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Differential Behavior on Skill and Chance Tasks as a Function of Perceived Locus of Control

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DIFFERENTIAL BEHAVIOR ON SKILL AND CHANCE TASKS AS A
FUNCTION OF PERCEIVED LOCUS OF CONTROL

by

Michael D. Paulson

Bachelor of Science, Moorhead State College 1965
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This Dissertation submitted by Michael D. Paulson in partial fulfillment of the requirements for the Degree of Doctor of Philosophy from the University of North Dakota is hereby approved by the Faculty Advisory Committee under whom the work has been done.

Wm. H. James

(Chairman)

R. H. Kolstos

John O. Vall

Alice T. Clark

Agnes Thiel

William Johnson

Dean of the Graduate School

Permission

Title DIFFERENTIAL BEHAVIOR ON SKILL AND CHANCE TASKS AS A FUNCTION
OF PERCEIVED LOCUS OF CONTROL

Department Psychology

Degree Doctor of Philosophy

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ABSTRACT

This investigation was designed to examine differences in behavior that may exist between internals and externals on skill and chance tasks. Since internals should be more motivated in a skill task, it was hypothesized that they would show more trials to extinction, more frustration, and more arousal in acquisition and extinction on the skill task than externals. Since externals should be more motivated on a chance task, it was hypothesized that they would show more trials to extinction, more frustration, and more arousal in acquisition and extinction on the chance task than internals.

Subjects were pre-selected on the basis of their scores on the James I-E Scale to form the internal, internal-external, and external groups. The skill and chance tasks were the "Skye" apparatus and a card guessing task, respectively. Frustration was measured by the Zaks and Walters Aggression Scale and arousal by the plethysmograph.

Results were in the predicted direction for all of the hypotheses except one. Internal females in the skill task did not show greater arousal during extinction than external females. The following hypotheses were supported: (1) internals had more trials to extinction than externals in the skill task, (2) externals had more trials to extinction than internals in the chance task, (3) externals showed greater arousal in acquisition than internals in the chance task, (4) external males showed greater arousal in extinction than

internal males in the chance task, and (5) external females showed greater arousal in extinction than internal females in the chance task.

CHAPTER I

INTRODUCTION AND REVIEW OF LITERATURE

The role of reinforcement is universally recognized by students of psychology as an important one in explaining the behavior of organisms. When a reinforcement is perceived by the subject as not being contingent upon his own behavior, then it typically is perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. Then it is said that the person has a belief in external control with respect to that event. If, however, the individual perceives the reinforcement as a consequence of something that he did, it is said that he has a belief in internal control with respect to the event.

It is with this dimension that the present investigation is concerned. Internals, who feel that what happens to them depends on their own skill, place higher value on the demonstration of skill (since it would indicate a promise for future rewards) than do externals, who feel that reinforcements are dispensed independently of their own actions. By the same reasoning, externals place higher value on the demonstration of luck (since it would, for them, indicate a promise for future rewards) than do internals. It is against this background that the present investigation is undertaken.

This chapter attempts to review the literature available with respect to the internal-external control dimension and with respect to that research in the area of frustration which is relevant to the present study. Generally speaking, two dimensions of internal-external control have evolved. One conception is concerned with the nature of the task, per se, while the other is concerned with the consistent differences that exist among individuals with respect to the degree to which they are likely to explain reinforcement in terms of personal control.

The first dimension, (I_t-E_t), refers to the notion that tasks can be ordered on a continuum from those involving a great deal of control to those involving little or no control on the part of the subjects, i.e., from tasks that are largely internal to tasks that are largely external. At the internal end of the continuum would be tasks where the reinforcement is clearly seen as being directly dependent upon the subject's own responses. This would include many individual physical skills, such as golfing or basketball and the academic skills which a student uses to prepare for a course. Moving towards the middle of the continuum we would have tasks in which reinforcement is partially contingent upon the subject but also partially contingent upon others' responses. A good example of this is the two person game experiment. Moving towards the external end of the continuum one would find tasks like operant conditioning where the subject has some freedom of response but where a large degree of reinforcement control is exercised by the experimenter. At very extreme externality one would find Pavlovian conditioning where there is a high degree of response restriction and reinforcement control by the experimenter.

The second dimension, ($I_p - E_p$), deals with perceived control as a personality variable. There is a great deal of evidence that individuals can be ordered on a continuum according to the extent to which they generally perceive events as internally or externally controlled. A person high on the internal end would be one who perceives most reinforcements as controllable by himself. The person high on the external end would attribute most reinforcements to external factors like luck, fate, chance, the manipulation of others, etc.

In reviewing the experimentation that has been done on locus of control, the writer chose to maintain this distinction and divide the review into two sections, one dealing with experiments in which task structure was varied and the other dealing with perceived control as a personality characteristic.

Internal-External Control as Determined by Task Structure

The first published report of the task structuring of locus of control was by Phares (1957). Phares used two ambiguous tasks in his study. The first task was a color matching task, and the second was a task involving the matching of lines of slightly varying lengths to standard lines placed on cards at differing angles. He instructed half of his subjects that the tasks were so difficult that success was a matter of luck only. The other half of his subjects were told that success was a matter of skill and that previous research had shown some people to be very good at the task. Thus the structuring of the task with respect to the internal-external control dimension was achieved by instructional manipulation. For both tasks, both groups received the same number and sequences of reinforcements. The

dependent variable was expectancy and it was measured by the number of chips a subject would bet on his probability of being correct the next trial.

It was hypothesized that if a person perceives a reinforcement as contingent upon his own behavior, then the occurrence of either a positive or a negative reinforcement will strengthen or weaken potential for that behavior to occur in the same or similar situation. If, however, the subject sees the reinforcement as being outside his own control, the behavior potential is less likely to be strengthened or weakened. Phares found, as hypothesized, increments and decrements following success and failure, respectively, were significantly greater under skill instructions than under chance instructions. In other words, subjects changed expectancies more in the direction of previous experience. Furthermore, he found that under skill conditions, subjects shifted or changed their expectancies more often than under chance conditions, and that there was a strong trend among members of the chance group toward unusual shifts in expectancies, i.e., up after failure or down after success. This trend has subsequently been labeled the gambler's fallacy.

This was followed by a study by James and Rotter (1958). Chance and skill conditions were again created by instructional manipulation in a manner similar to the study by Phares. In this study the effects of partial versus 100 per cent reinforcement schedules upon trials to extinction were examined. An ESP (card guessing) task was used in which success was completely controlled by the experimenter. Two groups of subjects were given chance instructions, one under 50

per cent partial reinforcement and one under 100 per cent reinforcement; and two groups were given skill instructions, again one under 50 per cent and one under 100 per cent reinforcement. Ten training trials were given before extinction. Extinction was defined as stating an expectancy of 1 or 0 on a scale of 10 for three consecutive trials. What was most interesting about the results was that the usual superiority of partial over 100 per cent reinforcement in resistance to extinction held up only for the chance group and not for the skill group. In fact a reversal was found with the skill group. In addition it was found that trials to extinction under partial reinforcement were significantly greater for chance than for skill instructions, and trials to extinction for 100 per cent reinforcement were significantly greater for skill than for chance instructions. James and Rotter explain these findings by postulating that under chance instruction, the change from 100 per cent to 0 per cent clearly signifies a change in the situation and a disappearance of previous lucky hits. Consequently, extinction is rapid. The 50 per cent reinforced chance condition, however, does not allow for the quick perception of a changed situation. Thus, extinction is more gradual until the change becomes evident to the subject. However, for subjects with skill instructions, the greater the previous reinforcement, the longer it took the subject to accept the fact that he was not able to do the task successfully.

A second experiment by Rotter, Liverant, and Crowne (1961) sought to replicate the James and Rotter findings. In this study, however, chance and skill conditions were created by using tasks which would be regarded as skill or chance tasks on the basis of

previous cultural experiences of the subjects. There were no differential instructions given. The tasks used were the ESP task or card guessing and a motor task presumably involving steadiness. It was felt that the former task would be perceived as a chance task and the latter task as a skill task. Instructions and sequences of reinforcement were identical for both groups. There were eight groups, four chance and four skill, with 25 per cent, 50 per cent, 75 per cent, and 100 per cent reinforcement over eight trials to acquisition. The results confirmed previous findings. During the training trials subjects showed greater increments or decrements following success and failure, respectively, under skill conditions than under chance conditions. It was also found that a 50 per cent reinforcement group was more resistant to extinction than the 100 per cent group only under chance conditions while the reverse held true under skill conditions. Differences in trials to extinction were smaller, however, at the 25 per cent reinforcement schedules than at 50 per cent or 100 per cent schedules.

A study by Holden and Rotter (1962) attempted to determine whether or not differences in extinction patterns would be the same with a behavioral criteria as they were with verbalized expectancies as the dependent variable. To test this, the ESP task of card guessing was again used with differential instructions again determining chance or skill conditions. All subjects were given two dollars in nickels and were told they could bet a nickel on each trial on whether or not they would succeed until they either ran out of nickels or until they wished to discontinue and keep the money they had left. Three

groups were used, one with skill instructions, one with chance instructions, and one with ambiguous instructions. All were given 50 per cent partial reinforcement. Those groups with chance instructions and with ambiguous instructions had significantly more trials to extinction than the skill group as had been found in previous studies. Extinction was defined as voluntarily quitting the experiment.

In his dissertation, James (1957) studied the generalization of expectancies and the spontaneous recovery of expectancies. Four groups were used and again two were given chance instructions and two skill instructions. He used a line-matching and an angle-matching task. Seventy-five per cent reinforcement for eight training trials was used with two of the groups. These two groups were then given one trial on the new second task and thus were tested for generalization of expectancies. The other two groups were given the same 75 per cent reinforced eight training trials but were given a five-minute rest and then given two additional trials on the same task. Then, these two groups were tested for spontaneous recovery. James found, as hypothesized, significantly greater generalization of expectancies from the first task to the second, under skill instructions than under chance instructions. In addition, he found more spontaneous recovery in the skill group than in the chance group though the difference was not quite significant.

Blackman (1962) attempted to determine whether longer sequences of flashing lights and easy rather than complicated patterns or random occurrence could make a task appear to be a skill task. By the same token, he reasoned that short sequences and complicated patterns or randomness would cause the subject to perceive the task as a chance

task. He reasoned that long or short patterned sequences would lead a subject to believe that he could make predictions of the event depending upon his skill to comprehend the pattern, whereas short sequences and complicated patterns or randomness would lead the subject to perceive the patterns as unpredictable. He used a 50 per cent reinforcement schedule. The task used was one of predicting whether a red or a green light would appear on the following trial. Extinction began when the red light ceased to go on, and the measure of extinction was based upon the elimination of red responses from the subject's predictions. He found, as hypothesized, that the longest sequence extinguished more quickly. Also, the easy pattern resulted in quicker extinction than the complicated pattern or randomness. These results were interpreted to mean that longer sequences and recognizable patterns suggest to the subject that there is an experimenter-controlled pattern. Thus, when extinction begins, the subject interprets the situation as one in which the experimenter has changed the sequence of lights. If, however, the subject feels that the original sequence is random, he will persist longer because he will anticipate that the red light will appear again.

