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## Communication of Experimenter Expectancy as a Function of the Internal-External Locus of Control

Diane M. Harder

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COMMUNICATION OF EXPERIMENTER EXPECTANCY AS A FUNCTION  
OF THE INTERNAL-EXTERNAL LOCUS OF CONTROL

by

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Bachelor of Arts, University of North Dakota 1968

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Submitted to the Faculty

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for the degree of

Master of Arts

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This thesis submitted by Diane M. Harder in partial fulfillment of the requirements for the Degree of Master of Arts 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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COMMUNICATION OF EXPERIMENTER EXPECTANCY AS A FUNCTION OF  
Title THE INTERNAL-EXTERNAL LOCUS OF CONTROL

Department Psychology

Degree Master of Arts

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## ABSTRACT

Several studies suggest that experimenters may influence subjects in experimental situations and thereby obtain the predicted results (Rosenthal, 1966). Thus, the results obtained in research may reflect (1) independent variables, and (2) bias resulting from the communication of expectancies by the experimenter.

Although numerous investigations have considered characteristics of experimenters and subjects that facilitate expectancy communication, the experimenter effect remains inadequately explained (Fode, 1967). It was felt that the investigation of an additional variable, internal-external locus of control, (Rotter, 1954) might contribute further information. Past research suggested that internal subjects are better influencers (Phares, 1965), and that they are also more resistant to external influence (Crowne & Liverant, 1963).

Ninety-six subjects were asked to rate ten pictured individuals (previously standardized to be neutral) on a success-failure continuum. A 2 x 2 x 3 design was used, with two types of experimenters (internal and external), two types of subjects (internal and external), and three treatment conditions (+5, -5, no bias). Twelve experimenters were assigned to a +5 expectancy, a -5 expectancy, or a no expectancy condition and ran four internal and four external subjects.

It was expected that internal experimenters would obtain more biasing than would external experimenters. Further, external subjects



would be more susceptible to bias than internal subjects. The dependent variable was the mean photo rating of each subject. A three-way analysis of variance supported none of the hypotheses. However, there was a tendency for internal subjects to rate photos more positively than external subjects.

## CHAPTER I

### INTRODUCTION AND REVIEW OF THE LITERATURE

Pfungst (1911) related the story of a horse, Hans, who could answer mathematical problems by tapping his foot. While investigating the talents of Hans, Pfungst found that the questioner had to be present and aware of the answer in order for Hans to give the correct response. He hypothesized that the questioner was unintentionally giving Hans clues. During subsequent examination Pfungst found that when he inclined his head forward, Hans started to tap his foot although no question had been posed. As soon as Pfungst leaned back, Hans stopped tapping. Pfungst concluded that Hans' apparent talents were completely dependent on cues from his observers. This story of Hans is one of the earliest illustrations of experimenter biasing effects.

Evidence of other types of experimenter effects have been found not only in anecdotal accounts but also in controlled laboratory experiments. Observers in the physical sciences are not infallible, as illustrated in the well known dispute between the astronomer Maskelyne and his assistant Kinnebrook (Boring, 1950). In later examination of this incident Bessel (1823) noted that differences in experimenter observation are the rule rather than the exception.

Although the experimenter's effect on his results has been recognized since the time of Pfungst and has been a phenomenon showing

a great deal of generality, little research had been attempted in this area until the work of Rosenthal in the late 1950's. Friedman (1967) noted that while experimentalists accepted the existence of individual differences, experimental study in this area focused only on subject differences. Experimenters were regarded as equal, interchangeable entities who elicited identical data from the same subject and observed and interpreted this data identically. He further reports that when many experimental texts discuss the standardization of an experiment, they emphasize the importance of controlling situational and stimulus conditions and of eliminating extraneous variables. However, the consideration of variability in experimenters is never mentioned.

One of the early voices of dissent to this widespread neglect of the experimenter as a research variable was that of Martin Orne (1962). He characterized the experiment as a special form of social interaction which included not only the subject and the experimental situation but also the experimenter. In discussing this idea he noted that while the experimental model has been applied with some success in the physical sciences it is not completely applicable to the behavioral sciences. The physical sciences are dealing with inanimate objects while humans can hardly be assumed to be passive responders to stimuli. In such a situation the experimenter can easily communicate his expectations because the subject's role is readiness and willingness to assist in any possible way. Orne concluded that the data obtained in an experiment may be a result not only of the experimental conditions but also of this complex subject-experimenter interaction. Therefore the experimenter is an important variable to consider when evaluating experimental data.



Robert Rosenthal's research has dealt with this type of problem, focusing on the experimenter's biasing effect on his results. Rosenthal (1966, p. 311) defines experimenter bias as ". . . the extent to which experimenter effect or error is asymmetrically distributed about the 'correct' or 'true' value." He further notes that when an investigator undertakes an experiment, he has some hypothesis as to the outcome, even if it is just a fact finding survey (Rosenthal, 1963). To the extent that this expectancy has an effect on experimental results, experimenter biasing has occurred and the data must be re-examined with that in mind. A considerable portion of the research of Rosenthal and his colleagues has concerned variables related to this expectancy biasing.

The present study is an attempt to investigate personality characteristics that may be influential in the communication and reception of experimenter expectancy bias.

