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ABSTRACT

STUDIES ON THE MEASUREMENT OF ATTITUDE INTENSITY

By

Michael Peretz

The present series of studies in the measurement of attitude intensity sought to improve upon the predictive validity of existing attitude measuring instruments. To do this, a neglected but important component of attitude was explicated, and an instrument to measure it was constructed. The component, attitude intensity, was defined as the drive state associated with an attitude. It represented the urge to behave in accordance with some attitudinal stimuli. Theoretical and experimental research suggested that attitude intensity might be manifested in terms of response vigor.

To measure subjects' response vigor, an instrument called MAIR (Miller Attitude Intensity Recorder) was invented. It is a metal box with three buttons labeled "Like," "Neutral" and "Dislike" which enables subjects to indicate their attitude toward a stimulus by pressing on one of the buttons. The MAIR produces a graphic output indicating the force with which each button is pressed. The experiments investigated two primary hypotheses: first, that attitude intensity is a separate and distinct component from attitude extremity, and that it varies

independently from attitude extremity; second, that attitude intensity is positively correlated with behavior. The first hypothesis was tested in three experiments by manipulating attitude extremity and measuring its effects on attitude intensity. The experiments produced conflicting results which failed to yield clear support for the hypothesis. Inadequacies in the experimental designs are discussed as possible causes for inconclusive results. A fourth experiment attempted to predict behavior from attitude intensity, by having subjects indicate their "Like" or "Dislike" toward various foods (in the form of cardboard models) on MAIR and then ranking the foods from liked most to least. Intensity responses on MAIR failed to predict food preference rankings for 20 of 21 subjects.

The general discussion section examines certain of the key findings and suggests a number of conceptual and methodological difficulties throughout the series of experiments which may account for their lack of conclusiveness. One finding which seems to cast doubt on the internal validity of the concept of attitude intensity is that "Neutral" responses are more intense than "Like" and "Dislike" responses. This is inexplicable, since "Like" and "Dislike" are attitudes which are, by definition, more intense than Neutrality.

Attempting to understand this apparent contradiction suggests one of the most important faults in this

Michael Peretz

series of experiments. It is the failure to validate the measuring instrument. While it is argued that attitude intensity is reflected in response vigor, this was never empirically verified.

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ATTITUDE INTENSITY

By

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Communication

1974

Accepted by the faculty of the Department of
Communication, College of Communication Arts, Michigan
State University, in partial fulfillment of the
requirements for the Master of Arts degree.


Director of Thesis

ACKNOWLEDGEMENTS

I would like to thank Dr. Gerald R. Miller for his keen mind and extraordinary patience.

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CHAPTER I

INTRODUCTION

The purpose of this introductory chapter is to explicate the concept of attitude intensity, to explain and justify a new way of measuring attitude intensity, and to show why attitude intensity, as measured by response vigor, should predict behavior better than previous measures. The technique for measuring response vigor is a device called the Miller Attitude Intensity Recorder (MAIR). The device, invented specifically to measure the concept of attitude intensity as proposed in this thesis, records the vigor with which a subject pushes one of three buttons. The buttons are labeled to enable the subject to indicate agreement, neutrality, or disagreement; or "Like," "Neutral," and "Dislike."

Explication of the Concept: Attitude Intensity

In his chapter on attitude measurement, Scott (1968) distinguishes most of the features of attitude commonly considered in attitude research. He distinguishes magnitude from intensity.

The magnitude or extremity of an attitude refers to its "degree" of favorableness or unfavorableness

(Hartley and Hartley, 1952). A more explicit designation of this property would be affective magnitude, in recognition of the fact that other properties may be conceived of in terms of magnitude also.

This property (intensity) refers to the strength of feeling associated with an attitude (Cantril 1946, Hartley and Hartley, 1952). It seems to be empirically correlated with extremity (Suchman, 1950). Whether or not one regards this as a tautology depends on one's ability to conceptualize the two attributes in ways that are sufficiently distinct to generate distinguishable sets of measures.

Scott himself becomes ambiguous when, after having just distinguished between "intensity" and "magnitude," he says, "By far the greatest attention has been devoted to the measurement of magnitude (or intensity) so the ensuing description of measurement procedures will focus exclusively on this property." [Italics mine] (208)

In order to avoid such conceptual haziness here, it will be useful to explain more precisely what is being measured by attitude intensity.

Scott's definition of intensity, as distinguished from magnitude, is what we are measuring. "Magnitude" refers to the degree of favorableness or unfavorableness, i.e., how favorable or unfavorable a statement about some attitude object one would endorse. Thurstone's approach illustrates this clearly. His technique presents subjects with statements about the attitude object. The statements vary in degree of favorableness toward the object. Subjects indicate those statements with which they agree.

"Intensity," on the other hand, refers to the strength of agreement with a statement, i.e., whether

one agrees with a statement mildly, strongly, etc. Likert type scales attempt to measure intensity by asking subjects how strongly they agree or disagree with a given statement. Hence, when measuring magnitude, "degree of" refers to the favorableness of the statement to which one will agree, while when measuring intensity, "degree of" refers to one's strength of agreement, e.g., "strongly," "moderately," etc.

To specify this conceptual definition even further, we can invoke Doob's (1947) helpful distinctions which are central to the author's thinking. When discussing the strength of an attitude, he distinguishes (1) the afferent strength, (2) the efferent strength and (3) the drive strength. Afferent strength refers to the strength of the bond between the stimulus pattern and the implicit response. Thus, one's reaction of liking or disliking, feeling favorable or unfavorable toward the attitude object comprises the affective bond of the attitude. The strength of this bond may vary. In one person the implicit response (liking, etc.) may not be evoked, or may not be evoked often in the presence of the stimulus. In Chein's (1948) terms this translates into " . . . one's degree of confidence that the attitude actually exists." (56) A person might express this by saying, "Sometimes I feel this way and sometimes I don't." Osgood's semantic differential would be an example of a measurement of affect.

Doob's "efferent strength" refers to the strength of the bond between the attitude as a stimulus and a later response (whether implicit or overt). Responses to an attitude as stimulus might be "linguistic responses, thoughts, images, or stereotypes." (47) Hence, after feeling a "like" or "dislike" toward an attitude object, a person might respond to this feeling with one or another conviction. For example, after seeing a policeman beat a demonstrator and experiencing dislike for the policeman, one's response might be, "I think that that policeman should be put in jail." In general, efferent strength seems to correspond to what we have described as the magnitude of an attitude: the more extreme the statement endorsed as the conviction, the greater the magnitude of an attitude. Thurstone's measuring technique seems to be measuring this aspect of attitude--the efferent bond. Here, subjects are asked to endorse statements varying along a continuum of favorableness toward the attitude object. Likert type scales measure the efferent bonds of attitude as well, and, in addition, they attempt to measure the intensity with which one holds a particular conviction.

Earlier Bogardus' (1928) social distance scale tried to measure verbal reports of behavior directly. Subjects were asked to specify different behaviors toward the attitude object in which they would engage. The behaviors varied along a continuum of intimacy. Subjects

responded by saying that they would or would not behave in a certain way in a given situation. Thus, Bogardus attempted to measure a verbal report of behavior itself--hoping to bypass (or implicitly account for) both afferent and efferent bonds of attitude. Had his method been entirely successful, psychologists would be using his scales today to predict behavior. Since they are not, it is reasonable to assume that his scales must have been tapping something other than behavior, perhaps one's aspirations or, to use a term which locates him in the current framework, one's convictions. This would make Bogardus' scale similar, in practice, to those of Thurstone and Likert.

The third part of Doob's distinction, "drive strength," is crucial because it is this dimension of attitude we are measuring. Drive strength is the strength of the bond between the attitude (now conceived of as a conviction of some sort) and the response it evokes. Drive strength is the impulsion of behave. Once again, as Chein puts it, " . . . it is the intensity of one's urge to do something one's self." (56) Likert scales attempt to measure this aspect of attitude verbally by asking a subject how strongly he agrees or disagrees with the attitude statement.

Thus, when attitude intensity is measured, one is measuring the intensity of one's urge to behave in some way.

Although Doob applies the idea of drive only to one's urge to behave--to act in keeping with the efferent bond as stimulus--there is no reason why the concept of drive strength might not be applied as well to the affective bond as stimulus. In other words, drive strength might relate one's like or dislike to one's convictions or to one's behavior. But, since the affective bond is further removed from the actual overt behavior than is the effective bond, the measurement of drive associated with effect would seem to be more useful in predicting behavior. Figure 1 will aid in understanding the preceding discussion.

Although most authors have conceptualized the difficulty of predicting behavior from attitude as due to a "disparity" or unanticipated incongruence between the two, this view implies that one ought to be able to do so. But an attitude is only one input in determining a behavior. Oftentimes, it is an initial input which is then reinforced, modified, or reversed, by other factors which impinge upon the person. These factors may stand between an attitude or attitude object and a behavior, as "hurdles," (Campbell 1963) and often make perfect behavioral predictions impossible. Presented in Figure 2 is this author's conception of exactly where in the chain between attitude (stimulus) and behavior (response) these "hurdles" stand, and of what they consist.

