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Information Extraction and Incidental Learning as Functions of Locus of Control, Motivation, and Sex

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INFORMATION EXTRACTION AND INCIDENTAL LEARNING AS FUNCTIONS OF LOCUS OF CONTROL, MOTIVATION, AND SEX

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Information Extraction and Incidental Learning as Functions of Locus of Control, Motivation, and Sex

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An attempt at replication and extension of Spjut's (1968) study on incidental learning and locus of control was also made. Counter to expectations, no differences in incidental learning were found across the variables of personality, sex, and motivation.

A rating scale check on the effectiveness of the motivation-inducing instructions was utilized, and a significant motivation effect was found. Interpretation of this, however, was hampered by a lack of homogeneity of within-cell variances.

This Dissertation submitted by James Newell Hall 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.

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ABSTRACT

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An attempt at replication and extension of Spjut's (1968) study on incidental learning and locus of control was also made. Counter to expectations, no differences in incidental learning were found across the variables of personality, sex, and motivation.

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CHAPTER I

INTRODUCTION

This study is concerned with the extraction of information from the environment and some of the variables which may be related to information extraction. Specifically, attention will be focused upon three: the personality variable of locus of control of reinforcement, sex, and motivation.

Review of the Literature

Since the mid-1950's, a good deal of research has been compiled on locus of control, establishing it firmly as a basic variable of personality. This variable, which is often referred to as internal-external control or I-E, has to do with the person's perception of the source of control of behavior reinforcement contingencies in the environment that affect him. The I-E construct comprises a continuum with the internal (I) occupying one end and the external person (E) occupying the other end. Most individuals fall within the mid-ranges and are neither predominantly internally nor externally oriented. An internally controlled person is one who perceives a contingency between his own behavior and the reinforcements he receives. In other words, the I feels that he can control what

happens to him (reinforcements) by regulating his own behavior. The E, on the other hand, attributes what happens to him to such things as luck, fate, and the actions of others. In short, the distinguishing characteristic between the two is the amount of perceived control they have over their environments, whether or not such a perception is realistic.

The I-E dimension grew out of Rotter's (1954) Social Learning Theory. Social Learning Theory relies upon four basic concepts: Behavior potential, expectancy of reinforcement for a given behavior, the value of the expected reinforcement, and the psychological situation in which the individual is behaving. Rotter offered a basic formula which serves to summarize Social Learning Theory as follows:

$$BP_{XS_1R_a} = f(E_{XS_1R_a} \ \& \ RV_a)$$

This equation is interpreted to mean that the potential of behavior X's occurrence in situation 1, with reinforcement a, is a function of the subjective probability or expectancy that the behavior in this situation will be reinforced by a and the value of the reinforcement. In addition to this basic formula, Rotter offers others to deal with more complex situations.

The I-E variable is concerned with the expectancy term ($E_{XS_1R_a}$) in the above formula. Although it can be objectively measured, it is a

subjective probability the person holds that a given behavior he may emit will receive reinforcement. When this expectancy term is applied to the I-E dimension, it, consequently, becomes a generalized expectancy that his behavior will or will not have a significant impact on the environment.

A review of the various studies of the locus of control variable reveals that they have been classified into two categories, task-structured studies (internal task versus external task) and I-E as a variable of personality. The intent here is not to give an exhaustive review of the locus of control literature (for these see Lefcourt, 1966, and Rotter, 1966) but rather to provide a broad sample of experiments so as to further define and illustrate the I-E concept.

I-E control induced by task-structuring

The first study of task-structured locus of control to appear was a doctoral dissertation by Phares (1955, 1957). On a matching task, Phares gave one group of subjects (Ss) instructions emphasizing that success on the task was a matter of skill, while he gave the other group instructions that success was largely a matter of chance. The dependent variable was S's expectancy of success as measured before each trial by betting. In reality, all Ss received an equal number of reinforcements and in the same sequence. As a result of structuring the task as skill, there were more changes in expectancy, and these changes tended to be in the

direction dictated by Ss previous experience on the task (increments in expectancy following success and decrements following failure). In the chance group, there were fewer expectancy changes, and those that did take place were not necessarily logically dictated by previous experience. It should be pointed out that chance instructions correspond to an E orientation, while skill instructions result in an orientation toward the other extreme.

James and Rotter (1958) extended Phares' work to extinction of expectancies. A skill-instructed and a chance-instructed group were each divided in half with one of the halves receiving continuous and the other intermittent reinforcement on a card-guessing task. During extinction, the usual partial reinforcement effect was evident only under chance conditions. Under skill conditions, the group trained on a 50% schedule was less resistant than the group that was trained on a 100% schedule, although this difference was not significant. At any rate, the usual partial reinforcement effect was not found during extinction in the skill-oriented Ss.

In the James and Rotter (1958) study, expectancy was measured by subject-ratings. The findings from this investigation have been replicated using less verbal measures of expectancy, such as betting (Holden and Rotter, 1962) and by inducing skill and chance orientations through differing tasks rather than by way of instructions (Rotter, Liverant, and Crowne, 1961).

In an investigation of generalization of expectancies from a line-matching to an angle-matching task and of spontaneous recovery of expectancies following extinction, James (1957) found the usual skill versus chance differences in expectancy-acquisition (Phares, 1955, 1957). Furthermore, he demonstrated more generalization under skill directions than under chance instructions. Finally, although the findings just approached significance, somewhat more spontaneous recovery was in evidence in the skill group.

The significance of these experiments is in demonstrating that on tasks structured as skill, individuals behave differently than on tasks structured as chance.

I-E control as a variable of personality

Phares (1955) provided the first measure of locus of control as a personality variable. Phares' scale was later revised and titled the Internal-External Control Scale by James (1957). In its present form, it is a Likert-type, 60 item test with 30 items acting as fillers and is called the DeKalb Survey Test-Form IE-1. As shown by non-significant relevant-irrelevant item correlations, effects from response sets are minimal. Correlations of the scale with the Crowne-Marlowe Social Desirability Scale (Crowne and Marlowe, 1960) are non-significant, constituting evidence that a person's score on the James I-E scale is not likely a reflection of social desirability. Reliability coefficients in the

range of .84 to .96 have been obtained by the split-half method. Test-retest reliabilities run from .86 over a three month period to .71 over a one year period.

