THE EFFECTS OF EXPERIMENTER-VERSUS SELF-DEFINED REINFORCEMENT AND LOCUS OF CONTROL UPON REINFORCEMENT EXPECTANCIES

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ABSTRACT

THE EFFECTS OF EXPERIMENTER-VERSUS SELF-DEFINED REINFORCEMENT AND LOCUS OF CONTROL UPON REINFORCEMENT EXPECTANCIES

This investigation sought to examine the effects of (a) self-defined reinforcement levels (b) experimenter-defined reinforcement levels (c) personality locus of control (internals and externals) and (d) situational locus of control (skill and chance) upon initial and later-long-range reinforcement expectancies.

Prior studies investigating the relationship between locus of control and reinforcement expectancies have not taken into account how subjects themselves define reinforcement. The present study asked subjects to indicate on a subjective scale (a) how large a percentage of failures would be required for them to still consider that they had succeeded (minimum expectancy for success, min. e.s.) on the task and (b) how small a percentage of successes would be required for them to still consider that they had failed (maximum expectancy for failure, max. e.f.) on the task. These self-defined reinforcement levels were two of the four reinforcement schedules included in the present study. The other two were experimenter-defined high (70%) and experimenter-defined low (30%) reinforcement.

The personality construct of Internal-External Locus of Control of Reinforcement is based on Social Learning Theory and is a generalized expectancy cutting across many situations. The individual who scores, on the Rotter I-E Scale (Rotter, 1966), as an internal believes that

reinforcements are contingent upon his own behavior, while the person who scores as an external on this same scale believes that reinforcements are controlled by chance, luck, fate, or powerful others. The psychological situation used in this study was skill and chance control of reinforcement. These were manipulated through verbal instructions and the nature of the task itself. The task for all 160 subjects was performing 40 trials on the Nickels Disk-Dropping task. The measure of initial- and later-long-range reinforcement expectancies was obtained through subjects' responses to the question presented to them prior to each drop of the disk (i.e., On what percentage of all future drops of the disk do you expect the disk to land as you say it will land?).

Five hypotheses were advanced based on Social Learning Theory and the Nickels and Williams (1970) study. All of the hypotheses were confirmed. The results indicate that:

1. Subjects under skill conditions attributed significantly more disk control to "skill" while subjects under chance conditions attributed significantly more disk control to "chance" (hypothesis one).
2. Skill conditions produced significantly higher initial-long-range reinforcement expectancies than did chance conditions (hypothesis 2b), while internality-externality (hypothesis 2a) and level of reinforcement (hypothesis 2c) had no effect upon subjects' initial-long-range reinforcement expectancies.
3. Skill conditions produced significantly higher later-long-range reinforcement expectancies than did chance conditions (hypothesis 3b), higher reinforcements (min. e.s. and 70%) produced significantly

higher later-long-range reinforcement expectancies than did lower reinforcements (max. e.f. and 30%; hypothesis 3c), and internality-externality had no effect upon subjects' later-long-range reinforcement expectancies (hypothesis 3a).

4. Internality (hypothesis 4a) and skill conditions (hypothesis 4b) both led to subjects making significantly higher min. e.s. and max. e.f. estimates than did externality (hypothesis 4a) and chance conditions (hypothesis 4b), while reinforcement level had no effect upon subjects' min. e.s. and max. e.f. estimates (hypothesis 4c).
5. The perception that one's reinforcements indicated success led to significantly higher later-long-range reinforcement expectancies than did perceptions that one's reinforcements indicated failure (hypothesis 5).

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CHAPTER I

INTRODUCTION

One of the extensively investigated concepts in Rotter's Social Learning Theory (1954) is that of locus of control. The construct of locus of control refers to the location of those causal forces which, one believes, determine his reinforcements. Such causal forces can be derived from two sources: (1) one's own personality; or (2) the situation in which one finds himself. According to Rotter (1954) the means by which one's personality may influence his expectancy for success or reinforcement is: (a) the degree to which that individual believes that his reinforcements are within the realm of his own control, and indeed, follow as a consequence of his own behavior; or, (b) the degree to which one believes that his reinforcements are beyond his control, and thus contingent upon such outer forces as luck, chance, fate, the whims of others, etc. An individual who believes that he can control reinforcements regarding his life events is referred to as an _internally oriented individual_, while a person who believes that factors outside his control determine his reinforcements is referred to as an _externally oriented individual_. Such a personal orientation is considered by Rotter (1954) to be a generalized expectancy for reinforcement.

In addition to this generalized expectancy for reinforcement, an individual may also find himself in a situation in which the locus of control is defined by the task he is performing. For example, one situation may clearly be seen by observers as requiring one's own abilities and capabilities to achieve success, while success in another situation may be clearly seen by observers as a function of luck, chance, the decision of others, or some other outside force. The former situation is defined as a skill situation, while the latter is defined as a chance situation.

In reviewing the locus of control literature one discovers that studies have differed in terms of design, results, and conclusions. Such differences can be found with respect to both the locus of control personality variable (internality-externality) and the locus of control situational variable (skill-chance). Whether an individual is internally oriented (internal), externally oriented (external), or somewhere in between these two extremes (middle) has been determined according to their responses to questionnaires such as Rotter's I-E Control Scale (Rotter, 1966) or the James-Phares Scale (James, 1957). Whether a situation is viewed as skill or chance has been determined by instructions, the tasks performed by the subjects, or a combination of these two methods.

In regards to the locus of control personality variable, a few investigators have studied the behavior of subjects defined as internals, middles, and externals (e.g., Bandt, 1967; Hountras & Scharf, 1970; Lipp, Kolstoe, James, & Randall, 1968), while others have excluded the middle group and studied the behavior of extreme internal and extreme external subjects (e.g., Davis & Phares, 1967; Phares, 1967; Ritchie & Phares, 1969). Still other investigators have defined internal and external subjects according to whether they were above or below the mean or median of I-E scorers (e.g., Julian, Lichtman, & Rychman, 1968; Lefcourt, 1967; Lefcourt, Lewis, & Silverman, 1968). Thus, studies have differed in subject population. Also the scale used to define subjects as internals or externals has differed. Some investigators have utilized the James-Phares Scale (e.g., James, 1957; James, Senn, & Lotsof, 1965; Shepel & Weiss, 1970; Waldrip, 1968), while others have used the Rotter I-E Control Scale (e.g., Davis & Phares, 1967; Gore & Rotter, 1963; Julian, Lichtman, & Ryckman, 1968; McDonald, Tempone, & Simmons, 1968; Nickels & Tolen, 1968; Nickels & Williams, 1970). Finally, in terms of subjects, some investigators have included females only in their studies (e.g., Julian, Lichtman, & Ryckman, 1968; Nickels & Tolen, 1968; Nickels & Williams, 1970), others have included males only (e.g., Davis & Phares, 1967; Hountras & Scharf, 1970), and still others have included both male and female subjects (e.g., Gore & Rotter, 1963; Phares, 1962; Rotter & Mulry, 1965).

In regards to the locus of control situational variable, investigations have differed in terms of how skill and chance situations have been defined for subjects. Some experimenters used instructions (Holden & Rotter, 1958; James, 1957; James & Rotter, 1958; Phares, 1957; Phares, 1962), while others determined skill and chance by the task itself (Bennion, 1961; Lefcourt & Steffy, 1970; Nickels & Tolen, 1968; Nickels & Williams, 1970; Rotter, Liverant, & Crowne, 1961). However, even when the task itself defined skill and chance, some investigators used radically different tasks (e.g., Lefcourt & Steffy, 1970; Rotter, Liverant, & Crowne, 1961), while others used essentially the same task with slight variations in procedure (Nickels & Tolen, 1968; Nickels & Williams, 1970). Also, in terms of design, investigators have typically placed internal and external subjects in either a perceived skill or a perceived chance condition and have controlled their reinforcements in terms of percentage of successes and failures on the training trials (schedules of reinforcement). However, studies have differed in the schedules of reinforcement that subjects obtained during training trials. Some investigators have utilized only one level of reinforcement (Holden & Rotter, 1962; Phares, 1957), others have used two levels of reinforcement (James & Rotter, 1958; Nickels & Williams, 1970), and still other investigators have included four levels of reinforcement (Nickels & Tolen, 1968; Rotter, Liverant, & Crowne, 1961).

Since studies have differed so widely in the kinds of subjects and the design used, it is not surprising that inconsistent results have been found. For example, some investigators have found no differences between skill and chance situations when acquisition of expectancies was measured (James & Rotter, 1958), while others found that success (failure) under skill conditions, as compared with chance conditions, had a greater effect on raising (lowering) expectancies for future reinforcements (Bennion, 1961; James, 1957; Phares, 1957; Rotter, Liverant, & Crowne, 1961).

There have also been inconsistent results when internals and externals have been placed in incongruent situations, i.e., when internals have worked under chance conditions and when externals have worked under skill conditions. Sometimes internals in chance situations have behaved as externals are expected to behave (Davis & Phares, 1967; Lefcourt, Lewis, & Silverman, 1968; Rotter & Mulry, 1965), but in other investigations their behavior has remained typically internal (Julian, & Katz, 1968; Lefcourt, 1967). On the other hand, externals when placed in skill situations have at times behaved as one would expect internals to behave (Lefcourt, 1967; Lefcourt & Ladwig, 1965), though at other times, they have retained their externality (Davis & Phares, 1967; Julian & Katz, 1968).

Finally, investigators have differed in their conclusions regarding the relative importance of internal-external personalities and skill-chance situations in determining subjects' responses on tasks. Some investigators have concluded that the personality construct of internality-externality is a more important factor in determining a subjects' responses than the skill-chance situations in which he finds himself (e.g., Phares, 1965; Seeman, 1963; Seeman & Evans, 1962), whereas other studies indicate that the stimulus situation may be a more important factor (Lefcourt & Steffy, 1970; McDonald, Tempone, & Simmons, 1970; Nickels & Williams, 1970).

Perhaps the above differences in designs, results, and conclusions may be resolved by taking a slightly different approach to the use of the reinforcement variable. None of the above studies have taken into account how subjects themselves define reinforcement. Therefore, the purpose of the present study is to shed more light upon the locus of control variables through an analysis of experimenter-versus self-defined reinforcement.

CHAPTER II

HISTORICAL SUMMARY

Throughout the history of psychology the variable of reinforcement has been an important one. It has received widespread attention in and has become an integral part of many learning theories. For example, the concept of reinforcement has been of prime importance for Thorndike in his Law of Effect Theory, for Skinner in his Operant Conditioning Theory, for Guthrie in his Contiguous Conditioning Theory, and for Hull in his Systematic Behavior Theory. It is not the intention of the writer to elaborate on various ways reinforcement has been important to various theorists, but merely to indicate the importance of this concept.

Expectancy

One approach to reinforcement which has particular relevance to the present study involves the concept of expectancy. Tolman (1932) presented a viewpoint that has been referred to as a sign-gestalt, sign-significate, or expectancy theory. He described the occurrence of learning in terms of an individual building up an expectancy that a given sign in his environment will lead to a given significate (Tolman, 1934). The method of acquiring an expectation is that with repeated experience with a certain sequence of events leading to a goal the probability is discriminated that a certain behavior will lead to the expected final result. The three main aspects of expectancy, for Tolman, are that: (1) the organism forms expectancies which are confirmed by successes in goal attainment; (2) the individual approaches a situation with various methods of attack based upon previous experience, and, (3) when the goal path is blocked, a well established cognitive structure is available to the person.

Another researcher who has utilized the concept of expectancy is Lewin. Lewin (1926) advocated in his field theory that there is a tension system necessary for activity and that psychological behavior depends upon energy related to psychological tension systems. In addition, psychological success and failure depend upon ego involvement in the task at hand, so that if the goal is achieved the individual feels he has made an accomplishment that is significant for him and if he fails he feels defeated. Individuals tend to set momentary goals or levels of aspiration within a range of activities in which there is such ego involvement. One's level of aspiration is set, according to Lewin, and individuals differ with respect to this variable. Lewin also stated that several factors determine one's subjective probability for future success and thus the rise in level of aspiration. One main factor appears to be the individual's past experience in terms of certain goal attainments. Another is one's wishes for success, fears of failure, and his expectations with respect to success and failure.

Lewin emphasized the concept of subjective probability in one's estimation of a situation (Lewin, 1951). Thus, what is of psychological importance is the expectations of the subject rather than the objective expectations presumed to be present on the basis of past experience. Brunswick, on the other hand, emphasized objective probability in determining behavior (Brunsink, 1951). That is, an expectation one makes regarding outcomes and the probability of an occurrence is determined by the frequency of the occurrence of objectively described past events.

Of particular importance to the present study is Rotter's Social Learning Theory (1954). He tends to avoid the use of the word subjective, as Lewin used it, since it holds the connotation of introspection and thus is inaccessible to objective measurement. Objective probability, as Brunswick used it is one of the major constructs advanced by Rotter to estimate internal probability or expectancy (Rotter, 1954, p. 107). In an early study, Rotter (1942b) laid the groundwork for his future theory. Subjects were rewarded for correct estimates of their motor performance (level of aspiration) and punished for incorrect ones. There were several patterns of behavior that emerged in terms of level of aspiration. One of these patterns involved subjects who made an average number of shifts in level of aspiration. These subjects also tended to make more realistic shifts in level of aspiration (i.e., level of aspiration rises after successes and drops after failures). Another pattern found was one in which the subjects made a larger than average number of shifts in level of aspiration. These subjects tended to make more unrealistic shifts in level of aspiration (i.e., level of aspiration drops after successes and rises after failures).

Rotter (1954) has stated seven postulates and several corollaries to clarify his theoretical position. The first postulate is the basic one of a field theory. That is, "the unit of investigation for the study of personality is the interaction of the individual with his meaningful environment" (1954, p. 85). In other postulates he emphasized the importance of reinforcement effects in permitting predictions of behavior. His last postulate states that behavior is not only determined by goals and reinforcements but also by the individual's expectancy that these goals will be achieved.

Rotter's (1954) basic concepts include expectancy, reinforcement value, internal reinforcement, and external reinforcement. Rotter defines expectancy as "the probability held by the individual that a particular reinforcement will occur as a function of a specific behavior in a specific situation" (1954, p. 107). Thus, expectancy is one of the basic variables used to predict behavior and the one most apt to change as a result of new experiences. The reinforcement value of any given external reinforcement, according to Rotter, is "the degree to which preference for any reinforcement occurs if the possibility of their occurring are all equal" (1954, p. 107). Rotter advances the concept of internal reinforcement to indicate the subject's experience or perception that an event has occurred which has some value for him, while external reinforcement is advanced to indicate the occurrence of an event that is known to have predictable reinforcement value for the group or culture to which the subject belongs (1954, p. 112). Thus, a reinforcement acts to strengthen an expectancy that a certain behavior or event will be a future consequence of that reinforcement. After such an expectancy has been established, the failure of the reinforcement to occur will either reduce or extinguish the expectancy. In addition, when a reinforcement is not seen as a consequence of one's own behavior then it's occurrence will not increase an expectancy as greatly as if it is viewed as being contingent upon one's own behavior. For Rotter, individuals differ in the degree to which they attribute reinforcements to their own action and this locus of control depends to a great extent upon their history of reinforcement.

