ABSTRACT

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Rotter's Internal-External Locus of Control Scale was administered to 129 introductory psychology students at the beginning of the semester to determine their Internal-External scores. Six weeks later, each subject's first quiz was returned with the grade manipulated to reflect a seven point increase, decrease, or no change from the quiz score the student expected. Immediately following the false feedback, the Rotter scale was readministered. It was hypothesized that differential shifts in Locus of Control would occur as a function of the independent manipulation and the subject's initial Internal-External control orientation.

The analysis of variance performed on the change scores did not confirm the predicted results. There were three possible conclusions. First, the Rotter scale could accurately measure Internal-External Locus of Control at one discrete point in time. Second, the subject's Locus of Control was uneffected by expectancy changes which would not have an enduring or lasting effect upon their lives. Third, the Rotter scale lacked construct validity in that it may be measuring social desirability.

LOCUS OF CONTROL AS A FUNCTION OF THE CONFIRMATION OR DISCONFIRMATION OF AN EXPECTANCY

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III

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APPROVAL

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Introduction

The concepts outlined by Rotter (1954) in his social learning theory have been the source for the development of the Internal-External (I-E) Control construct; thus it would be beneficial to briefly review these main concepts.

Rotter (1954) utilized four concepts in the prediction of behavior. These concepts were reinforcement value, expectancy, psychological situation, and behavior potential.

Behavior Potential

Rotter (1954) defined behavior potential as "the potentiality of any behavior's occurring in any given situation or situations as calculated in relation to any single reinforcement or set of reinforcements [p. 105]." This was stated in a functional format formula: BP=f(E & R.V.); or behavior potential is a function of the individual's expectancy for reinforcement to occur and the values of these reinforcements in the situation.

Psychological Situation

The psychological situation was explained as a series of cues which serve to arouse the individual's expectancies for reinforcement of specific behaviors. For example, the classroom situation may have given cues to a very aggressive person that physical abusiveness would very likely result in strong punishment, while the football field cued expected reinforcement for similar behaviors. In brief, the environment and situational specifics have an interactive effect upon expectancies.

Reinforcement Value

Reinforcement value was defined as, "the degree of the person's preference for that reinforcement to occur if the possibilities of occurrence of all alternatives were equal [Rotter, 1954, p. 107] ." The value of a reinforcer was based upon many parameters. However, Rotter believed that expectancy, based upon previous experiences with a reinforcer, had a direct effect upon the specific value a reinforcer would have in a given situation. Rotter utilized the concept of stimulus generalization to explain how many earlier learned reinforcers, from previously specified situations, could become applicable across many situations in the present.

Expectancy

Expectancy was defined as "the probability held by the individual that a particular reinforcement will occur as a function of a specific behavior on his part in a specific situation or situations. Expectancy is systematically independent of the value or importance of the reinforcement [Rotter, 1954, p. 107]." The general formula for expectancy, $E_{s_1}=f(E^1_{s_1} \& \frac{GE}{N_{s_1}})$, was explained as "an expectancy (E_{s_1}) is a function of the expectancy for a reinforcement to occur resulting from previous experience in the same situation ($E^1_{s_1}$) and as a function of expectancies generalized from other situations (GE), divided by some function of the number of experiences in the specific situation (N_{s_1}) [Rotter, 1954, p. 166]." An individual's generalized expectancy for success of his behavior (GE) in achieving a desired reinforcer was dependent upon his perception of the control for acquiring the reinforcement. For example, in a task where the subject believed that reinforcement (success) was controlled by the experimenter, a sequence of reinforcements (e.g., +--+-+++) might yield a low expectancy for success on the next trial. If the subject believed reinforcement was determined by his own skill, the same pattern or reinforcements should yield a

relatively high expectancy for success on the next trial. The key factor which determined the probability of future trial success or failure was not the sequence pattern alone but involved the individual's perception of responsibility for the previous outcomes. This locus of responsibility for future events has been conceived as Internal-External Control.

Internal-External Control

Rotter (1966) defined Internal-External Locus of Control as:

> When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically 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. When the event is interpreted in this way by the individual, we have labelled this a belief in 'external control'. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in 'internal control' [p. 1].

Internal-External Locus of Control construct has become a separate and important area of investigation in recent years. Since 1966, there have been over 300 studies performed investigating some question involving I-E Control

(Throop and MacDonald, 1971). Because of the extensive investigations carried out in this area, the validity and reliability of the instrument used to determine Internal-External Control is of primary importance. Although there is more than one test available for determining Locus of Control, Rotter's scale (1966) has been the most widely utilized (Appendix A).