Rotter, Seeman, and Liverant (1962) have devised a forced-choice 29 item (six items are fillers) scale called the Internal-External Control Scale. Work with this device is summarized in a monograph by Rotter (1966). Three I-E scales have also appeared for use with children. The Locus of Control Scale for Children by Bialer (1961) is a true-false scale for oral administration. The Children's Picture Test of Internal-External Control (Battle and Rotter, 1963) is a projective instrument which presents the child with a task similar to that in the Rosenzweig Picture Frustration Test (Rosenzweig, Fleming, and Rosenzweig, 1948). A test (Intellectual Achievement Responsibility Questionnaire) by Crandall, Katkovsky, and Crandall (1965) has appeared for assessing locus of control in children in the area of intellectual achievement. It should also be noted that a scale for measuring alienation in sociological research has been developed by Dean (1961). This test, the Powerlessness and Normlessness Scale, consists of Likert-type items (as does the James I-E scale). The Powerlessness scale has been considered as a measure of the I-E construct. It was devised from the Internal-External Control Scale (Rotter, et al., 1962).

Research has been carried out on ethnic group I-E differences, mostly comparing Negroes and whites. Battle and Rotter (1963) found in

a bi-racial study of children that lower-class Negroes were more externally oriented than both middle-class Negroes and whites and lower-class whites. Lefcourt and Ladwig (1965, 1966) found higher externality in Negro than in white prisoners. In an investigation of a tri-ethnic community, Graves (1961) determined Indians to be more external than Mexican-Americans who were, in turn, more external than whites. Such results seem reasonable when one considers the economic, educational, and social plight of ethnic minorities and the members of other lower socioeconomic groups in our society.

Another area of investigation of the I-E variable is that of commitment and action-taking behavior. Gore and Rotter (1963) found that those students at a southern Negro college who were willing to commit themselves on paper to participation in a civil rights march or a freedom ride were more internal than those not willing to do so. Strickland (1965) went one step further and compared a group of Negroes who were active in civil rights activities with a group who were not. The two groups were matched on the basis of education and socioeconomic status. The participating Ss were more internal. Seeman (1964) used a translated I-E scale in Sweden and found union membership, activity in unions, and knowledge of political affairs were all related to internal control. However, Rotter (1966) obtained negative results in a petition-signing (pro or con) study with the topics covering such things as admission of Red China to the U.N. and having post-season football games. Rotter

predicted that signing either pro or con would be related to internality but found no such relationship.

In an investigation of the relationship of locus of control and adjustment, James (1957) obtained a significant curvilinear relationship between the James scale and the Rotter Incomplete Sentences Blank adjustment index (Rotter and Rafferty, 1950). On three measures of I-E, the James scale, an early form of the Internal-External Control Scale, and the Bialer Locus of Control Scale, Cromwell, Rosenthal, Shakow, and Kahn (1961) found schizophrenics to be more E than normals. In addition, they ran both groups on a reaction time task where S sometimes had control and sometimes did not. The schizophrenic Ss did better under, and expressed more preference for, the externally controlled condition, while the normals preferred, and did better under, the self-controlled condition.

The relationship of I-E orientation with smoking has also been examined. In one study (Straits and Sechrest, 1963), non-smokers were found to be more I than smokers. James, Woodruff, and Werner (1965) replicated this finding. In addition, they found that smokers who were more convinced of the credibility of the Surgeon General's Report (1964) on the hazards of cigarette smoking, which was released one week before the study, were more internally controlled. Furthermore, those male Ss who quit smoking after the publication of the Report were more I than those who did not.

Studies have also been conducted on the relationship of I-E to conformity. Data indicate that the internal person tends to conform less than the external individual. An early study (Odell, 1959) found a relationship between the I-E variable and Barron's (1953) Independence of Judgment Scale. Es were more conforming than Is. Green, Lotsof, and James (1964) and Crowne and Liverant (1963) obtained similar findings by utilizing an Asch-type situation. The latter study also found Is to bet about the same amount of money on independent and conforming trials, while Es bet less money on independent trials.

Research aimed at uncovering I-E differences in learning and conditioning situations has appeared in the literature. James and Randall (1965) paired words of positive and negative connotation with nonsense syllables. Following the training (pairing) trials, the syllables were rated by Ss as to pleasantness or unpleasantness. No I-E differences in rated connotation of the syllables were found. Accurate predictions were made, however, from drive level as induced by instructions, with more conditioning in the higher than in the lower drive Ss. A measure of awareness of the intent of the study was taken, and Is were found to be more aware.

In an operant situation (telegraph key pressing with a counter and a light as reinforcement), James and Steele (1968) found no significant main effects due to I-E during acquisition. During extinction, however, externals were more resistant than internals. It had been expected that

internals would show more rapid acquisition and greater resistance to extinction. In explanation of their failure to confirm these hypotheses, they pointed out that the task was a simple operant and was very possibly perceived by the Ss as being an external task (experimenter contingent). This type of arrangement "would favor the subject who is somewhat more rigid, conforming, and passive," or, in short, the external.

In a study of reading rates (operant behavior) as influenced by automated instructional devices in poor readers at the college level, Mathis, Hippe, and James (1968) found significantly superior acquisition in Is. It was also found that high-expectancy-of-success Ss (expectancy being induced by instructions) demonstrated more rapid learning than neutral- and low-expectancy Ss. Why the I-E dimension should afford differential predictions in this study while it did not in the James and Steele (1968) investigation is likely due to the tasks involved in the two studies. As Mathis, Hippe, and James suggested, the James and Steele task was more controlled and experimenter contingent than the Mathis et al. task, where Ss were allowed to go at their own rate and improvement depended more upon their own behavior and skill. In terms of James' (1965) classification of tasks as external (E_T) or internal (I_T) on the basis of the amount of personal control of performance the task affords S, the James and Steele task would tend toward the external and the Mathis et al. task toward the internal end.

Some I-E studies indicate that Is and Es extract differing amounts

of information from their milieu with Is extracting more and showing greater sensitivity to environmental cues. Seeman and Evans (1962) found, for example, that internally controlled tuberculosis patients possessed more objective information about their affliction than external patients. Both groups were matched on the basis of socioeconomic status and hospital experience. Ward ratings of the amount of tuberculosis-related information possessed by the patients also confirmed this finding as well as indicated that the Is were more demanding of medical attention and more dissatisfied with the medical feedback about their disability that they were receiving.

Seeman (1963) followed this study with an investigation of male inmates in a reformatory. All Ss received exposure to material about the reformatory setting, long-range career opportunities, and ways of achieving parole. A test over this material revealed that Is had more information about parole than Es. There were no group differences on the other two categories of information. The important thing to note here is that I-E differences were evident on the information implying a degree of personal control (ways of achieving parole) but not on the information with less clearly defined implications of such control. Seemingly this would indicate that I-E informational differences are to be found under conditions of elevated motivation. This interpretation can also shed light on the Seeman and Evans (1962) results.

In Seeman's (1964) previously-cited study, it will be recalled that

one of the findings was of greater knowledge of general political affairs in Swedish workers with an internal orientation than in those workers who were more externally controlled. In that study, Ss were matched on the basis of age, income, and education. Again, motivation would seem to be relevant in this study insofar as political activities should have an effect upon such things as wages, benefits, etc.