Phares (1962) used a somewhat different approach to study the locus of control variable. He used a tachistoscope to expose nonsense syllables, some of which were accompanied by shock. Two groups of subjects were used. The skill group was told that the shock could be escaped by pressing the correct button which could be learned. The chance group was told, however, that they could press any of a series of buttons and that this may or may not avoid the shock depending on

chance. The skill group was run first in order that the skill and chance groups could be matched with respect to the total number of shocks during 10 training trials. In fact, the groups were also matched in that they got the shocks on the same trials for the same nonsense syllables. Phares was interested in recognition thresholds for these syllables. Thresholds were taken before and after training. He found, as hypothesized, that recognition thresholds dropped significantly more in the skill-instructed than in the chance-instructed groups. Phares explained this on the basis that an expectancy of control in the shock situation would lead the subject to behave in a manner most likely to capitalize on his ability to control the situation, which in this experiment, could be accomplished by lowering thresholds of recognition.

Internal-External Control as a Personality Variable

The first attempt to measure individual differences in locus of control as a personality variable was reported in a doctoral dissertation by Phares (1955). Phares developed a 13-item scale to measure a general attitude or personality characteristic of attributing the occurrence of reinforcements to chance rather than to one's own skill. He found some evidence that prediction of behavior in a task situation was possible by using this instrument. Within groups receiving skill versus chance instructions for a color-matching and a line-matching task, he found some low level predictions of frequency of shifting and unusual shifts with his scale.

James (1957) in his dissertation, revised the Phares scale, still using a Likert-type format but writing 26 items plus filler

items. He hypothesized that within each of his groups (groups that had been given differential chance and skill directions), those subjects who scored high on externality would behave in each group differently than those who were high on the internal end of the continuum in much the same manner as those who received chance instructions behaved differently from those who received skill instructions. He found low but significant correlations between his test and behavior in the task situation. Internals had larger increments and decrements following success and failure respectively, generalized more from one task to another, recovered more following extinction, and produced less unusual shifts than did externals. In 1963, the above scale was revised and restandardized and has subsequently been named the DeKalb Survey Inventory, Form I.E. which shall hereafter be referred to as the I-E Scale.

Since then Rotter, Seeman, and Liverant (1962) have developed another scale to measure locus of control. It is called the Internal-External Control Scale and utilizes a forced choice format. It offers alternatives between internal and external interpretations of certain events. After much work the final version of the scale contained 29 items, six of which were fillers intended to make the purpose of the test more ambiguous. The scale is concerned with the subject's belief about the nature of the world rather than the values that the individual holds. Internal consistency estimates are moderately high for the scale. It has been shown to have low correlations with intelligence, sex, and social desirability as measured by the Marlowe-Crowne Social Desirability Scale thus showing good discriminant validity. Evidence

for the convergent validity of the scale is afforded by its correlation of .60 with the before-mentioned I-E Scale, and by high correlations with a story completion test designed to measure internality-externality and a semistructured interview technique designed to measure the same dimension.

Three measures of internal-external control for children have been developed. The first of these was developed by Bialer (1961). It was modified from the James-Phares Scale and is called the Locus of Control Scale for Children. It is a 23-item questionnaire with only yes and no responses possible to each item. With younger children the items can be orally administered. Crandall, Katkovsky, and Preston (1962) developed a scale called the Intellectual Achievement Responsibility Scale, commonly called the IAR. The items in this scale, as the name implies, deal with whether or not the child feels that he usually causes the successes and failures he realized in achievement situations or whether he feels others have the power of causation. A third test was developed by Battle and Rotter (1963) which was somewhat projective in nature. This test was modeled after the Rosenzweig Picture Frustration series. The child is presented with six situations, and he is told to fill in the balloon, as in the familiar comic strip, for an outline drawing. Incidentally, scores from this projective measure correlated .42 with scores from the Locus of Control Scale for Children. The test was named the Children's Picture Test of Internal-External Control.

With college groups who are relatively homogeneous, social class differences with respect to the internal-external control dimension have not been found. However, with younger or non-college age

subjects who are more heterogeneous as a group than are college subjects, differences have been noted. Franklin (1963) recorded a significant positive relationship between higher socioeconomic class and internality. Battle and Rotter (1963) similarly found a significant social class effect with race and intellectual level controlled. There was also a significant effect for race, but most of this variance was accounted for by an interaction in which lower class Negroes were much more external than middle class Negroes or lower class whites. Working on the assumption that Negroes in the United States can easily perceive impediments in the way of goals, several studies have examined the relationship between the internal-external control dimension and race with the basic prediction being that Negroes would exhibit greater externality than whites. Lefcourt and Ladwig (1965) successfully predicted higher externality among Negroes than among white prison inmates on six different measures. In another ethnic group investigation, Graves (1961) studied ethnic differences with respect to the internal-external dimension in a tri-ethnic community. They found, as hypothesized, whites were least external, followed by Spanish-Americans, and Indians. In all of the reported ethnic studies, groups who because of class or race are in a position of minimal power tend to score higher in the external direction.

The relationship between the internal-external control dimension and risk taking has also been examined. Liverant and Scodel (1960) examined subjects' preferences for bets in a dice-throwing task. It was shown that internals preferred bets of intermediate probability or extremely safe bets over low probability bets and that they wagered

more on these bets than on low probability bets when compared to those subjects who scored high in the external direction. This result was interpreted as meaning that subjects who were internal believe they can exert at least some control in a chance-determined situation whereas subjects who were external would perceive all outcomes as random. Thus internals revealed a greater tendency toward self-regulation with regard to probability. Lefcourt (1965) compared the risk-taking behavior of Negroes and whites with respect to a chance task. He assumed that a chance task would elicit less defensiveness than a skill task for Negroes, and that Negroes would prove less external in this situation. He found, as hypothesized, Negroes chose less low probability bets and were less risk-taking than whites.

One of the most important kinds of studies that have added to the construct validity of the internal-external control dimension have been those studies that have dealt with the attempts of people to control the environment, the basic hypothesis being that more attempts to control would be seen on the part of internals than externals. One of the first studies of this type was that undertaken by Seeman and Evans (1962). They found, as hypothesized, that hospitalized tuberculosis patients who were internal had more objective knowledge about their own conditions than did external subjects. This was further verified by the fact that multiple and independent staff describers of the patient agreed concerning the low amount of information possessed by the external patients. Seeman (1962) followed this study up by an investigation of what was remembered by reformatory inmates. These

inmates were exposed in an incidental manner to information about how the reformatory was run, parole, and long-range prospects for a non-criminal career. It was found, as hypothesized, that inmates who were internal showed superior retention of parole material compared to external inmates. Gore and Rotter (1963) found that Negro college students who were willing to take part in a march on the state capitol or join a freedom ride were significantly more internal than those who were only willing to attend a rally or were not interested in participating at all. A very similar study by Strickland (1965) investigated Negroes in a different state and found activities to be more internal than non-activists. Carlson, James, and Carriere (1966) found that subjects who were found to be internal by the I-E Scale possessed significantly more information about Viet Nam than those found to be external. In addition, it was found that internals were more willing to participate in social action behavior, i.e., to demonstrate publicly, and were more intense in their support of U. S. policy on Viet Nam as measured by an attitude scale than were externals. Phares (1965) selected two groups of subjects, one internal and one external, and instructed both groups to act as experimenters and change the attitude of other students toward fraternities and sororities on campus. He found, as hypothesized, that his internal subject-experimenters were significantly more successful in the amount of change achieved than the external subject-experimenters.

Related to the concept of control of the environment is control of the self. Studies of the relationship between the internal-external control dimension and smoking behavior would here be

relevant. Straits and Sechrest (1963) found non-smokers significantly more internal than smokers. James, Woodruff, and Werner (1965) found the same thing to be true. Also, they found that those male smokers who quit smoking, following the Surgeon General's report on smoking and lung cancer, and did not return were more internal than those male smokers who believed the report but did not quit smoking. The difference was not significant for females, however. It is felt that other variables enter in to motivate females in this situation. This entire set of studies lends surprisingly consistent support to the conception that the internal-external locus of control variable can be thought of as a personality characteristic in addition to being a product of task structuring.

It seems reasonable that those individuals at the internal end of the scale would show more overt striving for achievement than externals who feel they have little control over their environment. Some successful predictions of a relationship between achievement behavior and the internal-external control dimension have been made. Crandall, Katkovsky, and Preston (1962) used the IAR and other measures and compared them with four achievement-related activities with early grade school children. Male students who were internal spent more time in intellectual free-play pursuits, scored higher on intelligence tests, on reading achievement tests, and on arithmetic achievement tests. These findings were found for males only and not for females. Franklin (1963) studied the relationship of the internal-external control dimension to 17 measures of reported evidence of achievement motivation in high school children. He found a significant relationship in 15 of the

17 relationships, all in the predicted direction. Efran (1963) found that internals had more of a tendency to forget or repress failures than did externals in a high school population. The results were interpreted to suggest that the external subject had less need to repress his failures since he has already accepted external factors as being the cause of his failures to a greater extent than internals.

Rotter and Mulry (1965) tested the hypothesis that internals will take longer to make a difficult discrimination in a task which they perceive to be skill determined and that externals will take longer to make a discrimination in a task which they perceive to be chance determined. It seems logical that an individual who felt that what happened to him depended on his own skills would place higher value on demonstration of skill (since it indicated a promise for future rewards) than would a person who felt that reinforcements were arbitrarily dispensed independently of his own actions. The latter person would regard luck as a personal although unstable attribute and would have greater concern with whether or not he was a lucky or unlucky person. Increased value in turn would lead to longer decision time in both cases. Chance versus skill control was determined by instructional manipulation and the task was a very difficult angle-matching task. Internals were found to have a longer decision time both during acquisition and extinction in the skill-defined task than in the chance-defined task. Also, internals were found to have longer decision times than externals in the skill-defined task. Externals were found to have longer decision times

in the chance-defined task than in the skill-defined task. Also, externals had longer decision times in the chance-defined task than internals. These results were interpreted to mean that internals were the most involved and highly motivated in the skill task while externals were the most involved and highly motivated in the chance task.

Most of these studies, however, have used high school and grade school children as subjects. Studies with adults (usually college subjects) have been much less fruitful, possibly because in the highly structured academic situation there is a great deal of specificity determining response.