I-E Locus of Control - Status as a Trait

As previously summarized, Rotter presented internal-external control as an integral component of his general theory of social learning. In comparing Rotter's social learning theory with the more traditional personality conceptualizations, the essential difference was the stress placed upon the importance of specific current environmental events and their functional relationship to both antecedent and future behaviors. The more traditional trait and state theories had sought the determinates within the individual rather than the environmental conditions that covaried with the specified behavior. Mischel (1968) summarized the central differences between social learning theory and traditional personality theory as:

> A useful trait or state theory depends on demonstrated Major-Cross situational consistencies in behavior, whereas social

> behavior theory neither assumes nor requires such broad consistencies. Instead, social behavior theory depends on the discovery of independent variables or stimulus changes that produce and maintain modifications in behavior. While trait and state theories search for consistencies in peoples' behavior across situations, social behavior theory seeks order and regularity in the form of general rules that relate environmental changes to behavior changes p. 150 .

It appears that since inception, Rotter's Internal-External Locus of Control variable had acquired the same broad consistency requirements that the state or trait theorist would ascribe to an individual. The generalized internal-external expectancy had achieved an autonomous identity from the original theory. This expectancy, like trait factors, was integrated into the individual's personality and was believed to be accurately measured without regard to the immediate preceding environmental events.

Purpose of the Present Study

The purpose of the present study was to investigate differential shifts in Locus of Control as a function of the independent manipulation and the subject's initial Internal-External control orientation. This research was believed to be important as there had been no previously published studies investigating specific antecendent events upon I-E as a

dependent measure.

The assumption of most experimenters who have utilized the I-E scale has been that immediate preceding environmental events did not significantly change the subjects' appraisal of reinforcements as indicated by their answers on Rotter's scale. Psychologists have had no way of controlling the subject populations' interactions with the environment preceding the first issuance of the test. Subsequently, there has been no way of knowing whether the I-E score achieved by an individual reflected a generalized expectancy or a specific expectancy based upon a recent event confirming or disconfirming a previously held expectancy or a combination of both general and specific expectancies.

The present study was primarily concerned with the effect a specific unexpected event would have on an individual's generalized expectancy score. The dependent variable was defined as the shift (post-test minus pre-test score) in the I-E scale score. Rotter's (1966) I-E scale was administered at the beginning of the semester to determine student's base score (pre-test) and orientation as internal or external. Before turning in their first quiz answer sheet, each student was requested to indicate how many questions

they thought were answered correctly (expected score). The independent experimental manipulation was performed by providing feedback which reflected a seven point increase, decrease, or no change from the expected quiz score previously indicated. The manipulated scores were returned to the students and was immediately followed by a re-administration of the Rotter scale (post-test). The following shifts in I-E control were hypothesized (Table 3).

Internals. Lefcourt (1972) reviewed the literature on differential responses to success or failure between internals and externals. In general, Lefcourt reported unusual shifts in I-E scores would not be expected from internals who perceived a particular task as based upon skill (i.e., a function of the individuals effort and ability) rather than chance. Davis and Davis (1972) also hypothesized that internals would attribute specific task outcomes to personal sources, and therefore, would remain relatively uneffected by the specific nature of the outcome. Phares (1971) found that the expectancy statements of both internals and externals did not significantly change following a failure manipulation. In concordance with Phares' result, Dweck and Reppucci (1973), in their work with children, found that internals would attribute failure to a lack of

TABLE 3

SUMMARY OF HYPOTHESIZED SHIFTS AS MEASURED BY CHANGE SCORES (POST-PRE)

	Internal Group	Mean Group	External Group
Score greater than expected	No Change	Significant Shift Internally	Significant Shift Externally
Score =expected	No Change	No Change	No Change
Score less than expected	No Change	Significant Shift Externally	Significant Shift Externally

effort. Therefore, it was anticipated in the present study that the perception of success or failure would have no overall significant effect on changing the locus of control in the internal group.

Externals. Previous studies dealing with the direction and magnitude of shifts in expectancy for externals seemed inconclusive to date. Some studies were reported indicating no change in expectancy following a success manipulation (Phares, 1971; Davis and Davis, 1972). Some experimenters have indicated that externals ascribe a situation of perceived failure to mere luck or chance as a mechanism of defense (Rotter, 1966; Hersch and Scheibe, 1967; Davis and Davis, 1972). Other studies have demonstrated that externals do not shift their expectancies as much as internals by indicated changes in confidence statements in a well defined skill oriented situation (Feather, 1968; Rychman, Gold, and Rodda, 1971). Although there was considerable weight to the proposition of no significant shifts in expectancy within this group, it was hypothesized in the present study that this effect would not be replicated. The reason for hypothesizing a shift was because of a crucial difference between the present study and other studies previously reported. The difference was the strong effect the independent manipulated feedback

scores would have on the subject's perception of locus of control. The strength of the effect was assumed due to the credibility of the situation and the importance a classroom test grade would have on a student (subject). Therefore, it was hypothesized that external subjects, who received lower and higher than expected grades, would accept the information as confirmation of their belief that they were subject to the "winds of fortune" and would therefore demonstrate a significant shift to a more extreme external score. Perhaps, as suggested by previous studies, this shift would have been activated as a defense mechanism. The externals achieving their expected grade were not expected to shift in either direction.