Locus of Control

One of the most important variables derived from Rotter's Social Learning Theory (1954) is that of the locus of control construct. Briefly, the basic hypothesis in Social Learning Theory is that if an individual sees a reinforcement as due to his own behavior, then the occurrence of either a success (or failure) will strengthen (or weaken) the potential for that behavior to occur in the same or similar situations. If one sees the reinforcement as being unavailable to his control, then the behavior is less likely to be strengthened or weakened. Thus, learning under the one reinforcement condition is expected to be different from learning under the other. Specific expectancies with respect to causality of behavior-outcome sequences in various situations tend to affect the choice of behavior displayed to a significant degree.

Rotter and his colleagues have recognized that a measure of locus of control (causal forces) may be derived from: (a) one's own personality or (b) the situations in which one finds himself. One of the ways that an individual's personality may influence his expectancy is the degree to which the individual believes that generally reinforcements follow as a consequence of his own behavior, or the degree to which one believes that these reinforcements are generally contingent upon external forces such as luck, fate, chance, powerful others, etc. A person with the former orientation is defined as being internally oriented, while a person with the latter orientation is defined as being externally oriented. One's own personal orientation toward the source of his reinforcement is considered, by Rotter (1954), to be a generalized expectancy which operates across a very large number of situations and relates to whether an individual assumes that he can or cannot exert power to influence his life events. One may not only have a generalized expectancy for reinforcement but he may also find himself in a situation which clearly defines the locus of control for him. For example, the task one performs may be typically seen by a large segment of the population as yielding success or failure based on one's own capabilities, while another task may be seen as yielding success or failure based on forces outside one's own control. The former task is defined as a skill situation, while the latter is defined as a chance situation.

Internals and externals have been shown to differ in a variety of behaviors. For example, Lefcourt (1967) demonstrated that internals base their expectancy for future success upon past experiences on a task while externals tend not to do this. Thus, internals profit by past performance while externals do not, they learn more rapidly than do externals, and they tend to make less unusual shifts (i.e., raising their expectancies after failure and lowering them after success) than externals. Thus, in terms of acquisition of expectancies, internals and externals seem to differ. In addition, internals apparently differ from externals in other ways. For example, they tend more often to forget failure experiences (Efran, 1963), to resist subtle influence (Gore, 1962), to avoid cheating (Johnson, 1970), to shun risk-taking behavior (Liverant & Scodel, 1960), to maintain their attitude with a high prestige communicator (Ritchie & Phares, 1969), to prefer skill rather than chance activities (Schneider, 1968), to be more concerned with their performance on clearly skill-determined tasks (Julian, Lichtman, & Ryckman, 1968), and to persist longer at a task (Shepel & Weiss, 1970). Internals also tend to perceive themselves quite differently than externals perceive themselves. Hersch and Scheibe (1967) found that internals describe themselves as clever, efficient, independent, clear-thinking, insightful, organized, and self-confident, while externals perceive themselves in opposite ways. Finally, internals describe themselves as active, striving, achieving, powerful, and independent, while externals describe themselves as inactive, non-achieving, powerless, and dependent.

Performance under skill conditions has been shown to differ from performance under chance conditions. For example, with respect to acquisition of expectancies, several investigators have found that success (or failure) under skill conditions, as compared with chance conditions, has a greater effect on raising (lowering) expectancies for future reinforcement (Bennion, 1961; James, 1957; Phares, 1957;

Rotter, Liverant, & Crowne, 1961). In addition, subjects' performance under skill and chance conditions have differed in other respects as well. For example, skill conditions lead to: a tendency toward higher expectancies (Waldrip, 1968); reversals in the effects of reinforcement (Phares, 1957); greater initial and long range reinforcement expectancy scores (Nickels & Williams, 1970); greater generalization of expectancy from task to task (James, 1957); greater ability to cope with threatening situations through increased perceptual behavior (Phares, 1962); and less resistance to extinction of expectancies (Holden & Rotter, 1958) than do chance conditions. Thus, individuals working under skill conditions seem to predict their future performance on the basis of their past experience with the task, to learn more rapidly, and to have higher expectations for future success than do subjects working under chance conditions.

Rationale and Statement of the Problem

As indicated in the Introduction numerous differences have been found in designs used, results found, and conclusions drawn. Since reinforcement is one of the main variables in these studies, the present investigation is concerned chiefly with extending the analysis of reinforcement expectancy under the assumption that by better utilizing the reinforcement variable these previous difficulties can be remedied. In none of the studies have subjects been given reinforcements according to their own views of what, to them, represents success or failure on a task. Rotter (1966) has indicated that the value of a reinforcement to the individual is important in determining behavior as well as the expectancy that certain behavior will lead to the attainment of a particular reinforcement. Thus, perhaps what the experimenter assumes to be reinforcing for the subject may not actually be. For example, one individual may regard 60% correct predictions as indicative of success for him on that particular task, while another individual may feel that he needs 80% correct predictions before he would consider that he has succeeded on the task. The aim of the present study is to determine (a) how large a percentage of failures is required for the subject to still consider that he has indeed succeeded i.e., the minimum expectancy for success (min. e.s.) on the task, and (b) how small a percentage of successes is required for the subject to consider that he has indeed failed i.e., maximum expectancy for failure (max. e.f.) on the task. These self-defined reinforcement schedules are two of the four reinforcement schedules included in the present study. The other two are experimenter-defined high (70%) and experimenter-defined low (30%) reinforcement. The question asked in the present study is as follows: "if an individual is given the opportunity to define what is reinforcing for him and then is given a comparable reinforcement in terms of successes and failures on the trials, will he behave on this task in the same manner as other subjects for whom the experimenter chose the reinforcement schedule?"

Three investigations with relevance for the present study have utilized the concept of self-defined expectancy. Heath (1959) defined an expectancy as that score the subject predicts he will make in a specific task. That is, he asked subjects the score they expected to get on a vocabulary test which they subsequently took. The experimenter then reported falsified scores that were above (success) or below (failure) the subject's stated vocabulary expectancy. On the other hand, as a basis for manipulating success and failure on a task, Jessor (1954) used a score (minimum goal) which the subject had already indicated would be the lowest one he would still be satisfied with getting. This experimenter also gave the subject a falsified performance score which was a specified number of points above or below the minimum goal in an attempt to assure that success or failure was defined within the subject's own framework rather than arbitrarily. Finally, Chance (1959) asked the subject to write down his estimates of the scores he thought he was most likely to make on each of two tests. Just as in the other two studies, falsified feedback was given to the subject either by adding seven or fourteen points to the score the subject estimated he would make on the first test (an ink blot test). The subject was then asked to reexamine and re-estimate what he thought he might make on the second test (a word association test). All three of these studies were concerned with the effects of generalization of expectancies.

The present study differs from the above three studies in several ways: the main purpose of the present study was to investigate the effects of reinforcement on behavior with respect to locus of control orientation and skill-chance situations rather than the effects of generalization of expectancies; in two of the four groups, the reinforcements expected by the subject were those they received; and no feedback was stated by the experimenter since the subject could observe his own successes and failures as he performed the task.

The investigation most closely related to the present study is the one by Nickels and Williams (1970). This investigation used the Nickels disk-dropping apparatus to test the effects of levels of reinforcement (25% and 75%), subject locus of control (internals and externals), and situation locus of control (skill and chance) on long range and next trial predictions of success in disk-dropping. The results indicated that skill conditions and high-reinforcements both increase long range reinforcement expectancies and decrease the number of next trial expectancy shifts. They also suggest that the stimulus situation (skill-chance) may be more important than the personality construct (internality-externality) in influencing such expectancies when the skill/chance nature of the task is highly structured. The present study assumed that this latter suggestion was accurate when the task was clearly perceived by the subject as skill or as chance, when it used the same apparatus and task, and when it involved the same level of reinforcement. Such a view is supported by Davis and Phares (1967) and Rotter (1966). The present study differs from the Nickels and Williams investigation (1970), however, in that reinforcement levels other than those defined by the experimenter were used. In other words, it examined the effects of two additional levels of reinforcement i.e., the self-defined minimum expectancy for success (min e.s.) and the maximum expectancy for failure (max. e.f.). The two experimenter-defined reinforcement levels used in the present study were 70% and

30%. These reinforcement levels were selected for two reasons: (1) because it is easier to control for reinforcements when they are expressed in terms of 10 percent levels of reinforcement (rather than levels such as 25%, 55%, etc.); and, (2) so that the results of the present study could better be compared with those of the Nickels and Williams (1970) study which used 25% and 75% reinforcements. From this last study various hypotheses have been derived.

Hypotheses

Previous research indicates that individuals working under skill conditions on the Nickels Disk Dropping Task believe that it is a skill task, while subjects working under chance conditions believe that it is a chance task. Therefore:

(1) If the tasks are believable in terms of chance and skill conditions, then subjects under skill conditions will attribute a greater proportion of disk control to "skill" factors, while subjects under chance conditions will attribute a greater proportion of disk control to "chance" factors.

Previous research indicates that when the task is clearly defined as skill or chance, the effect of the personality variable (internal-external) on expectancy is minimized. Also factors such as skill conditions and higher reinforcements facilitate learning. Therefore, the following predictions can be made regarding subjects' long range reinforcement expectancies before any of these expectancies have been confirmed by feedback. Therefore:

(2a) If the task is clearly defined as skill or chance, the initial-long-range reinforcement expectancies for internals and externals will not differ significantly.

(2b) If the task is clearly defined as skill or chance, the initial-long-range reinforcement expectancies for subjects under skill conditions will be higher than for those subjects under chance conditions.

(2c) If no reinforcements have been previously received, the initial-long-range reinforcement expectancies will not differ significantly for subjects under max. e.f., 30%, 70% or min. e.s. levels of reinforcement.

If the effects of the personality variable are minimized in a clearly defined skill versus chance task and if higher reinforcements, adequate feedback, and skill conditions facilitate learning, then the following predictions can be made regarding subjects' long range reinforcement expectancies after these expectancies have been confirmed by feedback. Therefore:

(3a) If the task is clearly defined as skill or chance, the later-long-range reinforcement expectancies for internals and externals will not differ significantly.

(3b) If the task is clearly defined as skill or chance, the later-long-range reinforcement expectancies for subjects under skill conditions will be higher than for those subjects under chance conditions.

(3c) If higher reinforcements and adequate feedback facilitate learning, the later-long-range reinforcement expectancies for those subjects under min. e.s. and 70% reinforcement levels will be higher than for those subjects under max. e.f. and 30% reinforcement levels.

If internals hold higher expectations of themselves in terms of their capabilities than do externals; if skill conditions lead to higher expectancies than chance conditions; and, if reinforcement has not been operating when the min. e.s. and max. e.f. estimates are made, then the following predictions can be made regarding subjects' min. e.s. and max. e.f. estimations. Therefore:

(4a) If internals hold higher expectations of themselves than do externals in terms of their capabilities, than internals will make higher min. e.s. and max. e.f. estimates than will externals.

(4b) If skill conditions lead to higher expectations than do chance conditions, then subjects under skill conditions will make higher min. e.s. and max. e.f. estimates than will subjects under chance conditions.

(4c) If reinforcement is not operating at the time the min. e.s. and max. e.f. estimates are made, then reinforcement will have no effect upon min. e.s. and max. e.f. estimations.

It may appear intuitively plausible that individuals who believe they are succeeding on a task will perform similarly to those actually attaining high levels of reinforcement. Therefore:

(5) Those subjects who perceive themselves as frequently succeeding will have higher long-range reinforcement expectancies than those subjects who perceive themselves as frequently failing (regardless of the percentage of objectively administered reinforcement).

CHAPTER III

METHOD

Subjects

The subjects were female introductory psychology students from the University of Manitoba who voluntarily participated in the study as a part of their course requirement. Several hundred subjects were administered the Rotter Internal-External Control Scale (I-E Scale; Rotter, 1966) as one part of a mass testing session one month prior to the experimental session. The I-E Scale is a 29 item forced choice test measuring an individual's generalized expectancy about how reinforcement is controlled, that is, whether by internal (self-oriented) or external (other, luck, chance, or fate oriented). The I-E Scale is scored in terms of the total number of external choices selected, so that a high score indicates an external expectancy and a low score an internal expectancy. A copy of this scale is located in Appendix A.

From the large number of subjects tested 80 who scored 8 or below were selected as internally oriented subjects and 80 who scored 11 or above were selected as externally oriented subjects.

Apparatus and Task

The apparatus used in this study was the Nickels Disk Dropping Apparatus described in the Nickels and Tolen study (1968). A photograph of this apparatus is located in Appendix B. A 2½ inch diameter cup was attached to the countertop of a small suitcase. The task was for the subject to anticipate(predict for the skill condition and guess for the chance condition) how a disk the size of a quarter would land when it was dropped from a height of 15 cm. above the cup as indicated by a plastic rule extending upward from the cup. The disk was marked "A" on one side, and "B" on the other. All subjects participated in the same task but under either skill conditions or chance conditions. Subjects working under the skill condition dropped the disk themselves from their hand into the cup. In addition, subjects were led to believe, through a demonstration by the experimenter, of how the task worked and through instructions, that the landing of the disk was a function of their skill in disk dropping. The detailed instructions given to subjects under the skill condition are located in Appendix C. Subjects working under the chance condition were not permitted to drop the disk themselves. Instead the experimenter placed the disk into a container, shook it, and then dropped it into the cup. In addition, these subjects were led to believe, through a demonstration, by the experimenter, of how the task worked and through instructions, that the landing of the disk was a function ofchance. The detailed instructions given to subjects under the chance condition are located in Appendix D.

On the basis of the instructions and the procedure, E apparently had no control of the disk landing or knowledge of how the disk must land for a subject to either succeed or fail in her prediction. In actuality, the experimental disk was a magnet, and an electromagnet was situated under the cup. Subjects indicated their predictions by placing the black indicator block into separate compartments marked "A" or "B", respectively. The polarity of the electromagnet was determined by hidden microswitches in each prediction compartment so that whatever the subject predicted would not occur on that trial. (In order to insure that the subject did not think the experimenter controlled the outcome, the prediction compartments were screened from the experimenter's view.) To make reinforcement possible (success by predicting correctly), the entire switching arrangement could be reversed by means of a signal from a hidden transmitter in the experimenter's clipboard to a small receiver hidden within the suitcase.

