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TASK PERFORMANCE ON A SIMPLE REACTION TIME TASK AS A FUNCTION OF SUCCESS EXPECTANCY, TASK INVOLVEMENT AND FEEDBACK

by

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ABSTRACT

The primary purpose was to investigate the effects on simple reaction time task performance of initially stated success expectancies, different levels of task involvement, and success/failure feedback. A secondary purpose was to investigate the relationships among changes in success expectancy during the experimental session, subjects' attributions as to the causes for their success or failure at the experimental task, and their perceived locus of control as measured in two separate ways.

Using randomly varying foreperiods of 1.5, 2.0 and 2.5 seconds, 120 white male subjects' reaction speed to a visually presented stimulus was measured to the nearest millisecond by means of an electronic clock. Four trial blocks of 15 trials each were run. The mean of the first two blocks combined was taken as a baseline reaction speed for each subject. A third trial block was run after expectancy statements had been collected and a task involvement manipulation attempted. Feedback was given on a fourth trial block, on a trial by trial basis. Each subject received either 80% success or 80% failure feedback on Trial Block 4. A second expectancy statement and attribution measures were then collected from all subjects. Some days later each subject completed Rotter's Locus of Control Questionnaire.

It was hypothesized that level of success expectancy would influence task performance under high task involvement, but not under low task involvement. Other hypotheses were stated about the effects of expectancy, involvement, and feedback level on performance. None of these hypotheses received unambiguous support.

Hypotheses were stated concerning relationships between expectancy change and patterns of causal attributions for success or failure at the experimental task. A positive association was also expected between a measure of locus of control derived from Bernard Weiner's attributional model, and the measure obtained by Rotter's I-E scale. Little support was obtained for the attribution hypotheses, and none for an association between the two measures of locus of control. Reasons for this are discussed in terms of the methodology of the present study, and also through a critique of both the Rotter and attribution measures of locus of control.

Extensive post hoc analyses were performed to explore several hypotheses. On this basis some support for the interaction hypothesis is cited, as is evidence for a complex relationship between reaction speed, initial level of success expectancy, and task involvement level.

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A doctoral dissertation is a report of independent scholarly research, and is attributed to one particular individual. In actual fact, however, is chronicles the progress of an apprenticeship, of a first testing of scholarly wings. Its formulation, completion and success in demonstrating research competence is usually dependent on the generosity and critical assistance of many prople. This was abundantly true in the present case.

I wish first to acknowledge a major debt of gratitude to Professor Irwin Katz. As Chairman of the dissertation committee he gave unstintingly of his time and of his knowledge during the course of the research. From initial formulation of the proposal, through resolution of methodological difficulties, data analysis and final drafts, he was always there for consultation when needed. Thorough and provocative in his comments and criticisms, he was also understanding of the problems in combining research work with raising a family and holding a full-time job.

Of great value as well was the expertise of the other two members of the dissertation committee, William Oakes and Gertrude Schmeidler. Their encouragement and their advice on methodology, data analysis and style were very influential. They, too, displayed a generosity with their time and a thoroughness in their concern that was of great assistance.

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CHAPTER I

INTRODUCTION

General Introduction.

The primary purpose of the present study was to measure subjects' performance on an experimental task and determine the relationship of that performance with the overt statement or non-statement of varying levels of success expectancy at the experimental task, with different degrees of task involvement, and with success or failure feedback. The task itself was a simple reaction time task, with reaction speeds electronically measured to the nearest millisecond after onset of a visual stimulus.

This part of the study was inspired by interest in results published by Zajonc & Brickman (1966). Their most provocative finding was that the mere overt statement of a success expectancy on an experimental task was sufficient to cause their subjects to register faster reaction speeds on the task, in the absence of feedback. This enhancement effect was stated to be independent of the level of expectancy stated by subjects. It was the intention of the present experimenter to test and/or replicate these findings under more general experimental conditions. Not only would task performance be measured under variations in success expectancy and feedback level, but also under different levels of task involvement.

Of interest to the present experimenter as well was Bernard Weiner's (1971) attribution model for assigning causality for success or failure to events. This model has yielded provocative findings for Weiner and his co-workers, and an attempt to replicate some of their findings under different experimental conditions than those originally employed seemed desirable.

Two things in particular were envisioned. One was to study relationships between changes in success expectancy and causal attributions. The second was to correlate measures of locus of control obtained by the use of Rotter's (1966) Locus of Control Questionnaire, with measures obtained from the same subjects through the use of Weiner's attribution categories. Both approaches yield measures of constructs identically labeled locus of control. It was desired to investigate the degree to which they measured the same thing, under the conditions of the present experiment.

Before proceeding to the details of the present study, however, a review of the seminal Zajonc & Brickman study and of the experimental history of the present study's variables will be presented. The rationale for specific hypotheses will then be stated.

Zajonc & Brickman (1969) Study

Zajonc & Brickman's major purpose was to investigate the effects on task performance of stating an expected level of performance. Studies in the past had shown that stated expectancies, in interaction with past performance, may influence future performance. But it had not previously been demonstrated that stating a success expectancy, in and of itself, has motivational consequences. In earlier studies attempting to investigate the effects of motivational states on task performance several variables had been confounded.

Expectancies were not clearly distinguished from goal setting, which is more closely related to levels of aspiration. Further, the effects deriving from either expectancies or goal setting were not kept separate from the effects of feedback and reinforcement. In studies where subjects are allowed to set their own goals this confounding is further complicated by the fact that goals are influenced by past performance, one of the most reliable findings in the literature. If the effects of any one of these variables alone is to be studied, then that variable must be introduced experimentally in the absence of other, confounding variables. Logically, the question of what effects expectancies have on task performance requires that they be assessed separately from the effects of feedback or other significant variables. This is what Zajonc & Brickman did.

They refer to previous work on cognitive dissonance, and note that dissonance theory specifically asserts that cognitive interactions such as discrepancies between expectancies and cognitions about outcomes can be a source of powerful motivational consequences. As examples of studies not separating expectancies and goal setting from one another or from the effects of feedback and reinforcement they cite Locke's studies attempting to show that subjects who are led to set specific goals perform better than subjects who are simply told to do their best (Bryan & Locke, 1967; Locke, 1967a; Locke & Bryan, 1966), and that subjects who set or are assigned hard goals perform better than subjects who set easy goals (Locke, 1966; 1967b). They criticize the typical dissonance experiment's mode of attaining independence of task performance and feedback, by using tasks on which no objective measure of performance is possible, as exacting too high a price.

In their own study, in which they proposed to demonstrate the independence of feedback and expectancy, they utilized a simple reaction time task. It has the advantage that subjects' objective task performance can accurately be measured and recorded, while at the same time specific performance levels are by no means obvious to subjects. They utilized a High/Low/No Expectancy X High/Low/No Feedback orthogonal design, yielding nine cells, for their study.

All subjects began with three practice blocks of ten reaction time trials each. This allowed the experimenters to measure a performance baseline before introducing either of the experimental variables of expectancy or feedback. After the third block of trials one-half the subjects were asked to state how many times out of ten they expected to succeed in reacting within the permissible interval (which was not stated) on the next trial block. Still without feedback, all subjects then did Trial Block 4, after which those who had previously stated an expectancy did so once again. On Block 5, one-third of each group of subjects (expectancy stated and expectancy not stated) continued as before without feedback. One-third were given success feedback (80% success) by means of a light, and one-third were given failure feedback (20% success). These conditions were continued through Trial Block 6.

The experiment was done with equipment constructed by Zajonc. Each subject faced a panel containing a stimulus light, a toggle switch and a feedback light. After a verbal warning to get ready the stimulus light flashed, and the subject was to throw the switch as quickly as possible. His reaction time was recorded. On trials where he was to receive feedback it was given by means of the experimenter-operated failure light.

Zajonc & Brickman found significant performance improvement associated with both the expectancy and feedback variables. In addition, before expectancies were even stated those subjects who subsequently stated high expectancies were already performing somewhat better than those stating low expectancies, showing a possible influence of actual ability on stated expectancies. There was a significant main effect for expectancy, with analysis of variance on the change scores yielding an F of 7.57 (df = 2/117), significant at the .001 level. Both the high and low expectancy groups differed from the no expectancy group, but not from each other. The no expectancy group showed a small, non-significant performance improvement. As with expectancy, only the main effect of feedback was significant. With the introduction of feedback there was a large improvement in the performance of those subjects relative to subjects not receiving feedback ($F = 10.37$, $df = 1/111$, p less than .001). And, as was expected from literature on changes in performance expectancies (Atkinson, 1964), subjects made significant changes in their expectancies following feedback on Block 5. They raised their expectancies after success feedback, lowered them after failure, and did not change them significantly in the absence of feedback.

Changes in expectancies following Block 5 were followed by an interesting pattern of performance changes on Block 6. Dividing the previous high and low expectancy groups according to the median expectancy change following Block 5, the investigators found that those subjects refusing to lower their expectancies by large amounts after failure feedback subsequently improved their task performance more on Block 6 ($F = 9.98$, $df = 1/32$, p less than .01 on the Feedback X Expectancy Change interaction). There was no significant relationship under success feedback, which the investigators attributed to a performance ceiling effect among the high expectancy-success feedback subjects. By Block 6 these subjects were outperforming all other groups, and were to commit the individual to the action implied by the expectancy, and that the process of making a commitment enhances motivation and hence improves performance. Secondly, stating a performance expectancy might make standards of excellence more salient.

In criticism of Zajonc & Brickman, however, these two suggestions are less consistent with the data showing equal improvement for different stated expectancies than they are with the hypothesis that different stated expectancies should lead to different levels of performance improvement. Another criticism is that they ignored the role of task involvement in task performance. They speak of the "meaning" of specific performance levels for different subjects, obviously implying that this has motivational consequences. Yet the possible role of differences in motivation was not explored. The assumption seem to have been that all subjects were equally highly motivated. No indication is even given as to what kind of introductory statement was given their subjects as explanation for the task. It is unrealistic to expect different subjects, even if of different success expectancies, to strive differentially for success if a task is meaningless or boring to them. And it is easy to see that a repetitive simple reaction time task might become boring and "very likely" reaching an asymptotic level according to Zajonc & Brickman.

One of the most interesting of their findings is that subjects who said they expected to do poorly still improved, within statistical significance limits, at the same rate as those who stated high expectancies. It would seem, for the sake of consistency, that their performance improvement should be less than that of the high expectancy group. And this was expected by the investigators. Yet this dissonance hypothesis was not supported. The investigators themselves suggest one reason for the failure of their results to conform to predictions. They suggest that their assessment of subjects' expectancies might have been faulty. They asked subjects how many times they expected to succeed over the next ten trials. It may be that four successes out of ten was as satisfying and motivating for one subject as eight or nine successes out of ten was for another, if these performance levels were in agreement with the subjects' initial expectancies. Each would have achieved "success" according to hiw own expectations.

They also suggest two reasons why simply stating an expectancy might be a sufficient condition for performance improvement on a reaction time task. First, it might be that one effect of stating an expectancy to another person is non-motivating to a subject within a relatively short time.

In the present study considerable emphasis has been given to the interaction of task involvement and success expectancy as they relate to task performance. Before describing the present investigation, however, it will be useful to review some different approaches to the relationship of success expectancy and human behavior.

Learning Theory Approach to Expectancy

The reinforcement-learning theory approach is relatively straightforward. It says that expectancies will mirror experience, and that if reality changes for an individual then his perceptions and expectancies will change to match. Social learning theory (Rotter, 1954; 1955; 1960) provides the general background for most of the work dealing with expectancies and their effects on reinforcement. As Rotter (1966) says, "In social learning theory, a reinforcement acts to strengthen an expectancy that a particular behavior or event will be followed by that reinforcement in the future." This has been shown to be true in many studies involving skill-based tasks, in that expressed expectancies and feedback-reinforcement are positively correlated. This includes studies with children (Crandall, 1963; Crandall, Good & Crandall, 1964; Mischel & Staub, 1965) and with adults (Diggory & Morlock, 1964; Feather, 1963, 1965, 1966, 1968; Heath, 1961, 1962; Rychlak & Lerner, 1965; Phares, 1957; Brickman, 1968; Zajonc & Brickman, 1969).

All these studies utilized similar paradigms. Subjects were asked their expectancies of success on some task, with tasks ranging from anagrams to mathematical puzzles to reaction time measures. They were then asked to perform for a number of trials, during or after which they were given performance feedback. Without exception, these studies show that success/failure feedback strongly effects subsequent expectancies at the same task. Following success most subjects altered their expectancies upward; following failure feedback most subjects altered them downward. The findings are overwhelming that realistic alteration of expectancies follows performance and feedback. This pattern of results is hypothesized in the study being proposed here as well. A second assessment of expectancies, after success or failure feedback has been received, should show the following results: compared with initial expectancy levels those following success feedback will be higher, and those following failure feedback will be lower than were initial levels.

Work by Schwarz (1966) also indicates, reasonably enough, that success/failure feedback patterns are more important than simple probabilities of success. Successes occurring together are more effective than if they are scattered. Studies concerned with the temporal stability and generalizability of changed expectancies indicate that those changed through a single experimental session are very unstable, reverting back to pre-session values in as little as twenty-four hours (Phares, 1966; Schwarz, 1966). Schwarz indicates that this is especially true of highly discrepant changes in expectancy.

Other studies have shown positive correlations between expectancy and performance measures. Crandall, Katkovsky & Preston (1964) showed, for males, significant positive correlations between expectancies on an intellectual task (measured by asking a child whether he thought he could solve each of eight specific tasks in a soon-to-be administered test) and the intensity of striving at these tasks (observer ratings of degree and duration of concentration). Internality and minimal achievement standards were also associated with males' achievement behavior. Battle (1965) related expectancy and persistence at a difficult mathematical task, for junior high school students. Feather (1963, 1966, 1968) reported a strong relationship between present achievement levels and the feedback levels for just-completed anagrams tasks.

These results showing a positive relationship between expectancy and performance, plus those of Zajonc & Brickman (1969) showing a positive correlation between expectancy and initial task performance levels, lead to a similar hypothesis in the present study. Mean reaction times on initial trial blocks will show a positive correlation with initial levels of success expectancy. Again reasoning from these same foregoing studies, one would expect a main effect of feedback on task performance. That is, task performance would be significantly enhanced by feedback, compared with that of a control group not receiving feedback. This is not a principal point of interest of the present study, however, and the direct test of this hypothesis is not provided for in the study design.

Some work has been done concerning the possible effects of initial expectancy level. For example, is sensitivity to success or failure conditioned by initial level of generalized expectancy? Gurin & Gurin (1970) reported on a group of studies supporting the thesis that expectancies will change most in reaction to the most discrepant experiences. Most studies reported have obtained greatest change in expectancies with failure feedback (Crandall, 1963; Crandall, Good & Crandall, 1964; Feather, 1966, 1968; Rychlak & Eacker, 1962;

Rychlak & Lerner, 1965). However, the subjects used in these experiments were middle-class, supposedly success-oriented individuals. They would reasonably be expected to approach the experimental tasks with high expectancies of success. Mischel & Staub (1965) suggest that persons with low success expectancies tend to overgeneralize when they experience success, that they are overdependent on their immediate environment. Clearly, these findings must be brought into congruence with those showing the transience of changed expectancies before confident predictions can be made as to amount and permanence of expectancy change in any specific situation.

One word of caution is in order concerning experimentally induced levels of expectancy. Feather (1966) states his belief, on the basis of his own experimental work, that experimenter-induced expectancies are effective in influencing behavior only when subsequent task results confirm the induced expectancies. Otherwise, the first thing to go is the subject's belief in the accuracy of the expectancy level he was given. Instead of the experimenter stating an expected level of performance, Feather says it is better to let subjects formulate their own expectancies. This could perhaps be done, for example, through judicious pre-testing of subjects in which different groups obtain different levels of feedback. Otherwise, Feather says, little can be deduced from experimental data when one cannot be sure that the expectancy induction "took".

All the above studies support the hypothesis that both expectancies and feedback effect later task performance. They not only suggest that expectancies effect later performance, but lead one to expect a positive correlation between initial level of expectancy and subsequent performance level. However, none of the study designs, with the exception of that by Zajonc & Brickman (1969) allow one to separate the effects of different variables (e.g., success expectancy, and feedback) on task performance. And that is the one study which calls into question the validity of the expected positive correlation between expectancy levels and subsequent task performance improvement.

In summary, a large number of studies with widely varying types of task have shown positive correlations between levels of success expectancy, feedback and task performance. There is strong indication that quickly altered expectancies are very prone to reversion toward pre-experimental levels over the course of a few hours or days. And there is evidence for a complex relationship between initial expectancy, expectancy change, type of experimental task, reinforcement schedules, and subsequent task performance. Generally, it constitutes a very respectable amount of support for the reinforcement learning approach to success expectancies and task performance. But other theoretical approaches have their supporting evidence as well, even though not necessarily as extensive in magnitude. And it is to another of these approaches that we now turn.

Dissonance Theory And Expectancy

In marked contrast to the rather weathervane aspect of expectancies that seems to be emerging so far, theories based on the general concept of cognitive consistency specifically predict resistance to change of expectancies under certain circumstances. Congruity theory (Osgood & Tannenbaum, 1955), balance theory (Abelson & Rosenberg, 1958, 1960), and dissonance theory (Festinger, 1957) all proceed from the central supposition that there are strong forces in everyone to bring our actions, beliefs and emotions into agreement. Credit for originating the line of thought which was later developed into the various consistency theories is given to Heider (1944, 1946, 1958), with major credit for elaboration of the three major theoretical formulations built on the consistency principle given to the investigators cited immediately above. Congruity theory, the first cited, is a detailed and explicit model of attitude change. It is precise in its functioning, but quite limited in scope. Balance theory is less determinate than the first model. It does not specify the specific effect of new information on a particular attitude, but predicts the occurrence of one of a small number of possible changes each of which would lead to increased consistency. Operational clarity of concepts, and determinacy of predictions decrease sharply when one proceeds to dissonance theory, but the scope and reality of material dealt with increases sharply in contrast. Dissonance theory deals with cognitive elements and their degree of consonance or equilibrium. Dissonance amounts to ambivalence, to a situation where an individual's thoughts impel him simultaneously in mutually incompatible directions. Persons can handle dissonance in several fashions. They may reduce it when it results from discrepant information by denying implications of that information. They may act in such a way as to undo the need for expectancy changes. Or they may make cognitive changes to bring their expectancies into line with new information or into congruence with some action freely taken on their part. These alternative paths for dissonance reduction are not exclusive of one another.

Early dissonance experiments were generally structured in such a way as to leave open to subjects only the cognitive-emotional modes of dissonance reduction. Subjects could only deny or distort the implications of their actions, or change their attitude toward the object of their actions. This was true in Festinger & Carlsmith's (1959) study of cognitive consequences of compliance to a distasteful course of action. It was true of Aronson & Mills' (1959) study of subjects' liking for a group as it related to the severity of initiation into that group. And it was true of Festinger, Riecken & Schachter's (1956) study showing the effect of social support in influencing the mode of dissonance reduction employed by individuals. The thrust of each of these studies was toward showing the existence and direction of behaviorally induced attitudinal changes. But cognitive control over behaviors leading to success or failure became an important area of research after Aronson & Carlsmith (1962) reported that people who expect to fail will behave in such a manner as to conform more closely to previous expectancies of failure, thus at least partially rejecting evidence of success. This was an important study because its implications bear directly on any program designed to change people's thinking or their modes of behavior, from social improvement programs of international scope down to individual research studies in which it is desired that subjects believe task instructions, feedback and debriefing attempts.

Several studies have been conducted in attempts to replicate Aronson & Carlsmith's finding. Evidence in support of their prediction has been reported by Ellsworth (1966), and by Winer (1965), while equivocal or negative findings have been reported by others (Lowin & Epstein, 1965; Silverman & Marcantonio, 1065; Frentzel, 1965; Cottrell, 1965, 1967; Zajonc & Brickman, 1969). An extensive replication attempt was made by Brock, et al (1965) in a series of studies. First, in two studies that exactly replicated the conditions of the original Aronson & Carlsmith study, they obtained results similar to those obtained originally. In subsequent studies of the series they varied task feedback to the subjects. They found that when feedback is clear and frequent, subjects behaved as incentive theory predicts, rather than according to the predictions of dissonance theory. In the Zajonc & Brickman (1969) study discussed earlier in this paper and cited above, feedback was given to subjects on a trial-by-trial basis when it was given at all. This certainly would seem to constitute clear and frequent feedback. They did not report support in their data for a dissonance hypothesis of the Aronson & Carlsmith type. The methodology of the present study is very similar to that of Zajonc & Brickman, especially insofar as administration of feedback is concerned. Therefore, no such pattern of dissonance reduction is expected.

Locus of Control and Expectancies

An approach dealing with subjective locus of control of behavioral reinforcements links expectancies, motivational forces and overt behavior. Julian B. Rotter's (1966) is the name most closely associated with this line of investigation. He developed a measure of the locus of control concept, out of his theoretical interest in the learning of new expectancies. For him a person with an internal locus of control is a person who feels himself to be his own master and master of his fate. His definition of external locus of control is very similar to Seeman's (1959) earlier definition of powerlessness. This is the expectancy held by an individual that his own behavior cannot determine the occurrence of his reinforcements.