Mean Group. There were no relevant studies, to date, dealing with changes in expectancy within a group not classified as internal or external. However, one might hypothesize the following: Those subjects who received information consonant with expectancy should have had no reason to change, hence, no shift was hypothesized. Subjects in the success condition (higher than expected) would have attributed their success to personal powers (ability and effort) and therefore would shift significantly in the internal direction. Conversely, subjects in the failure condition (lower than

expected) would be more likely to attribute the outcome to a chance or bad luck occurrence; therefore, a significant shift toward externality was expected.

Method

Subjects

Subjects for the experiment were 129 undergraduate students (22 males, 107 females), enrolled in an introductory psychology course, spring semester 1973, at the University of North Carolina at Greensboro. All subjects completed the I-E scale (Rotter, 1966) during the first class period. The I-E scale was scored in the external direction, that is, the higher the score, the greater the externality.

The sampled test scores ranged from 2 to 22. The distribution of scores approximated a normal distribution (see Figure 1) with a mean equal to 10.75, mode equal to 11.00, and median equal to 10.63. The standard deviation of the sample was equal to 4.02.

Subjects who scored one standard deviation below the mean (scores ≤ 6) were designated as internals. The mean within this group was equal to 4.61. The internal group, n=18, was composed of 6 males and 12 females.

Subjects who scored one standard deviation above the mean (scores ≥ 15) were designated as externals. The mean

within this group was equal to 17.05. The external group, n=19, was composed of 4 males and 15 females.

The third or mean group was designated as the 15 subjects who scored 11 points, plus 3 subjects randomly selected in like manner from those who scored 12 points. The mean within this group was equal to 11.00. The mean group, n=21, was composed of 3 males and 18 females.

Procedure

Rotter's I-E scale (Rotter, 1966) was administered to all subjects during the first regularly scheduled class period as an attitude survey. All subjects were given the explanation that attitudes were being measured over the course of the semester and that they should expect to fill out the same or a similar type of questionnaire several times.

The instructions given during the first course quiz included a request that each subject estimate the maximum number of questions answered correctly. This number, their expected score, was manipulated as specified by one of three experimental conditions. The next class period these manipulated scores were returned to the students as their achieved grade. The details of the manipulation proceeded as follows. The 63 subjects designated as internals, external

or mean (n=21 per group), were randomly assigned to one of three experimental conditions:

1. Lower than expectancy condition - These subjects received false feedback indicating that the score achieved on the first regularly scheduled quiz was 7 points lower than what was expected.

2. Higher than expectancy condition - In this condition, subjects received false feedback indicating their test grade was 7 points higher than what was expected.

3. No change from expectancy condition - The subjects assigned to this condition received a test score which equaled what was expected.

The expectancy of each subject was determined by requesting that each student indicate his expected score on the answer sheet of the first quiz. The score reflected how many answers were correct out of a possible perfect score of 50. The grading scale: 44-50=A, 39-43=B, 34-38=C, 29-33=D, and below 29=F, was announced the first day of class and repeated prior to the students taking the quiz. Therefore, an experimentally manipulated change of plus or minus 7 points would successfully raise or lower a subject's expected score by at least one letter grade.

The communication of the false feedback to the subjects was carried out in the following manner: It was announced, prior to giving out the quiz, that they would be graded and returned the next regularly scheduled class period. This statement was made to help maximize the probability of class attendance for that day. Six subjects were eliminated from the study as they were absent during the post-test.

When class began, the professor placed the I. B. M. class enrollment roster at the front of the lecture hall. The manipulated test scores were posted by each student's identification number. The professor explained that he had inadvertently forgotten the test sheets, but did have their grades posted. Therefore, he allowed them to come forward, two rows at a time, and check their grades. It was further explained that on that particular day his class was again to fill out another attitude questionnaire. This questionnaire was the post-test measurement (I-E scale), and was identical to the pre-test. In order to minimize using any more valuable class time than was necessary, it was requested that each student take a questionnaire with them and begin working on it as the more distant rows came forward for their grades. Cross conversation among subjects, which may have led them

to suspect the experimental manipulation through a comparison of grades, was controlled by demanding no talking due to the testing in progress.

A post experimental check was performed as follows: After all subjects had completed the scale, they were requested to turn their response sheets over and answer this question. "What do you think is the purpose of this attitude questionnaire?" The tests were collected, subjects debriefed and the quizzes with the correct scores returned.

Results

Primary Data Analysis

An analysis of variance was calculated using the difference of post test minus pre-test scores (Table 4). The analysis indicated one significant main effect, the locus of control designation ($F=12.87$, 2/49, $p < .01$). Both the main effect of the manipulated expected scores and the interaction were not significant.