Design

The 160 subjects were randomly placed in one of sixteen groups according to (a) their test results (internal or external), (b) their tasks (skill or chance), and (c) their reinforcements (min. e.s., 70%, max. e.f., or 30%). The subjects were given 40 trials on the Nickels Disk-Dropping task (since the outcome for Trial 1 is shown in the "last-Trial" column for Trial 2, the last reinforcement is indicated as Trial 41 on the data collection sheet). Other than on this data collection sheet (Appendix G), reinforcements were identified with the trials they reinforced. One extra trial beyond the 40 was given in order to provide the subject with a success on her last trial. Trials number 1, 11, 21, and 31 (as well as extra Trial 41) were all successes for all subjects and Trials number 10, 20, 30, and 40 were failures for all subjects. The exact percentage of reinforcement was administered within each block of ten trials (e.g., if a subject were to receive 20% reinforcement he would have obtained 2 successes at the end of Trial 10, 4 successes at the end of Trial 20, 6 successes at the end of Trial 30, and 8 successes at the end of Trial 40). In addition to the experimenter-defined reinforcement levels (70% and 30%), data were available at the conclusion of the study for each subject in regards to her: (a) locus of control orientation (internal or external); (b) stimulus situation (skill or chance); and (c) self-defined reinforcement expectancies (min. e.s. and max. e.f.). Data were also available for each subject in regards to her experimental behavior: (a) pre- and post-experimental skill-chance factor attribution; (b) initial-long-range reinforcement expectancies; (c) later-long-range reinforcement expectancies; and (d) degree of suspiciousness regarding the apparatus, the procedure, and the experimenter's activities during the experiment. No predictions were made with respect to the suspiciousness of the subjects. The awareness question was constructed by the experimenter and was included primarily to determine whether or not the subjects had indeed become aware that the experimenter is controlling their successes and failures. Any subject who was suspicious was excluded from the study.

Procedure

The subject was escorted to the experimental room and introduced to the Nickels Disk Dropping Apparatus and Task. This was accomplished by verbal instructions and demonstrations of the task. (See Appendix C for detailed instructions given to subjects under skill conditions and Appendix D for those given to subjects under chance conditions). The subject was then asked to complete the pre-experimental attribution questionnaire. This questionnaire deals with what factors she believes contributes to such a task as this one in terms of attributing certain percentages to each of 10 statements including skill-determined and chance-determined factors. A copy of this questionnaire is located in Appendix E. The next request made of the subject was to complete the success-failure estimate sheet. This scale was used to indicate (a) the largest percentage of failures the subject could obtain and still consider that she had succeeded (min. e.s.) and (b) the smallest percentage of successes she could obtain and still consider that she had failed (max. e.f.) on the task. A copy of the success-failure estimate sheet used to record min e.s. and max. e.f. data is located in Appendix F. The experimenter glanced at this scale and then placed it out of sight.

Prior to the first trial, as well as all future trials, the subject was asked to indicate on what percentage of all future trials she expected the disk to land as she said it would land. The experimenter recorded this expectancy estimate on the data collection form used to record (a) the subject's expectancies prior to each trial, (b) the A or B disk side that came up, and (c) the subject's success or failure outcome. A copy of this data collection form is located in Appendix G. A copy of the schedules of reinforcement (i.e., success and failure trials) may be found in Appendix H. After completion of the 40 trials, the subject was asked to indicate on the post-experimental attribution questionnaire what factors she believed had contributed to such a task as the one she had just performed. A copy of this questionnaire is located in Appendix I. Following the completion of the post-experimental attribution questionnaire, the subject was asked to complete the awareness questionnaire. This questionnaire was designed to ascertain whether or not (a) the subject was aware of the fact that the experimenter controlled the landing of the disk and (b) the subject considered herself to be a success on the task. A copy of the awareness questionnaire is located in Appendix J.

Finally, the subject was debriefed. This involved two stages with the first stage being a general explanation of the study given to the subject immediately after her completing the awareness questionnaire. She was then told that a letter would be sent to her informing her of the results of the study, her part in it, and a more complete description of the aims of the study. This letter constitutes the second stage of the debriefing. A copy of this letter is located in Appendix K. The subject was then thanked for her participation in the experiment and shown out of the experimental room.

CHAPTER IV

RESULTS

Believability of the Task

The test of hypothesis one was made by means of analysis of variance (three-way) on pre- and post-experimental factor attribution. This analysis yields internal-external control person conditions (df = 1), skill-chance conditions (df = 1), and four reinforcement conditions (min. e.s., 70%, max. e.f., and 30%: df = 3) as main effects with three double interactions (one df = 1 and two df's = 3), one triple interaction (df = 3), and a within cells error term (df = 144).

The dependent variable for testing this hypothesis was the percentage of control attributed to skill on the one hand, and to chance and luck on the other, when subjects fill out the attribution questionnaires. The ratings of the pre- and post-experimental questionnaires for each locus of control condition were expected to indicate that those subjects under skill conditions attribute a greater proportion of disk control to "skill", while those subjects under chance conditions should attribute a greater proportion of disk control to "chance" factors.

As predicted, subjects working under skill conditions attributed significantly more control to "skill", while subjects working under chance conditions attributed significantly more control to "chance" and "luck" on both the pretest and posttest questionnaires.

On the pretest attribution questionnaire, subjects in the chance conditions attributed, on the average, a greater percentage of disk control to chance and luck factors (77.15) than subjects in the skill conditions (15.52). (See Table 1). On this same questionnaire, subjects in the skill condition attributed, on the average, a greater percentage of disk control to skill factors (10.88) than subjects in the chance condition (0.51). (See Table 2). Analysis of variance confirms that the above mean differences are statistically significant. That is, subjects in the chance condition did attribute significantly greater disk control to chance and luck than did subjects in the skill condition ($F = 676.98$, $p < .001$, $e = .90$). (See Table 3). Furthermore, subjects in the skill condition attributed significantly greater disk control to skill than subjects in the chance condition ($F = 35.27$, $p < .001$, $e = .42$). (See Table 4).

On the posttest attribution questionnaire, subjects in the chance condition attributed, on the average, a greater percentage of disk control to chance and luck factors (75.99) than subjects in the skill condition (15.11). (See Table 5). On this same questionnaire, subjects in the skill condition attributed, on the average, a greater percentage of disk control to skill factors (11.63) than subjects in the chance conditions(0.64). (See Table 6). Analysis of variance confirms that the above mean differences are statistically significant. That is, subjects in the chance condition did attribute significantly greater disk control to chance and luck than did subjects in the skill condition ($F = 406.72$, $p < .001$, $e = .83$). (See Table 7). Further-

TABLE 1

Means and Standard Deviations for Pretest Chance-Luck Attribution

Condition	N	$\bar{X}$	S.D.
Skill	80	15.52	13.64
Chance	80	77.15	16.18
Internal	80	46.57	34.37
External	80	46.10	34.49
Min. e.s.	40	47.32	33.31
70%	40	47.38	36.76
30%	40	49.77	34.34
Max. e.f.	40	40.88	33.43

TABLE 2

Means and Standard Deviations for Pretest Skill Attribution

Condition	N	$\bar{X}$	S.D.
Skill	80	10.88	15.34
Chance	80	0.51	2.19
Internal	80	6.07	11.15
External	80	5.31	13.03
Min. e.s.	40	9.00	14.29
70%	40	5.00	11.88
30%	40	3.65	9.33
Max. e.f.	40	5.13	12.17

TABLE 3

Analysis of Variance for Pretest Chance-Luck Attribution

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	151905.37	676.98***
Internal-External (I-E)	1	8.95	0.04
Reinforcement (R)	3	582.85	2.60
Sk x I	1	24.41	0.11
Sk x R	3	88.74	0.40
I x R	3	152.17	0.68
Sk x I x R	3	184.70	0.82
Within Cells	144	224.39	
Total	159		

*** $p < .001$

TABLE 4

Analysis of Variance for Pretest Skill Attribution

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	4295.25	35.27***
Internal-External (I-E)	1	23.26	0.19
Reinforcement (R)	3	212.17	1.74
Sk x I	1	2.26	0.02
Sk x R	3	190.76	1.57
I x R	3	31.59	0.26
Sk x I x R	3	34.92	0.29
Within Cells	144	121.77	
Total	159		

*** $p < .001$

TABLE 5

Means and Standard Deviations for Posttest Chance-Luck Attribution

	N	$\bar{X}$	S.D.
Skill	80	15.11	17.20
Chance	80	75.99	22.31
Internal	80	44.70	36.90
External	80	46.40	36.15
Min. e.s.	40	41.57	36.86
70%	40	42.63	36.94
30%	40	57.38	36.36
Max. e.f.	40	40.63	34.20

TABLE 6

Means and Standard Deviations for Posttest Skill Attribution

	N	$\bar{X}$	S.D.
Skill	80	11.63	16.20
Chance	80	0.64	2.80
Internal	80	6.11	10.53
External	80	6.15	14.85
Min. e.s.	40	7.63	11.49
70%	40	4.63	12.98
30%	40	4.17	10.72
Max. e.f.	40	8.10	15.60

TABLE 7

Analysis of Variance for Posttest Chance-Luck Attribution

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	148230.38	406.72***
Internal-External (I-E)	1	115.78	0.32
Reinforcement (R)	3	2512.68	6.89**
Sk x I	1	125.82	0.35
Sk x R	3	68.41	0.19
I x R	3	145.30	0.40
Sk x I x R	3	595.11	1.63
Within Cells	144	364.45	
Total	159		

**$p < .01$
***$p < .001$

TABLE 8

Analysis of Variance for Posttest Skill Attribution

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	4829.00	34.81***
Internal-External (I-E)	1	0.06	0.00
Reinforcement (R)	3	162.71	1.17
Sk x I	1	63.75	0.46
Sk x R	3	155.92	1.12
I x R	3	46.61	0.34
Sk x I x R	3	71.67	0.52
Within Cells	144	138.74	
Total	159		

*** $p < .001$

more, subjects in the skill condition attributed significantly greater disk control to skill than did subjects in the chance condition ($F = 34.81$, $p < .001$, $e = .42$). (See Table 8). As indicated in Table 7 a significant reinforcement effect was found on the posttest attribution questionnaire for chance and luck factors ($F = 6.89$, $p < .01$, $e = .13$). Further analysis (see Appendix L) revealed that subjects working under the experimenter-defined low (30%) reinforcement schedule attributed significantly more disk control to "chance" and "luck" than did subjects working under: the experimenter-defined high (70%); the self-defined minimum expectancy for success (min. e.s.); and the self-defined maximum expectancy for failure (max. e.f.) conditions. There were no significant differences among these latter three reinforcement conditions.

Initial-Long-Range Reinforcement Expectancies

Tests of hypothesis two were made by means of analysis of variance (three-way) on long range reinforcement expectancies. This analysis yields internal-external person conditions (df = 1), skill-chance conditions (df = 1), and four reinforcement conditions (min. e.s., 70%, max. e.f., and 30%; df = 3), as main effects with three double interactions (one df = 1 and two df's = 3), one triple interaction (df = 3), and a within cells error term (df = 144).

For all of the tests of this hypothesis, the dependent variable was the subjects' stated expectancies for success on all future trials prior to the first drop of the disk as recorded on the data collection form (see Appendix G). Hypothesis 2a may be formulated as: there will be no significant differences between internal and external subjects in their initial-long-range reinforcement expectancies. Hypothesis 2b may be formulated as: those subjects under skill conditions will state higher initial-long-range reinforcement expectancies than those subjects under chance conditions. Hypothesis 2c may be formulated as: there will be no significant differences between subjects' initial-long-range reinforcement expectancies under the various levels of reinforcement (min. e.s., 70%, 30%, or max. e.f.).

The means and standard deviations for initial-long-range reinforcement expectancies (Trial 1) are located in Table 9 and the analysis of variance results for this dependent variable are located in Table 10. As predicted, the only significant effect was that for the skill-chance conditions. Subjects under skill conditions stated significantly higher initial-long-range reinforcement expectancies than did subjects under chance conditions ($\underline{F} = 7.03$, $\underline{p} < .01$, $\underline{e} = .20$). Since the task was clearly seen as skill or chance (see the previous discussion on hypothesis 1), it was anticipated that the internal-external personality variable would have little or no effect upon initial-long-range reinforcement expectancies. This prediction was supported ($\underline{F} = 2.46$, ns) as well as the prediction that since no reinforcement had been received as yet, reinforcement effects would be insignificant ($\underline{F} = 0.25$, ns).

Later-Long-Range Reinforcement Expectancies

The tests of hypothesis three were made by means of analysis of variance (three-way) on long-range reinforcement expectancies. This analysis yields internal-external person conditions (df = 1), skill-

TABLE 9

Means and Standard Deviations for Initial-Long-Range Reinforcement Expectancies (Trial 1)

Condition	N	$\bar{X}$	S.D.
Skill	80	4.99	1.65
Chance	80	4.38	1.16
Internal	80	4.86	1.55
External	80	4.50	1.34
Min. e.s.	40	4.52	1.62
70%	40	4.72	1.32
30%	40	4.80	1.52
Max. e.f.	40	4.67	1.38

TABLE 10

Analysis of Variance for Initial-Long-Range Reinforcement Expectancies (Trial 1)

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	15.01	7.03**
Internal-External (I-E)	1	5.26	2.46
Reinforcement (R)	3	0.54	0.25
Sk x I	1	0.16	0.07
Sk x R	3	0.29	0.14
I x R	3	1.21	0.56
Sk x I x R	3	0.90	0.42
Within Cells	144	2.14	
Total	159		

** $p < .01$

chance conditions (df = 1), and four reinforcement conditions (min. e.s., 70%, max. e.f., and 30%; df = 3) as main effects with three double interactions (one df = 1 and two df's = 3), one triple interaction (df = 3), and a within cells error term (df = 144).

For all of these tests of this hypothesis, the dependent variable was the subjects' stated expectancies for success on all future trials with the estimate obtained immediately after the disk drop on Trials 2 (after one success and no failures), 10,(after the first appropriate level of reinforcement has been administered), 20 (after completion of half of the training trials), and 40 (after completion of all the training trials). Hypothesis 3a may be formulated as: there will be no significant differences between internal and external subjects in their later-long-range reinforcement expectancies. Hypothesis 3b may be formulated as: those subjects under skill conditions will state higher later-long-range reinforcement expectancies than those subjects under chance conditions. Hypothesis 3c may be formulated as: those subjects working under min. e.s., and 70% reinforcement levels will show higher later-long-range reinforcement expectancies than those subjects working under max. e.f. and 30% reinforcement levels.