It would seem that internals would be more resistant to manipulation and suggestion from the outside than would externals and thus would be less conforming. A number of studies have been undertaken to study the relationship between internal-external control dimension and Barron's Independence of Judgment Scale, with subjects high in externality showing greater tendencies to conform. Crowne and Liverant (1963) also investigated the relationship between locus of control and conformity behavior. They used two groups of college students, one internal and one external, and observed them in the typical Asch-type conformity situation. Two conditions were used; under one condition the normal Asch instructions were used; under the other, subjects were given a certain amount of money and were allowed to bet on each of their judgments. Subjects were free to determine whether they would bet or not and whether they would bet a large or small amount. Briefly, in the normal Asch-type situation, there were no differences between internals and externals in the amount of yielding. However,

under betting conditions, internals yielded less than externals, bet more on themselves on independent trials than did externals, and had no significant differences between their bets on independent and yielding trials (externals bet significantly less on independent than on yielding trials). Greene, Lotsof, and James (1964) also found a relationship between conformity behavior and the locus of control dimension. They found that internals showed greater conformity than externals over 12 critical trials in a typical Asch-type situation. In addition, it was found that externals tended to bet more and were somewhat more confident than externals on the critical trials. Strickland (1962) found a significant difference between subjects who were aware of the reinforcement contingency and did not condition and those who were aware and did condition. As hypothesized, the latter group was considerably more internal than the former group. Gore (1962) also studied the apparent resistance of internals to external manipulation. She used three conditions; one condition used overt influence in which she specified which card she thought was best; another condition involved subtle influence and suggestion; and a third condition was a control condition of no influence. The purpose of the experiment as presented to the subjects was to see which card would produce longer stories. Briefly, her results showed no differences between internals and externals under overt suggestion and the control condition. However, under the condition of subtle suggestion, internals produced stories which were much shorter than externals. Apparently, when internals are given a conscious choice, they are not resistive. When they are aware that an attempt

is being made to subtly influence them, they become resistive. These studies taken as a group indicate that a person who is internal may conform when he chooses to, when he is given a conscious alternative, and when he thinks it will benefit him. On the other hand, if he perceives that conforming behavior will not be to his benefit or that there are subtle attempts being made to influence him without his awareness, he may react resistingly.

Butterfield (1964) in an extensive study found interesting relationships between the internal-external control dimension and frustration and anxiety. Using the Child and Waterhouse Frustration-Reaction Inventory and the Alpert-Haber Facilitating-Debilitating Test Anxiety Questionnaire, he found a significant relationship between internality and constructive reaction to frustration and facilitating anxiety. He also found a significant relationship between externality and intropunitive reactions to frustration.

Cromwell, Rosenthal, Shakow, and Kahn (1961) in a study which compared schizophrenics and normals on the locus of control dimension, found schizophrenics to be significantly higher in externality than normals. In addition, they found normals had lower reaction times and preferred situations that allowed autonomy while schizophrenics had lower reaction times and preferred situations in which there was external control.

The one area that perhaps will require the most investigation in the future is the area of the antecedents of internal and external attitudes. Relatively little work has been done in this area to date.

Literature on Frustration

In the past four decades an enormous amount of research has been carried out in the field of frustration. The term frustration has been used to refer to almost any situation prior to goal-achievement. Thus, any learning situation could be regarded (and has been so regarded by some psychologists) as a frustrating situation until the required response has been mastered to the point at which further errors do not occur. Therefore, this review of the literature on frustration will confine itself to those studies which it is felt are relevant to the present study. For a more complete review the reader is referred to Yates (1962).

The frustration hypothesis is a particular type of approach within the general framework of interference theory which attempts to reveal the nature of the extinction process. According to this theory, extinction occurs when a new and incompatible response is conditioned to the conditioned stimulus. Although some evidence for such an interpretation has existed for a long time, the difficulties with interference theory have always been great. Two main difficulties are apparent: (1) What is the motivation for the interfering response; (2) Even if the motivation of the interfering response is known, it is still difficult to account for the strengthening of this response during nonreinforced extinction trials. The basic assumption in the frustration hypothesis is that the omission of the positive reinforcer is frustrating. Frustration is thus seen as the motivation for competing responses in extinction and frustration reduction is viewed as being the

reinforcement which accounts for the strengthening of the competing response in extinction.

If frustration is motivating, it should be capable of energizing behavior, i.e., performance following frustration should be more vigorous than would have occurred without it. The first clear demonstration of the energizing function of frustration on learned behavior was by Amsel and Roussel (1952). They employed a two-stage straight runway in their study. The first stage led to the first goal box, and the second stage led to the second goal box. Hungry rats first ran from the starting box to the first goal box, where they were rewarded with food (or not rewarded when the object was to frustrate them). Then they were allowed to run the second stage of the runway to the second goal box where they were always rewarded with food. The rats were run through a long series of trials with reward available in both goal boxes, and then were switched to a situation in which reward was omitted in the first goal box on half the trials, i.e., partial reinforcement. The assumption that the omission of reward is frustrating led them to predict faster running in the second stage of the maze following non-reinforced trials. The hypothesis was upheld.

Adelman and Maatsch (1956) provided a demonstration that escape from frustration as a reinforcement is extremely strong. In this study, the response studied was that of jumping out of a box 10 inches high for rewards of three different kinds: satisfaction of curiosity, food, and release from frustration. The food reinforced group of rats received 37 habituation trials without food and without

an opportunity to escape from the box followed by 30 trials in which jumping out of the box and up onto a ledge was reinforced with food. The curiosity reinforced rats were treated in the same way except that the last 30 trials were unreinforced except by escape from the box and the possible satisfaction of exploratory and curiosity drives. The frustrated rats were treated somewhat differently. Instead of 37 habituation trials they received 37 trials in a runway which terminated in the jump box. On these trials they were reinforced with food in order to provide a basis for frustration later on in the experiment. They were not allowed to jump out of the box at this time. In the later phase, the animals found no food in the box. They were confined for 5 minutes and then allowed to escape from this theoretically frustrating situation by jumping out of the box. There were large differences in the effectiveness of the three reinforcers used in this experiment. Average response latencies during acquisition were 168, 20, and 5 seconds for the curiosity-rewarded, food-rewarded, and frustration groups, respectively. There were also large differences in extinction behavior. The curiosity-rewarded animals extinguished immediately after acquisition, and the food-reinforced animals required on the average 60 trials to extinguish; but the animals rewarded by frustration-reduction showed no signs of extinction in 100 trials which attests to the strength of escape from frustration as a reinforcement.

Maier has gathered a large amount of evidence through several studies that frustration produces very persistent learning. In the studies, the rat has been placed on the Lashley jumping stand

apparatus. The rat is confronted with an insoluble problem where two stimuli are placed to the right and left in the apparatus. The responses to each are randomly reinforced half the time. Under these conditions, no matter what course of action is adopted by the rat, he receives reinforcement on half the trials. On the other half of the trials, the animal jumps against a locked door and falls into a net. Maier felt this situation was highly frustrating for the rats. The animals soon developed a marked tendency not to jump at all. When this happened, they were forced to jump by electric shock applied to their feet or by an air jet applied to the base of the tail. These stimuli probably made the situation more frustrating. Most of the rats developed very strong and persistent adjustments to the situation called by Maier "fixations." After the fixations had been established, attempts to break them by making the problem soluble and consistently reinforcing jumps to one card failed with 75 per cent of the animals.

Weinstock (1958) has extended the frustration hypothesis to explain the partial reinforcement effect. Theoretically, frustration is capable of strengthening the response which follows non-reinforcement. Since partial reinforcement introduces frustration on non-reinforced trials, this should strengthen behavior during training; and, if the frustration drive is conditionable, this conditioned frustration should carry over into extinction and increase the persistence of behavior there. The latter result has been obtained in most experiments but the former has not. In fact performance during acquisition is slightly weaker for the partial reinforcement group as a rule. Weinstock has

successfully accounted for this apparent discrepancy. Briefly the results of his experiment were as follows: (1) Early in acquisition, the continuously reinforced group performed better than the partial reinforcement group. This is what has generally been found with other experiments which have used relatively brief periods of acquisition; (2) However, later in training the groups receiving partial reinforcement performed better; (3) The usual partial reinforcement effect in extinction was found. Weinstock has successfully explained his findings within the framework of the frustration hypothesis. Frustration increases motivation. Early in training before the correct response is firmly established, the effect of this increase in motivation is mainly to strengthen interfering responses produced by frustration. This accounts for the lower performance early in acquisition for those under partial reinforcement. In time, however, the interfering responses tend to disappear because they are never reinforced. When this happens, the motivation produced by frustration now improves performance. In extinction, the animals under continuous reinforcement during acquisition are frustrated for the first time which produces interfering responses long since extinguished by the partially reinforced animals. As a result, the response previously effective in obtaining reinforcement extinguishes quickly for the continuously reinforced group.

Dollard and his associates have formulated a hypothesis about the relationship between frustration and aggression. They feel that frustration produces instigations to a number of different types of response, one of the most important of which is an instigation to

some form of aggression. The strength of the instigation to aggression, it was hypothesized, will vary directly with the motivation to reach a goal, if the goal is unattainable, and the strength of the barrier to the goal is held constant.

A number of experiments have been reported which support this last hypothesis. Sears and Sears (1940) produced frustration in infants by withdrawing the bottle before hunger was satisfied. The degree of motivation was varied by withdrawing the bottle after varying amounts of milk had been consumed. The strength of instigation to aggression was measured by the latency to crying. Latency varied directly with the amount of milk consumed before withdrawal and the hypothesis was supported. Haner and Brown (1955) gave children the task of placing marbles in holes. Haner and Brown induced frustration by terminating the trial arbitrarily before the task was completed. The strength of instigation to the goal-response was varied by terminating the trial after the child had placed 8, 18, 27, 32, or 36 marbles (the goal being 36 marbles). The strength of instigation to aggression was measured by having the subject press a lever after each trial, the pressure being secretly recorded. As hypothesized, pressure increased as the child failed close to the goal. Finch (1942) found that "frustration-response incidence" (including aggression) increased as a direct function of number of hours of food deprivation when the animal was placed in a frustrating situation.

It has also been hypothesized that the strength of instigation to aggression will vary directly with the number of frustrated responses. Finch (1942) showed that aggressive response incidence

increased with repetition of the frustrating situation. Palmer (1960) found that convicted murderers had been subjected to significantly more physiological and psychological frustrations during childhood than had their control brothers. The murderers showed fewer socially acceptable forms of aggression release.

In addition, it has been hypothesized that the strength of instigation to aggression will vary directly with the number of responses (other than aggressive responses) which are extinguished through non-reinforcement as frustration persists. Otis and McCandless (1955) have reported evidence that supports this hypothesis. Using pre-school children, they showed a significant decrease under conditions of repeated frustration, in non-aggressive activities; and a reliable increase in aggressive behavior.

Zaks and Walters (1959) have constructed a 12-item scale to measure aggression. This scale has been shown to have adequate reliability. It has been shown to discriminate between various criterion groups which would be expected, on a priori grounds, to differ in aggressiveness. The scale has been shown to be effective in distinguishing normal adults from prisoners convicted of crimes of violence and normal from delinquent adolescents. It also discriminated between an adolescent and an adult group with adolescents showing significantly more aggression than adults, as would be expected. Later validation studies by Walters and Zaks (1959) showed that subjects frustrated immediately before the administration of the inventory scored significantly higher than those taking the inventory under standard conditions. Thus, the scale was seen to discriminate

successfully between situationally frustrated and non-frustrated groups. Also, it was found to discriminate successfully between individuals rated by their peers as aggressive and those rated as non-aggressive. Thus, there is considerable supportive evidence that the 12-item scale is a valid measure of aggression. Not only does it discriminate pathologically aggressive individuals from normal subjects, but it is also capable of discriminating between subjects in the normal range and between situationally frustrated and non-frustrated subjects.

