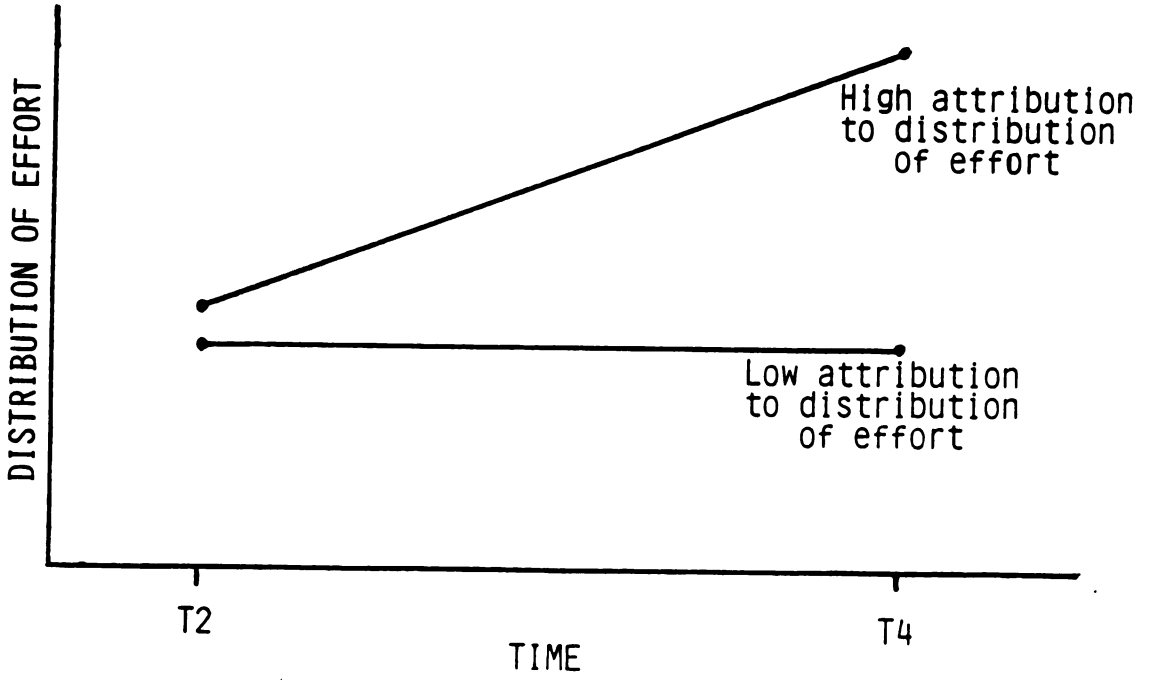


Figure 27: Aggregated observed relationships between attributions and changes in amount of effort for subjects with a negative discrepancy and not changing their goal.

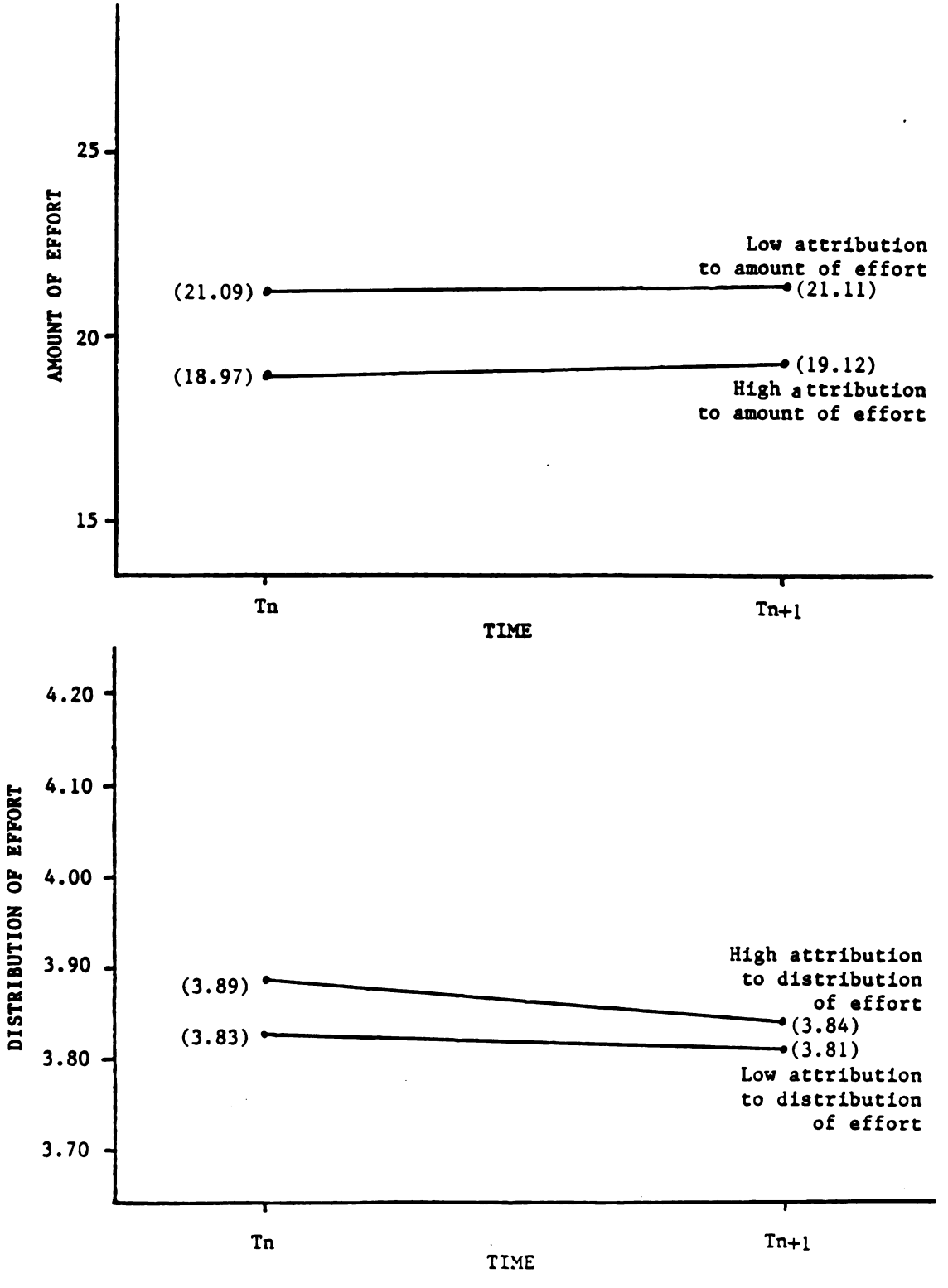
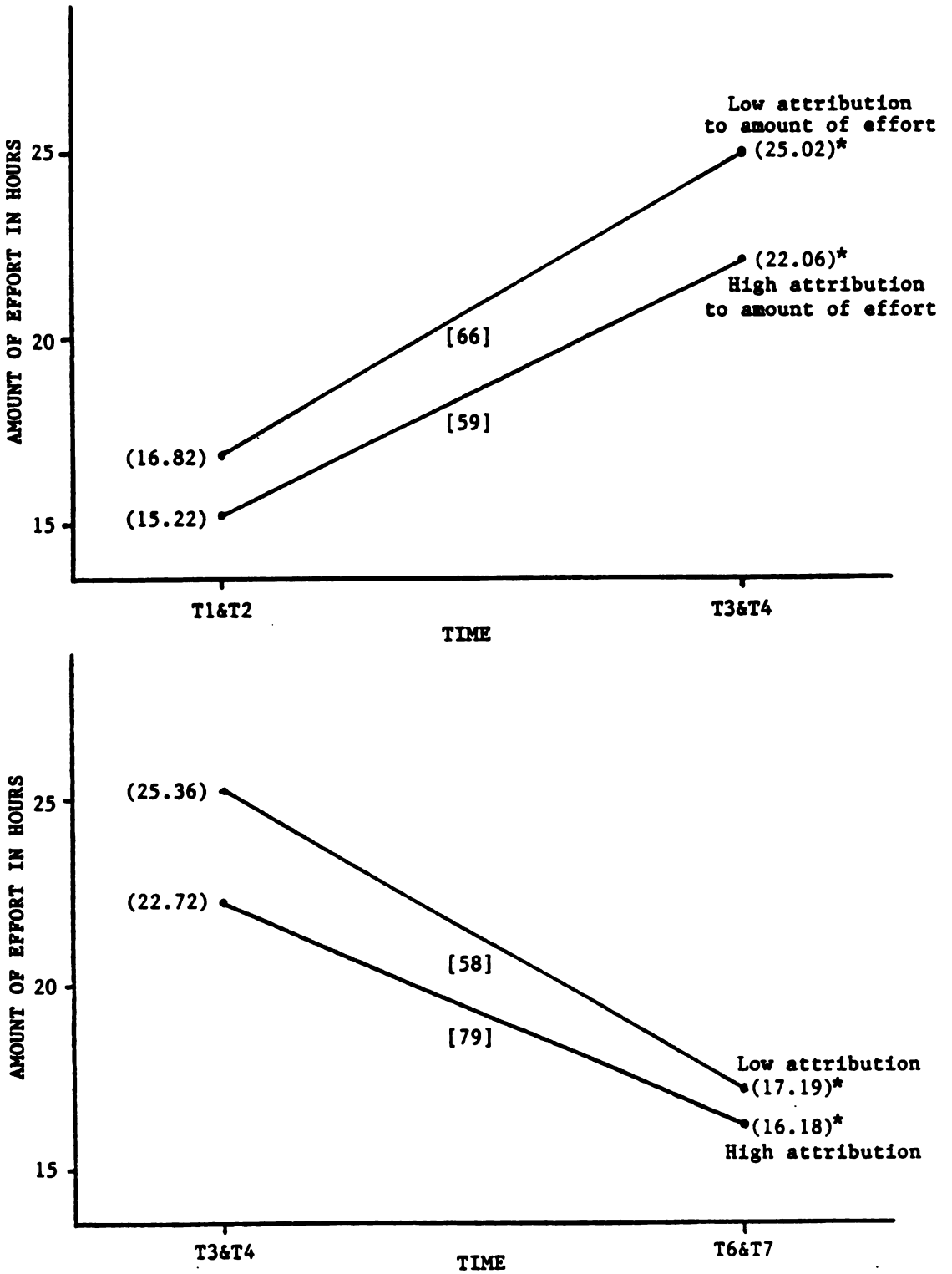
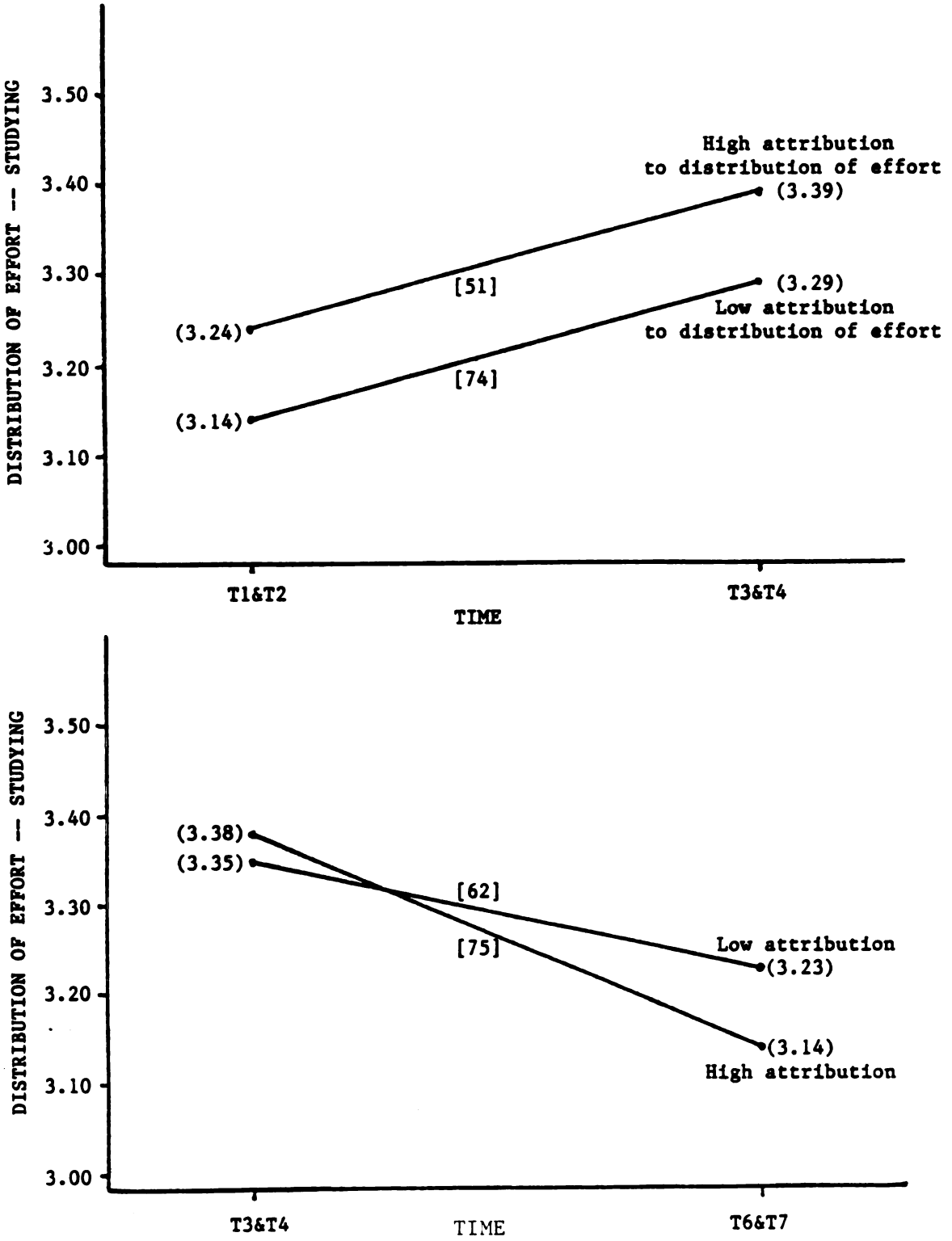


Figure 28: Observed relationships between attributions and changes in amount of effort for subjects with a negative discrepancy and not changing their goal.



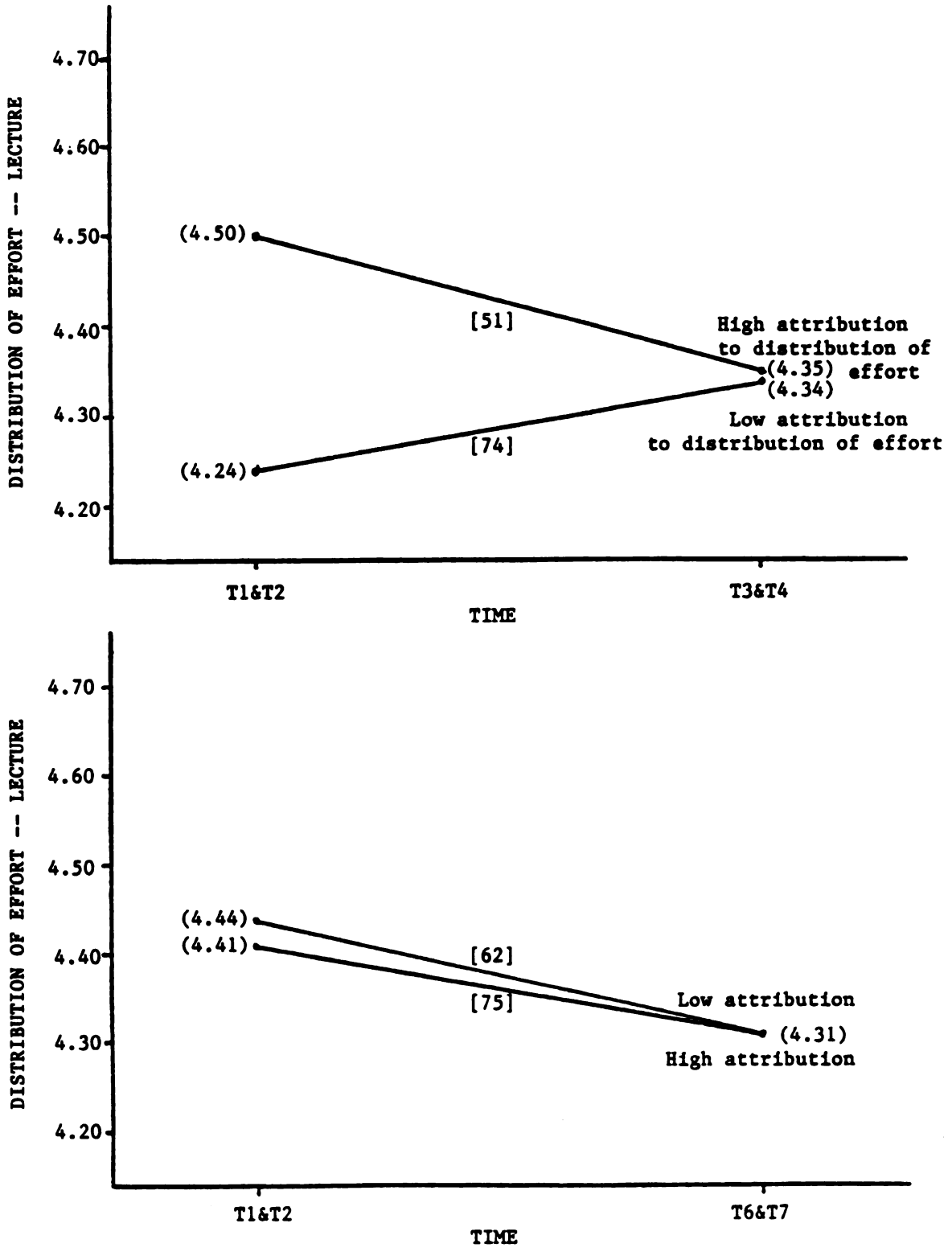
Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

Figure 29: Observed relationships between attributions and changes in distribution of studying effort for subjects with a negative discrepancy and not changing their goal.