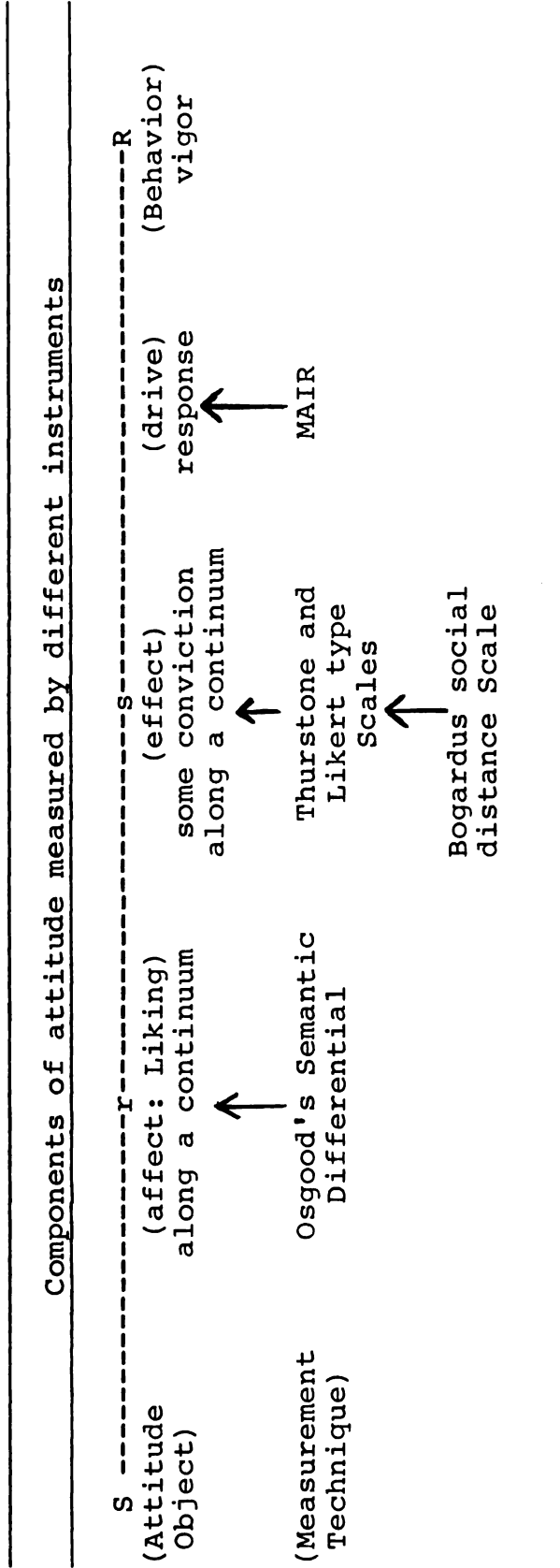


Figure 1.

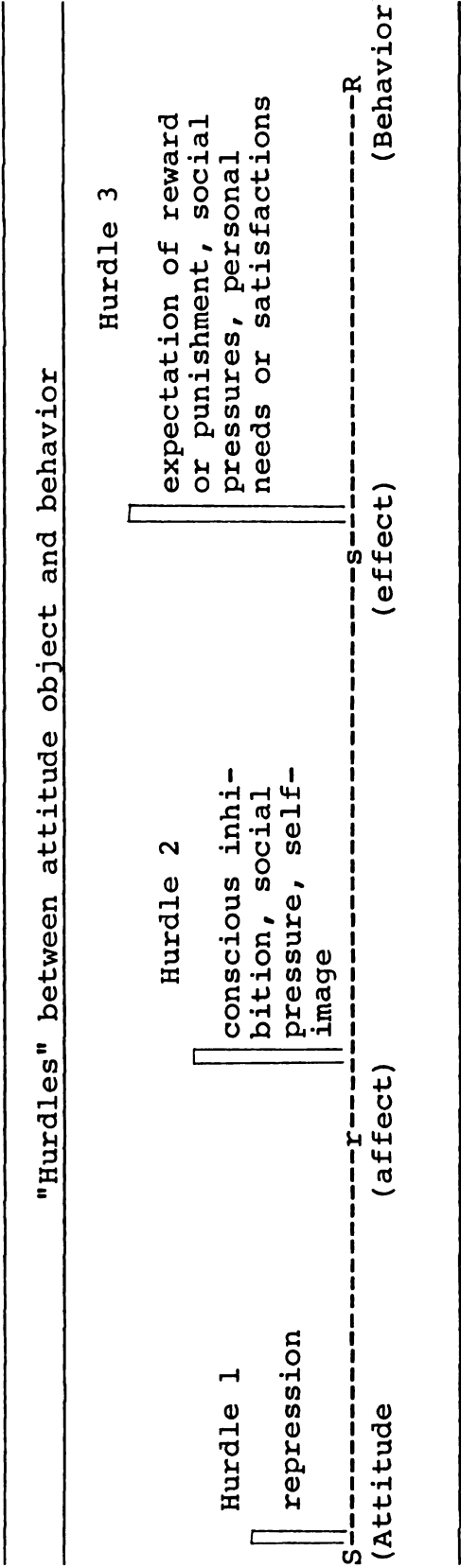


Figure 2.

Figure 2 suggests that difficulties in predicting behavior from the attitude object increase in number and magnitude as one's conception of attitude nears the attitude object. Hence, in attempting to predict behavior, Osgood's technique (Figure 1) must successfully negotiate hurdles 2 and 3. Thurstone or Likert's technique (Figure 1) of attitude measurement must negotiate hurdle 3, one less hurdle in predicting behavior. Although Bogardus' technique asks directly about behavior--attempting to account for the factors in hurdle 3--it does not do so with complete success as evidenced by the fact that the predictive ability of Bogardus' type scales seems no greater than that of the other two techniques.

MAIR would seem to have improved conceptually on the techniques of Likert, Thurstone and Bogardus since it is not measuring effect alone, but with it the energy or the urge with which the effective component is initiated. And it would seem to have improved considerably over Osgood's technique in predicting behavior, since the semantic differential does not even attempt to measure effect and the factors which may modify its expression. Other improvements over previous measuring instruments which are embodied in MAIR are: (1) it is a disguised measure, (2) it is not subject to conscious control, and (3) it is a behavioral rather than a verbal measure of behavior. Because of these features, it is likely that MAIR will more faithfully reflect the effect of social

pressures, expectation of reward or punishment, etc., than would a conscious (or verbal) measure. Conscious measures seem better suited to reflect man's aspirations, rather than his actions.

Justification for Response Vigor as a Measure of
Attitude Intensity: The Relation
Between Attitudes and Drive

Hull (1951) argues that situations associated with drives themselves become drive-producing. Fear is used as an example. After encountering a noxious stimulus, such as a hot stove, a withdrawal response will automatically follow. In the future, after one or several of these stimulus response pairings, the presence of the stimulus conditions will evoke the external physical response of withdrawal, as well as the internal learned response of fear. Fear, as a learned intermediary, later energizes anticipatory withdrawal responses in the presence of the appropriate stimuli.

Likewise, an attitude, whether conceived of as an implicit drive producing response (Doob, 1947), a disposition to evaluate in certain ways (Chein, 1948) or an amount of affect for or against an object (Thurstone, 1931) is generally considered to be learned (Doob, 1947; Staats and Staats, 1948; Campbell, 1963; Lott and Lott, 1969). A stimulus is presented and depending on the nature of the consequent reinforcements a particular attitudinal response is elicited--whether it be called

"Like," "Dislike," a tendency to approach or avoid, etc. In the future, the presence of the stimulus or conditions associated with the stimulus will elicit the internal learned response of liking or disliking, etc. The stimulus or its associations are the conditions for the arousal of the acquired disposition, or attitude, of like or dislike. These attitudes in turn energize responses in the presence of the appropriate stimuli.

Conditioned fear has been shown to have a variety of energizing effects on behavior (Loess, 1952; Brown, 1953; Campbell and Kraeling, 1953; Fredenberg, 1956; Bass, 1958). The energizing effect is non-specific as described by Hull. All reactive behaviors are energized. This position has been supported by research (Brown, 1953).

In infra-human research, amount of drive is commonly measured by the intensity, vigor, or energy expenditure in behavior (Cofer and Appley, 1964). Brown, Kalish, and Farber (1951) conditioned a startle response in rats by pairing a buzzer with electric shock. They found that the height of the startle response (jumping) increased when the buzzer was paired with more intense shocks.

In keeping with Hull's ideas about the energizing effect of primary and acquired drives, attitudes have been assumed to have, and have been shown to have similar energizing effects on various reactive behaviors of humans. Just as the amount of drive in infra-human research has been measured by some index of response vigor,

so has the intensity of attitude been indexed by measures of response strength both physical and physiological. The following two theorists support the plausibility of using physiological responses as an indicator of attitude intensity.

Cook and Selltitz (1964) discuss the use of physiological measures of attitude and state that, "The basis of inference from unconditioned physiological measures to the concept of attitude comes from the definition of attitude which assumes that the magnitude of the physiological reaction is directly and positively related to the extent of arousal or the intensity of feeling, thus, the greater the physiological response, the stronger or the more extreme the attitude is presumed to be." (233)

Shapiro and Crider (1964) state that,

The key notion in the arousal theory is that behavior processes are divisible into a directional component, specifying the orientation of the organism towards a goal, and an intensive component specifying the correlated degree of energy expenditure. Malmö (1958) has equated these components with the Hullian distinction between habit strength and drive as the major determinants of overt response. While electroencephalographic patterns are regarded as the best measure of the activity levels of the central nervous system, the degree of peripheral autonomic or electromyographic excitation is taken as a convenient indicator of this continuum. (p. 45)

Empirical support for the position taken by these authors exists in the field of physiological measures of attitude.

1. Cooper (1959) and Cooper and Pollock (1959) in their investigations of prejudicial attitudes and their

affective fortification, used the GSR from which to predict paper and pencil attitude scale ratings. Stronger or weaker prejudicial attitudes were correlated with the strength of the GSR response.

2. C. E. Smith (1936) used a Wechsler psychogalvanometer to measure the amount of autonomic reactivity the subject showed when presented with an item (e.g., it is bad for women to drink alcohol) and his degree of initial conviction in agreeing or disagreeing with the item.

3. Rankin and Campbell (1955) performed a clever experiment in which prejudice was studied in white subjects by having both Negro and White experimenters come into contact with subjects while the electrodermal reactivity of the subjects was being recorded. Prejudiced subjects showed an elevated reactivity to Negro experimenters entering the room.