CHAPTER II

THE PROBLEM OF THIS STUDY

The basic stimulus for the present research effort was the research effort by Rotter and Mulry (1965) cited previously. They predicted that internals, who feel that what happens to them depends on their own skills, would place higher value on the demonstration of skill (since it would indicate a promise for future rewards) than would externals, who feel that reinforcements are dispensed independently of their own actions. Thus, internals would be more motivated on a skill-task than externals. By the same reasoning, they predicted that externals would place higher value on the demonstration of luck (since it would, for them, indicate a promise for future rewards) than would internals. Thus, externals would be more motivated in a chance-task than internals. They found that decision time for internals was greater than for externals on the skill-determined task and vice-versa on the chance-determined task, purportedly due to the differing levels of motivation in these tasks. Also, due to this differential motivation, they predicted that internals would take more trials to extinguish on the skill-determined task and externals more trials on the chance-determined task. They obtained directionality but not significance with respect to this prediction.

Since the only difference between the skill and chance tasks in the Rotter and Mulry (1965) study was the difference in instructions,

it is believed that the tasks were not clearly enough differentiated into skill and chance tasks. In addition to instructional differences, the present study also employed tasks which would be regarded as skill or chance tasks on the basis of previous cultural experiences of the subjects. The tasks chosen were those previously used by Rotter, Liverant and Crowne (1961)--the "Skye" apparatus task and a card-guessing task. It is believed that with this increased differentiation of the skill and chance determinants of the task, the subjects would be more likely to perceive the tasks as being determined by skill and by chance or luck.

On this basis the following hypotheses were developed:

Hypothesis I:

Internals as measured by the I-E Scale will show greater persistence, i.e., more trials to extinction than externals in a skill-determined task.

This prediction is based on the belief that internals are more motivated in a skill task and thus would show greater persistence of behavior during extinction.

Hypothesis II:

Externals as measured by the I-E Scale will show greater persistence, i.e., more trials to extinction, than internals in a chance-determined task.

This prediction is based on the belief that externals are more motivated in a chance task and thus would show greater persistence of behavior during extinction.

Hypothesis III:

Internals as measured by the I-E Scale will show greater frustration (as measured by the Zaks and Walters Aggression Scale) due to their continued failure in extinction than will externals in the skill task.

This prediction stems from the belief that internals are more motivated in a skill task than externals. When a subject's goal directed behavior is blocked by extinction, it is believed that frustration results. Since internals are more motivated in the skill task, it seems reasonable that they would experience greater frustration as a result of extinction.

Hypothesis IV:

Externals as measured by the I-E Scale will show greater frustration (as measured by the Zaks and Walters Aggression Scale) due to their continued failure in extinction than will internals in the chance task.

Again, since externals are more motivated, they should show greater frustration as a result of failure during extinction.

Hypothesis V:

Internals as measured by the I-E Scale will show greater arousal (as measured by the Plethysmograph) during acquisition than will externals in the skill task.

Since it is believed that internals are more motivated in a skill task, it seems logical that they should show more arousal in acquisition than externals.

Hypothesis VI:

Externals as measured by the I-E Scale will show greater arousal (as measured by the plethysmograph) during acquisition than will internals in the chance task.

It seems logical that if externals are more motivated in a chance task, they should show more arousal in acquisition than internals.

Hypotheses VII and VIII:

Internals as measured by the I-E Scale will show greater arousal (as measured by the plethysmograph) during extinction than will externals in the skill task.

Externals as measured by the I-E Scale will show greater arousal (as measured by the plethysmograph) during extinction than will internals in the chance task.

Because of the belief in differential motivation, it seems logical to postulate that internals would show more arousal in extinction in the skill task, and externals would show more arousal in extinction in the chance task.

CHAPTER III

METHOD

Design

A 3 x 2 x 2 factorial design was employed as the basic design in this experiment. The independent variables used were as follows: (1) 3 levels of perceived locus of control: an Internal group, an External group, and an Internal-External intermediate group; (2) 2 levels of task: skill and chance; (3) 2 levels of sex. The dependent variables are as follows: (1) trials to extinction, (2) frustration, (3) arousal during acquisition, and (4) arousal during extinction.

Subjects

Subjects were selected from the Introductory Psychology class at the University of North Dakota on the basis of their scores on the I-E Scale which was administered to them prior to this study. Subjects of both sexes were used--48 males and 48 females. The 16 males 16 females who scored the highest on the I-E Scale were selected to form the External group, the 16 males and 16 females who scored the lowest on the I-E Scale were selected to form the Internal group; and the 16 males and 16 females who scored the closest to the reported mean of 37 in college populations were selected to form the intermediate Internal-External group.

Materials and Instruments

James I-E Scale: This scale is a slightly modified version of the original scale developed by James (1957). For disguise of purpose the test has been titled "The DeKalb Survey Test-Form I.E." It provides a measure of the extent to which a person perceives events as determined by factors extrinsic to himself such as fate, luck, chance, and the manipulation of others (external control) versus the extent to which the individual perceives events as determined by factors intrinsic to himself (internal control). Only the 30 even numbered items are scored with the 30 odd numbered items acting as fillers. It is a Likert-type scale necessitating selections of a level of agreement from strongly agree, through agree, disagree, to strongly disagree. All items are scored in the external direction. Scores can range from 0 to 90 with a mean of 37 in college populations and a standard deviation of 12.

Zaks and Walters Aggression Scale: This scale was developed in 1959. For disguise of purpose the test has been titled "The Personal Opinion Inventory." Only the 11 odd numbered items and item 22 are scored with the first 10 even numbered items acting as fillers. The items are responded to in terms of agreement or disagreement. One point is scored for each item answered in the agree direction. Scores can thus range from 0 to 12. The scale has been shown to discriminate between various criterion groups which would be expected, on a priori grounds, to differ in aggressiveness. It has been shown to be effective in distinguishing normal adults from prisoners convicted of crimes of violence and normal from delinquent adolescents.

It also discriminated between an adolescent and an adult group with adolescents showing more aggression than adults as would be expected. Later validation studies by Walters and Zaks (1959) showed that it successfully discriminated between situationally frustrated and non-frustrated subjects.

The "Skye" Apparatus: This apparatus, previously used by Rotter, Liverant, and Crowne (1961), was used for the skill-determined task. It is in essence a vertical level of aspiration board with an adjacent scale ranging from 0 to 100. The subject's task was, by smoothly pulling a string, to raise a block as high as possible. Upon this block a small metal ball was resting. Actually, the block slants to the front, and the ball can be held on the block only by means of an electromagnet of which the experimenter had control, without the subject's awareness.

Plethysmograph: This instrument measures changes in finger volume as a result of changing amounts of blood in the finger. These changes in blood volume are related to the level of arousal or emotionality. Blood flows into an extremity such as a digit continuously. During that phase of the pulse cycle where blood is ejected from the heart, there is a sudden extra surge of blood into the finger. Although there is some increase in outflow, inflow exceeds outflow for a short time and the finger increases in volume to accommodate the extra blood. At the end of the ejection phase of the heart, the rate of inflow drops rapidly and for a time, outflow exceeds inflow. The additional finger volume is, therefore, lost. The transient increase in finger volume is termed the pulse volume or blood volume

pulse, and this is represented by a cartesian coordinate plot of the time course of the net difference between the rate of volume outflow of blood for the digit. The pulse volume is not a measure of the rate of flow of blood into the finger because the rate of flow out of the finger is unknown and only the difference between them in terms of volume can be measured.

Procedure

The Zaks and Walters Aggression Scale was administered to each of the subjects approximately three weeks prior to the experiment. Upon entering the experimental room, the subject was asked to seat himself on a chair at the end of the table. The plethysmograph was then attached to the index finger of that hand which the subject preferred not to use for the experimental task (the subject was allowed to use only one hand for the experiment). He was told that the apparatus attached to his index finger would be explained to him shortly. Then the instructions appropriate to the task were read to him (given below). In accord with the instructions, the plethysmograph was turned on and a "resting phase" of two minutes was observed with each subject prior to the commencement of his performance on the task. A mark was made on the plethysmograph record at the end of the "rest phase" and at the end of each set of five trials. Then the succeeding procedures for the skill and chance tasks, respectively were followed.

Skill Task: The subject was given 10 acquisition trials where the number of successes was controlled by the experimenter. The

subject was required to estimate how far he thought he could raise the block without having the ball fall off. This estimation was in terms of the scale on the "Skye" apparatus, which is graduated from 0 to 100, and which served as a measure of the subject's expectancy. If the experimenter wished to give the subject a success experience, he merely allowed him to reach his expectancy. If, however, he wished to give the subject a failure experience, he did not allow him to reach his expectancy. All subjects received 80 per cent reinforcement with failures on trials three and six. These two trials were selected for failure experiences by means of a table of random numbers. After acquisition, all subjects were given failure until extinction was reached (extinction being defined as a verbalized expectancy of 10 or 0 for three consecutive trials). If extinction was not reached after 25 trials, the experiment was terminated.

A series of 35 random numbers was selected from a random numbers table so that each subject could be treated identically. These numbers were assigned on a one-to-one basis to each of the 35 trials. The numbers varied from 1 to 15. If an individual was scheduled for a success on a particular trial, he was allowed to reach his verbalized expectancy plus the random number assigned to that trial before the ball fell off. If he was scheduled for a failure on a particular trial, he missed reaching his verbalized expectancy by an amount equal to the random number assigned to that trial.

After extinction had been reached, the task was terminated. However, before the subject left, he was administered the Zaks and Walters Aggression Scale.

Chance Task: The subject was given 10 acquisition trials where the number of successes was controlled by the experimenter. The subject was required to estimate his degree of certainty of success on a scale going from 0 to 100. This served as his verbalized expectancy for each trial. If the experimenter wished to give the subjects a success experience, he merely allowed the subject to guess correctly three or more of the five cards presented each trial. If, however, he wished to give the subject a failure experience, he did not allow the subject to guess as many as three cards correctly. All subjects received 80 per cent reinforcement with failures on trials three and six. These two trials were selected for failure experiences by means of a table of random numbers. In addition, a table of random numbers was used to determine the number and position of correct card guesses both during acquisition and extinction. That is on a trial pre-designated for success each subject obtained either three, four, or five correct guesses on a random basis and on a trial pre-designated for failure each subject obtained either zero, one, or two correct guesses on a random basis. After acquisition, all subjects were given continued failure until extinction was reached (extinction being defined as a verbalized expectancy of 10 or 0 for three consecutive trials). If extinction was not reached after 25 trials, the experiment was terminated.

After extinction had been reached, the task was terminated. However, before the subject left, he was administered the Zaks and Walters Aggression Scale.

Instructions

In addition to using tasks which would be regarded as skill or chance tasks on the basis of previous cultural experiences of the subject, the instructions were so devised as to accentuate the skill and chance elements inherent in respective tasks. In this manner it was hoped that the respective tasks would have very definitive skill and chance determinations.

Skill Task Instructions: This is a test of coordination skills. Your task is to pull this string smoothly and raise this block in such a manner that the ball which is resting on the block will not fall off. Remember, it is essential that you pull the string very smoothly and slowly if you wish to succeed. Before each trial, you are to tell me how high you think you can raise the block and still keep the ball on it. Indicate this by giving me a number from 0 to 100 corresponding to the graduations you see on the scale fixed to the apparatus. You are to sit at the end of the table at all times and when and if the ball falls off, I will place it back on the block. I will be recording your score each time and at the end of the experiment I will tell you your total score relative to what others have done on this. There is one other thing that can affect your total score. If you get as high or higher than you predict, the amount you predict will be added to your total score. If you get lower than what you predict, double that amount predicted will be subtracted from your total score. So your score depends on two things--how high you can raise the block without having the ball fall off and how accurate your predictions are.