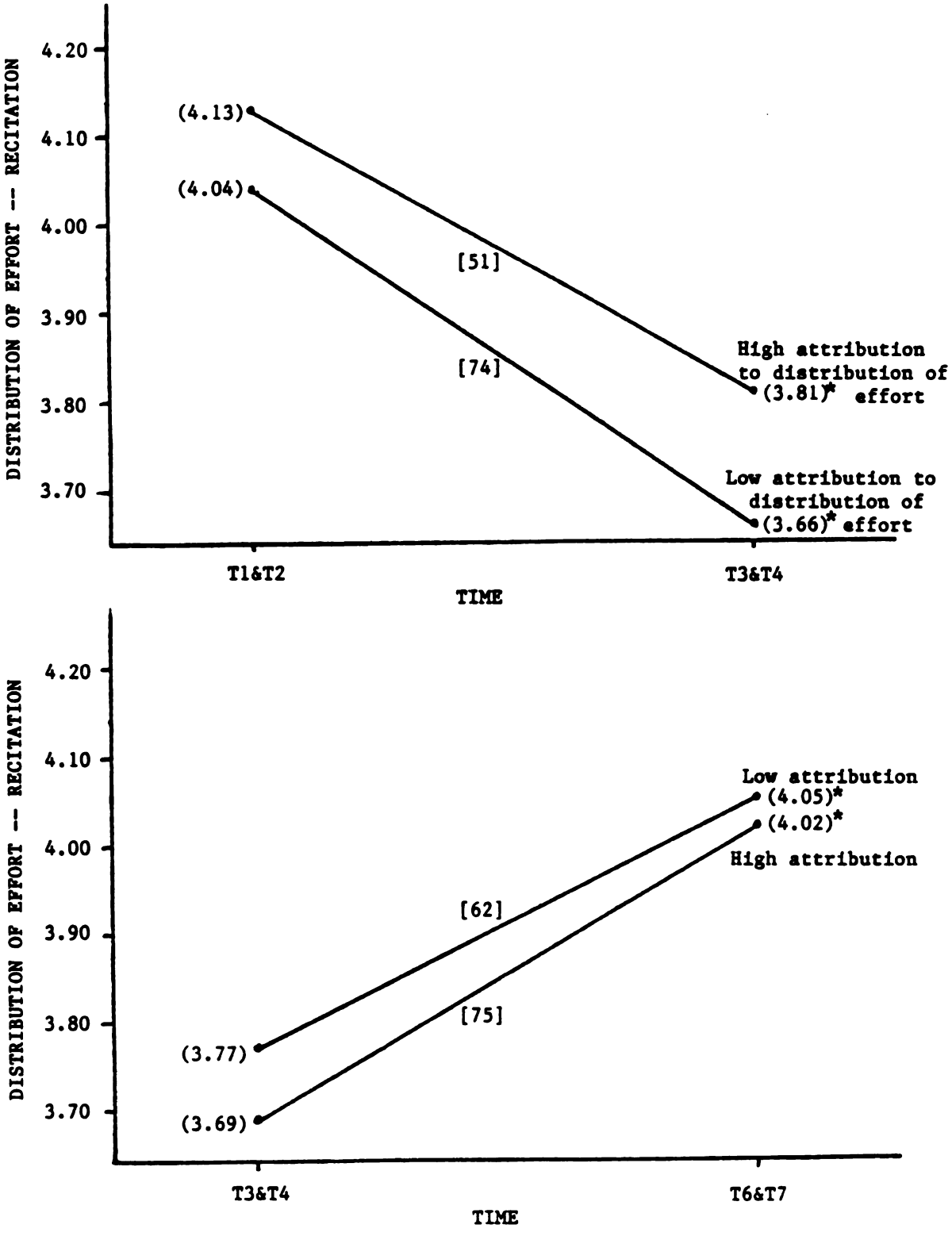
Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

Figure 30: Observed relationships between attributions and changes in distribution of lecture effort for subjects with a negative discrepancy and not changing their goal.



Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

Figure 31: Observed relationships between attributions and changes in distribution of recitation effort for subjects with a negative discrepancy and not changing their goal.



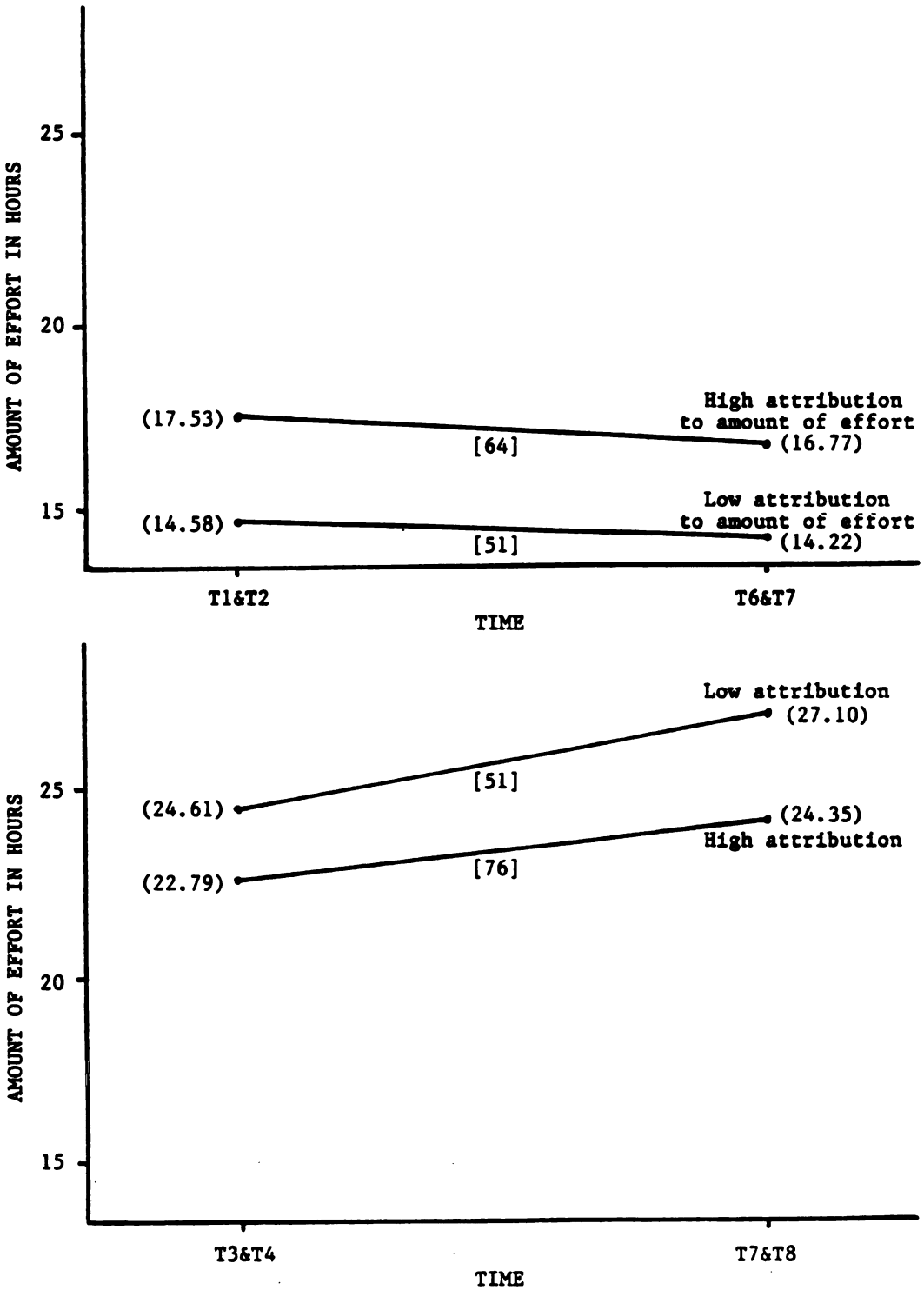
Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

hours fell from T3 and T4 to T6 and T7. In addition, for both time comparisons, the change in hours was actually slightly greater following low attributions than when high attributions were made. For the three distribution of effort dimensions (Figures 29 to 31), changes were either significant (for recitation) or not significant (studying and lecture) regardless of whether attributions to distribution of effort were high or low. For these dimensions, changes in effort were larger following high attributions in only half of the comparisons.

The comparisons shown in Figures 28 to 31 are between successive performance events. Given the nature of the course, however, successive performance events are dissimilar, and as evidenced in Tables 1 and 11, dissimilar performance events operate differently. This is also evident by the fact that the signs of the slopes in Figures 28 to 31 frequently change between the two time comparisons. Given this, comparisons were also made between changes in effort for successive <u>similar</u> performance events (i.e., T1 & T2 vs. T6 & T7 and T3 & T4 vs. T7 & T8). The mean values obtained for each of these comparisons are presented in Figures 32 to 35.

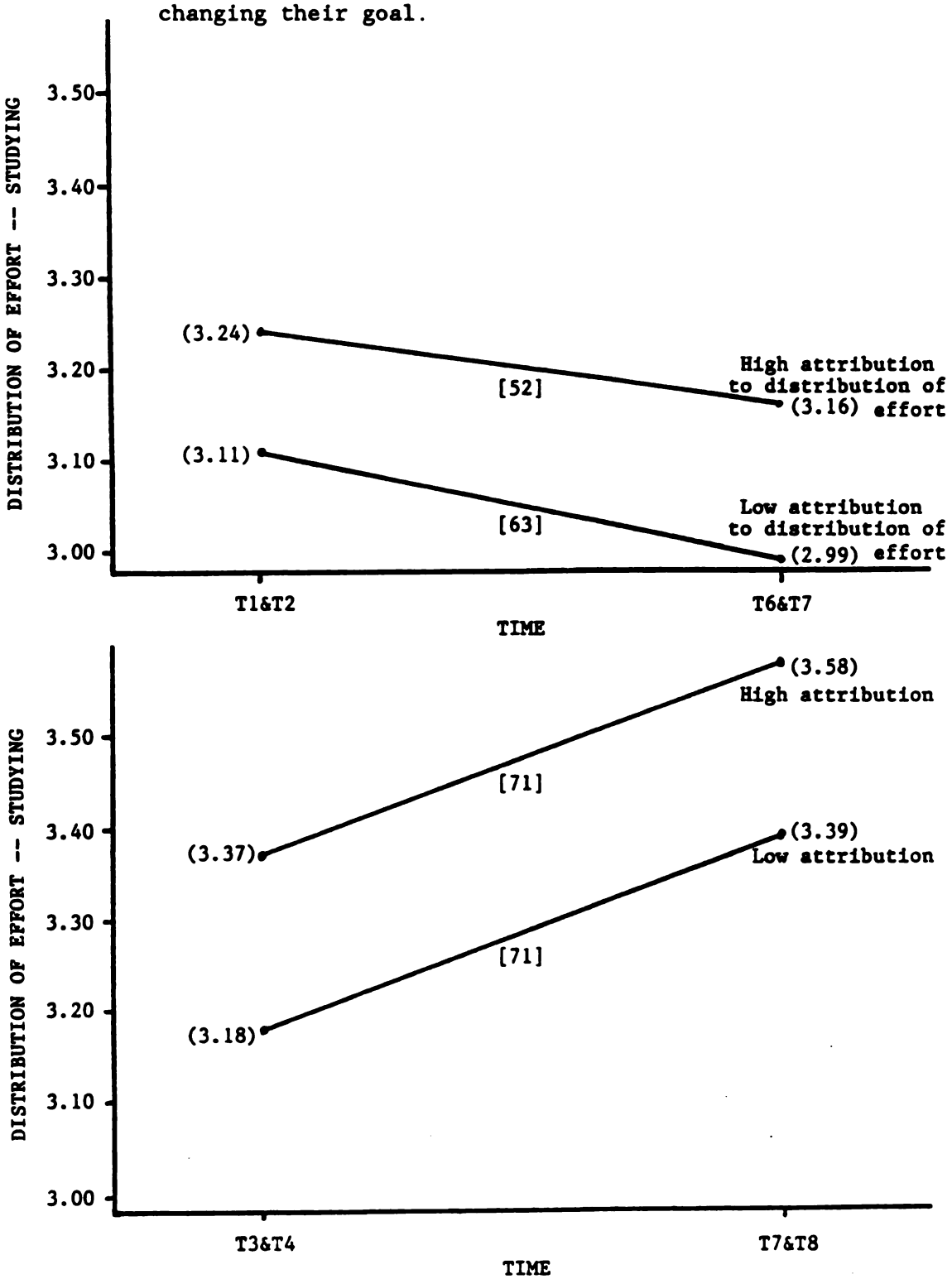
Even when comparisons are made between similar successive events, the predicted patterns are not evident. Changes in hours expended were not significant regardless of attributions to amount of effort. For the comparison between quizzes (i.e., T1 & T2 vs. T6 & T7), the change in hours was actu slightly greater following high attributions, but for the exam comparison (i.e, T3 & T4 vs. T7 & T8), the change was larger when attributions to amount of effort were low. For the distribution of effort dimensions, changes were significant following high attributions in two instances and following low attributions in one. The direction

Figure 32: Observed relationships between attributions and changes in amount of effort for similar performance events for subjects with a negative discrepancy and not changing their goal.



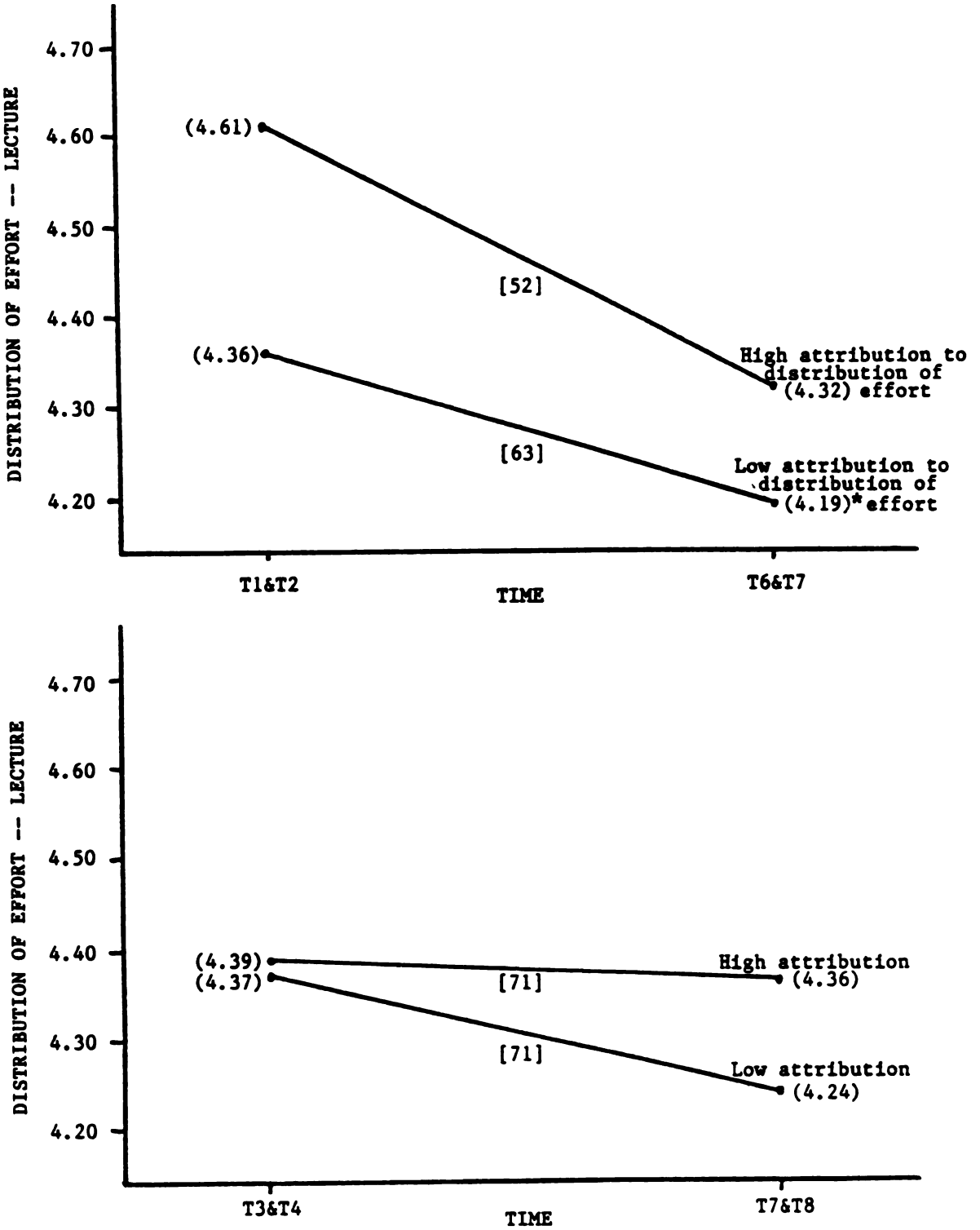
Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

Figure 33: Observed relationships between attributions and changes in distribution of studying effort for similar performance events for subjects with a negative discrepancy and not changing their goal.



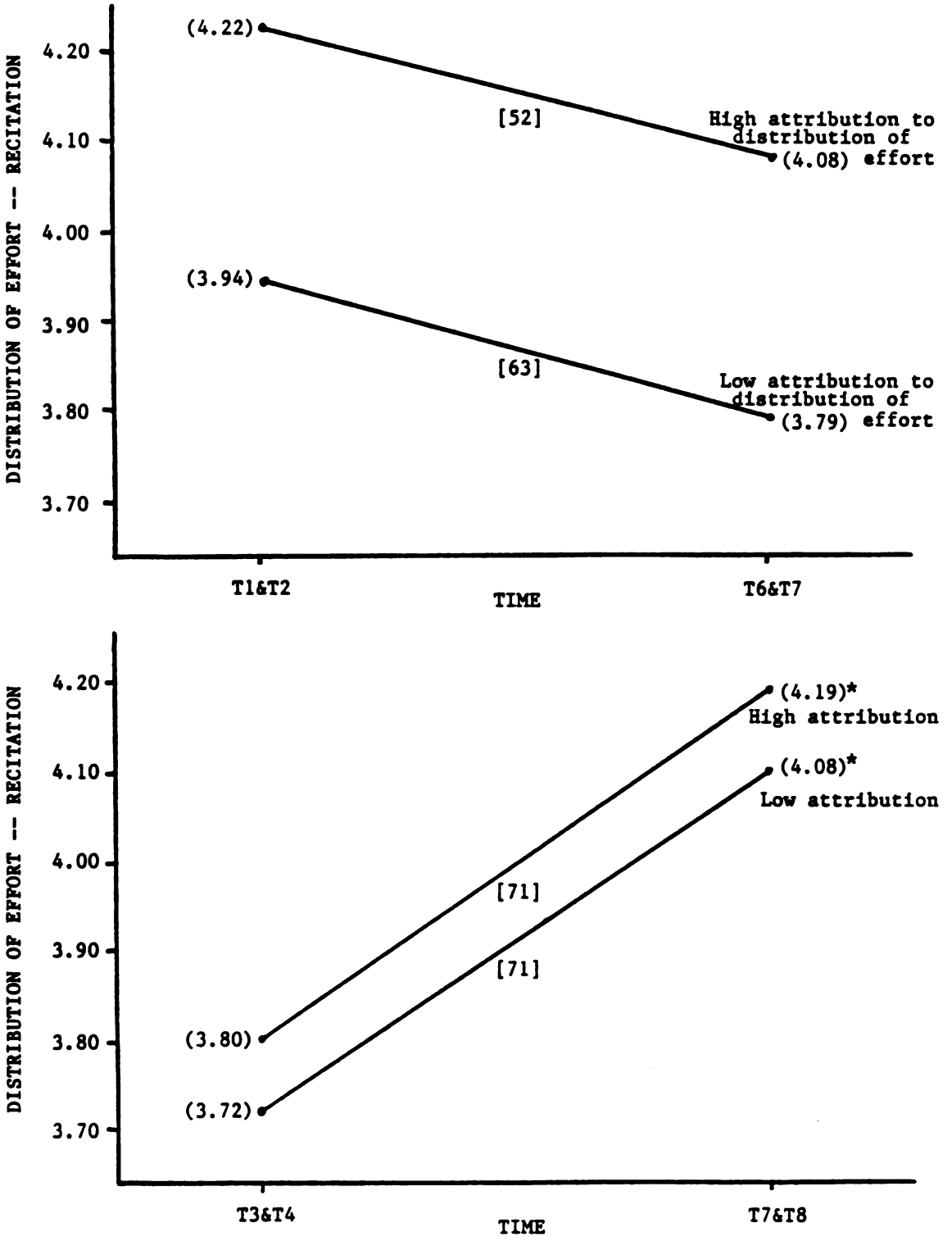
Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

Figure 34: Observed relationships between attributions and changes in distribution of lecture effort for similar performance events for subjects with a negative discrepancy and not changing their goal.



Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

Figure 35: Observed relationships between attributions and changes in distribution of recitation effort for similar performance events for subjects with a negative discrepancy and not changing their goal.



Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

of change in two of these three cases was the opposite of what was hypothesized. The degree of change was also again not consistently greater following high attributions to distribution of effort. The only trends evident in Figures 28 to 35 are that effort tended to increase from the first quiz to the midterm, decrease from the midterm to the second quiz, also decrease from the first quiz to the second quiz but increase from the midterm to the final. No consistent role of attributions is evident from these mean comparisons.

This hypothesis was also tested by calculating zero-order correlation coefficients between (a) amount of effort attributions and subsequent changes in hours reported on the scholastic activity diaries and (b) direction of effort attributions and subsequent changes in responses to the three dimensions of the scholastic activity inventory. These correlations were expected to be positive, and are presented in Table 13 for all four of the comparisons discussed above. The results of the correlational analyses reflect those of the mean comparisons. The average correlation, weighted by sample size ($\bar{r}_w$), between amount of effort attributions and subsequent changes in hours was 0.04. The average weighted correlation between direction of effort attributions and changes in the three scholastic activity dimensions was 0.03. These correlations were significant for only three of the sixteen relationships, and in two of these instances, the direction of the relationship was the opposite of that hypothesized.

In summary, results were mixed regarding the role of attributions. There was support for hypothesis 1a as both the mean comparisons and the moderated regression analyses supported, for the most part, the predicted attribution by discrepancy interaction. For both HRM and GPA goals at

Table 13: Correlations between behavioral attributions and subsequent changes in behavior.

ATTRIBUTION	CHANGE IN SCHOLASTIC ACTIVITIES			
	HOURS	STUDYING	LECTURE	RECITATION
WEEKS 1 & 2 VS WEEKS 3 & 4				
AMOUNT OF EFFORT	0.14[1]			
DIRECTION OF EFFORT		0.04	0.01	0.11
WEEKS 3 & 4 VS WEEKS 6 & 7				
AMOUNT OF EFFORT	0.15			
DIRECTION OF EFFORT		-0.22	0.06	0.11
WEEKS 1 & 2 VS WEEKS 6 & 7				
AMOUNT OF EFFORT	0.01			
DIRECTION OF EFFORT		0.10	0.05	0.11
WEEKS 3 & 4 VS WEEKS 7 & 8				
AMOUNT OF EFFORT	-0.16			
DIRECTION OF EFFORT		-0.07	0.02	0.01

[1]As only subjects who had negative discrepancies and who did not change their HRM goal were included, n ranges from 95 to 122, $p < .05$ for correlations greater than 0.15.

multiple time comparisons, attributions to stable causes were associated with greater changes in outcome expectancies following goal-performance discrepancies than when attributions were made to unstable causes. The hypothesized main effects of discrepancies on outcome expectancies were also, for the most part, obtained. In all of these instances, expectancies increased following positive discrepancies and decreased when discrepancies were negative. There was no support, however, for hypothesis 1b in either the mean comparisons or the correlational analyses. Even when similar performance events were compared, causal attributions to the amount or distribution of effort did not relate to subsequent changes in the amount of effort expended or the distribution of that effort.

Hypothesis 2 - Role of Attractiveness and Expectancies

Hypothesis 2a

Hypothesis 2a states that the force towards the attainment of a goal will be positively related to commitment to that goal and that subsequent changes in force will be positively related to changes in goal commitment. This hypothesis was first tested by computing zero-order correlation coefficients between the force towards the attainment of goals and commitment towards those goals for both the GPA and HRM grade goals at each of the four times they were chosen. These correlations, presented in Table 14 are significant for both goals at all four time periods. This relationship was slightly stronger for the HRM goal on average ($\bar{r}_w$ = 0.24) than for the GPA goal ($\bar{r}_w$ = 0.19).

This hypothesis was also tested by comparing mean levels of goal commitment at successive time periods for subjects who reported changes in the force towards their chosen goal but did not alter their goal.

Table 14: Correlations between force towards chosen goals and commitment towards those goals.

	FORCE TOWARDS HRM GOAL	FORCE TOWARDS GPA GOAL
AT TIME 1	0.29[1]	0.15
AT TIME 4	0.17	0.17
AT TIME 6	0.25	0.20
AT TIME 9	0.26	0.23

[1] n ranges from 244 to 266, $p < 0.001$ for correlations greater than 0.15.

Given Hypothesis 2a, it was expected that subjects who reported an increase in the force towards their goal, would also report a significantly higher level of goal commitment while subjects who reported a decrease in their force towards their goal, should have significantly lower levels of commitment. This expected pattern of means, illustrated in Figure 36 for T1 to T4 was also expected between T4 and T6, T6 and T9, and T1 and T9, for both GPA and HRM grade goals. The observed means, aggregated over these four comparisons, are plotted in Figure 37. The expected pattern of means was not observed in these comparisons, as goal commitment dropped, on average, regardless of changes in the force towards goal attainment. This drop was, however, slightly larger following a decrease in force than following an increase. The specific means obtained for each of the time comparisons are illustrated in Figures 38 to 41.

The trend towards lower levels of goal commitment evident in Figures 37 is also observable in Figures 38 to 41 regardless of changes in force. In only two instances (both T1-T4) were the changes in goal commitment significant, again employing multiple t-tests. Both of these were in the predicted direction, as they were decreases in commitment following a decrease in force towards the goal. There were no increases in goal commitment following an increase in force, let alone any significant increases. As a final test of Hypothesis 2a, changes in the force towards goal attainment were correlated with changes in goal commitment for both GPA and HRM grade goals at each of the time comparisons. These correlations, hypothesized to be significant and positive, are presented in Table 15. The average weighted correlation between changes in force towards the HRM goal and

Figure 36: Hypothesized relationship between changes in force and in goal commitment for subjects not changing their goal.

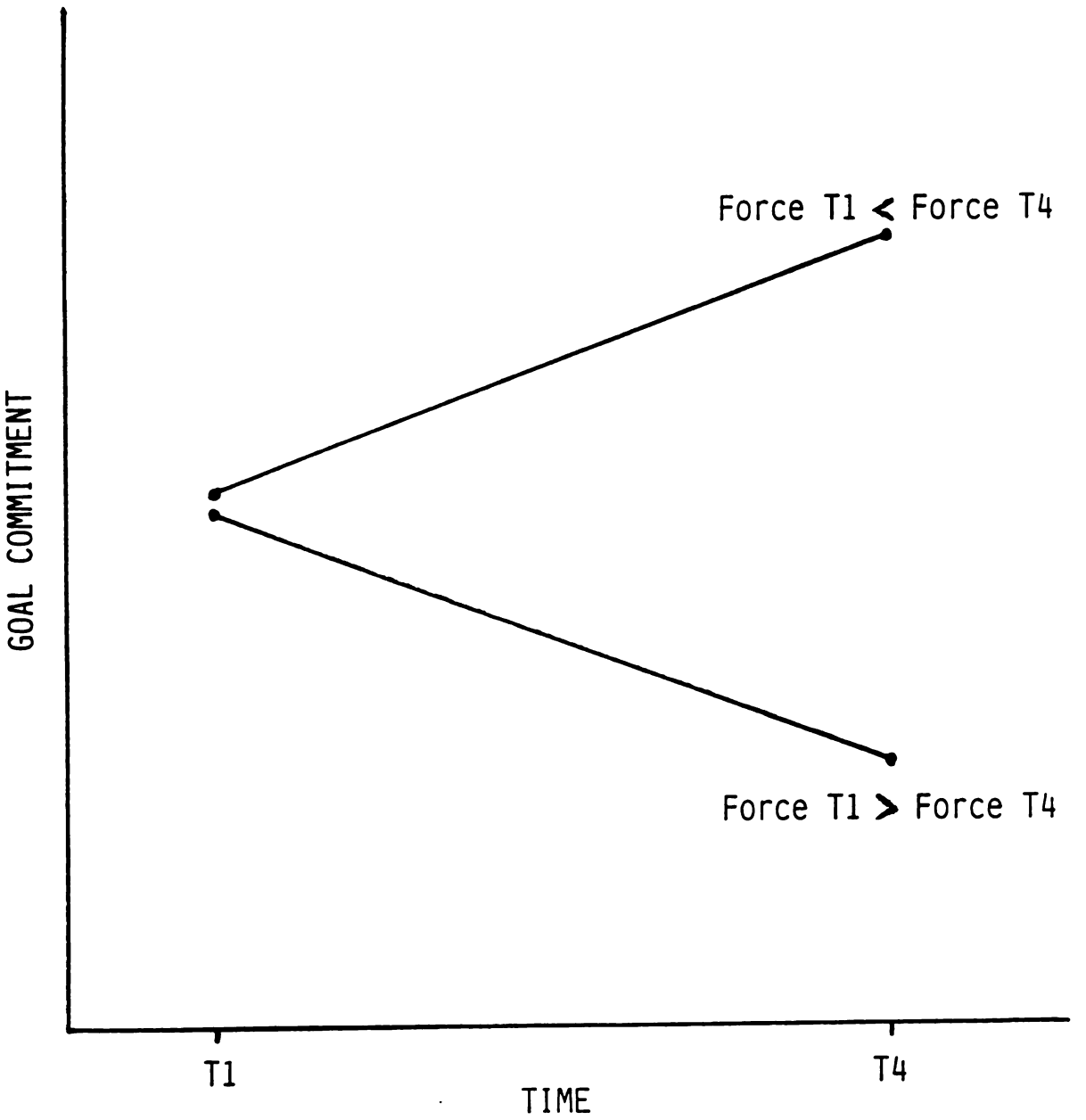
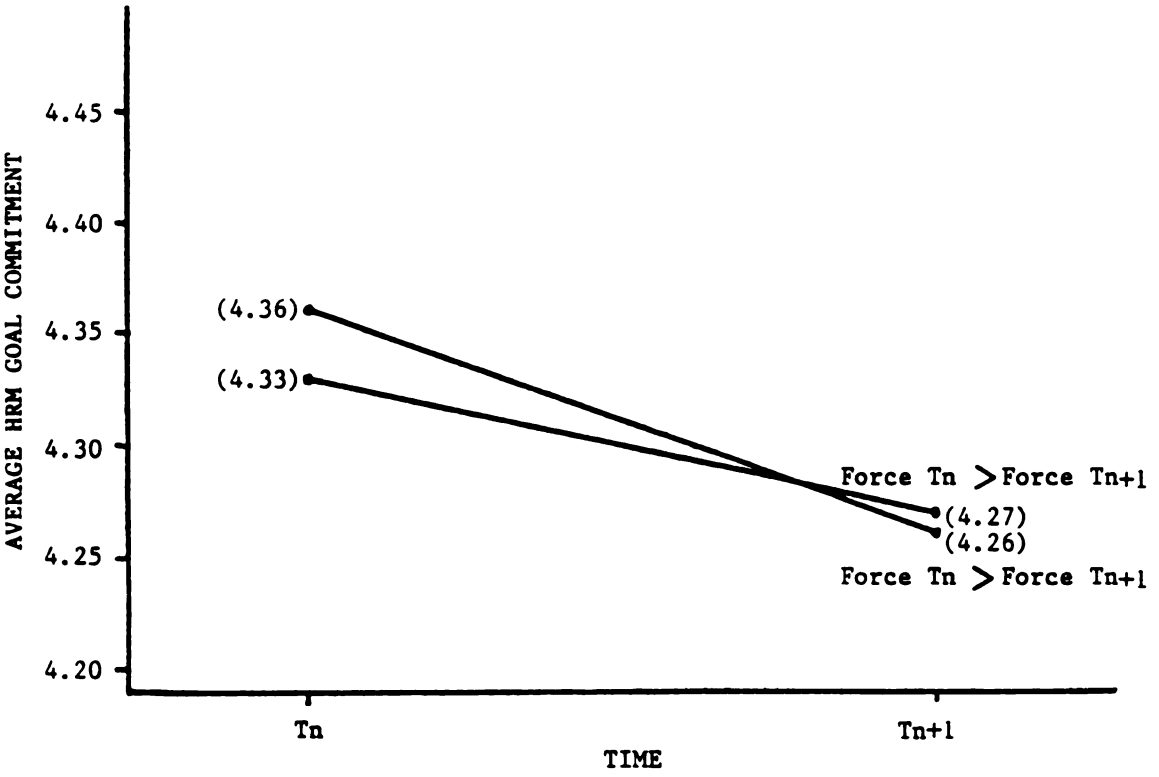


Figure 37: Aggregated observed relationships between changes in force and in goal commitment for subjects not changing their goal.



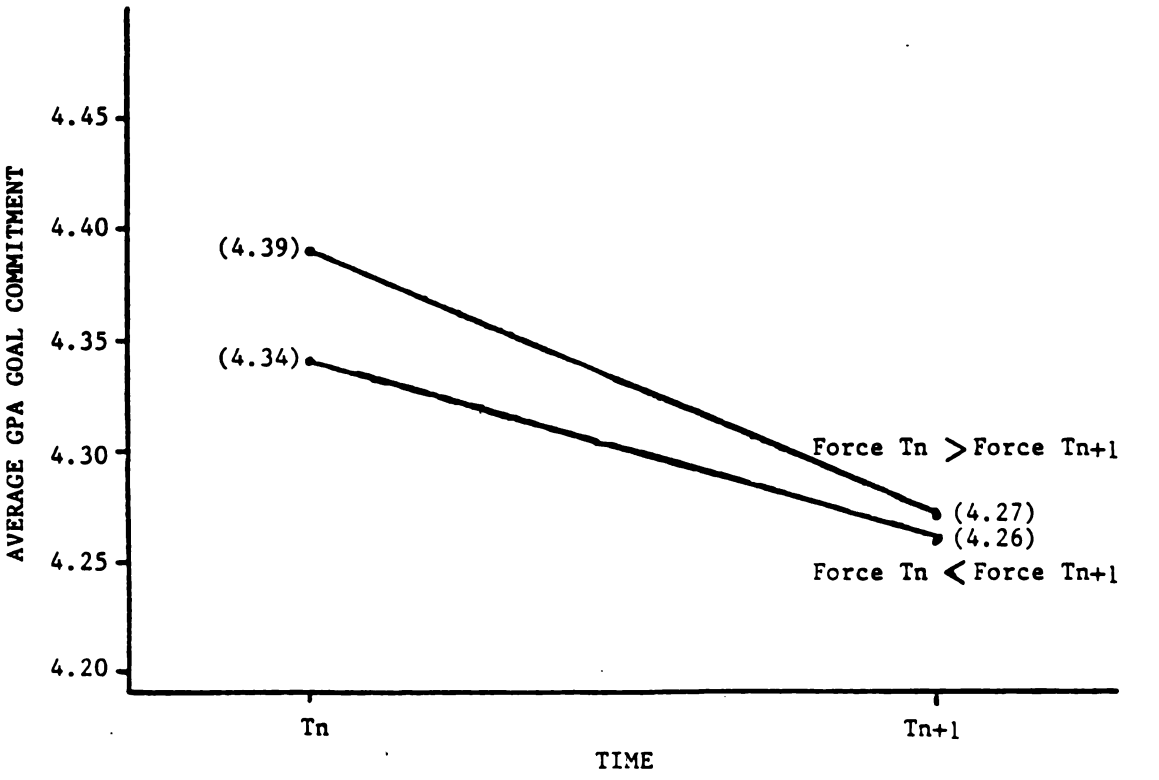
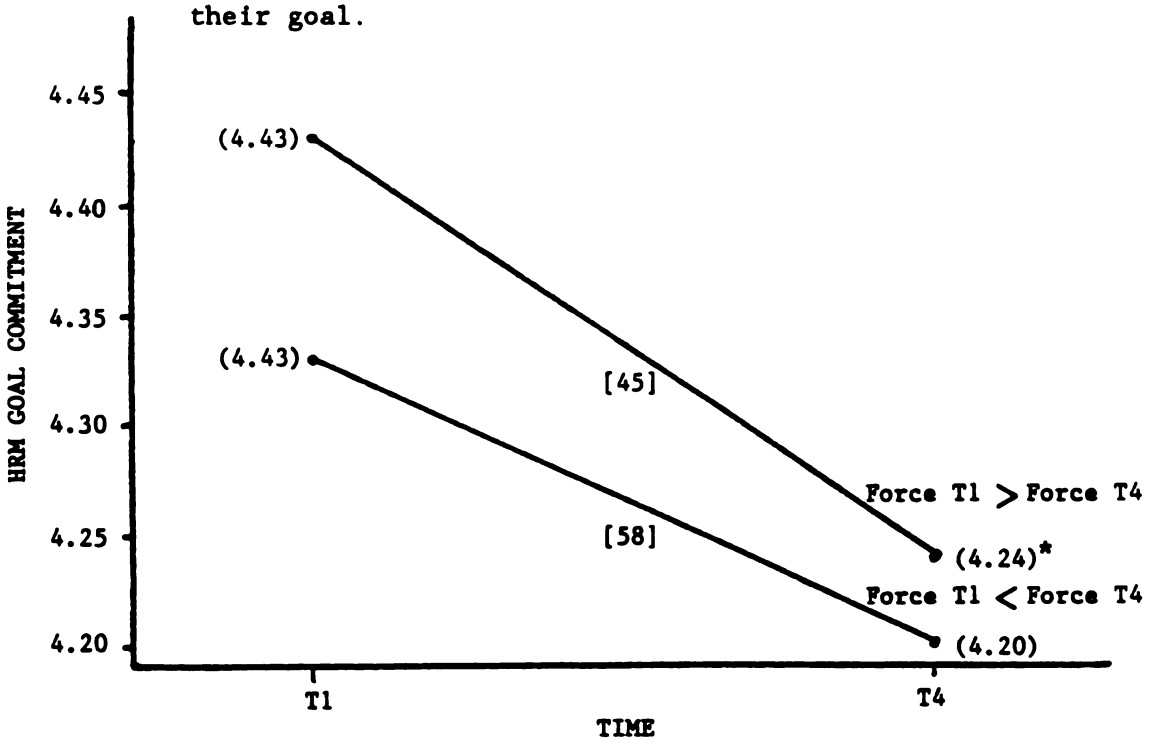
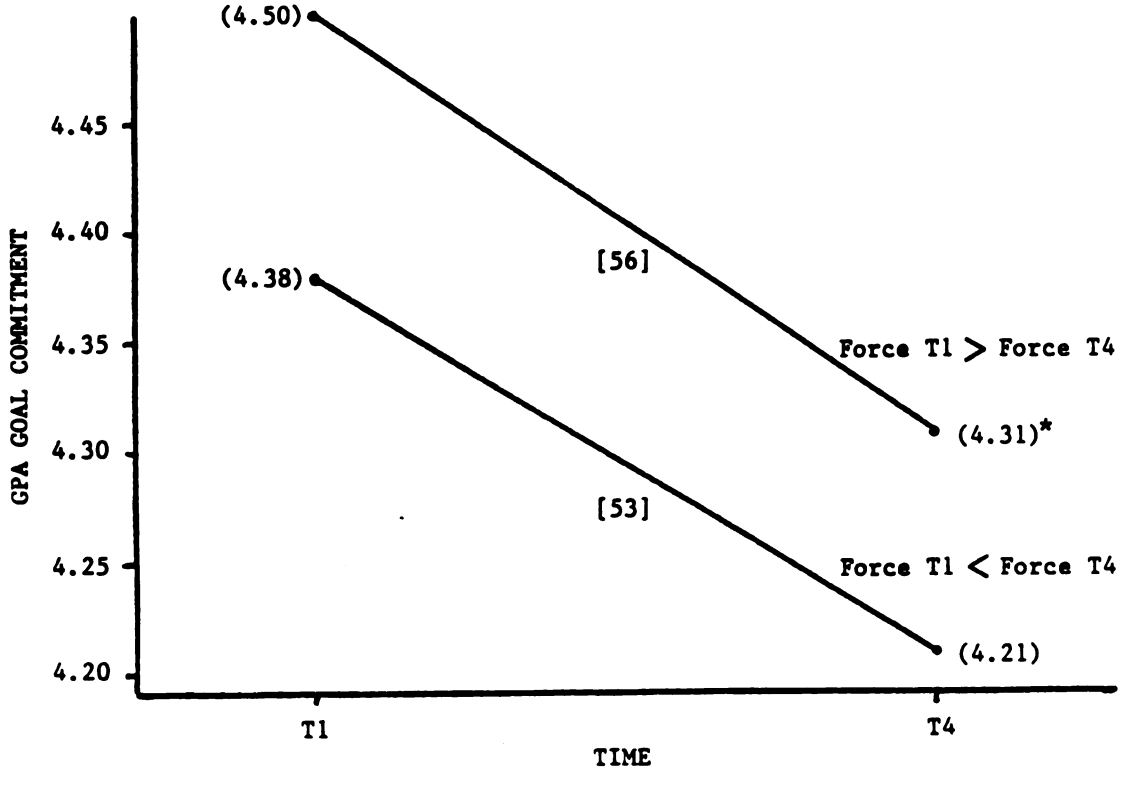