#### Review of the Literature

The effect of experimenter expectancy on the outcome of research has been shown to be a very general phenomenon. Rosenthal (1966) notes that the studies covered in his book include over 350 experimenters (Es), over 2,000 subjects (Ss), and a large number of different experimental situations. One of the first studies concerning this area is quite startling because it deals with animal Ss. Rosenthal and Fode (1963) used an experimental situation in which the task was training rats to run a maze. Although the sample of rats was random, some of the Es were told that the rats were "maze bright" and others were told that the rats were "maze dull." Those Es who thought that their rats were

dull found that they learned little; those Es who thought that their rats were bright were gratified to find that they learned easily; in other words even when the Ss were animals the Es in some way influenced their responses. A second study concerned with expectancy biasing used human Ss. Rosenthal and Fode (1961) biased their Ss to expect either success or failure ratings from Ss in a photograph rating task. A significant difference was found between the mean ratings of Ss of the "success-biased" Es and the Ss of the "failure-biased" Es. The importance of such a result is apparent when it is noted that the photos had been standardized to have a neutral rating on the success-failure continuum.

#### Expectancy Communication

After acceptance is given to the idea that experimenter expectancy effects are quite general and consistent (Friedman, 1967; Fode, 1967; Rosenthal, 1963), the subsequent question that emerges concerns the means of communication of these expectancies. Rosenthal (1966) in his discussion of this question notes that there are three general ways in which theories concerning the methods of communication differ. First, there is a difference concerning whether the expectancy is communicated immediately before the Ss start the task or rather if it assumes the form of reinforcement after the Ss respond. Second, the evidence is not conclusive concerning the sense modality in which the expectancy is communicated. Some researchers feel that it is communicated in visual-kinesthetic cues, others feel that it is communicated in auditory-paralinguistic cues. Visual-kinesthetic cues would include such things as smiling, head shaking, raising eyebrows, or handling



animal Ss. Auditory-paralinguistic cues would include such things as differential emphasis when reading instructions, repeating a response, or tonal quality of voice. The final point on which researchers differ is whether the cues given are specific or if they are merely in the general atmosphere of the experiment.

There has been some research to clarify the first two disagreements. Rosenthal, Fode, Vikan-Kline, and Persinger (1964) report a study which deals with the temporal localization of biasing effects. Rosenthal and his colleagues analyzed the data from three previous studies in an attempt to determine if biasing effects were based on operant conditioning. They reasoned that if conditioning had occurred the amount of biasing should be greater on later photographs than on the first photograph. However, the researchers found that in two of the studies the magnitude of biasing was somewhat greater on the first photograph than for all ten photos combined. When all three studies were considered the magnitude of biasing on the first photograph was not significantly different from that on all ten photos. Thus it appears that it is not operant conditioning that is mediating experimenter biasing effects. Rosenthal (1966) reports a study which indicates that experimenter effects are present immediately at the beginning of the session. After considering these studies he concluded that the bias must be communicated in the very brief period when the Es greet, seat and instruct their Ss.

Fode (1960) reported a study dealing with the means of expectancy biasing in which he restricted communication of Es. He had Es administer the photograph rating task under three conditions of

restriction: (1) the Es could be seen by their Ss but they were completely silent; (2) the Es could be heard by their Ss but they could not be seen; (3) the Es could be both seen and heard. As could be expected biasing was greatest when the Es could be both seen and heard. The second most biasing occurred when the Es could be heard but not seen. While the least biasing occurred when the Es could be seen but were silent, it may not be completely correct to conclude that visual clues give the least assistance in communication of bias. Rosenthal (1966) suggests that the Ss in this treatment condition may have been affected by the apparent strangeness and unfriendliness of their Es.

Friedman (1967) attempted a different approach to the study of bias communication. He used several filmed interactions between Es and Ss in the typical photo rating task. He asked observers to rate such behaviors as the number of glances exchanged between E and S, the number of E smiles, the duration of time spent in each portion of the experiment, and the accuracy of reading instructions. Friedman found that Es who exchanged fewer glances with Ss and read the instructions most accurately obtained the most biasing. He related these behaviors to the professionalism of the E. He suggested that the more professional E produced an experimental situation that tended to elicit facilitating, hypothesis fulfilling behavior on the part of Ss. That is, the atmosphere was one in which the Ss were motivated to attempt to be "good" Ss by fulfilling the expectations of E. Thus, the more professional the E the greater ease he will have communicating his biases.

Perhaps of more interest were Friedman's anecdotal comments on the observed interactions. He noted that, although the Es were



instructed to have no communication with Ss except the reading of the instructions, they were drawn into frequent interactions. Further, they often varied slightly the wording of instructions, substituting such things as "we're" for the more formal "we are." Even when the instructions were read completely accurately the Es stressed certain phrases. For example, Es who were biased to expect -5 ratings might stress the sentences explaining the meaning of a rating of -10.

#### Experimenter Behavior and Bias Communication

A considerable portion of the research related to expectancy has concerned the characteristic behavior of the E that is associated with the communication of bias. Rosenthal (1966) reviews a series of five studies in which the Ss were asked to rate certain behaviors of their E. In subsequent analysis these ratings were correlated with the amount of biasing obtained by the E. In summarizing the results of several different analyses of the data, Rosenthal cites four main variables that appear to be related to Es who were able to obtain more biasing. Subjects perceived "good" biasers as: (1) more professional and businesslike; (2) more relaxed, enthusiastic and interested, however still maintaining a professional distance; (3) using more kines-  
thetic cues, however, these cues remained subtle; (4) speaking more expressively and slowly.