The apparatus attached to your hand gives me an indication of the extent of your concentration on the task. You need not be concerned about it. It is important that you do not move your hand throughout the course of the experiment, however. Before we begin I would like to measure your concentration level when you are not doing anything. This will only take a few seconds and then we will start on the task.

Chance Task Instructions: This experiment is to see how well you can do at guessing which of two kinds of cards will be exposed on the screen in front of you and also to see how accurate you are in estimating your luck. In this apparatus we have a large number of cards marked with either an X or an O. These cards have been shuffled and placed at random in the apparatus. You are to tell me whether you think the first card will be an X or an O. After you tell me, the card will be flashed on the screen and you will know whether you were right or wrong. You are to do this for each of the remaining cards. In this way we will go through a number of sets of five cards. I will be keeping score and will let you know how well you did at the end of each trial, that is, at the end of each set of five cards.

Now in order to do better than chance on a set you must get at least three or more cards right out of five. Three or more cards correct will mean that you have succeeded. Any number of cards correct below three will mean that you have not succeeded.

Before each trial or set of five cards, I would also like you to estimate how certain you are that you will get three or more cards correct. You are to estimate your degree of certainty of success on

a scale going from 0 to 100. For example, if you feel fairly sure you will succeed, you may rate yourself with a 90 or 100. If you feel moderately sure--with a 40, 50 or 60. If you feel pretty sure you will not be successful--with a 0 or 10.

I will be recording whether or not you are successful, that is, whether you got three or more cards correct out of five, and at the end of the experiment I will tell you your total score in terms of how others have done on this. There is one other thing that can affect your score. If you are successful on a set of five cards, I will add your estimate to your total score. However, if you are unsuccessful on a set, I will subtract double your estimate from your total score. So your total score depends on two things--whether or not you are successful in guessing three or more cards correctly out of a set of five cards and how good you are at estimating your own success. It is important that you select your estimates carefully on a 0 to 100 scale and that they correspond closely with how certain you really are.

The apparatus attached to your right hand gives me an indication of the extent of your concentration on the task. You need not be concerned about it. It is important that you do not move your right hand throughout the course of the experiment, however. Before we begin I would like to measure your concentration level when you are not doing anything. This will only take a few seconds and then we will start on the task.

CHAPTER IV

RESULTS AND DISCUSSION

This chapter is concerned with the analysis of the data and discussion of the various hypotheses. Discussion of additional data is presented in the latter portion of this chapter.

Hypothesis I:

Internals as measured by the I-E Scale will show greater persistence, i.e., more trials to extinction, than externals in a skill-determined task.

Table 1 presents means and standard deviations for the main effects of locus of control, task, and sex. Table 2 presents the means and standard deviations for each cell of the number of trials to extinction. Table 3 contains the completed analysis of variance with respect to dependent variable one, number of trials to extinction. Figure 1 graphically depicts the interaction of locus of control by task.

As indicated by Table 3, the interaction of locus of control by task was significant at the .01 level. The mean number of trials to extinction for internals in the skill task was 18.06. The mean number for externals in the skill task was 13.18. The difference required for significance at the .05 level, one-tailed, by Duncan's Multiple Range test is 4.216. The obtained difference is 4.88. Thus, the data supports the hypothesis that internals show greater persistence in a skill task than do externals.

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR MAIN EFFECTS OF LOCUS OF CONTROL,
TASK, AND SEX

Main Effect	Mean	Standard Deviation
I	14.78	7.55
I-E	15.03	6.81
E	16.06	6.70
Skill	15.08	7.21
Chance	15.50	6.88
Male	15.06	7.37
Female	15.52	6.71

TABLE 2

MEANS AND STANDARD DEVIATIONS FOR ALL CELLS OF TRIALS TO EXTINCTION

Cell	Mean	Standard Deviation
I Skill Male	17.63	8.12
I Chance Male	9.25	3.31
I-E Skill Male	12.75	6.80
I-E Chance Male	18.63	6.38
E Skill Male	12.63	5.50
E Chance Male	19.50	6.90
I Skill Female	18.50	6.84
I Chance Female	13.75	7.14
I-E Skill Female	15.25	7.68
I-E Chance Female	13.50	4.36
E Skill Female	13.75	5.72
E Chance Female	18.38	5.72

TABLE 3

TABLE OF ANALYSIS OF VARIANCE FOR NUMBER OF TRIALS TO EXTINCTION

Source	Sum of Squares	D.F.	Mean Square	F	P
Total	4773.84	95			
I-E	29.52	2	14.76	.32	N.S.
Task	4.17	1	4.17	.09	N.S.
Sex	5.04	1	5.04	.11	N.S.
I-E X Task	638.89	2	319.94	6.92	.01
I-E X Sex	66.52	2	33.26	.72	N.S.
Task X Sex	26.03	1	26.03	.56	N.S.
I-E X Task X Sex	126.66	2	63.33	1.37	N.S.
Error	3877.00	84	46.15		

Hypothesis II:

Externals as measured by the I-E Scale will show greater persistence, i.e., more trials to extinction, than internals in a chance-determined task.

The mean number of trials to extinction for externals in the chance task was 18.94. The mean number for internals in the chance task was 11.50. The difference required for significance at the .0025 level, one-tailed, by Dunca's Multiple Range test is 7.14. The obtained difference is 7.44 and is significant. Thus, the data supports the hypothesis that externals show greater persistence in a chance task than do internals.

Fig. 1.--Interaction of locus of control by task for
trials to extinction



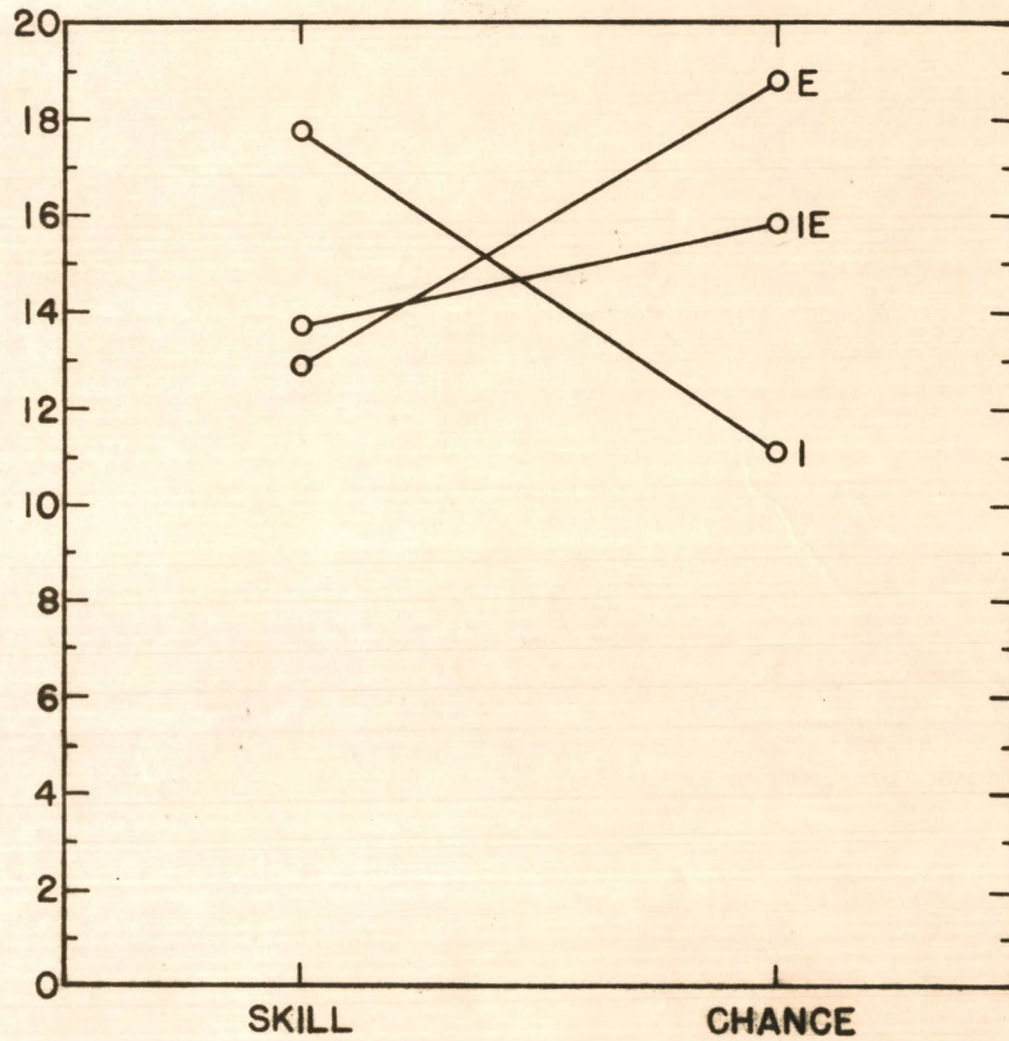


FIGURE I

Hypothesis III:

Internals as measured by the I-E Scale will show greater frustration (as measured by the Zaks and Walters Aggression Scale) due to their continued failure in extinction than will externals in the skill task.

The Zaks and Walters Aggression Scale which has previously successfully discriminated between situationally frustrated and non-frustrated subjects was used to measure the degree of frustration. The scale was given to the subjects approximately three weeks before the experiment in order to determine base rates of responding. The scale was given again immediately after the experiment to determine the amount of frustration induced by the experiment. Analysis of variance with covariant adjustment was used to analyze the data since the test lacked perfect reliability. The "covariant" was the test scores before the experiment.

Table 4 contains the adjusted means for each cell for the test scores. Table 5 contains the completed analysis of variance with covariant adjustments for dependent variable two, test scores.

As indicated by Table 5 none of the main effects or interactions were significant at the .05 level. The adjusted mean score for internals in the skill task was 4.24. The adjusted mean score for externals in the skill task was 4.04. The difference required for significance at the .05 level, one-tailed, by Duncan's Multiple Range test is 1.050. The obtained difference is .20. Thus, the data fails to support the hypothesis that internals experience more frustration due to failure in a skill task than do externals. Although the difference was not significant, it was in the predicted direction.

It is felt that the reason, at least in part, for the failure to find a significant difference between the two groups is due to the fact that the time interval between the pre-test and post-test was only three weeks. Because of this short interval, the subjects may have remembered how they responded to the scale before and responded in like manner at the time of the second administration.