An individual's perceptions about the causes of reinforcements can strongly effect his later behavior. If an achievement situation is perceived as strictly skill determined in its outcomes, then initial successes or failures in that situation will have a much greater effect in determining expectancies for future success or failure than if the situation is perceived as being a rigged game from the start. When control of reinforcements is seen as external to the person, then reinforcement experiences are less useful to the individual for estimating future chances of success. When calculating probabilities of success in a skill situation a person includes his estimate of his own abilities and of the effort he intends to expend. In a situation governed by chance these factors aren't even relevant. An external locus of control individual tends to treat all achievement-related situations as if they were chance determined, whereas the chronic tendency of an internal locus of control individual is to accept such situations as skill determined unless there is clear evidence to the contrary.

Subjects in skill situations and subjects who believe their own actions determine the rewards they receive show greater increases or decreases in expectancies following successes or failures, and they reach a given expectancy level with fewer successes or failures (Rotter, Liverant & Crowne, 1961; Phares, 1957; Bennion, 1961). In addition, expectancy changes after success or failure are most realistic (Phares, 1957; James, 1957; Feather, 1968). These studies support the thesis that Internals should profit more from their experiences than Externals, and that being an External is roughly equivalent to treating every situation as chance controlled.

Reflecting the reality of power differences associated with socioeconomic status, middle class individuals have been found to be more internal than working class subjects (Crandall, et al, 1965; Coleman, et al, 1966). This level of realism should be found in academic situations as well. Katz (1967) states that a child's feelings about whether his own efforts determine his external rewards should affect his expectancies of success, and hence should affect his willingness to strive for success. Compatible with this suggestion Crandall, et al (1962) found that white grade school boys showed a positive correlation between achievement test scores and a feeling that they controlled their own reinforcements. Coleman, et al (1966) found internal locus of control related to academic achievement in both blacks and whites, with it being especially important in black students. Internality in black students appeared to be highly responsive to the racial environment of the classroom.

For the poor two factors of importance in learning new expectancies are the conditioning effects of initially low expectancies, and of externally based expectancies. We have already discussed earlier in this paper hypothesized effects of generalized low expectancies of success (Gurin & Gurin, 1970; Mischel & Staub, 1965). Individuals with generalized low success expectancies are thought to be especially susceptible to expectancy change as a result of success feedback. The opposite should be the case for persons entering achievement situations with generalized externality of locus of control. They should be resistant to change because they would place less emphasis on feedback as a factor governing expectancies. As of the present time, more needs to be known about the motivational patterns of subjects who have both low and external expectancies, and of their cognitions concerning causes for patterns of feedback, before predictions can be made about expectancy change under the impact of different feedback patterns.

It may be that the dynamics of expectancy-behavior interaction are different in time-limited and non-involving circumstances than they are in situations of important social relevance or in situations which endure over long periods of time, like days, weeks or months. For example, the Zajonc & Brickman (1969) study utilized a reaction time task, and each subject was seen for only one brief session. These investigators found no significant difference in amount of task improvement between high expectancy and low expectancy subjects. In marked contrast to this Lichtenstein (1971) reported on a more socially relevant and longer term study. Its purpose was to investigate the role of expectancies in an aversive conditioning program to help people stop smoking. In his high expectancy group all eighteen subjects stopped smoking for some time, with fourteen subjects remaining off cigarettes two months later. In the low success expectancy group only eight of the eighteen stopped at all, and only one subject remained a non-smoker after the passage of two months.

Attribution Theory and Expectancies

This approach is concerned with those processes whereby individuals assign causality to events. It derives its inspiration from the writings of Heider (1958). Heider saw each person as a naive scientist, making and testing hypotheses about the nature of the world. His theory describes individuals operating as if they were motivated to obtain cognitive mastery of their environment. This motivational assumption gives his theory a functionalist cast and a cognitive emphasis.

The next major theorist to expand on attributional theory was Kelley (1967), in a Nebraska symposium article. According to Kelley, "Attribution refers to the process of inferring or perceiving the dispositional properties of entities in the environment...such as color, size, shape, intention, desire, sentiment, and ability." (p. 193). Heider emphasized "can" versus "try" dimensions of events in our attribution of causality and responsibility for them. Kelley's formulation is also equally concerned with assigning self-versus-environment causality, and with inferring a person's intention from knowledge of his actions' consequences. The major standards by which causality judgments are made are those of events' distinctiveness, consistency over time and over circumstances, and consensus among different persons concerning the events' effects.

Weiner & Kukla (1970) state that two approaches have been emphasized in attributional research. One deals with the effect of environmental factors on the formation of attributions. This approach was utilized by Heider (1958), Jones & Davis (1965), and Kelley (1967). A second approach focuses on individual differences in perceived causation. This approach is exemplified by Crandall, Katkovsky & Preston (1962), Crandall, Katkovsky & Crandall (1965), and by Rotter (1966).

An attributional model of achievement behavior has been proposed by Bernard Weiner and his associates (Weiner & Kukla, 1970; Weiner, et al, 1972). Bearing some similarities to Rotter's (1966) use of the locus of control concept, it attempts to replace Atkinson's (1957) achievement motivation model with a cognitive approach. In Weiner's model persons make implicit attributions of causality following success or failure at an achievement task. These attributions are to a combination of four factors: Ability, Effort, Task Difficulty and Luck. They serve both to explain the outcome to oneself and to allow predictions, expectancies of success/failure, on similar tasks in the future. These four factors are cast within a two-dimensional framework where the dimensions are locus of control, and relative stability of attributional factors (Figure 1).

FIGURE 1

Weiner's Two-Dimensional Attribution Model

		LOCUS OF CONTROL	
		"Internal"	"External"
STABILITY	"Fixed"	Ability	Task Difficulty
	"Variable"	Effort	Luck

Weiner and his colleagues have reinterpreted some studies done by other researchers in terms of this attribution model, and have established correspondences between it and earlier work in achievement motivation by Atkinson (1964). In the Rosenthal & Jacobson (1968) "Pygmalion in the classroom" study, for example, it is pointed out that false information given teachers about their students precluded their ascribing failure in their "bloomer" group to any lack of ability. Instead, they were induced to attribute it to lack of effort. Attribution of failure to lack of effort implies that a greater effort will lead to success. Perhaps the teachers persuaded both themselves and these students that their failures had been due to lack of motivation, thus persuading them to try harder for success.

The Rosenthal & Jacobson study has been criticized on the basis of statistical shortcomings as not having actually shown what it purported to demonstrate (Barber & Silver, 1969), but for our purpose of reinterpreting it in terms of Weiner's attributional model it serves admirably.

In one of a series of simulation studies, Weiner & Kukla (1970) report that subjects tend to reward or punish both themselves and others on the basis of ascribed motivation level, giving that factor more weight than the factor of innate ability in determining the magnitude of reward or punishment to be dispensed. If one accepts that ability is a relatively stable attribute, unresponsive to external reward or punishment, then it should be more effective to reinforce level of motivation, because that alone is relatively amenable to change under external pressures. In another simulation study they show that, regardless of both ability and motivation levels, subjects dispense more rewards than punishments to others, whereas the tendency is to dispense more punishment than rewards to oneself for one's performance in achievement situations. They also state that pride in successful accomplishment is primarily a function of perceived effort, an internal attribute.

Atkinson (1964) contends that the motive to succeed represents a capacity to experience pride in the attainment of goals. Rotter (1966) states that perception of internal control in achievement situations increases the affect associated with goal attainment. And Weiner, Heckhausen, Meyer and Cook (1972) conclude that affect in achievement-related situations is determined primarily by the control dimension, whereas attributions to the stability dimension are the primary cause of changes in expectancies following success or failure.

These diverse strands lead to the suggestion that individuals high in the need to achieve are likely to ascribe success to themselves and to experience greater emotional reward for goal attainment than are persons lower in the need to achieve. However, the intuitively satisfying notion that individuals high in the need to achieve will attribute success to internal determinants, and that low need for achievement will be associated with externality, is not supported by research (Crandall, et al, 1962; Odell, 1959; Lichtman & Julian, 1964; Feather, 1967). Much of this research is reviewed by Rotter (1966) and by Lefcourt (1969).

Weiner & Kukla (1970), however, say that the method of assessing locus of control might mask a relationship between the variables of locus of control and need for achievement. Most of the locus of control research has used Rotter's (1966) Internality-Externality (I-E) scale. This is a general measure, and is not intended to assess perception of control only in achievement situations. It contains items whose content is often more related to social influence, power, etc., than to achievement motivation. Also, Rotter's scale includes items with both positive and negative outcomes. And evidence has accumulated that different attributional dynamics are applicable for success and for failure experiences. Crandall, et al (1965) found little correlation between causal attributions of successful and of unsuccessful events. Zajonc & Brickman (1969), as well, suggest that "...lowering one's expectancies, and improving one's performance, may thus be alternative modes of reacting to failure...".

Weiner & Kukla (1970) report that high need-Achievement individuals are more internal for success than are lows. In the case of failure, they suggest that these groups differ not in their overall level of internal attributions but in their patterns of causal attributions. Persons high in need for achievement attribute failure more to lack of effort, whereas lows attribute it more to lack of ability. These are both internal attributions, but different in their implications for further behavior and for expectancies of success. Their work indicates that the cognitive mediators between event feedback and subsequent behavior, for individuals high in need for achievement, are stable attributions for success and unstable attributions for failure. They suggest that the opposite pattern is true for individuals low in need for achievement. This would explain the greater persistence of high need-Achievement individuals in the face of failure.

It has been suggested that some of the individuals scoring as Externals on Rotter's I-E scale may have developed such expectancies for defensive reasons (Rotter, 1966; Hersch & Scheibe, 1967; Davis, 1970). Several studies provide evidence to support this hypothesis. For example, Efran (1963) and Phares, Ritchie & Davis (1968) reported greater recall of threatening information by externals. If an external orientation does serve a defensive function it might be expected that the relationship between internality and attribution of responsibility would be mediated by the nature of an event's outcome. Following failure, defensive externals would be more likely to rationalize the outcome by attributing it to forces beyond their control. Success outcomes, on the other hand, would engender no threat, and one should see less difference in the attributions of internals and externals to outside forces than in the case of failure. Davis & Davis (1972) found support for this hypothesis. They found no difference between internals and externals in their tendency to take credit for success. When the outcome was negative then internals did blame themselves more than did externals for the negative outcome.

Davis & Davis agree with Rotter that externals on the I-E scale should be further subdivided on the basis of defensiveness. They suggest that defensive externals might act more like internals in situations where competitiveness is not a strong factor. Other externals, in contrast, may have developed this set of expectancies because it more or less reflects their life situation. If this were true, then defensive externals would show the greatest tendency to vary their attributions with changes in outcomes. Internals and defensive externals would be likely to attribute positive outcomes to personal sources. But for negative outcomes, both defensive and non-defensive externals would attribute more responsibility to non-personal sources than would internals.

They combine this general hypothesis with an observation from an earlier study (Davis, 1970) that defensive externals place higher value on academic achievement reinforcements than do non-defensive externals, while internals score between these two groups. On this basis they then suggest that individuals placing a high value on achievement goals would be those adopting attribution patterns similar to those of defensive externals. They also note that this picture is very similar to that reported by Weiner & Kukla (1970) for individuals high in achievement motivation. As will be recalled, Weiner & Kukla found high need-Achievement subjects to attribute more responsibility for success to personal sources than did low need-Achievement subjects, while this pattern was reversed for failure outcomes.

Resolution of these issues will require further research, but at a minimum it seems clear that individuals' attributions do differ depending upon whether an achievement situation ends in success or in failure.

What predictions can be made in the present study for subjects receiving success or failure feedback? It will be recalled that Weiner & Kukla (1970) stated that attributions of causality to unstable factors implies that past and future events will be different, just as attributions to stable factors implies that past and future events will be consistent. We would expect, therefore, that subjects who lower their expextancies least after failure feedback would attribute their failure to the unstable factors of effort and luck more than would subjects whose expectancies were more labile in the face of failure.

The subject attributing failure to unstable factors is precisely the type of subject whom Weiner & Kukla (1970) also say should exhibit greater persistence in the face of failure. In support of this, Kukla (1972) conducted a study during which he induced attributional sets typical of either high or of low need-Achievement persons in his subjects. That is, he induced the belief that success was a function of effort only, or of ability only. He found that the "effort" belief subjects worked with greater intensity than did the "ability" (a stable attribute) belief subjects. This study ties in well to Zajonc & Brickman's (1969) experiment, because they found that subjects who lowered their expectancies least after failure feedback were the ones who improved their task performance most on the subsequent feedback trial block.

This result appeared to be replicated in the pilot studies of the present experiment as well. Therefore, two results are expected to be obtained in the present study from subjects receiving failure feedback. Subjects lowering expectancies least after failure feedback are expected to improve their task performance more than will those who lower their expectancies more. Also, these subjects lowering their expectancies least will attribute their failure to the unstable elements of effort and luck to a greater extent than will subjects lowering their expectancies more.

A third prediction for subjects receiving failure feedback follows from results obtained by Davis & Davis (1972). Those investigators found that only under conditions of failure feedback was there any relationship between Rotter internality and the assumption of personal responsibility for what had happened to them. It is expected in the present study that Rotter and Weiner-type measures of internality will be positively correlated, under conditions of failure feedback, but not related for subjects receiving success feedback.

What other predictions might be made for subjects receiving success feedback? A prediction has already been made for failure feedback subjects that those lowering their expectancies the least would more strongly attribute their failure to unstable factors. Reasoning by analogy from this, it is predicted that those subjects receiving success feedback who increase their expectancies the most will more strongly attribute their success to stable factors (ability and low task difficulty) than will subjects who increase their expectancies by lesser amounts. This prediction, though unsupported by previous research findings, should follow from Weiner's model because a belief in consistency of past and future events implies attributions to stable causality factors.

Weiner & Kukla (1970) reported a strongly significant correlation between n-Achievement and attributions to ability under success conditions, with a lesser correlation for effort. They also reported an increase in attributions both to ability and to effort after success feedback, for all subjects. In one negative finding, they found no relationship between n-Achievement and internality of attributions under failure feedback conditions. Seemingly in conflict with this is the Davis & Davis (1972) finding of more self blame for failure by internals than by externals, but no difference between the groups in taking credit for success.

It is tentatively hypothesized for the present study that success feedback will be associated with greater attributions both to ability, and to effort than will failure feedback.

Discrepancies in the Expectancy Literature

The theoretical approaches we have been considering disagree somewhat on the expected relationship between expectancy and task performance. But all of them, the learning-reinforcement approach, the dissonance approach, the locus of control approach and the attribution theory approach, predict different magnitudes of change in performance level corresponding to different initial levels of expectancy. And these are not the results obtained experimentally by Zajonc & Brickman (1969). They found that stating an expectancy resulted in a task performance increment, but that the amount of performance improvement was independent of the level of initially stated expectancy. Even the explanations for these results offered by Zajonc & Brickman, that stating an expectancy makes standards of excellence more salient, and that the process of making an expectancy level public induces a commitment to do well, both lead relatively easily to predictions of a positive correlation between stated expectancies and subsequent task performance.

If so much previous work points in the direction of differential performance levels for different levels of expectancy, then how does one explain Zajonc & Brickman's results?

One easy answer is that they did indeed get a differential effect of expectancy levels. High expectancy subjects performed better right from the start than did low expectancy subjects. But this was a marginally significant difference at best, and is not what we are primarily interested in. Rather, we would expect a greater rate of task performance improvement for subjects with high expectancy levels, especially under the impact of failure feedback. Why did Zajonc & Brickman not get it? There are several possible answers to this question.

First, it is quite possible that Zajonc & Brickman's results just are not true (i.e., are artifactual), and that in general differential expectancies are related to differential striving and to differential task performance improvement rates.

Second, it could be that the time scale was not long enough for such effects to become clear, or that a more complex task is necessary in order to demonstrate the effect.

Third, it could be that the relation of expectancy to task performance is curvilinear, rather than monotonic. In the Atkinsonian (1964) model, subjects with midrange expectancy values would be expected to perform better than those at either extreme, at least after receipt of feedback and for those subjects in whom the motive to succeed is stronger than the fear of failure.

Fourth, it could be that we are seeing a ceiling effect in Zajonc & Brickman's experiment. Perhaps the statement of any level of success expectancy is sufficiently motivating that subjects perform at their best level, and further motivational differences due to expectancy differences cannot be reflected in performance differences.

Fifth, it could be that Zajonc & Brickman's subjects did not retain initially high expectancies after contrary feedback, and that this adversely affected their performance. There is some support for this point of view in Zajonc & Brickman's Table 2. It shows that those subjects having initially high expectancies and then receiving failure feedback improved their mean performance level by 6.54 milliseconds, whereas those receiving success feedback improved their performance level by 8.28 milliseconds.

Sixth, it is true that a given level of objective feedback about performance level can have different subjective meanings for different subjects. Subjects were asked by Zajonc & Brickman to state how many times out of ten they expected to react within the (unspecified) time limit. Perhaps four successes out of ten meant the same to a subject who stated an initially low expectancy as did eight successes out of ten to a subject who had initially stated a higher expectancy. In other words, the subjective meaning of a given level of feedback can differ from subject to subject, depending on initial levels of expectancy.

Attaching a subjective success-failure meaning to a given level of performance has not been done in expectancy research. Atkinson used expectancy in the sense of probability only, while in his achievement motivation model the "meaning" of a given success probability is seen as an incentive value whose magnitude is mathematically the inverse of the success probability. In order to establish desired subjective success-failure meanings for different levels of performance it would be helpful to broaden the available range of expectancy levels which subjects might state. It would also be helpful to label different levels of stated expectancy, to make them distinct in terms of success-failure implications.

Seventh, a possible reason for the obtained experimental results is that many of the subjects were not interested enough in the task. If subjects were not ego-involved in the outcome of the experimental task, if it held little importance for them, one would not expect differential performance levels for different levels of expectancy. There would be no purpose in subjects ever making an extra effort. Therefore, in any replication of Zajonc & Brickman's (1969) experiment not only the range of expectancies should be broadened and different levels made distinct with respect to subjects' experiences of success or failure, but the level of task involvement should be varied as well to obtain greater generality of experimental findings.

Expectancy Assessment

Some methodological considerations are in order at this time. It was desired to use the best methods of assessing success expectancy in the present experiment. Dorothy Alita Evans (1968), in an unpublished Doctoral dissertation, reviewed approaches to expectancy assessment used in psychological research. This is summarized here. Six different modes of expectancy assessment have been used in experimental studies.

In one study, Lasko (1952) asked subjects to choose between indicators of expected success or failure, such as between red and green lights, in a simple dichotomous choice. A second method of assessment is to ask for probability statements about the occurrence of specific events, or to have subjects rank events in terms of probability (Lewin, Dembo, Festinger & Sears, 1944). A third is to have subjects state scores they expect to obtain on succeeding trials, in which a range of possible scores is made clear to them (Chance, 1952; Jessor, 1954; Heath, 1959, 1961, 1962; Rivers, 1964). A fourth mode of assessment is to ask subjects to bet on different possible outcomes (Crandall, Solomon & Kellaway, 1955; Phares, 1957; Holden, 1969). A fifth is to measure the latency period between when a question is asked and the time a subject's response is given.

Lotsof (1958) asked subjects to indicate which of two lights would flash on a panel in front of them. He had different groups of subjects working under fixed schedules of 25%, 50% or 75% reinforcement. He found support for the hypothesis that decision times vary inversely with expectancy of positive reinforcement. He had previously found (Lotsof, 1956), in experiments involving a choice between two alternative acts, that decision times varied inversely with the degree of discrepancy between the reinforcement values of the two acts. He stated that the same principles appear to govern simulated and real acts. His experimental task was to choose which of two liquids to drink.

A sixth mode of assessing expectancy was also utilized by Lotsof (1959). He found a positive correlation between confidence levels assigned to expectancies by subjects and the objective probabilities of events' occurring.

A few studies have been performed in which combinations of measures have been used. James & Rotter (1958) used the second and third methods listed here---probability statements about the occurrence of events, and expected scores on succeeding trials. Cohen (1960) used a combination of three and six---asking for expected scores on subsequent trials, and asking for confidence levels of stated expectancies.

Does it make any difference which measure or measures is used? One study, by Rotter, Joyce & Fitzgerald (1954), was addressed specifically to this question. Different groups of subjects assessed the probability of the same class of events by a variety of methods. One group stated absolute expectancies for each problem to be faced, and then rated on a ten-point scale the subjective probability of making their previously stated expected scores. One group was asked to give the absolute probability of making each of six possible scores before trying each problem. Another group rated on a ten-point scale the absolute probability of making at least each of the six possible scores. Another group was given money to bet on their success in making each of the six possible scores.

The upshot of this was that the investigators found all the methods utilized tend to measure the same thing, and any or all of them could be used with confidence.

CHAPTER II

METHODOLOGY

Pilot Studies.

