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FACTORS INFLUENCING EXPECTANCY CHANGE DURING DELAY
IN A SERIES OF TRIALS ON A CONTROLLED SKILL TASK

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

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The Ohio State University
1963

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CHAPTER I

INTRODUCTION

The purpose of this dissertation is to explore some variables relevant to expectancy change. The term expectancy now has a long history of usage as a psychological concept; however, each theorist using this term has given it, and the construct to which it refers, a slightly different meaning.

The specific definition of expectancy and the general behavioral model used in this research are those offered by Rotter (1954) in his Social Learning Theory. An expectancy will be defined as the subjectively held probability that a reinforcing event will occur in a specific situation. The magnitude of the expectancy held by the subject is determined by - and can be estimated from - his past experience with the same and similar reinforcements in the same or similar situations. Thus, if a subject succeeds in winning the approval of his friends on a large majority of occasions, he will have acquired a high expectancy for winning approval in the company of his friends.

The effect upon expectancy of various sequences of reinforcement has been rather extensively investigated. Both theoretical and empirical formulae have been proposed for predicting the expectancy change that will result from a sequence of variable reinforcement. However, all but a few of the empirical studies have used a design in which the reinforcement trials were closely spaced. Furthermore, the theoretical formula proposed by Rotter (1954) for predicting expectancy change from the
number of previous reinforcements does not consider the potential significance of the time interval between reinforcements. Despite previous neglect of the time variable, there are many observations from nonexperimental situations which suggest that it has a significant effect upon expectancies, an effect that is somewhat independent of the reinforcements experienced in the situation. For example, the boy who has been hit by a baseball while attempting to bat is encouraged to return to the plate immediately, since it is feared that he may never be able to bring himself to try again if he waits too long. Here, time itself may be thought to increase the subjective probability of occurrence for an undesirable event. Another example comes from the area of gambling behavior: a man plays a slot machine for several nonpayoff trials and quits, although he has sufficient money to continue. Later he resumes play as though his expectancy for winning had risen without any intervening task-related experience. Although these examples do not defy explanation without recourse to a time variable and related constructs, they do illustrate the kinds of problems in which the passage of time may be significant. Research studies by Phares (1961, in press) have shown that delay in a reinforcement sequence does alter the course of expectancy change from that which would occur with the same sequence of reinforcements having no delay. It is the purpose of this dissertation to explore factors which affect the magnitude and direction of changes induced by delay in the reinforcement sequence.

Knowledge of the effects on expectancy of reinforcement sequences involving delay seems to be of crucial importance because of its signifi-
cance for everyday behavior. Sequences of uniform reinforcement intervals are rather rare in the experience of most people. Life experiences relevant to a particular need area do not typically come at brief, equal intervals. They come as a result of a multitude of irregular events, sometimes in groups, at other times widely dispersed. Although much experience is unordered, in some very significant situations, such as formal education, psychotherapy, and child rearing, we are in a position to control the spacing of experience. Greater knowledge of the variables that are significant for expectancy change will lead to greater efficiency in changing behavior by means of this route.

To illustrate this latter point hypothetically, one might consider the issue of spacing experience in psychotherapy. The behavioral changes that occur in therapy, according to Rotter (1962), are brought about by two related processes: changing expectancies and changing reinforcement values. (The latter change in itself necessitates an expectancy change, since reinforcement value is a function of the expectancy that the reinforcing event in question will lead to some subsequent reinforcement.) The psychotherapist is in a position to reinforce expectancies selectively, the modification of which will produce behavioral change. It is characteristic of the individual seeking therapy that many of his expectancies are inappropriate for his current life situation. Typically these expectancies have had an extensive history of reinforcement during childhood and adolescence. The therapist's reinforcements, intended to bring about a more realistic expectancy, must counteract the effects of previous reinforcement.

Given a finite total number of therapy hours, what would be the most
optimal spacing of reinforcing experience? Should the therapist spend an hour a week with the patient, as a Rogerian might do, or be in constant interaction with him for periods of twelve and sixteen consecutive hours after the practice of John Rosen? What types of previous reinforcement history would be best overcome by each method? With more detailed knowledge of the spacing variable in the expectancy change process, one could make such decisions on the basis of theory that has been soundly supported by empirical evidence.

This study focused upon factors affecting expectancy changes induced by delay in a sequence of reinforcements. Two subject groups were given the same controlled sequences of success and failure on a motor skill task; however, one group experienced a long delay at some points in the sequence. Two other subject groups were given a reinforcement sequence which was the reverse of that mentioned above. Again, one of these groups experienced a long delay between some trials. Two hypotheses concerning delay-induced expectancy change were tested. The first is that the nature of the preceding reinforcement sequence influences the effect of delay upon expectancy. The second hypothesis concerns the relationship between expectancy change induced by delay and the generalized expectancy of the individual, i.e., expectancy generalized from the individual's experience in other related situations. It is hypothesized that expectancies generalized from related situations, suppressed during massed experience, are reactivated during delay, resulting in a movement of expectancy level in the direction of the generalized expectancy.
CHAPTER II

BACKGROUND

This chapter contains a review of the theoretical formulations and research findings relevant to the problems under investigation in this research. The first section will deal with formulations of expectancy and generalized expectancy according to Social Learning Theory. Next, the theory and research pertinent to expectancy change under massed and spaced conditions will be discussed. Then the hypotheses proposed for this research will be presented together with the discussion explaining their congruence with foregoing empirical findings and theoretical formulations.

The Nature of Expectancy

Rotter's formulation of the construct of expectancy (Rotter 1954) includes many features which distinguish it from similar constructs of the same name used by other theorists (e.g., Tolman, 1955, and Atkinson, 1957). Rotter defines expectancy as "the probability held by the individual that a particular reinforcement will occur as a function of a behavior on his part in a specific situation or situations (1954, p. 107)." Thus an expectancy may be described in probabilistic terms and, hence, it may have any value from .00 to 1.00. It can also be seen from this definition that a particular expectancy cannot be completely identified without specifying the nature of three separate and independent characteristics: the reinforcement, the behavior, and the situation. To elaborate, a given expectancy pertains only to a particular reinforcement;
specifying the reinforcing event or class of events is essential to identifying the expectancy. It is also essential to specify the behavior upon which the reinforcement is contingent. Finally, the expectancy is specific to the situation for which the behavior is contemplated. A change of the anticipated reinforcing event, the behavior contemplated, or the situational context of the behavior defines a different expectancy and, therefore, a different subjective probability value.

Components in expectancy. Rotter (1954) considers expectancy to be a function of two conceptually separate types of experience: (1) the past experience of the individual in situations perceived to be the same as that for which an expectancy is in question and (2) experience with similar reinforcements occurring in other situations for functionally related behaviors. Experience here means having undergone a behavior-reinforcement sequence. Thus, expectancy \( E \) is a function of the expectancy resulting from previous experience in the same situation \( E' \) and expectancies pertaining to the same behavior reinforcement sequence generalized from other situations, simply referred to as generalized expectancy \( GE \). Moreover, Rotter postulates that the importance of generalized expectancy \( GE \) in determining an expectancy in a given situation decreases with further experience in that situation. Under the condition of no experience whatsoever in a given situation, \( GE \) is the sole determiner of \( E \); but as experience in the situation increases, the situation based expectancy \( E' \) develops quickly and becomes the major determiner of expectancy \( E \) for the now familiar situation. A study by Dean (1953) provided an experimental verification for the
decreasing effect of generalized expectancy over a series of trials.

A summary of methods for measuring E and GE is included below because each plays an important role in this research.

**Measurement of expectancy.** Since an expectancy is a theoretical construct having no single invariable behavioral referent, its magnitude must be inferred from the influence it has upon a variety of situationally determined overt behaviors. With humans one convenient basis for such inferences is the verbal report of the subject. Verbal statements of expectancy have been extensively used in research as estimates of "true" expectancy. This research often follows the paradigm for studies of level of aspiration, viz., the subject is asked either to report the score that he is most likely to obtain on some task or to state his probability of obtaining a given reinforcement. The latter statement is often elicited in reference to a 10 or 100 point scale of probabilities. A statement of the most likely score does not permit an inference about the absolute value of the probability associated with obtaining the most likely score, but only permits the inference that the probability of obtaining any other score is lower and that the probabilities for obtaining other scores on a continuum fall away symmetrically from the probability level of the most likely score (Rotter, Fitzgerald, and Joyce, 1954).

Verbal statements of expectancy are likely to be spuriously influenced by any of the multitude of variables that have been demonstrated to affect judgements of personal characteristics. Several studies (P. Sears, 1940, 1941; Dean, 1953) have demonstrated that statements of expected scores are often based upon wish and fantasy
rather than what might be predicted from the subject's past record of performance, particularly for subjects with poor previous performance. Generalizing from the work of Asch (1956) and subsequent research on conformity, one would expect the conforming individual to state for himself the expectancy that he believed most others to be stating. Similarly, research on the approval motive (Crowne and Marlowe 1960) suggests that the individual with a high need to appear in a socially desirable light would bias his expectancy statements in the approved direction, in the hope that he would appear to possess the characteristics implied by his stated expectancy. Because of the potential biasing effect of such variables, the total social context in which the expectancy statement occurs must be considered in making inferences about internally held expectancy.

One of the simplest techniques for measuring expectancy, and one which avoids many of the difficulties referred to above, is that of behavioral choice with reinforcement value controlled. This method, however, provides only a rank ordering of expectancy level for the situations and behaviors tested. The behavioral choice technique was utilized by Lasko (1952) in an experiment employing the Humphreys paradigm. For a series of trials, subjects were asked whether they expected a red light or a green light to go on in the next trial. It could be assumed that guessing either red or green would have equal reinforcement value, thus eliminating the potential influence of reinforcement value upon choice behavior. Therefore, the color chosen would reflect only that event which they believed to be most probable, as judged from previous experience in the situation. Phares (1963),
in a study to be discussed later (see p. 25), used a technique similar to controlling reinforcement value for assessing expectancy for success.

A device which reduces spurious influences on verbal expectancy statements is that of increasing the reinforcement value of accuracy. Verbal instructions urging accuracy have been extensively used to increase the reward value of accuracy. The potential effectiveness of verbal instructions for this purpose may depend, to a great extent, upon the nature of the subject population involved. For example, it should be more effective for college students than for delinquents. Methods for increasing the reward value of accuracy, other than the verbal instruction method, require a subsequent test of the accuracy of the subject's prediction which can serve as the basis for differentially rewarding degrees of accuracy. When there are a number of trials in the sequence, each testing the accuracy of the previous prediction, subjects may wager valued objects, and thus reflect degree of confidence in the amount bet, or alternatively, be rewarded by the experimenter for accurate prediction. The presence of subsequent validating trials undoubtedly has the effect of increasing the desirability of accuracy for many subjects, even in the absence of formal reward systems. Most subjects simply like to be correct.

In this research expectancies were assessed by means of verbal expectancy statements, utilizing a 10-point scale as a frame of reference. The nature of the verbal instructions and the presence of subsequent validating trials in the experiment both would have had the effect of increasing the reinforcement value of accuracy in the statement of expectancies.
Measurement of generalized expectancy. Variance attributable to the influence of generalized expectancy (GE) is included in the measurement of any given expectancy (E); however, in all but one instance GE is confounded by the influence of expectancy derived from previous experience in the same situation (E*). The single exception is the initial expectancy statement which is obtained before a behavior-reinforcement sequence has occurred in the new situation. The initial E for that situation is comprised only of expectancies generalized from other situations involving similar behavior-reinforcement combinations. Therefore, the initial E in a novel situation is a measure of GE, uncontaminated by E*. The initial-E method of measuring GE has been used in research by a number of investigators (Crandall, 1961; Neff, 1956; Rychlak, 1957, 1962; and Watt, 1962). Since this measure of GE is a verbal statement of expectancy, it falls prey to the same spurious influences which affect most self-report measures. Those particularly relevant to E statements were discussed above.

Any device would be a measure of GE if it reflected the average expectancy for a class of reinforcements contingent upon certain behaviors. All one need do is assess all of the separate expectancies and compute the average. This average would be the best estimate of the expectancy generalized to any novel situation involving a similar behavior-reinforcement sequence. The method of assessing GE from expectancies in other situations was employed by Dean (1953) in a study of expectancy determinants. He obtained two measures of motor skill situations considered. The first measure, restricted to a single situation highly similar to the experimental situation, was an
average of expectancy indicative statements obtained during a motor-
skill task. The other much broader but less closely related measure
was based upon interviews, concerning subjects' expectancies and
experience in several motor skill situations. The situations varied
in similarity to the experimental situation.

There is an advantage to be derived from basing the GE estimate
on interview data. Although the subject may distort the picture he
presents of himself, the situation is flexible enough that the inter-
viewer can inquire further into the history of reinforcements in a
given area, and thus check to see if it is congruent with the expect-
ancy level verbalized by the subject. The estimate of GE could be
based entirely upon the history of reinforcement in a variety of related
situations. This is essentially the procedure used in one of the esti-
mates of GE employed in this study. An estimate of motor skill GE was
derived from an inventory of the subject's history of athletic partic-
ipation. Two additional estimates of GE were also obtained: one
based upon a ten point scale and relevant to the chances of success on
the first trial of a novel motor skill task, and the other in the form
of a percentile score reflecting the subject's final total score rela-
tive to other subjects in the experiment.

Expectancy change with massed experience. Rotter (1954) discusses
two principles governing expectancy change. The first of these, gener-
ally stated, is that change in expectancy with new experience will be
greater in proportion to the degree that the expectancy resulting from
further experience in a situation (E') is divergent from the previously
held expectancy (E) for that situation. For example, if E has a value of .40, new experience yielding an E* of .80 will result in a greater increment in E than new experience yielding an E* of .50. The second principle states that, "The increment of a specific expectancy (E*) following the occurrence of any reinforcement diminishes as the subject has more experience in the specific situation" (Rotter, 1954, p. 176). Therefore, one would anticipate a reduction in the variability of expectancies with increased experience, even though the experience itself remained highly variable with respect to success and failure. An experimental study by Castaneda (1952) demonstrated this principle by randomly repeating a highly variable eight-trial sequence of success and failure while measuring expectancy for success after each trial. He observed a striking reduction in variability of expectancy with the repetition of the series. The expectancy had stabilized as a result of greater experience in the situation. Good (1952) studied the expectancies resulting from experience sequences of equal variability, but differing in length. He found that length of the sequence under these conditions did not affect the final expected score; however, the E resulting from the longer trial sequence was more resistant to modification by experience divergent from that upon which the E was based. Like Castaneda's results, those of Good also support Rotter's second principle of diminishing increments in E* with increased experience in the same situation.

Considering these two principles, together with the systematic changes postulated for the determination of E, one can summarize as follows Rotter's theoretical formulation with regard to E changes
resulting from a sequence of trials in a novel situation: Initially E is comprised entirely of GE (expectancy generalized from related situations). After the first behavior-reinforcement sequence E' is combined with GE to produce a new E. In the early trials E' is greatly affected by the outcome of trials, but is affected less and less by succeeding trials. At the same time E' is contributing larger proportions of the variance to E while the GE contribution is diminishing. After a long series of trials, GE contributes an infinitesimal proportion of the variance to E, and E is determined almost entirely by E' which at this point is very little affected by each succeeding trial. Thus, a very stable E, hardly at all related to GE, results for the situation.

Systematic expectancy change divergent from theoretical formulations. The well-supported principles of expectancy change formulated by Rotter deal with the cumulative effects upon expectancy of discrete serially presented reinforcements. A number of empirical studies of expectancy change have demonstrated the influence upon expectancies of variables other than simple cumulative reinforcement effects. Since only one of these noncumulative effects of reinforcement is of major importance for this research, viz., the effect of delay in the reinforcement sequence, the other effects will be discussed rather briefly.

The first of these is the effect of repetitive characteristics in the reinforcement sequence. Using the Humphreys paradigm, Lasko (1952) demonstrated that subjects guessing whether a red or green light would flash on, not only matched the empirical probability of these events, but also noticed and predicted another uniform quality of the
sequence; the maximum length of a sequence of all red or all green. They improved greatly upon chance prediction for the trial subsequent to that which marked the maximum length of a homogeneous sequence, thus demonstrating changes in expectancy which paralleled patterned characteristics of the experience sequence. Rotter's formula would have predicted a stronger tendency to choose the same light at precisely the point where subjects shifted their choices.

Recent work on expectancy change by Rotter, Liverant, and Crowne (1961) showed strikingly different degrees of stability of expectancy for two interacting variables: the nature of the behavioral task and the percentage of positive and negative reinforcements in sequences of trials preceding a 100 percent negative reinforcement (extinction) sequence. The two tasks used were representatives of two categories of tasks, a chance task for which the reinforcements were perceived to be out of the control of the subject, and a skill task, for which the reinforcements were perceived by subjects to be primarily dependent upon their degree of skill. In both tasks all reinforcements were actually controlled by the experimenter without the subject's knowledge. (The skill task used by Rotter, Liverant, and Crowne is the same one used in the research for this dissertation.) It was found that subjects raise their expectancy more after success on a skill task than on a chance task, replicating an earlier finding by Phares (1957). Whether they lower expectancies more under 100 percent failure on a skill task or on a chance task depends upon the proportion of success and failure in a previous reinforcement sequence of eight trials. When all previous trials are positive, failure results in a faster drop
in expectancy for the chance task than the skill task. When there is a mixture of success and failure in the previous experience, yielding an objective probability for success of .50, subsequent failure produces a faster expectancy drop for the skill task than for the chance task. In other words, the two kinds of tasks reverse position with regard to the vulnerability of expectancies to negative reinforcement after 100 percent and 50 percent success experience. It may be pointed out that expectancy change with these sequences of reinforcement conforms more to Rotter's theoretical formulations under the skill conditions than under chance conditions.

The above results were explained by supposing that subjects having experienced consistent success on a skill task continue to expect that they will be able to succeed once again despite repeated failure. Consistent with that explanation, one might argue that subjects in the 50 percent reinforcement condition on the skill task were less convinced that they possessed the requisite skill, hence dropped expectancies faster than with previous 100 percent reinforcement. Possession of a skill would not be a relevant question for subjects on a chance controlled task; they have only to consider whether it seemed reasonable that the external controlling powers would deliver another reinforcement. The shift from 100 percent to 0 reinforcement being so marked, they quickly lost faith; however, the difference between 50 percent and 0 reinforcement was not so noticeable, since they had previously experienced positive reinforcement following one or more negative reinforcements.
The relative contribution of GE and \( E' \) to \( E \). Generalized expectancy (GE), as one component of expectancy (E), can be represented as a probability varying from .00 to 1.00. It is assumed by Rotter that the magnitude of this probability does not influence the proportion of the variance that it contributes to E at any given point in the sequence of experience in a novel situation. The results of two experimental studies suggest that this assumption may not be valid for all situations. Virginia Crandall (1961), using initial expectancy as a measure of GE, found that children with high generalized expectancies for success changed their E estimates less as a result of both adult positive and negative reactions than did children with low generalized expectancy. Her explanation of this finding has much in common with the explanation of the differences between skill and chance tasks. She states that the high GE child having more confidence in his ability may also consider his own judgement of his ability in a more favorable light than the child with low GE, thus the high GE child is less influenced by the reaction of the adult experimenter. The meaningfulness of these findings for a theory of E determinants is subject to debate if one accepts the notion that externally equivalent reinforcements are not of equal strength for the high and low GE child.

Neff (1956), also using an initial expectancy estimate of GE, investigated the effects of GE upon persistence in the face of failure on a difficult color matching task. Consistent with Crandall's (1961) results, he found that after all subjects reach a high E level those high in GE require more failures to extinguish the expectancy for
success. The findings in both of these studies might be explained in part by extraneous sources of variance in the GE measure, e.g., social desirability. Subjects with a high need to appear in a socially desirable light might state high initial expectancies and also be resistant to any modification of E and especially a downward modification which would connote inadequacy.

If the GE measures used were highly valid, these studies would suggest that reinforcement specific to the situation contributes less to E when the GE level is high than when it is low. A low GE quickly drops from its role as a major influence upon E; situational reinforcements and the resulting $E'$ alone account for E.

A somewhat analogous finding at the level of GE rather than E was reported by Rychlak (1962). He found that the GE was more greatly influenced by either failure or success in anxious subjects than in nonanxious subjects as classified by the Taylor MAS. It may be that social desirability was also operating in this classification variable.

Expectancy Change Under Spaced Conditions

Delay in the reinforcement sequence is yet another variable which affects expectancy change. The major concern of this research was to study the effect of delay upon expectancy level. It was designed to answer two questions in particular: (1) are delay effects dependent upon the nature of the immediately preceding sequence of reinforcements and (2) are the effects of delay due to a renewed influence of GE? Several studies concerned with the effects of delay upon expectancy will be discussed in the following section.
The effect of delay upon the stability of expectancy and generalized expectancy. In studies of learning there has been extensive use of the paradigm wherein two experimental groups are compared, one with massed experience (all practice in one session), another with spaced experience (practice distributed over several training sessions). Relatively few studies, however, have been conducted using this paradigm for investigating expectancy. The first seems to be that of Good (1952). In his study one group of subjects had five experience trials at a single session and another group had a single trial on each of five successive days. Since these two groups had the same homogeneous sequence of scores, it is not surprising that there was no difference in their expected scores for a subsequent sixth trial. However, one cannot conclude that the two groups were comparable with regard to their subjective probabilities for obtaining the same score. Good's major concern in this study was with the effect of spacing upon stability of expectancies; consequently, each subject was given a sixth score that was 10 points different from the score expected for that trial in order to observe its effect on expected scores for the seventh trial. These groups, differing in the spacing of earlier experience, did not differ in the effect of the ten point divergent trial upon subsequent expected scores. It was concluded that spacing does not affect the stability of expected scores.

Rychlak (1957), employing a design similar to that of Good (1952), investigated the effects of delay upon the stability of generalized expectancies. Two groups of subjects experienced four negative reinforcements on the same task, then stated an expected score on a
similar task at which they had had no previous experience. Since the
task was novel the initial expected score would reflect GE. One of the
two groups stated their GE for the new task after a seven minute delay,
and the other stated GE relevant scores immediately following the four
trials on the related task. Rychlak hypothesized that rumination during
delay would stabilize GE for the delay group. After the four essen-
tially negative scores on the first task, Rychlak found no difference
in stated expected score between the two groups, but he did find that
subsequent success on a related task elevated GE more for the non-delay
group than for the delay group. This finding supported the hypothesis
that delay has a stabilizing influence upon GE.

In a later study Rychlak (1962) again supported the hypothesis
of a stabilizing effect of delay upon GE. After building high and low
GE groups by giving subjects either all positive or all negative rein-
forcements on four separate tasks, he was able to demonstrate that
subjects who experienced delay before announcing GE statements at the
end of the four tasks, modified a subsequent GE statement significantly
less as a result of a divergent experience on another new task. This
study replicated the findings of Rychlak (1957) and increased the
generality of the findings by testing the effects of negatively diver-
genent experience as well.