TABLE 4
ADJUSTED MEANS FOR ALL CELLS FOR TEST SCORES

Cell	Mean
I Skill Male	4.80
I Chance Male	3.83
I-E Skill Male	3.98
I-E Chance Male	3.23
E Skill Male	3.67
E Chance Male	4.51
I Skill Female	3.68
I Chance Female	3.99
I-E Skill Female	3.49
I-E Chance Female	3.92
E Skill Female	4.42
E Chance Female	3.73

TABLE 5

TABLE OF ANALYSIS OF VARIANCE WITH COVARIANT ADJUSTMENTS FOR
TEST SCORES

Source	Sum of Squares	D.F.	Mean Square	F	P
Total	157.00	94			
I-E	3.74	2	1.87	1.12	N.S.
Task	.41	1	.41	.24	N.S.
Sex	.55	1	.55	.33	N.S.
I-E X Task	.71	2	.36	.21	N.S.
I-E X Sex	1.46	2	.73	.43	N.S.
Task X Sex	2.29	1	2.29	1.37	N.S.
I-E X Task X Sex	8.84	2	4.42	2.66	N.S.
Error	139.00	83	1.66		

Hypothesis IV:

Externals as measured by the I-E Scale will show greater frustration (as measured by the Zaks and Walters Aggression Scale) due to their continued failure in extinction than will internals in the chance task.

The Zaks and Walters Aggression Scale was used to measure the degree of frustration. The scale was given three weeks before the experiment and immediately after it.

The adjusted mean score for externals in the chance task was 4.18. The adjusted mean score for internals in the chance task was 3.91. The difference required for significance at the .05 level, one-tailed, by Dunca's Multiple Range test is 1.050. The obtained difference is .21. Thus, the data fails to support the hypothesis that

externals experience more frustration due to failure in a chance task than do internals. Although the difference was not significant it was in the predicted direction.

Again, it is felt that the reason, at least in part, for the failure to find a significant difference between the two groups is due to the fact that the time interval between the pre-test and post-test was only three weeks.

Hypothesis V:

Internals as measured by the I-E Scale will show greater arousal (as measured by the plethysmograph) during acquisition than will externals in the skill task.

The plethysmograph was used to measure arousal. This instrument measures changes in blood volume in the finger which is purportedly related to the level of arousal or emotionality. A "resting phase" of two minutes was observed before the commencement of performance on the task during which each subject's base rate of responding was obtained. Analysis of variance with covariant adjustments was used to analyze the data since the instrument lacked perfect reliability. The "covariant" was the average amount of arousal during the "resting phase."

Table 6 contains the adjusted means for each cell for arousal during acquisition. Table 7 contains the completed analysis of variance with covariant adjustments for dependent variable three, arousal during acquisition. Figure 2 graphically depicts the interaction of I-E by task. Figure 3 graphically depicts the interaction of I-E by sex.

As indicated by Table 7 significance was obtained for the interaction of locus of control by task and for the interaction of

locus of control by sex. Both interactions were significant at the .05 level. The adjusted mean arousal score for internals in the skill task was 8.15. The adjusted mean arousal score for externals in the skill task was 7.43. The difference required for significance at the .05 level, one-tailed, by Duncan's Multiple Range Test is 1.488. The obtained difference is .72. Thus, the data fails to support the hypothesis that internals show more arousal during acquisition in a skill task than do externals. Although the difference was not significant, it was in the predicted direction.

TABLE 6
ADJUSTED MEANS FOR ALL CELLS FOR AROUSAL DURING ACQUISITION

Cell	Mean
I Skill Male	9.45
I Chance Male	7.87
I-E Skill Male	8.10
I-E Chance Male	8.11
E Skill Male	7.06
E Chance Male	8.53
I Skill Female	6.96
I Chance Female	6.38
I-E Skill Female	6.55
I-E Chance Female	7.95
E Skill Female	7.81
E Chance Female	9.72

TABLE 7

TABLE OF ANALYSIS OF VARIANCE WITH COVARIANT ADJUSTMENTS FOR
AROUSAL IN ACQUISITION

Source	Sum of Squares	D.F.	Mean Square	F	P
Total	428.00	94			
I-E	5.54	2	2.77	.66	N.S.
Task	1.52	1	1.52	.36	N.S.
Sex	7.60	1	7.60	1.82	N.S.
I-E X Task	28.70	2	14.35	3.44	.05
I-E X Sex	30.22	2	15.11	3.62	.05
Task X Sex	2.91	1	2.91	.69	N.S.
I-E X Task X Sex	5.51	2	2.76	.66	N.S.
Error	346.00	83	4.17		

At the present time the author is not certain as to why a significant difference between internals and externals was not found. It is felt, however, that possibly internals will not show a great deal of arousal in acquisition where they are performing quite successfully and that their increased arousal over and above that of externals in a skill task may not show up until extinction.

Hypothesis VI:

Externals as measured by the I-E Scale will show greater arousal (as measured by the plethysmograph) during acquisition than will internals in the chance task.

Fig. 2.--Interaction of locus of control by task for arousal
in acquisition

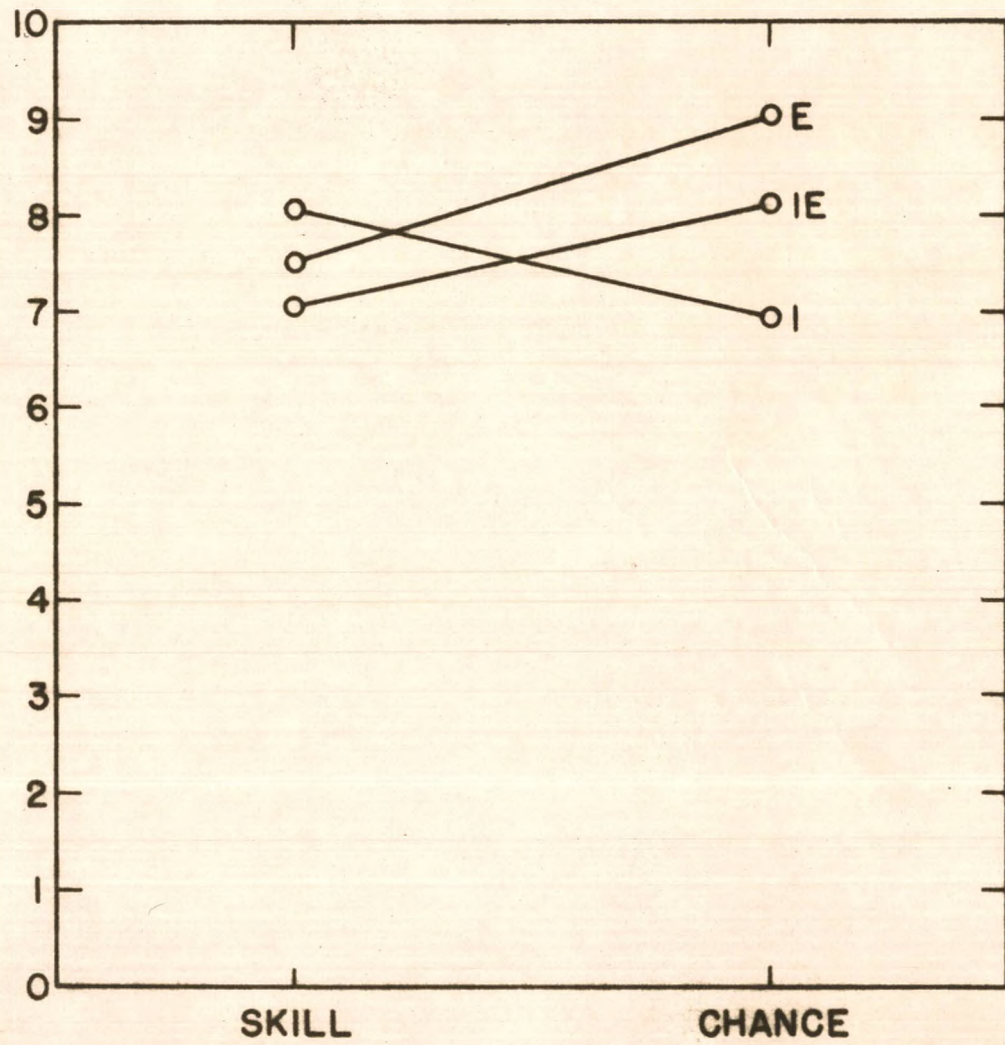


FIGURE 2

The adjusted mean arousal score for externals in the chance task was 9.13. The adjusted mean arousal score for internals in the chance task was 7.15. The difference required for significance at the .025 level, one-tailed, by Duncan's Multiple Range Test is 1.770. The obtained difference is 1.98. Thus, the data supports the hypothesis that externals show more arousal during acquisition in a chance task than do internals.

Hypothesis VII and VIII:

Internals as measured by the I-E Scale will show greater arousal (as measured by the plethysmograph) during extinction than will externals in the skill task.

Externals as measured by the I-E Scale will show greater arousal (as measured by the plethysmograph) during extinction than will internals in the chance task.

Analysis of variance with covariant adjustments was used to analyze the data since the plethysmograph lacked perfect reliability. The "covariant" was the average amount of arousal during the "resting phase."

Table 8 contains the adjusted means for each cell for arousal during extinction. Table 9 contains the completed analysis of variance with covariant adjustments for dependent variable four, arousal during extinction. Figures 4a and 4b graphically depict the interaction of I-E by task at both the male and female levels.

TABLE 8

ADJUSTED MEANS FOR ALL CELLS FOR AROUSAL DURING EXTINCTION

Cell	Mean
I Skill Male	11.02
I Chance Male	7.84
I-E Skill Male	11.70
I-E Chance Male	10.16
E Skill Male	10.17
E Chance Male	10.18
I Skill Female	8.05
I Chance Female	8.12
I-E Skill Female	8.48
I-E Chance Female	9.27
E Skill Female	8.67
E Chance Female	12.08

As indicated by Table 9 significance was obtained for all the interactions and for all the main effects except for the task main effect. All these were significant at the .05 level. Since the three-way interaction is significant, in order to test the above hypotheses it becomes necessary to look at the arousal scores for internals and externals in the chance and skill tasks at both levels of the third variable, sex, i.e., at both the male and female level.

TABLE 9

TABLE OF ANALYSIS OF VARIANCE WITH COVARIANT ADJUSTMENT FOR
AROUSAL IN EXTINCTION

Source	Sum of Squares	D.F.	Mean Square	F	P
Total	625.00	94			
I-E	32.42	2	16.21	3.79	.05
Task	2.30	1	2.30	.53	N.S.
Sex	23.75	1	23.75	5.56	.05
I-E X Task	39.70	2	19.85	4.64	.05
I-E X Sex	19.80	2	9.90	7.69	.05
Task X Sex	38.09	1	38.09	8.92	.05
I-E X Task X Sex	113.94	2	56.97	13.34	.05
Error	355.00	83	4.27		

The adjusted mean arousal score for internal males in the skill task was 11.02. The adjusted mean arousal score for external males in the skill task was 10.17. The differences required for significance at the .05 level, one-tailed, by Duncan's Multiple Range Test is 2.08. The obtained difference is .85. Thus, the data fails to support the hypothesis that internal males show more arousal during extinction in a skill task than external males. Although the difference was not significant, it was in the predicted direction.