Rosenthal (1966) reports a study in which he also used filmed interactions of Es and Ss. In this research he asked observers, rather than Ss, to rate behavior characteristics of Es. He asked his observers to rate five characteristics of the observed Es; dominance, liking (the amount of liking the observer had for the E), activity, professionalism,

and friendliness. The mean ratings of the observers for each E were correlated with the amount of biasing that E obtained. Rosenthal found the highest, positive relationship (+.63) between the E's professionalism and his ability to bias. Slightly lower, positive correlations were observed between the dominance (+.53) of the E and his ability to bias and the rated likeableness (+.54) of E and biasing. A large, negative relationship (-.48) was reported between the amount of activity of the E and his biasing ability. Thus Es who were more professional, able to control the situation, less hyperactive, and more liked by the observers tended to be successful biasers.

Rosenthal (1966) attempted a more thorough study of behavior characteristics of biasers using undergraduate, untrained observers. In addition to the five characteristics studied in the first experiment he added the characteristics of "important-acting" and "speaks distinctly." Unfortunately the observers had very low inter-observer reliabilities. However, their mean ratings in each condition were correlated with the Es' expectancy effects. Five main clusters of behaviors resulted from an analysis of the correlations of the variables and the amount of biasing. The most significant positive cluster was labeled as "likeable-professional" (+.43). Thus, the relaxed, professional, and honest E appeared to obtain more biasing. The only variable contained in the second cluster was "dominance." This characteristic was also positively correlated (+.32) with the amount of expectancy effects. The third cluster related to "business-like" behavior. It was found that this had a positive relationship (+.29) to biasing. A fourth cluster contained such behaviors as friendly, expressive



voice, and personal. This cluster showed a negative relationship (-.28) with the amount of biasing. Rosenthal suggests that such behaviors may make the experimental situation into more of a social interaction. The last cluster was constructed of activity ratings, such as the number of arm and head gestures. A negative correlation (-.34) was found between these variables and the experimenter effects. Thus similar pictures of the biasing experimenter emerge from these two studies conducted by Rosenthal. Such an E is professional, business-like and dominant, yet still likeable and relaxed.

#### Experimenter and Subject Characteristics and Bias Communication

Sex. A final group of studies investigating experimenter expectancy effects considered the relationship of E's personality characteristics and his ability to influence the results of studies. These investigators also considered the personality characteristics of Ss who were susceptible to expectancy communication. Studies evaluating the relationship of the sex of Es and Ss to biasing have probably obtained the most consistent and unambiguous results of any of the research in this area. A study by Rosenthal, Persinger, Mulry, Vikan-Kline, and Grothe (1964b) compared biasing by male and female Es. They found that male Es obtained the most biasing with male Ss. These Es biased female Ss to a lesser degree, although they still obtained ratings in the direction of their expectations. Female Es were even more successful than male Es with female Ss, however, they were not as effective with male Ss. Their data from male Ss showed a non-significant trend to be in the opposite direction from their expectancies. A second study by the same researchers (Rosenthal et al., 1964a) also considered the



biasing of male and female Ss. They found that male Es were successful in influencing both male and female Ss but appeared to obtain slightly better results with female Ss. Female Es were again successful with female Ss, however, there was a significant trend for their data from male Ss to be in the opposite direction from the Es' expectations. Thus the results from these two studies appear to show that while male and female Es both influence female Ss, female Es tend to obtain opposite results from male Ss. Male Es still obtain results in the direction that they expect from male Ss.

Acquaintance. A second group of studies have concerned the E's acquaintance with his Ss and the amount of biasing obtained. Some of the first information regarding this relationship was actually incidental to the main purpose of a study reported by Rosenthal, Persinger, Vikan-Kline and Mulry (1963). A portion of the Ss in this study were run by male Es who were acquainted with them. The measure of biasing in this experiment was the correlation between the ratings the Es expected to obtain and the data that they actually did receive. Data based on unacquainted Ss alone yielded a correlation of  $-.05$ , while the analogous correlation for the acquainted Ss was  $+.69$ . Thus, it appears that male Es are more successful in influencing Ss with whom they are acquainted. Persinger (1963) reported a second study which further related the effects of acquaintance and the sex of the Es. He found that while male Es tend to obtain more biasing from Ss with whom they are acquainted, female Es obtain more biasing from Ss with whom they are unacquainted.

Anxiety. Fode (1967) reports a study in which he considered the relationship of another personality characteristic to the amount

of biasing obtained. He explored the relationship of levels of E and S anxiety to expectancy communication. He separated both Ss and Es into three levels of anxiety as measured by the Taylor Manifest Anxiety Scale (Taylor, 1953). When he analyzed the amount of biasing obtained by the Es, he found that medium anxiety Es appear to be the most successful influencers. Further the medium anxiety Ss tended to be the most susceptible to influence. Unfortunately subsequent studies have lead to a situation of complete confusion in which nearly every possible combination of anxiety levels of E and S are reported as producing the most bias. Rosenthal (1966) in reviewing six additional experiments reports that in three studies experimenters with medium anxiety levels were observed to allow Es to obtain the most bias. In two samples Es with high anxiety levels produced the most bias and in one sample low anxiety level was associated with the most bias. The results were further complicated by an interaction between S's anxiety level and that of the E. Rosenthal concluded that while there appears to be some relationship between anxiety and experimenter biasing there is no agreement among researchers as to the nature of this relationship.