4. Westie and Defleur (1959) located prejudiced and unprejudiced subjects by questionnaire and found that the prejudiced subjects showed an elevated GSR and finger pulse measure.

5. It has also been shown more recently (Horwitz, Glass, and Niyekawa, 1964) that muscle tension varies as a function of the differences between positive and negative valence of a win or loss. In this experiment, bipolar surface electrodes were attached over the extensor muscles of the subject's forearm.

There have been some studies reported in the literature in which physical response vigor has been used as a dependent measure of change in attitude or attitude intensity. If, however, we conceive of aggression as an attitude, then numerous studies have measured an attitude (aggressiveness) in terms of the intensity of a physical response. Miller and Dollard (195) suggest that anger is a learnable drive, and have postulated such reactions as thrashing about, striking, clawing and internal visceral responses as occurring innately to situations which produce anger.

Brown (1961) says:

In the majority of experiments designed to reveal the motivating properties of frustration, an increase in the strength of an indicant response has been taken as the criterion of the heightened drive. Enhanced running speed, exaggerated movements have all been used in the frustration drive concept. There is a need for a device to measure drive. (162)

Attempting to measure the aggression of rats after being shocked, Azrin (1967) used a "bitometer." Although unsuccessful in showing a positive relation between aggressiveness and bitometer activity, the device, as its name implies, measured such characteristics as the frequency, duration and intensity of the animal's bite. Other researchers have also used response vigor as dependent measures of attitude.

Holton (1956) hypothesized that nonreward or frustration leads to more vigorous responses. The manipulation involved preschool children making a spatial discrimination

by pushing on one or two color patches on a wall. A failure to reinforce the panel pressing response was arranged to differentially frustrate the subjects. The method used for measuring the induced drive was the intensity with which the panel was pushed measured in pounds of force. Haner and Brown (1955) measured the intensity of aggression after some manipulation in terms of the amount of plunger depression measured in millimeter of depression. Amplitude in millimeters is also expressable in terms of pounds of force. Krasner (1965) successfully measured an increase in favorable attitudes in terms of a subject's force exerted on a dynamometer. Subjects were positively reinforced (and a control group was not) in such a way as to increase their liking "for medical scientists, and by implication, toward the experimenter . . . " The experimenter asked subjects to squeeze a dynamometer as hard as possible as part of the manipulation. Subjects with a more favorable attitude exerted more pounds of force on this task.

Based on the theory and evidence cited, the analogy between the measurement of drive (energizing of external responses) in infra-human research and the measurement of attitudinal drives (energizing of physical or physiological responses) in human research is quite plausible. Theoretically, not only the physiological strength of the response, but physical strength or vigor of the response in human subjects ought to be an indicant of attitude strength

or intensity. To analogize more specifically, just as Brown, Kalish and Farber (1951) measured a more vigorous startle response in animals in the heightened fear condition, this researcher would expect a more vigorous physical response of some kind from subjects in a high, as opposed to a low attitude intensity condition.

Other Attempts to Measure Attitude Intensity

In addition to the attitude measures already discussed, wherein it is difficult to distinguish an attempt to measure attitude extremity from attitude intensity, the following literature has dealt specifically with the problem of intensity.

Daniel Katz (1944) discusses several techniques used to measure the intensity of attitudes by the American Institute of Public Opinion. They include:

- 1) A verbal self-rating of strength of feeling. (How strongly do you feel about this question? ____Very strongly; ____Fairly strongly; ____Don't care)
- 2) A thermometer or a self-rating on a graphic numerical scale.
- 3) A four-step logical scale setting forth the main alternatives on the issue.
- 4) A verbal self-rating on certainty or sureness of the correctness of one's opinion. (How sure are you that your opinion is right? ____Not sure; ____Fairly sure; ____Very sure)
- 5) The interviewer's rating of the strength of the respondent's attitude.
- 6) The respondent's self-rating of his degree of personal involvement. (How much does this question mean to you personally? ____Means very little to

me personally; ____ Means something to me personally; ____ Means a great deal to me personally.)

- 7) The length of time the respondent has been of his opinion. (When did you make up your mind about this question? ____ Just now when you were being asked; ____ Within the past few days; ____ Within the past few months; ____ Have thought this way for a long time.)

With the exception of methods 3 and 5, these techniques approach the problem of intensity in essentially the same way as a Likert type scale. After picking an answer choice of "Agree" or "Disagree," "Yes" or "No," on one of several statements, subjects are then asked to indicate how strongly they feel this, how sure they are, how important the issue is to them, how long they have held this opinion, etc.

The studies utilizing these techniques seem to suffer from a major empirical weakness. Although the researchers state that the purpose of measuring intensity is to aid in prediction of behavior, the studies never correlate measures of intensity with behavior. Stouffer (1949) reports research on the relationship between intensity and extremity of content. In Stouffer's work, extremity of content, or content score, was calculated by summing the number of questions which the subject answered favorably with regard to some aspect of the army. Hence, a subject answering 10 questions with a positive response would have a higher content score than one who answered only 5 questions in a positive way. After each of the content questions--which were followed by several choices from which the subject could pick one--Stouffer added an

intensity question. He asked, "How strongly do you feel about this?" He provided choices from "Very Strongly" to "Not at All Strongly." Stouffer describes the correlation between content scores and intensity scores as a U-shaped curve. That is, the high negative and high positive content scores are highly correlated with their intensity scores, while the correlation between intensity and content scores representing a neutral attitude is much lower. The overall high correlation at the positive and negative ends of the content continuum are evidence that attitude intensity and content extremity vary somewhat together.

It is, however, interesting to note that the variation of the intensity scores around the more "neutral" content scores becomes exceedingly large. Two explanations are offered. First, Stouffer suggests that subjects may have misunderstood the purpose of the question. Some may have responded to the intensity question thinking, "Yes, I feel very strongly that the question is an important one." Similar misunderstandings could also account for strong intensities and middling content scores. Second, Stouffer argues that some subjects may have held a carefully thought out, logically reasoned opinion which happened to be neutral. These subjects could justifiably hold a neutral attitude strongly. Although the general U-shaped curve is evident in Stouffer's data, close examination reveals that there is substantial variation of intensity scores around the highly positive content scores. This suggests, along

with the poor correlation between intensity scores and neutral content scores, that intensity and extremity may be varying somewhat independently.

General Hypotheses for the Four Studies

This series of experiments examined the potential utility of the MAIR as a device for measuring attitude intensity. One of the working assumptions of the research presented here is that attitude "extremity" applies to the scale position marked by the subject on such scales as a Likert, Thurstone, or Semantic Differential type scale. Any other dimension of attitude among those subjects marking the same scale position was taken to be something other than extremity. This approach is certainly justifiable, especially if one can predict different behaviors among subjects within the same extremity group based on differential scores on a new variable, in this case, intensity.

In this series of studies in the measurement of attitude intensity, two general hypotheses were being tested:

- H1. Attitude intensity (as measured by MAIR) varies independently of degree of affect or extremity.
- H2. Attitude intensity (as measured by MAIR) is positively correlated with behavior.

Hypothesis 2 states in a general form that attitude

intensity is positively correlated with behavior toward any attitude object where a more intense "Like" response will predict a stronger approach response. Similarly, a more intense "Dislike" response would be positively correlated with a greater avoidance type of behavior than a less intense "Dislike" response.

Experiments I, II, and IV are designed to test Hypothesis 1, and Experiment III is designed to test Hypothesis 2.

CHAPTER II

DESCRIPTION AND EXPLANATION OF APPARATUS

The primary apparatus used in each of the four experiments was the Miller Attitude Intensity Recorder. Since the device is new and was invented expressly for this series of studies in the measurement of attitude intensity, a detailed description of the device will be given. A description of the additional materials used in each of the individual experiments will be given in the account of each experiment.

The MAIR is a flat metal box, like a show box, containing three buttons (Appendix A). Concealed below each button is a metal bar on which a strain gauge is mounted. As a button is pressed, it exerts force on the bar. The force is measured by the strain gauge which transmits an electrical impulse to the recorder. The greater the force applied to the button, and hence the bar, the greater the deflection of the pen in the recorder. Scores were in terms of the number of units deflected, each unit $1/32$ inch wide (Appendix C). Separate gauges, mounted to each of the three bars, are wired in series to an amplifier which is in turn

connected to a two track brush pen recorder. The recorder is separate from the MAIR itself and is usually set up in an adjoining room. A wheatstone bridge (three, 360 ohm precision wound resistors) on the amplifier is used to alter the voltage output to the recorder. Since there is only one pen for measuring the stress on the bars (a linear measure), a parallel system was built to indicate which bar was being depressed. When each button was depressed, a microswitch was tripped which signaled the other pen in the brush recorder as to which of the three bars was being depressed. A circuit diagram is shown in Appendix B.

The box itself is presently under modification so that the D.C. amplifier can be omitted. This is being done by replacing the present strain gauges (with a factor of 2 to 3) by semi-conductor strain gauges with a factor of 116. Such an improvement should make the machine less expensive and less cumbersome. The present model is built so that pen deflection and button push force are linearly related. This characteristic was empirically tested.

Features of the Box

The box is made out of aluminum, the bars out of steel $1/4 \times 1/4 \times 16$. It is 4 inches high, 17 inches long and 7 inches wide. The top surface of the box is removable and adjustable for height so that the buttons will never pass the cover level of the box when depressed. Inside

the box the bars are mounted to the back plate inside a tight fitting notch. They extend to the front of the box and are supported by a fulcrum. Bars are 1 inch apart. Special features were built into the box to make it versatile.