In a study of attitudes toward, and information about, the Viet Nam War, Carlson, James, and Carriere (1965) found that internal college students possessed more factual knowledge about the War than external college students as measured by an objective test devised for the study. The test covered information from various news media that was available to all Ss. Again, as this study tapped an area of great concern to students, the variable of motivation of the Ss in the topic appears to assume importance. A sex difference was also found in this investigation with males possessing significantly more information than females.

Spjut (1968) investigated incidental learning and its relationship with the I-E continuum, sex, and motivation as manipulated by the directions to the Ss. Ss were given slides of common words to learn. In addition to a word, each slide also contained a number, and incidental learning was measured by how many of these numbers were learned as determined in a free recall period. As hypothesized, more incidental learning was found among the internals than the externals for both males and females. With the females surpassing the males, the sex variable

was also significant. On the other hand, drive was not significant. The author's explanation of the I-E difference was that Is were better information extractors than Es.

Spjut's instructions for inducing high motivation stressed a supposed relationship between intelligence and performance on the word-learning task, while this stress was absent in the low motivation directions. A motivational hypothesis of information extraction and I-E would seemingly have to predict an I-E by motivation interaction in this study with the Is predominating on the incidental learning measure only under conditions of high motivation. Why such an interaction did not occur is not immediately clear, although two possibilities may be offered. First, it could be that motivation is not a relevant variable and that internals should pick more information from their surroundings than externals irrespective of the amount of personal involvement or relevant motivation. This would seem to mean that I-E differences should be apparent on any information extraction task. Nevertheless, the study by Seeman (1963) on prisoners plus research to be reviewed shortly indicate that this is not the case. Second, it may be that Spjut's drive-induction directions did not have the intended effect on the Ss. This is to say that there may not have been group differences in motivation.

It can be seen from the foregoing that most of the studies bearing on information extraction and I-E have used rather "molar" measures as dependent variables, such as knowledge of an illness, knowledge of the

course of a war, etc., and performance on such tasks could encompass more than the extraction of information per se. An exception is the study by Spjut (1968) which used a more "molecular" measure. To investigate the information extraction hypothesis on a more "molecular" level, two pilot experiments with college students as Ss were conducted by the present author.

The task in both of these studies consisted of picking out a common English word hidden in a number of extraneous letters on one or both ends. An example is the word GERM in BASGERMOSW. There were twenty such items. In the first study, a two by two factorial design was used with the independent variables being sex and locus of control. The items were flashed on a screen with a two second exposure time per item and twenty seconds between items for Ss to record their responses. The data were collected in groups. A subject's score was defined as the number of correct word identifications. Is were predicted to do better than Es. Due to a small subject pool, unequal cell frequencies were obtained, and the data were analyzed via an unweighted-means analysis (Winer, 1962). The results indicated a lack of significance in both the sex variable ($F=1.02$) and the I-E variable ($F=2.35$). The interaction was also non-significant (F less than 1.00).

Since there were differences between Is and Es, even though non-significant, a second study was undertaken with the exposure time of items manipulated as an independent variable. A three-way analysis of

variance design was utilized with two levels of I-E, two levels of sex, and two levels of exposure time (1.0 and 1.5 seconds). It was suspected that the two second exposure interval in the first study was too long. The method was the same as in the first experiment. To obtain equal cell-n's (n=10), four scores were estimated by the technique of using the mean of the cell in which the score was missing. Because of this, the degrees of freedom (df) for the error term were 68 instead of 72. There were two significant main effects, sex at less than the .05 level (F=6.5) and exposure time at less than the .01 level (F=10.9). For I-E, F was .14. There were no significant interactions with the largest being I-E by time (F=1.1). Although not significant, internals predominated under the shorter exposure time and externals under the longer.

The results of these two studies would seem to demonstrate that I-E informational differences are not inevitably found but only under certain conditions. What these specific conditions may be is still unknown, but conditions of elevated motivation are suspect. As stated earlier, this is hinted at by the bulk of the studies reviewed showing Is to abstract more information than Es.

Purpose of the Present Study

Broadly stated, the main reason for conducting the present research is to help elucidate the relevant variables in I-E differences in abstracting environmental information. Specifically, the major purpose is to

examine the validity of the motivational hypothesis by manipulating motivation as an independent variable.

Another purpose of this study is to re-examine the possible differences between males and females on the present task which is essentially the same as in the two pilot studies. It will be remembered that a significant effect due to sex was not evident in the first experiment, although it was in the second. It was felt that this should again be examined.

An attempt at replication and extension of the results obtained by Spjut (1968) on incidental learning as a function of the I-E variable was the final reason for this investigation. It will be recalled that Spjut measured incidental learning by having his Ss recall any of the numbers which were paired with the words. A more stringent test of incidental learning was used in the present study.

Hypotheses

Hypothesis I

There will be no significant differences on abstraction of information across the I-E variable.

Hypothesis I represents a replication of the findings of the two studies by the present author noted above. Confirmation of this hypothesis would again show that differences between internals and externals are not to be found under all conditions.

Hypothesis II

There will be a significant difference on the information extraction task between the high and low motivation conditions with more correct responses under the high motivation condition.

Hypothesis III

Female subjects will perform significantly better than male subjects on the information extraction task.

Hypothesis IV

There will be a significant interaction between the I-E dimension and the instructions variable on the information extraction task. Internals should out-perform externals under high motivation but not under low motivation. Also, more incidental learning will be found among Is than Es.

This is the central hypothesis in the experiment. The studies reviewed earlier seem to indicate that only under conditions of high motivation will internals pick out more information than those at the other end of the I-E continuum, and affirmation of the first part of Hypothesis IV would substantiate this indication. Furthermore, the second portion of this hypothesis constituted the major finding in the work by Spjut (1968), and these results are expected to be upheld even though a more stringent measure of incidental learning will be employed in this study.

CHAPTER II

METHOD

Subjects

The subjects were 60 males and 60 females selected from the Introductory Psychology class at the University of North Dakota in the spring semester of 1969. There were 20 internals, 20 externals, and 20 Ss from the midrange of the I-E dimension in each sex grouping. For this investigation, an internal was defined as an individual lying between .9 and three standard deviations below the mean of all potential subjects. Likewise, an external was so designated as falling between .9 and three standard deviations above the mean. Individuals lying within .1 standard deviation on either side of the mean comprised the final subject grouping, or the IE group (neither I nor E). It should be mentioned that students comprising the subject pool were required to take part in four studies during the term of the course.

At the start of the semester, all Introductory Psychology students were given the James I-E scale in addition to other psychological tests in their recitation sections. Table 1 depicts the I-E test characteristics of a random, proportionate sample of the students enrolled in the course.