The effects of delay upon the level of generalized expectancy.
An unpredicted incidental finding of the 1962 study by Rychlak has
direct relevance to the research of this dissertation and to the
investigations of Phares (1961, in press) which will be discussed in
the next section. Rychlak obtained initial covert expectancy state-
ments from all subjects before introducing the four tasks designed to build the new GE referred to above. He had a method for identifying these initial covert statements (GE<sub>1</sub>), although subjects believed them to be anonymous. The GE statement following the four tasks was actually the second statement obtained (GE<sub>2</sub>). Rychlak found that when an eight minute delay followed the four separate tasks before GE<sub>2</sub> was obtained, GE<sub>2</sub> was less divergent from GE<sub>1</sub>, than when GE<sub>2</sub> was obtained immediately following the four tasks. The smaller GE changes following delay prevailed whether the reinforcements which induced the change were positive or negative. Rychlak makes the following remarks regarding this finding:

Permitting S to delay for a time in the success or failure situation seems to limit the extent to which he will lower or raise GE within the reinforcement effects already considered. Exactly why this should occur is not known, but the best argument seems to be that S's have time to take stock of themselves and/or redefine the task situation so that a kind of "regression to the mean" (in this case GE<sub>1</sub>) results. It is as if, following the delay, Ss were given an opportunity to perform in the second half of a dual-task situation, and they therefore return to the GE level which was held at the outset of the experiment. This would be similar to certain common life situations. For example, any professional baseball player has participated in hundreds of ball games since his childhood. As he sets out to play the first game of a double-header, his general expectancy for success aside from the relative merits of either team on the field - is to some extent determined by all of this previous experience. If his team then wins the first game he does not get exaggerated ideas about certain victory in the second game, though a momentary notion and emotion of this sort might occur as the last out is made and for shortly thereafter. If his team loses the first game he may feel quite defeated and pessimistic as the last out is made. In either eventuality, following the break between games he returns to the field with a modified, but more realistic, estimate of his teams chances. And, it is felt, this estimate will be somewhat closer to his expectancy level for success before the first game than would an estimate which had been made at the very close of the first game, when he was either overly elated or excessively dejected. The delay between games has given GE a chance to operate (1962, p. 132).
The effect of delay upon expectancy level. In a recent study, Phares (1961) utilized the massing-spacing paradigm in testing some hypotheses concerning expectancy change. His reasons for predicting a massing-spacing effect upon expectancy change are similar to the explanation of differential GE change quoted above. Rychlak, it may be noted, gave no indication that he was familiar with Phares earlier study. Phares writes:

It is here assumed that when inter-trial intervals become larger or more frequent, the likelihood of the operation of generalization effects from prior situations seen as similar is enhanced. Thus, during inter-trial periods S will be able to ruminate or ponder over past experiences and perhaps "restructure" his current performance in the light of that previous experience. Expectancy changes over a series of trials should be altered differentially in relatively massed and spaced groups (1961, p. 200).

The experimental task used by Phares was a complex symbol substitution task adapted from the Rotter-Jensen Group Level of Aspiration Test (Jensen & Rotter, 1947). Three experimental groups were used. The task consisted of 17 trials. The massed group received 17 consecutive trials on one day. The first spaced group (Spaced Group A) received 7 trials the first day, 4 trials the third day, and 6 trials on the fifth day. The second spaced group (Spaced Group B) received 5 trials the first day; 2 trials on the third, fifth, and eighth days; and 4 trials on the tenth day. The scores which the subjects received were perfectly controlled by the experimenter without the subjects' awareness, and all groups received the same sequence of successes and failures. Subjects were given the set that they would fail initially, but after several trials most students would be achieving successful trials fairly regularly. These instructions would appear to give subjects an expectancy that performance on each succeeding trial had
a greater probability of being successful than on the previous trial. The instructions also suggested that expectancies might be generalized from the realm of learning ability, intelligence, and academic recognition tasks.

Although Phares hypothesized that spacing or delay effects would be a function of GE influence, he did not measure GE or attempt to relate it in any systematic fashion to expectancy changes resulting from delay. He attempted only to demonstrate that delay had an affect upon expectancy.

Figure 1 shows the sequence of successes and failures used by Phares and the resulting curves of mean expectancy for each group. Spaced Group B (large intervals, few trials per session) was significantly lower in final expectancy level than both the Spaced Group A and the Massed Group. The latter two groups did not differ from each other in final expectancy level. The shape of the Spaced Group A curve, however, for trial-by-trial expectancy statements was markedly different from that of the Massed Group. The curve for the Massed Group was a fairly smooth, negatively accelerated curve. The curve for Spaced Group A followed the general trend of the Massed Group curve except that the expectancy statement given before the first trial after each delay showed a marked decrement from the expectancy level prior to the delay. This decrement was fully recovered on the second expectancy statement of the session. Similarly, for Spaced Group B, the mean expectancy statement before the first trial of every new session was lower than the last expectancy statement of the previous session and also lower than the subsequent expectancy statement of the new session; however, these decrements were not so marked as
FIG. 1. EXPECTANCY CHANGE UNDER THREE CONDITIONS OF RELATIVE MASSING AND SPACING (AFTER PHARES, 1961).
for Spaced Group A. With Spaced Group B, the non-significant post-delay decrements appeared irrespective of the reward sequence within each session.

In a later paper, Phares (in press) discussed the findings of the study above as follows:

The results were interpreted to indicate that when initial expectancy for success is low and intervals in the trial sequence occur, the operation of generalization factors is enhanced. If, for example, a massed S succeeds on trial 5, he begins Trial 6 immediately in the presence of cues which suggest success - the initial low expectancy is diluted. However, a comparable spaced S succeeds on Trial 5 but then leaves the situation and its success cues. In the meantime his recent success experience (s) becomes diluted by the initial low expectancy for success on this task and perhaps by other generalized expectancies for failure. His removal from the success cues leads to a regression toward the initial low expectancy.

Phares conducted two further studies which were reported in the paper from which the preceding quotation was taken. These studies were undertaken in order to explore the generality of his earlier findings and to eliminate some possible contaminating influences. Again, no attempt was made to relate delay expectancy change to GE or earlier specific expectancies. The first of the studies utilized a social interaction task in which male subjects were judged by good-looking female judges on the quality of their interaction with a third personable, good-looking female. The reinforcement sequence for all subjects consisted of initial failure followed by an increasing frequency of positive reinforcements. In this study the trial preceding delay was always a success trial, thus correcting one factor contaminating the earlier study. (Rather than explaining the marked drops in expectancy after delay as resulting from the influence of early low expectancy,
these decreases might have been accounted for by rumination about the failure trial which immediately preceded the delay for Spaced Group A.) The social interaction study demonstrated that the expectancy drop after delay is not a function of the immediately preceding reinforcement, and that the phenomenon will occur in a highly realistic social role-play situation.

The second study, reported in the same paper (Phares, in press), included major methodological changes designed to further reduce the number of possible explanations for the massing-spacing phenomenon observed in the earlier study. Porteus Mazes were used as the behavioral task. Each S was given four mazes of increasing complexity. Through manipulation of reported time, all subjects were failed on the first two and succeeded on the next two trials. Massed subjects returned the next day for the fifth trial. On the fifth trial and every trial thereafter, subjects were given the choice of doing the "crucial" maze (a harder maze which subjects were told gave the best measure) or of taking another practice trial on one of the easier mazes. Under such conditions the measure of expectancy is a behavioral choice rather than the more equivocal verbal statement of expectancy used in the other studies. It was assumed that a larger proportion of Ss in a given group choosing the more difficult maze would reflect higher expectancies for success for the group as a whole. Phares found that significantly more Ss in the massed group than in either of two spaced groups chose the crucial maze on the fifth trial, thus indicating higher expectancies for success resulting from massed conditions.

A second factor investigated in this study was the effect of a
warmup trial prior to expectancy assessment following delay. One of the
two spaced groups mentioned above experienced a nonfeedback warmup trial
after the intermission and before the first reinforced trial of a new
session. The groups were equivalent in all other respects. They were
found not to differ in the proportion of subjects choosing the crucial
maze on the fifth trial, thereby indicating equivalent expectancy levels
at the fifth trial despite the presence of a nonfeedback warmup for one
of the groups.

On the basis of these three studies Phares concluded "that a
massing-spacing variable is an important one in its effect on the
formation and change of expectancies" (in press). His explanation of
the phenomenon at the conclusion of the latter two studies was essent-
ially the same but presented in more elaborate form. He reasoned that
on the initial trials of any task the subject's expectancy for success
is based primarily on generalized expectancy. With additional experi-
ence, expectancy (E) comes to be based more upon experience in the
situation (E') than upon expectancies generalized from other situations
(GE). During a delay period, though, the subject leaves the situational
cues, and the effects of GE may be enhanced as the subject ruminates
along lines consistent with his original GE, thereby moving the post-
delay E toward the initial GE level.

Phares states that the experimenter's instructions concerning
the likelihood of success on a task are equivalent to the subject's
GE. Their overall comparability to GE is questionable, but his
hypothesis that they could have an effect on trial-by-trial expectancy
statements similar to the effects of GE is very reasonable. One might
hypothesize that instructional influences upon E would decrease rapidly with massed experience but that rumination about the original instructions during a delay renew their influence upon E. The result would be a change in E following delay.

It would seem, then, that three separate but not mutually exclusive influences have been suggested by Phares as possibly accounting for the differences between expectancy change in conditions of massed versus spaced experience. One explanation involves influences derived from the early failure experience in the task itself. Another involves the influence of the experimenter's verbal statements concerning the nature of the task. The third credits the influence to the subject's own previous experience with tasks related to the experimental task. To date there has been no concerted effort to demonstrate that any one of these three variables is related to expectancy change with delay. Rychlak's (1962) a posteriori finding that GE was significantly related to GE changes with delay may be seen as lending some weight to a similar influence of GE upon E during delay.

The Effects of Delay Upon Other Psychological Phenomena

A large body of research exists which concerns the effects of delay upon the course of classical and instrumental conditioning. However, studies based upon the conditioning model are concerned with the magnitude or frequency of a particular response which occurs in relation to a given set of stimulus conditions, whereas in the present research, expectancy level is the dependent variable. It would be hazardous to surmise that a change in response rate or strength resulting from delay
is attributable to a change in expectancy. From the point of view of Social Learning Theory, a change in response rate or strength with delay could be due to a variation in the value of the major reinforcements involved, to a differential presence and strength of uncontrolled competing reinforcements between the before and after delay conditions, or to a change in the expectancy for the controlled reinforcement.

A shift in the level of analysis and in the theoretical framework of analysis in order to permit a comparison of studies of expectancy with those having response magnitude or frequency as the dependent variable would prove exceedingly complex. Such hypotheses as might emerge would be of dubious value because of the multitude of a priori assumptions necessitated by the transformation. Nevertheless, it may be useful to survey the effects of spacing, delay, or the passage of time upon some variables which may indirectly affect expectancy levels.

Of all the constructs which have been coordinated with a time dimension, surely forgetting has been one which has greatly interested psychologists. The most general finding has been that the largest proportion of the material learned or experienced is lost early in the post-experience period. Negatively accelerated decreasing curves of retention result from most studies (Hilgard, 1962, p. 291). The results in this area cannot be simply summarized because the method for measuring percent of retention—whether recall, recognition, or relearning—as well as the kind of material learned affect the slope of the retention curve. In general, the more meaningful the material, the more resistant it is to forgetting. It has been shown that the following materials are progressively less subject to forgetting:
nonsense syllables, prose, poetry, and solutions to problems. Problem solutions show very little forgetting over long periods of time, whereas nonsense syllables show as much as 50 percent loss in the first hour after learning (Kendler, 1963, pp. 326-330).

It is not clear how one would classify the memory processes which are significant for expectancy formation and change. The tendency in the past has been to assume that reinforcements have a direct and immediate additive effect upon expectancy level and that expectancy level is not biased by forgetting. If this is so, then the memory for the events which provide the influence upon expectancy is of no significance. However, if a subject does ruminate about this experience and can thereby modify or reaffect expectancy level through his memory of these events, factors affecting the memory of the events themselves become of importance.

Factors other than the meaningfulness of material affect its later availability to the subject. Zeller (1950a) made a survey of studies dealing with the hypothesis of differential recall of pleasant and unpleasant experience. A number of the studies surveyed, as well as a subsequent study by Zeller (1950b), supported the hypothesis that pleasant events are more readily recalled than unpleasant events. Furthermore, some of the studies provided evidence for individual differences in the recall of pleasant versus unpleasant events. If there is an overall tendency for subjects to remember pleasant events, one would predict a rise in expectancies as a result of rumination about past experience. If there are individual differences with respect to the memory of positive versus negative events, the prediction of expectancy
change resulting from rumination would have to be made on an individual basis.

The decline of the retention curve would lead to the prediction that recent experience is more likely to be available for rumination than experience further into the individual's past.

Commitment. Recently Watt (1962) studied the effects of commitment upon change in GE. He defined a commitment situation as one in which future reinforcements are dependent upon acting in accord with one's previous behavior. Watt varied the feeling of commitment by having subjects state expectancy levels under conditions differing in the degree of public knowledge of the stated level. He found that commitment tended to make the subjects reluctant to lower expectancy level in the face of negative reinforcement. The constraining effects of commitment diminished to a sufficient extent with the passage of time so that they were not in evidence a week later.

It is possible that commitment is a relevant variable in studies of expectancy change under massed and spaced conditions. The subject may feel an increasing commitment to an expectancy no lower than a given level when he has publicly stated that level several times in succession. If the feeling of commitment is strong, he may continue to state the same expectancy level even in the face of negative reinforcement. The occurrence of a delay in the reinforcement sequence may reduce commitment and permit the subject to revise his expectancy level more realistically and, in essence, get himself off the hook.
Incubation of anxiety. A number of studies have shown that a 24 hour delay has the effect of increasing the magnitude of a conditioned emotional response (PGR) to a verbal stimulus (Bindra & Cameron, 1953, and Golin, 1961). Other verbal stimuli which, through generalization, acquire the capacity to elicit the emotional response also produce a stronger emotional response after a 24 hour delay (Diven, 1937; Mednick, 1957; Golin, 1961). This incubation effect is primarily restricted to the initial presentation of the stimulus in the extinction trials which follow delay. On the second presentation of the conditioned stimulus during extinction the emotional response level is quite similar to that observed during acquisition before delay.

Mednick (1957) found that a delay of 10 minutes was insufficient to produce a mediated incubation effect, but a 24 hour delay did produce a verbally mediated incubation effect.

What implications might these data have for expectancy change during delay? One could predict that, under conditions in which the situational reinforcements are strong enough to produce an emotional reaction, those cues which immediately precede the reinforcement might acquire the capacity to elicit a conditioned emotional reaction. The emotional reaction itself could alter the subject's expectancy by at least two possible routes: (1) causing him to expect the kind of reinforcement that is consistent with his emotional reaction or (2) altering his perception of his capacity to perform the behavior that is necessary to obtain the reinforcement. Although a conditioned emotional response may have this effect on each and every trial, if a delay is introduced during which emotional responsivity increases, it will have
its strongest effect on the expectancy for the first trial after delay, in some cases producing an unusual drop in expectancy level.

Design and Experimental Hypotheses

The investigations by Phares (1961, in press) discussed above demonstrated that delay has a significant effect upon expectancy level. Expectancies for success were affected for a very life-like social interaction task as well as for a laboratory-type symbol substitution task. Furthermore, the observed decline in expectancies with delay could not be accounted for by accentuation of the effects of the last reinforcement preceding the delay, since expectancies declined whether the last trial was a failure or a success. Also an additional nonreinforced warmup trial after delay did not attenuate the lowering effect of delay upon expectancy. It should be noted that in each of these studies Phares employed a sequence of reinforcement that began with initial failure and proceeded with an increasing proportion of successes. In all cases the delay in the sequence first occurred after success had been experienced and always resulted in a subsequent expectancy which was lower in the experimental group than in the control (nondelay) group at a comparable position in the sequence.

Origin of experimental hypotheses. Phares (in press) proposed three related hypotheses to account for his findings with regard to the effects of delay. All three include the notion that delay gives the subject an opportunity to ruminate about experiences that he would otherwise ignore or, at least, give less consideration under massed conditions.
In explaining his findings, Phares proposed that the subject thinks about experiences which yield expectancies that are lower than his predelay expectancy level. These low expectancies have a depressing influence upon postdelay expectancy. Phares proposed that there are three potential sources for the content of task-related rumination: (1) failure experience earlier within the same situation, (2) failure in other situations related to the experimental situation, and (3) failure expectancies engendered by the experimental task instructions. It should be noted that these sources of failure expectancy are not mutually exclusive; influential failure expectancies could theoretically come from all of them simultaneously or from any combination of the three.

This research tested two of these related hypotheses as formulated at a more general level: the hypothesis that the influence on expectancy during delay has its source in earlier experience within the same situation, and the hypothesis that the influence has its source in experiences in other related situations.

Several deductions concerning expectancy change during delay can be made from these hypotheses. Phares always employed the procedure of initial failure followed by success and then a delay. The fact that expectancy drops during delay after this sequence is consistent with the first hypothesis. Since subjects failed early in the sequence, a rather low expectancy would have been activated by rumination, and consequently would have had a depressing influence upon postdelay expectancy. If one were to employ the opposite reinforcement sequence in which subjects initially succeed and later fail before delay, the
first hypothesis would predict a rise in expectancy after delay, since the earlier experience in the situation would result in a success expectancy higher than that immediately preceding the delay. Similarly, a sequence with little or no difference between expectancy during early trials and expectancy just before delay would result in no expectancy change as a function of delay.

The reinforcement sequence is irrelevant to the second hypothesis which is that delay changes in expectancy are due to an increase in the influence of experience in other related situations and the resulting generalized expectancy (GE). All that should be required to demonstrate a GE influence on E during delay is an E before delay that is divergent from GE. Then if GE for a given subject is lower than his predelay E, a drop in E will occur during delay; if GE is higher than predelay E, a rise in E will occur during delay. The data of Phares are consistent with this hypothesis only in those instances where the mean E before delay is rather high. One would expect subjects low in GE to drop considerably as a function of the renewed influence of GE during delay; however, those high in GE, according to this hypothesis, would not be predicted to drop at all in E since their GE is compatible with predelay E. Nevertheless, grouping both high and low GE subjects together, as Phares did, would result in a mean drop in E for the combined groups which is still consistent with the GE hypothesis. If the group mean predelay E were low, one would expect an increase in the mean E after delay as a result of an increase in E level for high GE subjects only, the low GE subjects remaining at their same low predelay E level.
Survey of the research design. This research was designed to provide information concerning the influence of different preceding reinforcement sequences upon delay-induced expectancy changes and also information concerning the relationship between delay-induced expectancy changes and GE. A motor skill task upon which success and failure could be controlled without the subject's knowledge was used to deliver two predetermined sequences of reinforcement to separate groups of subjects. Four groups were constituted: two spaced experimental groups each with a massed control group. Experimental Group A received a reinforcement sequence of initial failure trials and later success trials in equal number. A 24-hour delay was introduced after the success trials for this group. Further success trials after the delay were followed by failure trials, again in equal numbers. Then a second 24-hour delay occurred. Control Group A received the same sequence of reinforcements; failure-success, success-failure; however, all on a single day with no delay. Experimental Group B experienced success and failure in a diametrically opposed order to that of the A groups, but the 24-hour delay periods were inserted in homologous positions. Control Group B had a like sequence with no delay. All four groups finished the experiment with four success trials. A verbal statement of expectancy for success was elicited from all subjects before each trial. Measures of generalized expectancy for success on motor skill tasks were obtained from each subject before the first trial.

The first general hypothesis permits three specific predictions or experimental hypotheses which can be tested in this investigation. The first two pertain to the effects of specific reinforcement orders
upon delay expectancy change and are as follows:

I A With a reinforcement sequence of initial failure and later success, delay in the sequence following success trials will result in a smaller rise in E for success than occurs at a comparable position in the same sequence without delay. The opposite postdelay change in E is predicted when the order of success and failure is reversed.

I B With a reinforcement sequence of initial success and later failure, delay in the sequence following failure trials will result in a smaller drop in E for success than occurs at a comparable position in the same sequence without delay.

When a subject is involved in the situation, the trials immediately preceding an E statement may tend to have a disproportionately strong influence upon expectancy. Divorcement from the situation during the delay will give the subject an opportunity to survey the reinforcement sequence in its entirety and, at that time, be more equidistant from all of the trials in the sequence. Reconsideration of the entire experience should correct any disproportionate weighting of trials immediately preceding expectancy statements and result in an altered E level after delay. Therefore, in any reinforcement sequence other than that resulting in complete uniformity of E level from trial to trial, some difference, however small, should be observed between pre- and postdelay E level.

The third specific prediction deriving from the first general hypothesis concerns individual rather than group reaction to the reinforcement sequence. The extent to which subjects are influenced by immediately preceding trials is not likely to be constant from subject
to subject. For example, some subjects may disproportionately raise expectancy following immediate success while others show little change. Since it has been hypothesized that change in expectancy with delay is essentially an adjustment for the disproportionate influence of immediately preceding trials, the magnitude of the adjustment during delay ought to covary with the magnitude of the disproportionate influence. The greater the rise in expectancy resulting from a series of successes immediately before delay, the greater the readjustment, or drop in expectancy, during delay. When delay is preceded by a series of failures, the greater the resulting drop in expectancy, the greater the rise in expectancy during delay. These relationships are subsumed at a more general level by the following prediction:

I C The magnitude of expectancy change resulting from a group of reinforcements opposite in sign to earlier reinforcement and occurring immediately before delay will be negatively correlated with the magnitude of expectancy change resulting from delay.

Two experimental hypotheses were drawn from the second general hypothesis under investigation. The first deals with the delay expectancy change that is hypothesized for subject groups with various combinations of GE and predelay E level.

II A Those subjects high in GE who also have a high predelay E level will exhibit little delay expectancy change, while those high in GE who have a low predelay E level will tend to raise the E level during delay. Conversely, low GE subjects with high predelay E levels will tend to lower
E level during delay, while low GE subjects with low predelay E levels will exhibit little or no expectancy change during delay. Thus, independently of predelay E level, high GE subjects will have either less decrease or greater increase in E level as a function of delay in the reinforcement sequence.

The rationale behind this hypothesis is that rumination concerning experiences in situations related to the experimental task reactivates GE as a significant influence upon E. Thus E will be moved from the predelay level determined primarily by expectancies derived from the situation \(E^*\) and in the direction of the original GE.

The foregoing hypothesis can be tested with any of several measures of GE; however, by using the initial expectancy level as the measure of GE, a more refined examination of essentially the same relationship may be made. Rather than contrasting subjects dichotomously grouped for GE level and predelay E level, the difference between position on these two variables may be treated as a continuous variable, a variable reflecting the extent and direction of movement from the original GE level. Thus, a higher predelay than initial E level would result in a difference score that would be given a positive sign, since it represents an increase in expectancy level; a difference in the other direction, representing a lowered expectancy, would be given a negative sign. The rationale for hypothesis IA, suggests the following hypothesis:

II B The magnitude of the expectancy change from initial E to predelay E level will be negatively correlated with delay expectancy change in spaced groups but not in massed groups.
Thus, the individual whose expectancy just prior to delay has moved furthest in a positive direction from the initial E (GE) level will experience the greatest drop in expectancy during delay, and vice versa.
CHAPTER III

METHODOLOGY

The findings from three preliminary studies conducted by the author provided the basis for many of the procedures incorporated in the major research design. For this reason the results of the preliminary studies are discussed at this point. The methodology employed in the major research follows this section.