1. The fulcrum is moveable so that the amount of depression the bar (and the button) exhibits may be changed to see if this has any effect on button pushing intensity.
2. In order to account for the different depth of depression, the top is made adjustable so that the buttons never sink below the top surface.
3. The button depression sensitivity has also been made variable to account for any differences this may create. Each microswitch, on which each of the buttons rest, is mounted on a plate with alternate mountings. Thus, before the button bottoms on the bar, the distance it travels can be varied by moving the mountings from one position to another. To accommodate for the different length plunger effect, three sets of buttons with different length shafts have been turned to accept the different microswitch mountings. The buttons can be simply dropped in and taken out.

CHAPTER III

EXPERIMENT I

PURPOSE

Chapter I was devoted to explicating the components of attitude and showing the relationship between them. It attempted to show that attitude intensity (one's urge to behave) entailed a drive strength, while attitude extremity did not. It was on this ground that intensity and extremity were distinguished. While a stimulus may evoke an attitude of the same given extremity among several people, the intensities of that attitude may vary from person to person.

In order to test Hypothesis I, which states that intensity (as measured by MAIR) and extremity are distinct components of attitude, Ss were exposed to three stimuli varying in level of noxiousness. It was assumed that the extremity of an S's dislike attitude would increase with the increased levels of the noxious stimuli. If attitude extremity could thus be manipulated, with no corresponding increase (or decrease) in attitude intensity, we could assume that the two variables were acting independently. It was hypothesized that there would be no main

effect in intensity due to different treatment conditions.

METHOD

Subjects: Twelve staff members and graduate students of the Department of Food Science at Michigan State University were used as Ss in this experiment. All were familiar with the taste panel room and all had participated in taste panels before.

Materials: Three samples of frozen strawberries were served to each S in the taste panel room. Ss were served in one ounce plastic cups with plastic spoons. Sample one contained ordinary, untreated frozen strawberries. Sample two was made from a batch of ten ounces of strawberries (seven ounces of strawberries and three ounces of syrup) mixed with one level teaspoon of salt. Sample three was the same as sample two except that it was mixed with two teaspoons of salt.

The MAIR was on the counter, just in front of each S, so that responding would be convenient for any right-handed person. Ss could deflect the pen a maximum of 50 units, each unit $1/32$ of an inch.

Procedures: Ss were gathered from the halls and from their offices and labs in the Food Science Building. This was common procedure, as food panel tests were being run every day. The experiment was administered to each S individually after the S had been seated in one of the

booths in the food panel room. The E prepared the food samples from a kitchen in an adjoining room and passed the samples into the S's booth through a small door made for this purpose. Each S was given instructions by the E who spoke through the small door. Ss were told that this would be another food study but that instead of rating the foods on the usual paper and pencil questionnaire, they would record their responses by pushing down on one of the three buttons on the box in front of them, labeled "Like," "Neutral," or "Dislike." Ss were to take a drink of water between each taste, and they were to taste the samples in order. As is standard procedure, samples were not labeled 1, 2, and 3, but were given numbers like 62, 13, 92, so as not to bias respondents by associating quality with assigned number of the sample. Before beginning, Ss were instructed to use one finger throughout the rating procedure. They were asked to press each of the buttons at least once before beginning, to get the "feel of the instrument." After preliminary instructions and warm-up responses were completed, Ss tasted sample one, responded on the MAIR, took a drink of water; tasted sample two, responded, and drank; tasted sample three, responded, and drank. Ss were thanked and told that they were finished after rating the third sample.

RESULTS

General

Transformation of the Raw Data: In Experiments I, II, III, and IV, the raw data, number of units of pen deflection, were transformed in order to legitimately sum scores of Ss. The transformation in all four cases was basically the same. For each S a baseline was chosen so that he could act as his own control. Rather than assign each response a score based on the difference between that response and the baseline, the ratio of the individual push to that of the baseline was used. In this way, more vigorous button pushers could be equated with their less vigorous counterparts. Hence, one S with a baseline of five and a push of ten would receive a ratio score of two; while another S who might have a baseline score of ten and a push of twenty would also receive a ratio score of two. If only the differences scores were used, the first S would score five and the second ten, thus allowing the second S to have an inordinate amount of influence on the overall mean.

In Experiments I and II the baseline was taken to be the least intense response of the practice responses. In Experiments III and IV a more stable baseline was computed based on the average of the three lowest responses regardless of direction. In Experiment II, the raw scores were used without computing a ratio score since there were many responses per S and since their variance was small.

It is difficult to assess the relative merits of each scoring system and its net effect on the raw data. This is so because the effects of a transformation using either ratio or difference scores will depend, in part, on the characteristics of the data to which they are applied. The level of an S's baseline and the size of the variation of his responses about that baseline would come into play in determining the effects of each type of transformation. One effect of a transformation based on differences between baseline and specific response is that a mean based on such differences tended to be greatly influenced by one or two large differences, whereas a transformation based on the ratio between these two scores would minimize the impact of a few large differences.

The decision to use a ratio transformation of the data was based on two considerations. First, the ratio transformation seemed to violate the data least. While the difference system seemed to distort these particular data by magnifying unsystematic large differences, the ratio system distorted them by making Ss less different than they appeared. Based on this observation, and on the inclination that overlooking a true difference was more desirable than reporting a specious one, the ratio system was used.

Results: Experiment I:

The main hypothesis in this study was that attitude intensity (as measured by response vigor on MAIR) would

vary independently with attitude extremity (degree of dislike) for each of the three samples of strawberries. A treatment by subjects' analysis of variance presented in Table 1 indicates a non-significant overall F.

Table 1. Analysis of Variance of Subjects' Responses to Treatment Conditions

	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Between Treatments	2	7.05	3.52	1.85	NS
Between Subjects	7	58.41	8.34	4.37	
Interaction	14	26.67	1.90		
Total	23	102.13			
Mean intensity of response to strawberries condition:					
1 (untreated)		$\bar{x} = 1.07$			
2 (1 teaspoon salt)		$\bar{x} = 2.17$			
3 (2 teaspoons salt)		$\bar{x} = 2.01$			

DISCUSSION

This experiment provides evidence in support of Hypothesis I that attitude intensity, operationalized in terms of response vigor on MAIR, may not vary directly with attitude extremity.

In this study, attitude extremity was equated with the level of noxiousness of the stimuli: strawberries with one, two, or no teaspoons of salt. Since the administration of the three treatments did not show a significant

effect on the S's attitude intensity responses, the data support the hypothesis that these two variables may be operating independently.

Looking at the mean intensity responses for treatment one and two, however, shows that intensity is increasing with extremity. This suggests that there may be some relationship between the two variables.

However, the study differs from a serious flaw in that attitude extremity is inferred directly from the noxiousness of the treatment without a manipulation check. Hence, there is no way of knowing if all Ss are experiencing treatment one with attitudes of the same extremity. Similarly, there is no check on S's experience of treatments two or three, neither the homogeneity of attitude within each treatment nor the increasing extremity between treatments.

Ss in the same treatment group may have had attitudes of varying extremity toward the stimuli. Their intensity responses on MAIR, therefore, might have been perfectly correlated with their attitudes and yet an analysis of the data would encourage one to speciously conclude that intensity and extremity were independent.

In future research this situation should be remedied by having Ss indicate the extremity of their attitude on a paper and pencil measure prior to responding on the MAIR. Only by such a manipulation check can there be confidence that what is being measured is the intensity of

Ss with attitudes of the same extremity; and only by such a check can the success of the manipulation be assured.

One important modification in the experimental procedures should be to extend the warm-up time for Ss prior to their responses to the experimental manipulation. This might consist of ten or fifteen button presses related to some other task. It would allow Ss to reach a more or less stable baseline prior to the critical responses.

EXPERIMENT II

PURPOSE

The goal of this study was the same as that of Experiment I: to show that intensity and extremity are distinct components of attitude. The hypothesis was also identical: that attitude intensity (as measured by MAIR) varies independently of degree of affect or extremity. Again, extremity was defined in terms of the level of a noxious stimulus and intensity in terms of response vigor on MAIR. In this experiment, however, procedures were carried out to check the effectiveness of the manipulation.

METHOD

Subjects: Thirteen students and staff of the Department of Food Science were Ss in this study. They were asked to leave their offices or labs to participate in a taste panel, as is common procedure. Of the 13 Ss, 11 produced useable data. One S's data were removed because

she failed to press "dislike" for a very bad sample of peaches, and disliked the good sample. A second set of data were discarded because the S refused to cooperate with the instructions.

Materials: The materials in this experiment were the same as those in Experiment I except that the stimuli were peaches instead of strawberries. Five samples of peaches were used in this experiment. Samples one and four were untreated; samples two and three had 4 mil. of a solution of citric acid added to an 18 oz. can of peaches, while sample five had 8 mil. added to the same quantity. The samples were referred to as: 1-"good," 2-"bad," 3-"bad," 4-"good," 5-"very bad."

In addition to the stimuli, Ss were given a five-point, pencil and paper rating scale for each sample along with the MAIR (Appendix D). Each sample was to be rated from "Like Extremely" to "Dislike Extremely" on the scale.

Procedure: This experiment was conducted in essentially the same way as Experiment I. However, five modifications in the procedures were made, the most important of which was the addition of a manipulation check. After each sample was rated on the MAIR, S's also rated the sample on a five-point pencil and paper scale ranging from "Like Extremely" to "Dislike Extremely." This allowed the E to determine if S's attitude toward the more noxious stimuli was actually more extreme.

Instructions for using the paper and pencil scale were as follows: Taste sample one and rate it by pressing either the "Like" or "Dislike" button. Then rate the sample on the paper and pencil scale. Then taste sample two, and repeat the same procedure until you have tasted and evaluated all samples.

A second change in the procedures consisted of having Ss participate in an "Aroma" test prior to actual taste test. This took the place of having the Ss "get the feel" of the MAIR by pressing each button once. It was thought that an "Aroma" test better approximated the experimental situation.

The third change entailed having Ss respond on only two rather than three buttons. The "Neutral" button was omitted in an attempt to simplify the experimental apparatus.