Due to the lack of significance of the difference between the male and female means, the mean for all Ss was used, as previously stated, for defining Is, Es, and IEs. This mean was 39.86, while the standard deviation was 9.95.

TABLE 1

MEANS AND STANDARD DEVIATIONS OF I-E SCORES FOR MALES AND FEMALES

	N	Mean	Standard Deviation	Difference	t	P
Males	83	40.78	10.42	2.22	1.34	NS
Females	59	38.56	9.12			

Procedure

A three by two by two factorial analysis of variance was used as the experimental design in the main part of the study. This involved the independent variables of three levels of locus of control (I, E, and IE), two levels of instructions (high and low motivation), and two levels of sex (female and male).

Ss took part in the study in groups of 20 each. The task was the same as in the two previously discussed pilot projects. Twenty items were flashed, one at a time, on a screen by a Kodak Carousel 800 slide

projector equipped with a Prontor-Press tachistoscope. Each item was exposed for one second and was followed by a delay of approximately 20 seconds (timed by stopwatch) to allow recording of the response.

The items consisted of common four-letter words with extraneous letters on one or both ends. A total number of six irrelevant letters were used per item and could be divided between the two ends in any combination, i.e., zero and six, one and five, ... , five and one, and six and zero, to rule out a positional effect. The items are listed in Appendix A. The 20 items used were picked from an original list of 50 which were administered for one second each to a group (61) of Introductory Psychology students of both sexes in the first semester of the 1968-69 academic year. The 20 items chosen were those that proved to be the most difficult for this pilot sample (were correctly identified the least). Through this procedure, and by using four-letter words with an equal number of extraneous letters per word, it was hoped the items were reasonably well standardized and called for an equivalent (to each other) amount of effort to identify the hidden word. This would rule out possible main effects due to things other than information extraction per se, e.g., differing word complexity possibly affecting subject groupings differentially. To investigate incidental learning, each slide also contained a two-digit number above and to the left of the item.

The Ss were picked at random from a list of all eligible candidates. Following this, each internal female was randomly assigned to either the

high motivation group or the low motivation group. A comparable procedure was followed with the external females, the IE females, the internal males, the external males, and the IE males.

The instructions for the first phase of the experiment were read to the Ss as follows:

> The purpose of this study is to determine how well people can recognize words hidden in extra, irrelevant letters. (High motivation Ss: To do this a task will be used that is significantly related to intelligence and, in fact, is being considered for use as a short intelligence test. Your performance should be a reflection of your intelligence.) You will be shown, one at a time, 20 words with a number of extraneous letters on one end or on both ends. When each item is shown, your task is to determine what the word is and print it by the appropriate number on your answer sheet. The word you choose must have four letters. Once you have recorded your choice, do not go back and make any changes or corrections. There will be a 20 second interval after each item for you to print what you think the word is. If you do not know what the word is, leave a blank on your answer sheet.
>
> Let me give a couple of examples. Suppose the item is this: BAKYOURCRE. Your task would be to spot the word YOUR. (Examples were printed on a blackboard, and the word in question was underlined as it was pointed out to the Ss.) If the item was ISLOPIPLYE, you would choose the word SLOP.
>
> Each item will be presented for a short period of time, so be alert. Remember to print your choice and to not make any changes after you have printed your choice. Also remember that your choice must contain four letters. Right before each item appears, you will be given a warning signal ("item number x- get ready"). Are there any questions?

Following the presentation of all the items, the answer sheets were collected, and a list of the items used was then distributed to each S. The following instructions were then recited:

> Another purpose of this experiment is to find out how much people learn without being instructed to learn anything. As you probably noticed, each slide contained a number. The numbers

were not in any kind of order. On the list of the items I have just given you, I want you to record to the right of each item what you think the number is which appeared with that item. Try not to leave any blank. If you are stumped on any of them, then take a guess. Please don't look at your neighbor's paper. Just work on your own. Are there any questions?

The dependent measure of incidental learning was the number of correct pairings of numbers with items. The data were cast into a three by two by two (I-E by sex by motivation) analysis of variance design for analysis.

When the Ss completed this task, their papers were collected, and a rating scale was distributed to each of the Ss. The scale was 15 cm. in length with anchor points of "very challenged" and "very bored." The Ss were to rate their own level of motivation during the task of spotting the hidden words. The directions for this part of the study were read to the Ss as follows:

By placing a check-mark somewhere on this continuum, indicate how involved you became in the task of picking out the hidden words in the items flashed on the screen, in other words, how interested in and challenged by the task you were.

The purpose of the rating scale was to assess the effectiveness of the instructions in manipulating the level of subject motivation. Furthermore, the possibility was considered that the instructions could differentially affect Is and Es or males and females. Consequently, the data from the rating scale were analyzed by a three by two by two analysis of variance. The variables in this design were the same as those in the other parts of the study: I-E, sex, and instructions. The dependent

variable was the number of millimeters from the "zero-point" of "very bored."

CHAPTER III

RESULTS

One factor that was considered to have a possible confounding influence on the information extraction task was intellectual ability. The composite standard score of the American College Test (ACT) was used as a measure of this variable in an attempt to determine its influence on the hidden-word task. A correlation of .28 (p less than .05) was found between the information extraction dependent variable and ACT scores. This would indicate that ACT is a related variable, albeit not a very strong one. Accordingly, group differences on ACT performance were tested for by way of a three way analysis of variance (sex by I-E by motivation). Scores on the ACT, which were obtained from the University of North Dakota Counseling Center, were missing on seven Ss. This necessitated the use of a three way unweighted-means analysis. This analysis resulted in negative interaction terms. Consequently, the missing scores were estimated by using as a score the mean of the cell in which that score was absent. Having attained equal cell n's in this manner, a three way analysis of variance design was utilized in the analysis of the ACT data. Table 2 presents the means and standard

TABLE 2

AMERICAN COLLEGE TEST MEANS
AND STANDARD DEVIATIONS

	High Motivation			Low Motivation		
	I	IE	E	I	IE	E
			Female			
Mean	21.50	20.30	20.10	22.40	22.70	20.80
S.D.	3.86	3.80	3.50	3.72	3.82	4.89
			Male			
Mean	21.30	22.70	20.30	24.80	20.00	21.43
S.D.	4.27	3.69	3.90	3.97	6.75	4.72

deviations of the various subject groupings on the ACT variable, while a summary table of the results of the analysis is to be found in Table 3.

As can be seen in Table 3, no significant differences existed between the groups on ACT. Consequently, it was concluded that intelligence was not a confounding variable on the word-recognition task, and no attempt was made to remove its effects. It should be noted in Table 3 that the degrees of freedom for both the mean squares within and total mean squares are seven less than would be usual since seven scores were estimated to achieve equal cell frequencies.