The Newman-Keuls test indicated that the internal group changed significantly more from pre to post-test, internally than the mean and the external groups ($p < .01$); whereas, the latter two groups were not significantly different from each other in the amount of change.

TABLE 4

VARIANCE ANALYSIS SUMMARY FOR LOCUS OF CONTROL SCORE CHANGE DIFFERENCES (POST-PRE)

Source	df	MS	F
LOC-Group Score Change (A)	2	98.31	12.87**
Manipulated Expected Scores (B)	2	12.25	1.60
A X B	4	7.25	.95
Error	49	7.63	

**P $<$ .01

The significant main effect, locus of control change scores, accounted for approximately 29 per cent of the total variance. The independent experimental manipulation, which was nonsignificant, accounted for 1 per cent of the total variance.

The multiple regression analysis of pre- and post-test scores (test-retest reliability) indicated a correlation between the two administrations of .78.

Secondary Data Analysis

Two additional change score analyses were performed on selected items from the I-E scale. The items selected were those identified by Gurin, Lao, and Beattie (1969) to represent questions associated with control ideology (general belief in LOC) and personal control (questions phrased in the first person).

Gurin, et al. (1969) defined the personal control factor as those items on the I-E scale which used the "first person" in the construction of the choice statements.

> The student who consistently chooses the internal alternative on these five items believes that he can control what happens in his own life. He has a strong conviction in his own competence or what we have called a sense of Personal Control [p. 35].

The analysis of variance on the personal control items was nonsignificant (Table 5).

The control ideology items were defined as those questions not phrased in the "first person".

> Referring instead to people generally, these items seem to measure the respondent's ideology or general beliefs about the role of internal and external forces in determining success and failure in the culture at large. Endorsing the internal alternative on these items means rejecting the notion that success follows from luck, the right breaks or knowing the right people, and accepting a traditional Protestant Ethic explanation. Such a person believes that hard work, effort, skill, and ability are the important determinants of success in life. We have called this factor a measure of the respondent's control ideology [Gurin et al., 1969, p. 35].

The analysis of variance on the items designated as corresponding to control ideology items resulted in two significant main effects. The locus of control designation was significant ($F=4.65$, 2/49, $p < .05$) as well as the effect of the manipulated expected scores ($F=4.48$, 2/49, $p < .05$) (Table 6). Approximately 10 per cent of the total variance was attributed to the locus of control score change factor and approximately 9 per cent of the variance was accounted for by the manipulated expected score.

A Newman-Keuls test on the locus of control factor indicated that only the internals' scores were significantly

TABLE 5

VARIANCE ANALYSIS SUMMARY FOR LOC SCORE CHANGE DIFFERENCES (POST-PRE) FOR PERSONAL CONTROL ITEMS

Source	df	MS	F
LOC-Group Score Change (A)	2	3.96	1.93
Manipulated Expected Scores (B)	2	1.81	.88
A X B	4	2.04	.99
Error	49	2.05	

TABLE 6

VARIANCE ANALYSIS SUMMARY FOR LOC SCORE CHANGE DIFFERENCES (POST-PRE) FOR CONTROL IDEOLOGY ITEMS

Source	df	MS	F
LOC-Group Score Change (A)	2	9.37	4.65*
Manipulated Expected Scores (B)	2	9.03	4.48*
A X B	4	3.58	1.77
Error	49	2.01	

* $P < .05$

lower than the externals ($p < .05$). The same post-hoc test was performed as a function of the independent variable, manipulated feedback scores. This analysis indicated that the subjects who received test scores greater than what was expected were significantly more internal than both those subjects' who received test grades equal to and less than what was originally expected ($p < .05$).

Discussion

It is all too apparent that the experimental manipulation of the students' expected scores had no effect upon the Internal-External orientation of the subjects. The fact that this main factor was nonsignificant in the analysis of variance was further substantiated by the statistical results from the multiple regression analysis and the minimal amount of variance (W^2) accounted for by the independent variable. A correlation coefficient of .78 was very high considering the results from previous experimentation (Rotter, 1966; Hersch and Scheibe, 1967), and was certainly indicative of the reliability of the test regardless of the experimental manipulation. This was confirmed by the fact that a mere 1 per cent of the total variance was attributed to the independent variable. As an overall result it may be

stated that none of the experimental hypotheses were confirmed by the data.

However, the failure to substantiate the hypotheses did not negate the relevance of the overall study. As stated in the introduction, it was anticipated that the Rotter (1966) Internal-External control scale could not accurately measure this variable at one discrete point in time with any degree of certainty. The results of this experiment have indicated that responses to Rotter's scale (1966) remained stable, at least over a six-week period. The shock and surprise of a student's good or bad fortune on the first quiz should have been a strong enough manipulation to modify their perception of control. However, the data indicated that this did not occur. This result may be explained in three ways. First, the score changes were not believed by the subjects; second, the manipulation was not strong enough to modify their belief in control expectancy; third, the I-E scale does not measure perceived locus of control but the subject's social awareness factor.