The fourth and fifth changes occurred by using five samples rather than three as in Experiment I, and by serving canned peaches treated with citric acid in place of strawberries treated with salt. It was reasoned that the rating of more stimuli might stabilize response patterns.

Results: Experiment II:

Table 2 below presents the results of the paper and pencil manipulation check designed to assure that Ss were actually perceiving the more noxious stimuli with more negative attitudes. As the samples went from "good" to

"very bad," the mean response of negative attitudes (on the paper and pencil measure) rose, on the average, from 2.50 to 3.12 to 4.54 respectively. We can feel some confidence therefore, that S's were actually perceiving the stimuli in the desired way.

Table 2. Manipulation Check

Mean Responses of 11 Ss on 5 Point Scale (5=dislike Extreme)

Sample	1	2	3	4	5
	good	bad	bad	good	very bad
	(untreated)	(4 mil.)	(4 mil.)	(untreated)	(8 mil.)
		acid			acid
	$\bar{x}=2.63$	$\bar{x}=3.09$	$\bar{x}=3.36$	$\bar{x}=2.45$	$\bar{x}=4.54$

Since the treatments were effective, the main hypothesis (i.e., that attitude intensity varied independently from attitude extremity) was tested by computing a treatments by subject analysis of variance on the intensity scores recorded on MAIR. If the two variables were independent, a non-significant F should result. As can be seen from Table 3 below, a significant F was found.

When these data were further analyzed by using a critical difference test for selected comparisons between treatments (Table 4), it was found that treatments 1, 2, 3, and 4 were all significantly different from treatment 5, but that treatments 1 and 4 (the "good" samples) were not different from 2 and 3 (the "bad" samples).

Table 3. Means and Analysis of Variance of Responses
Recorded on MAIR

Sample		Mean			
1	(good-untreated)	1.15			
2	(bad-4 mil. acid)	1.22			
3	(bad-4 mil. acid)	1.21			
4	(good-untreated)	1.17			
5	(very bad-8 mil. acid)	1.54			

Source	S.S.	df	MS	F	P

Between	.91	2	.45	5.87	*p<.05
Within	.34	10	.03	.44	
Interaction	1.56	20	.07		
Total	2.81	32			

*significant $p < .05$

Table 4. Critical Differences Among Mean Responses as
Recorded on MAIR

Sample	1 (good)	2 (bad)	3 (bad)	4 (good)	5 (very bad)
1		.07	.06	.02	.39*
2			.01	.05	.32*
3				.04	.33*
4					.37*

* $p < .05$; C.D. = .26

DISCUSSION

These data provide mixed evidence for the hypothesis that attitude extremity and intensity vary independently. While a significant overall F shows that the treatment (resulting in a given level of attitude extremity) does influence attitude intensity, the relationship is not significant when the differences between levels of extremity are not so great. This suggests a more complicated relationship, perhaps one in which intensity varies freely only within a certain range of attitude extremity, which, when exceeded, causes a jump in the general level of attitude intensity. It may be that intensity and extremity are positively related in some step-wise function.

One can also note that these data provide some evidence of the reliability of the MAIR as a measuring instrument in that the mean responses to both "untreated" samples were quite close together, as were the mean responses to the "bad" samples.

Additional support for the efficacy of the MAIR can be brought to light if we use these data to compare the sensitivity of the MAIR to that of the pencil and paper measure. If the MAIR was able to detect significant differences between treatments which the paper and pencil measure was not, this would indicate that the MAIR was the more sensitive instrument.

It has already been shown in Tables 3 and 4 that

Table 5. Means and Analysis of Variance of Paper and Pencil Manipulation Check

Sample		Mean [*]		
1	(good-untreated)	2.36		
2	(bad-4 mil. acid)	3.09		
3	(bad-4 mil. acid)	3.36		
4	(good-untreated)	2.45		
5	(very bad-8 mil. acid)	4.54		

Source	S.S.	df	M.S.	F

Between	29.92	4	7.48	6.29 ^{**}
Within	59.45	50	1.18	
Total	89.37	54		

* The higher the mean, the greater the dislike: 5=dislike extremely, 1=like extremely.

** $p < .05$

Table 6. Critical Differences Among Mean Responses as Recorded on Paper and Pencil Manipulation Check

Sample	1 (good)	2 (bad)	3 (bad)	4 (good)	5 (very bad)
1		.46	.73	.18	1.91*
2			.27	.64	1.45*
3				.91	1.18*
4					1.09*

* $p < .05$; C.D. = 1.02

the MAIR detected an overall significant effect in subjects' responses to the different treatments. Conditions 1,2,3, and 4 were all significantly different from condition 5. However, the MAIR failed to detect significant differences between the less divergent conditions: the "good" and "bad" samples. We can now ask whether the paper and pencil measure did as well as the MAIR in detecting differences, and perhaps whether it did better.

The data in Table 5 indicates that the paper and pencil measure, like the MAIR, detected an overall significant effect. When the data were further analyzed for specific differences (Table 6) it was found that conditions 1,2,3, and 4 were significantly different from condition 5. This parallels the findings of the MAIR exactly. Both measures detected the same differences and both failed to detect the same smaller differences.

While this similarity in sensitivity does not demonstrate MAIR's superiority to the paper and pencil measure, it does suggest that a technique such as MAIR can at least be comparable to the traditional measure. Since MAIR is in the very early stages of development, further refinements would probably produce even better results.

Regarding changes in the methodology of experiment two, improvements were made in the warm-up procedures by the use of an "Aroma" test. In this procedure five more responses were required than in experiment one. After observing the improvement in Ss' stability of response,

the author commends at least ten to twenty responses as a warm up. In addition, these responses ought to be made in a situation similar to the experimental situation. Establishing a stable baseline response requires more than a S's acquaintance with the device itself; it requires a leveling off of naturally occurring increases and decreases in vigorousness of response. At first the S is concerned with making sure his response is recorded, neither too light nor too heavy, too fast nor too slow. Only much later do the effects of repeated responses alter his intensity and rhythm of response. The S needs to become used to the idea that he will be responding on the device for a considerable period of time. The warm up period and the experimental responses should not last so long as to produce fatigue.

EXPERIMENT III

PURPOSE

Experiment II provided mixed evidence for the hypothesis that intensity and extremity vary independently. While intensity seemed not to be significantly correlated with small increases in attitude extremity, there was evidence suggesting that a stepwise function might exist between the two variables. Intensity may vary only within certain gross changes in extremity. The experiment showed that intensity was related to only two widely different states of extremity, neutral attitude (the S's response to

the "good" sample) and strong dislike (S's response to the "very bad" sample). Even if it can be shown that intensity is not at all correlated with extremity, it must still be shown what it is correlated with in order for it to be a useful concept.

This experiment leaves the question of the relationship of the two variables unresolved. Its purpose is to test the second major theoretic hypothesis stated in the introduction: attitude intensity (as measured by MAIR) is positively correlated with behavior. It is hypothesized that the range of intensities of a like attitude will correlate positively with approach or favorable behavior, and the range of negative intensities will correlate positive with negative or avoidance behaviors. Specifically:

H1a. The intensity of the "Like" and "Dislike" responses on MAIR are significantly correlated with a S's ranking of the attitude objects (food models) from most liked to least liked.

A secondary purpose of the study motivated by previous conflicting results, is to re-examine a more basic notion about intensity which ought to be true if the two major theoretic hypotheses are true. It is that the response vigor of the "Like" and "Dislike" response ought to be more intense than that of "Neutral" responses. This is hypothesized since "Like" and "Dislike" are, by definition, more intense attitudes than neutrality.

H3. The median button pushing intensities of

the "Like" and "Dislike" responses of each S are greater than his "Neutral" responses.

METHOD

Subjects: Twenty-one boys, eight through twelve years old, on two East Lansing Little League teams were used in this study. None had ever participated in an experiment before and all were very cooperative and interested. Prior to one of the morning baseball games in the East Lansing Park, the E set up his equipment in a picnic area adjoining the field. Before game time and between innings, Ss were asked if they would like to participate in a "scientific experiment." By this method, along with the promptings of those boys who had already participated, 21 Ss were gathered.

Materials: From a selection of colored cardboard models of 191 foods, 29 easily recognizable ones were chosen. The models were lifesize and pictured such foods as cooked broccoli in a plate, buttered carrots in a dish, a hamburger and bun, french fries, a glass of milk, a piece of apple pie, etc. The MAIR was placed on a park bench so that the boys could respond to each sample by pressing one of the three buttons, "Like," "Neutral," and "Dislike."

Procedures: After setting up the MAIR and the pen recorder so that the recorder was hidden from the Ss, each S was tested individually. Ss sat on one side of the

bench with the MAIR in front of them, while the E sat on the opposite side of the bench with a stack of 29 cardboard models. Ss were told to respond to each sample of food presented by pressing the button which best stated how they liked the food shown; whether they liked it, felt neutral toward it, or disliked it. Ss were asked to press each of the buttons at least once to get the feel of the machine. The E presented each model to the S by holding it in front of him and saying aloud what the model pictured. As soon as the S responded, the model was put face down into one of three categories, "Like," "Neutral," and "Dislike." Ss were unaware of this classification. After all models had been presented in this rapid fashion, the S was presented with all of those foods which he rated "Like." The samples were spread out in mixed order before him and he was asked, "If you had all of these foods to choose from at dinner, but you could have only one, which would you pick to eat first?" When the S indicated which food he liked best, the chosen alternative was removed and the same question was presented with the remaining models, "Now pretend you had these foods to choose from, which would you pick?" The second food was then removed and in this way the entire selection of liked foods was ranked from most liked to least liked. For Ss indicating a sizable number of disliked foods, a similar procedure was used to establish the order from least disliked to most disliked. Ss were asked: "If you had to eat one of

these foods at dinner, which would you pick?" The last food picked was the most disliked.