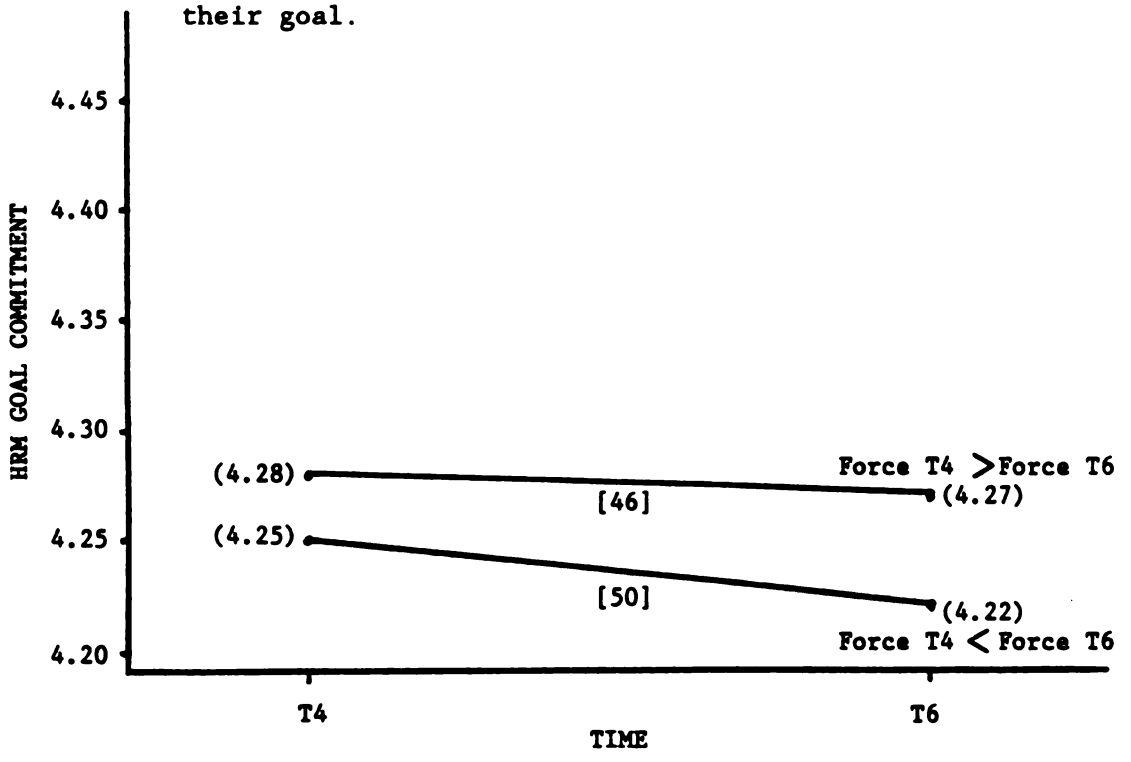
Figure 38: Observed relationships between changes in force and changes in goal commitment from T1 to T4 for subjects not changing their goal.

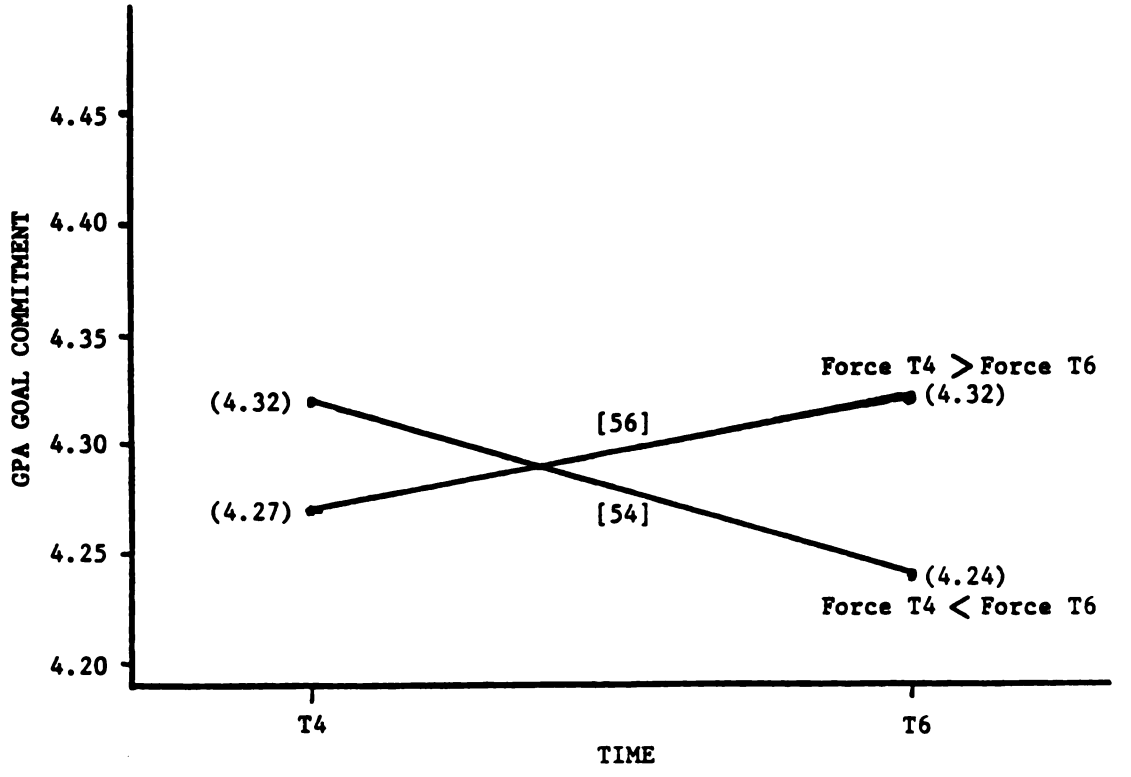




Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

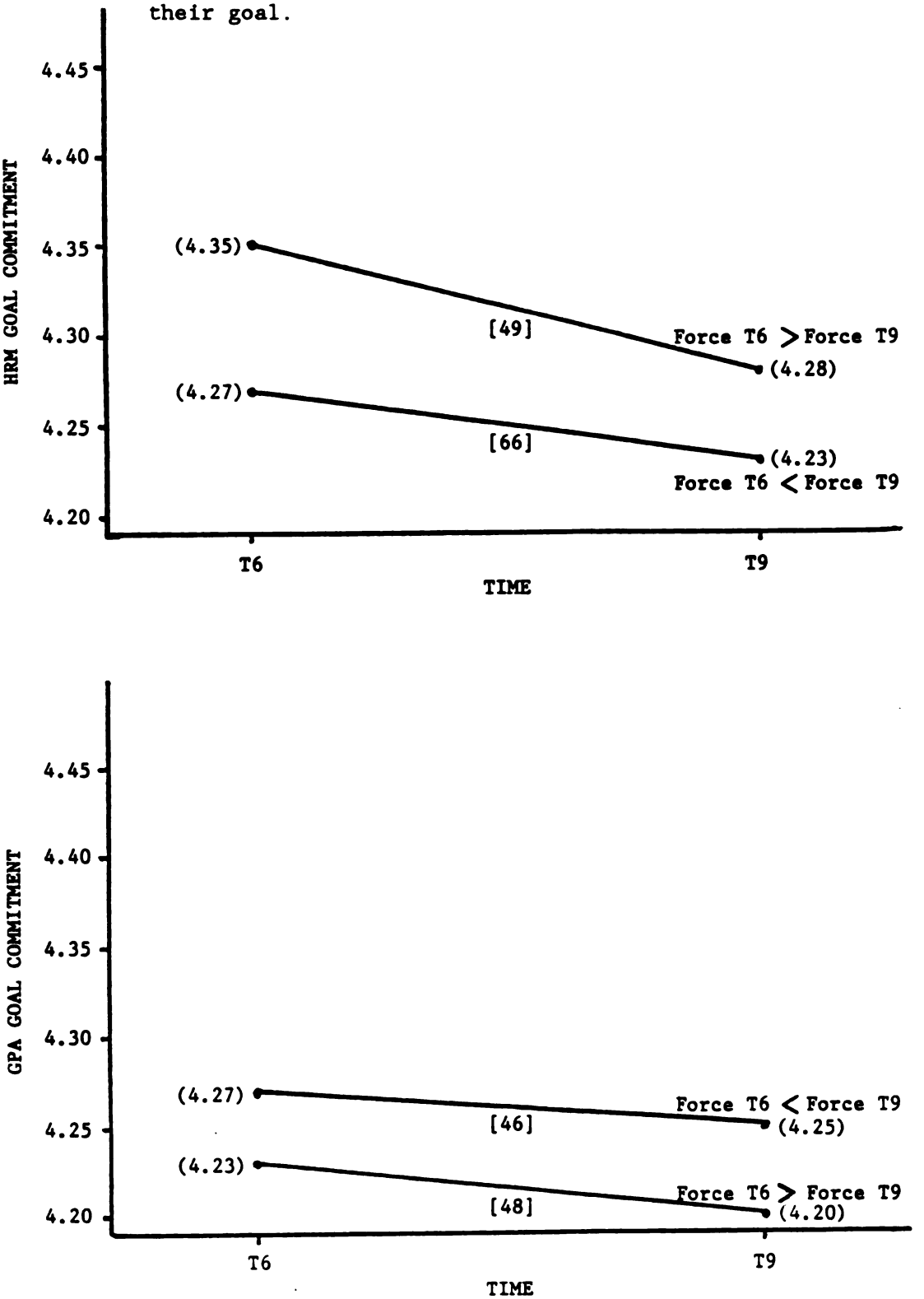
Figure 39: Observed relationships between changes in force and changes in goal commitment from T4 to T6 for subjects not changing their goal.





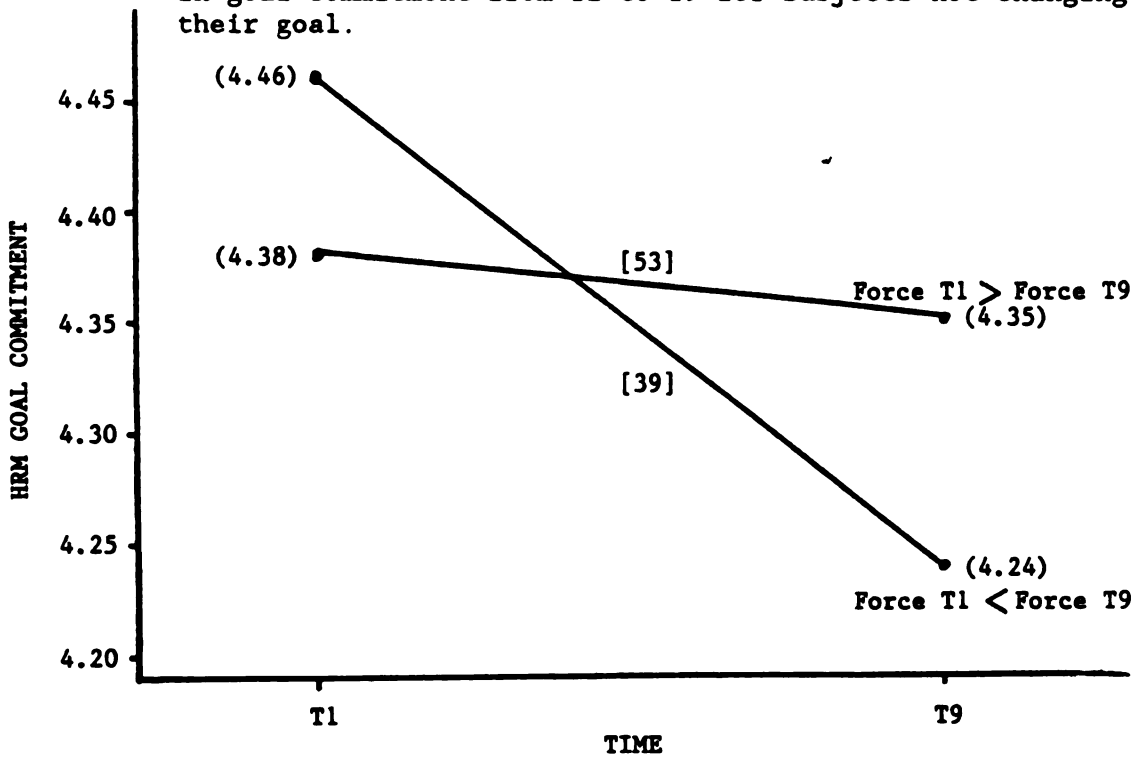
Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

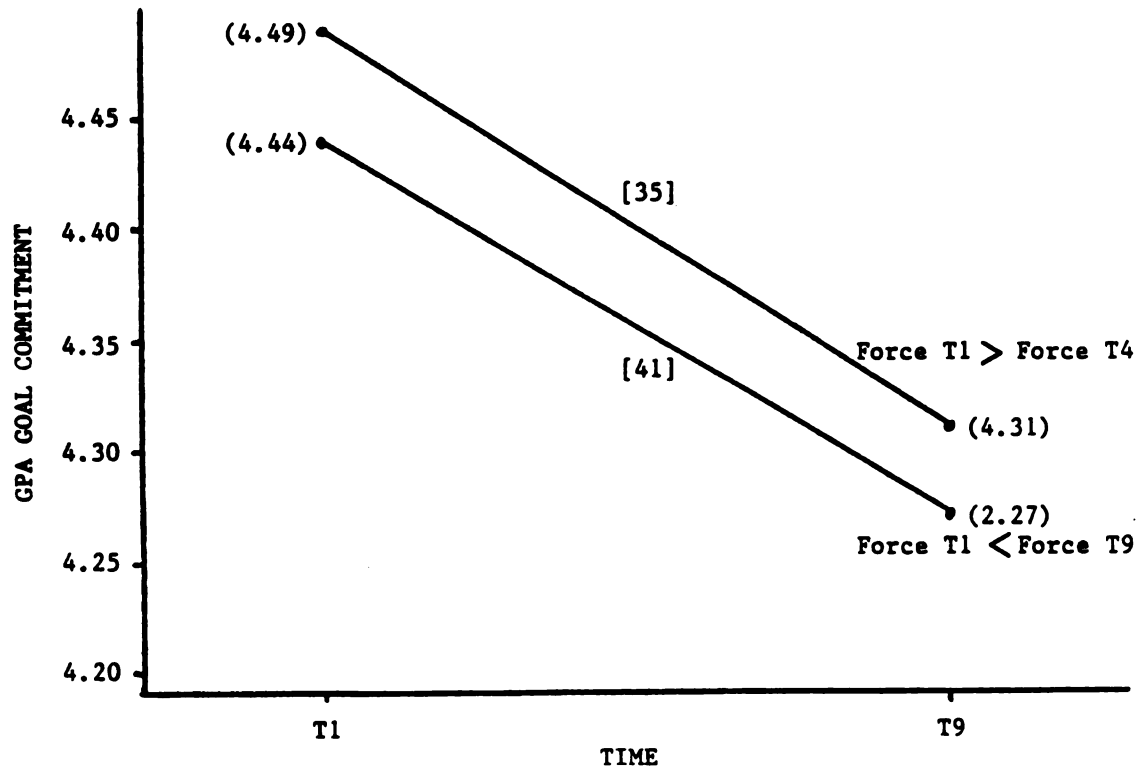
Figure 40: Observed relationships between changes in force and changes in goal commitment from T6 to T9 for subjects not changing their goal.



Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

Figure 41: Observed relationships between changes in force and changes in goal commitment from T1 to T9 for subjects not changing their goal.





Number of subjects in each subgroup in brackets. An asterisk indicates a statistically signficant difference between the two time periods.

Table 15: Correlations between changes in force towards chosen goals and changes in commitment towards those goals.