The means and standard deviations for the later-long-range reinforcement expectancies on Trials 2, 10, 20, and 40 are located in Tables 11, 12, 13, and 14, respectively. The analysis of variance results for Trials 2, 10, 20, and 40 are located in Tables 15, 16, 17, and 18, respectively. As predicted, the later-long-range reinforcement

TABLE 11

Means and Standard Deviations for Later-Long-Range Reinforcement Expectancies (Trial 2)

Condition	N	$\bar{X}$	S.D.
Skill	80	5.29	1.49
Chance	80	4.41	1.15
Internal	80	5.05	1.47
External	80	4.65	1.29
Min. e.s.	40	4.80	1.73
70%	40	4.88	1.28
30%	40	4.80	1.38
Max.e.f.	40	4.92	1.19

TABLE 12

Means and Standard Deviations for Later-Long-Range Reinforcement Expectancies (Trial 10)

Condition	N	$\bar{X}$	S.D.
Skill	80	5.38	1.80
Chance	80	4.41	1.30
Internal	80	5.06	1.73
External	80	4.72	1.53
Min. e.s.	40	5.38	1.81
70%	40	5.92	1.27
30%	40	3.87	1.26
Max. e.f.	40	4.40	1.35

TABLE 13

Means and Standard Deviations for Later-Long-Range Reinforcement Expectancies (Trial 20)

Condition	N	$\bar{X}$	S.D.
Skill	80	5.52	2.06
Chance	80	4.35	1.60
Internal	80	5.05	2.04
External	80	4.82	1.81
Min. e.s.	40	5.77	1.90
70%	40	6.30	1.34
30%	40	3.50	1.20
Max e.f.	40	4.17	1.72

TABLE 14

Means and Standard Deviations for Later-Long-Range Reinforcement Expectancies (Trial 40)

Condition	N	$\bar{X}$	S.D.
Skill	80	5.51	2.28
Chance	80	4.46	1.81
Internal	80	5.11	2.11
External	80	4.86	2.13
Min. e.s.	40	5.95	1.69
70%	40	6.75	1.43
30%	40	3.05	1.18
Max. e.f.	40	4.20	1.84

TABLE 15

Analysis of Variance for Later-Long-Range Reinforcement Expectancies (Trial 2)

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	30.63	16.52***
Internal-External (I-E)	1	6.40	3.45
Reinforcement (R)	3	0.15	0.08
Sk x I	1	1.23	0.66
Sk x R	3	0.74	0.40
I x R	3	0.72	0.39
Sk x I x R	3	0.11	0.06
Within Cells	144	1.85	
Total	159		

*** $p < .001$

TABLE 16

Analysis of Variance for Later-Long-Range Reinforcement Expectancies (Trial 10)

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	37.06	21.02***
Internal-External (I-E)	1	4.56	2.58
Reinforcement (R)	3	34.36	19.49
Sk x I	1	1.05	0.60
Sk x R	3	3.94	2.23
I x R	3	3.74	2.12
Sk x I x R	3	1.50	0.85
Within Cells	144	1.76	
Total	159		

*** $p < .001$

TABLE 17

Analysis of Variance for Later-Long-Range Reinforcement Expectancies (Trial 20)

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	55.22	28.46***
Internal-External (I-E)	1	2.02	1.04
Reinforcement (R)	3	69.41	35.77***
Sk x I	1	0.23	0.12
Sk X R	3	7.54	3.89*
I x R	3	4.04	2.08
Sk x I x R	3	3.84	1.98
Within Cells	144	1.94	
Total	159		

* $p < .05$
*** $p < .001$

TABLE 18

Analysis of Variance for Later-Long-Range Reinforcement Expectancies (Trial 40)

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	44.10	22.21***
Internal-External (I-E)	1	2.50	1.26
Reinforcement (R)	3	112.10	56.44
Sk x I	1	4.22	2.13
Sk x R	3	6.50	3.27
I x R	3	2.30	1.16
Sk x I x R	3	4.82	2.43
Within Cells	144	1.99	
Total	159		

*** $p < .001$

expectancies for subjects working under skill conditions were significantly higher than those for subjects working under chance conditions on Trials: 2 (F = 16.52, $p < .001$, e = .30); 10 (F = 21.02, $p < .001$, e = .28); 20 (F = 28.46, $p < .001$, e = .30); and 40 (F = 22.21, $p < .001$, e = .24).

Although the reinforcement effects were not significant for Trial 2 (since reinforcement was the same for all subjects), they were significant with respect to Trials: 10 (F = 19.49, $p < .001$, e = .48); 20 (F = 35.77, $p < .001$, e = .58); and 40 (F = 56.44, $p < .001$, e = .68). In addition, analysis on Trial 20 data revealed a significant skill x reinforcement interaction. The specific reinforcement effects for these trials were further analysed with the results indicating that in all but one analysis there were statistically significant differences among the four reinforcement conditions regardless of trial (see Appendix L).

Minimum Expectancy for Success and Maximum Expectancy for Failure

Tests of hypothesis four were made by means of analysis of variance (three-way) on min. e.s. and max. e.f. estimates. This analysis yields internal-external person conditions (df = 1), skill-chance conditions (df = 1), and four reinforcement conditions (min. e.s., 70%, max. e.f., & 30%; df = 3) as main effects with three double interactions (one df = 1 and two df's = 3), one triple interaction (df = 3), and a within cells error term (df = 144).

For all of the tests of this hypothesis, the dependent variable was the percentages that internal and external (skill and chance) subjects have indicated as perceived success (failure) on the min. e.s.

(max. e.f.) scales (see Appendix F). Hypothesis 4a may be formulated as: internal subjects will make higher min. e.s. and max. e.f. estimates than external subjects. Hypothesis 4b may be formulated as: those subjects under skill conditions will make higher min. e.s. and max. e.f. estimates than those subjects under chance conditions. Hypothesis 4c may be formulated as: there will be no significant differences between the various reinforcement groups (min. e.s., 70%, max. e.f., and 30%) in terms of their min. e.s. and max. e.f. estimations.

The means and standard deviations for the min. e.s. estimates are located in Table 19 and those for the max. e.f. estimates may be found in Table 20. The number of subjects selecting as their min. e.s. and max. e.f. estimates at each level of reinforcement may be found in Appendix M.

The analysis of variance results for the min. e.s. estimates appear in Table 21 and those for the max e.f. estimates are located in Table 22. As predicted, subjects performing under skill conditions stated significantly higher min. e.s. ($\underline{F}$ = 10.07, $\underline{p} < .01$, $\underline{e}$ = .23) and max. e.f. ($\underline{F}$ = 6.35, $\underline{p} < .05$, $\underline{e}$ = .18) estimates than did those subjects performing under chance conditions. Also as predicted, internal subjects stated significantly higher min. e.s. ($\underline{F}$ = 12.94, $\underline{p} < .001$, $\underline{e}$ = .26) and max. e.f. ($\underline{F}$ = 6.35, $\underline{p} < .05$, $\underline{e}$ .18) estimates than did external subjects. It was further predicted and found that reinforcement level would have no effect upon subject's min. e.s. and max. e.f. estimates.

TABLE 19

Means and Standard Deviations for Min. e.s. Estimates

Condition	N	$\bar{X}$	S.D.
Skill	80	59.88	11.02
Chance	80	54.25	11.78
Internal	80	60.25	12.22
External	80	53.88	10.31
Min. e.s.	40	55.50	9.86
70%	40	58.75	11.02
30%	40	56.50	12.92
Max. e.f.	40	57.50	12.96

TABLE 20

Means and Standard Deviations for Max. e.f. Estimates

Condition	N	$\bar{X}$	S.D.
Skill	80	41.36	14.39
Chance	80	36.50	9.95
Internal	80	41.36	13.76
External	80	36.50	10.80
Min. e.s.	40	37.25	11.87
70%	40	39.47	14.41
30%	40	38.25	12.07
Max. e.f.	40	40.75	11.96

TABLE 21

Analysis of Variance for Min. e.s. Estimates

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	1265.63	10.07**
Internal-External (I-E)	1	1625.63	12.94***
Reinforcement (R)	3	77.29	0.62
Sk x I	1	140.63	1.12
Sk x R	3	32.29	0.26
I x R	3	52.29	0.42
Sk x I x R	3	70.63	0.56
Within Cells	144	125.63	
Total	159		

** $p < .01$
*** $p < .001$

TABLE 22

Analysis of Variance for Max. e.f. Estimates

Source	df	MS	F
Skill-Chance (Sk-Ch)	1	945.70	6.35*
Internal-External (I-E)	1	945.70	6.35*
Reinforcement (R)	3	91.53	0.62
Sk x I	1	5.43	0.04
Sk x R	3	34.93	0.23
I x R	3	233.61	1.57
Sk x I x R	3	237.70	1.60
Within Cells	144	148.87	
Total	159		

* $p < .05$

Long-Range Reinforcement Expectancies for Clearly Defined Success-Failure Groups

Tests of hypothesis five were made by means of analysis of variance (three-way) for Trials 1 and 2 and by means of analysis of covariance (three-way) for Trials 10, 20, and 40 on long-range reinforcement expectancies of the seventy-four subjects who perceived themselves as successes and the seventy-four subjects who perceived themselves as failures (Winer, 1962, pp. 595-606). The covariate was the actual reinforcements received by the subjects. These analyses yield success-failure conditions (df = 1), internal-external person conditions (df = 1), and skill-chance conditions (df = 1) as main effects with three double interactions (df = 1), one triple interaction (df = 1), and a within cells error term (df = 140) for Trials 1 and 2 and(df = 139) for Trials 10, 20, and 40.

The dependent variable testing this hypothesis was the subjects' stated long-range reinforcement expectancies obtained prior to the disk drop on Trials 1, 2, 10, 20, and 40. Subjects who perceive their reinforcements as indicating success show higher later-long-range reinforcement expectancies than those subjects who perceive their reinforcements as indicating failure regardless of their actual levels of reinforcement. In other words, three kinds of subjects may view their reinforcements as indicating success, viz., those subjects in the min. e.s. group, those subjects in the 70% reinforcement group whose min. e.s. is 70% or lower, and those subjects in the 30% reinforcement group whose min. e.s. is 30% or lower. These subjects should have higher reinforcement expectancies than those subjects perceiving their reinforcements as indicating failure, viz., those subjects in the max. e.f. group, those subjects in the 70% reinforcement group whose max. e.f. is 70% or higher, and those subjects in the 30% reinforcement group whose max. e.f. is 30% or higher.

It was further hypothesized that when one performs an analysis of variance on data from Trials 1 and 2 (which is before differential reinforcement becomes operative), the differences between the two groups (success-failure) will be insignificant.

Analysis of covariance was chosen as the preferred method for testing the remainder of hypothesis five for several reasons: (1) to control for reinforcement effects since subjects in the min. e.s. and max. e.f. groups received a wide variety of actual reinforcements; (2) to permit the use of all subject data since matching by received reinforcements would be too restrictive; and, (3) to take account of past research (e.g., Nickels & Williams, 1970) which has indicated that subjects working under higher reinforcement levels make higher later-long-range reinforcement expectancies than do subjects working under lower reinforcement levels. It should be mentioned here that subjects in the min. e.s. group received 5% above their stated min. e.s. estimates in terms of successful predictions and those in the max. e.f. group received 5% below their stated max. e.f. estimates in order to insure perceived success or failure, while subjects in the 70% and 30% reinforcement groups received these exact percentages of correct predictions on the 40 trials.

The means and standard deviations for Trials 1 and 2 appear in Table 23 and the means for Trials 10, 20, and 40 are located in Table 24. The analysis of variance results for Trial 1 are located in Table 25 and those for Trial 2 are to be found in Table 26. The analysis of covariance results for Trials 10, 20, and 40 are located in Table 27, and Table 29, respectively.

At the beginning of the experiment all subjects were asked to give min. e.s. and max. e.f. estimates. By comparing these estimates with the actual reinforcement subjects received during the study, subjects were classified as to whether or not they viewed their obtained percentage of reinforcement as indicating success or failure. Of the 160 subjects in the study, 74 received a percentage of reinforcement above their lowest success point and 74 received a percentage of reinforcement below their highest failure point. Twelve subjects received a percentage of reinforcement in between these points and thus did not receive a percentage of reinforcement that could be clearly considered as success or failure. It was hypothesized that subjects who perceive their reinforcements as indicating success (i.e., subjects in the min. e.s. group, those in the 70% group whose min. e.s. estimates were 70% or lower, and those subjects in the 30% group whose min. e.s. estimates were 30% or lower) would show long-range reinforcement expectancies than those subjects who perceive their reinforcements as indicating failure (i.e., subjects in the max. e.f. group, those in the 70% group whose max. e.f. was 70% or higher, and those in the 30% group whose max. e.f. was 30% or higher) regardless of their actual reinforcement.

The hypothesis was supported since subjects who perceived their reinforcements as indicating success showed higher long-range reinforcement expectancies than did subjects who perceived their reinforcements as indicating failure for Trials: 10 ($F = 11.15$, $p < .001$, $e = .25$); 20 ($F = 10.57$, $p < .01$, $e = .25$); and 40 ($F = 4.63$, $p < .05$, $e = .16$). In addition, on all three trials there was a significant difference between skill and chance conditions in that subjects under skill conditions stated significantly higher long-range reinforcement expectancies than did subjects under chance conditions for Trials: 10 ($F = 7.59$, $p < .01$, $e = .21$); 20 ($F = 12.18$, $p < .001$, $e = 27$; and 40 ($F = 7.89$, $p < .01$, $e = .21$). A significant skill-success interaction was also found on Trials 10 ($F = 4.13$, $p < .05$, $e = .17$); 20 ($F = 6.38$, $p < .05$, $e = .19$); and 40 ($F = 6.15$, $p < .05$, $e = .18$). Subjects working under both skill and success conditions stated significantly higher long-range reinforcement expectancies than subjects working under chance and success conditions, subject working under skill and failure conditions or subjects working under chance and failure conditions. However, the success experience seems to be a more important variable than skill since both skill and chance conditions in combination with success experiences on the task led to higher long-range reinforcement expectancies than did skill or chance conditions in combination with failure experiences on the task. As predicted, according to the results of analysis of variance, there appeared to be no initial bias on control Trials 1 and 2 for the success-failure and internal-external control F's were insignificant. There were, however, significant skill-chance effects on these two trials with subjects under the skill condition stating higher initial-long-range reinforcement expectancies on Trial 1 (F = 5.33, $p < .05$, e = .16) and higher later-long-range reinforcement expectancies on Trial 2 (F = 14.24, $p < .001$, e = .28) than subjects under the chance condition.