Need for Approval. A set of similarly confusing results are observed in studies concerning the relationship of need for approval and the amount of expectancy effects obtained. In reviewing seven studies looking at this variable Rosenthal (1966) observed that the effects of need for approval are related to the anxiety level of the E. While there was variability in the results it was felt that, in general, medium anxious Es obtained more biasing if they had high need for approval. Since experimenter biasing is really the product



of the interaction between the E and the S it would appear profitable to consider the relationship of Ss' need for approval and the amount of biasing observed. It might be expected that Ss high in the need for approval would be more susceptible to influence. However, Rosenthal reported that this hypothesis was not confirmed in any of the studies. It appears that Ss' need for approval has no relationship to susceptibility to experimenter influence. When reviewing the results of the studies dealing with the relationship of need for approval and experimenter expectancy it is apparent that it is difficult to reach any simple conclusion because the results are dependent on the interaction of several variables. That is, not only need for approval but also anxiety must be considered in order to relate need for approval to biasing.

Status. A final group of studies explored the relationship of the status of the E to the amount of influence he obtained. Vikan-Kline (1962) reported a study which analyzed the differential results obtained by faculty members and graduate students when they were intentionally attempting to influence students. The results indicated that the faculty members were more successful than the graduate students, however this was only on later trials. On the first half of the trials the graduate students were slightly better influencers, although this trend was non-significant. Laszlo and Rosenthal (1967) report a study which attempted to look at the effects of status on influencing when it was unintentional. Unfortunately, they included a second variable, dogmatism of the Ss, which makes assessment of the findings difficult. They found that more dogmatic Ss showed slightly greater susceptibility to influence. It also appeared that, in general, Es who had lower

ascribed status obtain slightly more success ratings. A study by Riecken (1962) took a slightly different approach to assigning status to Es. He asked observers to rate the degree of professionalness of several experimental rooms. Ss were then randomly assigned to rooms which had been rated as either very professional or very non-professional. All the Es dressed similarly in order to attempt to appear of about the same status. Riecken found that Es in higher status rooms tended to obtain greater biasing. It appears that the research dealing with experimenter status had yielded results that are as confusing as those of studies dealing with the relationship of other personality characteristics and experimenter effects. Further research is necessary before an adequate assessment of the relation of E status to biasing can be obtained.

When the studies concerning the relationship of personality characteristics of Es and experimenter effects are considered as a whole it appears that the results are confused and contradictory. The research is complicated with interactions between S characteristics and E characteristics. In addition there are interactions between various personality variables themselves, such as the interaction between anxiety and need for approval. However, it is likely that the ability of an E to influence his results is in reality dependent on several characteristics. In addition, if it is assumed that the experimental situation is a social interaction, it is reasonable to assume that the characteristics of the Ss are also related to the amount of resulting bias. The proposed study is a further investigation of this complex area. It is felt that the discovery of any additional variable that is empirically



related to the amount of experimenter biasing would be helpful in attempting to clear the existing confusion. Therefore, the focus of the research proposed by this paper will consider the relationship of the internal-external locus of control to the ability of the E to communicate his expectancies and of the S to sense these communications.

#### Internal-External Control: Theoretical Basis

The concept of the internal-external locus of control was developed by Rotter in his social learning theory (Rotter, 1954). This concept is also based on expectancies of individuals. However, the expectancies that Rotter deals with are of a slightly different nature than those considered thus far in the paper. Rotter states that the potential for any behavior to occur is a function of both the person's expectancy that his behavior will secure the available reinforcement and the value of those reinforcements for him. If the person perceives positive or negative (reinforcing or non-reinforcing) events as a consequence of his own action, this is referred to as an internal control. However, if the person sees no contingency between his behavior and reinforcement, this is described as an external control expectancy. These control constructs are considered to be generalized expectancies applicable to a number of situations. Therefore, if an individual has internal control, he sees reinforcements as under his control in a number of situations, while the externally controlled individual generally feels that he has little control of whether or not he will secure any reinforcement.



### Internal-External Control and Ability to Influence

The first attempt to measure the internal-external control dimension was by Phares (1955). This thirteen item scale was later revised by James into a more lengthy version (James, Woodruff, & Werner, 1965). Since the development of that scale a considerable number of researchers have reported that internal Ss and external Ss differ in certain behavioral characteristics (e.g., Rotter, 1966; Lefcourt, 1966; and Green, Lotsof & James, 1964). A study by Phares (1965) suggests that internal Ss are better influencers than are external Ss. Phares asked internal and external Ss to act as experimenters and attempt to change attitudes of other students. He found that the internal Es were significantly more successful than the external Es. In fact, the external Es did not differ in the amount of change produced from a control group in which no influence was exerted. This ability to influence may be related to the internal S's expectancy that his behavior can secure reinforcements. He appears to be a better manipulator of his environment. It would seem reasonable to assume that this influencing ability of the internal S in a social situation would also be found in an experimental situation which is essentially a special type of social interaction.

### Internal-External Control and Susceptibility to Influence

Rotter (1966) offers a theoretical discussion of the difference between internal and external Ss in susceptibility to influence. He suggests that internal Ss would be more resistive to manipulation from the outside, if they were aware of it. Such a situation might make them feel deprived of their control. External Ss, who expect control

from the outside, would be more passive and less resistive to attempts to influence their behavior. However, Rotter states that if the internal S feels that it is to his advantage to conform, he may do so willingly and would only resist outside influence when it was to his disadvantage. A study reported by Crowne and Liverant (1963) yields some experimental support for Rotter's hypotheses. These authors studied internal and external Ss in two situations; one was a typical Asch-type situation (Asch, 1956), however, in the other situation Ss were allowed to bet on their judgments. In the Asch-type situation there was no difference in yielding between internal and external Ss. However, in the betting condition internals yielded to a significantly lesser degree. These results seem to indicate that the internal S may decide to conform unless it is to his disadvantage to do so as it was in the betting condition.