	FORCE TOWARDS HRM GOAL	FORCE TOWARDS GPA GOAL
FROM TIME 1 TO TIME 4	0.09[1]	-0.01
FROM TIME 4 TO TIME 6	-0.01	0.20
FROM TIME 6 TO TIME 9	0.03	-0.05
FROM TIME 1 TO TIME 9	0.07	-0.08

[1]As only subjects who did not change their goals were included, n ranges from 94 to 160, $p < 0.01$ for correlations greater than 0.20, $p < 0.05$ for correlations greater than 0.15.

changes in goal commitment was 0.05. The average weighted correlation for the GPA goal was 0.02. Only one of the eight correlations was statistically significant (GPA goal T4-T6).

Hypothesis 2b

The next hypothesis suggests a positive relationship between changes in the force towards goal attainment and changes in the goal itself. Before examining the relationship between changes in force towards goal attainment and changes in goals, the relationship between force and goal choice was examined. Zero-order correlation coefficients were calculated between the goal predicted by the force towards goal attainment and the goal actually chosen. These relationships, presented in Table 16, were significant and positive for both HRM and GPA goals at all four time periods. On average, this relationship was slightly stronger for the HRM goal ($\bar{r}_w$ = 0.60) than for the GPA goal ($\bar{r}_w$ = 0.53). These relationships tended to get stronger as the quarter progressed for both goals.

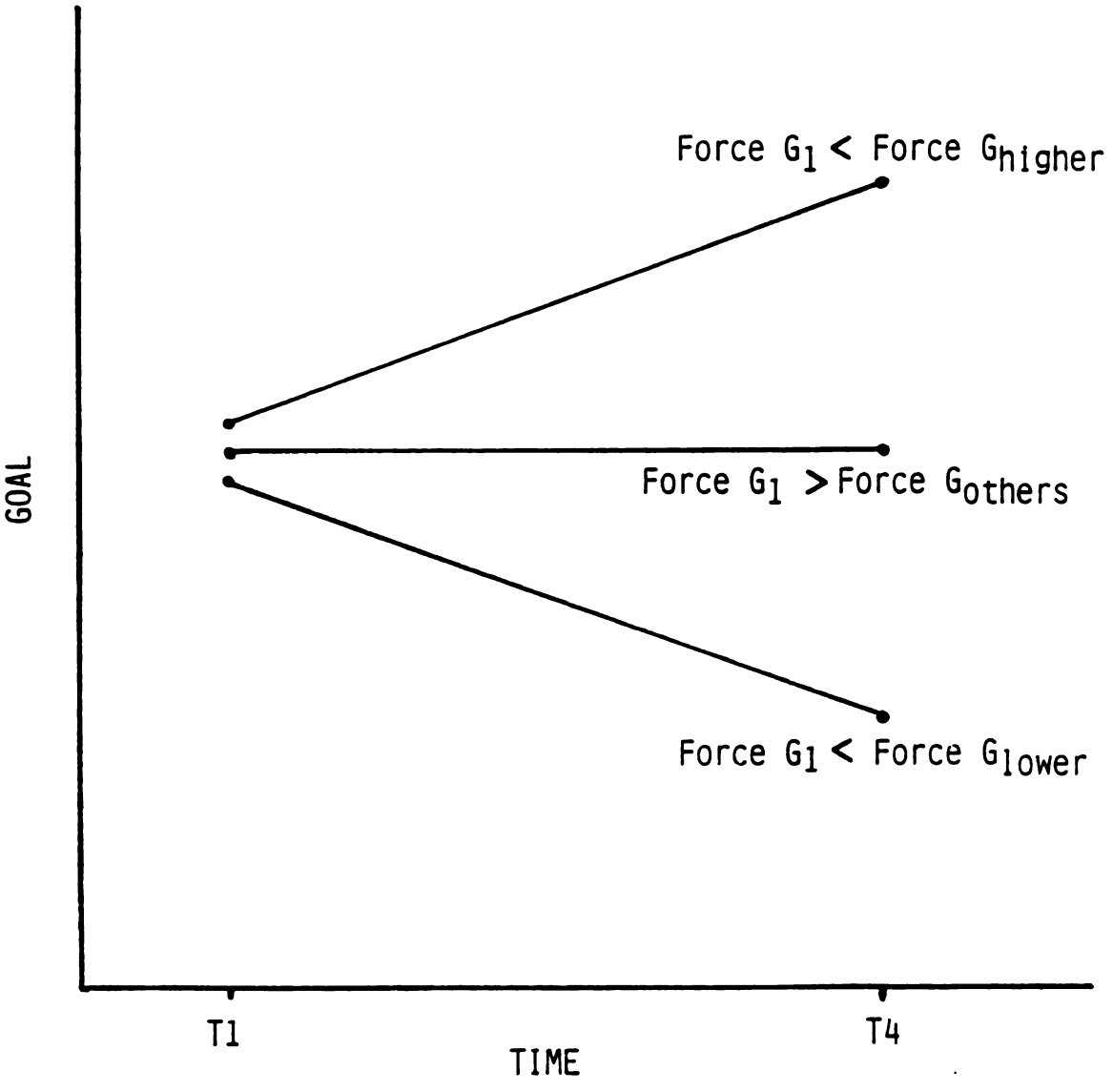
To assess hypothesis 2b, the sample was split into three subgroups and their mean goals compared across successive time periods. As illustrated in Figure 42, no significant change in goal level is expected when the force towards the previously stated goal is still greater than the force towards all other goals. When the force towards some other, higher goal becomes stronger than that towards the previously stated goal, the new goal should be higher than the previously stated goal. Similarly, when the force towards some other, lower goal becomes greater than that towards the previously stated goal, the new goal should be lower.

Table 16: Correlations between goals predicted by force and goals chosen.

	FORCE TOWARDS HRM GOAL	FORCE TOWARDS GPA GOAL
AT TIME 1	0.47[1]	0.44
AT TIME 4	0.57	0.48
AT TIME 6	0.59	0.56
AT TIME 9	0.76	0.62

[1] n ranges from 244 to 265, $p < 0.001$ for correlations greater than 0.15.

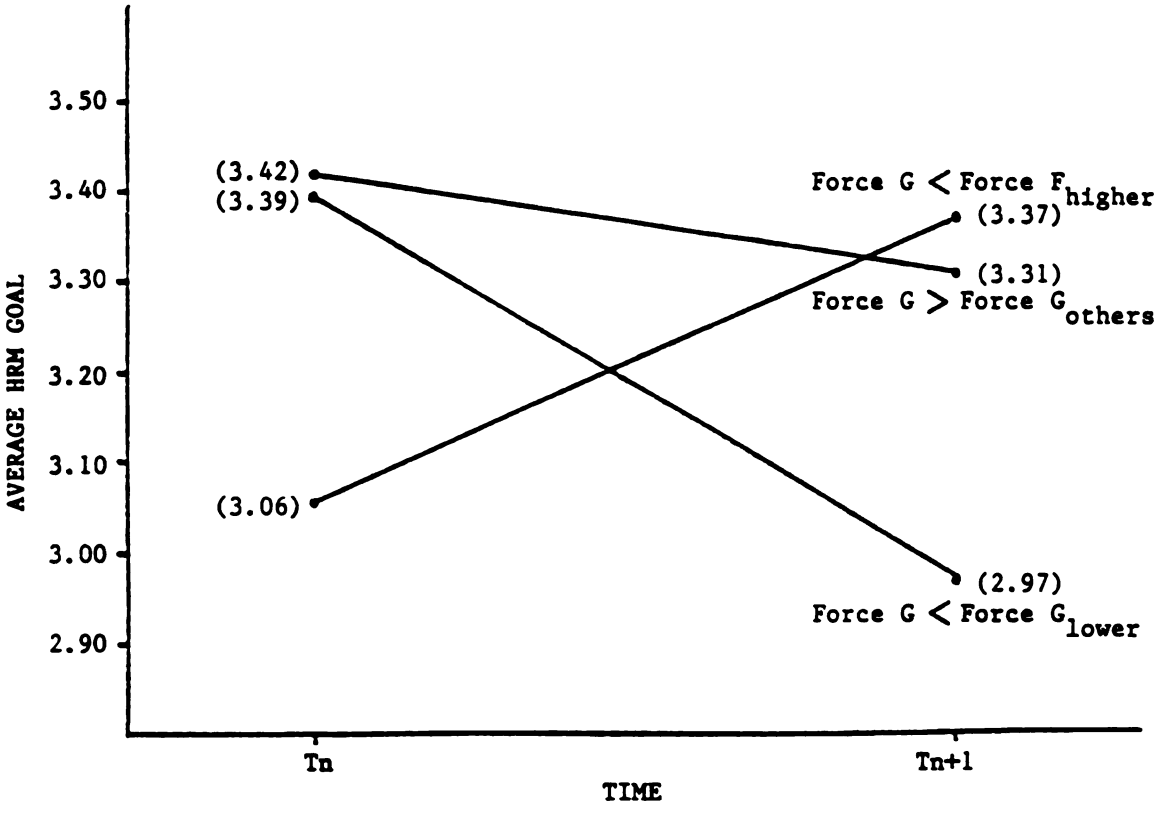
Figure 42: Hypothesized relationship between changes in force and goal change.



This pattern of means was examined both for GPA and HRM grade goals at all four time comparisons. The results of these analyses, aggregated across the four time comparisons are illustrated in Figure 43. The predicted relationships are evident for both the HRM and GPA goal and if the initial mean levels were adjusted to be equal (as assumed in Figure 42) the almost exact pattern of means hypothesized would be obtained. As evident in Figure 42, participants (a) increased their goals when the force towards some higher goal became greater and (b) lowered their goals when the force towards some lower goal became greater than their previously stated goal. When the force towards the original goal remained greater than the force towards all other goals, the mean goal level of subjects, did decrease slightly, but this change was smaller than for the other two subgroups of subjects.

The specific means obtained at each time comparison are illustrated in Figures 44 to 47. The relationships evident in Figure 43 are consistently reflected in the individual comparisons. In 7 out of the 8 comparisons, subjects increased their goals when the force towards some higher goal became highest. Similarly, in 7 out of the 8 comparisons, participants lowered their goals when the force towards some lower goal became highest. When the force towards the original goal remained greater than the force towards all other goals, the mean goal level of subjects, tended to decrease slightly. Again in 7 of 8 comparisons, however, the amount of change was smaller for these subjects than for the others. Because of the vastly different sample sizes among the subgroups created for these comparisons, statistical tests of the significance of these changes would be misleading.

Figure 43: Aggregated observed relationships between changes in force and goal change.



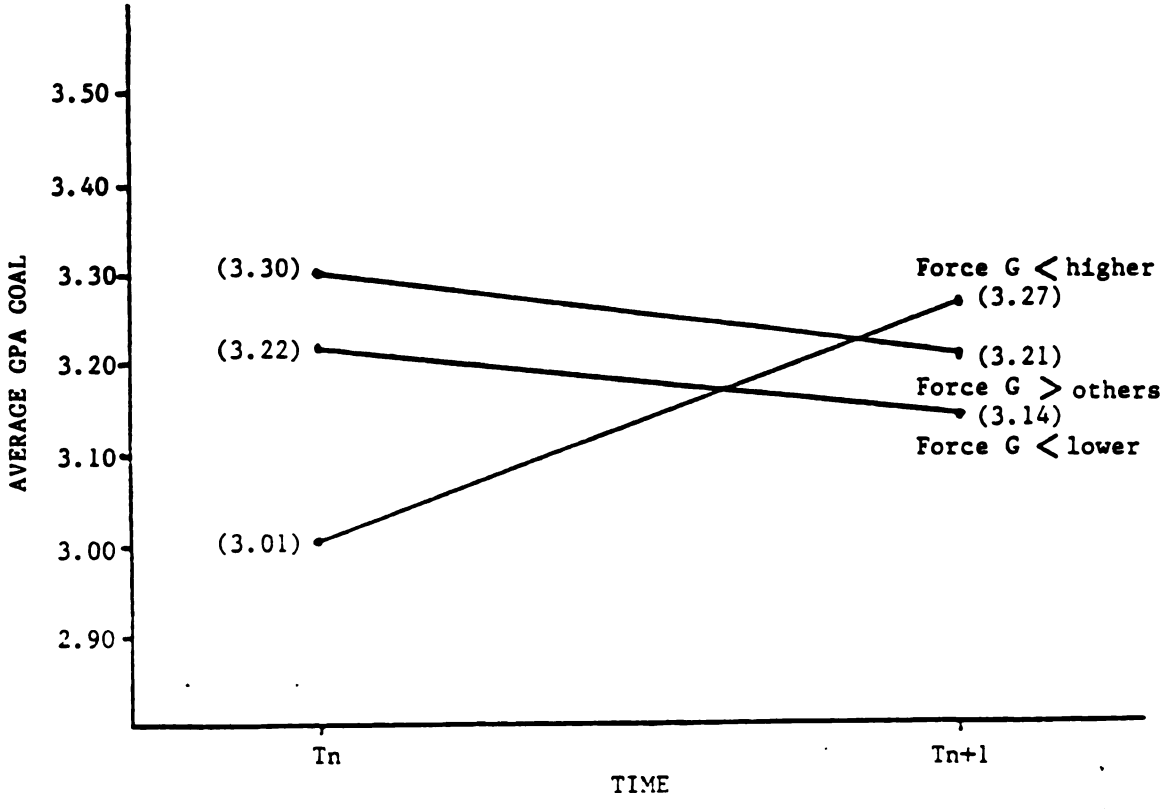
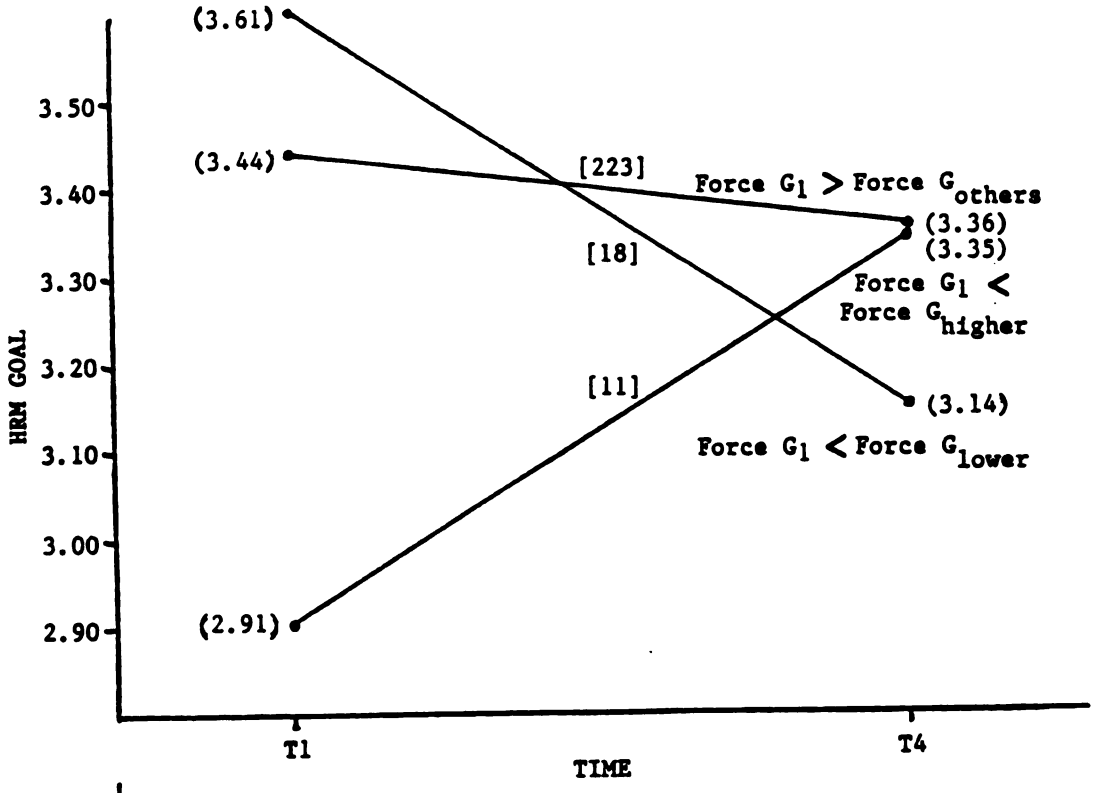
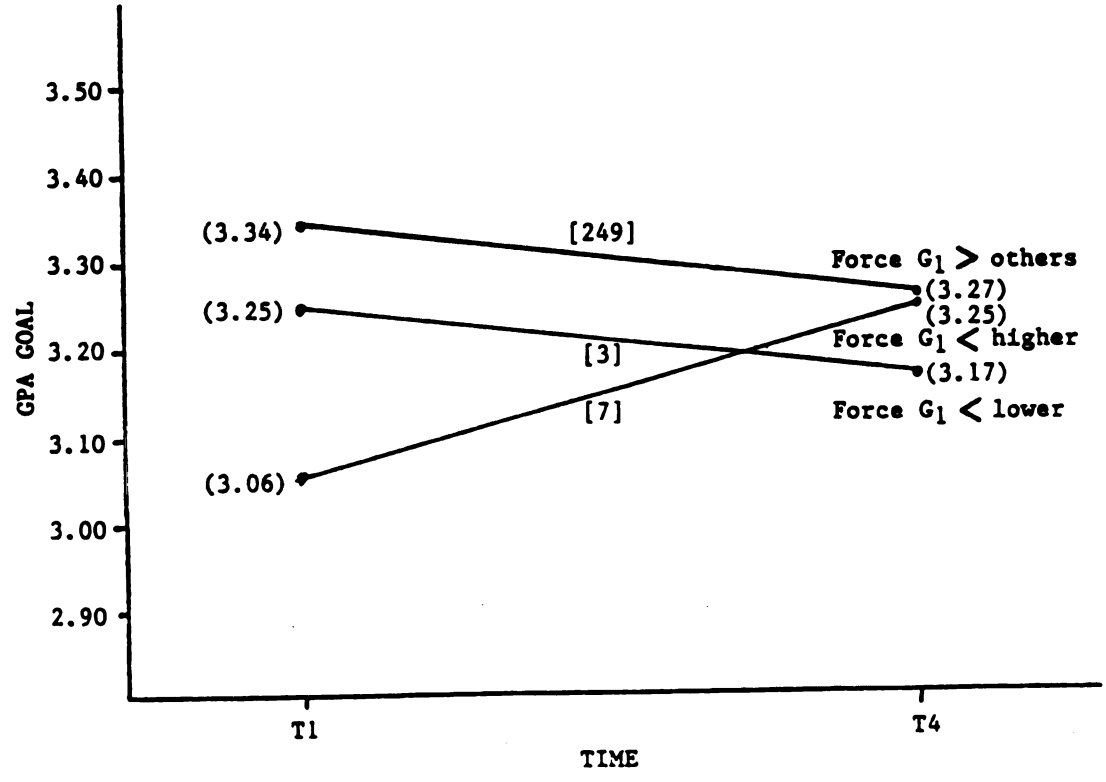