The data of the 74 "success subjects"and the 74 "failure subjects" were further analyzed by comparing this perceived success or failure with the percentage of reinforcement they actually received. The point biserial correlation indicates that perceived success was highly correlated with reinforcement (rb = .976). Thus, the higher the percentage of reinforcement the greater the likelihood of a success classification.

Finally, a comparison was made between data on perceived success and data obtained at the end of the experiment when subjects responded to question 3 of the awareness questionnaire. On this question subjects were asked "Generally speaking would you consider yourself a success on the task. If yes, why and if no, why not?" The experimenter and two other clinical psychologists independently attempted to classify all awareness questionnaire responses as expressing success or failure. Of the 148 subjects who were clearly classifiable according to pre-experiment perceptions, based on their min.e.s. and max. e.f. estimates, 106 were also clearly classifiable on the basis of post-experiment perceptions. A 2 x 2 Chi square was computed between the success-failure pre-experiment classification and the success-failure post-experiment classification. The overall Chi-square was 43.76

TABLE 23

Means and Standard Deviations for the Clearly Defined Success-Failure Groups (Trials 1 and 2)

Condition	Trial 1		Trial 2	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.
Success	4.51	1.46	4.74	1.53
Failure	4.85	1.38	4.97	1.19
Internal	4.85	1.51	5.04	1.44
External	4.53	1.34	4.68	1.29
Skill	4.95	1.65	5.26	1.49
Chance	4.43	1.13	4.47	1.12

N = 74 for all cells

TABLE 24

Means for the Clearly Defined Success-Failure Groups (Trials 10, 20, and 40)

Condition	Trial 10	Trial 20	Trial 40
	$\bar{X}$	$\bar{X}$	$\bar{X}$
Success (S)	5.53	5.91	6.20
Failure (F)	4.23	3.99	3.73
Internal (I)	5.04	5.08	5.08
External (E)	4.72	4.82	4.86
Skill (Sk)	5.33	5.53	5.34
Chance (Ch)	4.44	4.37	4.60

N = 74 for all cells

TABLE 25

Analysis of Variance for the Clearly Defined Success-Failure Groups (Trial 1)

Source	df	MS	F
Success-Failure (S-F)	1	3.58	1.81
Internal-External (I-E)	1	4.13	2.09
Skill-Chance (Sk-Ch)	1	10.55	5.33*
S x I	1	4.38	2.21
S x Sk	1	0.28	0.14
I x Sk	1	0.02	0.01
S x I x Sk	1	0.17	0.08
Within Cells	140	1.98	
Total	147		

*$p < .05$

TABLE 26

Analysis of Variance for the Clearly Defined Success-Failure Groups (Trial 2)

Source	df	MS	F
Success-Failure (S-F)	1	1.44	0.84
Internal-External (I-E)	1	5.58	3.24
Skill-Chance (Sk-Ch)	1	24.55	14.24***
S x I	1	3.63	2.11
S x Sk	1	0.11	0.06
I x Sk	1	0.48	0.28
S x I x Sk	1	0.00	0.00
Within Cells	140	1.72	
Total	147		

***$p < .001$

TABLE 27

Analysis of Covariance for the Clearly Defined Success-Failure Groups (Trial 10)

Source	df	MS	F
Success-Failure (S-F	1	24.19	11.15**
Internal-External (I-E)	1	0.10	0.05
Skill-Chance (Sk-Ch)	1	16.47	7.59**
S x I	1	3.70	1.71
S x Sk	1	8.96	4.13*
I x Sk	1	0.85	0.39
S x I x SK	1	4.62	2.13
Error	139	2.17	
Total	146		

* $p < .05$
** $p < .01$

TABLE 28

Analysis of Covariance for the Clearly Defined Success-Failure Groups (Trial 20)

Source	df	MS	F
Success-Failure (S-F	1	25.59	10.57**
Internal-External (I-E)	1	0.01	0.05
Skill-Chance (Sk-Ch)	1	29.49	12.18***
S xI	1	1.34	0.55
S x Sk	1	15.44	6.38*
I x Sk	1	1.73	0.71
S x I x Sk	1	2.80	1.16
Error	139	2.42	
Total	146		

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 29

Analysis of Covariance for the Clearly Defined Success-Failure Groups (Trial 40)

Source	df	MS	F
Success-Failure (S-F)	1	11.97	4.63*
Internal-External (I-E)	1	0.34	0.13
Skill-Chance (Sk-Ch)	1	20.40	7.89**
S x I	1	0.58	0.22
S x Sk	1	15.91	6.15*
I x Sk	1	0.03	0.01
S x I x Sk	1	0.17	0.06
Error	139	2.59	
Total	146		

* $p < .05$
** $p < .01$

TABLE 30

Success-and Failure Pre-Experiment Perception (Min. e.s. and Max e.f. Estimates) and Post-Experiment Perception (Subjects' Responses to Question 3 on the Awareness Questionnaire

Post-Experiment Perception	Pre-Experiment Success	Pre-Experiment Failure	Total
Success	42	8	50
Failure	11	45	56
Total	53	53	106

$X^2 = 43.76$, $p < .001$

($p < .001$), with a related samples test of two change cells (success to failure and failure to success) yielding a Chi square of 0.21 (ns). The results indicate that generally those subjects who received their predefined "success-reinforcement" saw themselves as successes at the end of the experiment, whereas those subjects who received their predefined "failure-reinforcement" saw themselves as failures at the end of the experiment.

CHAPTER V

DISCUSSION

An attempt was made to extend the analysis of reinforcement expectancy under the assumption that the variable of reinforcement may have contributed to the contradictory results one finds in the area of locus of control research. The present study included the usual experimenter-defined reinforcement levels; experimenter-defined high (70%) and experimenter-defined low (30%) as well as two levels of self-defined reinforcement: self-defined high (minimum expectancy for success or min. e.s.) and self-defined low (maximum expectancy for failure or max. e.f.). This study was designed to investigate the question that if one gives an individual the opportunity to define what is reinforcing for him and then gives him a comparable reinforcement in terms of successes and failures on a task, will he behave on this task in the same manner as other subjects for whom the experimenter selects the reinforcement schedule? The particular behaviors examined were: (a) believability of the task; (b) initial-long-range reinforcement expectancies; (c) later-long-range reinforcement expectancies; (d) estimates indicating how large a percentage of failures would be required in order for the subject to still consider that he had succeeded on the task (min. e.s.) and how small a percentage of successes would be required for the subject to consider that he had failed on the task (max. e.f.); and (e) the effects of perceptions of success and failure upon initial- and later-long-range reinforcement expectancies.

Believability of the Task

This hypothesis stated generally that if the tasks are believable in terms of skill and chance conditions, then subjects under the skill condition will attribute a greater proportion of disk control to "skill", while subjects under the chance condition will attribute a greater proportion of disk control to "chance" factors. The hypothesis was confirmed since, on both the pretest and posttest attribution questionnaires, subjects working under the skill condition attributed significantly more disk control to "skill" than those subjects working under the chance condition, while subjects working under the chance condition attributed significantly more disk control to "chance" than those subjects working under the skill condition. However, one's internal or external orientation did not seem to influence the degree to which subjects attributed the results of disk-dropping to either skill or chance factors. Presumably since the task itself appeared to be so clearly defined that the personality variable of internality-externality could not operate. As previously suggested (Nickels & Williams, 1970), if one wanted the personality variable to play a significant role in attribution of skill or chance factors then the task would have to be ambiguously defined.

There was, however, a significant difference found among the four reinforcement conditions on the post-test chance-luck attribution questionnaire. Subjects working under the experimenter-defined low (30%) reinforcement level attributed significantly more disk control to "chance" and "luck" than did subjects working under the experimenter-defined high (70%), the self-defined high (min. e.s.), or the self-defined low (max. e.f.) levels. The latter three reinforcement conditions did not differ significantly from each other. This result may indicate that subjects in the experimenter-defined low (30%) reinforcement condition perceived themselves as failures on the task and therefore attributed significantly more disk control to "chance" or "luck" in order to provide themselves with an excuse for their failure performances. All subjects in the chance condition and all but one in the skill condition viewed success as requiring a reinforcement level above 30% (see Appendix M). Thus, subjects under both skill and chance conditions in the 30% reinforcement group may have attributed more disk control to "chance" and "luck" factors after the 40 trials were completed and as they began to evaluate attribution in terms of their own performance on the task. Subjects in the other three reinforcement conditions could have received a sufficient number of successes to let them perceive themselves as successful on the task or at least questionable in terms of failure. Feather (1967d) indicates that even under chance conditions one tends to see himself as at least partially responsible for his success and, furthermore, he states that most people tend to disown their failures especially if that failure can be attributed to external forces. Of interest is the fact that Efran's finding (1963) that internals tend to forget their failures significantly more than externals, could not be tested since internals and externals did not differ significantly regarding attribution of disk control to skill or chance factors.

Initial-Long-Range Reinforcement Expectancies

One part of hypothesis two stated that the initial-long-range reinforcement expectancies for internals and externals would not differ significantly. Another predicted that subjects under skill conditions would state higher initial-long-range reinforcement expectancies than would subjects under chance conditions. Still another indicated that subjects under min. e.s., 70%, 30%, and max. e.f. levels of reinforcement would not state initial-long-range reinforcement expectancies that were significantly different from each other. All three hypotheses were conformed by the data. The personality locus of control (internality-externality) and the level of reinforcement (min. e.s., 70%, 30%, or max e.f.) played an insignificant role in the determination of initial-long-range reinforcement expectancies. However, the effect of the situational locus of control (skill-chance) was found to be a significant one. Skill conditions produced significantly higher stated initial-long-range reinforcement expectancies than did chance conditions. Thus, when the task was clearly defined as skill or chance, the effects of the personality variable were minimized and skill conditions produced higher expectancies. Reinforcement effects were found to be inoperative in terms of initial-long-range reinforcement expectancies as they would have to be since no reinforcement had been received yet. If reinforcement effects had been significant, then randomization of the subjects could have been called into question.

In view of the support found for hypothesis one (i.e., believability of the tasks) and hypothesis two (i.e., situational locus of control influencing long range reinforcement expectancies prior to the first trial), the credibility of the skill and chance tasks was supported. Only one subject out of 161 that were tested appeared to be even remotely suspicious, therefore the Nickels Disk-Dropping Apparatus appears to be not only believeable but also a successful means of clearly defining skill and chance conditions with only minor variations in procedure and instructions. The confirmation of hypothesis two lends support to the results of the Nickels and Williams study (1970) which found that skill conditions produce higher initial long-range reinforcement expectancies even though the subject has not received any feedback on his task performance.

Later-Long-Range Reinforcement Expectancies

One part of hypothesis 3 stated that the later-long-range reinforcement expectancies would not differ significantly for internals and externals. Another predicted that the later-long-range reinforcement expectancies for subjects under skill conditions would be higher than for those subjects under chance conditions. Still another indicated that the later-long-range reinforcement expectancies for those subjects under min.e.s. and 70% reinforcement levels would be higher than for those subjects under max. e.f. and 30% reinforcement levels. The data from four trials were analyzed: Trial 2 (after one success and no failures): Trial 10 (after the first appropriate cumulation of reinforcement percentage for min. e.s., 70%, 30%, and max. e.f. estimates): Trial 20 (after completion of one half of the trials); and

Trial 40 (after completion of all of the trials). All three hypotheses were confirmed. Internals and externals did not differ significantly in their stated later-long-range reinforcement expectancies on any of the four trials analyzed. Subjects under skill conditions stated higher later-long-range reinforcement expectancies than did those subjects under chance conditions on all of the trials examined. The confirmation of hypotheses two and three supports the suggestion made by Nickels and Williams (1970) that perhaps the stimulus situation is more powerful in determining long-range reinforcement expectancies than the personality construct because the present task is unambiguous in terms of perceiving it as a skill or chance one. Such a finding supports the view held by some researchers (Davis & Phares, 1967; Rotter, 1966) who have suggested that the personality construct of internality-externality may become a more prominant factor in tasks that are ambiguously defined, while the situational factor becomes more important in tasks that are highly structured and clearly defined as skill and chance ones.

The later-long-range reinforcement expectancies for subjects under min. e.s. and 70% reinforcement levels were significantly higher than those for subjects under max. e.f. and 30% reinforcement levels on Trials 10, 20, and 40, but not for Trial 2. The subjects in the min. e.s. groups could be expected to view themselves as successes since their obtained reinforcement level was 5% above the percentage they themselves had indicated as a success point, i.e., min. e.s. estimate. Similarly, subjects in the 70% group could be expected to view themselves as successes since for all but one subject obtained a reinforcement level above the percentage that they had indicated as their success point, i.e., min. e.s. estimate. Conversely, the subjects in the max. e.f. group could be expected to view themselves as failures since their obtained reinforcement level was 5% below the percentage they themselves had inicated as a failure point, i.e., max. e.f. estimate. Similarly, subjects in the 30% group could be expected to view themselves as failures since all but one subject obtained a reinforcement level below that percentage indicated as the failure point, i.e., max. e.f. estimate. In other words, higher reinforcements or higher success percentages or both may have led to higher later long-range reinforcement expectancies. The test of whether one of these factors made the major contribution is discussed in a later section.

It is interesting to note that reinforcement effects did not show up until after the first occurrence of the appropriate cumulation of reinforcement percentages (Trial 10). Further exploration of the differences among the various reinforcement conditions showed that subjects in the 70% reinforcement condition produced significantly higher later-long-range reinforcement expectancies than did subjects in the min. e.s. reinforcement condition. In addition, subjects in the max. e.f. reinforcement condition produced significantly higher later-long-range reinforcement expectancies than did the subjects in the 30% reinforcement condition. This was found for Trials 10, 20, and 40. Thus, when the task is clearly defined as skill and chance (a) the effects of the personality variable are minimized in terms of later-long-range reinforcement expectancies, (b) skill conditions produce significantly higher later-long-range reinforcement expectancies than do chance conditions, and (c) higher reinforcements produce higher later-long-range reinforcement expectancies than do lower reinforcements.