Some studies dealing with verbal conditioning also yield information about Ss' tendency to yield to external influence. James and Randall (1966) in a replication involving the Staats conditioning model (Staats, A. W., & Staats, C. K., 1963), found that internals showed more awareness of the contingencies in the study than did externals. These investigators suggested that these findings may indicate that internals are more responsive to cues in their environment. Strickland (1962) reported a study that explored awareness in the verbal conditioning situation more deeply. On the basis of a post-experimental interview she found a large group of Ss who were aware. She subdivided those Ss who were aware into those who conditioned and those who did not. The group that was aware and did not condition contained significantly more



internal Ss than the group that was aware and did condition. Therefore, this study also supports the suggestion that internal Ss are more resistive to manipulation when they are aware of it.

Gore (1962) reports a study that helps explain this negative reaction on the part of internal Ss to external influence. Gore used three influence conditions in which she attempted to elicit long stories to Thematic Apperception Test cards (Henry, 1956). One condition used overt manipulation, one used subtle manipulation, the third condition was a control condition of no influence. She found no significant difference between external and internal Ss in the overt influence condition, but found that internal Ss gave significantly shorter stories under the subtle influence condition. Rotter (1966) interpreted these findings as indicating that the internal S may go along with the suggestions when he chooses to and when they are overt. However, if such suggestions are not to his benefit or if he perceives them as attempts to influence him without his awareness he acts resistively. If these findings were generalized to the experimental situation it would seem that the internal S would be resistive to biasing attempts by Es. Such communications are subtle and internal Ss who are more responsive to cues from their environment may sense that an attempt is being made to influence them without their awareness.

Therefore, the following hypotheses were tested in the present study:

1. The internal Es will be more successful in communicating bias to Ss than will be external Es.



2. The external Ss will be more susceptible to influencing than will internal Ss.
3. The internal Es will obtain more biasing from external Ss than from internal Ss. Further, external Es will obtain more biasing from external Ss than from internal Ss.

## CHAPTER II

### METHODOLOGY

#### Subjects

The Ss were 96 male students enrolled in Introductory Psychology during the 1969-1970 fall semester at the University of North Dakota. The decision to limit the study to one sex was based on previous research which indicated that the sex of the E and the S interacted to produce confounded results (Rosenthal, 1966). Rosenthal reports that while male Es appear to bias data from both male and female Ss, female Es were successful in influencing female Ss, but obtained reverse results from male Ss. The Ss were selected on the basis of scores obtained on the James' Internal-External Scale (James, Woodruff, & Werner, 1969). Forty-eight of the Ss were chosen from individuals who scored at or below 35 (internal Ss) and 48 of the Ss were chosen from individuals who scored at or above 45 (external Ss). Ss were randomly assigned to six treatment groups with the restriction that each group of 16 Ss contain eight internal and eight external Ss.

#### Experimenters

The Es were 12 male students in an Introductory Psychology class at the University of North Dakota fall semester, 1969-1970. All Es were chosen on the basis of scores on the James' Internal-External Scale. Six of the Es were selected from individuals scoring at or

below 30 (internal Es), the remaining Es were selected from individuals scoring at or above 50 (external Es). The strict random selection of these Es was limited by their willingness to obtain three experimental credits by giving four hours of their time. All of the Es were naive with respect to the experimental variable under consideration and had no previous experience running Ss. The Es were randomly assigned to three treatment conditions with the restriction that each treatment condition include two internal Es and two external Es. The three treatment conditions included: (1) four Es who were biased to expect +5 ratings from Ss, (2) four Es who were biased to expect -5 ratings, and (3) a control condition in which no bias was given to four Es. Each of the 12 Es was assigned to only one bias condition and ran eight Ss, four internal Ss and four external Ss.

#### Stimuli

The stimuli for this study were a set of ten photographs of men's and women's faces cut from a magazine. These stimuli are part of a set standardized by Rosenthal (1966) and used in a considerable portion of the studies dealing with experimenter expectancy. The ten photographs used in this study were chosen by arbitrarily eliminating one set of ten photos because it contained a picture of a prominent figure which would be easily recognized by Ss. The photos were presented individually by the E who held each one in front of the S for approximately five seconds.

#### The Rating Scale

The rating scale, ranging from -10 to +10, was on a success-failure continuum. This scale was identical with the scale used in



previous photo rating studies by Rosenthal (1966). All the numbers, excluding zero, were spaced evenly along the scale (see Figure 1). A rating of -10 meant that the S judged the person in the photo as experiencing extreme failure. A rating of +10 meant that the S saw the pictured person as experiencing extreme success. A rating of -1 indicated that the S saw the person pictured as having experienced mild failure, while a rating of +1 was assigned when the S perceived the person in the photo as experiencing mild success.

EXTREME FAILURE	MODERATE FAILURE	MILD FAILURE	MILD SUCCESS	MODERATE SUCCESS	EXTREME SUCCESS														
-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10

Figure 1. The Empathy Test Rating Scale

The scale was typed on a 5 x 8 index card and taped on each experimental table. It was placed near enough to the S's chair so that he could refer to it while he made his ratings.