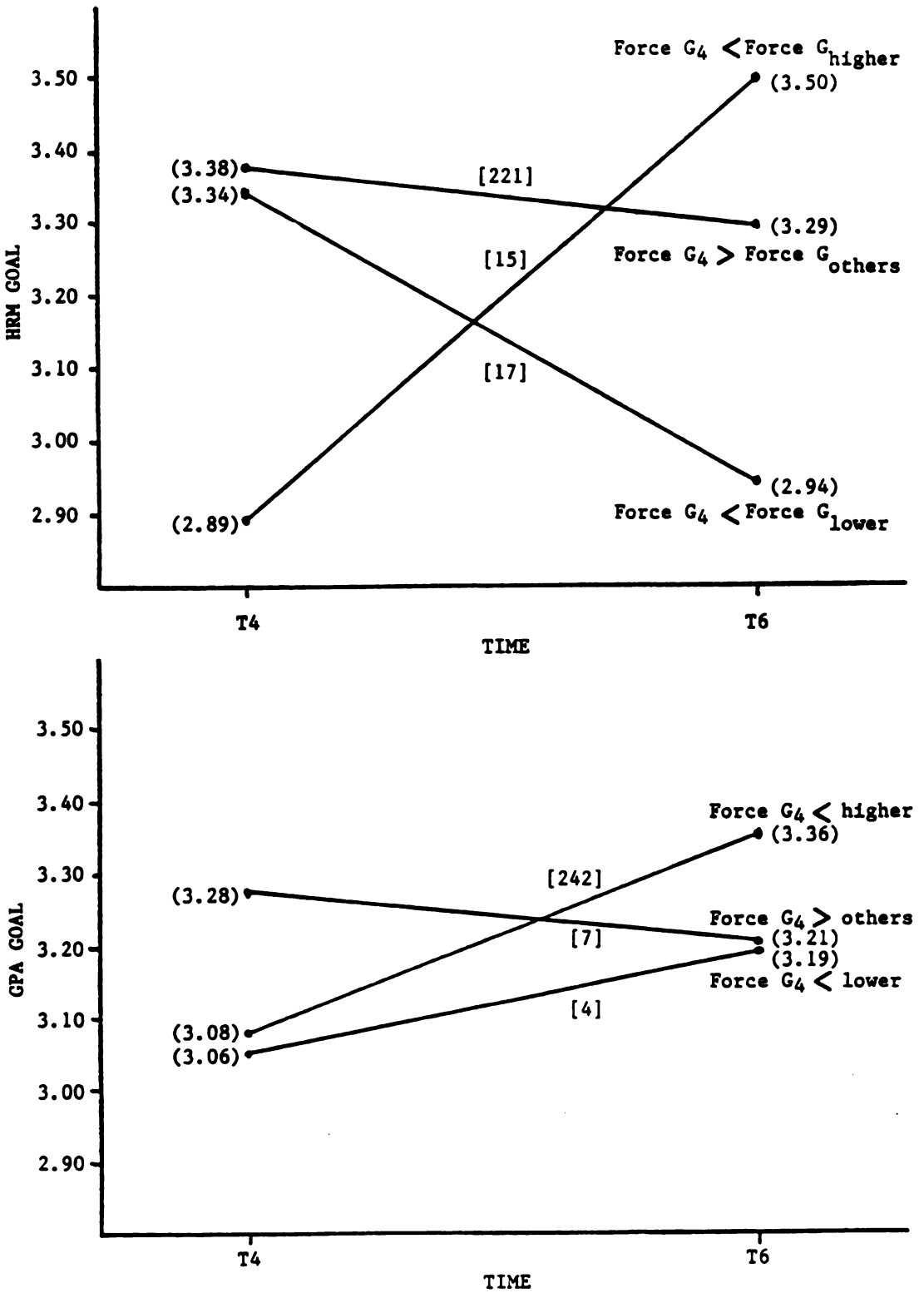
Figure 44: Observed relationships between changes in force and goal change from T1 to T4.





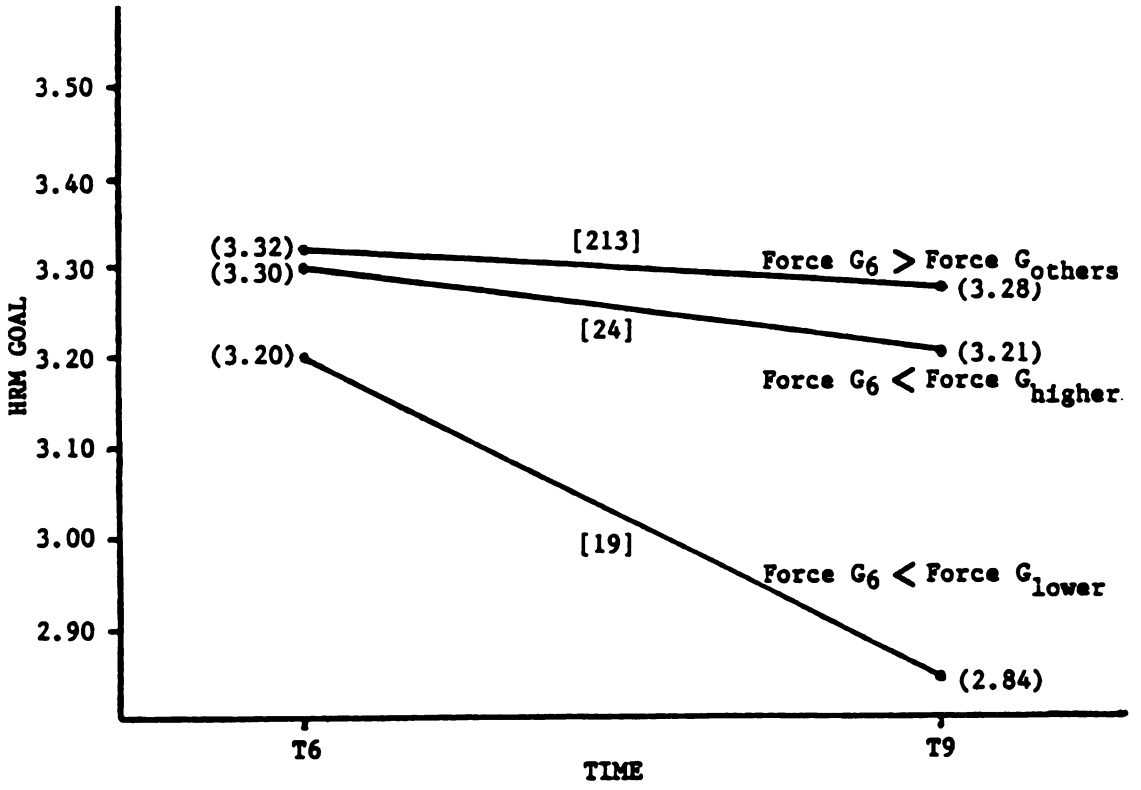
Number of subjects in each subgroup in brackets.

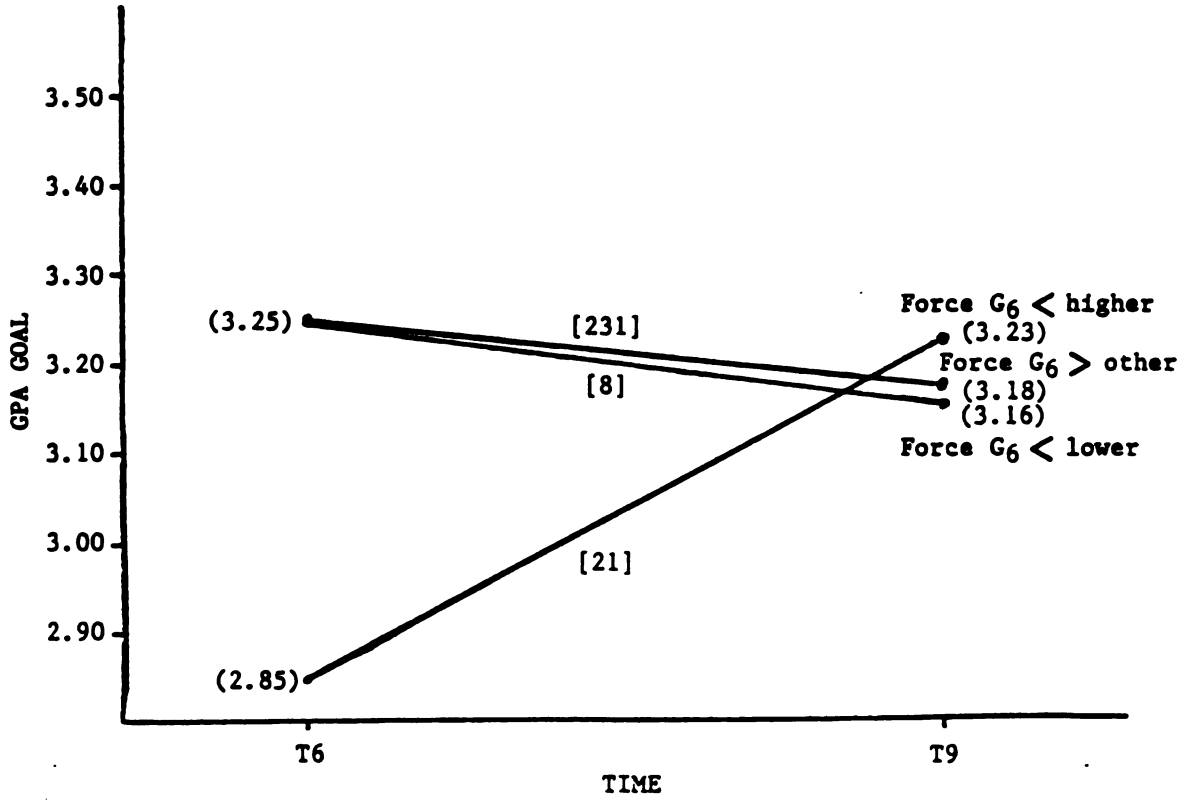
Figure 45: Observed relationships between changes in force and goal change from T4 to T6.



Number of subjects in each subgroup in brackets.

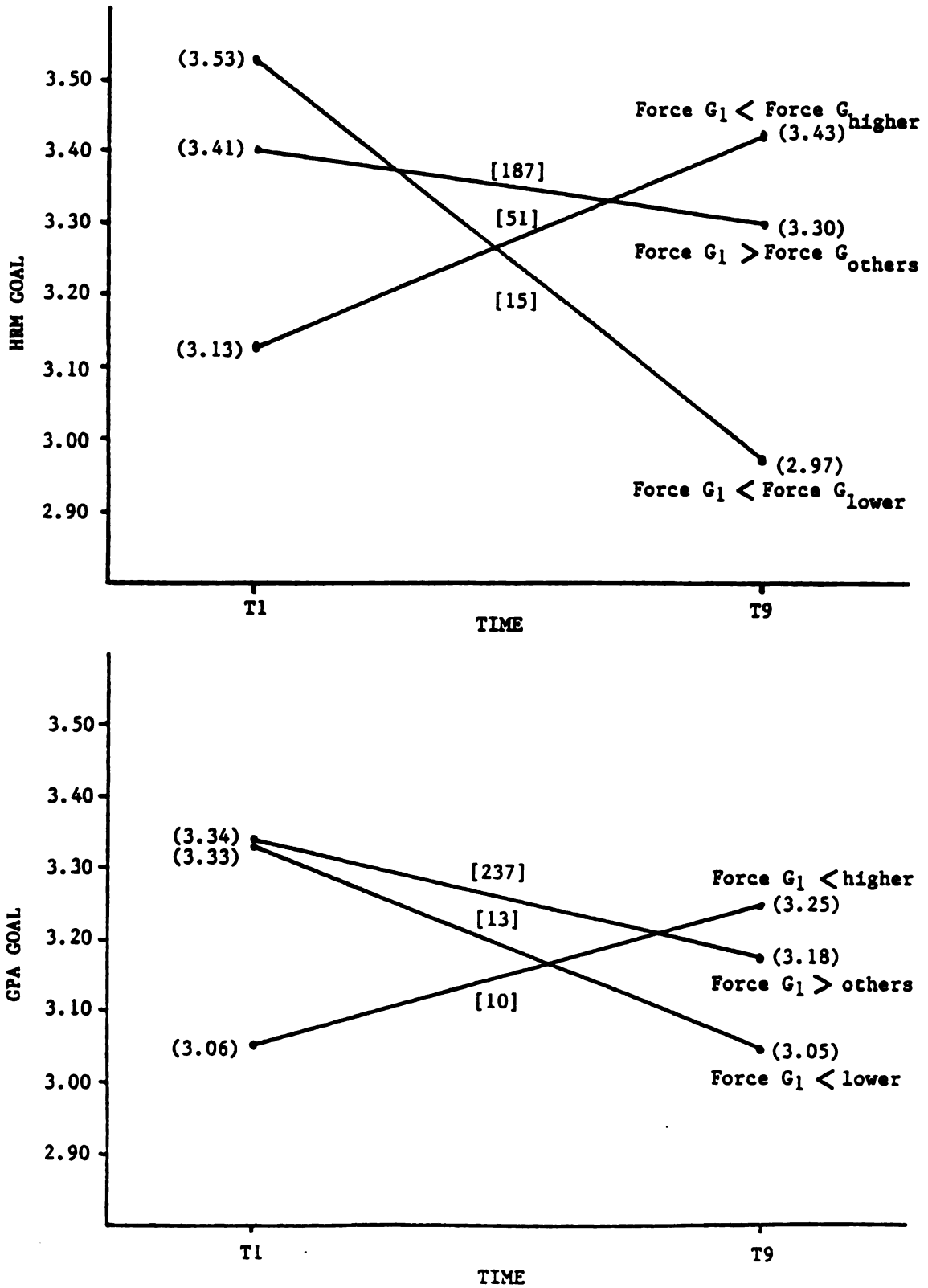
Figure 46: Observed relationships between changes in force and goal change from T6 to T9.





Number of subjects in each subgroup in brackets.

Figure 47: Observed relationships between changes in force and goal change from T1 to T9.



Number of subjects in each subgroup in brackets.

To further test hypothesis 2b, zero-order correlation coefficients were calculated between changes in the goal predicted by the force towards goal attainment and changes in the goal chosen. These relationships, presented in Table 17, were expected to be positive and were assessed for both GPA and HRM grade goals for each of the above four time comparisons. These correlations were all positive and with the exception of the GPA goal from T1 to T4, statistically significant. As with the correlations between predicted goals and chosen goals, this relationship was stronger, on average, for the HRM goal ($\bar{r}_w$ = 0.30) than for the GPA goal ($\bar{r}_w$ = 0.14) and these relationships became stronger over the course of the quarter for both goals.

While the hypotheses were not entirely confirmed, the results regarding the role of attractiveness and expectancies were fairly supportive of the model. Hypothesis 2a was partially supported as correlations revealed that the force towards goal attainment was significantly related to goal commitment for both GPA and HRM goals at all four time periods. No evidence was found, however, for a relationship between changes in force and changes in commitment in either the mean comparisons or correlation analyses. Support for Hypothesis 2b was more conclusive. The force towards goal attainment was significantly related to goal choice at all time periods for both HRM and GPA goals. In addition, both the mean comparisons and the correlational analyses further indicated that changes in force related to changes in chosen goals, again for both goal levels and at multiple time periods.

Table 17: **Correlations between changes in goals predicted by force and changes in goals chosen.**

	FORCE TOWARDS HRM GOAL	FORCE TOWARDS GPA GOAL
FROM TIME 1 TO TIME 4	0.25[1]	0.05
FROM TIME 4 TO TIME 6	0.25	0.10
FROM TIME 6 TO TIME 9	0.28	0.15
FROM TIME 1 TO TIME 9	0.41	0.24

[1] n ranges from 233 to 255, $p < 0.001$ for correlations greater than 0.18, $p < 0.05$ for correlations greater than 0.10.

Hypothesis 3 - Role of Goal Hierarchies

Indirect support for the hypothesized operation of goal hierarchies has already been demonstrated in discussing several other relationships. The correlations among goals at different levels (see Table 1) reveals stronger relationships among goals at adjoining levels (e.g., HRM grade and performance events) than with goals at non-adjoining levels (e.g., GPA and performance events). In addition, the more important the performance event goal, the stronger its correlation with higher level goals. Similarly, the more important the goal, the stronger its relationship with performance (see Table 11). Finally, the relationships between performance event characteristics (e.g., discrepancies, attributions) correlated higher with characteristics of the HRM goal (e.g., change in expectancies) than with characteristics of the GPA goal (see Table 12).

Hypothesis 3a

Hypothesis 3a states that the forces towards the attainment of sub- and end-goals are positively related, and that this relationship is mediated by the attractiveness of attaining the subgoal. To test this relationship, zero-order correlation coefficients were calculated between the force towards the GPA goal and the force towards the HRM grade goal at each of the four time periods these ratings were obtained. Correlation coefficients were also calculated between the force towards the GPA goal and the attractiveness of attaining the HRM grade goal. In addition, partial correlations were computed between the force towards the GPA goal and the force towards the HRM grade goal, controlling for the attractiveness of attaining the HRM grade goal.

Given Hypothesis 3a, it was expected that the zero-order correlations between the force towards the GPA goal and (a) the force towards the HRM grade goal and (b) the attractiveness of attaining the HRM grade goal would be positive and significant. Furthermore, if the relationship between the force towards the attainment of sub- and end-goals is completely mediated by the attractiveness of attaining the subgoal, the partial correlations should be nonsignificant. The results of these analyses are presented in Table 18. As predicted, the zero-order correlations between the force towards the GPA goal and the force towards the HRM grade goal were positive and significant at all four time periods ($\bar{r}_w = 0.27$). The zero-order correlations between the force towards the GPA goal and the attractiveness of attaining the HRM grade goal were also all positive and significant ($\bar{r}_w = 0.19$).

The partial correlations between the force towards the attainment of sub- and end-goals, controlling for the attractiveness of sub-goal attainment were also, however, all significant ($\overline{pr}_w = 0.19$). The significance and magnitude of the partial correlations indicates that the attractiveness of subgoal attainment does not completely mediate the relationship between the force towards the attainment of sub- and end-goals. Given, however, that the relationship between the force towards GPA goal attainment and the force towards HRM goal attainment did drop (0.08 on average) when controlling for the attractiveness of HRM goal attainment it appears that sub-goal attractiveness partly mediates the relationship.

Hypothesis 3b

The next hypothesis suggests that lower order goals will be faster acting with higher level goals being more resistant to change. To

Table 18: Correlations and partial correlations between force towards GPA and HRM goals and attractiveness of HRM goals.