The First Preliminary Study

The first preliminary study was concerned only with Phares' (in press) hypothesis that changes in E with delay are the result of GE influence. The plan of this preliminary study was to create subject groups with markedly divergent E's for success before the period of delay, and then to observe the degree of change in E after delay for groups of subjects differing in GE level. It was predicted that subjects low in GE with a high E for success before delay would show a drop in E during delay, while high GE subjects high in E before delay would remain at about the same E level as prior to delay. When E for success before delay is low, the high GE subject should have a rise in E during delay, while the low GE subject should remain at about the same E level as before delay.

A motor skill task was used to deliver a predetermined series of successes and failures to the two experimental groups, each consisting of 16 subjects. The experimenter controlled achievement on the task without the subject's knowledge. (This task is described in detail on 40
The High E Group received 75 percent positive reinforcement with one failure in each block of four trials. The Low E Group received 25 percent positive reinforcement with three failures in every block of four trials. A 24-hour delay occurred after the fourth and eighth trial of each sequence. Verbal statements of expectancy for success were obtained immediately before each trial using a ten point scale. Generalized expectancy for success on motor skill tasks (MSGE) was estimated from responses to a questionnaire completed prior to the behavioral task and also from the initial expectancy for success.

The first preliminary study was done to evaluate the experimental procedures and the various measures of generalized expectancy. It was necessary that a change in expectancy during delay occur, in order to test the experimental hypothesis. No one had previously employed the task under consideration to study the effects of delay. Therefore, the possibility of producing such effects with this task was of great interest in the first study.

The results of the study are presented in Figure 2. Mean levels of E are plotted serially for the four groups representing the various combinations of percent of reinforcement and level of GE. Subjects in both conditions of reinforcement were split at the median of MSGE scores into High and Low MSGE groups. In general, it can be said that the marked drops found by Phares (1961, in press) did not occur at all during the second delay and appeared during the first delay only in the failure condition. That drop may be accounted for by the reward sequence; a failure trial preceded delay. Across both periods of delay for each condition of reinforcement the downward incline of the E curve for High
FIG. 2. EXPECTANCY CHANGE FOR HIGH AND LOW GE GROUPS UNDER TWO REINFORCEMENT CONDITIONS.
GE's is sharper than that for the Low GE's, contrary to the hypothesis. The changes in E resulting from inter-trial intervals were not in the direction of the original GE. In fact, it cannot be stated definitely, on the basis of this data, that any E changes occurred as a function of delay independent of the immediately preceding reinforcement.

A second preliminary study was done to resolve, in one way or another, the question of whether a delay effect could be achieved with this task.

The Second Preliminary Study

In an effort to obtain appreciable postdelay E changes, subject groups were tested using the same apparatus but a different sequence of reinforcements. Paralleling the method used by Phares in his three studies (1961, in press), the new sequence began with several failures which were then followed by predominately successful trials. In Figure 3 levels of expectancy are plotted serially for Massed and Spaced Groups, both of which experienced the same order of reinforcements. All trials for the Massed Group were given in the same session. The Spaced Group had eight trials in the first session and five trials in each succeeding session. A 24-hour intermission separated the eighth and ninth trials and a 3-hour intermission separated the thirteenth and fourteenth trials for the Spaced Group. As can be seen in Figure 3, just as with Phares' studies, a marked drop in E was manifested by the Spaced group after each break in the trial sequence. At those points no comparable drop in E occurred for the Massed Group. For this Spaced Group of only eight subjects, a t-test of the significance of the mean difference between the
E ratings before and after delay was significant at the .01 level, for the first delay, and at the .05 level for the second delay. This finding, in and of itself, does not contribute much beyond the studies by Phares; but a comparison of these results with the results of the first preliminary study yields support for the hypothesis that changes in E during delay are highly dependent upon the sequence of reinforcements previously experienced in the situation.

If the drop in E with delay is dependent upon the nature of the sequence and not strongly related to expectancies generalized from other situations, one must ask which situational influences produce the drop in expectancy and how they are mediated. Phares' (1961) notion of rumination about failure bears a certain relationship to some of the phenomena subsumed under the label "incubation of anxiety." Several investigators (Diven, 1937; Bindra & Cameron, 1953; Mednick, 1957; and Golin, 1961) observed that the psychogalvanic response elicited by a conditioned verbal stimulus was higher after a 24 hour delay than just prior to leaving the conditioning situation. It may be that rumination, irrespective of GE level, increases anxiety and the subjective probability for the occurrence of negative events. However, an incubation-of-anxiety hypothesis would have predicted a drop in E with delay in the first preliminary study, since all subjects experienced some failure. No such drops were observed.

The Third Preliminary Study

In order to explore further the effects of sequence upon change in E with delay, a third preliminary study was conducted. The sequence
FIG. 3. EXPECTANCY CHANGE UNDER TWO CONDITIONS OF SPACING IN A FAILURE-SUCCESS REINFORCEMENT SEQUENCE.
of experience before the first break was essentially the reverse of that used by Phares (1961, in press) and that used in the second preliminary study discussed above. Rather than start with failure, the sequence began with two successes, a failure, and a third success followed by four failures on the trials immediately preceding the delay. A spaced group of 14 subjects showed a mean rise in E of 1.3 points after the break. A control group of 12 subjects had a drop in expectancy between the same two trials. Curves of the trial-by-trial E statements for the two groups are plotted in Figure 4. A t-test of the differences in changes in E between trials eight and nine for the control and experimental groups was significant at the .01 level.

The findings of the second and third preliminary studies strongly suggest that it is sequence of trials within the experimental situation, rather than generalized expectancies, which account for differences in changes in E between massed and spaced conditions. Since, in both studies, the experimental instructions stated that the task was difficult, rumination about instructions cannot account for the expectancy rise after a delay preceded by failure. Neither can a feeling of being fresh and rested after delay account for the E rise, since a decrement was found when success preceded the delay. The rise in E with the success-failure sequence also is not consistent with arguments that post-interval decrements with the failure-success sequence are due solely to initial caution.

A hypothesis which encompasses all of the findings discussed thus far is that subjects have an expectancy that the sequence of the second session will parallel that of the first session. To illustrate, if the first session began with success, it might be expected that the second
FIRST DELAY, 10 SEC; SECOND DELAY, 24 HR.
FIRST DELAY, 24 HR.

FIG. 4. MEAN EXPECTANCY LEVELS FOR TWO CONDITIONS OF SPACING.
session would also begin with success irrespective of what occurred in later trials. This "sequence-repetition hypothesis" was explored by having the Control Group of the third preliminary study return for one more session after they completed a sequence similar to the Spaced Group of that study. As one can see in Figure 4, the Control Group started with success, then experienced failure, and later, success. A delay after the second period of success in the sequence resulted in lowered E statements for every subject in the group. (Two of the original 12 subjects failed to return after the delay.) If subjects had expected this session to begin as the first session began, they would have maintained the high E's for success with which they ended the previous session. Again, this seems to be evidence for taking greater account, during the break, of experience within the previous session which is divergent from the experience immediately preceding the delay.

Methodology of the Major Research

The general plan of the major research was to bring the procedures of the preliminary studies into one experimental design which would permit a rigorous test of the hypotheses proposed at the end of Chapter II. These hypotheses, stated in general form, were that expectancy changes occurring during delay in the reinforcement sequence are the result of an increased influence of expectancies derived from experience earlier in the same situation (E') and the result of an increased influence of expectancies generalized from other related situations (GE).

Subjects. The subjects for this study were 147 male college students born in the U.S. and ranging in educational level from freshman
to senior. All were enrolled in Psychology 401 and Psychology 407 at the Ohio State University during the Summer Quarter of 1962 and chose to serve in the experiment in order to fulfill a course requirement of four hours of participation in psychological research. They knew only that the study for which they had volunteered was concerned with "experience and ability." From a total of 147 subjects, 136 fulfilled the minimum requirements of the study. From the experimental groups, 5 subjects were lost through failure to complete the experiment. In all conditions, a total of 6 subjects were dropped from the experiment for suspicion of the authenticity of scores received on the experimental task.

Due to the extended nature of the experiment for subjects in the spaced groups, credit had to be given for two hours of research participation; whereas, the subjects in the massed groups received only one hour of credit. Whether a subject volunteered for a one credit or a two credit experiment determined his placement in the control or experimental group. The subjects in the experimental groups attended sessions of a half hour on the first day, a half hour on the second day, and a quarter of an hour on the third day. A fairly successful attempt was made to have the subjects return at approximately the same time each day. Subjects in the control groups attended a single experimental session which lasted 40 minutes.

**Measurements.** There were three separate estimates of generalized expectancy (GE) obtained before the first trial. Before every trial measurements of the level of expectancy were obtained. In addition,
scores from four personality tests were made available.

Measures of expectancy for success on the motor skill task employed were obtained by means of the subject's verbal statement of expectancy. To facilitate intersubject comparisons of expectancy level, a ten point scale of expectancy was provided as a frame of reference for each expectancy statement. It consisted of a linear scale drawn vertically on a sheet of paper and graduated at equal intervals by means of short horizontal lines. Adjacent to the cross marks were numbers ranging from one to ten. Beside each number was a verbal statement of expectancy in terms of the likelihood of success on the next trial. (See Appendix A for a facsimile of the expectancy chart.)

Generalized expectancy for motor skill tasks (MSGE) was measured in three ways. The most simple estimate of MSGE was the subject's expectancy for success on the first trial of the novel motor skill task. In addition to this method, a second kind of initial expectancy statement was elicited before any experience with the task. This statement pertained to the subject's expected level of success in relation to others for the entire performance. It was stated in terms of the percentage of male college students that the subject expected to surpass in total score. (A copy of the chart used by the subjects in making these percentile estimates can be found in Appendix B.)

A percentile estimate pertaining to the final score was used because it appeared that it might be less influenced by failure-avoidant motives than the usual initial expectancy measure of GE. Also a comparison of ones performance with that of others, as in the percentile estimate, permits the MSGE for success to be based upon a more general stand-
ard of excellence than the arbitrary standard established by the experimenter. Subjects may vary in their anticipation of the degree of skill required to achieve the experimenter's arbitrary criterion of success, thus adding an extraneous source of variance to a probabilistic estimate of MSGE.

A third estimate of MSGE was designed for this study in an effort to secure a measure of GE that was relatively free from some of the shortcomings of verbal expectancy statements; namely, the intersubject variations in caution, social desirability, and conformity. This measure was an estimate of MSGE based upon the history of athletic participation of the subject, elicited by means of a questionnaire. Subjects listed athletic participation during childhood, high school, and college years, and, for each activity, rated their degree of proficiency in relation to other participants. The number of years of participation, the name of the sponsoring organization, and other specific data were gathered in order to decrease the tendency to distort the facts and also to provide a further basis for inferences about MSGE.

A scoring manual was constructed which set forth the principles guiding inferences from athletic experience to MSGE and delineated the rather objective rules for assigning weights to the experiences reported so as to reflect their relevance for MSGE. The following characteristics of a given athletic experience were taken into account in assigning scoring weight for MSGE:

1. The popularity of the athletic activity in which the subject had had experience. Were there a large number of participants and interested individuals?
2. The achievement or skill level at which the subject participated. Second string, first string; high school, or college. Here the competition for team membership was considered in assessing skill level.

3. The extent (number of years) and variety (different sports) of the subject's athletic experience.

4. The subject's perception of the degree of success achieved at each activity. Here again the competition was taken into account to estimate the level of expectancy for success which would be generalized to related situations.

An inter-scorer reliability coefficient of .95 was obtained by correlating the writer's scoring of 46 records with that of another graduate student in psychology. A copy of the scoring manual and the questionnaire for history of athletic participation are included in Appendix C.

The History of Athletic Participation questionnaire was completed by each subject individually just after he arrived at the appointed place for participation in the experiment. At this time he had no knowledge of the nature of the experiment other than the statement on the sign-up sheet that it was concerned with experience and ability.

Scores were available for most subjects on four other personality measures: the Barron Independence of Judgement Scale (Barron, 1953), the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960), the Internal-External Control Scale (Rotter, Liverant, and Seeman, 1962), and the Rotter Incomplete Sentence Blank (Rotter & Rafferty, 1950).

The Barron Independence of Judgement Scale (BIJ) consists of twenty-two true-false items. Subjects obtaining high scores are Independents, those scoring low are Conformers. (A copy of the scale appears in Appendix E. The responses in parentheses indicate the Independent replies.) The scale items are those which differentiated at the .05
confidence level or better between a group of Independents and Conformers in the "Asch situation". Tuddenham (1958) obtained a negative correlation of .56 between the Barron Scale and conformity, using a modified Asch technique. The scale was used in this research to evaluate the tendency for subjects to give conforming responses on the various self-report measures utilized. The scale was completed at the conclusion of the experiment by all subjects.

The Marlowe-Crowne Social Desirability Scale (M-C SD) was designed to measure the need to present oneself in a socially desirable light by answering test items in a culturally sanctioned fashion. The scale items are of two types; socially disapproved personal behaviors that have occurred in the behavior of a large majority of people, and socially sanctioned behaviors which have a low probability of occurring in personal behavior. Total scores on the scale consist of the number of disapproved behaviors rejected and of approved behaviors accepted as applicable to the responding subject. Thus, high scoring subjects have a stronger than average need to describe themselves as behaving in a socially desirable fashion. Low scoring subjects have less need to create a good impression and presumably would respond more objectively in other self-report situations. (A copy of the scale appears in Appendix E.)

The Social Desirability Scale was used to evaluate the tendency of subjects to give socially desirable responses on the self-report measures used in this research.

The Rotter Incomplete Sentence Blank (ISB), a measure of general maladjustment, employs a semi-projective method for eliciting responses
which are then scored according to rather objective criteria. The test consists of forty brief sentence beginnings or "stems" which are completed by the subject to make full sentences. Each completion is scored by comparing it with completions categorized by level of adjustment in an empirically derived scoring manual. The score weights, ranging from 0 to 6 according to the level of maladjustment indicated, are summed to produce an index of general maladjustment. Both construction of the manual and standardization made use of students from Ohio State University. The test is, therefore, particularly applicable to this subject population.

In this research the variable of adjustment played a role similar to the interview measure of overall generalized expectancy for success used by Dean (1953). He found that an overall GE measure accounted for some of the variance in expectancy statements on a motor skill task. An adjustment measure such as Rotter's would be expected to reflect overall generalized expectancy for success. The adjustment variable may also relate to the degree of rumination done by subjects during the delay. Because of the limited time of contact with the massed groups, the ISB was administered only to the experimental groups. The test was completed in the later portion of the second experimental session after the experimental trials for that day had been finished.

Although scores on the Internal—External Control scale (I—E) were not of crucial interest in this study, they were available since the I—E and the M—C SD scales are administered at the beginning of each quarter to most of the Psychology 401 classes. Scores on both of these measures were missing for subjects from a few of the Psychology 401
classes and for all Psychology 407 subjects. Some missing SD scale scores were obtained by individual administrations of the scale.

The I-E scale was designed to measure a person's belief concerning the locus of control for the reinforcements available in a variety of situations. A low score on this dimension reflects a tendency to believe that reinforcements, positive or negative, occur because of something that the individual has done which depends upon some relatively permanent characteristic, such as a skill, a personality trait, or a physical attribute. A high score reflects a belief that the locus of control of reinforcements is external to the individual, being controlled by chance, fate, or other individuals. Differences along this dimension might be related to differences in expectancy level and expectancy change.

The test consists of 29 forced-choice dyads, each composed of statements of internal and an external control of causality. The two statements in each dyad are equated for social desirability. The score consists of the total number of external choices. (A copy of the scale appears in Appendix F.)

**Apparatus.** The behavioral task selected for use in this study was the Vertical Aspiration Board, a task used previously by Rotter, Liverant, and Crowne (1961) as the skill task in a study of expectancy change in skill and chance situations. A photograph of the apparatus can be found in their article (p. 165). This apparatus consists of a platform that can be raised along a graduated scale by pulling a cord attached to the platform. A steel ball 2" in diameter is placed upon the platform and the subject is instructed to raise the platform slowly as high as possible before the ball rolls off. Although the subject
is told that the smoothness of his pull determines the height that he can reach, the ball is, in fact, held on the platform by an electromagnet which can be switched on and off by a silent knee switch situated out of view beneath the table top. Since the platform has a forward slope, when the electromagnet is deactivated, the ball rolls off immediately no matter what the level of the platform with regard to the score scale. In this manner any score or sequence of scores can be delivered to the subject. The apparatus is so constructed that nothing calls attention to the possibility of rigged scores. Rather than have an external power source which would necessitate a visible wire, current is supplied by a six volt dry-cell battery concealed beneath the table top. Current is transmitted to the moving platform through brushes which slide along stationary copper strips not visible to the subject.

The visible aspect of the apparatus is permanently fixed to the surface of a table 4' x 2½'. The table was situated in the experimental room with the short side toward the subject. From this perspective, the scale of scores for the task was displayed vertically at the far end of the table. The cord attached to the platform passed over a brass pulley at the top of the vertical frame and forward across the length of the table to the subject. Close visual inspection of the apparatus was prevented by the proximity of the table to the wall on the subject's right, the experimenter's position at the table near the apparatus to the subject's left, and the length of the table. Nevertheless, the subject could clearly see the score markings and the level indicator on the platform, since these were painted in white against a flat black background.
On each trial the subject stood facing the apparatus with the looped end of the cord over the index and middle fingers of his preferred hand, and his hand at his side. The distance that subjects stood from the platform was varied slightly according to arm length. Standard distances were adopted which required each subject to extend his arm out behind himself and as high as reasonably comfortable in order to raise the platform to the 100 (top) mark. This procedure, arrived at after experimentation, added considerably to the authenticity of the task, because as the subject raises his arm backward it becomes increasingly difficult to maintain a steady pull. The small random vibrations of the platform, resulting from the subject's pull and the slight irregularities of the platform guides, could easily be correlated with the drop of the ball, although the two events were not causally related.

This task appeared to fulfill all of the requirements of the study. It was a novel task for all subjects. Scores could be perfectly controlled yet would be perceived as resulting from the subject's own behavior. It lent itself reasonably well to the description made of it as a test of athletic skill and coordination. (It was desirable to deal with athletic skill, because the situations that potentially offer rewards for success in this area are readily identifiable and consensually agreed upon, a fact which facilitated the construction and use of an experiential measure of GE.) The task was also need-engaging, thus permitting the assumption of a desire to succeed on the part of most subjects. The nature of American culture seems to be such that a boy can hardly escape acquiring a positive value for athletic success, irrespective of his own past achievement in athletics.
Design and procedure. Four subject groups were used in this research. Each represented one of the four combinations of two delay conditions and two reinforcement conditions. Whether a subject volunteered for a one- or a two-credit experiment determined his inclusion in either the massed control groups or the spaced experimental groups; the two credit volunteers went into the more lengthy spaced condition. Within delay conditions subjects were assigned randomly to the A or B reinforcement conditions. Complete data on the major variables was obtained for 25 and 22 subjects in massed control groups A and B, respectively, and for 43 and 46 subjects in the spaced experimental groups A and B, respectively.

The initial part of the experiment was identical for subjects in all four groups. Each subject had arranged an individual appointment for the first experimental session. Upon his arrival at the waiting room, the subject was given a copy of the History of Athletic Participation questionnaire by the receptionist. He was asked to fill out the questionnaire and keep it to give to the experimenter who would arrive shortly. After the subject had had sufficient time to complete the questionnaire, the experimenter arrived, introduced himself, and escorted the subject to a small room containing the experimental apparatus.

After seating the subject at the end of the table, the experimenter read the instructions from a position to one side of the table. The instruction sheet read as follows:

We are going to use this apparatus to test your aptitude for tasks requiring a high degree of muscular coordination. This experiment is one aspect of a larger government supported research project investigating physical capability.
The object of this task is for you to try, by pulling this string, to raise the ball on the platform as high as possible before the ball drops off. The apparatus is built with a very slight curvature to the guiding supports which tilts the platform slightly forward the higher it is raised. Therefore, to reach a high score without the ball rolling off a much smoother and steadier performance is required than to achieve low scores. Of course, if you raise the platform swiftly the ball can't drop off because of the momentum. Therefore, the platform must be raised very slowly to get an accurate measure. A steady pull results in the best scores.

You will find that this task is rather difficult. Of course if it were easy everyone would score a 100 on each trial. It is difficult enough so that the scores achieved will reflect a wide range of individual difference in aptitude for learning muscular skills. Those who achieve high scores on this task learn sports and skills faster and are able to achieve a higher level of proficiency than low scorers.

In order to compare the scores of separate individuals a standard method must be used by all students. Only slight adjustments are made for each subject to correct for differences in skeletal structure.

This section of the instructions was designed to facilitate and assure categorization of the situation as one involving athletic skill.

At that point the experimenter stood up and requested that the subject stand as well so that the length of his preferred arm might be measured. The subject was assigned, on the basis of his arm length, a specific distance from the table for all trials. He was given a demonstration of the standard procedure for holding and pulling the cord which raised the platform. The subject tried the procedure by raising the platform once without the ball. The verbatim instructions for this section and the distances from the table for subjects with various arm lengths appear in the Subject Instructions included in Appendix G.

The experimenter and the subject seated themselves again, and the experimenter continued to read from the instructions.

The paragraph which followed next included the only sentence of the instructions which are different for any of the subject groups.
For the massed control groups it read as follows:

Since subjects do fluctuate from trial to trial in the scores they achieve, you will be given a series of 20 trials. All of the trials will be combined to get your overall score.

For experimental subjects, after the phrase "---a series of 20 trials," the following phrases were added: "eight today, eight tomorrow, and four on the following day."

The reference above to the fluctuation of scores was made in order to introduce a set which was compatible with the actual marked fluctuation of scores in the reinforcement sequences to be administered by the experimenter. It was hoped that the reference to fluctuation, together with the knowledge that scores would be combined, might suggest to the subject that repeated trials were given, not to measure improvement, but rather to obtain a reliable measure of a stable characteristic. Without instructions to the contrary, subjects typically expect steadily improving scores on most tasks. It was desirable in this case to disabuse them of any preconceived notion about the sequence of scores so as not to arouse suspicion about the authenticity of scores received.

The next paragraph of the instructions detailed the manner in which the percentile estimate of MSGE was obtained.

At this time I would like to get some idea of how you think your overall performance on this task will compare with that of other male college students. You can indicate that to me by telling me what percentage of male college students your overall performance on this task will exceed. (Hand percentile chart to S.) In other words, how many students out of the average 100 will you score better than on this task. Try to be as objective as possible. If you feel you'll do well, don't be modest about it; and if you don't think you'll do very well, don't be reluctant to indicate that either.