These results may be interpreted to indicate that skill conditions and higher reinforcements facilitate learning on a task. These findings are consistent with the results of prior studies (e.g., Nickels & Tolen, 1968; Nickels & Williams, 1970; Rotter, Liverant, & Crowne, 1961). Furthermore, reinforcement effects were not significant until the 10th Trial which seems to indicate that sufficient feedback in terms of successes and failures and a cumulation of reinforcement are necessary before reinforcement plays a significant role in determining later-long-range reinforcement expectancies. The 70% reinforcement condition led to higher later-long-range reinforcement expectancies than did the min. e.s. from which one may infer that a reinforcement level of 70% is sufficiently above the minimum expectancy for success point. Similarly, the max. e.f. reinforcement condition led to higher later-long-range reinforcement expectancies than did the 30% reinforcement condition from which one may infer that a reinforcement level of 30% is sufficiently below the maximum expectancy for failure point. In other words, it seems that 70% successes is sufficiently high to be perceived as high reinforcement and that 30% successes is sufficiently low to be perceived as low reinforcement. This indicates that prior researchers who selected 75% or higher and 25% or lower as their high and low reinforcement levels (e.g., Nickels & Tolen, 1968; Nickels & Williams, 1970; Rotter, Liverant, & Crowne, 1961) probably selected appropriate levels of reinforcement. It also suggests that a reinforcement level of above 30% may not be clearly seen as failure and a reinforcement level below 70% may not clearly be seen as success. Thus, prior researchers who selected a reinforcement level of, for example, 50% (e.g., Holden & Rotter, 1962; James & Rotter, 1958; Phares, 1957) could have obtained even more significant results had the reinforcement level not been ambiguous. Apparently internals and externals would be more likely to use their generalized reinforcement expectancy as a guide to future performance when the situation or the reinforcement is ambiguous and thus left open for individual interpretation. As indicated previously, the skill and chance situations were clearly defined and the reinforcement levels sufficiently reflective of success or failure levels so that the personality variable of internality-externality could not operate to influence later-long-range reinforcement expectancies.

Minimum Expectancy for Success and Maximum Expectancy for Failure

One part of hypothesis four stated that internally oriented subjects would make higher min. e.s. and max. e.f. estimates than would externally oriented subjects. Another predicted that subjects under skill conditions would make higher min. e.s. and max. e.f. estimates than would subjects under chance conditions. Still another indicated that reinforcement level would have no effect upon subjects' min. e.s.

and max. e.f. estimates. Again these three hypotheses were confirmed. In other words, internal subjects or subjects working under the skill condition held higher standards of success for themselves than did external subjects or subjects working under chance conditions. These results can be interpreted to indicate that although the task is clearly skill and chance defined which minimizes the effect of the personality construct on initial and later-long-range reinforcement expectancies, it had no such effect upon the relationship between internality-externality and subjects' standards of success and failure. The tendency for internals to hold higher expectations of their abilities than do externals was apparently strong enough to overcome the effects of clearly defining the task. Support for the assumption that internals hold higher expectations of their abilities than do externals stems from the Hersch & Scheibe study (1967) in which internals described themselves as clever, efficient, active, striving, and powerful, while externals described themselves in opposite ways. In addition, Lefcourt, Lewis, and Silverman (1968) have found that internals stated more self-confidence regarding their ability to perform a task than did externals. Support for the assumption that working under skill conditions leads to higher expectations of reinforcement and therefore higher levels of aspiration and higher expectancies for success than working under chance conditions may be found in the results of several studies (e.g., Holden & Rotter, 1962; James, & Rotter, 1958; Nickels & Tolen, 1968; Nickels & Williams, 1970; Phares, 1957; Rotter, Liverant & Crowne, 1961).

Reinforcement, as predicted, had no significant effect upon subjects' min. e.s. and max. e.f. estimates. This result is expected since reinforcement had not been introduced as yet. According to the significant findings on this hypothesis, it appears that both the personality locus of control (internality-externality) and the situational locus of control (skill-chance) variables are both important factors in determining what subjects would consider as successful and failing performances on a task.

Long-Range Reinforcement Expectancies for Clearly Defined Success-Failure Groups

This hypothesis stated that subjects who perceive their reinforcements as indicating success would show higher later-long-range reinforcement expectancies than those subjects who perceive their reinforcements as indicating failure, regardless of the obtained level of reinforcement. Analysis of variance on data from Trials 1 and 2 yielded insignificant results except for skill-chance differences. This result was expected since on Trials 1 and 2 subjects had not as yet received a predictable pattern of successes and failures. Perhaps as Blackman (1962) discovered, the important variable in the study of expectations is not the isolated success or failure but the predictable sequences of such successes and failures. Skill-chance differences presumably were found on Trials 1 and 2 because subjects had been provided with a clear definition of the task by means of instructions and the nature of the task itself. The lack of differences between internals and externals perhaps can be explained on the basis of the overpowering effect of the skill-chance variable as discussed by previous investigators (Davis & Phares, 1967; Nickels & Williams, 1970; Rotter, 1966).

Analysis of covariance on the data from Trials 10, 20, and 40 yielded significant results for the success-failure conditions. This result seems to be in line with the above interpretation that a predictable pattern of success and failure is necessary for the success-failure dimension to become operative. Such a pattern may have been established by Trial 10 at which time success-failure effects were observed. The findings demonstrated that subjects who perceive their reinforcements as indicating success had higher later-long-range reinforcement expectancies than did those subjects who perceive their reinforcement as indicating failure, regardless of actual level of reinforcement. However, as is intuitively obvious, there is a direct and highly significant correlation between percentage of reinforcement and perception of success. In other words, although the success-failure dimension is meaningful in its own right, the higher the actual success the greater the likelihood of perceived success. In addition, there was a significant skill-chance effect. Subjects working under the skill condition stated significantly higher later-long-range reinforcement expectancies than did those subjects working under the chance condition. This finding indicated that regardless of the level of reinforcement and regardless of the subjects' perceptions of their success and failure, the situation in which they find themselves influences their expectancies for future reinforcements. That is, skill condition will lead to subjects holding higher expectancies than a chance condition. This finding is consistent with hypothesis 3b since they are similar analyses with the latter undertaken on a reduced number of subjects. Finally, a significant skill-success interaction was found. Subjects working under skill conditions and experiencing success on the task stated significantly higher later-long-range reinforcement expectancies than: subjects working under chance conditions and experiencing success; subjects working under skill conditions and experiencing failure; or subjects working under chance conditions and experiencing failure on the task. This interaction could be expected since success perception and skill conditions independently led to higher expectancies. However, it would seem that perhaps success conditions may be a more influential factor since subjects working under skill conditions but experiencing failure on the task stated lower later-long-range reinforcement expectancies than subjects working under chance conditions and experiencing success on the task.

Three interesting interpretations resulted from testing this hypothesis: (1) subjects require a pattern of success and failure experience before the effects of success and failure operate to influence future reinforcement expectancies; (2) subjects obtaining high reinforcements perceive themselves as successes on the task and subjects obtaining low reinforcements perceive themselves as failures on the task; and (3) subjects who view their reinforcements as successes, regardless of their actual level of reinforcement, have higher expectancies for future reinforcement.

These results seem to have implications for learning and level of aspiration studies. It is a generally accepted fact that reinforcement, reward, or success plays an important role in the acquisition and performance of knowledge and skills. However, it has also been pointed out by Rotter (1966) that what constitutes a reward for some people may be perceived and responded to differently by other individuals. He also stresses the view that the effects of a reinforcement subsequent to some behavior that the person has performed depend upon his perception of what kind of causal relationship exists between the individual's behavior and that reward. If one perceives that his reinforcements are the result of chance, luck, fate, or some other external force then he will be less likely to: be motivated to learn, to experience a rise in level of aspiration, to be productive in terms of acquiring and performing knowledge and skills, and to have a higher need for achievement than when one believes that reinforcements are a result of his own skill and thus under the realm of his own control.

It would seem that this last point would have important implications for experimentation in psychology since many of its findings have been based on experiments in which a subject (himself either internally or externally oriented) has been placed in a specific locus of control situation (invariably chance-determined, rarely skill-determined). Important differences in learning, motivation, and productiveness among differently oriented subjects under different locus of control conditions have been found in previous studies (e.g., Julian, Lichtman, &

Ryckman, 1968; Lefcourt, 1967; Shepel & Weiss, 1970). Such differences can perhaps be attributed to the fact that few individuals perceive that they are in control of their reinforcements, whereas most perceive that their reinforcements are under the control of some external force (i.e., the experimenter).

Orne (1959) and Orne and Scheibe (1964) have demonstrated that the subject in an experimental study is an active participant who interprets the situation and makes implicit assumptions about the hypotheses advanced by the experimenter. Since the subject, in most cases, wants to be a "good subject", he attempts to validate what he believes to be the experimenter's hypotheses. However, at the same time, it seems reasonable to infer that the subject also evaluates where the locus of control of reinforcements lie. According to past locus of control research, it can be inferred that if the subject decides that his own behavior has nothing to do with the rewards he receives in an experiment, then his behavior in the experiment is likely to be different than if he perceives that he is in control of these rewards. In fact, Rotter has presented a great deal of experimental evidence to support this view. In a recent summary of his position, Rotter (1971) states:

> "In animals, the expectation of reward is primarily a function of the strength and frequency of rewards. In human beings, there are other things that can influence the expectations of reward--the information others give us, our knowledge generalized from a variety of experiences, and our perceptions of causality in the situation (p. 37)".

He follows this statement with several experiments to show that perceptions of causality are important in determining subjects expectations of reward (James & Rotter, 1958, Phares, 1957; Rotter, Liverant, & Crowne, 1961). For example, a well documented principle which states that behavior learned under partial reinforcement takes longer to extinguish than behavior learned under constant reinforcement has recently been questioned.

> "We found that the "law" of partial reinforcement held true only when subjects thought their successes were the result of chance. Subjects who thought their rewards were due to skill actually took longer to extinguish their responses after constant (100 per cent) reinforcement than after partial (50 per cent) reinforcement. This is the opposite of what one would expect from the laws of animal learning.....Several other experiments have confirmed that, under skill conditions, constant-reward learning may take longer to extinguish than partial-reward learning. It has become increasingly clear that in chance situations other laws as well are quantitatively and qualitatively different from the laws that apply to skill learning (Rotter, 1971, pp. 40-42)".

Clearly it is difficult to conduct experiments without manipulating the behavior of subjects. However, it is noted that in addition to being aware of (a) the demand characteristics of the experiment (Orne, 1962), (b) the tendency for subjects to "put their best foot forward" (Riecken, 1962), and (c) the bias that may be introduced by the experimenter (e.g., Adair & Epstein, 1968; Rosenthal, 1964; Rosenthal & Fode, 1963), investigators may be wise to consider under what locus of control orientation the subject is operating. This would seem to be particularly important for learning and level of aspiration studies.

The present study has presented results that are consistent with the above views since it was found that skill conditions led to higher expectancies for future reinforcement and higher standards of success and failure than did chance conditions. Also in line with this view, the present study shows that individuals differ in their perceptions of what constitutes success and failure for them as evidenced by the wide range of min. e.s. (15% to 85%) and max. e.f. (5% to 85%) estimates (See appendix M). Such a finding suggests that in studies investigating success and failure effects upon learning and level of aspiration, it is essential to select a sufficiently high level of reinforcement if one wants subjects to perceive their performance as success and a sufficiently low level of reinforcement if one wants them to perceive their performance as failure. It is being suggested that it would be a mistake to ignore the effects of perception of what constitutes success and failure for a subject and to ignore the effects of both situational locus of control (skill or chance) and personality locus of control (internality or externality).

CHAPTER 6

SUMMARY AND CONCLUSIONS

From previous research, primarily the Nickels and Williams study (1970), hypotheses were derived concerning:

(1) the believability of disk control as being either skill or chance determined.

(2) subjects' initial-long-range reinforcement expectancies.

(3) subjects' later-long-range reinforcement expectancies.

(4) subjects' minimum expectancy for success (min. e.s.) and maximum expectancy for failure (max. e.f.) estimates.

(5) initial and later-long-range reinforcement expectancies of subjects who perceive their reinforcements as indicating success or failure on the task.

The specific experimental conditions were: personality locus of control (internal-external); situational locus of control (skill-chance); and four levels of reinforcement (min. e.s., 70%, 30%, or max. e.f.). More specifically, min .e.s. subjects obtained 5% above their stated minimum expectancy for success point, 70% subjects obtained 70% reinforcement, 30% subjects obtained 30% reinforcement, and max. e.f. subjects obtained 5% below their stated maximum expectancy for failure point.

Eighty introductory psychology students from the University of Manitoba who had previously responded on the Rotter Internal-External Control Scale (Rotter, 1966) as internals and eighty students who had responded on this scale as externals were selected for the study. After the experimenter demonstrated the task as either involving skill or chance, subjects completed a pre-experimental attribution questionnaire regarding what factors they believe determine the landing of the disk when it is dropped either by the subject (skill condition) or by the experimenter from a container into the cup located on top of the suitcase (chance condition). Subjects then completed a questionnaire asking them the largest percentage of failures that would be required in order for them to still consider that they had succeeded (min. e.s.) and the smallest percentage of successes that would be required in order for them to still consider that they had failed (max. e.f.) on the task. They were then randomly assigned to either skill or chance conditions and to either the min. e.s., 70%, 30%, or max. e.f. reinforcement condition. After performing forty trials on the disk-dropping task in which they stated, prior to each trial, their expectancies for success on all future trials, subjects completed a post-experimental attribution questionnaire asking them what factors they believed determined the landing of the disk. Finally, an awareness questionnaire was presented to subjects in order to determine whether or not suspicion regarding the apparatus or experimenter activities existed and whether or not they viewed themselves as successes at the end of the experiment. Subjects were debriefed in two stages. First, just prior to leaving the experimental room they were given a general description of the experiment. Second, a letter was mailed to all subjects further explaining the experiment and reporting the results.

The results supported all of the five hypotheses advanced by the researcher:

(1) Subjects under skill conditions attributed significantly more disk control to "skill", while subjects under chance conditions attributed significantly more disk control to "chance" (hypothesis one).

(2) Skill conditions produced significantly higher initial-long-range reinforcement expectancies than did chance conditions (hypothesis 2b), while internality-externality (hypothesis 2a) and level of reinforcement (hypothesis 2c) had no effect upon subjects' initial-long-range reinforcement expectancies.

(3) Skill conditions produced significantly higher later-long-range reinforcement expectancies than did chance conditions (hypothesis 3b), higher reinforcements (min. e.s. and 70%) produced significantly higher later-long-range reinforcement expectancies than did lower reinforcements (max. e.f. and 30%); (hypothesis 3c), and internality-externality had no effect upon subjects' later-long-range reinforcement expectancies (hypothesis 3a).

(4) Internality-(hypothesis 4a) and skill conditions (hypothesis 4b) both led to subjects making significantly higher min. e.s. and max. e.f. estimates than did externality (hypothesis 4a) and chance conditions (hypothesis 4b), while reinforcement level had no effect upon subjects' min. e.s. and max. e.f. estimates (hypothesis 4c).

(5) The perception that one's reinforcements indicated success led to significantly higher later-long-range reinforcement expectancies

than did perceptions that one's reinforcements indicated failure (hypothesis 5). In addition, skill conditions led to the same effect, while internality-externality had no effect upon subjects' later-long-range reinforcement expectancies.