Hypotheses I through III and the first part of IV in this investigation

TABLE 3

ANALYSIS OF VARIANCE OF AMERICAN COLLEGE TEST SCORES

Source	Sum of Squares	df	Mean Squares	F	P
A (I-E)	68.60	2	34.30	1.54	NS
B (Motivation)	29.30	1	29.30	1.31	NS
C (Sex)	6.20	1	6.20	.27	NS
AB	27.60	2	13.80	.62	NS
AC	7.80	2	3.90	.17	NS
BC	3.60	1	3.60	.16	NS
ABC	78.90	2	39.45	1.77	NS
Within	2246.73	101	22.24		
Total	2468.73	112			

dealt with the word recognition task. To recapitulate, significant main effects were predicted on the motivation and sex variables, while an absence of significant differences was postulated across the I-E dimension. Further, the main hypothesis of the study was of a significant I-E by motivation interaction with internals demonstrating more correct responses than externals under the high motivation condition but not under low motivation. Group means and standard deviations on the information extraction task are given in Table 4. To test these hypotheses, the

TABLE 4

MEANS AND STANDARD DEVIATIONS OF EACH GROUP ON THE INFORMATION EXTRACTION TASK

	High Motivation			Low Motivation		
	I	IE	E	I	IE	E
			Female			
Mean	7.30	8.00	6.40	8.30	8.20	7.10
S.D.	2.80	3.00	3.32	2.76	2.09	2.12
			Male			
Mean	6.90	7.20	6.90	8.70	6.50	6.80
S.D.	3.86	2.56	2.26	3.66	2.69	2.36

data from this task were subjected to a three way analysis of variance, the results of which are depicted in Table 5. It should be recalled that the dependent measure here is the number of correct work recognitions out of the 20 items.

As Table 5 demonstrates, only Hypothesis I, which predicted an insignificant F for the personality variable, obtained support. As hypothesized, internally controlled Ss did not differ from externally controlled Ss. Counter to Hypotheses II and III, significant differences on the extraction of information did not obtain across the variables of motivation and sex, nor was a significant locus of control by motivation

TABLE 5

ANALYSIS OF VARIANCE OF INFORMATION EXTRACTION SCORES

Source	Sum of Squares	df	Mean Squares	F	P
A (Sex)	4.41	1	4.41	.49	NS
B (I-E)	20.81	2	10.41	1.16	NS
C (Motivation)	7.01	1	7.01	.78	NS
AB	11.32	2	5.66	.63	NS
AC	.68	1	.68	.08	NS
BC	14.12	2	7.06	.79	NS
ABC	4.55	2	2.27	.25	NS
Within	970.71	108	8.99		
Total	1033.59	119			

interaction found as predicted by Hypothesis IV.

Part of Hypothesis IV was concerned with incidental learning. Specifically, the expectation was that incidental learning would be greater in the internally oriented Ss than in those who were externally oriented. To test this, the incidental learning task was scored in two different ways. The first score was obtained by using the number of correct pairings of the two digit numbers with their corresponding hidden-word items. When this stringent measure was employed, scores greater

than zero were demonstrable in only 11 of the 120 Ss. Only one correct number-item pairing was achieved by 10 of these 11 Ss, with the remaining S getting two correct pairings. Since the vast majority of Ss received scores of zero, no statistical tests were conducted, and the latter half of Hypothesis IV was rejected when the number of correct pairings was used as the incidental learning dependent measure.

The other measure of incidental learning consisted of using as a score for a given individual the number of numerals he gave that had appeared on the slides even though he may not have correctly paired them with their proper hidden-word items. When the data were scored in this manner, 93 Ss scored two correct responses. The range of the scores was from zero through six. The reason why most Ss achieved scores of two, it seems clear, was because of the guessing strategy they followed. Most of them used the numbers one through 20, very often in numerical order. Since two of the correct incidental numbers were 13 and 16, they automatically attained a score of two. As in the other measure of incidental learning, the data were not subjected to any sort of statistical analysis, as there was but minimal variance on the task. Again, the second part of Hypothesis IV was not substantiated, and it must be concluded that, in this situation at least, differential amounts of incidental learning are not evident between I-E, sex, and motivational groupings.

An attempt was made in this investigation to induce differential amounts of motivation via instructions to Ss. As a check on the

effectiveness of this operation, each S completed a rating scale ranging from "very bored" to "very challenged." The dependent variable in this part of the study was the number of millimeters from the "zero point" of "very bored" to the check-mark given by S. Thus, the greater the score for a given S, the more motivated he was, as assessed by himself, during the information extraction stage of the experiment. The maximum possible score was 150 millimeters. Table 6 contains group means and standard deviations of the rating scale scores. The data were analyzed by a three way analysis of variance, a summary table of which is given in Table 7.

Inspection of Table 7 reveals that the instructions were seemingly

TABLE 6

MEANS AND STANDARD DEVIATIONS OF EACH GROUP ON RATING SCALE SCORES

	High Motivation			Low Motivation		
	I	IE	E	I	IE	E
			Female			
Mean	104.10	128.50	126.70	104.60	103.20	92.90
S.D.	41.27	15.57	9.81	18.19	19.64	24.64
			Male			
Mean	105.70	106.60	102.40	103.90	89.80	115.00
S.D.	38.72	28.97	22.84	29.24	38.06	23.18

TABLE 7

ANALYSIS OF VARIANCE OF RATING SCALE SCORES

Source	Sum of Squares	df	Mean Squares	F	P
A (Sex)	1116.00	1	1116.00	1.33	NS
B (I-E)	437.00	2	218.50	.26	NS
C (Motivation)	3477.00	1	3477.50	4.14	Less than .05
AB	2013.00	2	1006.50	1.20	NS
AC	2306.00	1	2306.00	2.75	NS
BC	2082.00	2	1041.00	1.24	NS
ABC	3269.00	2	1634.50	1.95	NS
Within	90670.00	108	839.54		
Total	105370.00	119			

effective in inducing different amounts of motivation. However, this interpretation is clouded somewhat by the existence of a significant Fmax at less than the .05 level (Fmax=17.68, df=12, 9). This indicates a lack of homogeneity of within-cell variances and, as such, represents a violation of one of the assumptions underlying the F test. As seen in Table 6, this heterogeneity of variance results primarily from the IE and E female-high motivation groups. It is interesting to note that this occurs within a single two-way subject grouping, namely that of the high motivation-female condition. Whatever variable is responsible for the

significant Fmax seems to have been rather specific in its effects. Consequently, while F due to motivation reaches the .05 level with ratings of greater motivation under high motivation conditions, this should be accepted with some reservation.

In regard to the significant Fmax, consideration was given to the performance of some type of data transformation of the rating scale scores. However, since neither extreme skewness nor a strong correlation between cell means and variances were evident, the usual transformations (Winer, 1962) of obtained data were not felt to be particularly relevant.