The succeeding paragraphs define a successful trial for the subject and illustrate the procedure for obtaining statements of expectancy. A successful trial was defined, in essence, as a trial in which the
score achieved is a little better than average. An average score was also defined for the subjects. These definitions were provided so that all subjects would have a common frame of reference for their first expectancy statement.

Another thing. Before each trial I would like to get an indication of how confident you are of making a score of 80 or better on that trial. (Point to 80 on the apparatus.) The average student usually obtains scores of 60 or 70, so you see a score of 80 is a very successful trial on this task. You can indicate your confidence of success on this scale going from 0 to 10. (Hand chart to S.) For example, if your confidence of reaching 80 is high, you would select a number at this end of the scale. If your confidence of reaching 80 is rather low, you would select a number from the other end of the scale. Use any number from 0 to 10 to indicate your confidence of reaching 80 in a given trial. Be as realistic as possible and avoid wishful thinking or underestimating just to protect yourself.

Now, how confident are you of getting a score of 80 or better on the first trial? Please make your rating carefully.

(Record the value of E).

OK, let's begin. Step up here with the back of your heels parallel to the (some distance was indicated) mark. Remember: you must raise the platform very slowly for an accurate measure.

The initial expectancy statement obtained at this point, prior to any reinforcement in the situation, was used as an estimate of GE. Subsequent expectancy statements were elicited before each trial by the following question from the experimenter: "How confident are you that you will get a score of 80 or better on this trial? Please make your rating carefully." On each occasion the expectancy chart was handed to the subject.

After the initial expectancy statement was obtained, the subject assumed his position before the apparatus to begin the trial sequence. One final reminder was given about raising the platform slowly.
Reinforcement conditions. Subjects randomly assigned to reinforcement conditions A and B received different sequences of reinforcement (cf. Table 1). The scores for trials 1 through 8 of condition A are exactly the same as those for trials 9 through 16 of condition B. Also the scores for trials 9 through 16 of condition A are the same as those for trials 1 through 8 of condition B. Each condition consists of two blocks of eight trials, one beginning with success and ending with failure, the other beginning with failure and ending with success. The order of these blocks in one sequence is opposite from that in the other. Each block of eight trials contains the same scores, four of which are below the success level, and four above the success level. Thus after the last trial of each block, i.e., trials 8 and 16, the objective probability of success is .50. Figure 5 shows the curves of objective probabilities of success for the two reinforcement sequences employed.

Variation in delay. After the eighth and sixteenth trials, the experimental groups experienced a 24-hr. intermission. At the same points in the sequence the control groups experienced a 30-sed. rest period, during which they remained standing before the apparatus. This rest period was introduced to mitigate the possible effects of fatigue upon expectancy for success in the massed groups.

After returning from each 24-hr. delay period, the experimental subjects were given a nonfeedback warm-up. Each was asked to raise the platform without the ball up to the 100 mark. The following instruction was used:
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FIG. 5. OBJECTIVE PROBABILITY CURVES RESULTING FROM TWO REINFORCEMENT SEQUENCES.
Now you were to stand with the back of your heels at the (distance indicated) mark. Step up there and take ahold of the cord as before. Just pull the platform up to the 100 mark to get the feel of it again. The warm-up was given to reduce any systematic lowering of expectancy which might result from a cold feeling or the absence of the muscle tone previously established by the activity. The expectancy statement was elicited after the warm-up and before the first reinforced trial after the intermission. It may be noted that this expectancy statement reflected the influence of the last trial preceding the intermission and any influence resulting during the intermission. Experimental subjects did not make an expectancy statement after the last reinforced trial before the 24-hr. delay. Only one expectancy statement was elicited between trials in all groups, and this statement always immediately preceded a reinforced trial.

Post experimental procedures. At the conclusion of the 20 trials each subject was questioned to find out whether he accepted the stated purpose of the experiment and also whether he suspected that the experimental task was rigged. He was asked, "What did you think this experiment was about? What was it trying to show?" The subject was next asked the following question, if it had not already been answered in the reply to the preceding question: "What kinds of things affected the scores you achieved?" Some subjects felt that the task was not a valid measure of coordination because of variable friction resistance during the ascent of the platform, but such subjects were retained in the sample unless they suspected that it was the experimenter who influenced their scores. Six subjects were dropped because of such suspicions. Of these six only
two deduced the actual method by which scores were controlled.

To prevent intersubject communication about the experiment the following request was made of all subjects at the end of the first experimental session.

One more thing, please don't talk about this task or the scores you achieved to anyone in Psychology 401 or Psychology 407, because this might affect their confidence and how they feel about their own scores, should they become a subject for this experiment. I hope you can understand why this is important.

Agreement to this request was obtained from all subjects and there appeared to be little communication between subjects about the experiment.

After the postexperimental interview each subject was taken to a small seminar room where he completed the Barron-Independence of Judgement Scale, the final item in the procedure.

**Summary of procedure.** There were four experimental combinations of reinforcement sequence and delay: a Spaced Group and a Massed Group which received reinforcement sequence A and a Spaced Group and a Massed Group which received reinforcement sequence B. Three measures of MSGE were obtained from all subjects before the first trial; an Experience estimate, a Percentile estimate and an Initial Expectancy estimate. Nineteen expectancy statements were obtained between the 20 trials on the behavioral task. Table 1 summarizes the reinforcement and delay conditions of the four groups, and shows the relative position of expectancy statements. A test of adjustment was administered to all subjects in Spaced Groups A and B; measurements of social desirability, conformity, and internal-external control were available for a large number of subjects in all four groups.
CHAPTER IV

RESULTS

The initial section of this chapter reports the analysis of data which is most relevant to the first general hypothesis, i.e., the hypothesis that expectancy change during delay is a function of the reinforcement sequence immediately preceding delay. The second section of the chapter presents the results pertinent to the second general hypothesis which states that expectancy change during delay is a function of the subject's generalized expectancy for a class of related situations. The final section of the chapter concerns the relationship of expectancy change during delay to several personality variables.

Reinforcement Influence

The basic dependent variables in this experiment are the statements of expectancy elicited prior to each reinforced trial in a series of trials. The mean values of these expectancy statements appear in Figure 6. Each curve reflects the systematic change in the average level of expectancy for one group of subjects throughout the reinforcement sequence. Massed and Spaced Groups A received the same sequence of reinforcements, as did Massed and Spaced Groups B; however, the A and B sequences were diametrically opposed with regard to sign of the reinforcement until after the sixteenth expectancy statement. The positions of successful and nonsuccessful trials were simply reversed in the two reinforcement sequences. After the sixteenth statement of expectancy, all trials in both sequences were successful. Figure 5 on page 64 shows the
FIG. 6. MEAN EXPECTANCY LEVELS FOR MASSED AND SPACED GROUPS UNDER REINFORCEMENT SEQUENCES A AND B.
curves which result when the objective probabilities of success are plotted sequentially for the two series of reinforcements. A visual comparison of Figures 5 and 6 shows a marked congruence between the curves for the objective probabilities and those for verbally reported expectancies.

The objective probability of success was .50 for all groups of subjects at the ninth and seventeenth statements of expectancy. These two statements of expectancy occur following delay, but the period of coincident objective probability begins after the last reinforcement before delay, and would apply as well to the first expectancy statement following delay. If the reinforcements alone, and neither their order of presentation nor delay in the sequence, affect expectancy for success, the four groups should have comparable mean stated expectancies at these points, provided that no initial differences in expectancy for success exist between the four groups.

Before a comparison could be made of the levels of expectancy respective to each group following delay, the question of the initial comparability of the groups had to be considered. To test the hypothesis of no differences among groups in initial expectancy for success, a 2 x 2 factorial analysis of variance was conducted upon the initial expectancy \((E_1)\) statements. The number of subjects in Massed Groups A and B, were approximately equal as were the number in Spaced Groups A and B; however, the Spaced Groups included nearly twice the number of subjects as the Massed Groups. Following the procedures suggested by Ferguson (1959, pp. 259-262), a Chi-square test was made to test the significance of the departure from proportionality in the number of
subjects included in each subgroup of the analysis. The resulting value of Chi-square did not approach the recommended level of significance for rejecting the hypothesis of no significant departure from proportionate subclass frequencies. The sums of scores and sums of squared scores in each subclass were adjusted by multiplying them by the ratio of the expected subclass size (the mean subclass frequency within a given level) to the actual subclass size, and the analysis of variance was conducted as usual upon the resulting values for the sums of scores and sums of squared scores.

The means and standard deviations of $E_1$ scores for the four groups are included in Table 2. (These values were unaffected by the correction for a nonsignificant departure from proportionality.) A summary of the analysis of variance of $E_1$ scores can be found in Table 3. None of the F-ratios were significant at the .05 level; therefore, it may be concluded that the four groups did not differ significantly in initial expectancy level.

The objective probabilities of success in both reinforcement sequences were equal at the ninth expectancy statement ($E_9$); therefore, an analysis of variance of the $E_9$ scores was conducted to show whether the sequence of reinforcements and/or the length of the delay affect expectancy level. An analysis identical with that for the $E_1$ scores was made of the $E_9$ scores. It too employed the corrections for departure from proportionality in subgroup size. The means and standard deviations of $E_9$ scores for the four groups can be found in Table 2 and a summary of the $2 \times 2$ factorial analysis of variance in Table 4. The data in Table 4 show that the interaction of spacing conditions with
### TABLE 2
MEANS AND STANDARD DEVIATIONS OF EXPECTANCIES AS ASSESSED AT SEVERAL POINTS FOR ALL GROUPS

<table>
<thead>
<tr>
<th>Group</th>
<th>$E_1$ M</th>
<th>$E_1$ SD</th>
<th>$E_9$ M</th>
<th>$E_9$ SD</th>
<th>$E_{10}$ M</th>
<th>$E_{10}$ SD</th>
<th>$E_{17}$ M</th>
<th>$E_{17}$ SD</th>
<th>$E_{18}$ M</th>
<th>$E_{18}$ SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massed A</td>
<td>3.80</td>
<td>1.90</td>
<td>7.16</td>
<td>1.40</td>
<td>7.64</td>
<td>1.41</td>
<td>6.68</td>
<td>1.59</td>
<td>7.52</td>
<td>1.42</td>
</tr>
<tr>
<td>N=25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spaced A</td>
<td>3.51</td>
<td>1.53</td>
<td>5.21</td>
<td>1.49</td>
<td>6.74</td>
<td>1.57</td>
<td>5.81</td>
<td>1.72</td>
<td>7.12</td>
<td>1.62</td>
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<td>N=43</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Massed B</td>
<td>4.14</td>
<td>2.14</td>
<td>5.77</td>
<td>1.44</td>
<td>5.18</td>
<td>1.50</td>
<td>7.09</td>
<td>1.59</td>
<td>7.50</td>
<td>1.59</td>
</tr>
<tr>
<td>N=22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spaced B</td>
<td>3.89</td>
<td>1.77</td>
<td>6.30</td>
<td>1.88</td>
<td>5.78</td>
<td>1.88</td>
<td>6.19</td>
<td>1.78</td>
<td>7.17</td>
<td>1.59</td>
</tr>
<tr>
<td>N=46</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 3
SUMMARY OF THE ANALYSIS OF VARIANCE OF INITIAL EXPECTANCY FOR ALL GROUPS

<table>
<thead>
<tr>
<th>Sources of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing Conditions</td>
<td>2.188</td>
<td>1</td>
<td>2.188</td>
<td>.662</td>
</tr>
<tr>
<td>Reinforcement Conditions</td>
<td>4.522</td>
<td>1</td>
<td>4.522</td>
<td>1.369</td>
</tr>
<tr>
<td>Interaction (S x R)</td>
<td>.015</td>
<td>1</td>
<td>.015</td>
<td>.004</td>
</tr>
<tr>
<td>Within Groups</td>
<td>436.057</td>
<td>132</td>
<td>3.303</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 4
SUMMARY OF THE ANALYSIS OF VARIANCE OF THE NINTH EXPECTANCY FOR ALL GROUPS

<table>
<thead>
<tr>
<th>Sources of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing Conditions</td>
<td>15.486</td>
<td>1</td>
<td>15.486</td>
<td>5.835*</td>
</tr>
<tr>
<td>Reinforcement Conditions</td>
<td>1.913</td>
<td>1</td>
<td>1.913</td>
<td>.721</td>
</tr>
<tr>
<td>Interaction (S x R)</td>
<td>47.381</td>
<td>1</td>
<td>47.381</td>
<td>17.853**</td>
</tr>
<tr>
<td>Within Groups</td>
<td>350.297</td>
<td>132</td>
<td>2.654</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05
** p < .001

reinforcement conditions was highly significant, yielding a probability of occurrence by chance of less than .001. The significant interaction clearly indicates that the order of reinforcements and delay in the sequence jointly influence the level of stated expectancy obtained immediately after the delay. The effect of delay upon expectancy cannot be predicted without taking into consideration the order of the reinforcements in the sequence which preceded the delay. Although the main effect of spacing was significant at the .05 level, caution is required in drawing conclusions as to its meaning since the interaction effect was so strong (McNemar, 1962, p. 312). An inspection of the means of the four groups suggests that the overall difference between spacing conditions might be accounted for by the very high scores of Massed Group A alone, since the mean of Massed Group B was not markedly different from those of the two spaced groups.
The significant interaction of spacing conditions and reinforcement conditions is consistent with the first general hypothesis which states that expectancy change with delay is a function of the preceding experience in the situation. In order to find out whether the interaction effects would persist beyond the first expectancy statement following delay, the same analysis of variance was made upon the E_{10} scores. It should be noted that the objective probabilities were equal for all groups at the ninth expectancy. On the subsequent trial, the groups receiving sequence A were positively reinforced and those receiving sequence B were negatively reinforced; therefore, the objective probabilities at E_{10} were no longer equal for all groups. This leads to the prediction of a significant main effect for reinforcement conditions; whereas, no such prediction was made in the case of E_{q} scores.

An inspection of the summary of this analysis, presented in Table 5, shows that the main effect of reinforcement conditions was significant at less than the .001 level. In addition, the interaction term was significant at the .05 level. An inspection of the group means for E_{10} scores presented in Table 2 suggests that the main effect of reinforcement is significant in its own right, and cannot be accounted for by interaction and the accompanying possibility of extreme scores in only one group. The significant interaction indicates that the joint influence of reinforcement order and delay upon expectancy level persists beyond the initial expectancy statement after delay.

At the seventeenth report of expectancy following the second delay, the objective probabilities of success were again equal for the two reinforcement sequences. A summary of the 2 x 2 analysis of variance
conducted with those scores may be found in Table 6. The means and standard deviations of the E₁₇ scores of all groups may be found in Table 2. The interaction of delay conditions with reinforcement conditions was not significant. However, there was a main effect for delay conditions which was significant at the .01 level. An examination of the means of the groups in Table 2 shows that the massed groups had higher expectancy levels than the spaced groups. The main effect of reinforcement conditions was not significant.

### TABLE 5

**SUMMARY OF THE ANALYSIS OF VARIANCE OF THE TENTH EXPECTANCY FOR ALL GROUPS**

<table>
<thead>
<tr>
<th>Sources of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing Conditions</td>
<td>.670</td>
<td>1</td>
<td>.670</td>
<td>.242</td>
</tr>
<tr>
<td>Reinforcement Conditions</td>
<td>74.35</td>
<td>1</td>
<td>74.350</td>
<td>26.822**</td>
</tr>
<tr>
<td>Interaction (S x R)</td>
<td>17.222</td>
<td>1</td>
<td>17.222</td>
<td>6.213*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>365.851</td>
<td>132</td>
<td>2.772</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05  
** p < .001

The absence of a significant interaction cannot be interpreted as contradictory to the first general hypothesis, because the levels of expectancy of the four groups at the seventeenth expectancy reflect the influence of two delay periods, each following a different order of reinforcement. Opposite delay effects after each reinforcement order may have tended to cancel one another.
TABLE 6

SUMMARY OF THE ANALYSIS OF VARIANCE OF THE SEVENTEENTH EXPECTANCY FOR ALL GROUPS

<table>
<thead>
<tr>
<th>Sources of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing Conditions</td>
<td>23.854</td>
<td>1</td>
<td>23.854</td>
<td>8.059*</td>
</tr>
<tr>
<td>Reinforcement Conditions</td>
<td>5.219</td>
<td>1</td>
<td>5.219</td>
<td>1.763</td>
</tr>
<tr>
<td>Interaction (S x R)</td>
<td>0.007</td>
<td>1</td>
<td>0.007</td>
<td>0.002</td>
</tr>
<tr>
<td>Within Groups</td>
<td>390.696</td>
<td>132</td>
<td>2.960</td>
<td></td>
</tr>
</tbody>
</table>

* p < .01

To test whether the main effect of delay observed at the seventeenth expectancy would persist beyond this first expectancy statement following a delay, an analysis of variance was conducted upon the $E_{18}$ scores. At that point the objective probability of success was the same for all groups. A summary of the analysis of the eighteenth expectancy scores is presented in Table 7. None of the F-ratios reached the .05 level of significance. It can be seen in Table 1 that the mean expectancy levels for all groups at $E_{18}$ are quite similar. Also, by referring back to Figure 5 on page 64, one may note that the mean expectancy levels of the four groups remain similar throughout the rest of the sequence. Because of the closeness of the means through $E_{19}$ and $E_{20}$ no statistical analysis of these scores was made. It would appear, then, that the significant main effect of delay observed immediately after the second delay had a short-lived influence upon expectancy level.
### TABLE 7
SUMMARY OF THE ANALYSIS OF VARIANCE OF
THE EIGHTEENTH EXPECTANCY FOR ALL GROUPS

<table>
<thead>
<tr>
<th>Sources of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing Conditions</td>
<td>4.096</td>
<td>1</td>
<td>4.096</td>
<td>1.611</td>
</tr>
<tr>
<td>Reinforcement Conditions</td>
<td>.032</td>
<td>1</td>
<td>.032</td>
<td>.013</td>
</tr>
<tr>
<td>Interaction (S x R)</td>
<td>.046</td>
<td>1</td>
<td>.046</td>
<td>.018</td>
</tr>
<tr>
<td>Within Groups</td>
<td>335.665</td>
<td>132</td>
<td>2.543</td>
<td></td>
</tr>
</tbody>
</table>

**Delay difference score.** The specific effects of delay are best revealed by a comparison of the difference between E scores separated by a long delay with the difference between the same E scores separated by only a short delay under identical conditions of reinforcement. In order to make such comparisons between the massed and spaced groups, two difference scores were computed for each subject. The difference between E₈ and E₉, the expectancies elicited before and after the first delay, was compared with the difference between E₁₆ and E₁₇, the expectancies preceding and following the second delay. These difference scores will be referred to as **delay difference** scores and will be abbreviated DD₁ and DD₂, the subscripts indicating their position in the sequence. The DD scores were used throughout the analysis as a measure of the change in expectancy which had occurred with delay. Since the delay difference score also reflects the influence of the last reinforcement before delay, it is not meaningful to compare DD scores from conditions which vary in the sign of the last reinforcement before delay. The means and standard
deviations of DD scores for all subject groups are presented in Table 8.

It was initially proposed that a 2 x 2 analysis of variance be applied to delay difference scores immediately preceded by the same block of eight reinforcements. In such an analysis the massed and spaced groups would constitute two levels of a delay condition, and the position of the delay as either first or second in the sequence would constitute two levels of a position condition. However, a comparison of the distributions of delay difference (DD) scores for the massed and spaced groups indicated that the variation of scores was much greater in each spaced group than in its massed control group for the same delay difference (DD) score. This marked and systematic departure from the assumption of homogeneity of variance made the parametric analysis of variance model questionable.

As an alternative to a parametric test, the Mann-Whitney U-test was applied to test for differences between massed and spaced groups in the magnitude of DD scores. The results of these comparisons may be found in Table 8. They show that when the delay period was preceded by a block of eight trials consisting of initial failure and later success, the DD scores were significantly less positive for the spaced groups than for the massed groups. Such was the case, no matter whether the delay occurred early or late in the sequence. The mean values of the DD scores indicate that the massed groups rose in expectancy following the failure-success sequences, presumably as a result of the success on the trial immediately before delay; whereas the spaced groups experienced a mean drop in expectancy under the same reinforcement conditions. These findings support Hypothesis IA which states that a delay immediately pre-
TABLE 8
MEANS AND STANDARD DEVIATIONS OF DELAY DIFFERENCE SCORES
FOR MASSED AND SPACED GROUPS A AND B, AND COMPARISONS
OF THE DELAY DIFFERENCE SCORES FOR MASSED
AND SPACED GROUPS BY MEANS OF VARIANCE
RATIOS AND MANN-WHITNEY U TESTS

<table>
<thead>
<tr>
<th>Score and Preceding Sequence</th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Variance Test</th>
<th>Mann-Whitney U Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F ratio</td>
<td>U</td>
</tr>
<tr>
<td>DD₁ Failure-Success</td>
<td>MA</td>
<td>25</td>
<td>+.56</td>
<td>.804</td>
<td>3.483</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>43</td>
<td>-1.53</td>
<td>1.500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DD₂ Failure-Success</td>
<td>MB</td>
<td>22</td>
<td>+.50</td>
<td>.723</td>
<td>3.471</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>46</td>
<td>-.48</td>
<td>1.347</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DD₁ Success-Failure</td>
<td>MB</td>
<td>22</td>
<td>-.91</td>
<td>.996</td>
<td>2.696</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>46</td>
<td>+.02</td>
<td>1.635</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DD₂ Success-Failure</td>
<td>MA</td>
<td>25</td>
<td>-.76</td>
<td>.991</td>
<td>3.140</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>43</td>
<td>-.53</td>
<td>1.756</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
eced by success following initial failure results in a less positive expectancy change for the spaced group than for the massed group.

The effects of a success-failure sequence upon expectancy change with delay were assessed in the same manner as the effects of the failure-success sequence reported above. It can be seen in Table 8 that the Mann-Whitney tests of the difference between DD scores for the Massed and Spaced B Groups following success-failure was significant at the .05 level; however, the difference between the Massed and Spaced A groups following success-failure was not significant. In the former case the delay occurred early in the sequence and in the latter case, it occurred late in the sequence. In both cases the DD score means of the Spaced Groups were less negative than those of the Massed Groups. Spaced Group B showed no mean drop in expectancy between $E_8$ and $E_9$, despite the failure which followed $E_8$ immediately before delay. Qualified support is provided for Hypothesis I B which states that following a success-failure sequence, a long delay results in a less negative expectancy change than a short delay.

It should be noted that the analysis of the expectancy change at the first delay ($DD_1$ scores) confirms the conclusions drawn from the analysis of $E_7$ scores. It was concluded that both the order of reinforcements in the preceding trials and delay in the sequence affect expectancy level. The analysis of $DD_1$ scores summarized in Table 8 indicates that delay can have directly opposite effects upon expectancy level, depending upon the nature of the preceding trials. In this study, delay following a failure-success sequence had a negative effect upon
expectancy level, and delay following a success-failure sequence had a positive effect upon expectancy level.