The first conjecture did not seem to be a satisfactory explanation. The two observers watching the student's expression as they received their grades, had no reason to doubt that the subjects did believe that the posted grades

were accurate. Also, a post experimental check did not indicate awareness of the manipulation or the connection between receiving the grades and filling out the scale for the second time.

The second explanation was more plausible. The ineffectiveness of the experimental manipulation might have indicated that Internal-External Locus of Control was a relatively stable and quantifiable personality variable which was not amenable to a short range manipulation. The fact that a specific test result was short-ranged in effecting a student's life may have made a difference in producing any changes in locus of control. McArthur (1970) found locus of control changed in that students became more external when good fortune gave them a high number in the draft lottery; thus enabling them to escape the draft. The effect of avoiding two years of service certainly had more long-range importance than receiving a quiz which was seven points higher or lower than expected.

The last conjecture, measurement of social awareness factors, also seemed very possible. The results of previous research studies had demonstrated the I-E scale to be correlated with social desirability scales (Appendix A). For example: Feather (1967) and Altrocchi, Palmer,

Hellmann, and Davis (1968) found significant correlations between Marlowe-Crowne and I-E scales; ($r=.42$, $p < .01$, $n=53$ and $r=-.34$, $p < .05$, $n=96$, respectively). Therefore, the ineffectiveness of the experimental manipulation in changing locus of control could be explained by the reason that the scale was at least partially measuring social factors as well as I-E control. The influence a specific test score would have on changing a subject's perception of social factors would probably result in a minimal score change. As non-significant score changes corresponded with the data collected, one might very well conclude that social desirability was being measured.

This study was also prone to be affected by regression to the mean on the post-test measures. The internal subjects demonstrated an eight point shift, (positive from pre-to post-test). The externals demonstrated a negative shift of five and one-half points, while those classified as the mean group initially, moved less than one point (Table 7). Evidence supporting this conjecture was found by performing comparison "t" tests between the pre- and post-test scores. Internal's scores on the post-test differed significantly from the pre-test ($t=3.61$, 34, $p < .01$). The same test performed on the

TABLE 7

SUMMARY OF MEAN (PRE-POST) TEST SCORES AND SUM OF MEAN SCORE DIFFERENCES

	Internal		Mean		External		Sum of Mean Differences
	Pre-Test Scores	Post-Test Scores	Pre-Test Scores	Post-Test Scores	Pre-Test Scores	Post-Test Scores	(Post-Pre) Scores
Receiving Scores Higher Than Expected	4.20	5.40	10.71	10.29	16.71	15.43	- .50
Receiving Scores = Expected	5.00	8.14	11.14	9.57	17.00	14.40	-1.30
Receiving Scores Lower Than Expected	4.50	8.17	10.86	12.14	17.43	15.86	+3.38
Sum of Mean Differences (Post-Pre) Scores	+8.01		+1.28		-5.45		

externals' scores indicated thatthe shift toward the mean was marginally significant ($t=1.99$, 36, $p < .10$). The shift in scores for the mean group did not indicate any significant change. Therefore, it was believed that the increase and decrease in scores most probably reflected the effect of regression to the mean.

It was difficult to make any statements about the implications of the significant main results in the control ideology analysis. Although the main effects were significant; the amount of variance these two main factors accounted for, out of the total variance, was only 19 per cent. The fact that 81 per cent of the variance was unaccounted for was really of no great surprise as the number of test items which composed this analysis was only 9 questions. The only statement one could make on control ideology was, internals differ from externals ($p < .05$).

In addition, the analysis of the 5 items reflecting personal control was nonsignificant. It was assumed that the very limited number of questions and large amount of uncontrolled variance resulted in the lack of significant results.

Summary

In summary, the results failed to confirm any of the experimental hypotheses. However, this lack of results

yields the following possible conclusions:

1. Assuming Rotter's scale measures I-E control, then one might conclude that Internal-External Locus of Control was measurable at one discrete point in time. This result, although subject to regression effects, was relatively stable, at least over a six week period.

2. It was also possible to conclude that the subjects' Locus of Control was not subject to the specific situational variable minipulated in this study. That is, one short-ranged but assumed powerful disconfirmation of expectation had no effect upon the Locus of Control.

3. Due to the significant relationships between the I-E scale and those measuring social desirability, one might question the construct validity of the I-E test instrument. The data presented was congruent with the hypothesis that the Rotter scale was possibly confounded by social factors which did not change over the six-week pre- post-test period.

4. Because subjects were given the expectation that the same scale could possibly be used again during the semester, pre-test sensitization might have occurred.