The obtained data from all phases of this experiment are found in Appendix B.

CHAPTER IV

DISCUSSION

The fundamental purpose in conducting the present research was to test what may be called the motivational hypothesis of information acquisition as influenced by the personality variable of locus of control of reinforcement. Previous research (Seeman and Evans, 1962; Seeman, 1963, 1964; Carlson, James, and Carriere, 1965; and Spjut, 1968) has indicated that internals acquire more information about their surroundings than do externals. Nevertheless, in attempting to replicate these findings on a more "molecular" level than the aforementioned studies with the exception of the one by Spjut, the present writer has failed to find information extraction differences between I-E groupings in two unpublished pilot studies. Of the studies which have uncovered such differences, all except for Spjut's have found these differences on verbal material in which Ss would seem to have had a fair amount of personal or ego-involvement. Thus, the question would seem to become one of the S's motivation on the task in question. This led to the expectation that only under conditions of high motivation will the I extract more information than the E. Based on the results of the present experiment, the validity

of this hypothesis is in doubt.

Why the predicted I-E by motivational level interaction was not found is not immediately clear. One possibility is that the instructions were not effective in manipulating the task motivation of the participants. This, however, can remain just a possibility, since a significant F for motivation was found on the rating scale data, with individuals under high motivation instructions seemingly tending to rate their motivation at a higher level than persons under low motivation instructions. In consideration of the lack of homogeneity of cell variances in these data, it should be tentatively concluded that the motivation-arousing directions were efficacious.

It could also be that the relevant variable in differences in information acquisition between Is and Es is the type of experimental material used. This is to say that such differences may be found only when more "molar" verbal material is used, material that has inherent meaning to S. The stimuli in the investigation at hand, as well as its two pilot studies, were perhaps seen by the Ss as rather sterile and devoid of much meaning. It is hard to see how these stimuli could have as much meaning to the Ss as questions about a war (Carlson, et al., 1965), about political affairs (Seeman, 1964), about tuberculosis (Seeman and Evans, 1962), and about ways of obtaining a parole (Seeman, 1963). However, the tenability of this proposition is called into question by the work of Spjut (1968) which presented Ss with stimuli which would seem to be more

similar to those used by the present author, i.e., a more sterile-appearing "laboratory" task. (Spjut's study is used in this connection by following his conclusion that his demonstration of I-E differences in incidental learning was another way of showing that Is extract more environmental information than do Es.)

Another way of explaining the failure to find locus of control differences in acquisition of information in this and the preceding studies by the present investigator is to conclude that the internal individual does not differ from the external individual in this respect. This would appear to completely ignore the results of the other studies on this topic, but such might not be the case. What this conclusion may entail is a reinterpretation of these results. One such reinterpretation may be in terms of retention differences. In this regard, it should be pointed out that these studies, with the exceptions of Spjut's (1968) and Seeman's (1963) prisoner study, tested their Ss for the amount of information they held at some later date from when they were exposed to the information. Stated differently, the designs of these experiments did not call for a measure of amount of information extracted immediately following exposure to the information, such as existed in Spjut's study, the study of male prisoners by Seeman, and those by the present author. What this may mean is that the externally controlled person may extract just as much information from his surroundings as the internally oriented subject but not retain as much of this information over a given period of time. Both

may start at the same level, but more is discarded or lost in the external for whatever reason. While this is a highly speculative idea, it could account for the positive results in the investigations of Seeman and Evans (1962), Seeman (1964), and Carlson et al. (1965), as well as the negative results of the present writer. Spjut's (1968) and Seeman's (1963) findings, however, seem to not fit, since they did find differences in situations where differing retention rates would not likely be important, at least longer-term differences. At any rate, it is an open question, and research aimed at uncovering any existing retentional differences between different points on the locus of control continuum would be worth doing.

A final attempt at explaining the present results would be in terms of degree of personal control implied by the experimental verbal material. In his prisoner study, Seeman (1963) predicted that there would be more learning by Is than Es only on the material that implied a good deal of personal control (parole opportunities), and this is what he found. If this were to have general validity, it could explain the lack of I-E differences in the studies by the present author, since the experimental material did not carry any such obvious implications of personal control. However, neither did the stimuli used by Spjut (1968), and he did find differences. Furthermore, it is not easily seen how factual information about the Viet Nam War (Carlson, et al., 1965), about political affairs (Seeman, 1964), nor about tuberculosis (Seeman and Evans, 1962) contains such obvious implications of control by oneself. As in the case of the others,

this explanation is found to be lacking. Nevertheless, one way of looking at it more closely would be to repeat the present study, using some hidden-words that imply personal control and other words that do not.

Based on the second pilot examination by the present author, a sex difference on the interpolated-word task was predicted, with females, on the average, receiving higher scores than males. As in the first pilot study, no such difference appeared, and it seems safe to conclude that, with this specific task at least, a true sex difference does not exist. It should be recalled that a sex difference was found by Carlson, James, and Carriere (1965) and Spjut (1968), with males surpassing females in the former and females surpassing males in the latter. Not only was a lack of a sex difference on the word-recognition task presently revealed, but also no differences between male Ss and female Ss were evident in the present research in incidental learning rates such as were found by Spjut.

A significant motivational effect was postulated on the hidden-word task but not found. This would tentatively lead to the conclusion that a person's level of motivation is not a relevant factor in the present task, since, from the analysis of the rating scales, there is some evidence that high motivation instructions led to elevated interest. The failure to find a difference across motivation is in agreement with Spjut's (1968) findings in incidental learning.

The final purpose in the present research was to attempt replication and extension of Spjut's (1968) work on incidental learning and locus of control. Although no differences were found, it is felt that some limits have been placed on the extent of I-E differences in the learning of incidental material. When the present method is compared with that of Spjut, it is by no means surprising that internals and externals were not found to differ. Simply stated, the reason is quite probably that Spjut gave much more exposure to his Ss to the incidental material than the present investigator did to his. Spjut exposed his Ss to the 10-item list four times with an item-exposure time of two seconds. Each S was thus exposed to each incidental stimulus for a total of eight seconds. In the present experimental condition, Ss were given exposure to the 20 item list just once with an item-exposure time of only one second. This translates into a total item-exposure time of only one second. With such a stringent test of incidental learning, it is not at all difficult to account for the failure to replicate Spjut's data. A further illustration of the stringency of the test employed is offered by the comments of many (perhaps the majority) of the participants following the reading of the incidental learning instructions. They complained, for example, that they were not even aware of any numbers on the slides, let alone able to recall specifically what they were.