	TIME 1	TIME 4	TIME 6	TIME 9
ZERO-ORDER CORRELATION BETWEEN THE FORCE TOWARDS THE GPA GOAL AND THE FORCE TOWARDS THE HRM GOAL	0.20[1]	0.26	0.21	0.39
ZERO-ORDER CORRELATION BETWEEN THE FORCE TOWARDS THE GPA GOAL AND THE ATTRACTIVENESS OF THE HRM GOAL	0.12	0.19	0.13	0.32
PARTIAL CORRELATION BETWEEN THE FORCE TOWARDS THE GPA GOAL AND THE FORCE TOWARDS THE HRM GOAL, CONTROLLING FOR THE ATTRACTIVENESS OF THE HRM GOAL	0.16	0.18	0.17	0.24

[1]n ranges from 241 to 266, $p < 0.05$ for correlations greater than 0.09, $p < 0.001$ for correlations greater than 0.17.

assess this contention, indices were created indicating how many subjects changed (a) their GPA goal, (b) at least one of their course grade goals, and (c) at least one of their performance event goals. It was expected that these values would be ordinal, with (a) less than (b) and (b) less than (c) at each of the three periods these goals were reassessed. In addition, given hypothesis 3b, the number of subjects changing their HRM and GPA goals should increase over time while instances of performance event goal changes should remain stable. This hypothesized pattern of goal change is depicted in Figure 48. The progression of goal change obtained is illustrated in Figure 49.

To insure the observed goal change was not random, a chi squared test was conducted for each of the three time periods. The expected null value for these tests was that half of the subjects would change each of the goals. The chi-squared values obtained were 176.46, 168.97, and 49.76 for T4, T6 and T9 respectively ($df=3$, $p < .001$ for all three). The values for the number of subjects who changed their goals were, for the most part, ordinal as expected. The number of subjects who changed their GPA goal was always less than the number who changed at least one of their course grade goals or the number of subjects who changed at least one of their performance event goals. In addition, the number of subjects who changed at least one of their performance event goals was higher than the number changing at least one of their course grade goals except at the last time period.

The pattern of goal change over time was not, however, as hypothesized. The number of subjects changing their GPA goals increased over time as predicted, but not as much as suggested in Figure 48. Instances of performance event goal changes remained stable through T6,

Figure 48: Hypothesized progression of goal change within the goal hierarchy.

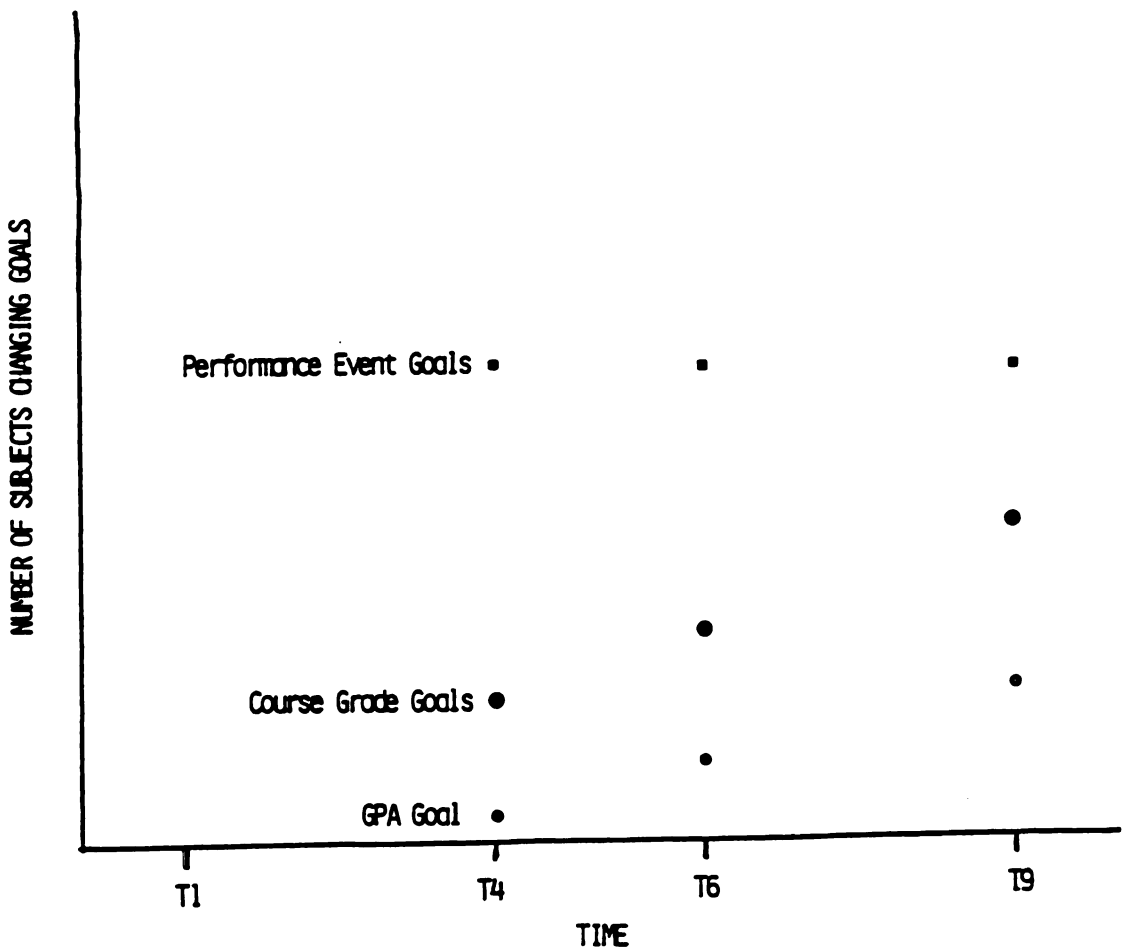
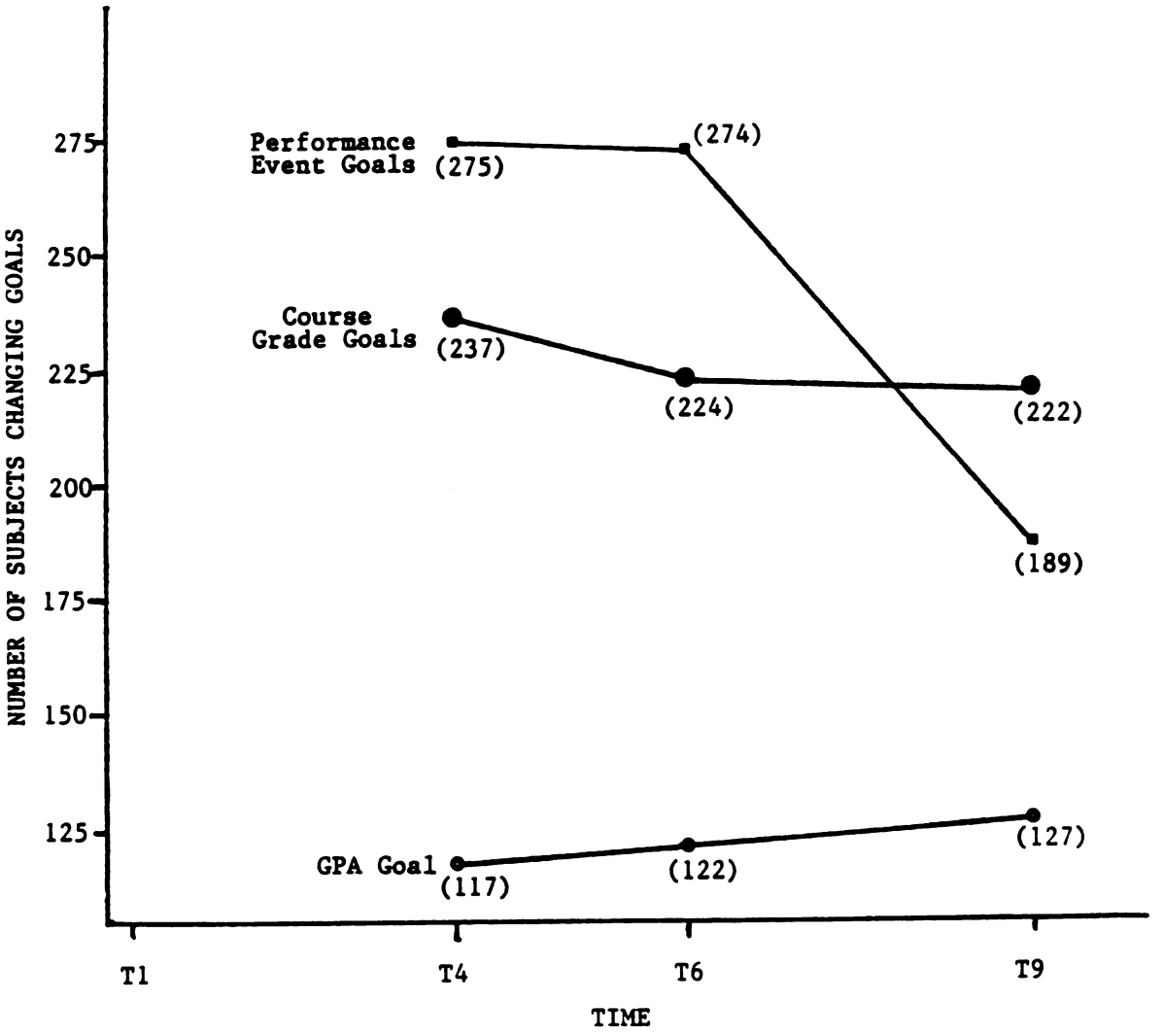


Figure 49: Observed progression of goal change within the goal hierarchy.



as predicted, but then dropped at T9. The number of subjects changing their course grade goals did not increase over time as expected, but rather dropped from T4 to T6 and then remained stable at T9. The unexpected drop in subjects changing performance event goals at T9 may be due to the fact that at that time in the course, only one event remained.

Hypothesis 3c

The final hypothesis posits that the overall relationship between levels in the goal hierarchy will remain in equilibrium following the change of a goal in that hierarchy. That is, when a goal is either not met or altered, goals at equal and/or lower levels will also change. Assuming that a course grade goal is altered, changes in the other course grade goals must occur in order for the GPA goal to be attained. To test this assertion, a sub-sample of subjects was identified who (a) altered at least one of their course grade goals and (b) did not alter their GPA goal. For these subjects, the net change in grade goals across all courses was calculated. If hypothesis 3c is correct, this total change should not be significantly different from zero while the absolute value of these changes should. The results of these analysis are presented in Table 19 for each of the three time periods goals were reassessed. As predicted, the absolute values of the total changes in course grade goals (0.96 on average) were significantly different from zero at all three time comparisons. Unexpectedly, the total changes in course grade goals (-0.19 on average) were also significant at all three time periods. The absolute value of total change in course grade goals

Table 19: Changes in course grade goals when GPA goals are not changed.

	T1-T4	T4-T6	T6-T9
MEAN SUM CHANGE IN COURSE GRADE GOALS	-0.15[1]	-0.19	-0.23
MEAN SUM ABSOLUTE VALUE OF CHANGE IN COURSE GRADE GOALS	0.96	0.94	0.98

[1]n ranges from 110 to 137, all means are significantly different from zero ($p = .05$).

was, however, significantly larger then the total change at all three comparisons.

This hypothesis was also tested by examining those individuals who did change their GPA goal. Given Hypothesis 3c, when a GPA goal is changed, one would expect that course grade goals would, on average, change, in the same direction. To test this, total course grade goal changes were calculated for this sub-sample of subjects. This change was expected to be significantly different from zero, and the total course grade goal change should correlate positively with GPA goal changes. The results of these analyses are presented in Table 20 for each of the three time periods goals were reassessed. As predicted, the mean sum change in course grade goals was significant at all three time comparisons (average = -0.47). In addition, these changes were significantly larger than the corresponding changes for students who did not change their GPA goal (-0.19 from Table 19). Also as predicted, the correlations between change in GPA goal and sum changes in course grade goals were all significant and positive ($\bar{r}_w$ = 0.57).

The results regarding the role of goal hierarchies, when taken as a whole, are also fairly supportive. The force towards an end-goal (GPA) was significantly related to the force towards a sub-goal (HRM) at all four time periods as predicted by hypothesis 3a although this relationship was not completely mediated by the attractiveness of the sub-goal's attainment. The ordinal hierarchy of goal change predicted in hypothesis 3b was obtained, with performance event goals showing the most flexibility and the highest level goal (GPA) being the most resistant to change. The manner in which those values changed over time, however, was not as expected. Hypothesis 3c, regarding the

Table 20: Changes in course grade goals and the correlations between changes in GPA and course grade goals when GPA goals are changed.

	T1-T4	T4-T6	T6-T9
MEAN SUM CHANGE IN COURSE GRADE GOALS	-0.37[1]	-0.28	-0.75
CORRELATION BETWEEN CHANGE IN GPA GOAL AND SUM CHANGES IN COURSE GRADE GOALS	0.59	0.52	0.59

[1]n ranges from 117 to 127, all means are significantly different from zero (p=.05), $p < 0.001$ for all correlations.

equilibrium of the goal hierarchy, also received partial support. When subjects changed at least one course grade goal but not their GPA goal, the sum change in course grades was significantly lower then the absolute value of sum change in course grades. In addition, when subjects changed their GPA goal, a significant change in course grade goals also occurred, and the correlations between these changes were significant at all three time periods subjects reported changes in goals.

CHAPTER 5: DISCUSSION

Summary and Implications of Findings

The results indicate that the force towards goal attainment (expectancy x attractiveness) relates to goal choice and goal commitment, and that changes in force relate to changes in goals. These findings are supportive of the position that goal setting and expectancy theories can be integrated by using expectancy theory notions to predict goal choice and goal commitment (Campbell, 1982; Dachler & Mobley, 1973; Hollenbeck & Klein, 1987; Matsui et al., 1981; Mento et al., 1980). These findings also have important implications for successful goal setting interventions by suggesting means for ensuring that individuals adopt challenging goals and remain committed to those goals.

Given that the more attractive the goal the more likely that goal is to be chosen and retained, factors which enhance the attractiveness of attaining organizational goals will enhance the adoption of and commitment to those goals. Factors that improve the expectancy of goal attainment will similarly affect the likelihood of goal choice and commitment. The examination of factors thought to influence the attractiveness and expectancy of goal attainment thus appears to be an important and fruitful area for future research. Hollenbeck and Klein (1987) outlined a number of such factors and studies by Hollenbeck and Brief (1986) and Hollenbeck et al. (1986) have begun to examine these relationships. Hollenbeck and Brief, for example, found that when goals are self-set, the expectancy and valence of goal attainment tended to be high and invariant relative to assigned goals, regardless of individual

differences in ability, need for achievement, self-esteem, or self-efficacy.

Results regarding attributions demonstrate that stability attributions do interact, to some degree, with goal performance discrepancies in relating to changes in outcome expectancies. Outcome expectancies decreased when performance fell short of the goal and increased when performance exceeded the goal. Regardless of the goal-performance discrepancy, outcome expectancies decreased more when stable attributions were made than when unstable attributions were made. The interaction between attributions and discrepancies was such that when unstable attributions were made, outcome expectancies did not decrease as much following negative discrepancies or increase as much following positive discrepancies as when attributions were made to stable causes.

Since it was also found that goal choice and goal commitment are related to the force towards goal attainment (a function of outcome expectancies), maintaining high outcome expectancies appears to be an important consideration for goal setting applications. The results obtained here suggest that end-goal outcome expectancies will remain high as long as short run successes are experienced. Facilitating the achievement of sub-goals should thus serve to maintain motivation toward end-goal attainment by sustaining, if not strengthening, the expectation that the goal can be achieved. Bandura and Schunk (1981), for example, found that the setting of sub-goals helped subjects to develop perceptions of self-efficacy and increased intrinsic interest in the activity. When sub-goals are not met, however, it appears that the fall in end-goal outcome expectancies may be buffered if unstable attributions are made. If an individual attributes the sub-goal failure

to a factor which is unlikely to occur again, either because of chance or corrective actions taken, expectancies need not fall provided there is time to make up for the short term loss.

While useful in maintaining goal commitment, this phenomenon could, however, be dysfunctional. If, through the making of unstable attributions, outcome expectancies remain unrealistically high, an individual could remain committed to an inappropriate, unattainable goal. While attributions may serve to maintain higher outcome expectancies, it is probably more beneficial for the long term success of goal setting programs for accurate attributions to be made than for creating attributions that will maintain high outcome expectancies.

The finding that the force towards the attainment of goals at different levels is positively related and that this relationship is, to a small degree, mediated by the attractiveness of the lower level goal suggests that goals will be chosen and pursued to the extent that they are viewed as instrumental to the attainment of higher order goals. This is consistent with the findings of Hollenbeck and Williams who found goal difficulty to interact with goal importance in determining performance. Therefore, another way of assuring that a goal is attractive to an employee, and hence more likely to be adopted and retained, is to ensure that the attainment of that goal will contribute to the attainment of higher-order goals of the employee. These results suggest that individuals may not accept or pursue goals which are incongruent with their own higher-order goals.

The finding that higher level goals are more resistant to change than are lower level sub-goals demonstrates support for several control theory contentions put forth by Powers (1971) and others. For example,

this finding supports the notion that control is exerted downward through the goal hierarchy and that lower level feedback loops have a faster response cycle. This finding suggests that if routine work goals are viewed as a low priority, they may well be quickly abandoned in the face of adversity. This may especially be the case, given the previous finding, if these work goals are not seen as important for the attainment of higher-order goals.

The results indicating that when a goal in a hierarchy is changed, changes in other goals take place to maintain equilibrium demonstrates that people do behave rationally, at least to some degree, when setting and reevaluating their goals. This finding also suggests that if a higher-order work goal is lowered, all other work goals and hence performance will also likely be lowered. Conversely, getting employees to set and pursue higher long range higher-order work goals may go a long way towards improving performance. Taken together, these last two findings suggest an incremental equilibrium effect which provides evidence of the strategic function and importance of short term goals in the attainment of long term goals.

While not all of the hypotheses were supported and others received only partial support, the findings are strong enough to justify further examination of these and other variables employing a control theory perspective. The findings in this study, as a whole, could not be predicted or explained without the control theory perspective. While some of the hypotheses could be derived from expectancy theory and others from attribution theory or goal setting theory, none of these theories alone, could account for more than half of the findings. Furthermore, none of those theories, either alone or in concert, are

well suited to explain the findings regarding goal hierarchies. Control theory is also better suited for examining multiple, competing goals and modifications of goals over time.

Alternative Explanations For Results

While the results as a whole are supportive of the proposed control theory model of work motivation, it is recognized that their may be alternative explanations for the data. Similarly, the failure to support two of the hypotheses does not refute the model since there are arguments, other than the fallacy of the theory, for why the expected results were not obtained. Some of these alternatives are discussed below.

Supported Hypotheses

One alternative explanation for the obtained results is that there were priming or consistency effects (Salancik and Pfeffer, 1977). A priming effect would be operating if the results were influenced by requiring the subjects to fill out the questionnaires. The measures employed forced participants to think through their goals and their commitment to those goals, evaluate the expectancy and attractiveness of attaining different outcomes, set goals they may not have otherwise, and monitor their behavior more closely than they otherwise may have.