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APPENDIX A

Validity

In discussing the validity of personality tests, Mischel (1968) has indicated that tests measuring a specific personality trait must also demonstrate that "it is not mainly redundant with other widely available indices" [p. 87]. Therefore, the possible mutual trait factors which the I-E scale may in fact be measuring must be thoroughly investigated.

> Thus whenever one claims to be measuring a novel trait or dimension one has to show what is not being measured as well as what is being measured. That is what is meant by 'discriminant validation' and it (as well as positive correlations) is required to show that a test measures something new. This need to demonstrate that measures are not largely redundant is especially evident when one considers the correlations between personality tests and measures of intelligence. Mischel, 1968, p. 88

Rotter (1966) reported good discriminative validity in his monograph by citing low correlations between tests of intelligence and the I-E scale. Of the three samples included in his monograph, (total N=259), the correlations with intellectual measures ranged from -.22 to .03. There has been only one other study performed since publication of Rotter's monograph directly concerned with correlations with intelligence. Hersch and Scheibe (1967) statistically

analyzed I-E scores with three different measures of intelligence (Otis, CMT, D48) and found non-significant correlations ranging from -.07 to .17. These results have indicated that the I-E scale does not measure intelligence and therefore has not been contaminated by this factor.

Most individuals consider themselves to be members of society and thereby conform and adhere to what society has dictated as the "appropriate attitudes." An extensive overlap of the I-E scale items and tests measuring social desirability would discredit the discriminative validity of the Locus of Control factor. Therefore Rotter was also concerned with demonstrating that the I-E scale was not contaminated with factors of social desirability. Rotter (1966) reported on five separate studies (total N=915) in which the Marlowe-Crowne Social Desirability Scale was correlated with the I-E scale. In this report, Rotter attempted to divert attention from the high correlations between the social desirability scale and the I-E scale by reporting how much improved the new I-E scale was in comparison to the old.

> Correlations of the 60-item I-E scale with the Marlowe-Crowne Social Desirability Scale were obtained in a number of college student samples and typically ranged between -.35 and -.40. The attempt to reduce this correlation in the new scale was moderately successful. The correlations for the new scale range from

> -.07 to -.35. The greater range may reflect differences in testing conditions. A correlation of -.22 represents the median for the different samples of college students where males and females are combined. [p. 14]

What was not specifically stated was the fact that 3 of the 5 correlations reported were significant at the p .05 level. This failure to substantiate the mutual exclusiveness of the I-E variable from social desirability has also been evident in later studies. A lack of correlation was replicated in studies by Strickland (1965), Tolor (1967) and Tolor and Jalowiec (1968). However, these results have been counterbalanced by a number of contradictory studies. Feather (1967) and Altrocchi, Palmer, Hellmann, and Davis (1968) found significant correlations between Marlowe-Crowne and I-E scales; ($r=.42$, $p < .01$, $N=53$ and $r=-.34$, $p < .05$, $N=96$, respectively). In two of the most recent studies concerned with social desirability, Hjelle (1971) reported that 15 of the 23 internal statements were rated more socially desirable, with eleven of the fifteen significant at p .05. Joe (1972) tested 203 introductory students by giving them a choice between the two forced choice I-E items. The students selected items on the basis of which of the two alternatives was valued as more socially desirable. The results indicated that for males (N=80), fifteen of the

twenty-three items were given a significantly different social desirability rating ($p < .05$). Furthermore, of the fifteen more desirable alternatives, thirteen of the statements were designated as Internal Statements. The females in the study (N=123) gave similar results in ranking seventeen of the twenty-three items as being significantly more socially desirable ($p < .05$). Of these seventeen alternatives, thirteen were Internal Statements. Experimenters using scales other than Marlowe-Crowne have also found significant correlations with the I-E scale. Berzins, Ross, and Cohen (1970) using the Edwards Social Desirability Scale, reported a significant correlation between the two scales. Therefore, it would seem that the most recent results have indicated that the I-E scale was contaminated by social and cultural factors. These factors would have a large influence on subjects who were susceptible to conforming to the pressures of society or highly valuing those alternative items they believe they should possess.

The good discriminant validity reported by Rotter (1966) comparing political affiliation and the I-E scale has been recently questioned. Although Minton (1967) found that political liberalism or conservatism, "left" versus "right" ideology, was unrelated to the I-E scale (confirming

Rotter's report), a more recent study by Thomas (1970) demonstrated a correlation between internal items and conservative political tendencies ($r=.44$, $p < .01$, $N=30$).