CONCLUSIONS

The conclusions that may be drawn from this experiment are that:

(a) The Nickels Disk-Dropping apparatus can be used effectively to create situations that are seen by subjects as clearly skill- or chance-determined ones with only minor changes in the procedure and instructions.

(b) Skill conditions as compared to chance conditions facilitate learning and lead to higher expectations for future success, early as well as throughout the whole sequence of trials.

(c) Skill conditions as compared to chance conditions facilitate the setting of more rigorous standards of success.

(d) Internality-externality is ineffective when the task is clearly defined as skill or chance.

(e) Internals as compared to externals make the standards of success they set for themselves more rigorous.

(f) High reinforcements as compared to low reinforcements facilitate learning and lead to significantly greater expectancies for future success.

(g) Subjects who view their reinforcements as successes, regardless of their actual level of reinforcement, have higher expectations for future success. However, there is a tendency for higher reinforcements to correlate highly with perceptions of success.

(h) Subjects require a pattern of success and failure experiences before the effects of success and failure operate to influence future reinforcement expectancies.

(i) 70% reinforcement is significantly above the minimal success point for most subjects and 30% reinforcement is significantly below the maximal failure point for most subjects. Since higher reinforcement leads to higher expectancies for future success (see f above), 70% reinforcement leads to significantly higher expectations for future success than when subjects define their own minimal success point and 30% reinforcement leads to significantly higher expectations for future failure than when subjects define their own maximal failure point. It would seem to be a better policy for investigators using reinforcement levels to indicate success and failure to either use a reinforcement level above 70% for high reinforcement and one below 30% for low reinforcement or let the subject define these limits for himself.

(j) Subjects tend to differ in the number of successes and failures they require in order to perceive that they have succeeded or failed on a task.

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APPENDIX A

THE ROTTER INTERNAL-EXTERNAL CONTROL SCALE

Please select the one statement in each pair of statements which you more strongly believe to be the case (as far as you personally are concerned). Be sure to select the one YOU BELIEVE TO BE CLOSER TO THE TRUTH 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. (Remember, mark one and only one statement in each pair).

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 student's 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.

<u>I more strongly believe that</u>:

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.

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 too 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.

<u>I strongly believe that</u>:

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.

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 chances or luck plays an important role in my life.

<u>I strongly believe that</u>:

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.

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 a local level.

APPENDIX B

APPENDIX C

INSTRUCTIONS FOR THE SKILL GROUP

In front of you is a suitcase containing everything needed to perform a disk-dropping task. When the lid of the suitcase is opened, you can see the black, level surface of a board which serves as a sort of counter top for the suitcase. Underneath this board is a complex and delicate system of gears and other balancing mechanisms which permit the suitcase to be perfectly balanced within one hundredths of an inch. On top of the board are located a cup, a disk to be dropped into the cup, and a black indicator block to be placed into one of the two compartments to register how you expect the dropped disk to land. The disk as you can see, is marked with an "A" on one side and a "B" on the other.

The object of the disk-dropping task is to see how well you can predict the landing of the disk when you drop the disk skillfully into the cup. How the disk does land depends upon your skill. Please note that you must drop the disk carefully from above the top of the ruler. Let me demonstrate how the task works. Actually I have practiced this task for some time and I am getting somewhat skillful at it. For example, if I predict that I will get five consecutive A-landings of the disk followed by five consecutive B-landings, I would start by placing the black indicator block into the A compartment and then drop the disk skillfully from my hand into the cup on the board. Let's see how the disk does land for ten consecutive trials. (The experimenter then drops the disk two times and fails on both trials). She halts momentarily and then states, "Oh, I must have forgotten to level the board when I opened the suitcase". The experimenter turns the two knobs on the sides of the suitcase and gauges how level the cup is through the use of a bubble level which fits over the cup. The experimenter then says, "Now let's see if I can get five A's followed by five B's (The experimenter then drops the disk five times getting five consecutive A-landings and then places the black indicator block into the B compartment and drops the disk five more times getting five consecutive B-landings.)

Before you start, please fill out this questionnaire before you. (The subject fills out the pre-experimental questionnaire regarding what factors she believes contributes to such a task as this one in terms of attributing certain percentages to each of 10 statements including skill-determined factors and chance-determined factors.) Thank you. Now I would like for you to attend to these scales. The experimenter reads the instructions for the min. e.s. and max. e.f. scales and then says, "Please complete this questionnaire". (The subject completes the questionnaire, after which the experimenter examines it, and places it out of sight.)

Good. Now tell me, on what percentage of all future drops of the disk do you expect the disk to land as you say it will land? (The subject states her expectancy for success on all future trials and the experimenter records these statements by circling the appropriate percentage on the data sheet.)

All right now without letting me see what you are doing please indicate how you expect the disk to land on the first drop by placing the black indicator block into either the A or the B compartment. (The subject places the indicator block into one of the two compartments.)

Now drop the disk. (The subject drops the disk from her hand into the cup.)

How did you say the disk would land? (The subject states either A or B and the experimenter circles the response on the data sheet.)

How did the disk land? (The subject states how it did land, the experimenter removes the top of the screen hiding the compartment and agrees, then circles either S or F on the data sheet.)

After 40 trials the experimenter says, "Now that you have gone through this part of the experiment, I would like to know what factors you think contributed most to the way the disk landed. Please fill out this questionnaire." (The subject fills out the post-experimental attribution questionnaire.) Then the experimenter presents the subject with the awareness questionnaire and states, "Finally, before you leave please answer these questions." (The subject fills out the awareness questionnaire.) Following this the subject is debriefed as described below:

Debriefing of the subject was performed in two stages. The first stage occurred immediately after the experiment but before the subject left the experimental room. Debriefing in this stage included a rather general description of the experiment but did not include information which would interfere with the study if it were conveyed to other subjects participating in the experiment later. The first stage debriefing consisted of the following statements:

> Now that you have completed the experiment, I would like to explain to you what the experiment was all about. You may recall that I asked you throughout the experimental task to indicate the percentage of all future drops of the disk in which you expected the disk to land as you said it would land. We have found in previous research that some individuals tend to change their expectations for success on this task according to their past performance on it, while other individuals do not. The present experiment is being conducted in order to further explore these individual differences in terms of expectancy. I have your name and address, and a letter will be sent to you after the data analysis since you may be interested in the results of this study. Thank you very much for participating in the study.

The second stage of the debriefing process consisted of the above mentioned letter in which each subject was informed about the following:

(a) the results of the study.

(b) her position along the continuum of internality-externality (which up to this point she would not have known).

(c) the fact that since the present study used a statistical analysis, the reported findings may represent group trends rather than the fact that all internal subjects behaved one way and all external subjects behaved another; and finally,

(d) how the subject could contact the experimenter if she had further questions about the study.

APPENDIX D

INSTRUCTIONS FOR THE CHANCE GROUP

In front of you is a suitcase containing everything needed to perform a disk-dropping task. When the lid of the suitcase is opened you can see the black, level surface of a board which serves as sort of a counter top for the suitcase. Underneath this board is a complex and delicate system of gears and other balancing mechanisms which permit the suitcase to be perfectly balanced within one hundredths of an inch. On top of the board are located a cup, a disk to be dropped into the cup, and a black indicator block to be placed into one of the two compartments to register how you expect the dropped disk to land. The disk, as you can see, is marked with an "A" on one side and a "B" on the other.

The object of the disk-dropping task is to see how well you can guess the landing of the disk when I drop the disk blindly into the cup. How the disk does land depends upon chance. Please note that I must drop the disk blindly from above the top of the ruler. Let me demonstrate how the disk-dropping task works. For example, if I guess that I will get five consecutive A-landings of the disk followed by five consecutive B-landings, I would start by placing the black indicator block into the A compartment and then drop the disk blindly from this container into this cup on the board. Let's see how the disk does land for ten consecutive trials. (The experimenter then drops the disk five times and fails two out of the five trials (#1 and #3) and then places the black indicator block into the B compartment and drops the disk five more times failing on three out of the five trials (#1, #3, and #5).)

Before you start, please fill out this questionnaire before you. (The subject fills out the pre-experimental questionnaire regarding what factors she believes contributes to such a task as this one in terms of attributing certain percentages to each of 10 statements including skill-determined and chance-determined factors.) Thank you. Now I would like for you to attend to these scales. The experimenter reads the instructions for the min. e.s. and max. e.f. scales and then says, "Please complete this questionnaire". (The subject completes the questionnaire, after which the experimenter examines it, and places it out of sight.)

Good. Now tell me, on what percentage of all future drops of the disk do you expect the disk to land as you say it will land? (The subject states her expectancy for success on all future trials and the experimenter records these statements by circling the approproiate percentage on the data sheet.)

All right now without letting me see what you are doing please indicate how you expect the disk to land on the first drop by placing the black indicator block into either the A or the B compartment. (The subject places the block into one of the two compartments.)

Now I will drop the disk. (The experimenter drops the disk from the container into the cup.)

How did you say the disk would land? (The subject states either A or B and the experimenter circles the response on the data sheet.)

How did the disk land? (The subject states how it did land and the experimenter removes the top of the screen hiding the compartments and agrees, then circles either S or F on the data sheet.)

After 40 trials the experimenter says, "Now that you have gone through this part of the experiment, I would like to know what factors you think contributed most to the way the disk landed. Please fill out this questionnaire." (The subject fills out the post-experimental attribution questionnaire.) Then the experimenter presents the subject with the awareness questionnaire and states, "Finally, before you leave please answer these questions. (The subject fills out the awareness questionnaire.) Following this the subject is debriefed as described below:

Debriefing of the subject was performed in two stages. The first stage occurred immediately after the experiment but before the subject left the experimental room. Debriefing in this stage included a rather general description of the experiment but did not include information which would interfere with the study if it were conveyed to other subjects participating in the experiment later. The first stage debriefing consisted of the following statements:

> Now that you have completed the experiment, I would like to explain to you what the experiment was all about. You may recall that I asked you throughout the experimental task to indicate the percentage of all future drops of the disk in which you expected the disk to land as you said it would land. We have found in previous research that some individuals tend to change their expectancies for success on this task according to their past performance on it, while other individuals do not. The present experiment is being conducted in order to further explore these individual differences in terms of expectancy. I have your name and address, and a letter will be sent to you after the data

analysis since you may be interested in the results of this study. Thank you very much for participating in the study.

The second stage of the debriefing process consisted of the above mentioned letter in which each subject was informed about the following:

(a) the results of the study.

(b) her position along the continuum of internality-externality (which up to this point she would not have known)

(c) the fact that since the present study used a statistical analysis, the reported findings may represent group trends rather than the fact that all internal subjects behaved one way and all external subjects behaved another; and finally,

(d) how the subject could contact the experimenter if she had further questions about the study.

APPENDIX E

PRE-EXPERIMENTAL ATTRIBUTION QUESTIONNAIRE

DISK-DROPPING TASK

You may feel that certain factors in the disk-dropping task determine the way the disk lands on each trial. Please indicate (in terms of percentage) the contribution you feel each of the following factors makes in determining how the disk lands. (all percentages must add up to 100.)

	INFLUENCING FACTOR	PERCENTAGE OF INFLUENCE
A.	Your present skill at disk-dropping.	________
B.	Your past experience at handling disks and performing similar tasks.	________
C.	Your mental, emotional and physical state during the "disk-dropping task".	________
D.	Your power to mentally influence the disk.	________
E.	Your luck.	________
F.	Chance.	________
G.	The physical characteristics of the disk itself.	________
H.	The way the disk is dropped.	________
I.	The height at which the disk is dropped.	________
J.	The shape of the funnel into which the disk is dropped.	________
K.	Other (describe fully) ________________________________	________
	TOTAL.	100%

APPENDIX F

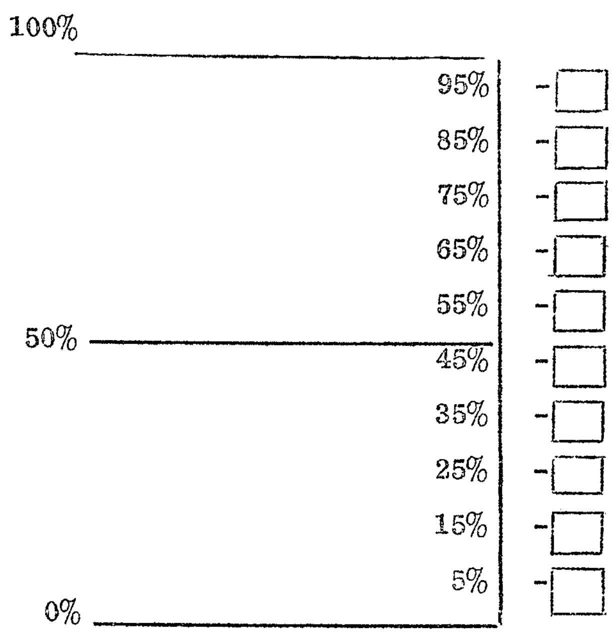
SUCCESS-FAILURE ESTIMATE SHEET

The scale at the bottom of the page indicates how often (in percentage) one can correctly anticipate the landing of the disk in the experiment. The scale extends from 0% (never correct) to 100% (always correct).

However, the same percentage may mean different things to different people. What one person considers success may to another represent failure. Therefore, on this sheet you are asked to estimate:

(1) How *high* a percentage could you obtain and still feel you had *failed* on the disk dropping task? (Mark an "F" in the box opposite the most appropriate percentage.)

(2) How *low* a percentage could you obtain and still feel you had *succeeded* on the disk dropping task? (Mark an "S" in the box opposite the most appropriate percentage.)