To assess the degree to which the goals employed would have normally been set, subjects were asked at the end of the final questionnaire if they would have set (a) a GPA goal, (b) course grade goals, and (c) HRM performance event goals for the term had they not been participating in the study. Eighty-seven percent of respondents indicated that they would have set a GPA goal, 78% course grade goals,

and 71% HRM performance event goals. Whether subjects would have otherwise thought about expectancies and the attractiveness of outcomes in evaluating goals or whether the subjects would have been less rational in their intentions and actions had they not been participating in the study remains to be seen. It is clear, however, that even if people are not usually as rational as the results suggest, they can be.

Consistency effects arise from the awareness of individuals of their own previous responses to questions and the tendency for people to organize information in consistent ways (Abelson & Rosenberg, 1958). It is possible that the obtained relationships between the force towards goal attainment and goals and goal commitment, are in part due to this consistency effect. Because subjects were first asked to evaluate the expectancies and attractiveness of different goals and then asked to choose a goal, their choice may have been influenced by the salience of their attractiveness and expectancy ratings. In the analyses, however, it was the force towards goal attainment (the product of attractiveness and expectancy) that was correlated with goals and goal commitment.

The relationships between goals at different levels could also conceivably be a function of a consistency artifact. While the goal items were separated in the questionnaires by other information processing demands, this does not insure the elimination of consistency effects. It is possible that the incremental equilibrium effect would not have been obtained had all subjects not been asked to set all of the goals at the same time period. Similarly, the possibility can not be ruled out that the finding that higher-order goals are more resistant to change than are lower-level goals was due to the order in which the goals were set since this order was not varied.

Because participants responded to the same scales at multiple time periods, it is also possible that their responses at later times were influenced by their previous responses. It is therefore conceivable that the increase in magnitude evidenced in some relationships over time, for example the relationship between force towards goal attainment and goal choice, is an experimental artifact and not a function of time or increased certainty regarding outcomes.

Finally, evaluation apprehension may also have influenced the results. Even though it was stressed to subjects that their responses would in no way influence their grades, it is possible that their responses (or even their behaviors) were influenced by the knowledge that they were participating in a research project and by the fact that information was being collected about their class-related activities in class by someone associated with the class.

It should be noted, that there is little research evidence supporting the operation of priming and consistency effects as studies designed to detect them have been unable to do so (Stone & Hollenbeck, 1982). In addition, in the current investigation, the failure to support two of the hypotheses suggest priming and/or consistency effects were not operating. If there were strong priming or consistency biases operating in this study, subjects reporting that their past failures were due to a lack of effort would surely report a subsequent increase in their effort.

Unsupported Hypotheses

There are also potential alternative explanations for the two hypotheses that were not supported and for the lower than expected

effect sizes in some of the supported hypotheses. As stated earlier, a problem with employing change scores is that when change among individuals is small, the difference score will have low reliability regardless of the precision with which the variable is measured. In this study, changes in scholastic activities and goal commitment were indeed small as evidenced in the high intercorrelations in Tables 3 and 7 between the same variables at adjacent time periods and in the means and standard deviations in Tables 4 and 8.

For hypothesis 1b, the average reliability of the scholastic activity change scores was 0.49. For hypothesis 2a, the average reliability of he goal commitment change scores was 0.36. Given these reliabilities and invariance in these criterion variables, it is not surprising that relationships with these variables were insignificant. Relationships with behavior or cognitive change cannot be detected when there are no individual differences in those changes. The lack of variability in some of the other change scores (e.g., outcome expectancies, goals) may similarly be responsible for the smaller than expected effects with those variables.

Another alternative explanation for the unsupported hypotheses is the weakness of the measures of scholastic activities, attributions, and goal commitment. The validity of the scholastic activity inventory was questioned earlier when reporting the results of the accuracy checks on some of the items in that scale. The low agreement of subjects' self-reports with the "objective" measures suggest that those scholastic activity inventory may not be an entirely valid measure of how subjects distributed the time they spent on the HRM course.

The attribution scale was developed using several pilot samples to identify a list of relevant causal ascribtions for academic performance. The categorization of these items (i.e., stable vs. unstable) was based upon the definitions of those categories and previous investigations. To test how well these categorizations matched the phenomenology used by the subjects, a third sample of 80 students enrolled in the same HRM class the term after the data for the study were collected was employed. These subjects were given definitions of the dimensions and then asked to categorize each of the items as either internal or external, controllable or uncontrollable, and stable or unstable.

For the locus dimension, there was 93% agreement overall between the categorization of items used in the analysis (see Appendix F) and those reported by members of this third sample. Furthermore, the agreement rate was at least 80% for all of the items. The overall agreement rate for the controllability dimension was somewhat lower, 85% overall, and agreement was less than 80% for six of the twenty-one items. There was much less agreement for the stability dimension. The overall agreement rate was only 67% and for seventeen of the items, the agreement rate was less than 80%. It appears that a difficulty in having subjects rate specific possible causes rather then general dimensions (such as stability), is that not all individuals interpreted the same cause in the same manner. It also appears that the different dimensions are differentially sensitive to this variance in interpretation.

The validity of the goal commitment scale is also open to question because of the difficulties incurred in trying to obtain a reliable, unidimensional scale from the items employed. To partially assess the

construct validity of the goal commitment scale, the relationship between goal commitment, goal level and task performance was examined. Given that there is a strong theoretical basis for a moderating effect of goal commitment with goal level on performance (Locke, 1968; Hollenbeck & Klein, 1987) and assuming that the performance measures are valid, then empirical evidence of this relationship could be interpreted as supporting the construct validity of the goal commitment scale (Schwab, 1980).

In a series of hierarchical regressions, goal level entered as a first step accounted for, on average, 35% of the variance in HRM grade and GPA performance. Neither goal commitment, entered alone in a second step, or the interaction term of goal commitment x goal level, entered in a third hierarchical step, accounted for any incremental variance in performance. The failure to observe an interaction, while not supportive of the validity of the goal commitment scale, does not necessarily support the conclusion that the scale is invalid. Another possible explanation for the absence of an effect as well as the small and sometimes nonsignificant effects with goal commitment in the study, is insufficient variance. As evidenced in Table 3, goal commitment was, for the most part, high and invariant, and insufficient variability has frequently been cited as an alternative explanation in studies failing to obtain expected relationships with goal commitment (Locke, Latham, & Erez, in press).

Generalizability of Results

Accepting for a moment the validity of the interpretations offered here for the obtained results, the external validity of these findings should be examined because this study employed college students and an

academic field setting, rather than employees in an organizational setting. In addressing these issues, several points are discussed below concerning the generalizability of the study as well as the relevance of external validity to the value of this investigation.

The ecological validity of a study refers to the extent to which the environment or situation employed in the study is generalizable (Bracht & Glass, 1968). Since going to classes, studying, and taking exams are, with the exception of some training interventions, rare events in organizations, one could argue that this study lacks "mundane realism" -- the degree to which the setting and procedures resemble things that occur in organizations (Berkowitz & Donnerstein, 1982). This investigation does have, however, a great deal of "experimental realism" -- the extent to which the study captures the essence of the variables of interest (e.g., goals, task strategies). As suggested earlier, the tasks employed were complex, the goals set were meaningful and the behavior of the subjects had very real consequences for them. There is little reason to believe that the constructs examined here would operate fundamentally different than they did here in other settings or with other samples.

Furthermore, no research is totally generalizable or totally lacking in generalizability (Flanagan & Dipboye, 1980). Cook and Campbell (1976) emphasize that external validity is fundamentally an empirical question of replication. Within the current investigation, there were multiple replications both across time and goal levels. In addition, with regards to goal setting research, there is considerable empirical evidence that results obtained with college students are also replicated in organizational settings (Latham & Lee, 1986). In

addition, because the purpose of this study was primarily theory testing and not estimating population parameters, the question of external validity is a minor issue in the evaluation of this research. The study was designed to support or refute propositions generated from a control theory model of motivation, and it is theory, if anything, that generalizes from one setting to another (Ilgen, 1986; Mook, 1983).

Boundary Conditions and Suggestions for Future Research

Even though this investigation has considerable external validity, the identification of potential boundary conditions of these results is useful for identifying areas for future research. Boundary conditions refer to important differences between the research setting and the target setting -- factors which occur in (or are absent from) the research setting which may limit the generalizability of the results (Fromkin & Strufert, 1976). For example, this study only examined one hierarchy of goals -- those related to the subjects' academic performance. Individuals have multiple goal hierarchies for the multiple role demands they face. As suggested in discussing the implications of the results obtained here, the operation of work related goal hierarchies cannot be completely understood independent from non-work goal hierarchies. The investigation of how goals change within a hierarchy must extend to how goals change across hierarchies.

In addition, the goal hierarchy examined here was essentially linear in nature. That is, the sum of the performance events determined the HRM course grade and the average of the course grades determined the quarter GPA. More often, hierarchies are non-linear as was the case between scholastic activities and performance events. Since goals at

the level of activities were not assessed in the current study, no information was available for this link in the hierarchy. It remains to be seen, therefore, if the incremental equilibrium effects obtained in the current investigation would hold for non-linear hierarchies.

Another potential boundary condition is the feedback environment in which the study was conducted. Students received immediate, specific, and highly accurate feedback. While these conditions are thought to be desirable (Ammons,1956; Ilgen et al., 1979) they often are not present in organizational settings. It is not known if the results obtained would hold under conditions of scarce or less credible feedback. On the other hand, the feedback subjects received was almost exclusively outcome or evaluative feedback. Subjects knew exactly how they did, but received limited information as to how to improve their scores. Had subjects also received directional or descriptive feedback, stronger relationships may have been obtained, especially with regard to changes in scholastic activities.

A third boundary condition is the fact that all of the tasks involved were independent from the influence of others performance. The obtained results may not hold in situations where successful performance requires the joint efforts of several individuals each with their own goals. In addition, the time frame employed here, while long for a goal setting study, is relatively short. While some performance periods or job assignments are quarterly in nature, it is unclear how the obtained relationships would differ for a longer performance period or how they would hold up over subsequent performance periods.

Future research should also examine the many other propositions which can be generated from a control theory perspective. With regards

to the role of affect, for example, a control theory model of motivation suggests that (a) satisfaction with performance is a function of the goal performance discrepancy, (b) that relationship is moderated by the attractiveness of goal attainment and whether or not outcome expectancies are changed, and (c) attributions will interact with discrepancies to enhance or diminish the satisfaction with performance.

Other relationships suggested by control theory worthy of investigation include the identification of potential personal and situational factors which may influence the attractiveness and expectancy of goal attainment and the examination of differing effects, if any, for positive versus negative goal-performance discrepancies. In addition, the interplay of short and long term goals is worthy of much closer investigation. The findings presented here suggest that attaining short term goals serves to maintain high expectancies and hence commitment to long-term goals. Determining the frequency and magnitude of failures which can be experienced before individuals lower their expectancies and goals, perhaps integrating concepts of self-efficacy (Bandura, 1977; Bandura & Schunk, 1981; Bandura & Cervone, 1983, 1986), would be a fruitful area for future research.

Conclusion

In conclusion, this research extends the goal setting literature in several respects. Most importantly, it is an integration of goal setting, feedback, expectancy and attribution theories. While feedback and goal setting have often been addressed jointly, only a handful of studies have examined both expectancy theory and goal setting notions and even fewer have looked at attributions and goal setting. This study also examines several levels of goals and how those goals change over

time, both of which have been neglected topics. Given that at least some support was found for most of the hypotheses, the next logical step would be to replicate and extend these findings in various organizational settings, taking into account the boundary conditions discussed above with further refinements in the measurement of the critical variables. Subsequent investigations should then examine how organizational systems which can incorporate goal setting (e.g., training, performance appraisal and compensation systems) can be designed to incorporate these findings regarding attributions, expectancies, and goal hierarchies. The further employment of these variables and a control theory perspective in the investigation of the mechanisms underlying the effectiveness of goal setting is clearly an appropriate goal for future research.

APPENDICIES

APPENDIX A

ITEMS USED IN ASSESSING GOALS

Please circle the grade point average that you realistically hope to obtain this term. That is, what is the average grade you want to receive across all of the classes you are taking this term. My GPA goal for Winter Term 1987 is (circle one):

2.0 2.25 2.5 2.75 3.0 3.25 3.5 3.75 4.0

Please list below all of the classes which you are enrolled in this term (department name and course number). Following each class, circle the grade that you realistically hope to obtain in that class.

	CLASS	GRADE GOAL						
1.	MGT 310	1.0	1.5	2.0	2.5	3.0	3.5	4.0
2.	_____	1.0	1.5	2.0	2.5	3.0	3.5	4.0
3.	_____	1.0	1.5	2.0	2.5	3.0	3.5	4.0
4.	_____	1.0	1.5	2.0	2.5	3.0	3.5	4.0
5.	_____	1.0	1.5	2.0	2.5	3.0	3.5	4.0
6.	_____	1.0	1.5	2.0	2.5	3.0	3.5	4.0

There are several requirements that contribute to your grade in MGT 310. In the blanks below, please indicate your goals for each of these. Please state your goals in terms of the scores that you realistically hope to receive on each. The possible points for each are provided in parentheses.

Quiz 1 (30) _____ Midterm Exam (100) _____

Quiz 2 (30) _____ Final Exam (100) _____

Paper (40) _____

APPENDIX B

SCHOLASTIC ACTIVITY DIARY

Use the grid below to help you keep track of how many hours you spend working on MGT 310 during the coming week. Please include time spent on all aspects of the course. For example, time in class, reading, working on assignments, and studying. In determining the amount of time, subtract any breaks, interruptions etc.. That is, record only the time you actually spent on 310, to the nearest 1/2 hour.

Enter the number of 310 related hours you spent (even if it was 0) in each part of each day. You need not carry this form around with you, making entries three times a day. It is asked, however, that you do not wait more than two days before recording your activities, as it is essential that this information be accurate. As with all other information you provide for this study, your entries will only be seen by the investigator.

DAY	MORNING	AFTERNOON	EVENING	TOTAL HOURS/DAY
SATURDAY (X/XX)				
SUNDAY (X/XX)				
MONDAY (X/XX)				
TUESDAY (X/XX)				
WEDNESDAY (X/XX)				
THURSDAY (X/XX)				
FRIDAY (X/XX)				
	TOTAL HOURS SPENT ON MGT 310 THE WEEK OF X/XX - X/XX:			

At the end of the week (Saturday) total up the number of hours you spent on 310 during the week and fill out the inventory on the back side of this sheet.

APPENDIX C

SCHOLASTIC ACTIVITY INVENTORY ITEMS

I tested myself on what I had studied, checking any doubtful points.
I paid careful attention to the Professor during lecture.
*I studied in unfavorable environments.
I tried to overlearn the material to assure its retention.
My mind was elsewhere during much of my recitation section.
*I rewrote my lecture and/or recitation notes.
I planned in advance when, what, and how I was going to study.
I took thorough notes in recitation.
I set goals for my study periods.
I wrote summaries of the material I read.
I followed closely the material presented by the T.A. during recitation.
When I was unsure of the meaning of words or terms, I looked them up.
I read the chapters assigned for this week.
I took detailed notes in lecture.
*I skipped the tables and graphs that I came across in the text.
I attended recitation.
I outlined the chapters as I read them.
*I socialized with friends during much of lecture.
I reviewed my class or chapter notes.
I attended lecture.
I underlined or highlighted the text as I read it.
I actively participated in my recitation section.
In lecture I sat close enough to be able to clearly read the overhead.

*indicates item was excluded from the scales when used in the analyses.

APPENDIX D

OUTCOME EXPECTANCY AND ATTRACTIVENESS ITEMS

Please indicate how important it is to you to obtain the following grade point averages across all of the classes you are taking this term. That is, all things considered, how good would you feel about receiving the following GPAs for this term given the classes you are taking.

How attractive is:

obtaining a GPA of 0.0 - 1.0 this term?
obtaining a GPA of 1.1 - 1.5 this term?
obtaining a GPA of 1.6 - 2.0 this term?
obtaining a GPA of 2.1 - 2.5 this term?
obtaining a GPA of 2.6 - 3.0 this term?
obtaining a GPA of 3.1 - 3.5 this term?
obtaining a GPA of 3.6 - 4.0 this term?

Please indicate below what you think your chances are of obtaining each of those GPAs this term. For each question, write down a number between 0 and 100 which best describes what you think the probability is of your receiving <u>at least</u> that GPA this term. Use the following anchors to help you determine your answers.

0	25	50	75	100
No chance at all	A slight chance	A 50/50 chance	A good chance	Completely Certain

What are the chances in 100 that you will:

obtain at least a 1.0 GPA this term? _____
obtain at least a 1.5 GPA this term? _____
obtain at least a 2.0 GPA this term? _____
obtain at least a 2.5 GPA this term? _____
obtain at least a 3.0 GPA this term? _____
obtain at least a 3.5 GPA this term? _____
obtain at least a 4.0 GPA this term? _____

APPENDIX E

GOAL COMMITMENT ITEMS

I am strongly committed to pursuing this grade goal.

*I am willing to put forth a great deal of effort beyond what I'd normally do to achieve this grade goal.

*It is unrealistic for me to expect to reach this grade goal.

Quite frankly, I do not care if I achieve this grade goal or not.

*Since it is not always possible to tell how hard a task is until you've been at it a while, it is hard to take this grade goal seriously.

There is not much to be gained by trying to achieve this grade goal.

*It is quite likely that this grace goal may need to be revised, depending upon how things go.

It would not take much to make me abandon this grade goal.
I intend to try to obtain this grade goal.

I think this is a good grade goal to shoot for.

* indicates item was excluded from the scale when used in the analyses.

APPENDIX F

CAUSAL ATTRIBUTION ITEMS

The thoroughness with which I studied. (I, US, C, D)
The format of the test. (E, S, UC)
My interest in the class. (I, S, UC)
*The mood I was in. (I, US, UC)
My test taking abilities. (I, S, UC)
The amount of time I spent studying. (I, US, C, A)
My attitude toward the class. (I, S, UC)
My attentiveness in class. (I, US, C, D)
The way in which I prepared for the test. (I, US, C, D)
The ease or difficulty of the test. (E, S, UC)
The manner in which I studied. (I, US, C, D)
The way the test questions were written. (E, S, UC)
*Distractions during the test. (E, US, UC)
My involvement in the class. (I, US, C, D)
*My attendance in class. (I, US, C, A)
The amount of effort I've put into the class. (I, US, C, A)
The manner in which the material was taught. (E, S, UC)
The amount of reading I did. (I, US, C, A)
My clarity of thinking. (I, US, UC)
My general intelligence level. (I, S, UC)
*My physical health. (I, US, UC)

(S) Stable	(US) Unstable	(C) Controllable
(E) External	(I) Internal	(UC) Uncontrollable
(D) Direction of effort	(A) Amount of effort	

* indicates item was excluded from the scales when used in the analyses.

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