The variance of DD scores. Of importance in its own right is the marked difference in the variation in expectancy change with delay between the massed and spaced groups. Variance ratios were computed between comparable DD scores for massed and spaced groups. A comparison of the variances of DD₁ and DD₂ scores for massed and spaced groups under sequences A and B resulted in four separate variance ratios. These are presented in Table 8 together with their associated p values. The latter indicates the significance of the difference between the two variances comprising each ratio. In each case, the p values are for a two-tailed test, and all indicate differences at a high level of statistical significance. By noting the standard deviations given in Table 8, one can see that, in each case, it is the Spaced Group which has the larger DD score variance. This suggests that delay, in addition to producing changes in the magnitude and direction of expectancy change, also produces a greater variation in the expectancy change which occurs between trials. Stated another way, delay is different from no delay or a very short delay, and it has varied effects upon the subjects within the same experimental group. Furthermore, it should be noted that a variance difference in DD scores was observed in the single comparison of massed and spaced groups that did not result in a mean difference in the magnitude of DD scores. It would appear, then, that delay late in the sequence did affect expectancy after a success-failure sequence, but the effect was not uniform for all subjects in the Spaced group; some subjects raised their level of expectancy while others lowered their
level. The net effect apparently did not change the overall magnitude of DD\textsubscript{2} scores for the spaced group as compared with the massed control group.

**Recent change in expectancy.** Hypothesis I C predicts that the expectancy change resulting from a group of reinforcements opposite in sign to a preceding group of reinforcements will be inversely related to the change in expectancy that occurs during delay. Of the two measures required to test this hypothesis, the measure of expectancy change during delay (DD score) has been discussed above. The second measure was derived from the difference between levels of expectancy at specific points in the sequence, points which were chosen to reflect the magnitude of change in expectancy which accompanied a shift from repeated failure to success, in the failure-success block, or a shift from repeated success to failure, in the success-failure block. Because this score reflects the extent of change in the level of expectancy with recent experience, it was named the recent change score.

Two recent change (RC) scores were computed for each subject. The first (RC\textsubscript{1}) reflects the shift in the sign of reinforcements in the first sequence of eight trials preceding the first delay. The value of E\textsubscript{4} was subtracted algebraically from the value of E\textsubscript{8}, the last expectancy elicited before delay. In like fashion, the second recent change score (RC\textsubscript{2}) was obtained by subtracting E\textsubscript{12} from E\textsubscript{16}, the last expectancy elicited before the second delay. RC\textsubscript{2} reflects the change in expectancy resulting from the trials following E\textsubscript{12} and prior to E\textsubscript{16}. The recent change (RC) scores were correlated with the delay difference (DD) scores per-
taining to the same period of delay. A positive value for RC indicates an increase in expectancy with recent experience before delay. A positive value for DD, it may be recalled, indicates an increase in expectancy during delay. Negative values of RC and DD indicate decreases in expectancy.

Table 9 presents the product-moment correlation coefficients between \( RC_1 \) and \( DD_1 \) and between \( RC_2 \) and \( DD_2 \) for Massed and Spaced Groups under each reinforcement condition. The statistical significance of each coefficient is indicated by the \( p \) value entered in the table adjacent to the corresponding coefficient. All \( p \) values were determined by a two-tailed test of the significance of the difference of the coefficient from zero. For the Massed Groups, in no case is the correlation between RC and DD statistically significant at the .05 level. In every case for the Spaced Groups the correlation between RC and DD is significant beyond the .01 level of confidence. Each of the correlations for the Spaced Groups was negative, as is predicted by Hypothesis I C; they indicate that the direction and magnitude of expectancy change immediately before the delay is inversely related to the direction and magnitude of expectancy change during delay.

**Influence of Generalized Expectancy**

Three measurements of expectancy for success at motor skill tasks (MSGE) were obtained. Before presentation of the results concerning their relationship to expectancy change with delay, it would be well to examine the data available concerning their interrelationships and the way in which the measurements of MSGE are related to the measurements of personality.
### Table 9

**Means and Standard Deviations of Recent Change Scores and Correlations Between Recent Change and Delay Difference Scores**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>RC₁ Mean</th>
<th>SD</th>
<th>RC₂ Mean</th>
<th>SD</th>
<th>r</th>
<th>p</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA</td>
<td>25</td>
<td>+3.28</td>
<td>1.61</td>
<td>1.71</td>
<td>-1.28</td>
<td>-.00</td>
<td>.13</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>SA</td>
<td>43</td>
<td>+3.21</td>
<td>1.64</td>
<td>1.62</td>
<td>-1.75</td>
<td>-.46</td>
<td>.01</td>
<td>-.64</td>
<td>.001</td>
</tr>
<tr>
<td>MB</td>
<td>22</td>
<td>-1.27</td>
<td>1.21</td>
<td>1.30</td>
<td>+2.41</td>
<td>-.06</td>
<td>---</td>
<td>+.17</td>
<td>---</td>
</tr>
<tr>
<td>SB</td>
<td>46</td>
<td>-1.98</td>
<td>1.54</td>
<td>1.53</td>
<td>+2.09</td>
<td>-.39</td>
<td>.01</td>
<td>-.60</td>
<td>.001</td>
</tr>
</tbody>
</table>

Table 10 presents the intercorrelations between the three measures of MSGE and four other personality variables. It can be seen that the three GE measures (the Initial Expectancy Statement, the Percentile Estimate of Success, and the Athletic History estimate) all have moderate correlations with one another. Each correlation is significant beyond the .01 level of confidence. Apparently all three measures reflect to some extent the same characteristic of the individual - his generalized expectancy for success at motor skill tasks. The Athletic History and the Percentile estimates are not significantly correlated with any of the other personality measures. All three measures are uninfluenced by the subject’s need for approval, as measured by the SD scale; neither are they related to his perception of the locus of the control of rein-
<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>( E_1 )</th>
<th>( %)-ile</th>
<th>Ath.</th>
<th>SD</th>
<th>BIJ</th>
<th>I-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>( E_1 )</td>
<td>136</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( %)-ile</td>
<td>136</td>
<td>.46**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ath.</td>
<td>136</td>
<td>.35**</td>
<td>.50**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>120</td>
<td>.13</td>
<td>-.13</td>
<td>-.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIJ</td>
<td>120</td>
<td>-.24**</td>
<td>.14</td>
<td>.04</td>
<td>-.26**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-E</td>
<td>100</td>
<td>.00</td>
<td>-.09</td>
<td>-.09</td>
<td>-.22*</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>ISB</td>
<td>89</td>
<td>.33**</td>
<td>.06</td>
<td>.12</td>
<td>.02</td>
<td>-.34**</td>
<td>.02</td>
</tr>
</tbody>
</table>

* p < .05
** p < .01

**Note:** \( E_1 \) -- Initial Expectancy GE  
\( \%\)-ile -- Percentile Estimate GE  
Ath. -- Athletic History GE  
SD--M-C Social Desirability  
BIJ -- Barron Independence of Judgment  
I-E -- Internal-External Control  
ISB -- Rotter Incomplete Sentence Blank
forcement, as measured by the I-E scale. The Initial Expectancy estimate of MSGE is significantly related to adjustment, as measured by the ISB, and independence of judgment, as measured by the BIJ scale. The sign of the correlation coefficients indicate that the well-adjusted and/or conforming subjects tend to state high initial expectancies under these experimental conditions. The converse is also true: independent and/or maladjusted subjects tend to state low initial expectancies. The significant correlation between ISB and BIJ raises the possibility that these scales may both be measuring a common characteristic related to the statement of initial expectancy level.

Generalized expectancy and delay change. The second general hypothesis of this study states that change in expectancy during delay is a function of generalized expectancy, and that expectancies change during delay to become more compatible with the subject's initial expectancy for the situation. One test of this general hypothesis, formally stated as Hypothesis II A (Page 37), requires a simultaneous consideration of the subject's GE and his E level just prior to the delay. If both GE and predelay E are approximately congruent, little change in E would be expected during delay. If one is low and the other high the E level would be expected to change in the direction required to reduce the disparity. In order to test this hypothesis, a 2 x 2 classification of subjects was made according to GE level and predelay E level. Each of the three GE measures was examined separately as the GE classification variable. In each case, a score value was selected which would divide the subjects into High and Low GE Groups of approx-
imately equal size. Using a similar splitting procedure, these groups were further subdivided into High and Low Predelay E Groups. Since each Spaced Group experienced a first and second delay and since there was a DD score for each delay which reflected the change in expectancy that occurred during that delay, the High and Low GE groups had to be reclassified for High and Low predelay E prior to an examination of their respective DD_1 and DD_2 scores. Therefore, Spaced Group A, for example, may be thought of as consisting of a High and a Low GE Group. About half of the subjects in each of these groups will have high expectancies before the first delay, but the same subjects may or may not have high expectancies before the second delay, thus necessitating the reclassification by predelay E.

**Initial Expectance and DD scores.** Table II shows the DD score means for Spaced Groups A and B classified by $E_1$, a measure of GE, and by the predelay E appropriate for the DD score under consideration. Each quadrant of the table may be thought of as an independently meaningful $2 \times 2$ classification of DD scores by GE level and predelay E level. It may be noted that in every case the Low GE subjects who had high expectancies just before the delay have the lowest mean DD scores, and, in three of the four separate comparisons, it is the High GE-Low Predelay E Group which has the highest mean DD score. The relative magnitude of these means of DD scores is in agreement with the predictions from Hypothesis II A: subjects with high expectancies before delay and low generalized expectancies tended to experience a drop in expectancy during the delay, and subjects with low expectancies before delay...
and high generalized expectancies tended to experience a rise in expectancy during delay.

The hypothesis concerning GE effects upon expectancy change during delay leads to the prediction of zero change under some circumstances and a positive or a negative change under others. However, it is not meaningful to compare the DD scores with zero in order to test the significance of the magnitude and direction of change, because the DD scores reflect not only the influence of delay but also the effect of the reinforcement which occurred subsequent to the last expectancy statement elicited before delay. Neither is there a suitable constant which could be applied to DD scores as a correction for the influence of the last reinforcement, because a particular reinforcement does not have a uniform effect upon subjects. The effect of a reinforcement is, to a degree, related to the level of expectancy at the time the reinforcement occurs.

An alternative statistical procedure for testing Hypothesis II A is a 2 x 2 analysis of the variance of DD scores incorporating high and low levels of GE and high and low levels of predelay E. The predicted outcome is for (1) relatively higher DD scores under conditions of High GE-Low Predelay E, (2) intermediate DD scores for High GE-Low Predelay E and Low GE-High Predelay E, and (3) relatively lower DD scores for Low GE-High Predelay E. Such a relationship is observed among the group DD score means within each quadrant of Table II. For such relative differences to be considered statistically significant a 2 x 2 analysis of variance would need to show a significant main effect for both GE level and predelay E level.
<table>
<thead>
<tr>
<th>Group</th>
<th>DD₁</th>
<th></th>
<th>DD₂</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hi-E₈</td>
<td>Lo-E₈</td>
<td>Hi-E₆</td>
<td>Lo-E₆</td>
</tr>
<tr>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td>12</td>
<td>-1.42</td>
<td>1.38</td>
<td>8</td>
<td>-0.88</td>
</tr>
<tr>
<td>10</td>
<td>1.00</td>
<td>1.05</td>
<td>15</td>
<td>-1.75</td>
</tr>
<tr>
<td>11</td>
<td>-1.73</td>
<td>1.61</td>
<td>8</td>
<td>-0.40</td>
</tr>
<tr>
<td>16</td>
<td>-0.81</td>
<td>2.07</td>
<td>10</td>
<td>+0.30</td>
</tr>
<tr>
<td>12</td>
<td>+1.00</td>
<td>1.79</td>
<td>7</td>
<td>-1.71</td>
</tr>
<tr>
<td>8</td>
<td>-1.12</td>
<td>0.64</td>
<td>13</td>
<td>1.68</td>
</tr>
</tbody>
</table>

**TABLE 11**

MEANS AND STANDARD DEVIATIONS OF DELAY DIFFERENCE SCORES FOR SUBJECTS HIGH AND LOW ON INITIAL EXPECTANCY AND HIGH AND LOW ON PREDELAY EXPECTANCY.
The division of subjects within experimental groups according to GE level and predelay E level resulted in unequal cell frequencies. Since the resulting cell frequencies were already rather small, it seemed inadvisable to further reduce any cell frequency by the random exclusion of data, in an attempt to equate cell frequencies. An alternative procedure, suggested by Ferguson (1959, pp. 259-262), was used to adjust the analysis of variance for unequal cell frequency. Since a separate 2 x 2 analysis of variance was to be conducted for the DD\(_1\) and DD\(_2\) scores of both Spaced Groups A and B, separate Chi-square tests were made to ascertain whether there existed a significant departure from equality in cell frequency in any of the four 2 x 2 matrixes. Using three degrees of freedom, none of the Chi-square values was significant at the .05 level.

A summary of each of the four separate analyses of variance may be found in Table 12. It can be seen that in each analysis the effect of predelay E upon DD scores is statistically significant; however, the effect of initial expectancy level does not reach the .05 confidence level in any of the four analyses. It should be pointed out that the A and B spaced groups constitute independent samples and thus independent tests; and, although different treatments are involved before each of the four DD scores analyzed, each analysis of variance constitutes a separate test of Hypothesis II A. No single one of these analyses provides what may be considered statistically reliable support for Hypothesis II A, but the consistency of the findings from one analysis to the next constitutes support for the proposition that expectancy change during delay is influenced by initial expectancy and that the influence of
### Table 12

**SUMMARIES OF FOUR SEPARATE ANALYSES OF VARIANCE CONDUCTED UPON DELAY DIFFERENCE SCORES**

<table>
<thead>
<tr>
<th>Group</th>
<th>Score Preceding Sequence</th>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spaced A</strong></td>
<td>DD1</td>
<td>E₁ Level</td>
<td>2.354</td>
<td>1</td>
<td>2.354</td>
<td>1.346</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E₈ Level</td>
<td>18.846</td>
<td>1</td>
<td>18.846</td>
<td>10.775</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E₁ X E₈</td>
<td>4.071</td>
<td>1</td>
<td>4.071</td>
<td>2.328</td>
<td>.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within</td>
<td>68.221</td>
<td>39</td>
<td>1.749</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spaced A</strong></td>
<td>DD2</td>
<td>E₁ Level</td>
<td>9.198</td>
<td>1</td>
<td>9.198</td>
<td>3.094</td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E₁₆ Level</td>
<td>25.000</td>
<td>1</td>
<td>25.000</td>
<td>8.409</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E₁ X E₁₆</td>
<td>.329</td>
<td>1</td>
<td>.329</td>
<td>.111</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within</td>
<td>115.962</td>
<td>39</td>
<td>2.973</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spaced B</strong></td>
<td>DD1</td>
<td>E₁ Level</td>
<td>4.921</td>
<td>1</td>
<td>4.921</td>
<td>2.186</td>
<td>.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E₈ Level</td>
<td>24.877</td>
<td>1</td>
<td>24.877</td>
<td>11.052</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E₁ X E₈</td>
<td>.058</td>
<td>1</td>
<td>.058</td>
<td>.026</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within</td>
<td>94.548</td>
<td>42</td>
<td>2.251</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spaced B</strong></td>
<td>DD2</td>
<td>E₁ Level</td>
<td>4.151</td>
<td>1</td>
<td>4.151</td>
<td>2.599</td>
<td>.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E₁₆ Level</td>
<td>22.974</td>
<td>1</td>
<td>22.974</td>
<td>14.386</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E₁ X E₁₆</td>
<td>1.042</td>
<td>1</td>
<td>1.042</td>
<td>.652</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within</td>
<td>67.054</td>
<td>42</td>
<td>1.597</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
initial expectancy on $E$ change is contingent upon the predelay $E$ level. Beyond its role as a contingency factor, predelay $E$ level is clearly related to the extent of expectancy change that occurs during delay. Further analyses presented in a later section will make clear the role that predelay $E$ level plays in delay expectancy change. It may be mentioned now, however, that predelay $E$ in all cases is positively correlated with recent change scores. The greater the rise in expectancy with immediate success, the higher the predelay $E$, and the lower the drop in expectancy with immediate failure, the lower the predelay $E$. The negative correlation between $RC$ scores and $DD$ scores for the Spaced groups has been mentioned. The significant main effect of predelay $E$ level may only reflect the influence of recent change in expectancy upon expectancy change during delay.

**Percentile and Athletic History measures of GE and DD scores.**

Hypothesis II A was also tested using the Percentile Estimate and Athletic History measures of GE. Just as with the Initial Expectancy measure of GE, subjects were divided into groups high and low in GE and then further subdivided according to the predelay expectancy appropriate for each delay. Table 13 presents the resulting mean $DD$ scores for each subgroup. The upper half of the table shows the two Spaced Groups divided into high and low GE according to the Percentile Estimate. In the lower half, the same groups are divided according to the Athletic History measure of GE. In each case, the divisions for high and low predelay $E$ are the same as those used in constituting the High and Low Predelay $E$ Groups whose means are presented in Table 11. Therefore, ignoring the dichotomy in GE, the
Table 13

Mean delay difference scores for subgroups high and low in generalized expectancy and high and low in predelay expectancy

<table>
<thead>
<tr>
<th>Group</th>
<th>DD₁</th>
<th>DD₂</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hi-E₈</td>
<td>Lo-E₈</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td>Spaced A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hi-%-ile</td>
<td>15</td>
<td>-2.33</td>
</tr>
<tr>
<td>Lo-%-ile</td>
<td>9</td>
<td>-1.78</td>
</tr>
<tr>
<td>Spaced B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hi-%-ile</td>
<td>13</td>
<td>-.54</td>
</tr>
<tr>
<td>Lo-%-ile</td>
<td>10</td>
<td>-.80</td>
</tr>
<tr>
<td>Spaced A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hi-Ath.</td>
<td>11</td>
<td>-2.18</td>
</tr>
<tr>
<td>Lo-Ath.</td>
<td>13</td>
<td>-2.08</td>
</tr>
<tr>
<td>Spaced B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hi-Ath.</td>
<td>11</td>
<td>-1.10</td>
</tr>
<tr>
<td>Lo-Ath.</td>
<td>12</td>
<td>-.25</td>
</tr>
</tbody>
</table>
same individuals are always grouped together as either high or low in predelay E, but the grouping by the first predelay E (Eg) differs from that by the second predelay E (E₁₆), because for many individuals these scores are not the same.

When subjects are dichotomized into High and Low GE Groups by Percentile Estimates, the evidence in support of Hypothesis II A is much less strong than in the case of a dichotomization by Initial Expectancy. The DD₁ and DD₂ scores of Spaced Group B conform to the predicted pattern, but those of Spaced Group A do not. In Spaced Group B for both DD₁ and DD₂, the Low GE-High Predelay E Subgroups have the lowest mean DD scores, and the High GE-Low Predelay E Subgroups have the highest mean DD scores, while the other two Subgroups have intermediate mean DD scores. This relationship between the means of subgroups is consistent with Hypothesis II A. The analysis of variance applied to DD scores in the case of Initial Expectancy GE was not applied here, because the differences in DD scores between GE levels were less extreme than in the case of the Initial Expectancy GE measure. In the latter instance the analysis was not significant for the GE effect. A dichotomization of subjects by the Athletic History measure of GE affords no support whatever for Hypothesis II A. An examination of the DD score means in the lower half of Table 13 shows that the interrelationships among subgroup means within the two experimental groups at each delay, in no case clearly conforms to the pattern predicted by Hypothesis II A. No statistical analysis was made of DD scores grouped by the Athletic History measure of GE, since the absence of the predicted relationship is quite evident. A significant main effect for predelay
E would undoubtedly be forthcoming from this data and also from the data grouped by Percentile GE, because the subject grouping on the predelay E factor is the same as in the case of the dichotomization of subjects by Initial Expectancy.

**Prediction of the change in expectancy with delay from the Initial E-Predelay E discrepancy.** Rather than compare subjects dichotomously grouped for level of GE and predelay expectancy, the difference between a subject's level of expectancy on each of these variables may be treated as a continuous variable, a variable reflecting the direction and magnitude of change from the original level of generalized expectancy. Of the three measures of GE, only the Initial Expectancy measure was scaled in units which were directly comparable to those of the predelay E measures. By subtracting algebraically the value of the initial expectancy score from the predelay expectancy score, scores were derived for each subject to represent the nature of the discrepancy between GE and the level of expectancy existing at the time of each delay. These scores were called distant change (DC) scores because they reflected the net change in expectancy from the inception of the experiment to the last expectancy elicited before delay. Since there were two delays, each subject had two distant change scores: the first (DC₁) was derived from the difference between E₁ and E₈, the expectancy score preceding the first delay, and the second (DC₂) from the difference between E₁ and E₁₆, the expectancy score preceding the second delay.

Hypothesis II B states that the magnitude of the difference between the initial expectancy and the predelay expectancy is negatively
correlated with the change in expectancy during delay for spaced groups, but not for massed groups. The delay difference (DD) scores were used as the measure of expectancy change during delay, as before, and were correlated with the distant change (DC) scores pertaining to the same delay period. Table 14 presents the means and standard deviations of DC scores and the product-moment correlation coefficients between DC\_1 and DD\_1 and between DC\_2 and DD\_2 for Massed and Spaced Groups A and B. It can be seen that for both Spaced Groups at the first and second delays, the DC scores were negatively correlated with DD scores. All of these correlations were statistically significant. For the massed control groups, in no case was the correlation between DC and DD scores significant at the .05 level and, in two instances, the relationship is positive rather than negative. Therefore, Hypothesis II B received strong support. The direction and magnitude of change in expectancy from the initial statement to the predelay statement, is inversely related to the direction and extent of change in expectancy during delay.

Multivariate Prediction of Delay Change

Since the magnitude of expectancy change resulting from recent experience as well as that representing a deviation from the initial GE were both found to be related to delay expectancy change as measured by delay difference (DD) scores, the question arose as to whether they each make an independent contribution to the prediction of DD scores. First order partial correlation coefficients were computed for recent change (RC) and DD scores, with distant change (DC), held constant, and for DC and DD with RC held constant. These computations were repeated for the sets of scores pertaining to the first and second delay of both Spaced
TABLE 14
MEANS AND STANDARD DEVIATIONS OF DISTANT CHANGE
SCORES AND CORRELATIONS BETWEEN DISTANT
CHANGE AND DELAY DIFFERENCE SCORES

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>DC&lt;sub&gt;1&lt;/sub&gt; Mean</th>
<th>SD</th>
<th>DC&lt;sub&gt;2&lt;/sub&gt; Mean</th>
<th>SD</th>
<th>DC&lt;sub&gt;1&lt;/sub&gt; and DD&lt;sub&gt;1&lt;/sub&gt; r</th>
<th>p</th>
<th>DC&lt;sub&gt;2&lt;/sub&gt; and DD&lt;sub&gt;2&lt;/sub&gt; r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA</td>
<td>25</td>
<td>2.80</td>
<td>1.86</td>
<td>3.64</td>
<td>2.59</td>
<td>+.24</td>
<td>--</td>
<td>-.31</td>
<td>.10</td>
</tr>
<tr>
<td>SA</td>
<td>43</td>
<td>3.23</td>
<td>2.24</td>
<td>2.84</td>
<td>2.35</td>
<td>-.59</td>
<td>.001</td>
<td>-.51</td>
<td>.001</td>
</tr>
<tr>
<td>MB</td>
<td>22</td>
<td>2.55</td>
<td>2.17</td>
<td>2.45</td>
<td>1.72</td>
<td>+.22</td>
<td>--</td>
<td>-.07</td>
<td>--</td>
</tr>
<tr>
<td>SB</td>
<td>46</td>
<td>2.39</td>
<td>2.08</td>
<td>2.78</td>
<td>1.97</td>
<td>-.44</td>
<td>.01</td>
<td>-.34</td>
<td>.02</td>
</tr>
</tbody>
</table>

Groups A and B. They may be found in Column 2 of Table 15.