RESULTS

The main hypothesis (H1) in this experiment was that the more the food model was liked or disliked (as indicated by S's rank ordering) the greater the response vigor on the "Like" or "Dislike" button. This hypothesis was tested by means of a Spearman Rank Order Correlation Coefficient which correlated intensity of push with rank of food. Among the rankings of 21 Ss, only one proved significant.

It should be pointed out that a correlation of .65 was statistically significant while others of .70 and .72 were not. This is due to the different number of cases in each comparison. Some Ss indicated "Like" for ten foods while others "Liked" 15. A correlation of .65 may be significant ($p < .05$) when based on 15 cases while a correlation of .70 based on 10 cases may not be.

The data were reanalyzed to see if the secondary hypothesis was supported: that "Like" and "Dislike" responses were more intense than the "Neutral" responses. A sign test presented below supports the opposite conclusion: "Neutral" responses are more intense than "Like" responses. The results of this experiment fail to support either hypothesis.

Table 7. Spearman Rank Order Correlation Coefficient
Comparing Rankings of Food Models and Intensity
of Response on MAIR (21Ss)

Like	Dislike
-.26	.44
-.18	-.80
.72	.28
-.10	-.29
.65*	.83
.13	
.20	
.12	
.70	
.32	
-.16	
.16	
.77	
-.38	
.25	
.05	

* $p < .05$

Table 8. Sign Test Comparing Intensity of Neutral
Responses to "Like" and "Dislike"

(N=21)	
Number of times "Neutral" more intense than "Like" = 15	
Number of times "Neutral" less intense than "Like" = 3	
Sign test Sig. .006	
Number of times "Neutral" more intense than "Dislike" = 8	
Number of times "Neutral" less intense than "Dislike" = 9	
Sign test N.S.	

DISCUSSION

The occurrence of only one significant finding out of a possible twenty-one was especially disappointing since the experimental procedures were essentially twenty-one replications of the same experiment, one of which would be expected to be significant on the basis of chance alone.

It could be argued, however, that the task of ranking cardboard food models is not an authentic behavior, or at least not the type of behavior which was alluded to in the rationale for the series of experiments. Ideally, ranking the foods themselves would have afforded a better test of the theory, since, presumably, the impact of the stimuli were diminished by using models of foods instead of real foods.

This objection, although plausible, did not seem to be operative in the actual experiment. The stimuli seemed realistic to the subjects while in the ranking task, and, moreover, the experiment seemed engaging to the Ss. As Aronson and Carlsmith have put it, although the task may not be like any of those in real life "mundane realism," the experiment may have "experimental realism"--where the Ss feel involved in the task and perform as best they can. The task of ranking food models seemed to have this sort of experimental realism for the subjects. In this situation, then, it would seem that the behavior of ranking cardboard models of food was adequate to serve as a realistic behavior.

One of the least expected results found in Experiment III was that the "Neutral" responses were more intense than both an S's "Like" and "Dislike" responses. This is directly contrary to expectation since, by definition, "Like" and "Dislike" attitudes are more intense than "Neutral." One possible explanation for this result is what shall be called the Latency Hypothesis. It derives from the observations of the E. Ss who experienced indecision as to their attitudes about a given stimulus hesitated in their responses on the MAIR. This hesitation seemed to be characterized by a restless mulling over process during which the S was trying to decide whether to respond "Neutral," "Like," or "Dislike." These moments spent struggling to come to a decision appeared to energize the S's response so that when the S did respond after a slight delay, the response was usually more intense than an easily manifested response. Thus, the energized response on "Neutral" may have been due not to greater intensity, perhaps, but to the energized state due to indecision. Since this state of indecision would probably occur more frequently when associated with "Neutral" rather than "Like" or "Dislike" responses, the intensity of "Neutral" responses may well have been elevated above those of "Like" or "Dislike." Future experiments on the topic of attitude intensity ought to test this hypothesis by measuring the differences in latency between "Neutral" and "Like" or "Dislike" responses.

EXPERIMENT IV

PURPOSE

Previous experiments have yielded mixed evidence for the claim that extremity and intensity vary independently. There has also been some support for the idea that there may be some sort of stepwise function relating the two variables where intensity varies freely within but not between greatly different levels of extremity.

Tested in Experiment III was another hypothesis basic to the notion of response vigor as a measure of attitude intensity. It met with negative evidence. Opposite the predicted result, "Like" and "Dislike" responses were less vigorous than "Neutral" responses, although, by definition, they should be more intense.

The purpose of this experiment was to deal with both of these problems by testing two specific hypotheses. First, based on the idea that intensity may indeed vary with gross changes in extremity, hypothesis H1b:

H1b. The mean button pushing response for Ss with strong attitudes will be significantly greater than that for Ss with only moderate attitudes.

Second, the experiment attempts to re-examine the basic hypothesis H3 which was disconfirmed in Experiment III.

H3. The intensity of "Like" and "Dislike" responses is greater than that of "Neutral" responses.

The experiment was also designed to test the "latency hypothesis" suggested in the Discussion section of Experiment III. This specific hypothesis was an attempt

to explain how "Neutral" responses could have been more vigorous than "Like" or "Dislike" responses. It was presumed that if Ss were indecisive, restless, and energized more often in their "Neutral" responses than in their "Like" and "Dislike" responses, such indecisiveness ought to be reflected in a greater response latency of "Neutral" responses as compared to "Like" and "Dislike" responses.

Hence:

H3a. Median latency of "Neutral" responses is greater than that of either "Like" or "Dislike" responses.

METHOD

Subjects: Twenty-four experimentally naive girls from a Family Sciences class were used in this experiment. Because of mechanical problems with the MAIR and a slight attrition from pre- to post-test, only 16 of the girls produced usable data.

Materials: A pre-test questionnaire containing 18 items was used (Appendix E). Ss were asked to respond to statements designed to cover a continuum from very liberal to very conservative. They could respond on a five choice scale ranging from "agree strongly" through "disagree strongly." Of the 18 questions, several were taken from Robinson and Shaver's conservatism-liberalism scale, several from Shaw and Wright's scales, and several were written by the E. Since the questions were not designed to be used as a single unit measuring liberalism or

conservatism, the E was not concerned with the items' intercorrelations.

In the second phase of the experiment, color slides were projected on a screen as stimuli for the Ss (Appendix F). A total of 19 slides were shown, 10 of which corresponded to items on the pre-test questionnaire. For example, one of the questionnaire items read, "I like the idea of huge rock festivals where people come from miles around--like the one at Woodstock, New York." Matched with this question was a color slide of the huge rock concert at Woodstock. Another question read, "I support our flag." Corresponding to this was a picture of two girls burning a toy American Flag. One more question read, "I like the Afro hair style on Black men." Its corresponding slide had a picture of a Black man with an Afro hair cut. The 9 remaining slides which did not correspond to items on the questionnaire were designed to be fairly neutral filler items, such as a roadside in Vermont, a construction sight, and a street scene in Detroit (Appendix G).

Procedures: While in class, Ss responded to an 18 item pre-test questionnaire containing items on a liberal-conservative dimension. Two days later they participated in the second phase of the experiment in which Ss individually entered a small interviewing room. They were greeted by the E and seated. A slide projector and the MAIR were situated on a table in front of them. A concealed wire ran from the MAIR to the recorder placed in an

adjoining room. Ss were told that they would be shown slides of different scenes and that they were to respond to the slides by pushing one of the buttons in front of them, labeled: "Like," "Neutral," "Dislike." They were to respond with their first reaction. Before beginning, Ss were told to press each button at least once "to get the feel of the machine." As each slide appeared, the E described the slide with a two or three word caption. For example "Roadside in Vermont," "Afro haircut," "two Hippies," "Girls burning Flag." Immediately after each response, the next slide was presented. Afterwards Ss were asked not to describe the experiment to other class members.

RESULTS

The main hypothesis in this study was that Ss with strong attitudes toward the stimuli shown would display greater response vigor than those with moderate attitudes. A sign test was computed comparing the intensity of response of those Ss who had indicated a strong attitude with those who indicated a moderate attitude on a pre-test questionnaire. (AS=agree strongly, DS=disagree strongly, A=agree, D=disagree.) The data are not significant, suggesting a lack of relationship between strength of attitude and response vigor.

The evidence bearing on H2 was examined. The hypothesis was that the "Like" and "Dislike" responses

should be more intense than the "Neutral" responses. A sign test presented below provided significant support in the opposite direction. "Neutral" responses are more intense than "Like" responses, showing no difference compared to "Dislike" responses.

Table 9. Sign Test Comparison of Intensities Between Strong and Moderate Attitudes

AS or DS more intense than A or D	7
AS or DS less intense than A or D	2
Sign test N.S.	

Table 10. Sign Test (16 subjects) Comparison of Intensity of Neutral Responses to Like and Dislike

Number of times "neutral" more intense than "like"	13
Number of times "neutral" less intense than "like"	2
Sign test Sig. .01	
Number of times "neutral" more intense than "dislike"	9
Number of times "neutral" less intense than "dislike"	5
Sign test N.S.	

Hypothesis 3 stated that the latency of "Neutral" responses ought to be greater than that of either "Like" or "Dislike" responses. It was hoped that this hypothesis, if confirmed, would help explain the counter theoretical findings regarding intensity and neutrality. Table 9 below

shows that the median latency for "Neutral" responses is smaller rather than larger than that of either "Like" or "Dislike."

Table 11. Median Latencies of "Like," "Neutral" and "Dislike" Responses

Dislike	Like	Neutral
33	32	29

Although these data failed to confirm the hypothesis that "Neutral" responses were, on the average, of greater latency than "Like" or "Dislike" responses, this did not rule out the possibility that latency and intensity are related within a given attitude. Perhaps not all "Neutral" responses were energized by indecision. However, high latency "Neutral" responses should certainly be more intense than low latency responses if "a restless mulling over which energized responses" is actually taking place. Thus, it is predicted that a significant positive relationship exists between latency and intensity within the "Neutral" responses. A median test using the chi square distribution ($p = .05$ $df=1$) was used to test this hypothesis.