The adjusted mean arousal score for external males in the chance task was 10.18. The adjusted mean arousal score for internal males in the chance task was 7.84. The difference required for

Fig. 3.--Intereaction of locus of control by sex for arousal
in acquisition

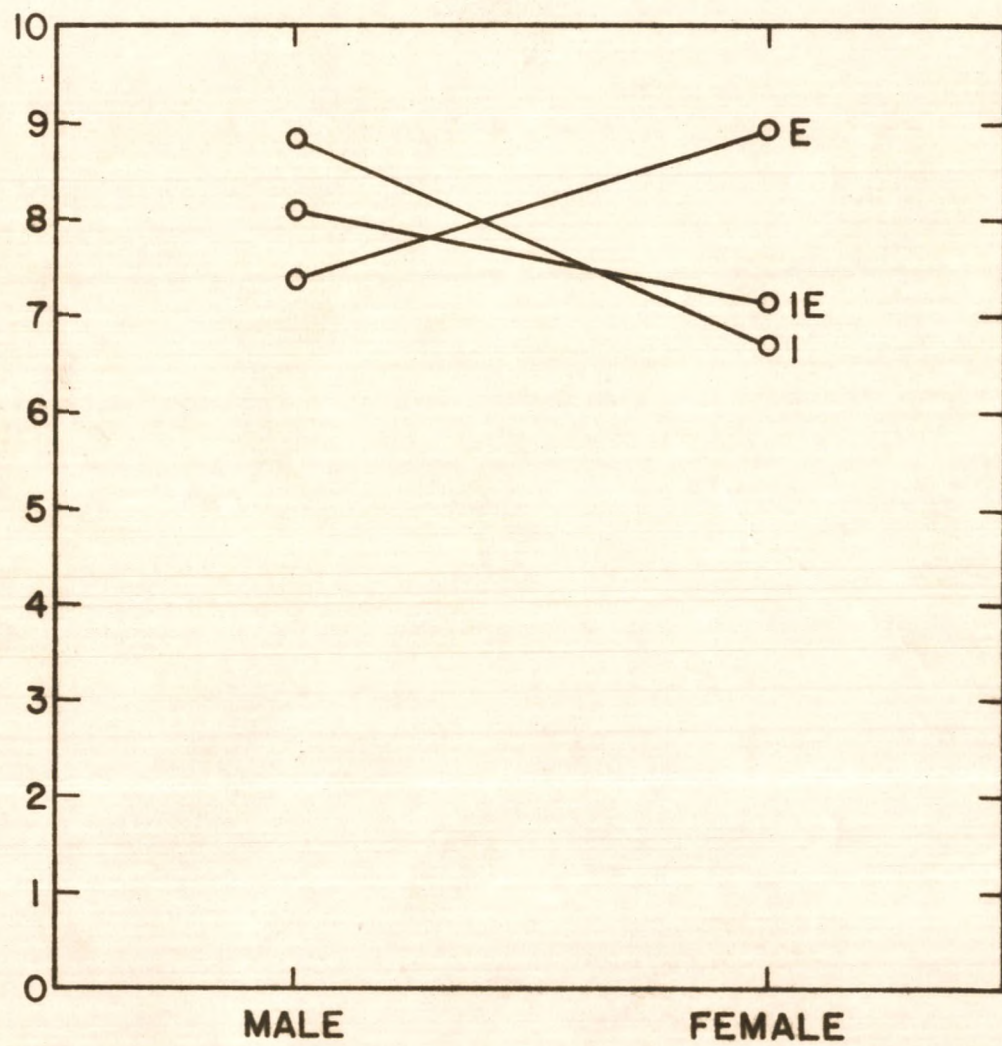
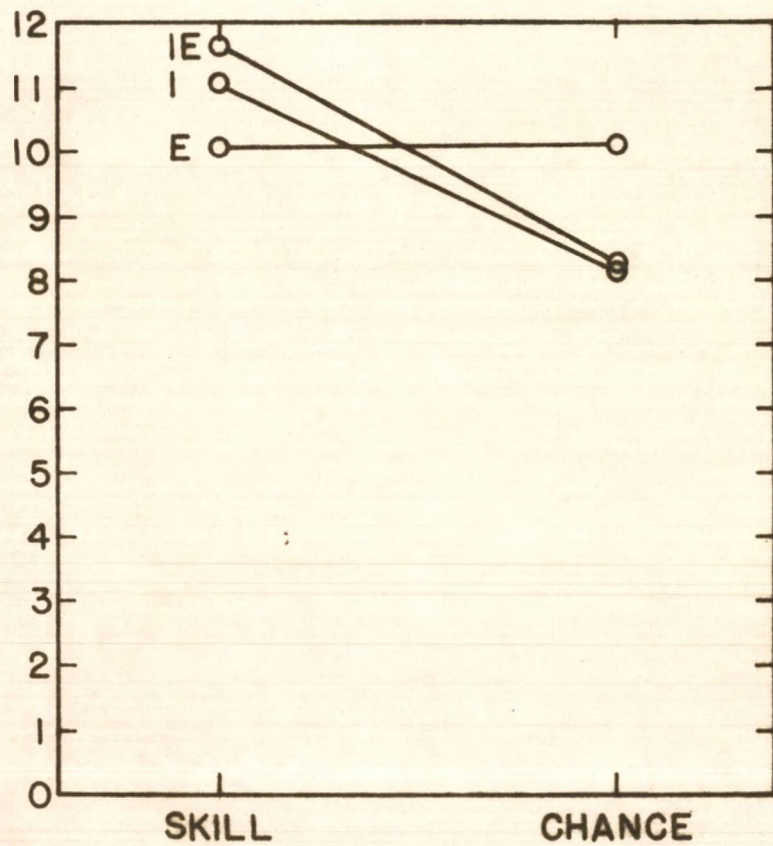


FIGURE 3

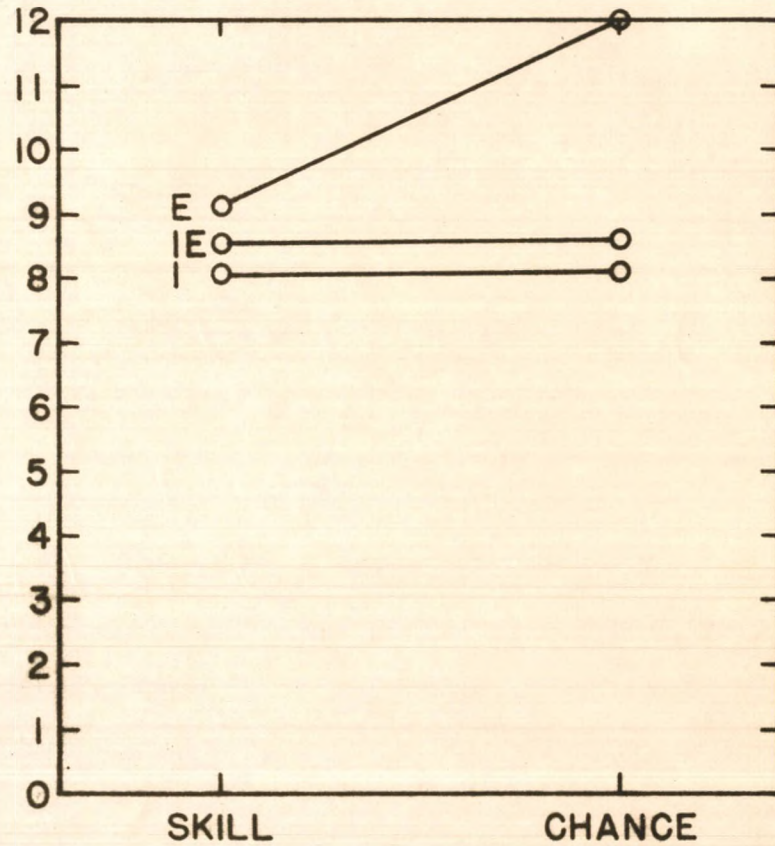
Fig. 4a:--Interaction of locus of control by task at the male
level for arousal in extinction

Fig. 4b:--Interaction of locus of control by task at the
female level for arousal in extinction



MALES

FIGURE 4a



FEMALES

FIGURE 4b

significance at the .05 level, one-tailed, by Duncan's Multiple Range Test is 2.21. The obtained difference is 2.34. Thus, the data supports the hypotheses that external males show more arousal during extinction in a chance task than internal males.

The adjusted mean arousal score for internal females in the skill task was 8.05. The adjusted mean arousal score for external females in the skill task was 8.67. The difference required for significance at the .05 level, one-tailed, by Duncan's Multiple Range Test is 2.21. The obtained difference is $-.62$. Thus, the data fails to support the hypotheses that internal females show more arousal during extinction in a skill task than external females. This is the only hypotheses where a difference in the predicted direction was not found.

The adjusted mean arousal score for external females in the chance task was 12.08. The adjusted mean arousal score for internal females in the chance task was 8.12. The difference required for significance at the .05 level, one-tailed, by Duncan's Multiple Range Test is 3.64. The obtained difference is 3.86. Thus, the data supports the hypothesis that external females show more arousal during extinction in a chance task than internal females.

It thus becomes apparent that the hypotheses were clearly supported for both sexes with respect to the chance task but were not supported for either sex with respect to the skill task. As was noted previously significant results were obtained for arousal during acquisition only for the chance task. Thus, the skill task consistently failed to yield the predicted results with respect to arousal,

whereas the chance task consistently succeeded in yielding the predicted results with respect to this measure. Consequently, it is felt that the skill task failed to deceive some of the subjects as it was intended to do and that this may have led to the failure to obtain confirmation for the hypotheses for the skill task with respect to dependent variables three and four, arousal during acquisition and extinction, respectively.

In addition to testing the above hypotheses, it has been noted that the interaction of locus of control by sex was significant at the .05 level for arousal during acquisition. The adjusted mean arousal score for internal males was 8.66. The adjusted mean arousal score for external males was 7.80. The obtained difference is thus .86. The adjusted mean arousal score for external female is 8.77. The adjusted mean arousal score for internal females is 6.67. The obtained difference is thus 2.10. The difference required for significance at the .05 level, one-tailed, by Duncan's Multiple Range Test in both instances is 1.49. Thus, external females show more arousal in acquisition than do internal females. The difference between internal males and external males is not significant. Why external females should show more arousal than internal females is not at the present time known.

It felt that this research together with that of Rotter and Mulry (1965) opens up a new area in the study of locus of control. In general, it has implications for further investigation of other possible differences in behavior between internals and externals in skill and chance settings as well as other types of experimental

settings. In essence, it is felt that locus of control may be a very important parameter of reinforcement which accounts for a great deal of the individual differences in behavior. Further experimental investigations in this area should serve to determine if this is so. In particular, it is felt that future investigations could be directed with profit towards the exploration of differences between internals and externals in achievement situations. Perhaps internals would choose skill tasks of intermediate difficulty more often than externals, and externals would choose chance tasks of intermediate difficulty more often than internals.

CHAPTER V

SUMMARY

This investigation was designed to examine possible differences in behavior that may exist between internals and externals in skill and chance tasks. It was felt that if the tasks were clearly differentiated into skill and chance tasks by means of both instructional manipulation and selection of tasks, which on the basis of a subject's previous cultural experience would be interpreted as dependent on skill or chance factors, that a number of differences in behavior would be observed. It was hypothesized that, due to their greater motivation in a skill setting, internals would show more trials to extinction, greater frustration as a result of extinction, and greater arousal both in acquisition and extinction, in the skill task. Also, due to their greater motivation in a chance setting, it was felt that externals would show more trials to extinction, greater frustration as a result of extinction and greater arousal both in acquisition and extinction in the chance task.