When delay follows a success-failure sequence, both recent change and distant change relate independently of one another to delay difference scores. This suggests that both expectancy change immediately before delay and the discrepancy of E level from GE level are factors influencing expectancy change during delay. The results are less consistent for the situation in which delay follows a failure-success sequence. Expectancy changes during an early delay (DD<sub>1</sub>) following a failure-success sequence are related to distant change, independently of the influence of recent change, but recent change scores are not related to delay difference scores, independently of the influence of distant change scores.
<table>
<thead>
<tr>
<th>Column 1 Product Moment Correlation</th>
<th>Column 2 First order Partial Correlation</th>
<th>Column 3 Second order Partial Correlation</th>
<th>Column 4 Multiple Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spaced A 1st Delay Failure</strong>&lt;br&gt;N=43</td>
<td><strong>Success</strong>&lt;br&gt;r_{01}=-.46***</td>
<td>r_{01.2}=-.08</td>
<td>r_{01.23}=.00</td>
</tr>
<tr>
<td></td>
<td>r_{02}=-.59***</td>
<td>r_{02.1}=-.43***</td>
<td>r_{02.13}=-.30*</td>
</tr>
<tr>
<td></td>
<td>r_{03}=-.56***</td>
<td></td>
<td>r_{03.12}=-.22</td>
</tr>
<tr>
<td><strong>Spaced B 1st Delay</strong>&lt;br&gt;N=46</td>
<td><strong>Success</strong>&lt;br&gt;r_{01}=-.39***</td>
<td>r_{01.2}=-.29*</td>
<td>r_{01.23}=-.20</td>
</tr>
<tr>
<td></td>
<td>r_{02}=-.44***</td>
<td>r_{02.1}=-.36**</td>
<td>r_{02.13}=-.30**</td>
</tr>
<tr>
<td></td>
<td>r_{03}=-.42***</td>
<td></td>
<td>r_{03.12}=.03</td>
</tr>
<tr>
<td><strong>Spaced A 2nd Delay</strong>&lt;br&gt;N=43</td>
<td><strong>Success</strong>&lt;br&gt;r_{01}=-.64***</td>
<td>r_{01.2}=-.55***</td>
<td>r_{01.23}=-.50***</td>
</tr>
<tr>
<td></td>
<td>r_{02}=-.51***</td>
<td>r_{02.1}=-.36**</td>
<td>r_{02.13}=-.28*</td>
</tr>
<tr>
<td></td>
<td>r_{03}=-.53***</td>
<td></td>
<td>r_{03.12}=.02</td>
</tr>
<tr>
<td><strong>Spaced B 2nd Delay</strong>&lt;br&gt;N=46</td>
<td><strong>Success</strong>&lt;br&gt;r_{01}=-.60***</td>
<td>r_{01.2}=-.54***</td>
<td>r_{01.23}=-.54***</td>
</tr>
<tr>
<td></td>
<td>r_{02}=-.34**</td>
<td>r_{02.1}=-.13</td>
<td>r_{02.13}=.04</td>
</tr>
<tr>
<td></td>
<td>r_{03}=-.38***</td>
<td>r_{03.12}=-.28*</td>
<td></td>
</tr>
</tbody>
</table>

* p < .10  
** p < .05  
*** p < .01

**Note:** Variable 0 = Delay Difference Score  
Variable 1 = Recent Change Score  
Variable 2 = Distant Change Scores  
Variable 3 = Predelay E Scores
The situation is exactly reversed for the second delay following a failure-success sequence. There, it is the recent change score which is related independently of distant change influence to expectancy change with delay, while distant change has no independent relationship to delay difference scores. It cannot be concluded from these findings that recent change and distant change do not both influence delay expectancy change after a failure-success influence. It may simply be that their influences are congruent. If this is the case, only if one were a stronger influence than the other could it be expected that either would relate independently of the other to the delay change scores. The relative magnitude of the correlations of recent change and distant change with delay change, at the first delay as compared with the second delay, suggests that the Initial E - Predelay E discrepancy exerts a greater influence upon change in expectancy with delay early in the sequence, and that the change in expectancy immediately before delay exerts a stronger influence upon delay change later in the sequence.

It was noted in conjunction with the analysis of variance of delay difference scores that the magnitude of DD scores was negatively related to the height of the predelay expectancy. The higher the predelay E, the greater the drop in expectancy during delay. Since the height of predelay E is dependent upon preceding expectancy changes, the observed relationship of predelay E to DD scores may merely reflect the influence of these preceding expectancy changes. The possibility does exist, however, that the height of the expectancy just prior to delay may have some influence, in its own right, upon the changes that
occur during delay. For this reason, second order partial correlations were computed between predelay E and DD scores with recent change and distant change held constant. These coefficients are presented in Column 3 of Table 15.

The second order partial correlations indicate the possibility of a relationship between predelay E and DD scores independent of RC and DC influence, but such a tendency is only in evidence after the failure-success sequence, and neither of the correlations reach the .05 level of confidence. It was after the failure-success sequence that the relationship between predelay E and DD scores was highest in the massed groups, which suggests that the independent influence of predelay scores stems from their unique association with the differential effect of the last reinforcement before delay.

The two significant second order partial correlations between recent change and DD with predelay E and distant change held constant, leaves no doubt that recent change is independently related to expectancy change during a delay which comes late in an experience sequence. The possibility of attributing differential delay change solely to the height of the predelay E level, is ruled out by this finding, and also by the existence of a significant second order partial correlation between distant change and DD with recent change and predelay E held constant. In general, the second order partial correlations provide strong support for an independent influence upon DD scores for both recent change and distant change, and tentative support for predelay E.

Multiple correlation coefficients were computed using RC and DC as predictors of the dependent variable, DD. The additional variance in DD scores which can be accounted for by the simultaneous consideration
of RC and DC is not appreciably greater than that which can be accounted for by considering DC alone, in the case of the first delay, and RC alone, in the case of the second delay. Neither does the addition of a third predictor variable, the predelay E, yield a multiple correlation coefficient which is appreciably larger than the simple correlation of either RC or DC with DD. The simple and multiple correlations mentioned above may be found in columns 1 and 4 respectively, of Table 15.

**DD Scores And Other Personality Measures**

For most of the subjects who participated in this research, scores were available from four scales measuring the following characteristics: social desirability, independence of judgement, internal-external control, and general adjustment. The correlations between each of these scales and DD scores indicate the extent to which the personality variables in question may influence the changes in expectancy that occur during delay. The intercorrelations among the personality measures themselves were presented in Table 10 on page 84. The product-moment correlations of each measure with DD₁ and DD₂ for Spaced Groups A and B are presented in Table 16. No predictions were stated in advance concerning the nature of the relationships to be expected between DD scores and these personality variables.

It can be seen in Table 16 that only one of the correlations between DD scores and personality variables was significant at the .05 level. Since sixteen coefficients were computed, the possibility exists that this one may be due to chance. Assuming for the moment that a true correlation exists, the relationship of social desirability to expectancy change during delay, since it only appears when delay occurs early in
an experience sequence following a failure-success reinforcement sequence. In general, it may be concluded that none of the personality variables which were investigated bear a consistent relationship to the expectancy changes that occur during delay in an experience sequence.

**TABLE 16**

**PRODUCT-MOMENT CORRELATIONS BETWEEN DELAY DIFFERENCE SCORES AND FOUR PERSONALITY MEASURES**

<table>
<thead>
<tr>
<th>Personality Measures</th>
<th>Spaced A</th>
<th>Spaced B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Failure-Success</td>
<td>Success-Failure</td>
</tr>
<tr>
<td></td>
<td>DD₁</td>
<td>DD₂</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>r</td>
</tr>
<tr>
<td>Social Desirability</td>
<td>36</td>
<td>.35*</td>
</tr>
<tr>
<td>Independence of Judgement</td>
<td>36</td>
<td>-.17</td>
</tr>
<tr>
<td>Internal-Ext. Control</td>
<td>33</td>
<td>.03</td>
</tr>
<tr>
<td>Adjustment</td>
<td>43</td>
<td>-.04</td>
</tr>
</tbody>
</table>

* p < .05
The discussion of the findings of this research parallels the order of presentation of the hypotheses. Consideration is given to the relative strength of the two hypothesized influences upon expectancy change during delay and to further deductions and predictions based upon this research.

Support for the First General Hypothesis

The first hypothesis, it will be recalled, states that the shift in expectancy during delay is a function of the sequence of prior expectancies in the situation. In order to make the observation relevant to the hypothesis, the trend of expectancy change was deliberately controlled. The sequences of success and failure were effective in producing the desired patterns of expectancy change before delay. The failure-success sequence produced low expectancies early in the sequence and higher levels of expectancy later in the sequence prior to delay. The reverse was true of the success-failure sequence; high levels of expectancy were obtained early in the sequence and there was a subsequent decline prior to the imposed delay.

Following the first delay, the level of expectancy was not a simple function of the order of success and failure, neither was it a simple function of the length of the delay. For the groups with short delay the shift between predelay and postdelay measurements represents an extrapolation from their prior pattern of expectancies, i.e., the
group which had been successful before delay had a sharp upswing in expectancies before delay (c.f. Fig. 6). The increase was maintained over the very brief delay. An analogous change was observed for the success-failure group, with the short delay, which shifted downward. The downward trend was continued over the short delay. On the other hand, the group which had a long delay exhibited a discontinuity which one is tempted to label a "regression toward the mean" of previous expectancies. In brief, the long delay groups seemed to take into account the entire experience of the day before, whereas the group with short delay showed a continuity with the trials immediately preceding delay. A long delay preceded by a failure-success sequence had a depressing affect upon expectancy, and one preceded by a success-failure sequence had an elevating affect upon expectancies.

Previous theory concerning expectancy change would have predicted no difference between the expectancy levels of these four groups at the point following delay, since they started with equivalent expectancy levels and experienced the same total reinforcement both in quantity and quality. The significant interaction after the delay indicates that the level of the expectancy at that point is a joint function of the order of success and failure and the length of the delay.

The most striking support for the first general hypothesis came from the analysis of individual patterns of expectancy change. It was the individuals who exhibited the greatest drop in expectancy from the level held earlier, who evidenced the most positive expectancy change during a long delay; and it was the individuals who showed the most rise in expectancy from the level held early in the sequence who tended to
lower expectancies most during a long delay. This inverse relationship between change from earlier expectancy and change in expectancy with delay was found for subjects experiencing the same sequence of reinforcements. The implication is that a knowledge of an individual's pattern of predelay expectancy change would result in a better prediction of his expectancy change with delay than a knowledge of the predelay order of reinforcements he experienced.

All of the findings above are consistent with those of Phares (1961, in press) although his studies were restricted to the failure-success sequence. Rychlak (1962) made observations concerning changes in GE after success, in one case, and failure in another, which were similar to the changes in expectancy reported here. He found that delay attenuated the effects of success or failure upon GE, and he characterized the phenomenon in terms of a "regression" in GE toward the former level of GE. His findings have relevance here because the distinction between GE and E is purely a matter of degree. The greater the similarity between situations, the more appropriate it is to speak of an expectancy for that type of situation. As situations decrease in similarity, one begins to speak of expectancies generalizing from one situation to another, with the degree of generalization depending upon the extent to which they are similar.

The findings of the major study are also consistent with those of the preliminary studies. In the third preliminary study, the positive change that occurred when delay followed a success-failure sequence was more pronounced than that found in the major study. An explanation of this difference may lie in the fact that the negative change in expectancy
before delay was greater in the preliminary study, no doubt because of the additional failure which was included in the sequence before delay. The differences between groups are similar to what has been observed on an individual basis; namely, that the more negative the expectancy change preceding delay the more positive the change during delay.

**Individual difference in expectancy change.** The extent of the variation in response to the same reinforcement conditions was rather surprising. Within the framework of Social Learning Theory, appreciable variability in expectancy level is expected only on the first few trials of a new task. The initial differences, which are due to variation in GE, are expected to disappear very quickly, as the common sequence of reinforcements received in the situation comes to play the primary role in determining expectancy level for that situation. Nonetheless, late in the sequence some subjects in this study showed marked expectancy changes as a result of a few reinforcements while others showed little or no change under the same conditions. Rotter (1945) and others have observed analogous behavior in the level of aspiration situation, and have attempted to describe syndromes of response which were given diagnostic significance.

A question worth considering at this point is whether these response patterns represent true changes in the expectancy for success or merely response styles which are affected to obtain some gratification extraneous to the manifest conditions of reinforcement in the experiment. If one accepts the view that expectancy change with delay is a readjustment of true expectancy, it follows that the observed individual differences in patterns of reported expectancy reflect true expectancy, since
these patterns were consistently found to be related to expectancy change with delay. Furthermore, if the individual differences in pattern of expectancy change prior to delay reflect predominately response tendencies and not true differences in expectancy, a direct rather than an inverse relationship to expectancy change during delay would have been expected. To illustrate this point further, the individual who has had a marked drop in expectancy prior to delay, in all probability, will exhibit a rise in expectancy level after delay, despite the fact that his last trial was a failure. If he were not stating true expectancies, but merely attempting to attain some form of reward for spuriously lowering expectancies, it seems unlikely that his need structure would change to such an extent that, upon reentering the situation after delay, he would abruptly and illogically state a higher expectancy. It would seem more plausible that a true change in expectancy had occurred during delay, a change of such a magnitude that he was willing to raise his stated expectancy and risk the negative social sanction that he might well expect for the inconsistent behavior of stating a higher expectancy after a failure trial.

The same rationale applies to the individual who maintains high expectancies in the face of failure and who, after delay, suddenly exhibits a marked decrease. In the latter instance, however, the case for true expectancy change is not quite so strong. It could be argued that a commitment phenomenon like that investigated by Watt (1962) had been operative in the situation before delay, and that delay had reduced the commitment, permitting the subject to lower his stated expectancy.

Some individuals exhibited no drop in expectancy with failure
and/or no rise in expectancy with success. Therefore, not all individuals were overly influenced by recent experience. On the contrary, some individuals were insufficiently influenced. If the above observation had been made for a situation and task with which subjects were highly familiar, the judgment of insufficient influence could not be made, because one would expect stable expectancies in a highly familiar situation. Since expectancy change during delay is dependent upon the individual course of previous expectancy change, and since the latter is somewhat independent of the pattern of reinforcements, the theorist must look to some characteristic of the individual that exists prior to the experiment in order to achieve a precise prediction of the pattern of expectancy change which will occur prior to delay and the accompanying change in expectancy which can be anticipated during delay.

In this connection it may be noted that there was observed a significant tendency for those individuals who were markedly affected by failure also to be markedly affected by success, and for those who were unaffected by the one to be unaffected by the other. The isolation of the independent characteristics which identify those people who exhibit unusual patterns of expectancy change is beyond the scope of this study. The studies by Crandall (1962), Rychlak (1962), and Rotter (1945) deal with this problem.

The Influence of Generalized Expectancy

Limited support was found for the hypothesis that expectancy change during delay is influenced by generalized expectancy. Of the three measurements of MSGE only the Initial Expectancy measure yielded
relationships which supported the second general hypothesis, but all findings with this measure were perfectly consistent with the hypothesis.

It was observed that changes in expectancy during delay tended to be in the direction of the initial expectancy as would be the case if GE influenced expectancy during a long delay. Subjects with high expectancies at the time of delay who had low initial expectancies tended to drop most in expectancy during delay. Those with low expectancy levels at the time of delay who were high in initial expectancy tended to drop less, or under some conditions, exhibit a rise in expectancy during delay. In terms of the absolute level of expectancy, the further the net rise in expectancy from the initial level, the greater the drop or less the rise in expectancy during a long delay. This inverse relationship between change from the initial level and delay change was not observed in the group who experienced the short delay. This fact indicates that influences associated with the initial expectancy either do not affect expectancies during massed trials or else have a much stronger effect during delay.

The influence of initial expectancy during delay could not be measured directly, because expectancy change with delay was affected as well by the patterns of expectancy change occurring prior to delay. However, an analysis by means of partial correlations established that each of these variables, initial expectancy and previous expectancy pattern, had an independent influence upon expectancy during delay. Following a success-failure sequence, therefore one might find a subject with a low initial expectancy actually exhibiting a rise in expectancy during delay, simply because the positive influence associated with
success expectancies held early in the sequence was stronger than the negative influence associated with the initial expectancy level.

**Evaluation of measurements of GE.** In view of the failure to find support for the second general hypothesis using two of the three measurements of GE, some consideration must be given to the similarities and differences among the three measurements. The correlations between measurements of GE and four personality variables were unimpressive. By contrast, each of the three measurements of GE was significantly and moderately correlated with the other two. This fact suggests that they all measured something in common, presumably motor skill GE (MSGE). The seeming adequacy of all three as measurements of MSGE, places some limits upon the generalizations that one can make on the basis of a relationship found for only one of these measurements. If one could argue that Initial Expectancy were the better measurement of MSGE, then it would be justifiable to make theoretical generalizations on the basis of a relationship found only for Initial Expectancy. Although Initial Expectancy has been the measurement of GE most frequently used in expectancy research, this is not sufficient support for its superiority. Its merit follows from the fact that it has frequently been related to other variables in the manner predicted by deductions from the theory including the construct GE. The fact that it is the only one of the measures immediately followed by a validating event suggests that subjects may be less inclined to bias their statements of expectancy in a socially desirable direction. The Athletic History is not conducive to distortion of this sort. Neither it nor the Percentile Estimate were correlated
with social desirability as one would predict if such bias affected scores.

When considered with regard to breadth of the category of related experience contributing to the generalized expectancy, the Athletic History measure is perhaps the broadest of the three. Before the measurements of Percentile Estimate and Initial Expectancy were obtained, the subject had seen the task he was to perform. The appearance of the apparatus and the accompanying description of the task by the experimenter may have provided cues which enabled the subject to restrict the category of experience from which he generalized expectancies. If such were the case, it would still not account for a difference between the two measurements, since both were obtained under similar circumstances. A difference which might be cited is that the Percentile Estimate consisted of the subject's judgement of his degree of success relative to others on the entire task, whereas the Initial Expectancy consisted of the subject's indication of his chances of success solely on the first trial. As indicated in the background chapter, such factors as the subject's suspicion or caution would be more likely to affect his Initial Expectancy than his Percentile Estimate. The significant correlation between adjustment and Initial Expectancy tends to support this point. The poorly adjusted subject is more likely to be threatened by a test situation and to react by stating defensively low initial expectancies for an untried task. The correlation between the measure of conformity and initial expectancy suggests that this defensive maneuver was more accessible to those subjects who were less sensitive to implicit social pressures to state high initial expectancies.
On the other hand, the correlation between adjustment and initial expectancy may simply indicate the generalization of failure expectancies on the part of the poorly adjusted subject.

The Initial Expectancy is the only one of the three measurements of GE that is likely to be affected by the experimenter's communication concerning the difficulty of the task. The Athletic History would, of course, be unaffected. The Percentile Estimate is not likely to reflect the experimenter's communication with regard to difficulty, because it measures GE for success on a relative scale, viz., the percentage of other individuals that the subject will exceed when all are performing under the same conditions of difficulty. The Initial Expectancy is an absolute measure of the expectancy, since it is a subjective estimate of the probability of reaching a score of 80. If the subject is led by the experimenter to believe that the task is difficult, his initial expectancy, irrespective of generalized expectancy level, will be low. (Most subjects seemed to expect the task to be difficult. The mean expectancy was 3.8, or in verbal terms, less than "a little doubtful of success.") Thus, Initial Expectancy scores obtained under the same communication conditions reflect individual differences in generalized expectancy and also individual differences in interpretation of the experimenter's communication regarding the difficulty of the task. The instructions were carefully designed to give no implication of systematic difference in difficulty from trial to trial; however, it may be assumed that subjects expected to improve somewhat on subsequent trials, since they were dealing with a skill task. Furthermore, there may have been variation in this generalized expectancy concerning the initial versus
later difficulty of motor skill tasks. Therefore, the initial expectancy level of individuals cannot be viewed as a probabilistic representation of the generalized expectancy for success, because it has been influenced by communications concerning the specific task at hand.

In summary, the factors which may influence Initial Expectancy and again influence expectancy after a delay are the following: (1) individual differences in interpretation of the experimenter's communications about the difficulty of the task, (2) individual differences in caution, (3) and individual differences in a generalized expectancy that initial trials are harder than subsequent trials. Each of these three factors is not likely to have as great an effect upon either the Percentile measurement of MSGE or the Athletic History as it has upon the Initial Expectancy. Phares (in press) hypothesized that the experimenter's characterization of the task may influence expectancy during delay. The relationship found here between initial expectancy scores and change in expectancy with delay is compatible with that hypothesis. The analysis also suggests that the influencing factors in initial expectancy have been generalized from a very broad category of situations such as skill tasks in general.

The Influence of Recent Change and Delay Change

It is interesting to note that the Delay Change scores (reflecting initial expectancy influence) had the highest correlation with the first Delay Difference score, whereas the Recent Change score (reflecting situational expectancy influence) had the highest correlation with the second Delay Difference score. These relationships suggest that
those factors which account for the variance in initial expectancy scores, although related to expectancy during a delay, are likely to have a decreasing influence during later delay as the experience in the situation increases. The influence of the pattern of prior expectancy change seems to play a greater role than initial expectancy in influencing expectancy change during later delays. A certain parallel to the effects of GE and E* upon E may be noted here. Within a series of trials the influence of GE upon E decreases rapidly and is replaced as the determiner of E by E* (expectancies derived from experience in the situation).

Another point worthy of note relevant to the influences of initial expectancy and situational expectancy is that these influences must oppose one another under some circumstances. After a success-failure sequence the influence of former situational expectancies for most subjects would be positive, since they had experienced a drop in predelay expectancy; whereas, the influence of initial expectancy would be negative, since nearly all subjects had lower initial expectancies than just prior to delay. Herein may lie the explanation for the failure to find a significant difference between the magnitude of the second Delay Difference scores for Massed and Spaced groups following a success-failure sequence. For many spaced subjects the two significant influences upon expectancy level may have cancelled each other, while for Massed subjects these influences simply had no opportunity to affect expectancy level. Had initial expectancies been high, one would have perforce expected the mean expectancy changes during delay, following the success-failure sequences, to be much more positive than was actually observed.
The Permanence of Delay Effects

The results of this study clearly demonstrated that delay permits certain factors to influence expectancy which have less influence during massed experience. Although the purpose was primarily to test several hypotheses concerning factors which affect delay change, in the process data have been collected which bear upon the extent and relative permanence of delay-induced expectancy changes.