#### Questionnaire and Follow-up Report

A questionnaire was designed to assess the S's awareness of the purpose of the experiment and is presented in Appendix A. An attempt was made to ascertain whether or not the Ss felt that the Es were attempting to elicit a particular response and if so, the S's reaction to this perceived manipulation.

The Es were also required to submit a short report concerning their assessment of the experiment and their impression of their performance. The purpose of this report was to assess the E's awareness of the actual focus of the study.



Procedure

A conference was held with each E one or two days before the experiment was scheduled to begin. All the Es received identical instructions except that the average rating was stated as "+5" for the +5 bias group and "-5" for the -5 bias group. The sentence "In the past, researchers in other areas have found that if the procedure is carried out correctly Ss tend to give an average rating of +5 (or -5)." was omitted for the control group which was given no bias.

Instructions to Es

You have volunteered to participate in a research project that is standardizing a test of empathy for use at the University of North Dakota. The task involved is the rating of a set of 10 photographs. In the past, researchers in other areas have found that if the procedure is carried out correctly Ss tend to give an average rating of +5 (or -5). You will be asked to run a series of 10 Ss and obtain from each his ratings. The experimental procedure has been typed out for you and is self explanatory. In order for this study to obtain a valid standardization of the test it is very important that you DO NOT DISCUSS THIS PROJECT WITH ANYONE, not even another experimenter until you are told that you may.

Just read the instructions to the Ss. Say nothing else to them except "hello" and "that's all, goodbye." If for any reason you should say anything else to a S other than what is written in your instructions, please write down the exact words you used and the situation which forced you to use them.

GOOD LUCK

The instructions printed above follow closely those used by Rosenthal (1966). They were adapted slightly to conform more closely to the proposed experimental situation.

The E was also given a copy of the Experimental Procedure (see Appendix B) and the Instructions to the Subjects (printed below) when he attended the pre-experimental conference.

All Ss were run during three, one-hour blocks of time on three consecutive nights. They came to a central room where the principal E referred them to an E in one of the 12 experimental rooms. In the room the E, following the experimental procedure, read the following instructions to the S and recorded his ratings of the pictures.

#### Instructions of Subjects

I am going to read you some instructions. I am not permitted to say anything which is not in the instructions nor can I answer any questions about this experiment. OK?

We are in the process of developing a test of empathy. This test is designed to show how well a person is able to put himself into someone else's place. I will show you a series of photographs. For each one I want you to judge whether the person pictured has been experiencing success or failure. To help you make more exact judgements you are to use this rating scale. As you can see the scale runs from -10 to +10. A rating of -10 means that you judge the person to have experienced extreme failure. A rating of +10 means that you judge the person to have experienced extreme success. A rating of -1 means that you judge the person to have experienced mild failure, while a rating of +1 means that you judge the person to have experienced mild success. You are to rate each photo as accurately as you can. Just tell me the rating you assign to each photo. All ready? Here is the first photo. (No further explanation may be given, although all or part of the instructions may be repeated.)

The instructions to Ss printed above are identical to those used by Rosenthal in photo rating studies (Rosenthal, 1966). After each S completed the session he was requested to return to the central room to fill out a short questionnaire. When all the Ss were run each E was asked to write a short report concerning his impressions of the experiment and his evaluation of his performance.

### CHAPTER III

#### RESULTS

The dependent variable in this study was the mean rating on a success-failure continuum by each S on a set of 10 photographs. The ratings were based on a scale that ranged from -10 (extreme failure) to +10 (extreme success). In order to increase the ease of calculation, the minus ratings were removed by transforming the original scale to a scale that ranged from one to 20 (see Figure 2). Therefore a rating of -1 would be transformed to a rating of 1 and a rating of +9 would be transformed to a rating of 19.

The Original Scale:

EXTREME FAILURE	EXTREME SUCCESS
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10	

The Transformed Scale:

EXTREME FAILURE	EXTREME SUCCESS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	

Figure 2. Graphic Comparison of the Original Rating Scale and the Transformed Scale.



Thus the 10 ratings for each S were transformed to a scale ranging from one through 20 and a mean rating was obtained by summing these ratings and dividing by 10.

The means and standard deviations of the subject ratings for the set of ten photographs are presented in Table 1. These means were calculated at each experimental treatment condition which consisted of a bias level and an internal or an external E.

Table 1

Means and Standard Deviations for Mean Subject Ratings of a Set of Ten Photographs for All Levels of Bias

Bias Condition	Experimenter Characteristic		Subject Characteristic		
+5 M 10.81 SD 1.16	Internal	M 11.11	Internal	M 11.41	
		SD 1.21		SD .87	
	External	M 10.51	Internal	M 10.62	
		SD 1.07		SD 1.18	
			External	M 10.80	
				SD 1.47	
-5 M 11.15 SD 1.43	Internal	M 11.15	Internal	M 11.52	
		SD 1.32		SD 1.70	
	External	M 11.14	Internal	M 11.47	
		SD 1.56		SD 1.61	
			External	M 10.80	
				SD 1.52	
No Bias M 11.33 SD 1.43	Internal	M 11.38	Internal	M 11.77	
		SD 1.46		SD 1.84	
	External	M 11.28	Internal	M 11.02	
		SD 1.44		SD 1.44	
			External	M 11.53	
				SD 1.49	

An F max test for this data was not significant ( $F_{\max} = 6.97$ ,  $df = 7$ ,  $k = 12$ ). This indicates that there were no reliable differences in the within group variances of the treatment conditions. Further, the test confirmed that the assumption of homogeneity of variance was not violated.