Subjects were pre-selected on the basis of their scores on the I-E Scale for form the internal, internal-external, and external groups. The tasks used were the vertical level of aspiration board called the "Skye" apparatus, and a card-guessing task, both of which were previously used by Rotter, Liverant, and Crowne (1961).

Frustration was measured by the Zaks and Walters Aggression Scale and arousal by the use of the plethysmograph.

Results were in the predicted direction for all of the hypotheses except one, internal females in the skill task did not show greater arousal during extinction than external females. The following hypotheses were supported: (1) internals had more trials to extinction than externals in the skill task, (2) externals had more trials to extinction than internals in the chance task, (3) externals showed greater arousal in acquisition than internals in the chance task, (4) external males showed greater arousal in extinction than internal males in the chance task, and (5) external females showed greater arousal in extinction than internal females in the chance task.

DE KALB SURVEY TESTS

Student Opinion Survey - Form I-E, 1

Name _____ Age _____ Date _____ Male _____ Female _____

Major Area _____ Current Address _____

Home Address _____

Instructions

Below are a number of statements about various topics. They have been collected from different groups of people and represent a variety of opinions. There are no right or wrong answers to this questionnaire for every statement there are large numbers of people who agree and disagree. Please indicate whether you agree or disagree with each statement as follows:

Circle SA if you strongly agree
 Circle A if you agree
 Circle D if you disagree
 Circle SD if you strongly disagree

Please read each item carefully and be sure that you indicate the response which most closely corresponds to the way which you personally feel.

- SA A D SD 1. I like to read newspaper editorials whether I agree with them or not.
- SA A D SD 2. Wars between countries seem inevitable despite efforts to prevent them.
- SA A D SD 3. I believe the government should encourage more young people to make science a career.
- SA A D SD 4. It is usually true of successful people that their good breaks far outweighed their bad breaks.
- SA A D SD 5. I believe that moderation in all things is the key to happiness.
- SA A D SD 6. Many times I feel that we might just as well make many of our decisions by flipping a coin.
- SA A D SD 7. I disapprove of girls who smoke cigarettes in public places.

- SA A D SD 8. The actions of other people toward me many times have me baffled.
- SA A D SD 9. I believe it is more important for a person to like his work than to make money at it.
- SA A D SD 10. Getting a good job seems to be largely a matter of being lucky enough to be in the right place at the right time.
- SA A D SD 11. It's not what you know but who you know that really counts in getting ahead.
- SA A D SD 12. A great deal that happens to me is probably just a matter of chance.
- SA A D SD 13. I don't believe that the presidents of our country should serve for more than two terms.
- SA A D SD 14. I feel that I have little influence over the way people behave.
- SA A D SD 15. It is difficult for me to keep well-informed about foreign affairs.
- SA A D SD 16. Much of the time the future seems uncertain to me.
- SA A D SD 17. I think the world is much more unsettled now than it was in our grandfathers' times.
- SA A D SD 18. Some people seem born to fail while others seem born for success no matter what they do.
- SA A D SD 19. I believe there should be less emphasis on spectator sports and more on athletic participation.
- SA A D SD 20. It is difficult for ordinary people to have much control over what politicians do in office.
- SA A D SD 21. I enjoy reading a good book more than watching television.
- SA A D SD 22. I feel that many people could be described as victims of circumstances beyond their control.
- SA A D SD 23. Hollywood movies do not seem as good as they used to be.
- SA A D SD 24. It seems many times that the grades one gets in school are more dependent on the teachers' whims than on what the student can really do.
- SA A D SD 25. Money shouldn't be a person's main consideration in choosing a job.

- SA A D SD 26. It isn't wise to plan too far ahead because most things turn out to be a matter of good or bad fortune anyhow.
- SA A D SD 27. At one time I wanted to become a newspaper reporter.
- SA A D SD 28. I can't understand how it is possible to predict other people's behavior.
- SA A D SD 29. I believe that the U.S. needs a more conservative foreign policy.
- SA A D SD 30. When things are going well for me I consider it due to a run of good luck.
- SA A D SD 31. I believe the government has been taking over too many of the affairs of private industrial management.
- SA A D SD 32. There's not much use in trying to predict which questions a teacher is going to ask on an examination.
- SA A D SD 33. I get more ideas from talking about things than reading about them.
- SA A D SD 34. Most people don't realize the extent to which their lives are controlled by accidental happenings.
- SA A D SD 35. At one time I wanted to be an actor (or actress).
- SA A D SD 36. I have usually found that what is going to happen will happen, regardless of my actions.
- SA A D SD 37. Life in a small town offers more real satisfactions than life in a large city.
- SA A D SD 38. Most of the disappointing things in my life have contained a large element of chance.
- SA A D SD 39. I would rather be a successful teacher than a successful business man.
- SA A D SD 40. I don't believe that a person can really be a master of his fate.
- SA A D SD 41. I find mathematics easier to study than literature.
- SA A D SD 42. Success is mostly a matter of getting good breaks.
- SA A D SD 43. I think it is more important to be respected by people than to be liked by them.
- SA A D SD 44. Events in the world seem to be beyond the control of most people.

- SA A D SD 45. I think that states should be allowed to handle racial problems without federal interference.
- SA A D SD 46. I feel that most people can't really be held responsible for themselves since no one has much choice about where he was born or raised.
- SA A D SD 47. I like to figure out problems and puzzles that other people have trouble with.
- SA A D SD 48. Many times the reactions of people seem haphazard to me.
- SA A D SD 49. I rarely lose when playing card games.
- SA A D SD 50. There's not much use in worrying about things...what will be, will be.
- SA A D SD 51. I think that everyone should belong to some kind of church.
- SA A D SD 52. Success in dealing with people seems to be more a matter of the other person's moods and feelings at the time rather than one's own actions.
- SA A D SD 53. One should not place too much faith in newspaper reports.
- SA A D SD 54. I think that life is mostly a gamble.
- SA A D SD 55. I am very stubborn when my mind is made up about something.
- SA A D SD 56. Many times I feel that I have little influence over the things that happen to me.
- SA A D SD 57. I like popular music better than classical music.
- SA A D SD 58. Sometimes I feel that I don't have enough control over the direction my life is taking.
- SA A D SD 59. I sometimes stick to difficult things too long even when I know they are hopeless.
- SA A D SD 60. Life is too full of uncertainties.

PERSONAL OPINION INVENTORY

Name: _____

Recitation Instructor: _____

Class Time: _____
(Day) (Time)

Section Number: _____

Circle One:

Agree Disagree

A D

1. There are two kinds of people in this world, the weak and the strong.

A D

2. Once in a while I think of things too bad to talk about.

A D

3. Dealings with policeman and government officials are always unpleasant.

A D

4. At times I feel like swearing.

A D

5. Most people get killed in accidents because of their own reckless driving.

A D

6. I do not always tell the truth.

A D

7. Horses that don't pull should be beaten or kicked.

A D

8. I do not read every editorial in the newspapers every day.

A D

9. At times we enjoy being hurt by those we love.

A D

10. I get angry sometimes.

A D

11. Many a decent fellow becomes a crook or a criminal.

A D

12. Once in a while I put off until tomorrow what I ought to do today.

A D

13. I easily lose patience with people.

A D

14. Sometimes when I am not feeling well I am cross.

A D

15. I often do things which I regret afterwards.

A D

16. My table manners are not quite as good at home as when I am out in company.

A D

17. It makes me mad when I can't do things for myself the way I like to.

A D

18. If I could get into a movie without paying and be sure I was not seen I would probably do it.

A D

19. Occasionally I was in trouble with the police or law.

A D

20. I would rather win than lose in a game.

A D

21. I almost never dare to express anger toward people for fear I may lose their love or approval.

A D

22. As an adolescent (or young kid) I often mixed with the wrong crowd.

TABLE 10
RAW DATA FROM EXPERIMENT

Cell	Pre-Test Score	Post-Test Score	Arousal During Rest	Arousal During Acquisition	Arousal During Extinction
I Skill Male	1	2	13	12	12
	4	5	9	5	7
	5	6	12	9	11
	3	4	3	8	7
	4	5	12	11	14
	3	4	11	13	15
	0	1	10	12	14
	6	6	9	11	13
I Chance Male	1	1	6	5	8
	1	1	16	9	9
	3	4	5	9	6
	5	4	3	6	6
	6	5	8	8	8
	1	4	7	7	7
	6	5	9	9	9
	4	2	8	8	8
I-E Skill Male	8	7	12	8	10
	5	6	7	9	11
	6	4	7	5	10
	5	5	10	10	9
	3	4	6	9	9
	6	6	13	10	13
	2	1	3	5	19
	5	4	2	6	10

TABLE 10--Continued

Cell	Pre-Test Score	Post-Test Score	Arousal During Rest	Arousal During Acquisition	Arousal During Extinction
I-E Chance Male	5	3	12	13	12
	5	3	13	12	13
	4	1	5	5	6
	5	5	7	5	10
	6	4	11	6	12
	6	6	7	7	10
	2	1	11	11	12
	7	8	10	10	10
E Skill Male	4	3	7	6	11
	7	5	4	7	10
	5	5	6	5	6
	6	6	10	7	10
	5	5	7	3	6
	5	4	4	6	11
	9	9	11	10	13
	5	2	14	11	13
E Chance Male	1	1	3	7	7
	7	8	10	6	10
	6	8	15	13	13
	8	6	5	8	11
	6	5	10	7	9
	7	6	10	9	10
	4	6	11	10	11
	6	5	9	11	13

TABLE 10--Continued

Cell	Pre-Test Score	Post-Test Score	Arousal During Rest	Arousal During Acquisition	Arousal During Extinction
I-E Chance Female	5	5	8	5	8
	6	3	11	8	10
	9	9	7	6	7
	1	1	13	8	11
	4	4	10	10	10
	3	4	10	10	10
	2	2	11	12	12
	4	4	9	10	11
E Skill Female	2	2	11	13	14
	4	5	11	6	8
	4	4	5	5	7
	4	4	4	3	5
	2	5	8	9	9
	6	7	7	7	7
	4	3	9	9	9
	4	3	8	9	9
E Chance Female	5	4	4	6	8
	6	2	13	10	13
	6	2	12	12	14
	8	7	15	7	10
	4	5	11	13	15
	4	5	9	11	13
	7	7	13	15	17
	4	6	11	13	15

TABLE 10--Continued

Cell	Pre-Test Score	Post-Test Score	Arousal During Rest	Arousal During Acquisition	Arousal During Extinction
I Skill Female	4	3	2	4	4
	5	2	5	5	6
	3	3	1	5	7
	4	4	4	5	6
	3	3	7	5	7
	1	3	4	6	4
	0	1	8	5	9
	2	2	6	8	10
I Chance Female	1	3	9	4	7
	2	1	4	6	6
	5	5	4	4	7
	3	4	7	4	6
	0	0	10	10	8
	1	3	13	10	13
	1	1	9	4	9
	3	2	8	8	8
I-E Skill Female	5	5	4	5	7
	3	3	7	7	8
	6	6	4	6	6
	6	3	5	4	7
	1	1	9	5	8
	1	1	7	7	8
	4	2	11	6	11
	2	3	7	7	8

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