A review of the expectancy literature has led to several hypotheses for testing in a modified replication of Zajonc & Brickman's (1969) experiment. Zajonc & Brickman found equal improvement in the task performance of subjects who stated success expectancies, regardless of the level of initially stated expectancy. However, the research literature suggests that task performance and level of stated expectancy should be positively related. This has sometimes been shown to be so even at the expense of an earlier level of task performance. The central finding of Aronson & Carlsmith's (1962) dissonance experiment was that subjects performing above their expectancy levels would subsequently lower their task performance to more closely conform to initially stated expectancy levels.

Thus, it was hypothesized at the beginning of the present pilot studies that stating an expectancy would result in gains in task performance for all subjects, and that these gains would be positively correlated with the level of expectancy stated. This hypothesis was later modified to apply only for subjects high in task involvement.

In a departure from the Zajonc & Brickman experiment, the variable of task involvement was incorporated into the present studies. It was hypothesized that there would be an interaction effect of task involvement and success expectancy on improvement in task performance, such that the predicted positive correlation of expectancy and task performance improvement would hold true only for subjects with high task involvement.

It was also hypothesized that baseline reaction speeds would correlate positively with initial levels of stated expectancy, reflecting a basis in reality for expectancies. It was hypothesized that post-feedback statements of expectancy would reflect feedback levels, with mean expectancy levels being higher for subjects who received success feedback and lower for subjects who received failure feedback. As in the Zajonc & Brickman study, subjects in the failure feedback condition who lowered their expectancies the least were expected to be the ones to improve their task performance the most.

Hypotheses concerning attributions of causality for success or failure were the following. Subjects stating high expectancies were hypothesized to give more stable attributions for success, and subjects stating low expectancies were hypothesized to give more stable attributions for failure. This is the pattern of results that Weiner & Kukla (1970) stated that one should see for high and low n-Achievement subjects, respectively. It was an unstated hypothesis that a median split of expectancy ratings would also yield a median split of n-Achievement strengths. This was expected because subjects were to be told that their performance was to be compared with the average task performance of a heterogeneous comparison group, an average group of people. And subjects high in need for achievement approach tasks of medium difficulty with more enthusiasm and confidence than do subjects who are lower in the need for achievement.

Pilot Study 1

A commercially manufactured reaction time apparatus was used in this pilot study, with a panel utilizing three telegraph keys for responding to three corresponding signal lights. This initial pilot study was informative only in the sense that it pointed up some methodological difficulties. Intra-subject variability in reaction times was so great that the data taken were worthless for statistical analysis. Later pilot studies were done with equipment partially constructed by the author and similar to that used by Zajonc & Brickman (1969). This apparatus is described in a later section of this dissertation. The first pilot study showed that the reaction time task had to be simpler, not involving gross movements of the subjects' forearms, if intra-subject variability were to be minimized.

Pilot Study 2

The second pilot study utilized 36 subjects of both sexes, recruited from pedestrian traffic along Forty-Second Street in New York City. The experimenter carried a sign which read, "Like to participate in a 30-minute psychology experiment? No charge." Individuals who stopped to ask about the experiment were simply told that the purpose of it was to study the reaction times of different individuals under different conditions. Subjects' ages ranged from 17 to 72 years.

Apparatus.

The subject's panel consited of an enclosed metal box with an inclined front panel. On this panel were four lights and a center-return toggle switch. An amber "Ready" light was at the lower left corner; two separate green "Go" lights were at the two top corners; and a red "Failure" light was situated in the lower right corner. The toggle switch, which could be flipped either to the left or to the right, was situated in the middle of the panel at the intersection point of its diagonals.

After the apparatus was explained to the subject and he had tried it out a couple of times, four trial blocks of 15 trials each were run in the following manner. The amber light was lighted first, to alert the subject that a trial was beginning. After a randomly varying period of time (1.5, 2.0 or 2.5 seconds), one of the green lights was lighted. The subject was then supposed to flip the toggle switch either to the left or to the right, depending on which green light had been lighted. This turned off the green light automatically and the clock was stopped, indicating how long it had taken the subject to respond. If the subject's reaction time was longer than an adjustable and pre-set period of time the red failure light was automatically lighted. Trials were separated by 10 seconds, and trial blocks by a five minute period.

Method.

When the subject entered the experiment room he was asked to fill out an information sheet asking his name, age, sex, occupation, race and nationality. Two trial blocks were then run. Data from the first trial block was later discarded in analysis of Pilot Study 2, and the data of Trial Block 2 alone were used for calculating subjects' baseline reaction times.

Between Trial Blocks 2 and 3, subjects were given an attribution questionnaire. In a forced-choice paired-comparison format they were asked to choose which of the factors of Ability, Luck, Task Difficulty and Effort they felt was likely to have the greatest influence on how well they would do on the reaction time task. A second questionnaire was intended to measure success expectancy. The subject was asked to check on an 11-point scale how well he expected to do in comparison with each of five groups of individuals (astronauts, average college students, residents of a home for senior citizens, middle-aged businessmen, and college athletes). A third sheet given subjects between Trial Blocks 2 and 3 was entitled "Explanation of Task". This was the means whereby high and low task involvement were to be created. The high involvement statement told subjects that the speed and pattern of their reaction time responses was indicative of mental quickness and alertness. The low involvement statement told them that the focus of the study was on the effects of experimenter demands on subjects' responses, and that the reaction time task was intended primarily as a time filler between the other parts of the experimental procedure. After this statement had been read by the subject, Trial Block 3 was run.

Immediately after Trial Block 3, a six-item task involvement questionnaire was given the subject to complete. He was asked to check a line, scaled in units of ten from zero to one hundred, for each of the following questions: "How important is it to you to do well on this particular task? How hard are you trying? How intent on the experimental task have you been? How much anxiety would you feel at not doing well? If you were interrupted before finishing the task, how strongly would you want to return and complete the task later? How pleased would it make you feel to do very well on the task?"

After completion of this questionnaire, subjects who were due to receive feedback were given a statement telling them about it. They were told that on every trial for which their speed was less than the average of all the combined groups with which they had compared their own expected performance, the red light would come on. They were further told to count their performance a success if they saw the red light less than 50% of the time, and a failure if they saw it more often than that. Trial Block 4 was then run, with either 20% success (failure condition) or 80% success (success condition) feedback.

After the completion of Trial Block 4, two measures were presented to the subject. The first was a repeat of the earlier attributions measure, worded slightly differently to follow appropriately after either success or failure feedback. The second measure was a repeat of the earlier expectancy measure. Subjects were then de-briefed, thanked and dismissed.

Results and Discussion.

This pilot study included only 36 subjects. Thus, cell numbers for analyses are very small, and findings are merely suggestive. With this in mind, the following results may be considered.

There seemed to be a strong effect of feedback on task performance, and failure feedback generated slightly more task improvement than did success feedback. The manipulation of task involvement was apparently not successful in this pilot study. No discernible differences in performance were found, either for the high and low task involvement groups or for subjects who answered differently on the six-item measure of task involvement.

The effect of stating a success expectancy was nil. In fact, those subjects who did state an expectancy performed slightly worse than did control subject who did not state one. The expectancy assessment itself seemed to be fairly accurate, since it agreed with the type of feedback which subjects had received, being higher for success feedback subjects and lower for those receiving failure feedback. Further indication of the adequacy of the expectancy measure lies in the fact that subjects stating high initial expectancies obtained better baseline performances than those stating initially low expectancies. However, the amount of performance gain was also about the same for the two subgroups, as in the Zajonc & Brickman study. The data were also consistent with their finding that subjects reducing their expectancies the least under failure conditions improved their perfromance the most.

But why did subjects who stated expectancies perform worse afterward than subjects who did not do so? It may be that any effect of stating an expectancy is a highly transitory one, or that it can readily be undone by any additional manipulation. In the present pilot study the initial expectancy assessment, the initial attribution assessment and the task involvement manipulation were all done between Trial Blocks 2 and 3.

Or it might be that not only stating an expectancy but any intervention which causes subjects to focus their attention on the experimental task would bring about enhanced task performance, but that this enhancement is quickly nullified by multiple or long and complicated measures administered between trial blocks. In this pilot study all subjects performed more poorly on Trial Block 3 than on Trial Block 2, but the No Stated Expectancy subjects, who had only two of the three experimental manipulations imposed on them had a smaller performance decrement than did those who experienced all three. In the final study, subject instruction is briefer, to lessen the possibility of a decrement in task performance due to distraction.

The causal attribution measure was administered twice in this pilot study. The initial measure did not seem to correlate significantly with anything, nor did either attribution measure correlate significantly with task performance. The second measure, however, did show some interesting relationships. Again keeping in mind the small number of subjects there appeared to be a significant correlation between the second measure of success expectancy and Weiner Internality (an additive combination of attributions to ability and to effort). This would be compatible with the results obtained by Weiner & Kukla (1970) on simulation tasks, if most subjects perceived the experimental task as relatively difficult.

Two-thirds of the subjects were run with a discriminative reaction time task as described in the Methods section above. The last one-third were run with a simple reaction time task. In this format the same green light was lighted on every trial, and the switch was always flipped in the same direction. There was strong indication that the simpler task gives better data. Intra-subject variability was much lower, and levels of statistical significance were better for the simpler task format. It was decided to use the simple reaction time task for all future work on this investigation.

Pilot Study 3

The purpose of this pilot study was to refine further the experimental procedure, and to conduct a more adequate test of the hypothesis that there is an interaction of task involvement and success expectancy on task performance improvement.

Subjects and Design.

Twenty subjects, both male and female, black and white, were utilized in this pilot study. All were students at New York City Community College, and were recruited by the experimenter while they were on the school premises. The experimental design was as follows: High/Low Expectancy X High/Low Task Involvement X Success/Failure Feedback X Trials.

Apparatus.

This was the same as that utilized and described in Pilot Study 2.

Procedure.

Though very similar to that of the second pilot study, several minor changes were introduced. In the initial "Information" sheet the subject was only asked to give his name, age and sex. Immediately following that and before the equipment was explained to him, the subject was given an "Introduction" sheet. This thanked him for coming to assist in the study, told him the time required would be about 45 minutes, and that the experimenter was interested in studying the physical reaction times of different individuals under different circumstances. The equipment was then explained to him, and four or five practice trials were run.

Before Trial Block 1 the subject was given the attributions questionnaire. It was changed in format, however. It was untitled, and the subject was asked to circle his choice of attributes in each of the six paired choices of the four factors (ability, effort, task difficulty and luck). Trial Blocks 1 and 2 were then run.

After Trial Block 2 the expectancy measure and the task involvement manipulation were presented to the subject. The expectancy assessment sheet was entitled "Expected Task Success". It asked the subject to consider what he had done up to the present time as a warmup. The meaning of three distinct expectancies was explained, in terms of the response format provided. This was a line, divided into units of ten from zero to one hundred, and anchored at either end by the words "Lowest Score" and "Highest Score". The subject was then asked, on an identical line lower on the same page, to indicate the degree of his satisfaction or dissatisfaction with his stated expectancy. He was asked to check the percentages of success on the reaction time task that would make him feel both pretty bad and pretty good. It was felt by the experimenter that perhaps the mean of these scores would be a more accurate measure of expectancies than could be obtained simply by asking subjects how well they expected to do.

The task involvement manipulation statement was presented to the subject on a sheet entitled "Explanation of Task". As before, the high involvement statement described the task as a test of general mental alertness and ability to cope with and master new situations. The low involvement statement explicitely stated that the subject had been given a dull task to perform, and gave as the reason the experimenter's need to try out a new research instrument for possible use in a later experiment. The high and low task involvement statements used in this pilot study are those utilized in the final study, and are included in the Appendix. After the subject had finished reading the statement, Trial Block 3 was run.

Just before Trial Block 4 the subject was given a short statement to read, entitled "Feedback". It informed him that on the following trial block he would be able to see how he was doing in comparison with other community college students. The significance of the red failure light was briefly explained. Trial Block 4 was then run, with the subject receiving trial by trial feedback.

After Trial Block 4 both the expectancy and attribution assessments were repeated. The latter was worded to correspond appropriately to the subject's feedback condition. For example, subjects who received success feedback were asked to state what they attributed their success to, while those receiving failure feedback were asked to state what they attributed their failure to. After these forms were completed, the subject was de-briefed, thanked and dismissed.

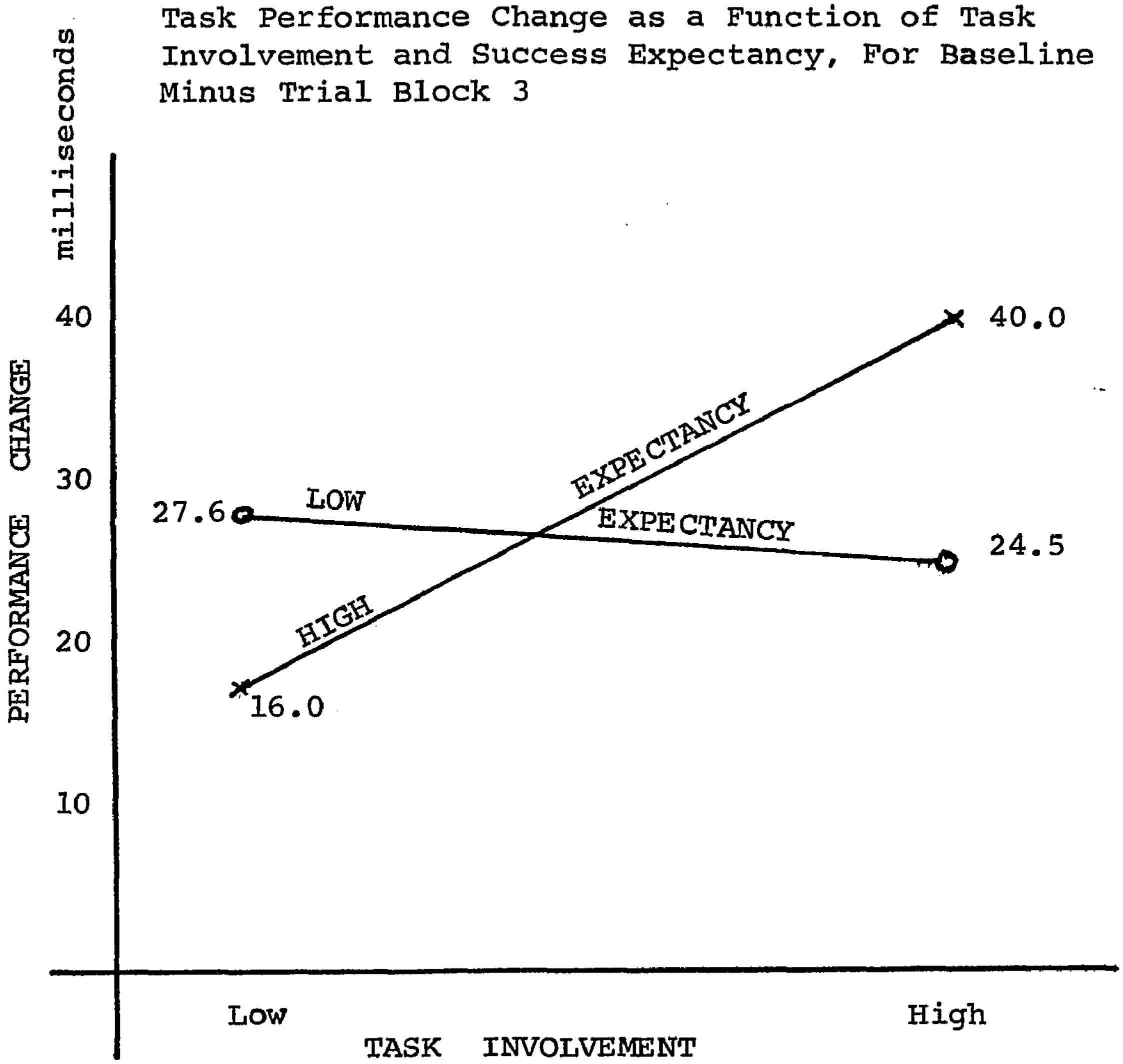
Results and Discussion.

The major purpose of this pilot study was to test more adequately the hypothesis that there is an interaction of task involvement and success expectancy on task performance improvement. The data were supportive of the hypothesis. Though there were not enough subjects for statistical significance, graphs of task performance improvement look suggestive (Figures 2 and 3). Baseline reaction times for each subject were defined as the mean reaction time of

Trial Blocks 1 and 2 combined (RT1 + RT2, divided by 2). The task performance level for each trial block was defined as the mean reaction time for that brial block. Performance changes are the differences in mean reaction times between the various trial blocks indicated in the figures.

FIGURE 2

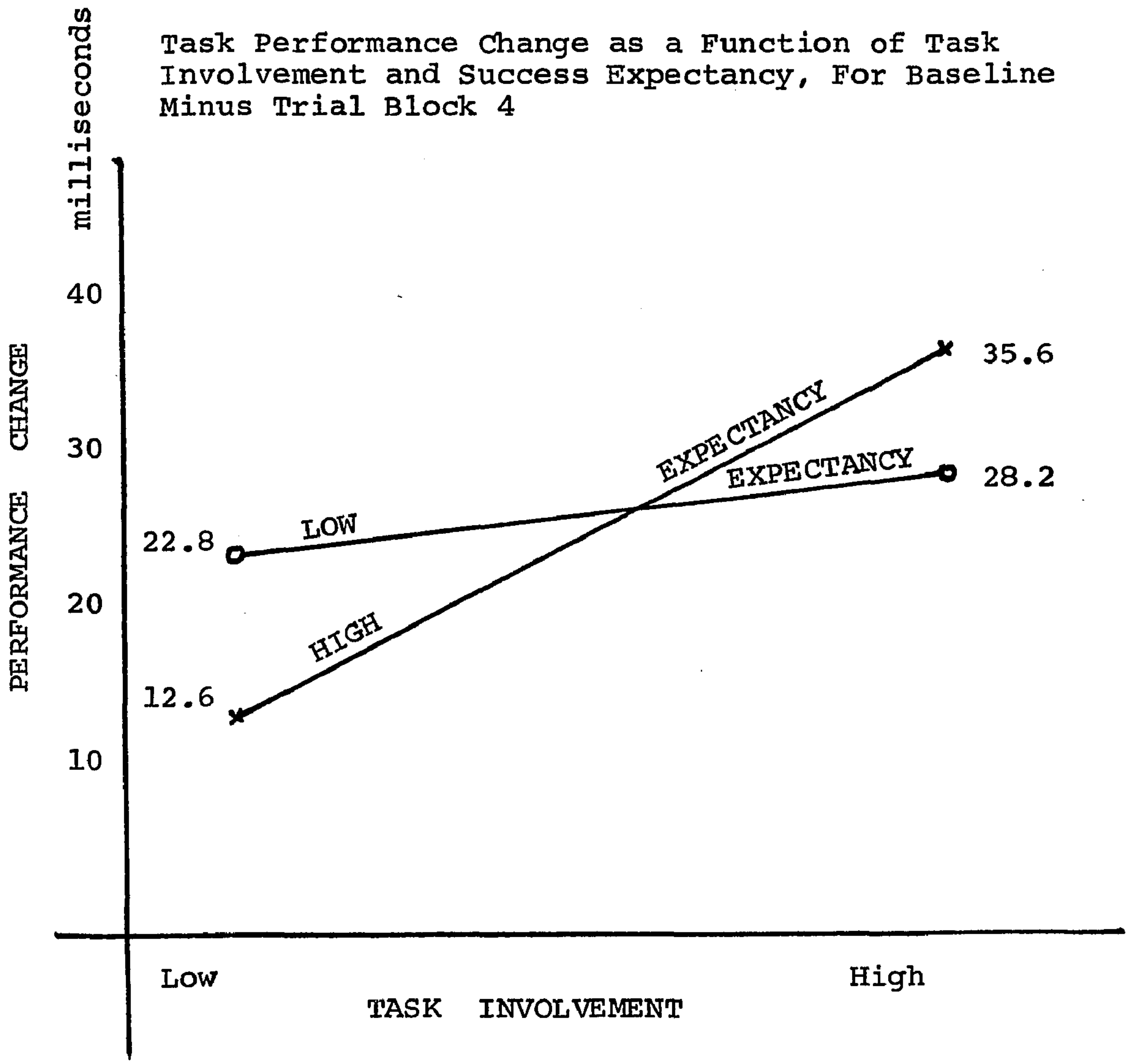
Task Performance Change as a Function of Task Involvement and Success Expectancy, For Baseline Minus Trial Block 3



Note: N = 5 for each group.

FIGURE 3

Task Performance Change as a Function of Task Involvement and Success Expectancy, For Baseline Minus Trial Block 4



Note: N = 5 for each group.

It will readily be noted that the task involvement variable seems to have had no differential effect on task performance improvement for the case of low success expectancy. For high expectancy subjects, however, there is a differential effect on performance improvement, for different levels of task involvement. Figure 2 shows this to be true for the period immediately after the task involvement manipulation and the assessment of expectancies. Figure 3 shows the same pattern to hold true with the inclusion of the feedback trials as well. This is in agreement with the hypothesis of an interaction of task involvement and success expectancy on task performance improvement.