A  $2 \times 2 \times 3$  analysis of variance with two levels of Es (internal and external), two levels of Ss (internal and external), and three levels of biasing conditions (+5, -5, and no bias) was employed to test the data (Winer, 1962, pp. 248-257). Preceding the analysis it was decided that rejection of the null hypothesis would be based on the .05 level of significance. The analysis of variance computed for Ss and Es at all levels of bias is summarized in Table 2.

Table 2

Analysis of Variance for Mean Subject Ratings on a Set of Ten Photographs at All Levels of Bias

Source of Variance	Sum of Squares	df	Mean Squares	F
A (Experimenters)	1.40	1	1.40	.76
B (Subjects)	4.30	1	4.30	2.32
C (Bias Conditions)	4.57	2	2.28	1.23
AB (Es X Ss)	1.99	1	1.99	1.08
AC (Es X Bias)	1.51	2	.75	.41
BC (Ss X Bias)	1.30	2	.65	.35
ABC (Es X Ss X Bias)	1.64	2	.82	.44
Ss within groups	156.00	84	1.85	

The largest F ratio was computed for the subject variable, however it did not reach the required .05 significance level. All other F ratios were considerably smaller. Thus none of the F ratios were large enough to warrant the rejection of the null hypothesis.

## CHAPTER IV

### DISCUSSION OF THE RESULTS

Examination of the analysis of variance indicates that none of the research hypotheses were supported. The results presented in Table 2 show that none of the F ratios reached the .05 level of significance. The test of the experimenter variable yielded an F ratio equal to .76 ( $df = 1, 84$ ). This indicates that the amount of biasing produced by internal Es did not differ from that produced by external Es. Thus, the first research hypothesis, which predicted that internal Es would be more successful in communicating bias to Ss than would be external Es, was not supported.

The test of the bias variable also yielded a non-significant F ratio which indicates that the bias condition (+5, -5, or no bias) produced no significant differences in mean subject ratings ( $F = 1.23$ ,  $df = 2, 84$ ). This finding is contrary to the reports given in the many studies reviewed by Rosenthal (1966). However, several other investigators have also failed to find the biasing effect (Barber, Calverly, Forgione, McPeake, Chavers, & Bowen, 1969; Wessler & Strauss, 1968).

The test of the subject variable yielded an F ratio that was larger than the others calculated, however, it did not reach the required .05 level of significance ( $F = 2.32$ ,  $df = 1, 84$ ). This suggests that there were no significant differences between internal and



external Ss in relation to susceptibility to influence. Thus, neither the second or third research hypotheses were supported. That is, external Ss were not more susceptible to influence, and furthermore both internal and external Es did not obtain more biasing from external Ss.

While the analysis of the subject variable did not reach the required level of significance it did reach the .25 level. Examination of the data suggests that there may be a slight tendency for the internal Ss to rate the photographs as more successful than do the external Ss. Such a finding would be in keeping with Rotter's (1966) comments about internal Ss. These individuals feel that they have control of reinforcements in a number of situations, while external individuals feel that they have little control of whether or not they will receive reinforcement. The internal S who feels that he has some ability to control success may project this feeling to the individuals in the photographs, seeing them as also being able to determine success. The external S, on the other hand, does not feel that he can control success and does not necessarily perceive the pictured individuals as successful. Thus, internal Ss' ratings would be higher (more successful) than those of external Ss.

There was no statistical analysis of the subject questionnaires or the experimenter reports. However, examination of the answers suggested that neither the Ss or the Es were aware of the purpose of the experiment.

The type of instruction given to the Es may be one possible explanation why the present study failed to show the biasing effect. The basic content and wording were nearly identical to those used by

Fode (1960) and Rosenthal (1966). However, unlike the Fode and Rosenthal studies, the Es were given no extra incentive to produce the desired results. They were merely informed that if the experiment was carried out correctly they could expect a certain type of data. They were not punished for obtaining conflicting results nor were they rewarded for obtaining the predicted results. This procedure was chosen because previous research had shown that internal individuals can become quite resistive to attempts to influence them subtly when they are aware of such attempts (Gore, 1962). Thus an effort was made to avoid excessive attempts at influencing Es which might "over bias" the internal Es. In the Fode and Rosenthal studies, on the other hand, Es were told that they would receive one dollar for participating in the study and two dollars if they obtained the predicted results. Not all of the bias studies have used such direct incentives; some have attempted to increase the E's involvement through other means. For example, Fode (1967) used engineering students who were told that the study was a laboratory exercise to see if they could replicate "well-established" experimental findings. It would seem that students performing a class function would feel more need to produce the desired results (i.e., do their duties correctly) than would individuals who were merely carrying out the procedure in order to earn required experimental credit.