Summarizing the studies examining the validity of the I-E scale, it may be stated that the results at this time have not been favorable. Sufficient experimental evidence has been collected comparing the I-E scale with other paper and pencil tests to warrant the following conclusions: First, the I-E scale has shown no significant correlations with tests measuring intelligence. Second, it has been demonstrated in numerous studies that the I-E test is significantly correlated with different scales measuring social desirability. This significance has demonstrated an undesirable major overlap of the two factors. Thus, the I-E scale may be measuring, to a large extent, a social awareness factor. Third, the relationship of the I-E factor to political affiliation has not been conclusively defined; however, evidence has been presented which implies an overlap between these two factors.

Reliability

In his 1966 monograph, Rotter reviewed the reliability data on his I-E scale. He found the internal consistency estimates were only moderately high (Table 1). Rotter justified the moderate reliabilities by explaining that

TABLE 1

TABLE OF RELIABILITIES OF INTERNAL CONSISTENCY (ROTTER, 1966)

Sample	Type of Reliability	N	Sex	r
Ohio State University Elementary Psychology Students (Sample #1)	Split Half	50	M	.65
		50	F	.79
	Spearman-Brown	100	Combined	.73
Ohio State (Sample #1)	Kuder-Richardson	50	M	.70
		50	F	.76
		100	Combined	.73
Ohio State University Elementary Psychology Students (Sample #2)	Kuder-Richardson	200	M	.70
		200	F	.70
		400	Combined	.70
National Stratified Sample Perdue Opinion Poll - 10th, 11th, & 12th Grades (1963)	Kuder-Richardson	1,000	Approx. Equal # of M & F Combined	.69

the test itself was not additive, hence the items were not comparable.

> Consequently split-half or matched half reliability tends to underestimate the internal consistency. Kuder-Richardson reliabilities are also somewhat limited since this is a forced choice scale in which an attempt is made to balance alternatives so that probabilities of endorsement of either alternatives do not include the more extreme splits [Rotter, 1966, p. 11].

Unfortunately, the test-retest reliabilities were somewhat lower (.55 to .83) than the reliability coefficients on internal consistency. Also, there were considerably smaller sample sizes used in verifying this reliability over the one and two month test-retest periods (Table 2). Rotter was also faced with having to explain why the two month reliabilities were generally lower than the one month data. Rotter attributed this discrepant result to the fact that the post-test for the two month group was administered individually rather than in a group, however there was no explanation offered why this would effect the reliabilities. In a more recent study on reliability, Hersch and Scheibe (1967) found test-retest reliability coefficients that ranged from .48 to .84 for a two month retest interval.

TABLE 2

TABLE OF RELIABILITIES OF TEST-RETEST (ROTTER, 1966)

Group	Method	N	Subjects	r
Ohio State University Elementary Psychology Students (Sample)	1 Month Test-Retest Group Administration	30	M	.60
		30	F	.83
		60	Combined	.72
Prisoners Colorado Reformatory	1 Month Test-Retest	28	M	.78
Ohio State University Elementary Psychology Students	2 Month Test-Retest (Pre-Test, group administered) (Post-Test, individual administered)	63	M	.49
		54	F	.61
		117	Combined	.55

The question of what value a coefficient must achieve before a test is considered reliable has been left to the discretion of the experimenter. As I-E Locus of Control has been considered a personality variable, one may use the results reported on similar measures (personality tests) as a means of comparing the I-E reliability figures. Helmstadtler (1964) included a table of range and median values for various psychological measures in his text on psychological measurement. Under the heading, Objective Personality Tests, a total of 35 reliabilities were reported with a range of .46 to .97 and a median value of .85. Although the reported I-E reliabilities fell within the range of other personality measures, the reliability values of the Rotter's scale were apparently lower than most of the other personality test instruments. Thus, one has good reason to question the internal construction of the Rotter scale.

ROTTER INTERNAL-EXTERNAL CONTROL SCALE (1966)

ATTITUDE QUESTIONNAIRE

Student Name _____ Student No. _____

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

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. Designate your choice on each item by checking the appropriate blank on the answer sheet.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also try to respond to each item

independently when making your choice; do not be influenced by previous choices.

REMEMBER

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

I more strongly believe that:

1. a. Children get into trouble because their parents punish them too much.
   b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.
   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.
   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.
   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks one cannot be an effective leader.
   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try, some people just don't like you.
   b. People who can't get others to like them, don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.
   b. It is one's experiences in life which determine what they're like.

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

I more strongly believe that:

9. b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student, there is rarely, if ever, such a thing as an unfair test.
    b. Many times exam questions tend to be so unrelated to course work, that studying is really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
    b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have influence in government decisions.
    b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.
    b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.
    b. There is some good in everybody.

15. a. In my case, getting what I want has little or nothing to do with luck.
    b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
    b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

I more strongly believe that:

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.
    b. By taking an active part in political and social affairs, the people can control world events.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
    b. There really is no such thing as "luck."

19. a. One should always be willing to admit his mistakes.
    b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person likes you.
    b. How many friends you have depends upon how nice a person you are.