Success-Failure Estimate Scale

APPENDIX G

DATA COLLECTION FORM

(address) (phone) (birthdate) (age) (sex) (class)

Trial	Last Trial	Remaining Trials	This Trial
1	////	0 1 2 3 4 5 6 7 8 9 10	A B
2	S F	0 1 2 3 4 5 6 7 8 9 10	A B
3	S F	0 1 2 3 4 5 6 7 8 9 10	A B
4	S F	0 1 2 3 4 5 6 7 8 9 10	A B
5	S F	0 1 2 3 4 5 6 7 8 9 10	A B
6	S F	0 1 2 3 4 5 6 7 8 9 10	A B
7	S F	0 1 2 3 4 5 6 7 8 9 10	A B
8	S F	0 1 2 3 4 5 6 7 8 9 10	A B
9	S F	0 1 2 3 4 5 6 7 8 9 10	A B
10	S F	0 1 2 3 4 5 6 7 8 9 10	A B
11	S F	0 1 2 3 4 5 6 7 8 9 10	A B
12	S F	0 1 2 3 4 5 6 7 8 9 10	A B
13	S F	0 1 2 3 4 5 6 7 8 9 10	A B
14	S F	0 1 2 3 4 5 6 7 8 9 10	A B
15	S F	0 1 2 3 4 5 6 7 8 9 10	A B
16	S F	0 1 2 3 4 5 6 7 8 9 10	A B
17	S F	0 1 2 3 4 5 6 7 8 9 10	A B
18	S F	0 1 2 3 4 5 6 7 8 9 10	A B
19	S F	0 1 2 3 4 5 6 7 8 9 10	A B
20	S F	0 1 2 3 4 5 6 7 8 9 10	A B
21	S F	0 1 2 3 4 5 6 7 8 9 10	A B
22	S F	0 1 2 3 4 5 6 7 8 9 10	A B
23	S F	0 1 2 3 4 5 6 7 8 9 10	A B
24	S F	0 1 2 3 4 5 6 7 8 9 10	A B
25	S F	0 1 2 3 4 5 6 7 8 9 10	A B
26	S F	0 1 2 3 4 5 6 7 8 9 10	A B
27	S F	0 1 2 3 4 5 6 7 8 9 10	A B
28	S F	0 1 2 3 4 5 6 7 8 9 10	A B
29	S F	0 1 2 3 4 5 6 7 8 9 10	A B
30	S F	0 1 2 3 4 5 6 7 8 9 10	A B
31	S F	0 1 2 3 4 5 6 7 8 9 10	A B
32	S F	0 1 2 3 4 5 6 7 8 9 10	A B
33	S F	0 1 2 3 4 5 6 7 8 9 10	A B
34	S F	0 1 2 3 4 5 6 7 8 9 10	A B
35	S F	0 1 2 3 4 5 6 7 8 9 10	A B
36	S F	0 1 2 3 4 5 6 7 8 9 10	A B
37	S F	0 1 2 3 4 5 6 7 8 9 10	A B
38	S F	0 1 2 3 4 5 6 7 8 9 10	A B
39	S F	0 1 2 3 4 5 6 7 8 9 10	A B
40	S F	0 1 2 3 4 5 6 7 8 9 10	A B
41	S F	0 1 2 3 4 5 6 7 8 9 10	A B
42	S F	0 1 2 3 4 5 6 7 8 9 10	A B
43	S F	0 1 2 3 4 5 6 7 8 9 10	A B
44	S F	0 1 2 3 4 5 6 7 8 9 10	A B
45	S F	0 1 2 3 4 5 6 7 8 9 10	A B
46	S F	0 1 2 3 4 5 6 7 8 9 10	A B
47	S F	0 1 2 3 4 5 6 7 8 9 10	A B
48	S F	0 1 2 3 4 5 6 7 8 9 10	A B
49	S F	0 1 2 3 4 5 6 7 8 9 10	A B
50	S F	0 1 2 3 4 5 6 7 8 9 10	A B
51	S F	0 1 2 3 4 5 6 7 8 9 10	A B
52	S F	0 1 2 3 4 5 6 7 8 9 10	A B
53	S F	0 1 2 3 4 5 6 7 8 9 10	A B
54	S F	0 1 2 3 4 5 6 7 8 9 10	A B
55	S F	0 1 2 3 4 5 6 7 8 9 10	A B
56	S F	0 1 2 3 4 5 6 7 8 9 10	A B
57	S F	0 1 2 3 4 5 6 7 8 9 10	A B
58	S F	0 1 2 3 4 5 6 7 8 9 10	A B
59	S F	0 1 2 3 4 5 6 7 8 9 10	A B
60	S F	0 1 2 3 4 5 6 7 8 9 10	A B
61	S F	0 1 2 3 4 5 6 7 8 9 10	A B
62	S F	0 1 2 3 4 5 6 7 8 9 10	A B
63	S F	0 1 2 3 4 5 6 7 8 9 10	A B
64	S F	0 1 2 3 4 5 6 7 8 9 10	A B
65	S F	0 1 2 3 4 5 6 7 8 9 10	A B
66	S F	0 1 2 3 4 5 6 7 8 9 10	A B
67	S F	0 1 2 3 4 5 6 7 8 9 10	A B
68	S F	0 1 2 3 4 5 6 7 8 9 10	A B
69	S F	0 1 2 3 4 5 6 7 8 9 10	A B
70	S F	0 1 2 3 4 5 6 7 8 9 10	A B
71	S F	0 1 2 3 4 5 6 7 8 9 10	A B
72	S F	0 1 2 3 4 5 6 7 8 9 10	A B
73	S F	0 1 2 3 4 5 6 7 8 9 10	A B
74	S F	0 1 2 3 4 5 6 7 8 9 10	A B
75	S F	0 1 2 3 4 5 6 7 8 9 10	A B
76	S F	0 1 2 3 4 5 6 7 8 9 10	A B
77	S F	0 1 2 3 4 5 6 7 8 9 10	A B
78	S F	0 1 2 3 4 5 6 7 8 9 10	A B
79	S F	0 1 2 3 4 5 6 7 8 9 10	A B
80	S F	0 1 2 3 4 5 6 7 8 9 10	A B
81	S F	0 1 2 3 4 5 6 7 8 9 10	A B
82	S F	0 1 2 3 4 5 6 7 8 9 10	A B
83	S F	0 1 2 3 4 5 6 7 8 9 10	A B
84	S F	0 1 2 3 4 5 6 7 8 9 10	A B
85	S F	0 1 2 3 4 5 6 7 8 9 10	A B
86	S F	0 1 2 3 4 5 6 7 8 9 10	A B
87	S F	0 1 2 3 4 5 6 7 8 9 10	A B
88	S F	0 1 2 3 4 5 6 7 8 9 10	A B
89	S F	0 1 2 3 4 5 6 7 8 9 10	A B
90	S F	0 1 2 3 4 5 6 7 8 9 10	A B
91	S F	0 1 2 3 4 5 6 7 8 9 10	A B
92	S F	0 1 2 3 4 5 6 7 8 9 10	A B
93	S F	0 1 2 3 4 5 6 7 8 9 10	A B
94	S F	0 1 2 3 4 5 6 7 8 9 10	A B
95	S F	0 1 2 3 4 5 6 7 8 9 10	A B
96	S F	0 1 2 3 4 5 6 7 8 9 10	A B
97	S F	0 1 2 3 4 5 6 7 8 9 10	A B
98	S F	0 1 2 3 4 5 6 7 8 9 10	A B
99	S F	0 1 2 3 4 5 6 7 8 9 10	A B
100	S F	0 1 2 3 4 5 6 7 8 9 10	A B

APPENDIX H

SCHEDULES OF REINFORCEMENT

+ = Successes
- = Failures

Trial	10%	20%	30%	40%	50%	60%	70%	80%	90%
1	+	+	+	+	+	+	+	+	+
2	-	-	-	+	-	-	+	+	+
3	-	-	-	-	-	-	-	+	+
4	-	-	-	-	+	+	-	-	+
5	-	-	-	-	+	+	+	+	+
6	-	-	-	-	+	+	+	+	+
7	-	+	+	-	+	+	+	+	+
8	-	-	+	+	-	+	+	+	+
9	-	-	-	+	-	-	+	+	+
10	-	-	-	-	-	-	-	-	-
11	+	+	+	+	+	+	+	+	+
12	-	-	-	-	-	+	+	+	+
13	-	-	-	-	-	+	+	+	+
14	-	-	-	-	-	-	-	+	+
15	-	-	-	+	+	-	-	-	+
16	-	+	+	+	+	-	+	+	+
17	-	-	+	+	+	+	+	+	+
18	-	-	-	-	+	+	+	+	+
19	-	-	-	-	-	+	+	+	+
20	-	-	-	-	-	-	-	-	-
21	+	+	+	+	+	+	+	+	+
22	-	-	-	+	-	-	+	+	+
23	-	-	-	-	-	-	-	+	+
24	-	-	-	-	-	+	-	-	+
25	-	-	-	-	+	+	+	+	+
26	-	-	-	-	+	+	+	+	+
27	-	+	+	-	+	+	+	+	+
28	-	-	+	+	+	+	+	+	+
29	-	-	-	+	-	-	+	+	+
30	-	-	-	-	-	-	-	-	-
31	+	+	+	+	+	+	+	+	+
32	-	-	-	+	-	-	+	+	+
33	-	-	-	-	-	-	-	+	+
34	-	-	-	-	+	+	-	-	+
35	-	-	-	-	+	+	+	+	+
36	-	-	-	-	+	+	+	+	+
37	-	+	+	-	+	+	+	+	+
38	-	-	+	+	-	+	+	+	+
39	-	-	-	+	-	-	+	+	+
40	-	-	-	-	-	-	-	-	-
41	+	+	+	+	+	+	+	+	+

APPENDIX I

POST-EXPERIMENTAL ATTRIBUTION QUESTIONNAIRE

DISK-DROPPING TASK

You may have felt that certain factors in the "disk-dropping task" determine the way the disk lands on each trial. Please indicate (in terms of percentage) the contribution you feel each of the following factors makes in determining how the disk lands. (all percentages must add up to 100.)

INFLUENCING FACTOR	PERCENTAGE OF INFLUENCE
A. Your past skill at disk-dropping........................	________
B. Your past experience at handling disks and performing similar tasks............................	________
C. Your mental, emotional and physical state during the "disk-dropping task"........................	________
D. Your power to mentally influence the disk................	________
E. Your luck..	________
F. Chance..	________
G. The physical characteristics of the disk itself.............	________
H. The way the disk is dropped............................	________
I. The height at which the disk is dropped...................	________
J. The shape of the funnel into which the disk is dropped......	________
K. Other (describe fully) ______________________________	________
TOTAL..	100%

APPENDIX J

AWARENESS QUESTIONNAIRE

In order to better evaluate this experiment and to gain suggestions about future related ones please answer the following questions.

1. What are some of your reactions to this task? What did you think of it?

2. Generally speaking, would you qualify yourself as a success on this task? If yes, why and if no, why not?

3. How did you go about deciding which side to choose when the disk was dropped?

4. What did you observer and what was the most significant thoughts and feelings you had during the experiment?

5. What were the most significant or unusual things that you found the experimenter doing?

6. Any additional comments or suggestions you have will be appreciated.

APPENDIX K

DEBRIEFING LETTER

Christene Williams
69 Hampshire Bay
St. Boniface 6
Manitoba
Telephone: 247-5336

Dear ______________________:

This past winter you participated in the experiment LOCE. At that time I was able to give you only a small amount of information about the experiment. This letter is being written to report to you the results of that study and to convey to you additional information regarding your particular part in the study.

You may recall that after the experiment I told you that the study was concerned with expectations. More specifically, the study investigated differences in expectancies as a function of individuals being placed in different kinds of situations. That is, the study investigated differences in expectations as a result of either subjects dropping the disk from their own hand into the cup, or the experimenter placing the disk into a container, shaking it, and then dropping it into the cup. If one drops the disk herself, the way the disk lands is more a matter of skill than chance, while if the experimenter drops the disk blindly into the cup the way the disk lands is more a matter of chance than skill. It has been found in prior research that subjects under skill conditions as compared to chance conditions learn more rapidly, are more motivated, and often use their past performance on a task to gauge their future performance on it. The LOCE study was interested in determining whether or not subjects' expectations for future success on the disk dropping task would be different for subjects dropping the disk themselves (skill condition) as compared to subjects who did not drop the disk themselves (chance condition). As you may recall you performed the disk dropping task under the __________ condition.

Another aspect of the study involved differences of expectancies between subjects who feel that their successes and failure generally are due to their own efforts (internals) as compared to subjects who feel that their successes and failures are generally due to luck, chance, or other people (externals). From the questionnaire you may recall taking, you scored as an ____________________.

I would like now to share the results of the experiment with you. Since these results are based on group performance, they indicate that individuals in a particular group reacted in a particular way as a group, rather than all internals, externals, subjects in the skill condition, or subjects in the chance condition behaved in a certain way. Expectations for future success were measured by subjects' responses to the question I asked before each trial (i.e., On what percentage of all future drops of the disk do you expect the disk to land as you say it will land?).

RESULTS

(1) The disk dropping apparatus can be used effectively to provide situations that are seen by subjects as clearly skill- or chance-determined ones with only minor changes in procedures and instructions.

(2) Skill conditions as compared to chance conditions lead to higher expectations for future success early as well as throughout the whole sequence of trials.

(3) Skill conditions as compared to chance conditions lead to the setting of higher standards of success (i.e., how often one must predict correctly to see herself as a success, or how often must one predict incorrectly to see herself as a failure).

(4) Internals and externals do not differ significantly in their expectations for future success when the task is clearly defined as skill or chance.

(5) Internals as compared to externals set their standards of success (i.e., how often one must predict correctly to see herself as a success or how often one must predict incorrectly to see herself as a failure).

(6) A high frequency of success as compared to a low frequency of success leads to higher expectations for future success.

(7) Subjects require a pattern of success and failure experiences before the effects of success and failure operate to influence future expectancies.

I hope that this letter will help you understand more fully the aims and findings of the study. I want to thank you again for participating in my study. If you have any questions or if you desire any further information about the study please contact me at the above address.

Sincerely,

Christene Williams.

APPENDIX L

t TESTS FOR REINFORCEMENT EFFECTS

		Min. e.s.	Max. e.f.	30%
Posttest Chance-Luck Attribution	70%	t= .181	t=1.06	t= 2.66**
	Min. e.s.			t= 2.72**
	Max. e.f.		t=.152	t= 8.61***
Trial 10	70%	t=2.08*	t=7.04***	t= 9.88***
	Min. e.s.		t=3.78***	t=5.88 ***
	Max. e.f.			t= 2.51*
Trial 20	70%	t=1.98*	t=8.73***	t=14.21***
	Min. e.s.		t=5.46***	t=11.52***
	Max. e.f.			t= 2.90**
Trial 40	70%	t=3.08**	t=3.11**	t=19.68***
	Min. e.s.		t=6.18***	t=12.88***
	Max. e.f.			t= 4.87***

df = 78
* p .05
** p .01
*** p .001

APPENDIX M

Number of Subjects Indicating Each Reinforcement Level

Min. e.s. Estimates

Reinforcement Level	Internal Skill	Internal Chance	External Skill	External Chance
85%	2	0	1	0
75%	11	4	4	4
65%	10	8	10	2
55%	15	17	15	14
45%	2	9	7	18
35%	0	2	2	2
25%	0	0	0	0
15%	0	0	1	0
Total	40	40	40	40

Max. e.f. Estimates

Reinforcemant Level	Internal Skill	Internal Chance	External Skill	External Chance
85%	1	0	0	0
75%	0	0	0	0
65%	3	2	0	0
55%	10	2	6	1
45%	14	17	12	9
35%	5	10	15	17
25%	4	5	6	12
15%	1	3	0	1
5%	2	1	1	0
Total	40	40	40	40