Rosenthal (1966) has a somewhat different opinion about the effect of reward on expectancy communication. He suggests that excessive rewards may in fact reduce the expectancy effect and produce reverse biasing. At first consideration this statement appears to be contradictory to the preceding discussion. However, examination of



the experimental studies in this area suggests another explanation. In the first study that Rosenthal discusses, Es were given differing amounts of money for producing the predicted results. There appeared to be a tendency for the moderately rewarded (two dollars) Es to obtain more biasing than the excessively rewarded (five dollars) Es (Rosenthal, Fode & Vikan-Kline, 1960). In the second study the Es in the treatment group were given one dollar and told that if they got better data than their partner they could have his dollar as well. However, if their partner obtained data that was closer to the predicted results the first E would lose his dollar. Again in this case there appeared to be a tendency for the control Es (who were not in this betting situation) to obtain more biasing than the treatment Es (Rosenthal, Friedman, Johnson, Fode, Schill, White, & Vikan, 1964). In each of the studies cited above, the treatment rewards (e.g., five dollars or the betting condition) could be considered extreme. That is, the attempts at influencing the Es were quite overt and the rewards that were offered were fairly substantial. On the other hand, the rewards in the present study were very minimal; very little incentive was given for producing the predicted results. In both of these cases the amount of biasing was reduced. However, in the case in which a moderate reward was given biasing was produced. It is suggested that those studies in which a moderate reward is used (e.g., two dollars or doing a good job on a class project) may produce the most optimal conditions for the occurrence of biasing. That is, moderate reward would produce more biasing than either extreme reward or very little reward. The Es would be moderately motivated and involved but not influenced so overtly to produce the correct results that they feel bribed.



Thus it is felt that in the present study, where a concerted attempt was made to avoid any type of extra incentive, the probability that the bias effect would appear might be reduced. If the preceding suggestion is correct it might indicate that the bias effect is neither as strong nor as prevalent as originally believed. Thus instead of occurring spontaneously, it would be most evident in situations where the amount of reward was optimal, neither too little nor too much.

A second reason why this study did not obtain the predicted results may concern the selection of the Ss. Limitations caused by the number of available Ss allowed for a difference of only one standard deviation (10 points) separating the selection levels for internal and external Ss. That is, each group was one half standard deviation from the mean. Thus, internal Ss were classified as those who scored 35 or lower on the James' Internal-External Scale; Ss who scored above 45 were classified as externals. While this should be an adequate interval to show any differences between the two groups if they exist, it may be that much more extreme groups are necessary to allow differences in susceptibility to influence to appear. This consideration is less applicable to the Es since they were chosen according to more stringent criteria. In this case internal Es were chosen from individuals who scored 30 or below on the scale, and external Es from individuals who scored 50 or above. If even more stringent levels for Es are needed for differences to appear it would seem that these differences would be small enough to be considered negligible.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

The present study was designed to assess the relationship of the internal-external locus of control and experimenter expectancy biasing. More specifically, an attempt was made to determine whether the personality characteristic, internal-external locus of control, was related to either the ability to communicate bias or the susceptibility to that communication. Scores on the James' Internal-External Scale were used to measure the internal-external dimension.

The Ss were 96 male students enrolled in an Introductory Psychology class at the University of North Dakota. These Ss were chosen on the basis of scores on the James' Internal-External Scale. Forty-eight of the Ss scored at or above 45 (external Ss), and 48 scored at or below 35 (internal Ss). The Es were 12 male students who were enrolled in the same introductory class. They were also chosen on the basis of Internal-External Scale scores. Six scored at or above 50 (external Es) and six scored at or below 30 (internal Es). All Ss and Es volunteered for the study in order to fulfill required class experimental credit.

The Es were randomly assigned to three treatment conditions with the restriction that each treatment condition included two internal and two external Es. The three treatment conditions included one



in which the Es were biased to expect a +5 rating from Ss, a second condition in which Es were lead to expect a -5 rating, and a control condition in which they received no bias. Each of the 12 Es was assigned to only one bias condition and ran four internal and four external Ss.

The experimental task consisted of rating a set of 10 photographs as to whether the individuals pictured had experienced success or failure. In order to increase accuracy of rating the Ss were given a 20 point scale that ranged from -10 (extreme failure) to +10 (extreme success). The Ss and Es were told that this task was a test of empathy.

A 2 x 2 x 3 analysis of variance, with two levels of Es (internal and external), two levels of Ss (internal and external), and three bias conditions (+5, -5, and no bias) was used to analyze the data. The dependent variable was the mean subject rating for the set of 10 photographs.

It was predicted that internal Es would be more successful at influencing Ss than would external Es. It was also predicted that external Ss would be more susceptible to influence than would be internal Ss. Finally, it was predicted that both internal and external Es would obtain more biasing from external Ss than from internal Ss.

None of these hypotheses were supported. The test of the subject variable resulted in the largest F ratio, however, it did not reach the .05 level of significance. There appeared to be a slight tendency for internal Ss to rate the pictured individuals as more successful than did the external Ss. It was suggested that this finding was in keeping with Rotter's (1966) theory concerning



internal and external individuals. Contrary to the studies reviewed by Rosenthal (1966) no biasing was obtained.

It was concluded that this study does not support the hypothesis that there is a relationship between the internal-external locus of control and the ability to communicate bias or susceptibility to that communication.

APPENDIX A





Experimental Procedure

1. Greet each S as he enters the room and indicate where he is to be seated.
2. Obtain the factual information necessary from each S and enter it on his data sheet.
3. Read the instructions to the S clearly and accurately.
4. Hold up each photograph at the S's eye-level for approximately five seconds. After he gives his rating, place the photograph at the bottom of the stack of pictures and record his response in the appropriate place on the data sheet. It is important that you follow this procedure in order to keep the S from viewing more than one picture at a time and to ensure that the photographs are in the correct order for the next S.
5. Each S should require approximately five minutes in order to complete the task. When the experiment is completed indicate to the S that he may leave by saying, "That's all, goodbye."

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