The slopes of the curves are the important fact here, rather than the specific end points of each curve, where the number of subjects in each group is so small. The apparent relationship shown between task involvement and expectancy is what is important. Thus, on the basis of these results from Pilot Study 3 task performance improvement is expected to be equal for both levels of expectancy, under conditions of low task involvement. And high task involvement is expected to have a facilitative effect on the performance improvement of high expectancy subjects.

The results relative to attributions are the following: there was a positive relationship between the final measure of success expectancy and Weiner Internality (ability plus effort attributions). This was true for all subjects, but it looked as if the trend might be stronger for subjects receiving failure feedback than for those receiving success feedback. In this pilot study as in the last, the first assessment of attributions did not seem to relate to any other measure or to task performance. Therefore, it was decided to use an after-only attribution measure in further investigations. It was also decided to change the format of the attribution questionnaire, so that it would more closely resemble that used by Kukla (1972). This involves a change from forced-choice paired-comparisons to Likert scales. A final change was the decision to use a more homogeneous sample with respect to sex, race and age in the final study.

HYPOTHESES

There are two distinct areas of interest for which hypotheses have been formulated. In the first, the major concern is with the relationship of success expectancies and measures of task performance. The second concerns subjects' attributions as to the reasons for their success or failure at the experimental task. In addition to this partitioning of hypotheses, some are considered more important than others. These divisions are indicated below.

Major Expectancy Hypotheses.

1. There will be an interaction effect of expectancy and task involvement on task performance improvement. For subjects who initially state that they expect to perform relatively poorly, performance improvement will be equal for both levels of task involvement. However, subjects initially stating that they expect to perform relatively well will improve their performance more under conditions of high task involvement than under conditions of low task involvement.

   The performance change of primary interest is the difference in reaction time from Baseline levels through Trial Block 3.

2. Subjects who state a success expectancy will subsequently show more performance improvement than will subject who do not initially state an expectancy, for all levels of expectancy stated.

The performance change of primary interest is the difference in reaction time from Baseline levels through Trial Block 3.

3. Mean reaction times will show a positive relationship, for all trial blocks, with initial levels of stated expectancy.

Minor Expectancy Hypothesis.

4. Post-feedback statements of success expectancy will reflect feedback levels, being higher for success feedback subjects than for failure feedback subjects.

Minor Attributional Hypotheses.

5. Subjects lowering their expectancies the least after failure feedback will attribute their failure to Unstable factors (Lack of Effort, and Bad Luck) to a greater extent than will subjects lowering their expectancies more.

6. Subjects increasing their expectancies the most after success feedback will attribute their success to Stable factors (Ability and Low Task Difficulty) more than will subjects who increase their expectancies by lesser amounts.

7. Success feedback will be associated with more Internal causal attributions than will negative feedback.

The Weiner Internality measures to be used for success feedback subject are Ability and Effort. For failure feedback subjects the comparison attribution measures are (100 - Lack of Ability) and (100 - Lack of Effort), respectively.

Major Attributional Hypothesis.

8. For failure feedback subjects only, there will be a positive relationship between Weiner Internality for the experimental task and internality as measured by Rotter's (1966) Internality-Externality scale. There will be no relationship between these two measures of internality for success feedback subjects.

EXPERIMENTAL PROCEDURE

Subjects

Subjects for the present study were one hundred twenty (120) white male freshmen students from the Voorhees campus of New York City Community College. Each subject was paid two dollars for participating in the study.

Apparatus

The experimental apparatus consisted of a subject's panel and a control panel, both relatively simple and both constructed by the experimenter, plus three pieces of commercially acquired equipment.

The subject's panel consisted of an enclosed metal box with an inclined front panel. On this panel were three lights and a center-return toggle switch. An amber "Ready" light was in the lower left corner, a green "Go" light in the upper right corner, and a red "Failure" light in the upper left corner. The toggle switch was situated in the middle of the panel at the intersection point of its diagonals.

The event sequence on this panel for each trial is the following: the amber light is turned on as a "get ready" signal, to alert the subject. After a randomly varying period (1.5, 2.0 or 2.5 seconds) it is turned off simultaneously with the turning on of the green stimulus light and the millisecond clock. If the subject does not flip the toggle switch within a pre-set period of time the red light is automatically lighted. The toggle switch will always turn off the green light and the elapsed time clock, but will not turn off the red failure light if it has already been turned on.

The experimenter's control panel contains a push button to initiate the trial sequence, one to turn on the red feedback lamp at any time this should be desired, and one to re-set the equipment. It also contains monitor lights in parallel with each of the lamps on the subject's panel. This allows the experimenter to remain fully aware of the subject's actions without turning around to face in his direction.

The three pieces of commercial equipment were two Hunter 100C Decade Delay boxes, and one Hunter 120A Clockounter. One delay box controls the length of the foreperiod between the appearance of the amber "Ready" light and the time the green "Go" lamp is lighted. The other delay box controls the time period after which the red "Failure" light will automatically turn on if desired. The Clockounter is a digital readout millisecond elapsed-time clock.

The subject and the experimenter were physically situated in the same room. They were separated by about ten feet, and the subject was seated facing away from the experimenter so that he would not be able to pick up any cues from watching the experimenter's movements.

Method

For descriptive purposes the experiment will be discussed in terms of general phases. Then its methodology will be discussed in detail. Phase 1 consisted of an introductory statement, explanation of the equipment, and the collection of baseline task performance data. Phase 2 involved subjects' statement of success expectancy, task involvement manipulation, and the taking of a trial block of data to record the effects of these operations on task performance. Phase 3 consisted of performance data taken under feedback conditions, plus an assessment of causal attributions and a second assessment of expectancies and de-briefing. Phase 4, after at least a two-week period of time, consisted of administration of Rotter's I-E scale.

Written material was used for the introductory statement and for all manipulations and assessment questionnaires. This material is all included in Appendix A.

In more detail, the procedure is as follows. When the subject appears the experimenter says, "Hello, I'm Joe Brown. Thanks for coming. Would you sit over here, please, and fill out your name and address on this first sheet?" While he is doing that, the experimenter turns the equipment on. The subject is then handed a sheet labeled "INTRODUCTION", which contains the following statement.

> Thank you for coming to assist in this study. The total time required from you should be no more than about an hour. We are interested in studying the physical reaction times of different individuals under different circumstances.
>
> At this time the experimenter would like to show you how the equipment in front of you functions. We are going to do a few warmup runs so that you can see what the task you will be asked to do is like.

The experimenter shows the subject the operational sequence for a reaction time trial, telling him that the amber light is the "Ready" light and the green light is the "Go" light. The experimenter flips the toggle switch for the demonstration trial, and shows the subject the digital clock on which elapsed time appears. The subject is then told, "This red light can be turned on for any trial in which your reaction speed is slower than is desired." And this is demonstrated for him. The experimenter then re-sets the equipment and tells the subject, "Before we start our warmup trials, I'd like to be sure you are comfortable with the procedure. Let's try it a few times."

At this time five individual trials are given, with the subject being corrected after any mistakes and being allowed to find the most comfortable stance for him. At the completion of these instructional trials the experimenter says, "Are you comfortable the way you are doing it? Good. Then please do it that same way from beginning to end. Now I would like to do a couple of warmup trial runs just like the ones I will be asking you to do later. Each trial run consists of 15 individual reaction time trials. Okay? Then let's go."

Trial Block 1 is then completed at this time. Foreperiods are randomly varied between 1.5, 2.0 and 2.5 seconds. There is a 5-second period between trials, and a 5-minute period between trial blocks.

At the completion of Trial Block 1 the subject is told the following: "We'll wait a few minutes between trial blocks. This is a very simple task, but your thumb might get a little tired if we just kept on and on without a break. And we don't want muscle fatigue to have any part in the reaction times you register." The experimenter then chats with the subject for five minutes, asking him about himself, what he is studying, etc., and generally keeping the conversation turned away from the study, the equipment or scientific experiments in general. At the completion of five minutes, the experimenter says, "I think we've waited long enough. Ready to go again?" Trial Block 2 is then run. With its completion, Phase 1 is complete.

Phase 2 of the experiment begins after Trial Block 2, with the presentation to subjects of an "Expected Task Success" sheet. This reads as follows:

> Consider what you have done up to now as a warmup. Before you begin the next group of trials, however, we would like you to estimate how well you expect to do on this task, in comparison with an average New York City Community College student's performance on it.
>
> You can indicate this by checking the line below. For instance, if you expect to succeed in flipping the switch as fast or faster than the average New York City Community College student ten times out of one hundred, put a check mark on the line at 10. If you expect to be as fast or faster almost half the time, you would perhaps put a check mark somewhere between 40 and 50. And if you expect to flip the switch faster than the average New York City Community College student every single time, check 100 on the line below. <u>You can put the check mark anywhere on the line</u>, either above or between the numbers.

As soon as five minutes have elapsed, or the subject has completed his expectancy statement and read the "Explanation of Task" (see Appendix) statement appropriate for his predetermined level of task involvement, Trial Block 3 is completed. That, in turn, completes Phase 2 of the experimental procedure. The wording of the explanation sheet designed to induce a high level of task involvement in subjects is as follows:

> The purpose of this experiment is to measure certain kinds of mental abilities.
>
> It is a very simple task you are going to do, but your performance on it gives a great deal of information about your mental quickness and alertness. Your speed can give us information about the efficiency with which you work, and may be an indication as to how rapidly you cope with new situations.
>
> More detailed information will be given you at the end of this experimental period. For now, just be as alert and quick as possible.

The low involvement form is rather different. Its wording is below.

> We have given you a rather dull experimental task to perform, and have asked you to repeat it again and again and again. The reason for this is that we are trying out this research instrument for possible use in a later experiment. By itself, it does not measure any kind of important ability. Our interest, in fact, is not on the data provided by any one person. We are interested in comparing groups, and not individuals. But before we can do this we must try the research equipment out several dozen different times. You will be helping us try out the equipment and procedures.
>
> More detailed information will be given you at the end of this experimental period. For now, just be as alert and quick as possible.

After the subject completes Trial Block 3, he is given a sheet entitled "Feedback". The statement on it reads as follows:

> The experimenter has been comparing your performance with that of others, but so far it has been for his information alone. In the next group of trials you will be able to see for yourself how well you are doing.
>
> On each trial for which your speed is less than that of the average New York City Community College student, a red light will come on. For each trial on which you react faster than the average New York City Community College student, the red light will not come on.
>
> The average New York City Community College student would see the red light come on about half the time. If you see the red light less than half the time you can consider yourself to be doing very well; if you see the red light more than half the time you will know you are not doing very well.

He is told by the experimenter, however, that they must wait about five minutes before the next trial run will begin. During that time, any questions he might have are answered by the experimenter, so long as they do not refer to the ongoing study. If they do, he is told that those questions will be answered at the end of the experimental session.

Trial Block 4 is completed by the subject at this time. During this trial block the experimenter waits one or two seconds after each trial, and then gives failure feedback if it is called for on that trial.

Subjects receive either 80% success or 80% failure feedback on Trial Block 4. That is twelve successes or twelve failures out of fifteen trials. The three discrepant trials, the failures for success subjects and successes for failure subjects, are planned for trials 2, 7 and 12. This cannot be a hard and fast rule, however. If the subject should have an especially slow trial he must receive negative feedback for that trial. To do otherwise would be to destroy the credibility of all his feedback.

When Trial Block 4 is complete, subjects are once again given an "Expected Task Success" sheet. For those subjects who were not asked to give an initial statement of success expectancy, this final statement is the only one they are asked to give. On it, they are asked:

> In view of your task performance so far, indicate how well you expect to do on the next group of trials, in comparison with the same New York City Community College students as before.

The rest of the sheet is a duplicate of the first one received. The meaning of different specific expectancies is explained, and the line is present on which to check off their expectancy of success at the experimental task.

After the expectancy statement has been completed, the subject is given a causality attributions questionnaire that is entitled either "Explanation for Low Score" or "Explanation for High Score" (see Appendix). Five questions are asked. The form of these questions is very similar for the two sheets, with the wording merely referring either to success or to failure. The "Explanation for High Score" form of the questions is as follows:

1. In comparison with other factors, how much was your success determined by ability?
   (0 = Ability played no part; 100 = Success due entirely to ability.)

2. In comparison with other factors, how much was your success determined by effort?
   (0 = Effort played no part; 100 = Success due entirely to effort.)

3. In comparison with other factors, how much was your success determined by low task difficulty?
   (0 = Low task difficulty played no part; 100 = Success due entirely to low task difficulty.)

4. In comparison with other factors, how much was your success determined by luck?
   (0 = Luck played no part; 100 = Success due entirely to luck.)

5. Would you evaluate your performance as a success or as a failure?
   (-5 = Extreme failure; 0 = Neither; 5 = Extreme success)

After the completion of the expectancy and the attribution questionnaires, a control questionnaire is administered. Its purpose is to determine if the subject read and understood the "Explanation of Task" sheet he was given. It also asks for his subjective evaluation of his task performance, and two questions are included to test the effectiveness of the task involvement manipulation. Thus, if a subject clearly did not read the "Explanation of Task" sheet or if the experimental manipulation of involvement level can clearly be seen to have failed with any subject, he can be eliminated from subsequent data analysis.

After completion of this final form, subjects are de-briefed by the experimenter. They are given an explanation of the experimental design and purposes. They are asked if anyone had told them about the experiment beforehand, and are asked in turn not to explain it to anyone else. Any questions they have are answered, and this completes Phase 3 of the procedure.

Two weeks after the experimental session, subjects are sent a copy of Rotter's (1966) 29-item I-E questionnaire to complete and return to the experimenter. This then completes the fourth and final phase of the experimental procedure.

DESIGN AND STATISTICAL ANALYSIS

Design

The experimental design was of the form A X B X C X Trials, where the letters represent the three independend variables of the study---High/Low/No Expectancy, High/Low Task Involvement, and High/Low Feedback. Since much of the focus of the study was on the relationship between success expectancy and task performance improvement, specifically on an interaction effect of success expectancy and task involvement on improvement, two-thirds of the subjects were assigned to the two levels of stated success expectancy, and only one-third to the No Stated Expectancy group. The variables of expectancy and task involvement were balanced, at least within the margins of a median split of assessed success expectancy. The feedback variable was balanced only in terms of numbers receiving success feedback and numbers receiving failure feedback. There was no control group of subjects not receiving feedback. This is because evidence for the presence of a feedback effect has been strongly supported by many previous studies and in the experimenter's own pilot studies, and because this is not the major interest of the present study. The study design is shown in Table 1.

TABLE 1

RESEARCH DESIGN

Expectancy	High N=40		Low N=40		Not Stated N=40	
Task Involvement	High N=20	Low N=20	High N=20	Low N=20	High N=20	Low N=20
Feedback						
80% Success	N=10	N=10	N=10	N=10	N=10	N=10
20% Success	N=10	N=10	N=10	N=10	N=10	N=10

Data Analysis

Dependent variables in the present study are the following: assessed reaction times, success expectancies, and causality attributions. These measures are derived in the following manner. Reaction time trial runs consist of 15 trials each, and each subject completes four trial runs. Each data point is transformed into its natural logarithm, to correct for a typical non-normal distribution of reaction time data. Baseline reaction time task performance is defined as the mean of the transformed reaction times of the first two trial runs combined. Subsequent task performance values are the mean transformed reaction times obtained on Trial Blocks 3 and 4, respectively.

Success expectancy is assessed twice for 80 of the subjects, in a before and after experimental manipulation paradigm. It is assessed only once, at the end of the experimental session, for 40 control subjects. Expectancy is expressed for each subject as a number between zero and one hundred. Causality attributions to ability, effort, task difficulty and luck are assessed once, for all subjects. Each attribution is expressed as is success expectancy, as a number between zero and one hundred corresponding to a checkmark made by the subject along the length of a line.

Hypothesis 1 states that there will be an interaction effect of expectancy and task involvement on task performance. Subjects who initially state relatively low expectancies (the lower half of a median split) will improve equally in their task performance for both levels of task involvement. However, for subjects who initially expect to perform relatively well those with high task involvement will improve their task performance more than will those with low task involvement. The performance improvement measure of primary interest here is the difference between mean reaction speed on Trial Block 3 and Baseline reaction speed. This hypothesis will be tested for by means of an interaction of expectancy and task involvement in an analysis of variance as follows: High/Low/No Expectancy X High/Low Task Involvement X Trials.

Hypothesis 2 states that subjects stating an expectancy will subsequently perform better than subjects not stating an expectancy. Performance change of primary interest here is again the difference between reaction time on Trial Block 3 and Baseline performance. This hypothesis is tested for by means of the Sheffe test for significant differences between cell means of the analysis of variance of Hypothesis 1.

Hypothesis 3 states that there will be a positive relationship between initially stated levels of success expectancy and all measures of reaction speed. This is tested for in two ways. First, a repeated-measures expectancy by task involvement analysis of variance is calculated, with subjects' mean task performance values for Baseline, Trial Block 3 and Trial Block 4 entered into the analysis as the values for trials one, two and three. Secondly, High/Low Expectancy X High/Low Task Involvement analyses of variance are calculated to test each separate task performance measure.

Hypothesis 4 states that feedback levels will continue to influence post-feedback statements of expectancy. This is tested for by means of a feedback by expectancy analysis of variance. Post feedback levels of stated expectancy are hypothesized to be higher after success feedback, and lower after failure feedback.

Hypothesis 5 states that subjects who lower their expectancies the least (median split) after experiencing failure feedback will attribute their "failure" to Weiner's unstable factors (lack of effort and bad luck) to a greater extent than will those who lower their expectancies more. The hypothesis is tested by means of *t*-tests of the product-moment correlations of expectancy change scores and attributions to Weiner's Unstable attributions construct.

Hypothesis 6 is the corollary of Hypothesis 5. It states that subjects raising their expectancies the most after receipt of success feedback will attribute their "success" more to stable factors (ability and low task difficulty) than will subjects raising their expectancies by lesser amounts. This hypothesis is tested in similar fashion to Hypothesis 5, that is by means of *t*-tests of the product-moment correlations between expectancy change scores and the Stable attributions construct.

Hypothesis 7 states that positive feedback will be associated with more internal attributions than will failure feedback. The measure of internality to be used for success feedback subjects is the arithmetic sum of attributions to ability and to effort. For failure feedback subjects the comparison attribution measure is (100 - Lack of Ability) plus (100 - Lack of Effort). This hypothesis is tested by means of a feedback by internal attributions analysis of variance.

Hypothesis 8 states that, for failure feedback subjects only, there will be a positive correlation between Weiner internality and Rotter internality. This hypothesis is tested by *t*-tests of the product-moment correlation of the two measures of internality.

CHAPTER III

RESULTS

The principal dependent variable in the present study is reaction time on a simple reaction time task. Reaction time scores of this type do not yield a normal distribution. Therefore, a transformation of the raw data is required. The appropriate transformation in this type of case is the logarithm of the raw data.

For each subject the reaction time on each trial was transformed into its natural logarithm. The mean of the transformed data was then calculated for each trial block of 15 trials, and for the first 7 and the last 8 trials of each trial block separately. These transformed data are the basis for all statistical computations throughout.

A post-experimental questionnaire showed an apparent failure of the task involvement manipulation for many of the subjects. Also, significant differences in response patterns were also found to be present between the first and second halves of each trial block. However, since neither of these contingencies were planned for in any specific manner in advance, analyses taking account of them are necessarily post hoc and therefore suspect. Consequently, each of the hypotheses is first tested strictly as proposed, with the entire subject sample and complete trial blocks. Then, several of the hypotheses will be re-examined with supplemental post-hoc analyses.

Hypothesis 1.

A major hypothesis of the present study is that there will be an interaction effect of level of success expectancy initially stated by subjects and their level of task involvement on improvement in task performance. For subjects who initially state that they expect to perform relatively poorly, performance improvement will be equal for both levels of task involvement. However, subjects initially stating that they expect to perform relatively well will improve their performance more under conditions of high task involvement than they will under conditions of low task involvement.

There were three expectancy conditions (High, Low and No Stated Expectancy) and two levels of task involvement (High and Low). Hence, the hypothesis was tested by means of a 3 X 2 analysis of variance. The dependent variable was the gain in reaction time from Baseline through Trial Block 3.

This is the difference in performance before, and immediately after, the assessment of expectancy and the manipulation of task involvement.

Results of these calculations, for all subjects, are given in Tables 2 and 3. Table 2 shows that there were no significant effects, and that for the total sample the hypothesis was not supported. Table 3 presents the cell means.

TABLE 2

Analysis of Variance of Changes in Reaction Time (Baseline Minus Trial Block 3) as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
Expectancy Level (A)	2	.02	<1.0	$>.20$
Task Involvement (B)	1	.04	1.12	$>.20$
A X B	2	.03	<1.0	$>.20$
Error	113	.04		

TABLE 3

Mean Changes in Reaction Time (Baseline Minus Trial Block 3) as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.[a]

Initial Expectancy	High Task Involvement			Low Task Involvement		
Level Stated	n	M	SD	n	M	SD
High	18	-.08	.19	22	.00	.13
Low	21	-.04	.20	18	.01	.18
No	20	.13	.21	20	-.01	.21

[a] Negative change scores indicate that reaction time got slower from Baseline to Trial Block 3.

Hypothesis 2.