Another purpose of Spjut's (1968) research was to investigate the effects of high versus low motivation (high motivation was induced in a

manner comparable to the method used in the present study) on incidental learning. As he had hypothesized, no differential effects were observed. The design in the present research made possible a retest of this, and the findings were concordant with Spjut's. A firm conclusion, nevertheless, cannot be offered for the lack of a significant drive effect on learning incidental material, since the within-cell variances on the motivation rating scale were significantly dissimilar. Since the data on the rating scale were only suggestive of higher rated motivation under the high drive instructions, a tentative conclusion that higher subject motivation does not necessarily result in greater incidental learning is about all that should be offered. The interpretation of the effects of varying degrees of motivation is made even more difficult by the fact that since such a strict test of incidental learning was made, little, if any, was found.

CHAPTER V

SUMMARY

The purpose of this study was to investigate the extraction of environmental information and incidental learning as they are influenced by the I-E personality variable, the sex of the subject, and the subject's level of motivation.

The experimental material consisted of 20 words that contained a varying number of extraneous letters on one or both ends. The items were presented on slides to groups of Ss with an individual item exposure time of one second. In addition to a hidden word, each slide also contained a two-digit number. Ss were exposed to each of the items one time.

Three dependent measures were obtained from the slides. One was a measure of the amount of information extracted and consisted of the number of correctly identified words. The other two were measures of incidental learning. The first of these was the number of two-digit numbers correctly recalled in association with their proper hidden-word items. The second was simply the number of correctly recalled two-digit numbers, whether or not they were correctly associated with their proper hidden-word items. It should be noted that no mention was made of the

two-digit numbers in the original instructions to the Ss.

In an attempt to vary the motivation of the Ss, the original instructions to half of them (high motivation Ss) stressed a supposed high relationship between intelligence and performance on the hidden-word task. In the low motivation Ss, no link between intelligence and the task was mentioned. As a check on the effectiveness of this operation, each S completed a rating scale of his own motivation during the experiment.

It was hypothesized that significant differences would be found across the sex and motivation independent variables on the hidden-word task. It was further predicted that no differences would be found across the personality variable. However, a significant personality by motivation interaction was expected, with internals doing better than externals under the high motivation condition but not necessarily under low motivation. Finally, more incidental learning was hypothesized in the internally controlled Ss than in those externally controlled.

Of the various hypotheses, only the one concerning no differences across personality was supported. The results of the analysis of variance on the rating scale data indicated a significant difference between the way Ss under the high motivation condition and Ss under low motivation rated their own level of motivation. However, due to a significant Fmax, indicating heterogeneity of within-cell variances, a clear-cut interpretation of this difference was felt to be too tenuous to make.

No single way of explaining the lack of substantiation of most of

the hidden-word hypotheses was evident. This study, plus two other unpublished experiments by the same author, resulted in conflicting data with those obtained by other investigators concerned with information extraction and locus of control (Seeman and Evans, 1962; Seeman, 1963, 1964; Carlson, James, and Carriere, 1965; and Spjut, 1968). These studies all found more information extraction in internals than in externals. Various possibilities exist, dealing with such things as the degree of personal control implied by the experimental material, the amount of inherent meaning in the material, and failure to control for retentional differences, but no one of these accounts for the results from all the studies.

APPENDIX A

STIMULI USED IN THE PRESENT STUDY, INCLUDING HIDDEN-WORD ITEMS AND ACCOMPANYING "INCIDENTAL" TWO-DIGIT NUMBERS

1.	HEARGEBANA	16	
2.	APOSSIGNQU	98	
3.	SWPEFORDOM	49	
4.	SMASTELOKG	27	
5.	SPIAKNOTOL	70	
6.	ISHOTEHAUD	47	
7.	IGNICETERY	73	
8.	SONLYERUBT	34	
9.	IBELUBITEN	83	
10.	YGEARKPOXZ	68	
11.	BASGERMOSW	25	
12.	WESPKEENAS	64	
13.	UQUIPROGEF	37	
14.	LAKOAMENEI	94	
15.	EMAVEASTEC	55	
16.	NALSOOASIS	13	
17.	AGGUPISLEE	41	
18.	SSPCURBURN	23	
19.	THCRHIMORN	89	
20.	YBIRAIDOKE	51	

TABLE 8

AMERICAN COLLEGE TEST SCORES

High Motivation						Low Motivation					
I		IE		E		I		IE		E	
Female											
20	26	18	24	23	20	23	22	18	21	25	17
21	26	14	25	21	17	29	19	16	22	17	25
26	18	23	26	26	15	24	27	25	28	27	26
22	21.50*	19	19	17	20	17	19	22	24	12	24
13	21.50*	16	19	25	17	25	19	29	22	18	17
Male											
27	23	19	25	20	27	27	26	20	16	22	21
24	20	26	24	20	17	28	26	23	21	24	12
23	17	21	15	13	18	23	14	18	4	15	21.43*
21	24	25	28	21	19	25	29	27	20*	28	21.43*
23	11	24	20	26	22	26	24	31	20*	28	21.43*

*Estimated scores

TABLE 9

HIDDEN-WORD TASK OBTAINED DATA

High Motivation						Low Motivation					
I		IE		E		I		IE		E	
Female											
11	7	10	9	11	7	7	10	12	7	6	9
6	6	3	8	7	7	5	10	7	6	6	11
9	3	10	11	2	3	6	9	9	7	3	9
7	6	7	9	11	10	10	12	9	9	6	8
13	5	2	11	3	3	3	11	5	11	7	6
Male											
12	9	8	8	6	4	11	10	9	7	6	4
9	7	8	4	9	4	17	7	9	3	6	6
7	2	3	12	6	5	6	7	7	6	11	6
12	3	9	6	9	10	2	9	10	1	8	10
8	0	5	9	10	6	9	9	5	8	3	8

TABLE 10

INCIDENTAL LEARNING OBTAINED DATA
(NUMBER OF CORRECT PAIRINGS)

High Motivation						Low Motivation					
I		IE		E		I		IE		E	
Female											
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1
0	1	0	0	0	1	0	1	0	0	0	1
Male											
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	1	0	0
0	2	0	0	0	1	0	0	0	1	0	1

TABLE 11

INCIDENTAL LEARNING OBTAINED DATA
(NUMBER CORRECT IN ANY ORDER)

High Motivation						Low Motivation					
I		IE		E		I		IE		E	
Female											
0	2	3	2	6	2	3	2	0	2	6	2
1	2	5	2	1	2	2	2	0	2	1	2
2	2	2	2	1	2	2	2	1	2	2	2
2	2	2	2	2	2	2	2	1	2	2	2
2	2	2	2	2	2	2	2	2	2	2	2
Male											
4	2	0	2	3	2	0	2	4	2	0	2
6	2	1	2	3	2	2	2	4	2	1	2
3	2	2	2	4	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2	2

TABLE 12

RATING SCALE OBTAINED DATA

High Motivation						Low Motivation					
I		IE		E		I		IE		E	
Female											
141	143	124	149	122	146	79	87	80	104	73	76
90	108	130	137	128	131	90	103	135	91	56	91
75	138	126	119	126	122	109	91	110	92	103	142
110	1	140	148	124	140	143	123	142	102	122	71
139	96	94	118	111	117	115	106	91	85	106	89
Male											
24	75	75	107	108	113	75	99	123	90	123	139
129	144	91	59	95	107	125	49	136	102	117	131
150	62	134	146	140	49	104	92	75	123	103	78
127	129	144	109	104	117	89	145	95	1	134	145
93	124	77	124	110	81	150	111	49	104	75	105

REFERENCES

Barron, F. Some personality correlates of independence of judgment. Journal of Personality, 1953, 21, 287-297.