21. a. In the long run, the bad things that happen to us are balanced by the good ones.
    b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort, we can wipe out political corruption.
    b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.
    b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.
    b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.
    b. It is impossible for me to believe that chance or luck plays an important role in my life.

I more strongly believe that:

26. a. People are lonely because they don't try to be friendly.
    b. There's not much use in trying too hard to please people, if they like you, they like you.

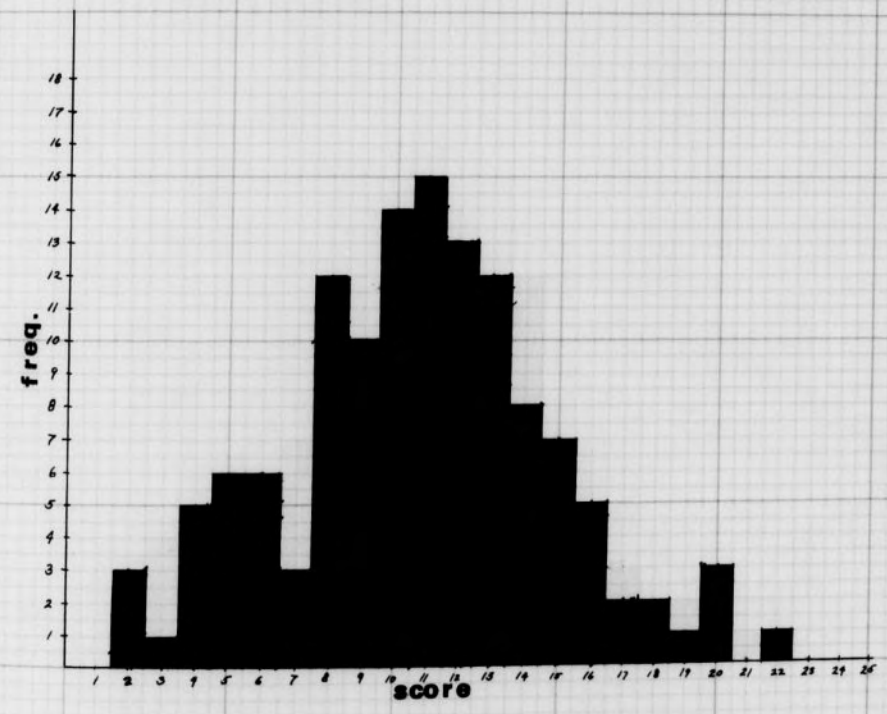
27. a. There is too much emphasis on athletics in high school.
    b. Team sports are an excellent way to build character.

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

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

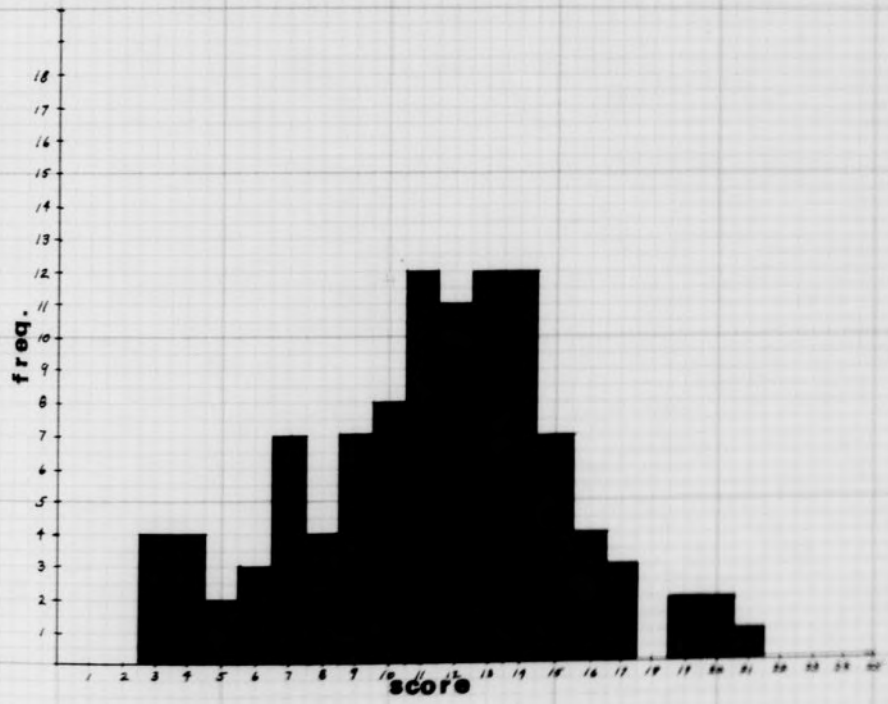
APPENDIX B

FIGURE 1



HISTOGRAM OF PRE-TEST SCORES

FIGURE 2



HISTOGRAM OF POST-TEST SCORES