A second major hypothesis of the present study is that subjects who initially state a success expectancy will subsequently show more performance improvement than will subjects who do not state an expectancy. This is predicted for all levels of expectancy stated.

A two-way analysis of variance (expectancy by task involvement) has already been calculated to test Hypothesis 1, above. Therefore, it was not necessary to do further such analyses to test the present hypothesis. It was planned to do so by means of the Sheffe test for significant differences between cell means of this previous ANOVA.

No Sheffe tests are reported here for the total sample group, since neither a main effect for expectancy nor for task involvement were present at significant levels in Table 2, nor was there a significant interaction effect of these variables on task performance improvement. Sheffe tests between variable levels are therefore not indicated. This is borne out further by Table 4, an expectancy by task involvement repeated measures analysis of variance. This likewise yielded non-significant results for expectancy, for task involvement and for their interaction.

Hypothesis 2 is rejected as having not been confirmed.

Hypothesis 3.

It was hypothesized that mean reaction speed, on all measures, would be positively related to initially stated levels of success expectancy. In other words, subjects above the median in initial success expectancy were expected to perform better than subjects with below median success expectancies.

This hypothesis was tested in two ways. First, a two-way (High or Low Expectancy X High or Low Task Involvement) repeated measures analysis of variance was calculated, with each subject's mean task performance values for Baseline, Trial Block 3 and Trial Block 4 entered in the analysis as the values for trials one, two and three. Secondly, two-way analyses of variance (High or Low Expectancy X High or Low Task Involvement) were calculated to test each task performance measure separately.

The results of the repeated measures analysis of variance are presented in Tables 4 and 5. The expectancy effect, while possibly there, is present only at a .15 level of probability. This result is compatible with Zajonc & Brickman's (1969) report showing statistically non-significant but graphically suggestive differences in task performance associated with differences in success expectancies.

Two-way analyses of variance were calculated for the individual trial blocks. These results are presented in Tables 6 and 7. A significant expectancy effect is present only for Trial Block 4, during which subjects received performance feedback ($F = 4.16$, $df = 1/75$, $p = .04$). Thus, Hypothesis 3 is given only moderate support.

TABLE 4

Repeated Measures Analysis of Variance for Reaction Time as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
Expectancy (A)	1	.15	2.08	.15
Involvement (B)	1	.05	<1.0	$>.20$
A X B	1	.15	2.12	.15
Error	75	.07		
Trials	2	.09	4.95	.01
A X Trials	2	.04	1.92	.15
B X Trials	2	.03	1.36	$>.20$
A X B X Trials	2	.01	<1.0	$>.20$
Error	150	.02		

TABLE 5

Mean Repeated Measures Reaction Times as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Median Expectancy		Task Involvement High	Task Involvement Low
High	Mean	5.35	5.32
	SD	0.13	0.18
	n	18	22
Low	Mean	5.34	5.42
	SD	0.12	0.17
	n	21	18

TABLE 6

Analysis of Variance for Reaction Time as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
Baseline Trial Blocks				
Expectancy (A)	1	.02	1.10	.20
Involvement (B)	1	.09	4.04	.05
A X B	1	.06	2.35	.06
Error	75	.02		
Trial Block 3				
Expectancy (A)	1	.00	< 1.0	$> .20$
Involvement (B)	1	.00	< 1.0	$> .20$
A X B	1	.09	2.40	.13
Error	75	.04		
Trial Block 4				
Expectancy (A)	1	.19	4.16	.04
Involvement (B)	1	.00	< 1.0	$> .20$
A X B	1	.02	< 1.0	$> .20$
Error	75	.04		

TABLE 7

Mean Reaction Times as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Median Expectancy Level Stated	High Task Involvement n	M	SD	Low Task Involvement n	M	SD
Baseline Trial Blocks						
High	18	5.34	.11	22	5.35	.17
Low	21	5.32	.16	18	5.44	.15
Trial Block 3						
High	18	5.42	.18	22	5.35	.21
Low	21	5.36	.19	18	5.44	.21
Trial Block 4						
High	18	5.28	.22	22	5.27	.22
Low	21	5.35	.15	18	5.39	.25

Hypothesis 4.

As a check on the effectiveness of the feedback manipulation, all subjects' expectancies of success on future (non-existent) trials were assessed near the end of the experimental session. It was hypothesized that these terminal expectancies would be significantly higher for subjects who had received success feedback than for those who had received failure feedback.

Separate analyses of variance for the effect of success versus failure feedback on terminal expectancies were done for subjects who had initially stated an expectancy, and for those who had not. The respective values of F for feedback level were 50.83 (df = 1/77) and 16.46 (df = 1/38), and p is less than .001 for each. Thus, feedback is shown to have been effective in influencing future expectancies of success.

Hypothesis 4 is well confirmed as stated.

Several hypotheses derived from the work of Weiner, et al (1971) are included in the present study. These concern subjects' attributions of causality for their success or failure on the experimental task. They were basically exploratory or intended to replicate previously reported results.

Hypothesis 5.

It was hypothesized that subjects who lowered their expectancies relatively little after receipt of failure feedback would attribute their failure to Weiner's Unstable factors (Lack of Effort plus Bad Luck) to a greater extent than would subjects who lowered their expectancies by greater amounts.

For subjects receiving failure feedback, expectancy change scores (initial minus terminal expectancies) were correlated with scores on Weiner's attributional categories of Internality (Ability plus Effort), Externality (Task Difficulty plus Bad Luck), Stable (Ability plus Task Difficulty), and Unstable (Effort plus Bad Luck). None of these correlations were significant.

Hypothesis 5 is therefore rejected as not confirmed.

In a related finding, Zajonc & Brickman (1969) had reported that subjects who lowered their expectancies relatively little after receipt of failure feedback improved their task performance relatively more than subjects lowering their expectancies by greater amounts. While this was not formally hypothesized in the present study, calculations were performed to determine if the present data would confirm these previously reported results.

Product-moment correlations were calculated between expectancy change scores and all measures of task performance from Baseline through Trial Block 4, and for the period limited to feedback as well. None of these correlations were statistically significant. Therefore, Zajonc & Brickman's previously reported finding is not confirmed by the present study.

Hypothesis 6.

It was hypothesized that subjects who raised their expectancies relatively more after receipt of success feedback would be more likely to attribute their success to Weiner's Stable category (Ability plus Low Task Difficulty) than would subjects raising their expectancies by lesser amounts.

Product-moment correlations were calculated between expectancy change scores and Weiner's attributional categories for subjects receiving success feedback. None of these correlations was significant, and therefore Hypothesis 6 is rejected as not having been confirmed. This result was expected, and repeats earlier negative findings reported for subjects receiving success feedback.

Hypothesis 7.

It was hypothesized that success feedback would be associated with greater attributions to Weiner's Internality category (Ability plus Effort) than would failure feedback. A two-way analysis of variance (High/Low/No Stated Expectancy X Success/Failure Feedback) was calculated. The dependent variable was Weiner Internality. This was defined in the present study as Ability plus Effort for success subjects, and as (100 - Lack of Ability) plus (100 - Lack of Effort) for failure feedback subjects. No significant relationship was found between feedback level and Weiner Internality.

Hypothesis 7 is therefore rejected as not confirmed.

Hypothesis 8.

It was hypothesized that scores on Rotter's I-E scale would be positively related to Weiner Internality, for failure feedback subjects only. No relationship was expected for success feedback subjects. To test this hypothesis, product-moment correlations were calculated between Rotter's and Weiner's measures of internality. This was done separately for success and for failure feedback subjects. No significant relationships were found for either group.

In an attempt to discover relationships between Rotter's I-E scores and other variables measured in the course of the present study, product-moment correlations were calculated between Rotter Internality and all independent and dependent variables defined over the course of data analysis. No significant relationships were found at all, either for success or for failure feedback subjects or for the combined groups.

This was an exploratory hypothesis. It was deemed worthwhile to attempt to determine if these two quite different measures, both called measures of internality, were related in some meaningful and readily determinable manner. If the two measures are related, it was not shown by the results of the present study. Hypothesis 8 is rejected as not confirmed.

CHAPTER IV

DISCUSSION

Results of the statistical analyses utilized thus far have been disappointing. The only hypothesis confirmed exactly as proposed was that final success expectancies would reflect feedback received by subjects. The study's principal hypothesis was that there would be an interaction of initially stated success expectancy and task involvement level on task performance improvement. Differential improvement in reaction time was expected from Baseline trials (before success expectancy statements and the task involvement manipulation attempt) through Trial Block 3 (immediately after these events). Neither this hypothesis nor any other, with the exception of that mentioned above, were unambiguously confirmed.

Subjects' responses to a post-experimental questionnaire indicated that for many of them the task involvement manipulation attempt had not been effective. This was true for subjects assigned both to the high and the low involvement categories, but was primarily true for subjects supposedly low in task involvement. In this questionnaire were questions concerning subjects' level of task involvement both before the task involvement manipulation attempt and after it had taken place.

The pre-assigned involvement categories were tested for separation in task involvement level by means of a one-way analsis of variance based on subjects' responses to the post-experimental questionnaire. Reliance on answers to a post-session questionnaire is itself open to criticism, since subjects' just-completed performance levels could have influenced their responses to the questions asked. However, the lack of separation of involvement levels shown by the ANOVA gives prima facie evidence for doubting the effectiveness of the task involvement manipulation.

Clearly, hypotheses about the effects of task involvement cannot be adequately tested until a clear separation of subjects by involvement levels has been achieved. Failure of the task involvement manipulation is a sufficient reason in itself for non-confirmation of the hypotheses, though it may well not be the only reason.

Although the task involvement manipulation was indicated by the post-experimental questionnaire to have been ineffective with almost one-half the study's total subject sample, no specific provision had been made for elimination of subjects based on responses to that questionnaire. This was because pilot studies had not shown this to be a source of concern prior to the carrying out of the actual study. Therefore, a variety of post hoc analyses have been carried out in a later section of this report (Appendix A). Many of these have been calculated with the entire subject sample, and have as their purpose a broadening of the scope of investigation beyond the narrow limits defined by the formal hypotheses of the present study. Others have been calculated with a selected subsample of subjects. This subsample was derived through elimination of those subjects for whom the task involvement manipulation was highly suspect. The procedural details for the elimination of subjects on the basis of their responses to the post-experimental questionnaire are included there in full.

All further consideration of the first four hypotheses is deferred to Appendix A.

Four hypotheses relating to Bernard Weiner's model for attributing causality to events (Weiner, et al, 1972) were included in the present study. These will be discussed in varying detail at the present time.

Hypothesis 5.

Subjects lowering their success expectancies relatively little after receiving failure feedback were hypothesized to attribute their failure to Weiner's Unstable factors (Lack of Effort plus Bad Luck) to a greater degree than subjects lowering their expectancies by greater amounts. Such a relationship was not found.

One reason for this negative finding may lie in the type of experimental task utilized. Examination of subjects' attributional responses showed that most of them attributed very little of either credit or blame for outcomes to the factor of luck. Apparently they perceived the task as one where outcomes were due to skill, and where luck played little part. If this were especially true with the type of task utilized in the present study it would have reduced the scope for variability of Weiner's Unstable attributional construct, and hence have weakened any expected relationship dependent on it.

Hypothesis 6.

This hypothesis stated that subjects raising their expectancies relatively much after success feedback would attribute success to Weiner's Stable factors (Ability plus Low Task Difficulty) to a greater extent than subjects raising their expectancies by lesser amounts.

This was an exploratory hypothesis, included partially for reasons of symmetry with Hypothesis 5. This proposed relationship has been explicitly tested over the full range of feedback in only one previous experimental study (McMahan, 1974). McMahan's findings were moderately supportive of both Hypothesis 5 and Hypothesis 6. His correlations, however, were generally quite low, and the majority were non-significant.

Logically, one would expect from Weiner's model a clear association of larger expectancy changes with the stable factors of ability and task difficulty. Working against this, however, is the fact that people are more willing to take credit for success than to accept blame for failure. There is evidence, too, that changed attributional patterns are first held by individuals as tentative hypotheses (Barefoot & Straub, 1971), subject to verification. Thus, a finer-grained trial by trial analysis of relative expectancy changes and attributions may be necessary in order to determine the ultimate validity of the present hypothesis. This likelihood is mentioned by McMahan in his paper as well. In the present case, where three discrepant trials (three success trials in the failure feedback condition, and vice versa) were distributed throughout the trial block, expected relationships would be even less clear. Weiner's model would lead us to expect greater attributions to the variable factors of effort and luck after these particular trials, rather than to the stable factors of ability and task difficulty.

Finally, predictions notwishstanding, it should be remembered once again that past support for the hypothesized relationship has not been strong.

Hypothesis 7.

It was hypothesized that success feedback would be associated with more internal attributions than would failure feedback. This finding had previously been reported by Weiner, et al (1971), but was not confirmed by the results of the present study. Parallel analyses were done with the individual attributional measures as dependent variables. The only one varying significantly with feedback was Task Difficulty ($F_{1/118} = 51.18$; p .001). Failure feedback was more strongly associated with attributions to high task difficulty than was success feedback with attributions to low task difficulty, which makes sense as a defensive pattern of results.

The generally weak level of significance of relationships between attributional measures and changes in success expectancy prompted the experimenter to investigate correlations between attributional measures and initial and final success expectancies alone, and with subjective evaluations of their task performance by subjects.

No significant correlations were seen for the attributional measures of task difficulty or luck, and the category of ability was the one most strongly related to subjects' expectancy and performance evaluation scores. Ability was significantly and positively related both to initial success expectancies

($r = .52$, $n = 39$; $p < .001$) and to terminal expectancies ($r = .30$, $n = 59$; $p < .05$) for success feedback subjects, and only to terminal expectancies ($r = .35$, $n = 60$; $p < .01$) for failure feedback subjects. This indicates that most subjects approached the experimental session in an optimistic state, a state confirmed by success feedback but not by failure feedback.

For success feedback subjects, subjective evaluation of task performance was significantly related both to ability ($r = .38$, $n = 59$; $p < .01$) and to effort ($r = .37$, $n = 59$; $p < .01$). For failure feedback subjects only ability was significantly related to it ($r = .43$, $n = 60$; $p < .001$).

It has earlier been noted that the attributional measure of luck seemed to be given relatively little weight by subjects in the present study. Here, the indications are that ability was seen as the factor of primary importance by most subjects.

<u>Hypothesis 8.</u>

It was hypothesized that scores on Rotter's (1966) I-E scale would be positively correlated with scores on Weiner's Internality construct. This was expected for subjects receiving failure feedback. No hypothesis was stated for subjects receiving success feedback.

The lack of support for this hypothesis in the present study was complete. Product-moment correlations were eventually calculated between Rotter I-E scores and almost all other independent and dependent variables defined over the course of data analysis. This was done for I-E scores from the total sample group and from the selected subsample as well. None of these were significant, not even the one out of twenty or so that one would expect by chance.

Why should there have been such a complete lack of correspondence between the two measures of internality? It was expected that locus of control might be different for positive and negative outcomes. This had been suggested by several investigators (Crandall, Katkovsky & Crandall, 1965; Mischel, 1968; Hersch & Scheibe, 1967; Rotter, et al, 1962). But this still left 60 subjects receiving each level of feedback. Not expected at all were the full extent of problems encountered in administering the Rotter questionnaire. Difficulties in getting subjects to fill out and return this questionnaire resulted in delays of over two months for several subjects, and over a month for many of them. This may be a principal reason for the lack of significant relationships between performance or attributional measures and Rotter's I-E scale values. The latter were obtained over a long period of time, under differing conditions.

In seeking further explanation for the lack of confirmation of Hypothesis 8 and for the complete lack of any observable relationship with Rotter's locus of control scale, it is instructive to consider the validity both of that measure and of Weiner's attributionally derived locus of control measure.

It has been shown (Gurin, et al, 1970) that Rotter's (1966) scale can be divided into different meaningful subscales, and that these subscales measure different things for different people. For example, Internal Ideology as measured by the I-E scale is for many people different from a belief in internality as it relates to their own life. More recently, Collins (1974) has shown that the nature of the outcome specified by the questions asked in the locus of control questionnaire---whether positive or negative---is important. He also showed the presence of four distinguishable subscales. These are Belief in a Difficult World, Belief in a Just World, Belief in a Predictable World, and Belief in a Politically Responsive World.

Validity coefficients of Rotter's 1966 I-E scale are usually low, and I-E control attitudes do not generalize across different situations (Rotter, 1966; Lao, 1970; Collins, 1974). An article by Mischel, Zeiss & Zeiss (1974) discusses this limitation in some detail. According to these investigators, individual difference effects tend to be relatively specific and dependent on the particulars of the psychological situation in which behavior occurs. Thus, correlations between attitudes concerning locus of control and specific behavioral measures would be expected only when the sampled behaviors are directly relevant to the exercise of control by the subject. Moreover, the associations to be expected would depend on the valence of the outcome, whether positive or negative, involved in the specific contingency.

It might have helped if the Rotter scale had been administered immediately prior to the reaction time task of the present study, instead of at times ranging from days to months afterward. It was felt, however, that this procedural alternative would link the I-E questionnaire items and the attributions questionnaire items in the minds of subjects, leading to "forced" and invalid correlations between them. A certain temporal separation seemed advisable. In view of the diffuse nature of the attitudes sampled by the I-E scale, plus their typical low correlation with beliefs of expectations tied to specific situations, plus the variation in procedures involved in administering it, it is not too surprising in retrospect that scores on Rotter's generalized locus of control scale correlated poorly with the very specific situationally determined responses of subjects to Weiner's attributional measure of locus of control.

Discussion so far has pointed toward limitations of Rotter's I-E scale. Several limitations also exist for Weiner's model. It was mentioned earlier that the non-confirmation of Hypothesis 5 in the present study might be due at least in part to a bottoming-out effect on the attribution to luck, reflecting subjects' feeling that luck was simply not a relevant factor in determining success or failure on a simple reaction time task such as was used here. If this were the case it would have collapsed the range of attributional choices onto the remaining three---ability, effort and task difficulty. This may be one reason why attributions to task difficulty, the only other external attributional factor, were the only ones to vary significantly across feedback conditions.

Under different circumstances this might be true of any one or more of the four attributional factors of Weiner's model. For example, in discussing the type of behavior about which attributions are being assessed, Weiner, et al (1972) state that attributions to effort are particularly important in determining the direction, magnitude and persistence of achievement-oriented behavior.

J.G. Nicholls (1975), in discussing predictions made from Weiner's model, says, "Thus, the logical position predicts equal attribution of success and failure to (high and low) ability, while defensive responding would lead to greater attribution of success than failure to ability." In the present study we have looked for but not found differences in the relationship between attributional measures and expectancy changes, under differing feedback conditions. Similarly, Davis & Davis (1972) found no significant relationships between attributional measures and Rotter's I-E scale for success feedback, though they did find that Rotter Externals attributed failure more to external sources than did Internals. Weiner & Kukla (1970), on the other hand, found increased attributions to ability, an internal factor, for success feedback.

Further pointing up the situational variability of responses to Weiner's categories are such attempts as the following to pre-program subjects' attributions: "Of course, your score will also be heavily influenced by luck. Even if you learn just exactly as much about the patterns as we expect, you could get a much higher total score just by being lucky in your guessing." (Kukla, 1972).

From this, it appears that one can make any combination of Weiner's four factors either more or less likely depending on the methodology and type of task utilized. Whether attributions to luck and to effort are in fact unstable factors as Weiner's model labels them, or whether they are relatively more stable or perhaps even irrelevant in a given situation, is highly dependent on the type of task utilized and its mode of presentation to subjects. If this is so, it weakens the applicability of Weiner's model, and may explain why reported relationships are often of low significance levels and of unimpressive replicability.

For future studies it might be advisable to survey subjects in pilot studies to determine their perceptions as to how much scope is available in the experimental task for attributions to each of the four factors of Weiner's model. As well as being interesting data in its own right, this information could be used to modify the study's methodology if it seemed to be necessary. Or it could be used to introduce a correction factor into later attribution scores.

In any case, the indications are that attributional results are more situationally determined and less a function of subjects' enduring personality traits or generalized expectancies than has been assumed to be the case up to now.

APPENDIX A

As noted earlier the only hypothesis to be confirmed exactly as written was that final success expectancies should reflect feedback levels received by subjects. Another that was partially confirmed was that subjects' pre-existing success expectancies should be at least partially based in reality and would correlate with task performance scores in all trial blocks. This hypothesis was confirmed only for Trial Block 4, during which feedback was given to subjects. This suggests a related series of analyses which might be profitable to pursue. For example, perhaps more trials than those given prior to the experimental manipulations were necessary for practice, before the motivational factors focused on by the present study could make their presence felt. Or perhaps feedback would combine with the experimental manipulations to yield hypothesized effects. Differences in response patterns are also possible during the course of each rather long trial block. Already mentioned as well was the probable failure of the task involvement manipulation with many subjects.

These possibilities will be dealt with in detail below, in the course of further analysis of the study's hypotheses.

Hypothesis 1.

The hypothesis was that initially stated success expectancy and task involvement should interact to influence the rate of improvement in subjects' reaction time task performance. Following Zajonc & Brickman (1969) this was expected to be true in the absence of feedback. Consequently, the period before feedback was the only one dealt with in the hypothesis. The hypothesis as stated was not confirmed.