The original studies in this area by Phares (1961) demonstrated quite marked discrepancies between the final expectancy levels of groups receiving the same reinforcements but differing relative spacing of trials. He found that a group with only two trials per day experienced a much slower rise in expectancy than a group experiencing all trials on the same day when the reinforcement sequence yielded increasingly higher objective probabilities of success. A second spaced group, experiencing four trials per day, did not differ from the massed group in final expectancy level. In the present study, with eight trials per day, there was no difference in final expectancy level between the massed and spaced groups. The work of Phares is thereby corroborated for approximately the same degree of spacing. Significant transient effects of spacing upon expectancy were observed, however, and these effects were both positive and negative in direction depending upon the preceding pattern of expectancy change and the initial expectancy level. The implications of these findings for sequences of experience with more frequent spacing are of considerable importance. It was mentioned in the introduction to this study that much of the behavior exhibited by individuals, particularly the interpersonal behavior frequently labeled
"personality", does not occur in closely clustered groups of trials. On the contrary, each of several related experiences is likely to be separated by at least several minutes and in most instances by hours, days, or even weeks. Phares' work indicates that under such frequent spacing expectancy rise congruent with objective probability occurs much more slowly than under conditions in which several trials are grouped. The findings of this study with regard to delay expectancy change after a success-failure sequence would lead to the following prediction: When an individual has had experiences resulting in a high expectancy, a decrease in the objective probability of reinforcement will result in a slower rate of expectancy decline when the trials are widely spaced. This formulation is deduced from the findings of this study and certain generalizations from the work of Phares. It is in need of empirical support; but, because of its vast potential utilization in practical efforts to induce behavioral change, it ought not to be neglected.

**Broader Implications of Delay Effects**

If the above hypothesis were supported, taking into consideration the findings of Phares, one would have the basis for a more powerful generalization; namely, that expectancy change, either positive or negative, proceeds more rapidly under conditions of massed than of spaced experience. Such a generalization would be directly opposite to that which is offered for the learning of verbal and motor skills, since it has been found that spaced practice is usually superior to massed practice in learning verbal and motor skills. Whether this broad generalization is supported or not, the findings of this study clearly
indicate that the formulae of social learning theory dealing with increments and decrements in expectancy need to include a variable for time delay.

By taking into account the possibility that expectancies change more rapidly with massed experience, the psychotherapist might more efficiently bring about changes in his client's expectancies, which, in turn, would result in behavioral change. Often the therapist directly reinforces certain behaviors of the client. If he were to wait for a behavior of a given class to occur spontaneously, he might have a long wait. Moreover, the instances of the behavior would be widely separated. With a long delay between experiences, GE and expectancies held earlier for the same situation might tend to move expectancies in the direction of their former level. By his communications with the client, the therapist could elicit the behavior several times in close succession. The expectancy change resulting from his reinforcements would then occur more rapidly, since GE factors would not have an opportunity to influence expectancy. Thus the length of the therapeutic process would be shortened. However, the massing of experience in therapy would have the undesirable accompaniment of an abrupt shift of expectancy in the direction of the former level at the end of the period of massed experience. A consequence of this regression would be a disconcerting return of the client's old symptoms. If the reoccurrence of symptoms is likely to have an adverse affect upon the client's hope of obtaining a permanent change, it would seem advisable to space experience in order to minimize regression between therapeutic experiences. In some instances the therapist might choose, on the basis of the total constellation of
problems presented by the client, to affect a dramatic temporary change, and in other instances to affect a gradual change which would be free from marked relapses between relevant experience.

Explaining stability in personality. A task which faces every personality theorist is that of accounting for the often intractable consistency of personality. For this purpose Freud invented the concept of fixation, and others rely upon the notion of constitutional traits, neither of which account well for the infinite variety of solidified patterns of personality emerging from diverse cultural molds. Although this study has focused upon change, its opposite, stability, has been lurking in the wing throughout. The very factors which have been shown to influence expectancy change during delay, may alternatively be conceived of as factors making for consistency and stability in the personality. During delay these factors appear to nullify to some extent the effects of recent experience. In the absence of the support of immediate experience, the newly acquired level of expectancy yields to the influence of the past, the influence of earlier expectancies and generalized expectancies. The finding of this study together with those of Phares (1961, in press) and Rychlak (1962) provide increasing support for the adequacy and importance of the concept of generalized expectancy in explanations of the resistance of the personality to permanent change.
CHAPTER VI

SUMMARY AND CONCLUSIONS

This study was concerned with certain factors affecting expectancy change. Expectancy, a major construct in Rotter's social learning theory, is defined as the subjectively held probability that a given reinforcement will occur as a function of a particular behavior in a specific situation. Since expectancy plays an important role in theoretical formulations for the prediction of behavior, it is quite understandable that a significant body of research now exists concerning factors which affect the acquisition and change of expectancies. Considerable support has been provided for Rotter's thesis that an individual's expectancy for reinforcement in a given situation is a function of his past history of reinforcements in that situation and in related situations.

Studies of expectancy change have investigated four types of variables; the sequence of reinforcements administered, the nature of the behavioral task employed, individual differences existing prior to the experiment, and the spacing between trials. It is this last variable which only recently has been considered a factor affecting the rate of expectancy change. The studies reported thus far (Phares 1961, in press) have clearly shown that rate of increase in expectancy is a function of the relative massing of experience, and that expectancy change occurs spontaneously during a delay in a sequence of reinforced behaviors.

The purpose of this investigation has been to test two general hypotheses concerning the origin of the influences which produce expect-
ancy change during delay. The first hypothesis states that it is the subject's consideration during delay of his earlier experience in the same situation which causes a change in expectancy during delay. Massed trials immediately preceding a given expectancy statement are thought to strongly influence the level of expectancy. A delay removes the subject from the immediate presence of cues associated with recent reinforcement, and his expectancy level changes as a result of his shift to a more equivalent consideration of the total experience in the experimental situation.

The second hypothesis states that it is the subject's recollection of his experience in tasks other than the experimental task which results in the expectancy change during delay. In other words, expectancies generalized from related situations determine initial expectancy levels, then are suppressed during massed experience. These generalized expectancies again influence specific expectancies during delay, resulting in a movement of the expectancy level in the direction of generalized expectancy (GE).

A precondition for testing the first hypothesis was the production of expectancy levels early in the sequence which differed markedly from those observed later in the sequence prior to delay. By incorporating in the design two reinforcement sequences, the direction of the difference between early and later expectancy level could be varied, thus permitting an assessment of its influence upon expectancy change with delay. The only additional data required for a test of the second hypothesis was a measurement of generalized expectancy for the behavioral task employed. Three separate measurements of this variable were obtained at
the beginning of the experiment.

A motor skill task, controlled by the experimenter without the subject's knowledge, was used to deliver predetermined sequences of successful and failing trials. A statement of expectancy for success was elicited from each subject before every trial. Four subject groups were used: a massed group and spaced group received one reinforcement order, and a second massed group and spaced group received a reversed reinforcement order. Spaced Group A and its massed control group received a success-failure block of trials followed by delay and a failure-success block followed by a second delay. Spaced Group B and its massed control experienced the same reinforcement blocks in reversed order, first a failure-success block followed by delay and then a success-failure block followed by delay. After the second delay, each group finished the experiment with a block of four successful trials. The delay periods for spaced groups lasted 24 hours while those for massed groups were only 30 seconds.

By subtracting algebraically the value of the expectancy last reported before each delay from that reported immediately after delay a measurement was obtained which reflected expectancy change during delay. This measurement was employed in testing five experimental hypotheses, three derived from the first general hypothesis (Hypotheses I A, B, and C) and two derived from the second general hypothesis (Hypotheses II A and B). In addition, measurements of general adjustment, social desirability, conformity, and internal-external control were obtained for most subjects. These personality variables were correlated with delay expectancy change scores and the three measure-
ments of GE. No hypotheses were formulated in advance concerning these relationships.

Conclusions

In this section each experimental hypothesis will be presented together with the findings relevant to it.

I A When delay is preceded by a failure-success sequence, the expectancy change during delay for spaced groups will be more negative than that for massed groups.

Strong support was found for this hypothesis. Statistically significant differences in the predicted direction were found in both the A and B reinforcement sequences, i.e., when the failure-success sequence appeared either before the first or the second delay. It was also found that the variance of scores reflecting expectancy change with delay was significantly greater for the spaced groups than for the massed groups under each of these conditions.

I B When delay is preceded by a success-failure sequence the expectancy change during delay for spaced groups will be more positive than that for the massed group.

This hypothesis was clearly supported for the first delay preceded by a success-failure sequence, however, the difference in expectancy change with delay between the massed and spaced groups was not significant for the second delay period. Nevertheless, there was significantly greater variation in the change in expectancy with delay for the spaced group at both the first and second delay periods following this sequence. Thus, at every delay period the spaced groups exhibited
greater variability in expectancy change.

I C The magnitude of expectancy change resulting from a group of reinforcements opposite in sign to earlier reinforcements and occurring immediately before delay will be negatively correlated with the magnitude of expectancy change which occurs during delay.

In order to test this hypothesis a recent change score was derived which consisted of the difference between the expectancy level at the end of an earlier homogeneous group of reinforcements and the expectancy level as last assessed before delay. This score reflected the amount of change in expectancy when a shifting from repeated failures to success in the case of a failure-success block, or a shift from repeated success to failure in the case of the success-failure block. It was given a positive sign if it represented an increase in expectancy, and a negative sign for a decrease.

In every case a significant inverse relationship was found between recent change in expectancy and expectancy change during delay for spaced subjects. For massed subjects, in no case was the relationship significant. This finding supports the first general hypothesis, viz., expectancies held earlier in the situation influence expectancies during a delay.

II A Those subjects who are high in both generalized expectancy (GE) and expectancy level just prior to delay, and those subjects who are low in both GE and predelay expectancy will exhibit little change in expectancy during delay. However, those subjects who differ in GE and predelay expectancy will exhibit delay ex-
pectancy change in the direction of their generalized expectancy.

Of the three measurements of GE, only Initial Expectancy yielded subgroups of individuals whose changes in expectancy during delay were clearly consistent with the above hypothesis. The absence of predicted differences among subgroups when classified by the other two measurements of GE was discussed and explanations were proposed which took into account differences in the measurements of GE.

II B The magnitude of the expectancy change from initial expectancy to predelay expectancy will be negatively correlated with expectancy change during delay in spaced groups, but not in massed groups.

The net change in expectancy level from the inception of the experiment to the point before delay was given a positive value if it consisted of an increase in expectancy level and a negative value for a decrease. For spaced groups only, a significant inverse relationship was found between the change in expectancy from the initial level and the change which occurred during delay. In no case was the relationship significant for massed groups. This finding supports the second general hypothesis in that it is consistent with a renewed influence of GE upon expectancy during delay.

Three factors were found to be negatively correlated with expectancy change during a 24-hour delay: (1) the change in expectancy occurring shortly before delay, (2) the deviation from the initial level of expectancy at the time of delay, and (3) the level of expectancy prior to delay. Partial correlations were computed to assess the independence of the influences upon delay expectancy change. It was found that, under
one or more of the four conditions of 24-hour delay, each was significantly related to expectancy change during delay, independently of the other two. For the first delay, this analysis also suggested that, the influence of generalized expectancies upon delay expectancy change was relatively stronger than the influence of expectancies produced earlier within the situation, and that the situational expectancies were relatively stronger for the second delay.

The findings of this study indicate that expectancies are affected during delay by expectancies held prior to experience in the situation and by expectancies generated earlier in the same situation. It appears that these influences would have a stronger stabilizing effect upon expectancy when trials are widely separated, thus making expectancies more resistant to change in either direction. It follows that if expectancy change is desired, massing of experience might be employed to minimize the tendency for these influences to move expectancies toward former levels. Time delay is a variable that clearly needs to be included in the formulae of social learning theory dealing with increments and decrements in expectancy.
10 I am very confident that I shall succeed on this trial.
9 I am quite confident that I shall succeed.
8 I am fairly confident that I shall succeed.
7 I am rather confident that I shall succeed.
6 I am somewhat confident that I shall succeed.
5 I am slightly confident that I shall succeed.
4 I am a little doubtful that I shall succeed.
3 I am somewhat doubtful that I shall succeed.
2 I am fairly doubtful that I shall succeed.
1 I am very doubtful that I shall succeed.
0 I am quite sure I shall not succeed on this trial.
APPENDIX B

PERCENTILE CHART
Select a number from those listed below to indicate the number of male college students out of the average 100 that you expect to exceed in overall score.

100  Much better than average.
95   Somewhat better than average.
90   Slightly above average.
85   Slightly below average.
80   Somewhat poorer than average.
75   Much poorer than average.
70   Poorer than average.
GENERALIZED EXPECTANCY FOR SUCCESS IN ATHLETIC ACTIVITY

Scoring Manual

This manual is designed to facilitate the assessment of an individual's generalized expectancy for success in athletics from the information elicited by a questionnaire concerning athletic activity. The questionnaire requests that the individual list the activities in which he has participated at various ages, describe the nature of the organizational context of the activity, indicate his extent of participation, and estimate his degree of proficiency relative to other participants. The first section of the manual sets forth the theoretical framework and the assumptions used in constructing the relatively objective scoring system. The second section delineates for each scored item of the questionnaire the categories of response which receive various score values.

Theoretical Framework and Assumptions

The expectancy for success in any given situation can be assessed by simply asking the individual to estimate his chances of success if he were to perform a certain behavior in that situation. This procedure follows from Rotter's (1954) definition of an expectancy as the subjectively held probability that a given reinforcement will occur in a given situation contingent upon a particular behavior. A method of assessing expectancy which is less direct than the simple verbal report is that of inferring expectancy level from the past experience of the individual. The latter is the method employed in the technique described
here. Since expectancies have been shown to be a function of the past
history of reinforcement in a given situation and to roughly parallel
the objective probability of reinforcement calculated from the past
history, it follows that an individual who has frequently been success-
ful at baseball will have a rather high expectancy for success in
baseball-playing situations. The problem faced in constructing this
manual was that of establishing principles for deducing the frequency
of past athletic success and, hence, the expectancy which might logically
be inferred from each type of athletic participation. The assumptions
made in constructing the scoring system and the rationale behind them
are discussed below. These principles should be considered when scoring
issues arise which do not readily fit the objective scoring categories
and the examples incorporated in the second section of the manual.

Extent of experience. An individual with a great deal of
athletic experience is likely to have a higher expectancy for success
at athletics than his inexperienced contemporary. There are two indep-
endent lines of argument that support this assumption. The first of
these considers the fact that practice improves motor skill; therefore,
the more experienced individual is likely to be a more skilled individual.
Given two people of equal aptitude, the one who has had greater experi-
ence has probably achieved greater skill, thereby achieving greater
and more frequent success which would lead to a higher expectancy for
success. Secondly, the individual who experiences failure at athletics
is likely to seek alternative activities as sources of satisfaction,
while he who succeeds is likely to continue in athletic participation.
Thus, aside from the effects of participation itself, one would anticipate that self-selection operates to restrict highly experienced individuals to primarily those with high expectancies for success at athletics.

In view of these assumptions, in those cases where the individual believes himself to be at least average at some athletic activity, a higher score is assigned for greater participation.

**Circumstances of athletic participation.** It would appear that athletic participation situations can be ordered on continua both with regard to the minimum level of skill required and with regard to the degree of skill necessary for excellence relative to other participants. For example, even a very poor player is permitted to enter a city wide tournament; however, quite outstanding skill may be required of the winner. On the other hand, no one is permitted to play Big 10 college football unless he has achieved a very high minimum level of skill. In relation to standard of excellence, one must have highly developed skill to win a city wide tournament as well as to make All Big 10, but a lower level of skill might be required to be the star on a church basketball team. The forgoing discussion may be summarized in a more general principle: When the competition is greater a higher degree of skill is required for success.

These aspects of athletic participation situations are relevant to assessing the degree of skill of participants, and the degree of skill is assumed to be indicative of the expectancy for success of the individual. The scoring system presumes that the individual who is average in a highly skilled group will have a higher expectancy for
success than the individual who is average in a group composed of participants at an average level of skill.

The type of sport or activity. The popularity of the activity may give cues concerning the competition confronting participants and the level of skill required for success. The greater the number of people attracted to a sport as participants, the greater the degree of skill required for success. The validity of this assertion can be supported by calling to mind the results of international Olympic competition. The country having the greatest following in a sport usually fields the best team; hence, the U. S. produces excellent basketball teams, but seldom a winner in soccer. At the high school level, more students turn out to compete for positions on teams for popular sports (e.g., football, and baseball) than for minor sports (e.g., cross country and tennis). Since the competition is keener, one would expect that the outstanding players in a major sport have greater general athletic ability than the outstanding players in a minor sport. It is assumed that the subject with greater general athletic ability will have experienced a greater incidence of success in other past athletic situations and thus have a higher generalized expectancy for success at athletics.

Success in a major sport may actually have a greater direct influence upon the expectancy for success in athletics in general. Degrees of success are dependent upon consensual agreement for their delimitation and definition. In a sport having a large following the standards of success will be clearer to the participant, and his performance, whether excellent or poor, will meet with a less ambiguous
reinforcement. It is assumed that the less ambiguous the reinforcement, the greater its effect upon expectancy.

Furthermore, when an individual engages in a popular sport as opposed to an unpopular one, the incidence of social reinforcement whether positive or negative, is increased by virtue of the greater number of interested individuals. This is not to say that the strength of the reinforcement is increased. What is proposed, however, is that having a large number of people who call the individual's attention repeatedly to a given behavior-reinforcement sequence may have an effect similar to repeating that sequence. Thus, if a subject has failed at a task and his attention is repeatedly called to that failure, his expectancy for success may be further lowered. Conversely, repeatedly calling attention to success may increase the expectancy for success contingent upon the same behaviors.

For all of these reasons greater weight is given for average or better success in major sports than for the same level of success in minor sports.

**Breadth of experience.** Another assumption made in scoring is that broad experience has a more profound and lasting effect on generalized expectancy than limited experience, whether the outcome of experience is positive or negative in character. The effect on expectancy is in a positive direction if the experience is successful and in a negative direction if the experience is unsuccessful. Empirical support for this hypothesis is found in the work of Rychlak (1954). Therefore, in scoring a record, the individual who has had a great
deal of unsuccessful experience is scored lower on expectancy for success in athletics than the individual with only a small amount of unsuccessful experience. The greater variety of experience is given more credit only when it can be assumed that some positive reinforcement was obtained in all of the situations. A great variety of experience in athletics may be empirically related to high expectancy for success, since it usually denotes good general athletic ability which itself is likely to be associated with a high expectancy for success in athletics. Furthermore, a variety of experience in organized athletics necessitates repeated success in the competition for team membership which would have a positive effect upon expectancy.

In summary, the following factors were taken into account in scoring expectancy for success in the area of athletic activity.

1. The popularity of the athletic activities in which the individual has had experience. Are there a large number of participants and interested individuals?

2. The achievement or skill level at which he participated. Second string, first string; high school, or college. (Here of course the competition for team membership must be considered in assessing skill level.)

3. The extent (number of years) and variety (different sports) of the individual's athletic experience.

4. His perception of the degree of success achieved at each participation. Here again the competition must be taken into account to estimate the individual's true perception of his own expectancy for success in other related situations.
Scoring Procedures

Item #1 High School

Before scoring this item check item #8 on last page. The score is affected by the size of the high school the S attended.

Size of H.S. graduating class:

- less than 70 = small (S)
- 70 to 199 = medium (M)
- 200 and over = large (L)

Following are scores and circumstances when they are given. Not all possible experience circumstances are listed. Use those listed as a guide line for assigning scores to unlisted combinations and circumstances. Note that interscholastic and intramural H.S. athletics are combined for this score. Also check to see that S's H.S. had interscholastic sports. If not, score must be prorated. Absence of intramurals is not too important.

The abbreviations listed below refer to the subject's level of skill relevant to others in the group.

Score B = below average A = average AA = above average

(0) No participation; 1 or 2B intramural sports
(1) 1 or 2A intramural; 1B varsity Small H.S.
(2) 2 major or 3 minor A intramural, Med. or Large H.S.;
   1 A varsity Small H.S.
   1 B varsity Med. or Large H.S.
   1 A & B varsity Small H.S.
(3) 1 A varsity Med. H.S.
   2 or 3 A & AA intramural
   1 B varsity Large H.S.
   2 A varsity & 1 or 2 A intramural Small H.S.
(4) 2 major or 3 major & minor A varsity Small H.S.
   1 AA major varsity Med. H.S.
   1 B varsity and 1 or 2 A intramural Large H.S.
   1 A major varsity Large H.S.
(5) 1 A varsity + 1 or 2 AA intramural Large H.S.
   1 AA major varsity Large H.S.
   2 or 3 A & B varsity Large H.S.
   1 AA & 1 A varsity Med. H.S.
   2 or 3 A & AA varsity Small H.S.
The number of years of participation (F,S,Jr.,Sr.) should be weighted subjectively. Keep in mind, participation at freshman and sophomore year and not at junior and senior year may mean that the S did not show promise of developing into first string material, or perhaps got tired of bench-warming. Years of participation should not affect the weight by more than one point.

Freshman H.S. sports may mean participation at the senior year or 9th grade of Jr. H.S.

**Item #2  College**

Before scoring this item check item #9, number of college quarters completed. If less than three quarters have been completed omit the item unless participation in a varsity sport is indicated. Otherwise prorate to obtain a total score according to the following empirically derived schedule:

If total score without college item is from 0 to 4 points, add 0 points.

<table>
<thead>
<tr>
<th>Points</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 9</td>
<td>1</td>
</tr>
<tr>
<td>10 to 13</td>
<td>2</td>
</tr>
<tr>
<td>14 to 17</td>
<td>3</td>
</tr>
<tr>
<td>18 to 20</td>
<td>4</td>
</tr>
</tbody>
</table>

B = below average  A = Average  AA = above average

(0) No participation
   1 or 2 B intramural sports

(1) 1 A intramural; 1 A & 1 B intramural

(2) 2 A intramural; 1 AA & 1 B intramural; 1 AA intramural

(3) 3 major A intramural; 2 AA major intramural
   2 A major; 1 AA minor intramural

(4) 1 minor varsity

(5) 1 major varsity
   1 minor varsity 3 yr. participation
   1 minor varsity & 2 AA intramural

**Item #3  Organized Non-Scholastic, H.S. to Present**

Before scoring this item check item #10, age. A much greater time span will be included in this item for older men. Therefore less credit can be given for extensive participation.
In scoring this item the evaluation of the organization is crucial. A guide is presented below which presents some of the writer's views as to the degree of competitiveness in some organization sports. This guide will serve as a frame of reference for the terminology used in the scoring manual.