The analysis shows non-significant results. This exploration of the latency hypothesis provides little insight into the relationship between latency and intensity; hence, it fails to shed any light at all on the original

problem of the relationship between response chosen ("Like," "Neutral," "Dislike") and latency of response.

Table 12. Median Split Comparing Intensity of High and Low Latencies of Neutral Responses

		Latency of Neutral Responses		
		High	Low	
(median) = 29	Above Median Intensity	15	12	$\chi^2 = .08$ df 1 N.S.
	Below Median	13	13	

DISCUSSION

Inadequacies in the experimental design make it impossible to determine the cause of the non-significant relationship between attitude intensity and response vigor. From a review of the data it was found that Ss who had indicated a strong favorable attitude, for example, on an item stating that "police should be allowed to forcibly remove protesters when they are breaking the law" sometimes reversed their position when shown a color slide of police physically removing protesters. It is not unlikely that Ss had one mental image when answering the pre-test questionnaire--and were expressing an attitude based on that image--yet had quite another image when seeing a full color picture of the real scene. This suggests that when

using different stimuli to elicit and remeasure what is assumed to be the same attitude a careful check be made to assure the comparability of the stimuli.

An attempt was made to examine the evidence for or against the latency hypothesis. The data were examined within the "Neutral" category. If the reasoning in the discussion section of Experiment III was correct, "Neutral" responses should have a higher latency than either "Like" or "Dislike" responses, or at least, high and low latency responses within the "Neutral" response ought to differ on intensity; high latency being matched with high intensity. As shown in the results section of this experiment, the latency hypothesis was not supported. "Neutral" responses failed to show greater latency than "Like" or "Dislike," and further, high latency responses among "Neutral" attitudes were not more intense than low latency responses.

A future experiment with more precise instruments for measuring latency might be desirable; but one must recall that the only reason for invoking the latency hypothesis was an attempt to explain the failure of Experiment III to support the hypothesis that "Like" or "Dislike" responses ought to be more intense than "Neutral" responses.

The disconfirmation of this hypothesis is especially troublesome since it does not demand that the experimental stimuli be interpreted in the way intended, but only that

they be responded to and understood. This hypothesis, along with the subsequent investigation of the relationship between latency and intensity with "Neutral" responses, is what amounts to an internal validation check of the theoretical rationale regarding the way response vigor is related to attitude intensity. Since the lack of confirmation of this hypothesis is not so readily susceptible to faults in the experimental manipulations, one is forced to re-examine the underlying theoretical rationale which holds that response vigor is an indication of attitude intensity.

CHAPTER IV

DISCUSSION

Four experiments were conducted to explicate the relationship between attitude intensity and extremity. It was hypothesized that the two were separate and distinct components of attitude and that they varied independently. Attitude intensity was conceived as one's urge to behave in some way and entailed a drive strength. The greater the drive strength associated with an attitude, the greater the attitude intensity. The concept of attitude extremity, however, does not contain a drive component; hence, a group of people could maintain an attitude of the same extremity and yet differ in intensity.

In Experiments I and II, the author attempted to demonstrate that intensity and extremity varied independently. Intensity of attitude appeared independent of attitude extremity (equated with the level of the noxious stimulus) in Experiment I although the data revealed that there was some increase in intensity with the increase in extremity. The lack of a manipulation check left considerable doubt as to whether subjects actually experienced attitudes of differing extremity. Findings that the two

components of attitude varied independently were, therefore, inconclusive. Experiment II was essentially a replication of Experiment I with small modifications plus the addition of a manipulation check. In the replication, it was found that intensity was significantly effected by different levels of extremity. These two experiments, therefore, produced conflicting results.

Experiment III left the question of the relationship between the two variables unresolved. It attempted to test the second major hypothesis: that attitude intensity is positively correlated with behavior. It was hypothesized that measurements of attitude intensity of "Like" and "Dislike" of various foods would correlate significantly with the ranking of the same foods in order of subjects' preference. Cardboard models of the foods were used when eliciting the original attitude intensity of "Like" and "Dislike" and then again for the ranking. The correlation between intensity and food rankings proved non-significant for 20 of 21 subjects. Thus, measurements of attitude intensity were unable to predict actual (ranking) behavior.

Since Experiments I and II yielded conflicting results, Experiment III attempted also to examine a more fundamental aspect of intensity--its relationship to response vigor. It was hypothesized that the intensity of "Like" and "Dislike" responses should be greater than

"Neutral" responses. This hypothesis was rooted in the basic definition of intensity along with the assumption that "Like" and "Dislike" were, by definition, more intense than Neutrality. The hypothesis was not supported. In fact, the data supported the opposite hypothesis: "Neutral" responses were more intense than "Like" or "Dislike" responses. Although this hypothesis was tested in order to confirm the base level knowledge of intensity which had already been assumed, it created considerable doubt about the postulated relationship between intensity and response vigor. "Like" and "Dislike" were assumed to be more intense attitudes than Neutrality, yet they failed to show greater response vigor. While the findings of Experiments I and II were in conflict about the relationship between intensity and extremity, Experiment III, it seemed, shook the very foundation on which this relationship was supposed to exist. However, one might say that "Like" and "Dislike" are not more intense than Neutrality, but that they are more extreme. If this were the case Experiment III need not be interpreted as a fatal blow to the concept of attitude intensity.

However, the failure to confirm what was regarded as fundamental to the concept of intensity led the author to re-examine the relationship between intensity and response vigor and investigate other possible relationships between intensity and extremity. Experiment IV tested two major hypotheses. First, the hypothesis that

"Like" and "Dislike" responses are more intense than "Neutral" responses was tested a second time. Second, based on data from Experiment I and II which suggested that intensity might be related to large differences in extremity, the author tested the hypothesis that response vigor for subjects with strong attitudes would be greater than for those with moderate attitudes. In essence, this hypothesis sought a direct relationship between response vigor and "strength" of attitude--leaving aside the troublesome question of whether "strength" refers to intensity or extremity. Bearing on the first hypothesis, the data indicated that "Neutral" responses were more intense than "Like" responses, again upsetting the original conception of intensity as manifested by response vigor. The data also failed to support the hypothesis that subjects with strong attitudes would register greater response vigor than subjects with moderate attitudes.

In trying to explain the conflicting and often confusing results of these studies, one of the most serious faults may be a logical one. The author had assumed, albeit after considerable theoretical argument, that response vigor did reflect attitude intensity. He then went on to examine the relationship between intensity, defined as response vigor, and extremity and found confusing results. It is suggested at this time that the assumed relationship between intensity and response vigor was never demonstrated empirically; and it was due to this

problem--failure to validate the measuring instrument--that inconsistent findings arose throughout the entire investigation. Other more specific problems will be discussed, but only after this problem is successfully resolved can further research be profitable.

The series of experiments were beset by problems both conceptual and methodological. In many ways, the MAIR itself contributed to both types of problems. Let us look at them in turn.

Conceptual Problems

In order to define the intensity variable, one must clearly distinguish it from extremity. This has been done conceptually in the earlier part of the introduction, and operationally in the latter part. One can argue, operationally, as this author has, that if 15 persons check "Like" on a three point attitude scale of "Like," "Neutral," and "Dislike," then all fifteen have the same attitude. This can be true by operational definition. If all persons in the "Like" condition then respond on MAIR with differential vigor, and if these different responses can be used to predict later behaviors, then one is justified in claiming intensity to be a distinct and useful variable.

Although this method for separating intensity from extremity is empirically sound, it may result in a problematic conception of intensity. It can be argued

that MAIR (with only three buttons) has merely put a "ceiling" on a measure of extremity by confining respondents to a three point scale. In effect, the positive side of the scale has only one response category. This means that the intensity measure on MAIR may in reality reflect how extreme a scale position would have been marked (on a traditional scale) had a scale with more response categories been available. By having only one "Like" button on the MAIR, it is possible that a whole range of extremities have been compressed into one category, and that differential response vigor may be measuring attitude extremity instead of, or as well as, attitude intensity. The design of MAIR itself seems to be responsible for this problem.

It can be argued that every scale must have some "ceiling," whether composed of three or thirty gradations, however, one can observe the distribution of responses and possibly determine if the response pattern is an artifact of the measuring instrument. On a measuring instrument with only one "Like" category, such as MAIR, one cannot know if such an artifact is operating. It therefore seems necessary to devise a measuring instrument which will measure differences in intensity while leaving extremity free to vary as well. Presently, MAIR allows intensity to vary, but restricts extremity severely to one "Like" button.

One possible solution to this problem requires a

modification in both the methodology and the MAIR. In a modified procedure, intensity would be measured within an extremity position that was not at either extreme of the attitude scale being used. In this way, a "ceiling effect" could not explain differences in intensity. To do this, a MAIR with five buttons would be ideal. If the buttons were labeled "Like extremely," "Like moderately," "Neutral," "Dislike moderately," "Dislike extremely" and Ss within the "Like moderately" position were found to vary on intensity, then one could be confident that one was not tapping a curtailed extremity response. Successful results in predicting a later behavior based on differences in intensity using this methodology would provide an unconfounded measure of intensity.

A substantial benefit of a five button MAIR would be the greater ease of comparing MAIR data with that obtained with traditional seven point scales like those used by Katz and Stouffer and many others. The data gathered from MAIR and any of these measures would be closely analogous and would not necessitate elaborate interpretations to make them comparable for comparison purposes. A five button MAIR would be comparable to a five point attitude scale, while the vigor of response would correspond to a commonly used five point intensity scale following the attitude question.