An expectancy by task involvement ANOVA was calculated for the entire experimental trial period, from Baseline through Trial Block 4. Another was calculated for just the period limited to feedback trials (Trial Block 3 minus Trial Block 4). The results of these analyses are presented in Tables 8 through 11. The hypothesis is not supported by any of the foregoing analyses. The interaction effect is not statistically significant for any of the performance changes considered.

In addition to examining task performance changes through the period of feedback, it was deemed advisable to subdivide the data within each trial block and analyze the first and second halves separately. The reaction time task employed in the present study was simple and repetitive, and the number of trials per trial block was 15, which is fifty percent more than the 10 per trial block used by Zajonc & Brickman. It was felt that significant shifts in motivation might have occurred during the course of any given trial block.

TABLE 8

Analysis of Variance of Changes in Reaction Time (Baseline Minus Trial Block 4) as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.[a]

Source of Variance	df	MS	F	p
Expectancy Level (A)	2	.05	1.26	>.20
Task Involvement (B)	1	.13	3.40	.07
A X B	2	.01	< 1.0	>.20
Error	113	.04		

TABLE 9

Mean Changes in Reaction Time (Baseline Minus Trial Block 4) as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Initial Expectancy	High Task Involvement			Low Task Involvement		
Level Stated	n	M	SD	n	M	SD
High	18	.05	.21	22	.09	.17
Low	21	-.03	.17	18	.05	.22
No	20	.02	.18	20	.01	.21

[a] All analyses of variance were calculated using the unweighted means method.

TABLE 10

Analysis of Variance of Changes in Reaction Time (Trial Block 3 Minus Trial Block 4) as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
Expectancy Level (A)	2	.06	1.46	$>.20$
Task Involvement (B)	1	.02	<1.0	$>.20$
A X B	2	.07	1.49	$>.20$
Error	113	.04		

TABLE 11

Mean Changes in Reaction Time (Trial Block 3 Minus Trial Block 4) as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Initial Expectancy	High Task Involvement			Low Task Involvement		
Level Stated	n	M	SD	n	M	SD
High	18	.14	.23	22	.08	.17
Low	21	.01	.21	18	.04	.21
No	20	.01	.22	20	.12	.22

Consequently, it was felt that the different halves of the trial blocks should be analyzed separately. It was decided to analyze the first 7 and the last 8 trials of each trial block. An alternative possibility would have been to analyze the first 10 and the last 5 trials separately, more nearly replicating Zajonc & Brickman's work. However, in this case the replication would have been more apparent than real, since the last 5 trials of each trial block would still have been there exerting their influence. Dividing trial blocks after the first 7 trials would be more likely to minimize motivational shifts or fatigue occurring during the first half of each trial block. It would also have the advantage of yielding results from each part of the trial blocks based on roughly the same number of trials.

Results for the total subject sample, on the first and second halves of each trial block are presented in Tables 12 through 17. The only significant effect is one for task involvement in Table 14, for the trial period encompassing from Baseline through Trial Block 4 ($p = .03$). There is no apparent interaction effect of expectancy and task involvement on reaction time change in any of the analyses thus far performed. And the main effect of task involvement seen in Table 14 is suspect, since it was suspicion of failure in the task involvement manipulation that has already been mentioned.

TABLE 12

Analysis of Variance of Changes in Reaction Time (Baseline Minus Trial Block 3) For the Separate Halves of the Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
First Half of Each Trial Block				
Expectancy Level (A)	2	.01	<1.0	$>.20$
Task Involvement (B)	1	.00	<1.0	$>.20$
A X B	2	.00	<1.0	$>.20$
Error	113	.01		
Second Half of Each Trial Block				
Expectancy Level (A)	2	.08	<1.0	$>.20$
Task Involvement (B)	1	.12	<1.0	$>.20$
A X B	2	.11	<1.0	$>.20$
Error	113	.14		

TABLE 13

Mean Changes in Reaction Time (Baseline Minus Trial Block 3) For the Separate Halves of the Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.[a]

Initial Expectancy Level Stated	High Task Involvement n	M	SD	Low Task Involvement n	M	SD
First Half of Each Trial Block						
High	18	.05	.12	22	.06	.13
Low	21	.03	.11	18	.04	.08
No	20	.03	.08	20	.04	.13
Second Half of Each Trial Block						
High	18	-.20	.42	22	-.04	.23
Low	21	-.11	.40	18	-.02	.36
No	20	-.00	.38	20	-.06	.39

[a] Negative change scores indicate that reaction time got slower from Baseline to Trial Block 3.

TABLE 14

Analysis of Variance of Changes in Reaction Time (Baseline Minus Trial Block 4) For the Separate Halves of the Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
First Half of Each Trial Block				
Expectancy Level (A)	2	.00	<1.0	$>.20$
Task Involvement (B)	1	.01	<1.0	$>.20$
A X B	2	.00	<1.0	$>.20$
Error	113	.01		
Second Half of Each Trial Block				
Expectancy Level (A)	2	.17	1.29	$>.20$
Task Involvement (B)	1	.63	4.65	.03
A X B	2	.03	<1.0	$>.20$
Error	113	.14		

TABLE 15

Mean Changes in Reaction Time (Baseline Minus Trial Block 4) For the Separate Halves of the Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Initial Expectancy	High Task Involvement			Low Task Involvement		
Level Stated	n	M	SD	n	M	SD
First Half of Each Trial Block						
High	18	.09	.07	22	.07	.11
Low	21	.09	.10	18	.06	.13
No	20	.08	.08	20	.06	.12
Second Half of Each Trial Block						
High	18	.02	.41	22	.11	.31
Low	21	.14	.36	18	.04	.40
No	20	.03	.34	20	.16	.39

TABLE 16

Analysis of Variance of Changes in Reaction Time (Trial Block 3 Minus Trial Block 4) For the Separate Halves of the Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
First Half of Each Trial Block				
Expectancy Level (A)	2	.01	< 1.0	$>.20$
Task Involvement (B)	1	.03	3.16	.08
A X B	2	.00	< 1.0	$>.20$
Error	113	.01		
Second Half of Each Trial Block				
Expectancy Level (A)	2	.29	1.78	.17
Task Involvement (B)	1	.20	1.23	$>.20$
A X B	2	.24	1.44	$>.20$
Error	113	.16		

TABLE 17

Mean Changes in Reaction Time (Trial Block 3 Minus Trial Block 4) For the Separate Halves of the Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.[a]

Initial Expectancy Level Stated	High Task Involvement n	M	SD	Low Task Involvement n	M	SD
First Half of Each Trial Block						
High	18	.04	.08	22	.01	.10
Low	21	.06	.06	18	.03	.14
No	20	.05	.09	20	.02	.10
Second Half of Each Trial Block						
High	18	.22	.45	22	.15	.33
Low	21	-.03	.39	18	.05	.43
No	20	-.02	.42	20	.21	.42

[a] Negative change scores indicate that reaction time got slower from Trial Block 3 to Trial Block 4.

The full range of trials has now been analyzed in testing for an interaction effect of expectancy and task involvement. This has been done for the period before feedback, the period limited to feedback, and the total trial period. Further, this has been done for complete trial blocks and for each half of the trial blocks. This has all been done for the complete subject sample. For the sake of thoroughness, it was necessary to first do these analyses with the complete subject sample, but now they must be done again with a selected subsample of subjects. It was earlier mentioned that the task involvement manipulation was apparently not effective for a large number of the subjects. If this were true it would of course open to question any calculations seeking an effect of task involvement which included the entire subject population.

A selected subsample of subjects was formed by eliminating from data analysis those for whom the task involvement manipulation was suspect. Subjects were eliminated based on their responses to the following two items in the post-experimental questionnaire.

1. At the beginning of the experiment (before the purpose of the task was explained to you), how much did you care about doing well at the reaction time task? How important to you was it to get a good score? Please indicate your answer on the line below.

Extremely Important — Extremely Unimportant

2. After reading the "Explanation of Task" sheet, telling the purpose of the reaction time task, did you care either more, or less, about doing well on the reaction time task, or did you feel about the same? Please indicate your answer on the line below.

Cared Very Much More — Cared Very Much Less

Subjects whose responses on these two questions gave reason to believe the task involvement manipulation had failed were eliminated from further analyses on the basis of the following criteria.

All subjects were eliminated whose responses to the first question were on the midpoint or on the wrong side of the midpoint (i.e., on the high involvement side of the midpoint for subjects assigned to the low involvement condition, and vice versa), and whose answers to the second question indicated a shift further toward the wrong direction. This eliminated twenty-two (22) subjects assigned to the low involvement condition, and seven (7) subjects assigned to the high involvement condition.

Subjects were also eliminated who started on the wrong side of the midpoint on the first question, and who indicated on the second question that their motivation had not changed after reading the "Explanation of Task" sheet. This eliminated another thirteen (13) subjects assigned originally to the low involvement condition, and thirteen (13) assigned to the high involvement condition. This procedure eliminated, therefore, a total of thirty-five (35) supposedly low involvement subjects, and twenty (20) supposedly high involvement subjects.

Thus, there are two subject samples, a total sample and a selected subsample from which have been eliminated almost half the original number of subjects due to the ineffectiveness of one of the experimental manipulations. Within each sample, the data for complete trial blocks and for each half of each trial block were analyzed separately. There is a consequent proliferation of calculations. Where one analysis of variance was originally contemplated, six were now made necessary.

Results of expectancy by task involvement analyses of variance are presented in Tables 18 through 23. Several results are present at suggestive ($p \leq .10$) and at statistically significant ($p < .05$) levels. It is noteworthy that these are all from analyses of the second half of the trial blocks and of the complete trial blocks. Analyses of variance of the first half of the trial blocks produced uniformly non-significant results, for all trial periods considered.

For the Baseline Minus Trial Block 3 period (Tables 18 and 19) there are suggestive levels of a main effect of initial expectancy ($p = .09$ for the complete trial blocks and $p = .10$ for their last half). These, however, are in the direction opposite to that hypothesized. Thus, there was a decrement in performance with increased task involvement and with increased levels of initial success expectancy.

For the Baseline Minus Trial Block 4 period (Table 20 and 21) there is a strong effect of initial success expectancy ($p = .01$ both for the complete trial blocks and for their last half). Looking at the cell means, it can be seen that the greatest performance improvement occurred for those subjects who did not state an initial success expectancy. There was slightly less improvement for subjects who stated high success expectancies, and a strong decrement in performance for subjects who stated low success expectancies. Table 20 also shows a non-significant interaction effect of expectancy and task involvement on task performance change (p = .11 for the complete trial blocks, and p = .09 for their last half).

The Trial Block 3 Minus Trial Block 4 period (Tables 22 and 23), covering only the feedback trials, gives us non-significant but suggestive effects of success expectancy (p = .09 for the complete trial blocks and p = .06 for their last half) in the hypothesized direction. High levels of stated expectancy are associated with increased task performance improvement. And significant results are obtained for the expectancy by task involvement interaction (p = .04 both for the complete trial blocks and for their last half). This is as was hypothesized. As Table 23 shows for the complete trial blocks, under high task involvement the high expectancy subjects showed a greater task performance gain (.23) than did the low expectancy subjects (.03). Under low task involvement the high expectancy subjects showed essentially no performance change (.01), and the low expectancy subjects registered a slightly poorer mean performance level (-.07). Hypothesis 1 made no prediction for the No Stated Expectancy condition.

In summary, one can say that post hoc statistical support for an interaction effect of expectancy and task involvement on reaction time change has been found, when analyses are limited to subjects for whom the experimental manipulations were apparently successful and when limited to trials on which there was performance feedback.

This statistical effect was significant at p less than .05 for the complete trial blocks, but analysis of the separate halves of the trial blocks shows it to have come seemingly in its entirety from the last half (the last 8 trials) of the blocks of 15 trials each.

Because the analyses showing these effects are post hoc in nature, they cannot by themselves confirm any hypothesis. They are, however, highly suggestive by themselves and will be valuable to anyone planning future research along lines similar to that described in these pages.

TABLE 18

Analysis of Variance of Changes in Reaction Time (Baseline Minus Trial Block 3) as a Function of High or Low Expectancies and High or Low Task Involvement, for Selected Subsample of Subjects.

Source of Variance	df	MS	F	p
First Half of Each Trial Block				
Expectancy Level (A)	2	.01	<1.0	$>.20$
Task Involvement (B)	1	.02	1.31	$>.20$
A X B	2	.01	<1.0	$>.20$
Error	58	.01		
Second Half of Each Trial Block				
Expectancy Level (A)	2	.33	2.38	.10
Task Involvement (B)	1	.08	<1.0	$>.20$
A X B	2	.25	1.81	.17
Error	58	.12		
Complete Trial Blocks				
Expectancy Level (A)	2	.08	2.52	.09
Task Involvement (B)	1	.01	<1.0	$>.20$
A X B	2	.05	1.54	$>.20$
Error	58	.03		

TABLE 19

Mean Changes in Reaction Time (Baseline Minus Trial Block 3) as a Function of High or Low Expectancy and High or Low Task Involvement, for Selected Subsample of Subjects.[a]

Initial Expectancy Level Stated	High Task Involvement n	M	SD	Low Task Involvement n	M	SD
First Half of Each Trial Block						
High	9	.09	.14	11	.02	.15
Low	18	.03	.11	6	.03	.06
No	13	.05	.08	7	.01	.12
Second Half of Each Trial Block						
High	9	-.35	.52	11	-.00	.21
Low	18	-.08	.39	6	-.17	.43
No	13	.09	.37	7	.07	.19
Complete Trial Blocks						
High	9	-.14	.22	11	.00	.12
Low	18	-.03	.20	6	-.07	.21
No	13	.07	.19	7	.04	.10

[a] Negative change scores indicate that reaction time got slower from Baseline to Trial Block 3.

TABLE 20

Analysis of Variance of Changes in Reaction Time (Baseline Minus Trial Block 4) as a Function of High or Low Expectancy and High or Low Task Involvement, for Selected Subsample of Subjects.

Source of Variance	df	MS	F	p
First Half of Each Trial Block				
Expectancy Level (A)	2	.00	< 1.0	$> .20$
Task Involvement (B)	1	.01	1.34	$> .20$
A X B	2	.01	< 1.0	$> .20$
Error	58	.01		
Second Half of Each Trial Block				
Expectancy Level (A)	2	.71	5.28	.01
Task Involvement (B)	1	.00	< 1.0	$> .20$
A X B	2	.34	2.50	.09
Error	58	.14		
Complete Trial Blocks				
Expectancy Level (A)	2	.18	5.15	.01
Task Involvement (B)	1	.00	< 1.0	$> .20$
A X B	2	.08	2.32	.11
Error	58	.04		

TABLE 21

Mean Changes in Reaction Time (Baseline Minus Trial Block 4) as a Function of High or Low Expectancy and High or Low Task Involvement, for Selected Subsample of Subjects.[a]

Initial Expectancy Level Stated	High Task Involvement n	M	SD	Low Task Involvement n	M	SD
First Half of Each Trial Block						
High	9	.11	.09	11	.06	.13
Low	18	.09	.10	6	.10	.11
No	13	.09	.08	7	.04	.09
Second Half of Each Trial Block						
High	9	.07	.41	11	.03	.38
Low	18	-.12	.38	6	-.35	.47
No	13	-.01	.32	7	.29	.21
Complete Trial Blocks						
High	9	.09	.22	11	.04	.20
Low	18	-.02	.18	6	-.14	.25
No	13	.04	.17	7	.18	.09

[a] Negative change scores indicate that reaction time got slower from Baseline to Trial Block 4.

TABLE 22

Analysis of Variance of Changes in Reaction Time (Trial Block 3 Minus Trial Block 4) as a Function of High or Low Expectancy and High or Low Task Involvement, for Selected Subsample of Subjects.

Source of Variance	df	MS	F	p
First Half of Each Trial Block				
Expectancy Level (A)	2	.01	< 1.0	>.20
Task Involvement (B)	1	.00	< 1.0	>.20
A X B	2	.00	< 1.0	>.20
Error	58	.01		
Second Half of Each Trial Block				
Expectancy Level (A)	2	.52	2.88	.06
Task Involvement (B)	1	.06	< 1.0	>.20
A X B	2	.60	3.30	.04
Error	58	.18		
Complete Trial Blocks				
Expectancy Level (A)	2	.12	2.50	.09
Task Involvement (B)	1	.02	< 1.0	>.20
A X B	2	.16	3.29	.04
Error	58	.05		

TABLE 23

Mean Changes in Reaction Time (Trial Block 3 Minus Trial Block 4) as a Function of High or Low Expectancy and High or Low Task Involvement, for Selected Subsample of Subjects.[a]

Initial Expectancy Level Stated	High Task Involvement n	M	SD	Low Task Involvement n	M	SD
First Half of Each Trial Block						
High	9	.02	.09	11	.03	.10
Low	18	.06	.07	6	.06	.14
No	13	.04	.08	7	.03	.09
Second Half of Each Trial Block						
High	9	.42	.39	11	.04	.38
Low	18	−.04	.42	6	−.18	.60
No	13	−.10	.44	7	.23	.34
Complete Trial Blocks						
High	9	.23	.19	11	.03	.21
Low	18	.01	.22	6	−.07	.29
No	13	−.03	.24	7	.14	.18

[a] Negative change scores indicate that reaction time got slower from Trial Block 3 to Trial Block 4.

Hypothesis 2.

The hypothesis was that subjects stating an initial success expectancy would subsequently show more performance improvement than subjects not stating such an expectancy. The primary period of interest was from the end of the Baseline trials (before expectancy statements and task involvement manipulation attempts) through Trial Block 3 (just after these manipulations). This hypothesis was not supported for the total sample group.

Supplemental analyses have been made to determine whether suggestive support for, or evidence against, Hypothesis 2 might be seen. Since it became apparent that the presence of feedback seems to have strongly affected task performance, investigation has been extended here as in the re-analysis of Hypothesis 1 to cover feedback trials as well. Reasons for elimination of almost half the total subject sample (failure of the task involvement manipulation) and for separate analysis of each half of each trial block (fatigue or motivational changes during the course of long trial blocks) have already been discussed.

The Sheffe test for significant differences between cell means of an analysis of variance utilizes the total between-groups error term of the ANOVA. Its use in any specific instance is justified or not justified by the presence of main or interaction effects in the ANOVA. However, in the present investigation each task performance measure will be used twice in examining the full range of trial periods (Baseline Minus Trial Block 3; Baseline Minus Trial Block 4; Trial Block 3 Minus Trial Block 4). This twofold examination of performance data might not be fully justified by referring only to ANOVAs covering each separate trial period to be tested. Instead, significant effects were looked for in repeated measures analyses of variance covering all experimental trial blocks simultaneously. Repeated measures analyses of variance were calculated for each half of the trial blocks and for the complete trial blocks.

The analysis for the first half of the trial blocks yielded a significant effect only for trials, showing an overall increase in reaction speed from Baseline through Trial Block 4 but nothing else. The analyses for the second half and for complete trial blocks were very similar in appearance, and yielded results at or better than the .05 level for Expectancy X Trials, and for Expectancy X Task Involvement X Trials terms. Because of this similarity, only the results for the complete trial blocks are presented below, in Tables 24 and 25.

TABLE 24

Repeated Measures Analysis of Variance for Reaction Time as a Function of High or Low or No Expectancy and High or Low Task Involvement on Complete Trial Blocks, for Selected Subsample of Subjects.

Source of Variance	df	MS	F	p
Expectancy Level (A)	2	.07	1.09	$>.20$
Task Involvement (B)	1	.00	<1.0	$>.20$
A X B	2	.09	1.37	$>.20$
Error	58	.06		
Trials	2	.04	1.88	.16
A X Trials	4	.06	3.30	.01
B X Trials	2	.00	<1.0	$>.20$
A X B X Trials	4	.05	2.50	.05
Error	116	.02		

TABLE 25

Mean Repeated Measures Reaction Times as a Function of High or Low or No Expectancy and High or Low Task Involvement on Complete Trial Blocks, for Selected Subsample of Subjects.

Expectancy Levels		Task Involvement High	Task Involvement Low
High	Mean	5.34	5.29
	SD	0.14	0.17
	n	9	11
Low	Mean	5.34	5.44
	SD	0.13	0.20
	n	18	6
No	Mean	5.36	5.33
	SD	0.15	0.13
	n	13	7

In the supplemental analyses for Hypothesis 1, Table 18 showed that for the Baseline Minus Trial Block 3 trial period the selected subsample had a suggestive level of main effect for expectancy ($p = .10$ for the second half of the trial blocks, and $p = .09$ for the complete trial blocks), and a non-significant though possible expectancy by involvement interaction ($p = .17$ for the second half of the trial blocks). Though Hypothesis 2 was not supported as stated, the question remained whether it might hold true within either level of task involvement. Following the significant results yielded by the repeated measures analysis of variance above, internal analyses were made of the various trial periods. The results for the Baseline Minus Trial Block 3 trial period are presented in Table 26.