Low Competition:
Organizations whose central activity is other than the perpetuation of athletic activity, particularly when the team is constituted only of the group's members and for the purpose of their mutual social amusement.

Church Groups, Explorer Scouts, Polish National Alliance, YMCA Camp Reservation

Medium Competition: (a) Organizations that support teams on a regular basis, the teams usually playing in a league of similarly constituted teams. These teams are made up of the organization members.

Allis-Chalmers Baseball, Toledo electric basketball, DeMolay, Elks, U.S. Army

(b) Organizations who encourage athletic participation and development of athletic skill in all members regardless of ability, and who also stage competition between groups or individuals.

Boys Club, YMCA, CYO

High Competition: Organizations that are athletic programs in and of themselves, encouraging competition between individuals and teams in which the less skilled are immediately or eventually eliminated.

City Tennis Tournament; Golden Gloves Tournament (Tournaments of all kinds); Pony league or Knothole baseball; Some service teams; Semi-pro Leagues; AAU competition.

(0) No participation
1 B Low Competition

(1) 1 A Low Competition
1 B Med. Com.
1 A & 1 B Low Com.
1 A Low Com. & 1 B Med. Com.

(2) 2 A Low Com.; 1 AA Low Com.
1 A Med. Com.
1 A & 1 B Med. Com.
1 AA & 1 A Low Com.

(3) 2 A Med. Com.
1 A Med. Com. and 2 A Low Com.
2 AA Low Com.; 1 AA Low Com., 1 A Low Com. & 1 A Med.
1 AA Med. Com.
(4) 1 A High Com.
   2 B High Com.; 1 B High Com. & 1 A Med. Com.
   1 AA High Com. Minor Sport

(5) 1 AA Major Sport High Com.
   2 A High Com.
   1 A High Com. and 1 AA Med. Com.
   2 AA Med. Com. and 1 B High Com. or 1 A Med. Com.

Here again the length of time spent in a given activity must be given some subjective weight, but should not affect the score by more than one point in any case. A greater subjective weight should be given for participation in major sports.

Item #4 is not scored for expectancy for success.

Item #5 Present Informal Activity

In scoring this item, in comparison with the others, relatively less weight is given to the variety of activities participated in by the S. The point of view taken here is that a S can dabble in a number of sports for very brief intervals never experiencing much success at any one. Credit can be given toward a high success expectancy only when the degree of success indicated (average or better).

(0) No participation
   1 or 2 B Any Frequency
   1 A less than Once a Week and 1 B any Freq.

(1) 1 A Once a Week (OaW) or More & 1 B Any Freq.
   1 A Less than OaW; 1 AA Less than OaW
   2 A Less than OaW & 1 B any Freq.

(2) 2 A Less than OaW; 1 A OaW or More
   2 A & 1 B OaW or More; 1 AA OaW or More

(3) 2 A OaW or More; 1 B, 1 A, & 1 AA OaW or More
   4 A Less than OaW; 1 B Less than OaW & 2 AA OaW or More
   1 AA OaW or More & 1 A Less than OaW; 2 AA Less than OaW

(4) 2 A & 1 AA OaW or More; 4 A OaW or More
   1 AA, 1 A Less than OaW & 1 AA, 1 A OaW or More
   2 AA OaW or More & 1 AA Less than OaW

(5) 2 AA & 2 A OaW or More; 3 AA OaW or More
   (No matter how frequent or varied the S's participation one B activity warrants him a 4 rather than a 5 rating for this item.)
**Item #6  Childhood Informal Activity**

In general the same scoring principles apply to this item as to item #5. Give little or no consideration to non-competitive athletic activities such as hiking, calisthenics, camping, fishing, running.

(0) No participation; 1 or 2 B Any Frequency

(1) 1 A OaW or More & 1 B any Freq.

(2) 2 A Less than OaW
   2 A & 1 B OaW or More

(3) 2 A OaW or More; 1 B, 1 A, 1 AA OaW or More
   4 A Less than OaW; 1 B Less than OaW & 2 AA OaW or More

(4) 2 A, 1 AA OaW or More; 4 A OaW or More
   1 AA, 1 A Less than OaW & 1 AA, 1 A OaW or More

(5) 2 AA & 2 A OaW or More; 3 AA OaW or More

(No matter how frequent or varied the S's participation one B success rating warrants him a 4 rather than a 5 rating for the item.)

**Item #7** is not scored for expectancy for success.
# History of Personal Experience and Interest in Athletic Activities

Please respond to the following requests honestly, frankly, and with all the accuracy that your memory will permit. Your responses will be held in the strictest confidence. No one involved in evaluating you at the University will ever see your responses.

1. Indicate below the nature of your participation, if any, in sports while in High School.

<table>
<thead>
<tr>
<th>Interscholastic Sport</th>
<th>Position or Specialty</th>
<th>Years of Participation (Circle)</th>
<th>Degree of Skill</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F S Jr. Sr.</td>
<td>Lucky to Make Team</td>
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<td>F S Jr. Sr.</td>
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<td>F S Jr. Sr.</td>
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<tr>
<td></td>
<td></td>
<td>F S Jr. Sr.</td>
<td></td>
</tr>
</tbody>
</table>

Did your school compete with other schools? (Interscholastic) Yes [ ] No [ ] Did team within your school compete? Yes [ ] No [ ]

<table>
<thead>
<tr>
<th>Intramural Sports</th>
<th>Position or Specialty</th>
<th>Years of Participation</th>
<th>Degree of Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F S Jr. Sr.</td>
<td>Not as Good as Most Intramural Players</td>
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<td>F S Jr. Sr.</td>
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<td>F S Jr. Sr.</td>
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<td>F S Jr. Sr.</td>
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</tbody>
</table>

2. Indicate below the nature of your participation, if any, in sports while in College.

<table>
<thead>
<tr>
<th>Interscholastic Sport</th>
<th>Position or Specialty</th>
<th>Years of Participation (Circle)</th>
<th>Degree of Skill</th>
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<tbody>
<tr>
<td></td>
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<td>F S Jr. Sr.</td>
<td>Lucky to Make Team</td>
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<td>F S Jr. Sr.</td>
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<td>F S Jr. Sr.</td>
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<td>F S Jr. Sr.</td>
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<tr>
<th>Intramural Sports</th>
<th>Position or Specialty</th>
<th>Years of Participation</th>
<th>Degree of Skill</th>
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<tr>
<td></td>
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<td>F S Jr. Sr.</td>
<td>Not as Good as Most Intramural Players</td>
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<td>F S Jr. Sr.</td>
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<td>F S Jr. Sr.</td>
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</table>
Did your school compete with other schools? (Interscholastic) Yes [ ] No [ ] Did teams within your school compete? Yes [ ] No [ ]

<table>
<thead>
<tr>
<th>Intramural Sports</th>
<th>Position or Specialty</th>
<th>Years of Participation</th>
<th>Degree of Skill</th>
<th>Lucky to Make Team</th>
<th>Aver.</th>
<th>One of Best on Team</th>
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<tbody>
<tr>
<td>F S Jr. Sr.</td>
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<td>F S Jr. Sr.</td>
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<td>F S Jr. Sr.</td>
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<td>F S Jr. Sr.</td>
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</table>

2. Indicate below the nature of your participation, if any, in sports while in college.

<table>
<thead>
<tr>
<th>Intercollegiate Sport</th>
<th>Position or Specialty</th>
<th>Years of Participation</th>
<th>Degree of Skill</th>
<th>Lucky to Make Team</th>
<th>Aver.</th>
<th>One of Best on Team</th>
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<table>
<thead>
<tr>
<th>Intramural Sport</th>
<th>Position or Specialty</th>
<th>Years of Participation</th>
<th>Degree of Skill</th>
<th>Lucky to Make Team</th>
<th>Aver.</th>
<th>One of Best on Team</th>
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</tbody>
</table>
3. Indicate below the nature of your participation, if any, in non-scholastic organized athletic activity, eg., church softball team, bowling league, armed service team, YMCA, ping pong tournament, etc. List any organized athletic participation from the beginning of high school to the present time.

<table>
<thead>
<tr>
<th>Non-school Athletic Activity</th>
<th>Position or Specialty</th>
<th>Organization</th>
<th>Years of Participation</th>
<th>Degree of Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not as Good</td>
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<td></td>
<td></td>
<td></td>
<td>Aver.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Better than Most</td>
</tr>
</tbody>
</table>

4. Indicate below the nature of your participation, if any, in non-scholastic supervised athletics prior to high school age, eg., little league ball, Boy Scout softball games, YMCA activities, camp activities.

<table>
<thead>
<tr>
<th>Early Non-school Athletic Activity</th>
<th>Nature of Supervision</th>
<th>Years or Seasons of Participation</th>
<th>Degree of Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td>Not as Good</td>
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<td>Better than Most</td>
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4. Indicate below the nature of your participation, if any, in non-scholastic supervised athletics prior to high school age, e.g., little league ball, Boy Scout softball games, YMCA activities, camp activities.

<table>
<thead>
<tr>
<th>Early Non-school Athletic Activity</th>
<th>Nature of Supervision</th>
<th>Years or Seasons of Participation</th>
<th>Degree of Skill</th>
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<td>Not as Good</td>
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5. Indicate below the athletic activities, if any, in which you engage informally at the present period of your life.

<table>
<thead>
<tr>
<th>Frequency of Participation</th>
<th>Degree of Skill</th>
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<tbody>
<tr>
<td>Athletic Activity</td>
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<tr>
<td>More than Once a Week</td>
<td>Not as Good</td>
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<td>Once a Week</td>
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<td>Once in 2 Weeks</td>
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<td>Less than Once in 2 Weeks</td>
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6. Indicate below the athletic activities, if any, in which you engaged informally during childhood.

<table>
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<tr>
<th>Activity</th>
<th>Frequency of Participation</th>
<th>Degree of Skill</th>
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<td>More Than Once a Week</td>
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7. Indicate below the athletic activities that you follow and in which you have a strong spectator interest.

<table>
<thead>
<tr>
<th>Activity</th>
<th>High School</th>
<th>Coll.</th>
<th>Pro on TV</th>
<th>Watch in Person</th>
<th>Follow on Sports Page</th>
<th>Read about in Sports Magazines</th>
<th>Number of Years of Personal Interest</th>
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<th>Coll.</th>
<th>Pro</th>
<th>Watch on TV</th>
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8. How many pupils were in your high school graduating class? __________

9. How many quarters of college work have you completed? __________

10. What is your present age? __________
APPENDIX D

BARRON—INDEPENDENCE OF JUDGEMENT SCALE
PERSONALITY QUESTIONNAIRE

Instructions: The following are statements of personal attitudes and traits. You are to read each item and decide whether the statement is true or false as it pertains to your own personal opinions and personality characteristics. Then circle the appropriate letter in front of the statement. Right NOW, fill in your name, the instructor's name, and the hour this class meets in the indicated spaces on the top of this page.

T (F) 1. What the youth needs most is strict discipline, rugged determination, and the will to work and fight for family and country.

(T) F 2. Some of my friends think that my ideas are impractical, if not a bit wild.

T (F) 3. Kindness and generosity are the most important qualities for a wife to have.

(T) F 4. I have seen some things so sad that I almost felt like crying.

T (F) 5. I don't understand how men in some European countries can be so demonstrative to one another.

T (F) 6. I must admit that I would find it hard to have for a close friend a person whose manners or appearance made him somewhat repulsive, no matter how brilliant or kind he might be.

T (F) 7. A person should not probe too deeply into his own and other people's feelings, but take things as they are.

T (F) 8. I prefer team games to games in which one individual competes against another.

(T) F 9. I could cut my moorings—quit my home, my family, and my friends—without suffering great regrets.

T (F) 10. What this country needs most, more than laws and political programs, is a few courageous, tireless, devoted leaders in whom the people can put their faith.

T (F) 11. I acquired a strong interest in intellectual and aesthetic matters from my mother.

(T) F 12. Human nature being what it is, there will always be war and conflict.
T (F) 13. I believe you should ignore other people's faults and make an effort to get along with almost everyone.

T (F) 14. The best theory is the one that has the best practical applications.

(T) F 15. I like to fool around with new ideas, even if they turn out later to be a total waste of time.

(T) F 16. The unfinished and the imperfect often have greater appeal for me than the completed and polished.

(T) F 17. I would rather have a few intense friendships than a great many friendly but casual relationships.

T (F) 18. Perfect balance is the essence of all good composition.

(T) F 19. Science should have as much to say about moral values as religion does.

T (F) 20. The happy person tends always to be poised, courteous, outgoing, and emotionally controlled.

T (F) 21. Young people sometimes get rebellious ideas, but as they grow up they ought to get over them and settle down.

T (F) 22. It is easy for me to take orders and do what I am told.

CHECK NOW TO BE SURE you have filled in your name, the instructor's name, and the class hour at the top of the first page. Some of you will be selected for a later part of this study; so we need to be able to identify you.
APPENDIX E

MARLOWE-CROWNE SOCIAL DESIRABILITY SCALE
PERSONAL REACTION INVENTORY

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally.

Do not make any marks on the test booklet. Record your answers in the true or false columns of the separate answer sheet that has been given you. Fill in your name and sex on the answer sheet.

Remember: Answer each item as it pertains to you personally.

1. Before voting I thoroughly investigate the qualifications of all the candidates.
2. I never hesitate to go out of my way to help someone in trouble.
3. It is sometimes hard for me to go on with my work if I am not encouraged.
4. I have never intensely disliked anyone.
5. On occasion I have had doubts about my ability to succeed in life.
6. I sometimes feel resentful when I don't get my way.
7. I am always careful about my manner of dress.
8. My table manners at home are as good as when I eat out in a restaurant.
9. If I could get into a movie without paying and be sure I was not seen I would probably do it.
10. On a few occasions, I have given up doing something because I thought too little of my ability.
11. I like to gossip at times.
12. There have been times when I felt like rebelling against people in authority even though I knew they were right.
13. No matter who I'm talking to, I'm always a good listener.
14. I can remember "playing sick" to get out of something.
15. There have been occasions when I took advantage of someone.
16. I'm always willing to admit it when I make a mistake.
17. I always try to practice what I preach.
18. I don't find it particularly difficult to get along with loud-mouthed, obnoxious people.
19. I sometimes try to get even rather than forgive and forget it.
20. When I don't know something I don't at all mind admitting it.
21. I am always courteous, even to people who are disagreeable.
22. At times I have really insisted on having things my own way.
23. There have been occasions when I felt like smashing things.
24. I would never think of letting someone else be punished for my wrongdoings.
25. I never resent being asked to return a favor.
26. I have never been irked when people expressed ideas very different from my own.
27. I never make a long trip without checking the safety of my car.
28. There have been times when I was quite jealous of the good fortune of others.
29. I have almost never felt the urge to tell someone off.
30. I am sometimes irritated by people who ask favors of me.
31. I have never felt that I was punished without cause.
32. I sometimes think when people have a misfortune they only got what they deserved.
33. I have never deliberately said something that hurt someone's feelings.
APPENDIX F

INTERNAL–EXTERNAL CONTROL SCALE
SOCIAL REACTION INVENTORY

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously there are no right or wrong answers.

Your answers to the items on this inventory are to be recorded on a separate answer sheet which is loosely inserted in the booklet. Remove this ANSWER SHEET NOW. Print your name and any other information requested by the examiner on the answer sheet, then finish reading these directions. Do not open the booklet until you are told to do so.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. Find the number of the item on the answer sheet and black-in the space under the number 1 or 2 which you choose as the statement most true.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also try to respond to each item independently when making your choice; do not be influenced by your previous choices.

REMEMBER

Select that alternative which you personally believe to be more true.
I more strongly believe that:

1 a. Children get into trouble because their parents punish them too much.

   b. The trouble with most children nowadays is that their parents are too easy with them.

2 a. Many of the unhappy things in people's lives are partly due to bad luck.

   b. People's misfortunes result from the mistakes they make.

3 a. One of the major reasons why we have wars is because people don't take enough interest in politics.

   b. There will always be wars, no matter how hard people try to prevent them.

4 a. In the long run people get the respect they deserve in this world.

   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5 a. The idea that teachers are unfair to students is nonsense.

   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6 a. Without the right breaks one cannot be an effective leader.

   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7 a. No matter how hard you try some people just don't like you.

   b. People who can't get others to like them, don't understand how to get along with others.

8 a. Heredity plays the major role in determining one's personality.

   b. It is one's experiences in life which determine what they're like.

9 a. I have often found that what is going to happen will happen.

   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
I more strongly believe that:

10 a. In the case of the well-prepared student there is rarely if ever such a thing as an unfair test.

b. Many times exam questions tend to be so unrelated to course work, that studying is really useless.

11 a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.

b. Getting a good job depends mainly on being in the right place at the right time.

12 a. The average citizen can have an influence in government decisions.

b. This world is run by the few people in power, and there is not much the little guy can do about it.

13 a. When I make plans, I am almost certain that I can make them work.

b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14 a. There are certain people who are just no good.

b. There is some good in everybody.

15 a. In my case getting what I want has little or nothing to do with luck.

b. Many times we might just as well decide what to do by flipping a coin.

16 a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17 a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

b. By taking an active part in political and social affairs the people can control world events.
I more strongly believe that:

18 a. Most people don't realize the extent to which their lives are controlled by accidental happenings.

b. There really is no such thing as "luck".

19 a. One should always be willing to admit his mistakes.

b. It is usually best to cover up one's mistakes.

20 a. It is hard to know whether or not a person really likes you.

b. How many friends you have depends upon how nice a person you are.

21 a. In the long run the bad things that happen to us are balanced by the good ones.

b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22 a. With enough effort we can wipe out political corruption.

b. It is difficult for people to have much control over the things politicians do in office.

23 a. Sometimes I can't understand how teachers arrive at the grades they give.

b. There is a direct connection between how hard I study and the grades I get.

24 a. A good leader expects people to decide for themselves what they should do.

b. A good leader makes it clear to everybody what their jobs are.

25 a. Many times I feel that I have little influence over the things that happen to me.

b. It is impossible for me to believe that chance or luck plays an important role in my life.

26 a. People are lonely because they don't try to be friendly.

b. There's not much use in trying too hard to please people, if they like you, they like you.
I more strongly believe that:

27  a. There is too much emphasis on athletics in high school.
    b. Team sports are an excellent way to build character.

28  a. What happens to me is my own doing.
    b. Sometimes I feel that I don't have enough control over the
direction my life is taking.

29  a. Most of the time I can't understand why politicians behave the
    way they do.
    b. In the long run the people are responsible for bad government
    on a national as well as on a local level.
APPENDIX G

INSTRUCTIONS FOR SUBJECTS
SUBJECT INSTRUCTIONS

We are going to use this apparatus to test your aptitude for tasks requiring a high degree of muscular coordination. This experiment is one aspect of a larger government supported research project investigating physical capability.

The object of this task is for you to try, by pulling this string, to raise the ball on the platform as high as possible before the ball drops off. The apparatus is built with a very slight curvature to the guiding supports which tilts the platform slightly forward the higher it is raised. Therefore, to reach a high score without the ball rolling off a much smoother and steadier performance is required than to achieve low scores. Of course, if you raise the platform swiftly the ball can't drop off because of the momentum. Therefore, the platform must be raised very slowly to get an accurate measure. A steady pull usually results in the best scores.

You will find that this task is rather difficult. Of course if it were easy everyone would score a 100 on each trial. It is difficult enough so that the scores achieved will reflect a wide range of individual difference in aptitude for learning muscular skills. Those who achieve high scores on this task learn sports and skills faster and are able to achieve a higher level of proficiency than low scorers.

In order to compare the scores of separate individuals a
(Assume seated position, continue reading.)

This standard procedure is used to minimize ability differences that are the result of practice. It has been found that this particular controlled arm movement occurs infrequently in popular sports.

Since subjects do fluctuate from trial to trial in the scores they achieve, you will be given a series of 20 trials, (eight today, eight tomorrow, and 4 on the following day). All of the trials will be combined to get your overall score.

At this time I would like to get some idea of how you think your overall performance on this task will compare with that of other male college students. You can indicate that to me by telling me what percentage of male college students your overall performance on this task will exceed. (Hand percentile chart to S.) In other words, how many students out of the average 100 will you score better than on this task. Try to be as objective as possible. If you feel you'll do well don't be modest about it, and if you don't think you'll do very well don't be reluctant to indicate that either.

(Record S's percentile selection.)

Another thing. Before each trial I would like to get an indication of how confident you are of making a score of 80 or better on that trial. (Point to 80 on the apparatus.) The average student usually obtains scores of 60 or 70, so you see a score of 80 is a very successful trial on this task. You can indicate your confidence of success on this scale going from 0 to 10. (Hand chart to S.)
standard method must be used by all students. Only slight adjustments are made for each subject to correct for differences in skeletal structure.

(Stand up.)

(Say from memory)

Now will you please stand up here. First of all I would like to measure the length of your preferred arm.

(Measure with yard stick from tip of shoulder to the knuckle of the index finger with the fist clenched.)

Arm length - inches 31 30 29 28 27 26 25 24 23 22
Distance from base 21 22 23 24 25
of table leg - inches

(Say from memory, coordinated with demonstration)

Now watch as I demonstrate.

For your trials you will stand with the back of your heels parallel to the number ( ) on the floor marker, that is ( ) inches from the table. Grasp the cord like this. Put these two fingers through the loop. Always keep the back of your hand facing front. Stand with your heels no more than three inches apart, your knees straight, your back straight, and the plane of your chest and shoulders perpendicular to the wall. Raise the platform by swinging your arm from the shoulder, like this, with your elbow straight.

Now you give it a try. Stand up here with the back of your heels parallel to the ( ) mark. Take hold of the cord. Now, just pull the platform up to 100 there to get the feel of it. Then have a seat and I'll continue with the instructions.
For example, if your confidence of reaching 80 is high, you would select a number at this end of the scale. If your confidence of reaching 80 is rather low, you would select a number from the other end of the scale. Use any number from 0 to 10 to indicate your confidence of reaching 80 on that trial. Be as realistic as possible and avoid wishful thinking or underestimating just to protect yourself.

Now, how confident are you of getting a score of 80 or better on the first trial? Please make your rating carefully.

(Record expectancy score.)

OK, let's begin. Step up here with the back of your heels parallel to the ( ) mark.

Remember: you must raise the platform very slowly for an accurate measure.
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I, James Conrad Schwarz, was born in Hartford, Connecticut, September 19, 1936. I received my elementary and secondary school education in the public schools of Harrisburg, Pennsylvania, and my undergraduate training at The Pennsylvania State University, which granted me the Bachelor of Science degree in 1958. From the Ohio State University, I received the Master of Arts degree in Psychology in 1961.

While completing the requirements for the Master's degree and the Doctor of Philosophy degree, I have held the following stipends and training positions: United States Public Health Scholar, 1958-59; Clinical Psychology Trainee, Chillicothe Veterans Administration Hospital, summer of 1959 and 1960; Graduate Assistantship, 1959-60; Clinical Psychology Trainee, Columbus Veterans Administration Out-patient Clinic, 1960-61; and United States Public Health Scholar, 1961-62.

I have held the position of Instructor in Psychology at Bowling Green State University since September of 1962.