Battle, E., and Rotter, J. B. Children's feelings of personal control as related to social class and ethnic group. Journal of Personality, 1963, 31, 482-490.

Bialer, I. Conceptualization of success and failure in mentally retarded and normal children. Journal of Personality, 1961, 29, 303-320.

Carlson, H. J., James, W. H., and Carriere, D. E. Attitudes on Viet Nam, factual information and internal control. Paper presented at the Midwestern Psychological Association, Chicago, 1965.

Crandall, V. C., Katkovsky, W., and Crandall, V. J. Children's beliefs in their own control of reinforcement in intellectual-academic achievement situations. Child Development, 1965, 36, 91-109.

Cromwell, R., Rosenthal, D., Shakow, D., and Kahn, T. Reaction time, locus of control, choice behavior and descriptions of parental behavior in schizophrenic and normal subjects. Journal of Personality, 1961, 29, 363-380.

Crowne, D. P., and Liverant, S. Conformity under varying conditions of personal commitment. Journal of Abnormal and Social Psychology, 1963, 66, 547-555.

Crowne, D. P., and Marlowe, D. A new scale of social desirability independent of psychopathology. Journal of Consulting Psychology, 1960, 24, 349-354.

Dean, D. G. Alienation: Its meaning and measurement. American Sociological Review, 1961, 26, 753-758.

Gore, P. M., and Rotter, J. B. A personality correlate of social action. Journal of Personality, 1963, 31, 58-64.

Graves, T. D. Time perspective and the deferred gratification pattern in a tri-ethnic community. Research Report No. 5, Tri-Ethnic Research Project. University of Colorado, Institute of Behavioral Science, 1961.

Green, B., Lotsof, E. J., and James, W. H. Personality characteristics of conformers and non-conformers. Paper presented at the Midwestern Psychological Association, St. Louis, 1964.

Holden, K. B., and Rotter, J. B. Supplementary report: A nonverbal measure of extinction in skill and chance situations. Journal of Experimental Psychology, 1962, 63, 519-520.

James. W. H. Internal versus external control of reinforcement as a basic variable in learning theory. Unpublished doctoral dissertation, Ohio State University, 1957.

James, W. H. The application of Rotter's social learning theory in educational settings. Paper presented at the Society for Research in Child Development, Minneapolis, 1965.

James, W. H., and Randall, V. The conditioning of meaning as a function of internal control and drive level. Paper presented at the Midwestern Psychological Association, Chicago, 1965.

James, W. H., and Rotter, J. B. Partial and 100% reinforcement under chance and skill conditions. Journal of Experimental Psychology, 1958, 55, 397-403.

James, W. H., and Steele, B. J. Internal control of reinforcement and resistance to extinction in operant learning. Paper presented at the Midwestern Psychological Association, Chicago, 1968.

James, W. H., Woodruff, A. B., and Werner, W. Effect of internal and external control upon changes in smoking behavior. Journal of Consulting Psychology, 1965, 29, 184-186.

Lefcourt, H. M. Internal versus external control of reinforcement: A review. Psychological Bulletin, 1966, 65 (4), 206-220.

Lefcourt, H. M., and Ladwig, G. W. The American Negro: A problem in expectancies. Journal of Personality and Social Psychology, 1965, 1, 377-380.

Lefcourt, H. M., and Ladwig, G. W. Alienation in Negro and white reformatory inmates. Journal of Social Psychology, 1966, 68, 153-157.

Mathis, R. W., Hippe, D. L., and James, W. H. Effects of internal control upon operant learning rates. Paper presented at the Mid-western Psychological Association, Chicago, 1968.

Odell, M. Personality correlates of independence and conformity. Unpublished master's thesis, Ohio State University, 1959.

Phares, E. J. Changes in expectancy in skill and chance situations. Unpublished doctoral dissertation, Ohio State University, 1955.

Phares, E. J. Expectancy changes in skill and chance situations. Journal of Abnormal and Social Psychology, 1957, 54, 339-342.

Rosensweig, S., Fleming, E. E., and Rosensweig, L. The children's form of the Rosensweig P-F Study. Journal of Psychology, 1948, 26, 141-191.

Rotter, J. B. Social learning and clinical psychology. Englewood Cliffs, N.J.: Prentice-Hall, 1954.

Rotter, J. B. Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 1966, 80 (1, Whole No. 609).

Rotter, J. B., Liverant, S., and Crowne, D. P. The growth and extinction of expectancies in chance controlled and skilled tasks. Journal of Psychology, 1961, 52, 161-177.

Rotter, J. B., and Rafferty, J. E. The Rotter incomplete sentences blank manual. New York: Psychological Corporation, 1950.

Rotter, J. B., Seeman, M., and Liverant, S. Internal versus external control of reinforcements: A major variable in behavior theory. In N. F. Washburne (Ed.), Decisions, values, and groups, Vol. 2. London: Pergamon Press, 1962, pp. 473-516.

Seeman, M. Alienation and social learning in a reformatory. American Journal of Sociology, 1963, 69, 270-284.

Seeman, M. Alienation and social learning: Four studies of mastery and powerlessness. Unpublished manuscript, 1964. Cited in Rotter, J. B. Generalized expectancies for internal and external control of reinforcement. Psychological Monographs, 1966, 80 (1, Whole No. 609).

Seeman, M., and Evans, J. Alienation and learning in a hospital setting. American Sociological Review, 1962, 27, 772-782.

Spjut, D. U. Incidental learning as a function of internal-external locus of control and motivation. Unpublished master's thesis, University of North Dakota, 1968.

Straits, B. C., and Sechrest, L. Further support of some findings about characteristics of smokers and non-smokers. Journal of Consulting Psychology, 1963, 27, 282.

Strickland, B. The prediction of social action from a dimension of internal-external control. Journal of Social Psychology, 1965, 66, 353-358.

United States Department of Health, Education, and Welfare. Smoking and health: Report of the advisory committee to the Surgeon General of the Public Health Service. Washington, D. C.: United States Government Printing Office, 1964.

Winer, B. J. Statistical principles in experimental design. New York: McGraw-Hill, 1962.