Again referring to the selected subsample of subjects, Table 20 showed an indication, though non-significant ($p = .11$), of an expectancy by involvement effect for the Baseline Minus Trial Block 4 period. Table 22 showed a significant ($p = .04$) interaction term for the Trial Block 3 Minus Trial Block 4 period.

For each of these trial periods above, the No Stated Expectancy cell was compared with the cells for High Expectancy and Low Expectancy, for each level of task involvement. This comparison was done by means of the Sheffe test and using Dunnett's tables of the Studentized range statistic for comparison of different treatment groups with a control group (Winer, 1974).

The results of these between-cell comparisons are given in Tables 26 through 28. In each case, a positive sign for the _t_ ratio indicates that reaction time improvement was greater under conditions where expectancy was stated than where no expectancy was stated. A negative sign indicates that the No Stated Expectancy is associated with greater task improvement than is the statement of a success expectancy.

Results for the first half of the trial blocks are uniformly non-significant for all trial periods measured. However, highly interesting results are obtained from the last half of the trial blocks and for the complete trial blocks. For complete trial blocks, we see in Table 26 (Baseline Minus Trial Block 3) that the high involvement-high expectancy subjects show significant decrements in performance compared with the subjects who did not state an initial expectancy ($p < .05$). Figures for all the other cell comparisons are non-significant, but are all in this same direction of superior performance for the No Stated Expectancy subject group. Results for the second half of the trial blocks are very similar to those for the complete trial blocks.

Considering the entire experimental period (Baseline Minus Trial Block 4), Table 27 shows that results for both the high involvement cells have fallen to chance levels. However, the low involvement-low expectancy subject cell shows a significant performance decrement when compared with the No Stated Expectancy group. This result is present at better than the .01 level of significance.

Table 28 shows results for the trial period encompassing feedback trials only (Trial Block 3 Minus Trial Block 4). This is where we have seen our most significant interaction effect of expectancy and task involvement on task performance improvement. For complete trial blocks and for their last half, Table 28 shows a corresponding reversal of relationships in our comparison of subjects stating and not stating success expectancies. Over the feedback trials high expectancy-high involvement subjects stating an initial expectancy showed strong superiority in task improvement over those who did not state an expectancy ($p < .05$). However, results for low expectancy-low involvement subjects suggest the opposite. For these subjects the greatest task performance improvement was registered by those who did not state an initial expectancy ($.10 < p < .20$).

TABLE 26

Sheffe-Dunnett Tests for Significance of Cell Mean Differences in Reaction Time Changes (Baseline Minus Trial Block 3) as a Function of High or Low Expectancy Versus No Expectancy, and High or Low Task Involvement, for Selected Subsample of Subjects.

Mean Difference Tested	Task Involvement High t	p[a]	Low t	p
First Half of Each Trial Block				
High Expectancy Minus No Stated Expectancy	0.73	>.20	0.25	>.20
Low Expectancy Minus No Stated Expectancy	-0.58	>.20	0.23	>.20
Second Half of Each Trial Block				
High Expectancy Minus No Stated Expectancy	-2.48	< .05	-0.35	>.20
Low Expectancy Minus No Stated Expectancy	-1.14	>.20	-1.08	>.20
Complete Trial Blocks				
High Expectancy Minus No Stated Expectancy	-2.46	<.05	-0.43	>.20
Low Expectancy Minus No Stated Expectancy	-1.40	<.20	-1.06	>.20

[a] All probability values are two-tailed.

TABLE 27

Sheffe-Dunnett Tests for Significance of Cell Mean Differences in Reaction Time Changes (Baseline Minus Trial Block 4) as a Function of High or Low Expectancy Versus No Expectancy, and High or Low Task Involvement, for Selected Subsample of Subjects.

Mean Difference Tested	Task Involvement: High		Task Involvement: Low	
	$\underline{t}$	p[a]	$\underline{t}$	p
First Half of Each Trial Block				
High Expectancy Minus No Stated Expectancy	0.36	>.20	0.30	>.20
Low Expectancy Minus No Stated Expectancy	-0.15	>.20	0.92	>.20
Second Half of Each Trial Block				
High Expectancy Minus No Stated Expectancy	0.44	>.20	-1.33	<.20
Low Expectancy Minus No Stated Expectancy	-0.76	>.20	-3.02	<.01
Complete Trial Blocks				
High Expectancy Minus No Stated Expectancy	0.56	>.20	-1.39	<.20
Low Expectancy Minus No Stated Expectancy	-0.83	>.20	-2.94	<.01

[a] All probability values are two-tailed.

TABLE 28

Sheffe-Dunnett Tests for Significance of Cell Mean Differences in Reaction Time Changes (Trial Block 3 Minus Trial Block 4) as a Function of High or Low Expectancy Versus No Expectancy, and High or Low Task Involvement, for Selected Subsample of Subjects.

Mean Difference Tested	Task Involvement High t	High p[a]	Low t	Low p
First Half of Each Trial Block				
High Expectancy Minus No Stated Expectancy	-0.52	$>.20$	0.21	$>.20$
Low Expectancy Minus No Stated Expectancy	0.54	$>.20$	0.56	$>.20$
Second Half of Each Trial Block				
High Expectancy Minus No Stated Expectancy	2.55	$<.05$	-0.84	$>.20$
Low Expectancy Minus No Stated Expectancy	0.41	$>.20$	-1.66	$<.20$
Complete Trial Blocks				
High Expectancy Minus No Stated Expectancy	2.51	$<.05$	-0.87	$>.20$
Low Expectancy Minus No Stated Expectancy	0.46	$>.20$	-1.60	$<.20$

[a] All probability levels are two-tailed.

Most of our analyses gave results contrary to what was hypothesized. The No Stated Expectancy condition was associated with greater performance improvement for most subjects than were either the high or low stated expectancy conditions. Only one group of subjects showed statistically significant results in the hypothesized direction. This was the high expectancy-high involvement group. And this one did so only during the course of the feedback trials.

Zajonc & Brickman (1969) reported a simple positive association between the statement of an initial success expectancy and subjects' subsequent task performance improvement. The present study did not confirm their reported finding. It has instead strongly indicated that any relationship between the statement of a success expectancy and subsequent task performance also depends in a complex manner on the level of success expectancy stated, the number of trials in each trial block, and on the presence or absence of feedback as well. Though these indications were obtained through post hoc analyses, it seems probable that the relationship between initial success expectancy and later task performance is considerably more complex than the simple one reported by Zajonc & Brickman.

Hypothesis 3.

This hypothesis of a positive association between initially stated expectancy levels and subsequent task performance reaction speed was previously shown, by a repeated measures analysis of variance of the total subject sample (Tables 4 and 5), not to have been supported throughout the entire experimental session as predicted. Analyses of the individual trial blocks showed Hypothesis 3 to have been supported only for Trial Block 4 (Table 6).

A series of supplemental analyses have been performed to examine the separate halves of the various trial blocks. Repeated measures ANOVAs have been calculated for the first and second halves of all of the trial blocks considered simultaneously, and individual ANOVAs have been calculated for the first and second halves of the individual trial blocks. Results of the repeated measures analyses are presented in Tables 29 through 32.

It will be remembered that these calculations, for the complete trial blocks, had yielded only the most tenuous support for a levels of expectancy effect on task performance ($p = .15$). The present supplemental calculations, however, show strong support for a levels of expectancy effect on the first half of the combined trial blocks. The repeated

TABLE 29

Repeated Measures Analysis of Variance for Reaction Time, on the First Half of All Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
Expectancy Level (A)	1	.28	6.53	.01
Task Involvement (B)	1	.12	2.91	.09
A X B	1	.01	< 1.0	$> .20$
Error	75	.04		
Trials	2	.12	20.44	$< .001$
A X Trials	2	.00	< 1.0	$> .20$
B X Trials	2	.01	< 1.0	$> .20$
A X B X Trials	2	.00	< 1.0	$> .20$
Error	150	.01		

TABLE 30

Mean Repeated Measures Reaction Times, on the First Half of All Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Median Expectancy		Task Involvement High	Task Involvement Low
High	Mean	5.29	5.34
	SD	0.10	0.12
	n	18	22
Low	Mean	5.36	5.40
	SD	0.11	0.14
	n	21	18

TABLE 31

Repeated Measures Analysis of Variance for Reaction Time, on the Second Half of All Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
Expectancy Level (A)	1	.06	< 1.0	$> .20$
Task Involvement (B)	1	.01	< 1.0	$> .20$
A X B	1	.56	4.00	.05
Error	75	.14		
Trials	2	.23	3.30	.04
A X Trials	2	.15	2.15	.12
B X Trials	2	.10	1.45	$> .20$
A X B X Trials	2	.03	< 1.0	$> .20$
Error	150	.07		

TABLE 32

Mean Repeated Measures Reaction Times, on the Second Half of All Trial Blocks, as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Median Expectancy		Task Involvement High	Task Involvement Low
High	Mean	5.39	5.31
	SD	0.20	0.25
	n	18	22
Low	Mean	5.33	5.44
	SD	0.16	0.24
	n	21	18

measures analysis of the second half of the trial blocks shows no statistically discernible relationship, however, between initial expectancy levels and later performance levels.

It is readily understandable why pilot studies gave no indication of these results, since they emerged clearly only upon completion of parallel analyses for the separate halves of the trial blocks.

Two-way analyses of variance (High or Low Expectancy X High or Low Task Involvement) were calculated for the individual trial blocks as well. These results, for each half of each trial block measure, are presented in Tables 33 through 38. They confirm the results of the repeated measures analyses, in that they emphasize the difference in results from the first to the last half of each trial block.

The hypothesis of a positive association between initial success expectancy and task performance is strongly borne out for the first half of each trial block, but not for the second half. The one exception is Trial Block 4. The expectancy effect is strongly present for the complete trial block (Table 6), as well as for the first half (Table 38). Seemingly, the stimulus provided by feedback has made the expectancy effect appear more clearly in this one trial block.

TABLE 33

Analysis of Variance of Reaction Time for Each Half of Baseline Trial Blocks as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
First Half of Baseline Trial Blocks				
Expectancy Level (A)	1	.07	4.71	.03
Task Involvement (B)	1	.03	2.17	.15
A X B	1	.00	<1.0	$>.20$
Error	75	.02		
Second Half of Baseline Trial Blocks				
Expectancy Level (A)	1	.00	<1.0	$>.20$
Task Involvement (B)	1	.19	3.44	.07
A X B	1	.20	3.66	.06
Error	75	.06		

TABLE 34

Mean Reaction Times For Each Half of Baseline Trial Blocks as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

	High Task Involvement			Low Task Involvement		
Median Expectancy	n	M	SD	n	M	SD
First Half of Baseline Trial Blocks						
High	18	5.34	.12	22	5.38	.13
Low	21	5.40	.10	18	5.44	.14
Second Half of Baseline Trial Blocks						
High	18	5.34	.24	22	5.34	.24
Low	21	5.25	.23	18	5.45	.22

TABLE 35

Analysis of Variance of Reaction Time for Each Half of Trial Block 3 as a Function of High or Low Expectancy and High or Low Task Involvement for All Subjects.

Source of Variance	df	MS	F	p
First Half of Trial Block 3				
Expectancy Level (A)	1	.14	6.62	.01
Task Involvement (B)	1	.02	1.00	.20
A X B	1	.00	1.0	.20
Error	75	.02		
Second Half of Trial Block 3				
Expectancy Level (A)	1	.04	1.0	.20
Task Involvement (B)	1	.01	1.0	.20
A X B	1	.35	3.28	.08
Error	75	.11		

TABLE 36

Mean Reaction Times for Each Half of Trial Block 3 as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

	High Task Involvement			Low Task Involvement		
Median Expectancy	n	M	SD	n	M	SD
First Half of Trial Block 3						
High	18	5.28	.13	22	5.32	.15
Low	21	5.37	.13	18	5.40	.17
Second Half of Trial Block 3						
High	18	5.53	.35	22	5.38	.31
Low	21	5.36	.32	18	5.46	.32

TABLE 37

Analysis of Variance of Reaction Time for Each Half of Trial Block 4 as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

Source of Variance	df	MS	F	p
First Half of Trial Block 4				
Expectancy Level (A)	1	.08	4.21	.04
Task Involvement (B)	1	.08	4.51	.04
A X B	1	.00	< 1.0	$> .20$
Error	75	.02		
Second Half of Trial Block 4				
Expectancy Level (A)	1	.33	2.76	.10
Task Involvement (B)	1	.01	< 1.0	$> .20$
A X B	1	.06	< 1.0	$> .20$
Error	75	.12		

TABLE 38

Mean Reaction Times for Each Half of Trial Block 4 as a Function of High or Low Expectancy and High or Low Task Involvement, for All Subjects.

	High Task Involvement			Low Task Involvement		
Median Expectancy	n	M	SD	n	M	SD
First Half of Trial Block 4						
High	18	5.25	.09	22	5.31	.15
Low	21	5.31	.14	18	5.37	.14
Second Half of Trial Block 4						
High	18	5.31	.35	22	5.23	.34
Low	21	5.38	.26	18	5.41	.42

An unexpected result yielded by these preceeding analyses of variance is a significant task involvement effect within the Baseline trials. It is present at barely suggestive levels in the first half of the Baseline trial blocks ($p = .15$), almost reaches the conventional .05 significance level in the second half ($p = .07$), and does reach the .05 level for the complete Baseline trial blocks.

These figures are all in the same direction, with high involvement subjects reacting faster than low involvement subjects. However, the Baseline trials were done before the task involvement manipulation was attempted, so such an effect was not expected at this stage of the data.

It seems to the experimenter that the most parsimonious explanation for these unexpected statistical results is still chance, despite the .05 level of significance obtained. This is because a standard procedure was used throughout the study, with subjects receiving instructions in writing except in those few instances where they requested clarification of some point by the experimenter. The experimenter was aware in advance, however, which experimental condition was going to be used for each subject. It is possible, though it seems not the most likely explanation, that his feelings were communicated in some manner to subjects in such a way that their task performance was influenced.

Covariance analyses of performance scores were performed for the total subject sample, with Baseline scores as co-variate. There were no significant effects, so these results are not presented here in tabular form.

Overall, the hypothesis that reaction speed is positively associated with initial level of stated success expectancy has received relatively strong post hoc support, especially under conditions of feedback. The additional finding that this is strongly true for the first half of all trial blocks and not for the second half is itself an interesting finding, and important to remember when future studies are planned in which a similar experimental task is utilized.

Hypothesis 4.

This hypothesis stated that terminal success expectancies would be higher for subjects receiving success feedback than for subjects receiving failure feedback. This hypothesis was strongly confirmed.

No specific hypothesis was included in the present study design for testing the effects of the presence of feedback, per se, on task performance. However, a suggestive test for feedback effects can be done within the confines of the present design. In addition, differential effects of feedback level can be tested for as well. And it can be determined whether the variables of success expectancy or task involvement have interacted with feedback level to influence task performance change over the course of the experimental session.

First, let us concern ourself with a suggestive test for the presence of feedback. In the absence of complicating stimuli such as feedback, subjects' reaction speed should follow the familiar learning curve over the course of trials, with the most rapid improvement in performance per trial occurring at the beginning of the trial series, and more slowly as the number of trials grows larger. In other words, in the absence of feedback subjects' task performance should improve by the greatest amount during the practice trials and the Baseline trial blocks, and by lesser amounts during Trial Blocks 3 and 4.

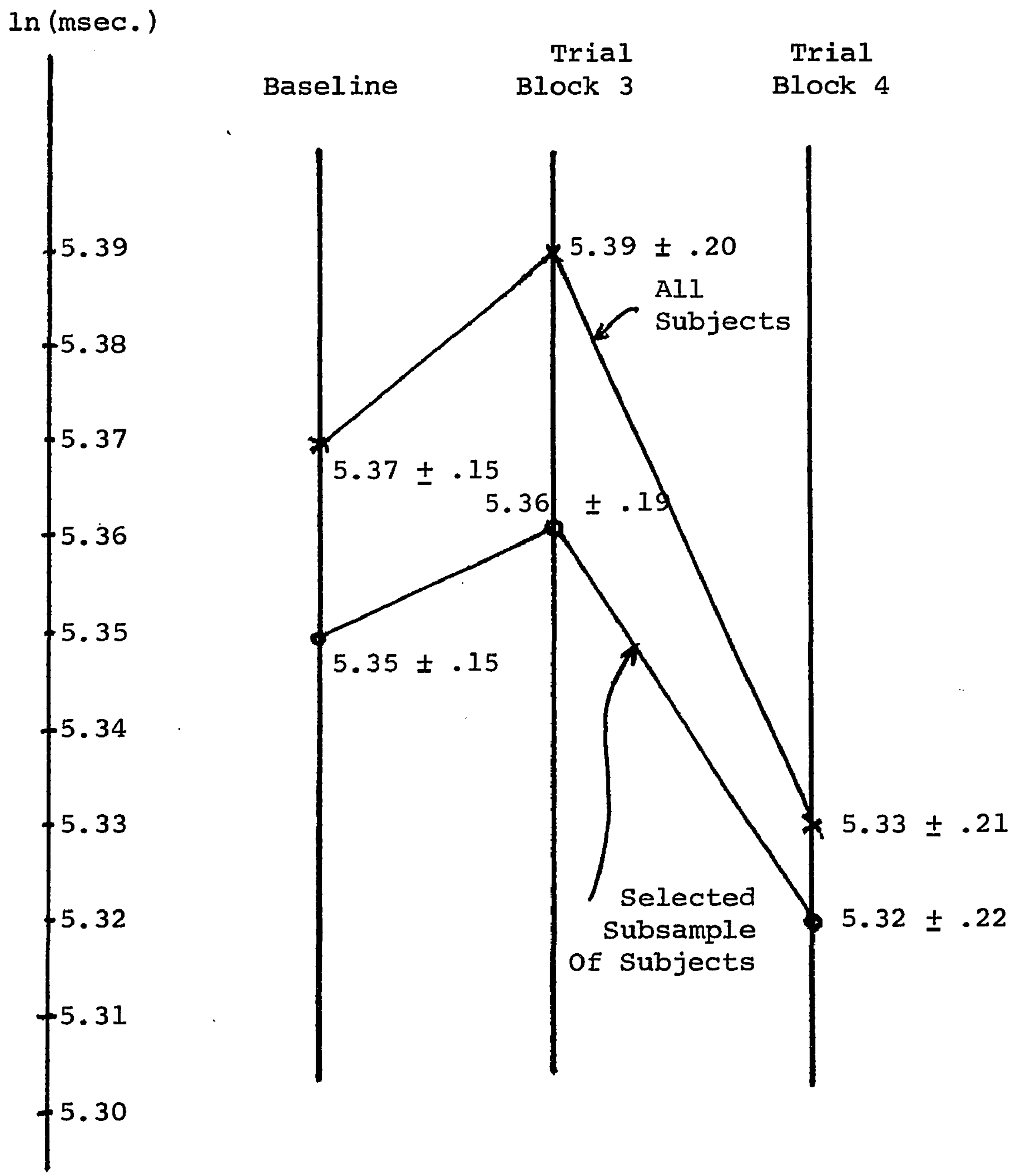
Some effects of the task involvement manipulation and the statement of success expectancies might reasonably be expected on Trial Block 3, right after these events occurred. Task performance should then be expected to move smoothly toward a final asymptotic value. Overall, we would expect to see the familiar learning curve of performance as a function of practice, with perhaps some disturbance between Baseline and Trial Block 3 due to our manipulations. Task performance change from Baseline through Trial Block 3 should be greater than the corresponding task performance change from the end of Trial Block 3 through the end of Trial Block 4, in the absence of feedback. At least, this should be true unless our manipulations had a deleterious effect on task performance greater than any positive effect of feedback. And we have already seen that these manipulations had no readily discernable effect until our subject sample had been considerably "purified" through the selection out of approximately half the original subject sample.

Thus, a comparison of task performance change from Baseline through Trial Block 3 (before feedback) with its change from Trial Block 3 through Trial Block 4 (during feedback) should yield a conservative test of the overall effects of the presence of feedback on task performance. Figure 4 shows the actual performance of all subjects, and of the selected subsample of subjects, on Baseline, Trial Block 3 and Trial Block 4.

Matched *t*-tests were performed to examine the data for any feedback effect. In this type of *t*-test one performance difference is compared with another, and the resultant mean difference is tested for significant deviation from zero. Tests for the total sample group were performed for the separate halves of the trial blocks, as well as for the complete

FIGURE 4

Reaction Time by Trial Block, For All Subjects and For Selected Subsample of Subjects.



trial blocks. The results of these tests are summarized in Table 39. Significant effects were obtained for the last half of the trial blocks and for the complete trial blocks ($p = .01$ for each). Furthermore, the mean difference score is negative in sign, indicating a curve of increased negative slope after the introduction of feedback. This is something Figure 4 had already made clear visually.

This is highly suggestive evidence for the presence of a feedback effect, per se. The effect, moreover, seemingly came in its entirity from the last half of the trials in each trial block, again emphasizing the fact that there are important differences in task performance measures from the first to the last half of each trial block.

While the design of the present study did not provide for a direct test of the effects of feedback versus no feedback on task performance, it does make possible a test to see whether different levels of feedback differentially effect task performance. We can also determine if the independent variables of success expectancy or task involvement interact with feedback level to influence task performance change.

Accordingly, a three-way ANOVA was performed (High, Low or No Stated Expectancy X High or Low Task Involvement X Success or Failure Feedback), using performance change from

TABLE 39

Comparison of Reaction Time Changes Before and During Task Performance Feedback, for All Subjects.

Comparison Group	M_d	SD_d	t	p
First Half of All Trial Blocks	.01	.18	< 1.0	$> .20$
Second Half of All Trial Blocks	-.16	.68	2.63	.01
Complete Trial Blocks	-.08	.35	2.64	.01

Trial Block 3 through Trial Block 4 as the dependent variable. Parallel analyses were performed for the data representing complete trial blocks and the separate halves of each trial block.

The analyses of the complete trial blocks yielded no direct or interaction effects of task involvement with feedback level. Analyses for the selected subsample could not be carried out because one cell of the ANOVA (Low Expectancy/ High Task Involvement/Failure Feedback subjects) was a null cell. Therefore, to simplify the presentation of results for the complete subject sample, the task involvement variable was collapsed. A two-way ANOVA of expectancy by feedback (High, Low or No Stated Expectancy X Success or Failure Feedback) was calculated, with the dependent variable the same as above.

These results are presented in Tables 40 and 41. The analysis of variance for the complete subject sample yielded uniformly non-significant results, and are not presented in tabular form. The tables show a clear pattern of results for the selected subsample of subjects, however. There is the previously reported expectancy effect on task performance improvement ($p = .04$ for the second half of the trial blocks, and $p = .06$ for the complete trial blocks), with higher

TABLE 40

Analysis of Variance of Reaction Time (Trial Block 3 Minus Trial Block 4) as a Function of High or Low or No Expectancy and Success or Failure Feedback, for Selected Subsample of Subjects.

Source of Variance	df	MS	F	p
First Half of Each Trial Block				
Expectancy Level (A)	2	.01	<1.0	$>.20$
Feedback Level (B)	1	.02	2.23	.14
A X B	2	.01	<1.0	$>.20$
Error	58	.01		
Second Half of Each Trial Block				
Expectancy Level (A)	2	.66	3.50	.04
Feedback Level (B)	1	.76	4.06	.05
A X B	2	.04	<1.0	$>.20$
Error	58	.19		
Complete Trial Blocks				
Expectancy Level (A)	2	.16	3.04	.06
Feedback Level (B)	1	.16	3.17	.08
A X B	2	.01	<1.0	$>.20$
Error	58	.05		

TABLE 41

Mean Changes in Reaction Time (Trial Block 3 Minus Trial Block 4) as a Function of High or Low or No Expectancy and Success or Failure Feedback, for Selected Subsample of Subjects.

Initial Expectancy	Success Feedback			Failure Feedback		
Level Stated	n	M	SD	n	M	SD
First Half of Each Trial Block						
High	7	.01	.11	13	.14	.09
Low	19	.06	.06	5	.06	.16
No	10	.00	.07	10	.07	.08
Second Half of Each Trial Block						
High	7	.43	.44	13	.08	.38
Low	19	-.04	.40	5	-.20	.67
No	10	.12	.36	10	-.09	.49
Complete Trial Blocks						
High	7	.23	.21	13	.06	.21
Low	19	.01	.22	5	-.08	.32
No	10	.06	.18	10	-.01	.27

success expectancies being associated with greater task performance improvement. There is also a clear effect of feedback level ($p = .05$ for the second half of the trial blocks, and $p = .08$ for the complete trial blocks). Table 41 shows that success feedback was associated with greater task performance improvement than was failure feedback, over the complete trial blocks and their last half. Throughout, any expectancy by feedback interaction remained negligible.

To summarize the findings associated with feedback, the following have been obtained. Terminal success expectancies were strongly associated with feedback level, being much higher after success feedback than after failure feedback. Further, comparison of earlier performance change (before feedback) with later (during feedback) revealed much greater performance improvement during feedback than before, whereas the opposite would have been expected in the absence of any feedback effect. This was taken to imply support for the presence of a main effect associated with the presence of feedback, per se. These findings were true for the total sample group.

A couple of findings were obtained for the selected subsample of subjects which did not hold true for the entire group. First, under the direct stimulus of feedback, task performance improvement was greater for high expectancy levels than for low, and was greater under conditions of success feedback than under failure feedback. These results were obtained for the complete trial blocks and for the last half of the trial blocks, but not for their first half.

Summary of Post Hoc Results.

Post hoc support has been obtained in varying degree for much of what was initially hypothesized. In most cases support for hypotheses was partial, however, and the pattern of that partial support is instructive.

The major hypothesis of the study was that success expectancies and task involvement levels would interact to influence subjects' rate of reaction time improvement. This hypothesis was not confirmed for the total sample, either for the complete trial blocks or for either half of them. When subjects were eliminated for whom the task involvement manipulation had probably been ineffective, an interesting pattern emerged for this selected subsample of subjects.

The trial period dealt with in the hypothesis (Baseline through Trial Block 3) yielded no significant interaction effect, though a possible hint ($p = .17$) of one is present. When the trial period under analysis was broadened to include feedback trials the level of statistical support for an interaction effect became somewhat stronger ($p = .09$ for the last half of the trial blocks). When analysis was limited to feedback trials only, an interaction effect was found to be present at the .04 level of significance.

Therefore, when analysis was limited to trials with feedback, and to subjects for whom the task involvement manipulation had been effective, statistical support for the study's principal hypothesis was obtained.

An unexpected finding was that support for the hypothesis was contributed seemingly in its entirety by the second half of each trial block. Typically throughout the study, results for the complete trial blocks and for their last half were very similar.

It had also been hypothesized, on the strength of Zajonc & Brickman's (1969) reported results, that subjects stating a success expectancy would subsequently show more improvement in reaction speed than subjects not stating such an expectancy. The hypothesis was not confirmed for the total subject sample. For the selected subsample of subjects, results for all trial periods were likewise non-significant for the first half of each trial block. Significant results were obtained for the last half of the trial blocks and for the complete trial blocks. Most, however, were in the direction opposite to that hypothesized. In other words, subjects stating an initial success expectancy subsequently showed a decrement in task performance relative to subjects not stating such an expectancy.

When data analysis was limited to feedback trials, a reversal of this relationship was obtained. High Expectancy-High Involvement subjects improved their reaction speed, over the course of feedback, significantly more than did subjects not stating an initial expectancy (p   .05). Non-significant results were obtained over the course of the feedback trials for the Low Expectancy-Low Involvement subjects (.10   p   .20), in the opposite direction.

Thus far, all significant relationships seen had manifested themselves primarily in the last half of the trial blocks, with the first half yielding chance results. When something was true for the complete trial blocks it was because of the strong contribution of the last eight trials rather than the first seven. This picture changes insofar as one hypothesis is concerned. Hypothesis 3 stated that mean reaction speed would be positively correlated with subjects' initially stated levels of success expectancy, for all trial blocks. This hypothesis was strongly supported for the first half of all trial blocks, but not for their second half. Non-significant results ($p = .15$) were obtained for the complete trial blocks, with the exception of Trial Block 4 (feedback trials) where the hypothesis was supported at the .04 level of significance. These results are compatible with those of Zajonc & Brickman (1969), who reported suggestive differences in task performance as a function of initial differences in success expectancy.

No direct test for the presence of feedback was planned because of its projected cost in numbers of extra subjects required. However, post hoc analysis indicated a marked improvement in task performance after its introduction. During feedback trials improvement in task performance was greater for high expectancy subjects than for low, and greater for success feedback than for failure feedback.

DISCUSSION

Hypothesis 1.

This study's principal hypothesis was that there would be an interactive effect of initial success expectancy and task involvement level on task performance improvement from Baseline through Trial Block 3. An expectancy by involvement interaction was statistically present, but not as hypothesized and only in post hoc analyses. It was present at significant levels only for feedback trials, and even there only for the selected subsample of subjects. Why would results so different from those of Zajonc & Brickman (1969) be obtained?

First, it is clear that failure of the task involvement manipulation would be a sufficient reason for non-confirmation of the hypothesis, though it may well not be the only reason.

Secondly, disagreeing with Zajonc & Brickman, it may be that feedback in some form is necessary. Perhaps it prevents a decrease in motivation in those subjects who are higher in involvement level and in initial success expectancy, but not in those subjects holding lower values on these variables.

Another possible explanation for why the hypothesized interaction effect only became manifest late in the experimental session is that a certain amount of learning, of practice at the task was necessary before motivational differences could become important determinants of task performance. Perhaps only after subjects began to approach a task performance plateau could variations in performance due to motivational differences become detectable over the previous variations due to learning.

Another factor of importance in the present study was the length of trial blocks. Zajonc & Brickman (1969) utilized trial blocks of ten trials each in their study, whereas blocks of fifteen trials each were utilized in the present study. It was initially felt by the experimenter that motivational differences between subjects would have more scope to make their presence felt, in terms of task performance differences, over the length of a longer trial block.

Instead, trial blocks were long enough that significant intra-subject motivational shifts occurred during the course of the individual trial blocks themselves. This is clearly shown by the fact that parallel analyses of the first seven and the last eight trials of each trial block yielded in every case different results from each other.

Where results were obtained for complete trial blocks, it was in every case because of the similarity of those results with the pattern of the last half of the trial blocks. The only reliable pattern found for the first half of the trial blocks was a positive correlation between reaction speed and subjects' initially stated levels of success expectancy. This was true for the first half of the trial blocks, but not for the second half nor for the complete trial blocks. This finding is compatible with the suggestion that practice effects were responsible for the late appearance of the hypothesized interaction effect.

Hypothesis 2.

Subjects stating success expectancies were expected to show more subsequent task performance improvement than those subjects not stating such an expectancy. This was one of the more provocative findings reported by Zajonc & Brickman (1969), that an enhancement effect of stating a success expectancy was present on performance even in the absence of reinforcement. One purpose of the present study was to test for confirmation of their reported finding. Pilot studies had not shown support for this hypothesis, but the number of subjects had been small and the study's methodology had not yet been completely determined. Support for the hypothesis was expected in spite of its lack of support in the pilot studies. It was expected solely on the strength of Zajonc & Brickman's reported findings.

Results for the total subject sample were non-significant. Post hoc results for the selected subsample of subjects were somewhat complex. Data from the first half of the trial blocks were uniformly non-significant for all trial periods. The following results pertain to the second half of the trial blocks and to the complete trial blocks only.

Prior to feedback, high involvement subjects who stated success expectancies performed significantly worse than did subjects not stating an initial expectancy. This effect was more pronounced for high expectancy subjects than for those holding low initial success expectancies. Low involvement subjects stating initial expectancies all performed at levels non-significantly worse than did those not stating success expectancies.

When the trial period encompassing feedback is considered, the pattern is reversed. High involvement subjects stating an expectancy performed better than those subjects not stating one, though the figures are significant (p .05) only for the high involvement-high expectancy subjects. Low involvement-low expectancy subjects performed non-significantly worse on feedback trials than subjects not stating an initial expectancy (.10 p .20).

These results again point up the fact that very important motivational shifts can occur over the course of individual trial blocks. We see that the level of subjects' motivation, interacting with expectancy levels and with performance feedback, can either confirm or completely disagree with the relationship reported by Zajonc & Brickman (1969).

Post hoc results of data analysis indicate support for the hypothesis that statement of an initial success expectancy, in combination with other variables, has an effect on task performance. The precise nature of that effect is not yet clear, however, though the indications are strongly that the relationship is more complex than was reported by Zajonc & Brickman (1969).

<u>Hypothesis 3.</u>

A positive correlation was hypothesized between subjects' initially stated levels of success expectancy and their task performance on all trial blocks.

Zajonc & Brickman (1969) had found non-significant but suggestive indications of the relationship hypothesized above. Data from the present study supported the hypothesis for the first half of each trial block only, with the exception of

Trial Block 4. For this one trial block, during which subjects received task performance feedback, the expectancy effect was present for both halves and for the complete trial block.

It appears, in explanation of these results, as though pre-existing motivational levels were most evident during the first part of each trial block, and were augmented by the energizing effect of feedback during Trial Block 4. On the second half of the Baseline trial blocks and of Trial Block 3, the recently imposed levels of task involvement became of relatively greater importance. Also, a general de-motivating effect of long trial blocks might reasonably have acted with greater force on subjects with high initial expectancies than on those lower in motivation.

In testing Hypothesis 3 an unexpected finding was the presence of a significant task involvement effect in the Baseline trial blocks (Table 33), before the task involvement manipulation had been attempted. The effect is in a plausible direction. That is, subjects later given the high task involvement manipulation achieved faster Baseline reaction times than did subjects who were later given the low task involvement manipulation (Table 34).

The presence of this unexpected effect presents a couple of problems. First, what is the explanation for its presence? And second, what effect might its presence have on the study's hypotheses?

It appears to the experimenter that the most parsimonious explanation for it is chance, notwithstanding its .05 level of probability. This is because instructions to subjects were all written rather than orally delivered, in a deliberate attempt to utilize a standard procedure throughout.

Another possible explanation for the task involvement effect on the Baseline trial blocks might be as a consequence of covert experimenter bias, of demand characteristics unconsciously communicated to subjects by the experimenter. The experimenter knew in advance which experimental condition each subject was to be in. Certainly it was more pleasant for him to tell a subject that he was engaged in a meaningful and important study than it was to tell him he was engaged in a relatively dull and meaningless task. Similarly, it was more enjoyable for the experimenter to conduct an experimental session in which the subject was going to succeed than to conduct one in which he was going to have to insure the subject's failure. It is conceiveable that these feelings could have been communicated to subjects during the experimental session, but it is difficult to argue that it could plausibly have happened.

It is undoubtedly important to explore the possibility of covert communication of experimenter bias to subjects, and whether that might have affected subjects' task performance on the Baseline trials. Quite aside from the cause of the task involvement effect on the Baseline trial blocks, however, what might its effects have been on others of the study's results?

The finding of a significant task involvement effect on the Baseline trials might explain the weakness of any task involvement effect on task performance change from Baseline through Trial Block 3, and the fact that apparent effects were in the direction opposite to that expected. That is to say, higher levels of task involvement were associated with lower levels of task performance improvement. It might also have had a deleterious influence on any expectancy by involvement interaction effect. Suppose some subjects who were assigned to be in the high task involvement group began their experimental session already more highly involved than their corresponding numbers in the low task involvement group. The task involvement manipulation attempt would perhaps not affect them to the extent it otherwise would have. This in turn might have been enough to erase the expected interaction effect through Trial Block 3.

This study is one in which the dependent variable is quite responsive to changes in subjects' motivational states. To avoid possible experimenter demand effects in the future such as may have occurred in the present study, it would be advisable for the experimenter to remain ignorant of each subject's experimental condition for as long as is feasible.

APPENDIX B

INFORMATION

Name ____

Address ____

____

INTRODUCTION

Thank you for coming to assist in this study. The total time required from you should be no more than about an hour. We are interested in studying the physical reaction times of different individuals under different circumstances.

At this time the experimenter would like to show you how the equipment in front of you functions. We are going to do a few warmup runs so that you can see what the task you will be asked to do is like.

EXPECTED TASK SUCCESS

Consider what you have done up to now as a warmup. Before you begin the next group of trials, however, we would like you to estimate how well you expect to do on this task, in comparison with an average New York City Community College student's performance on it.

You can indicate this by checking the line below. For instance, if you expect to succeed in flipping the switch as fast or faster than the average New York City Community College student ten times out of one hundred, put a check mark on the line at 10. If you expect to be as fast or faster almost half the time, you would perhaps put a check mark somewhere between 40 and 50. And if you expect to flip the switch faster than the average New York City Community College student every single time, check 100 on the line below. You can put the check mark anywhere on the line, either above or between the numbers.

0 10 20 30 40 50 60 70 80 90 100

Lowest Score | Highest Score

EXPLANATION OF TASK

The purpose of this experiment is to measure certain kinds of mental abilities.

It is a very simple task you are going to do, but your performance on it gives a great deal of information about your mental quickness and alertness. Your speed can give us information about the efficiency with which you work, and may be an indication as to how rapidly you cope with new situations.

More detailed information will be given you at the end of this experimental period. For now, just be as alert and quick as possible.

EXPLANATION OF TASK

We have given you a rather dull experimental task to perform, and have asked you to repeat it again and again and again. The reason for this is that we are trying out this research instrument for possible use in a later experiment. By itself, it does not measure any kind of important ability. Our interest, in fact, is not on the data provided by any one person. We are interested in comparing groups, and not individuals. But before we can do this we must try the research equipment out several dozen different times. You will be helping us try out the equipment and procedures.

More detailed information will be given you at the end of this experimental period. For now, just be as alert and quick as possible.

FEEDBACK

The experimenter has been comparing your performance with that of others, but so far it has been for his information alone. In the next group of trials you will be able to see for yourself how well you are doing.

On each trial for which your speed is less than that of the average New York City Community College student, a red light will come on. For each trial on which you react faster than the average New York City Community College student, the red light will not come on.

The average New York City Community College student would see the red light come on about half the time. If you see the red light less than half the time you can consider yourself to be doing very well; if you see the red light more than half the time you will know you are not doing very well.

EXPECTED TASK SUCCESS

In view of your task performance so far, indicate how well you expect to do on the next group of trials, in comparison with the same New York City Community College students as before.

You can indicate this by checking the line below. For instance, if you expect to succeed in flipping the switch as fast or faster than the average New York City Community College student ten times out of one hundred, put a check mark on the line at 10. If you expect to be as fast or faster almost half the time, you would perhaps put a check mark somewhere between 40 and 50. And if you expect to flip the switch faster than the average New York City Community College student every single time, check 100 on the line below. <u>You can put the check mark anywhere on the line</u>, either above or between the numbers.

0 10 20 30 40 50 60 70 80 90 100

Lowest Score — Highest Score

EXPLANATION FOR HIGH SCORE

You have obtained a higher than average score on the reaction time task. Indicate which of the four factors below you feel were most influential in your successful performance.

1. In comparison with other factors, how much was your success determined by ability?

0 10 20 30 40 50 60 70 80 90 100

Ability Played No Part — Success Due Entirely To Ability

2. In comparison with other factors, how much was your success determined by effort?

0 10 20 30 40 50 60 70 80 90 100

Effort Played No Part — Success Due Entirely To Effort

3. In comparison with other factors, how much was your success determined by low task difficulty?

0 10 20 30 40 50 60 70 80 90 100

Low Task Difficulty Played No Part — Success Due Entirely To Low Task Difficulty

4. In comparison with other factors, how much was your success determined by luck?

0 10 20 30 40 50 60 70 80 90 100

Luck Played No Part — Success Due Entirely To Luck

5. Would you evaluate your performance as a success or as a failure?

−5 −4 −3 −2 −1 0 1 2 3 4 5

Extreme Failure — Neither — Extreme Success

EXPLANATION FOR LOW SCORE

You have obtained a lower than average score on the reaction time task. Indicate which of the four factors below you feel were most influential in your unsuccessful performance.

1. In comparison with other factors, how much was your failure determined by a lack of ability?

0 10 20 30 40 50 60 70 80 90 100

Lack of Ability Played No Part — Failure Due Entirely To Lack Of Ability

2. In comparison with other factors, how much was your failure determined by a lack of effort?

0 10 20 30 40 50 60 70 80 90 100

Lack Of Effort Played No Part — Failure Due Entirely To Lack Of Effort

3. In comparison with other factors, how much was your failure determined by task difficulty?

0 10 20 30 40 50 60 70 80 90 100

Task Difficulty Played No Part — Failure Due Entirely To Task Difficulty

4. In comparison with other factors, how much was your failure determined by luck?

0 10 20 30 40 50 60 70 80 90 100

Luck Played No Part — Failure Due Entirely To Luck

5. Would you evaluate your performance as a success or as a failure?

-5 -4 -3 -2 -1 0 1 2 3 4 5

Extreme Failure — Neither — Extreme Success

NAME: ______________________________

1. During the experimental task you have just completed, what sort of explanation did you receive about its purpose, about the reasons for the experiment being run? Circle one of the following.

   (a) Testing procedures and equipment for some future experiments.

   (b) Testing mental alertness and quickness of people under different conditions.

   (c) Studying physical fitness of people through experiments.

2. How well do you feel you did on the reaction time task? Please indicate by a checkmark on the line below the extent to which you feel you either succeeded or failed on the task.

Complete Failure	Neither Succeeded Nor Failed	Complete Success

3. At the beginning of the experiment (before the purpose of the task was explained to you), how much did you care about doing well at the reaction time task? How important to you was is to get a good score? Please indicate your answer on the line below.

Extremely Important	Extremely Unimportant

4. After reading the "Explanation of Task" sheet, telling the purpose of the reaction time task, did you care either more, or less, about doing well on the reaction time task, or did you feel about the same? Please indicate your answer on the line below.

Cared Very Much More	Remained The Same	Cared Very Much Less

5. How often did the failure light appear, to indicate you were too slow, during the last trial block of your reaction time task? What percentage of the time did it appear?

Never Appeared	10%	20%	30%	40%	50%	60%	70%	80%	90%	Appeared Every Time

Thank you. Please return this sheet to the experimenter.

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