Results of Experiments III and IV which failed to

confirm that "Like" and "Dislike" responses are more intense than "Neutral" responses raised serious doubts that response vigor does indeed measure attitude intensity. If one assumed that more refined experimental procedures would negate this finding in the future, and that "Like" and "Dislike" responses were, in fact, more intense than "Neutral" responses, one would still be faced with the question: What do "Neutral" responses of different intensity mean?

It seems that to attribute intensity to a "Neutral" attitude may not be the same as attributing it to attitudes of "Like" and "Dislike." If we think of intensity as a quality of an attitude--"How sure we are" that we have a given attitude--then it seems equally attributable to all three states. We can understand perfectly well what it would mean to feel varying degrees of certitude that we were Positive, Negative, or Neutral. So conceived, intensity applied to a neutral state makes sense.

However, as the concept has been explicated in the introduction to this research, intensity was a measure of one's urge to behave--the drive strength associated with an attitude. Conceived in this way under certain conditions it is difficult to understand what intensity would mean when applied to a neutral state since neutrality can sometimes imply a lack of response.

Under certain conditions, it is difficult to

understand what "intensity" would mean when applied to a neutral state since neutrality sometimes implies a lack of response. For example, if one were asked which of two restaurants he wanted to go to for dinner and replied that he was neutral, this would imply that he would not argue for either nor would he act to influence the choice of restaurants. The more neutral, the less he would act in favor of one or the other; the less neutral, the more likely he would be to speak in behalf of one or the other. Neutrality conceived in terms of preference may well imply one's steadfastness against action.

Although this formulation brings neutrality under the scope of attitude intensity as presently defined, it would change the postulated relationship between attitudinal drive state and subsequent action. The relationship is conceived to be positive for attitudes of "Like" and "Dislike" and would have to be negative for "Neutral" attitudes.

However, under other conditions, feeling neutral with different degrees of intensity does not imply that the more intense the neutrality the less the desire to act. For example, if one felt intensely neutral toward the Arab-Israeli conflict, i.e., that both parties had numerous justifiable grievances, we might indeed spend considerable energy arguing for an even-handed treatment of the issue seeking compromise and conciliation. In a case such as

this, neutrality of greater rather than lesser intensity might be associated with arguing more strongly for an even handed settlement. Hence under one set of conditions, intense neutrality is associated with the lack of action and under another set it can be associated with vigorous action.

In future research in this area, special attention should be given to conceptualizing and operationalizing the meaning and the conditions under which the word "neutral" is used. After having been precisely defined and limited researchers should generalize the experimental findings with great care since the meaning of the term appears to be context dependent.

Methodological Problems

In discussing methodological artifacts of the MAIR itself in this series of experiments, one cannot avoid the fact that its mechanical operation played an important role in influencing the response tendencies of the respondents. The absence or presence of a click (due to a microswitch under each button) at the bottoming of a button push may have influenced respondents. When a click was absent, people tended to continue to push harder and harder waiting for some sign that the MAIR had recorded their response. Even after they had responded several times on the MAIR, their responses still tended to be more intense if they noticed no click and were looking for one.

On the other hand, the presence of a click at some point in the button press often had the effect of terminating a response once the click was heard. The sound of the click seemed to have the effect of narrowing the variance of an individual's response. As a solution, the author suggests a button with a solid bottoming effect but with no distinct click--similar to that of an elevator button. This would provide an obvious indication that the button had been fully depressed yet minimize the signaling effect of the click. It has also been observed that young children seem to be more sensitive to the absence of a click than adults.

Other subtle factors in the experimental situation seemed to have unexpected effects as well. All of the experiments revealed the importance of the order of presentation of the stimuli. Both the valence and magnitude of a previous stimuli appeared to influence the intensity--but not the direction--of a subsequent response. For example, a stimulus with a positive valence of three units may elicit a more vigorous response on MAIR when following a "Neutral" stimulus than when following one with a positive valence of five. In other words, a contrast effect seems to be operating.

The valence of the stimuli itself also seems to be a relevant variable. In this series of studies, stimuli with both positive and negative valence were used to elicit responses. It was assumed that for the purpose of

exploring the concept of attitude intensity the two were equivalent. After experience with both types of stimuli, it is suggested that they are not equivalent. In general, stimuli with a negative valence seem to work better in eliciting responses along a continuum of intensity. For some reason, which remains unclear, increases in liking or agreement do not seem to elevate response vigor continuously, while increases in negative attitude seem better able to do this. This author agrees with the assumption on which Cook and Selltiz (1967) comment:

In general, in attempts to assess attitudes toward social groups via measurement of physiological responses, it has been assumed that the range of affect is not from strongly favorable to strongly unfavorable but rather from accepting, or neutral, to strongly unfavorable; thus the inference has been drawn that the greater the physiological response, the more unfavorable the attitude.

Future research on the MAIR would probably fair best by trying to discriminate intensities of "negative" rather than "positive" attitudes.

As the last topic to be considered in this discussion, it should be pointed out that perhaps one of the reasons for the failure to isolate the relationship between intensity and extremity, and to predict behavior from intensity, lies in the difficulty of creating extremely strong attitudes in the laboratory. Determining the nature of the relationship between intensity and response vigor, although still unknown, may be greatly affected by this problem. While attitude intensity may

theoretically be a continuous variable, response vigor may be associated with the passage of progressive thresholds of attitude intensity. This would mean that response vigor within a certain range of attitude intensity may be more or less random until a sufficiently higher level of intensity has been reached. Once this higher level had been reached, the next increment in physiological arousal would have been excited, resulting in increased response vigor.

If the relationship between attitude intensity and response vigor operated in this way, the failure to create or elicit sufficiently strong attitudes would make all levels of physiological stimulation fall below the same threshold. This would result in the inconsistent findings generally obtained.

The one exception to this general finding occurred in Experiment II where significantly different levels of response vigor were recorded for the different treatments. These treatments involved samples of food with excessive salt--a stimulus to which subjects reacted almost violently. Differences in response vigor with such stimuli may be due not to differences in attitude intensity, but to shock and bodily reaction to an extremely aversive stimuli.

It is suggested that future researchers in this area attempt to elicit attitudes with clear and extreme differences in intensity. For example, it might be

possible to measure the differences in attitude intensity among members of SDS and members of a liberal democratic club on the issue of ROTC on campus. Here we would have good reason to expect sizable differences in intensity among members of the two groups. We would also expect a difference of this magnitude to cross any threshold that might be operating and to produce the predicted differences in response vigor.

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APPENDICES

APPENDIX A

PICTURE OF MAIR

Picture of MAIR

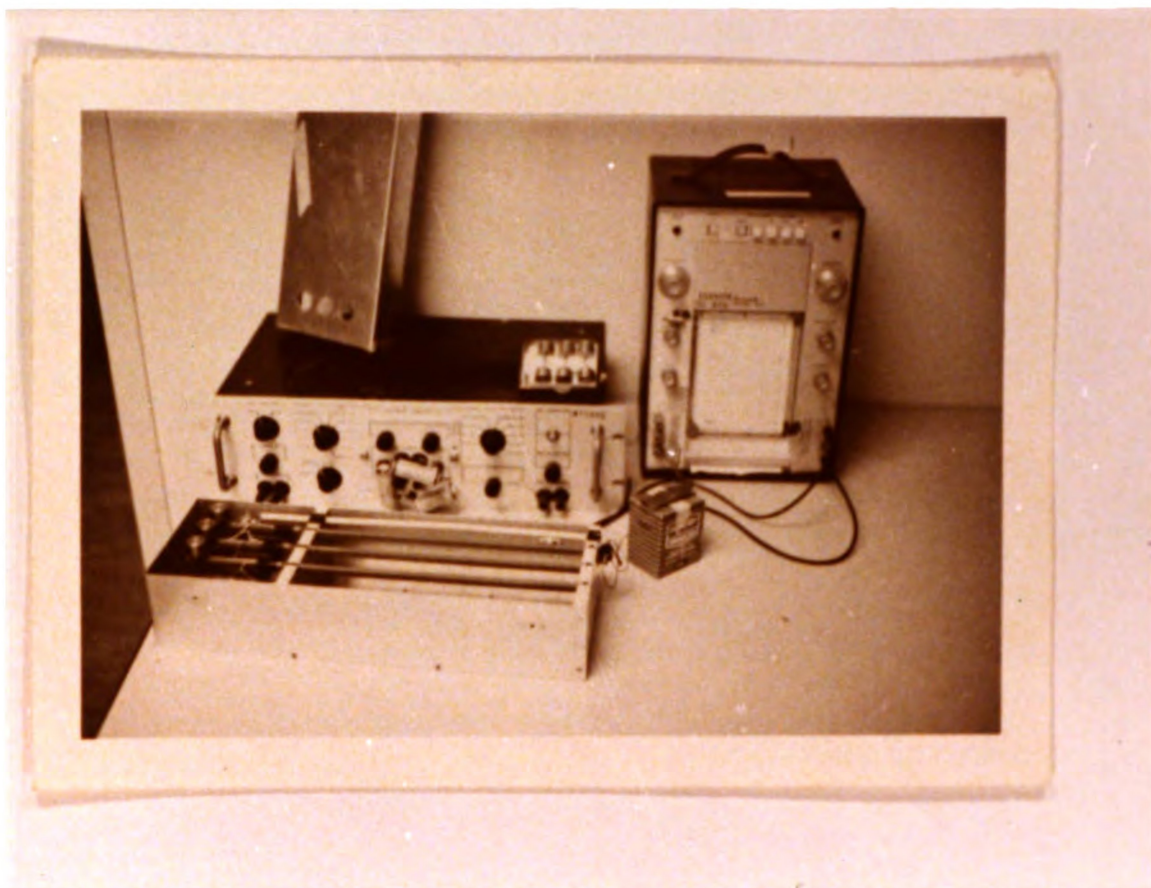


Figure 3.

APPENDIX B

CIRCUIT DIAGRAM OF MAIR

Circuit Diagram of MAIR

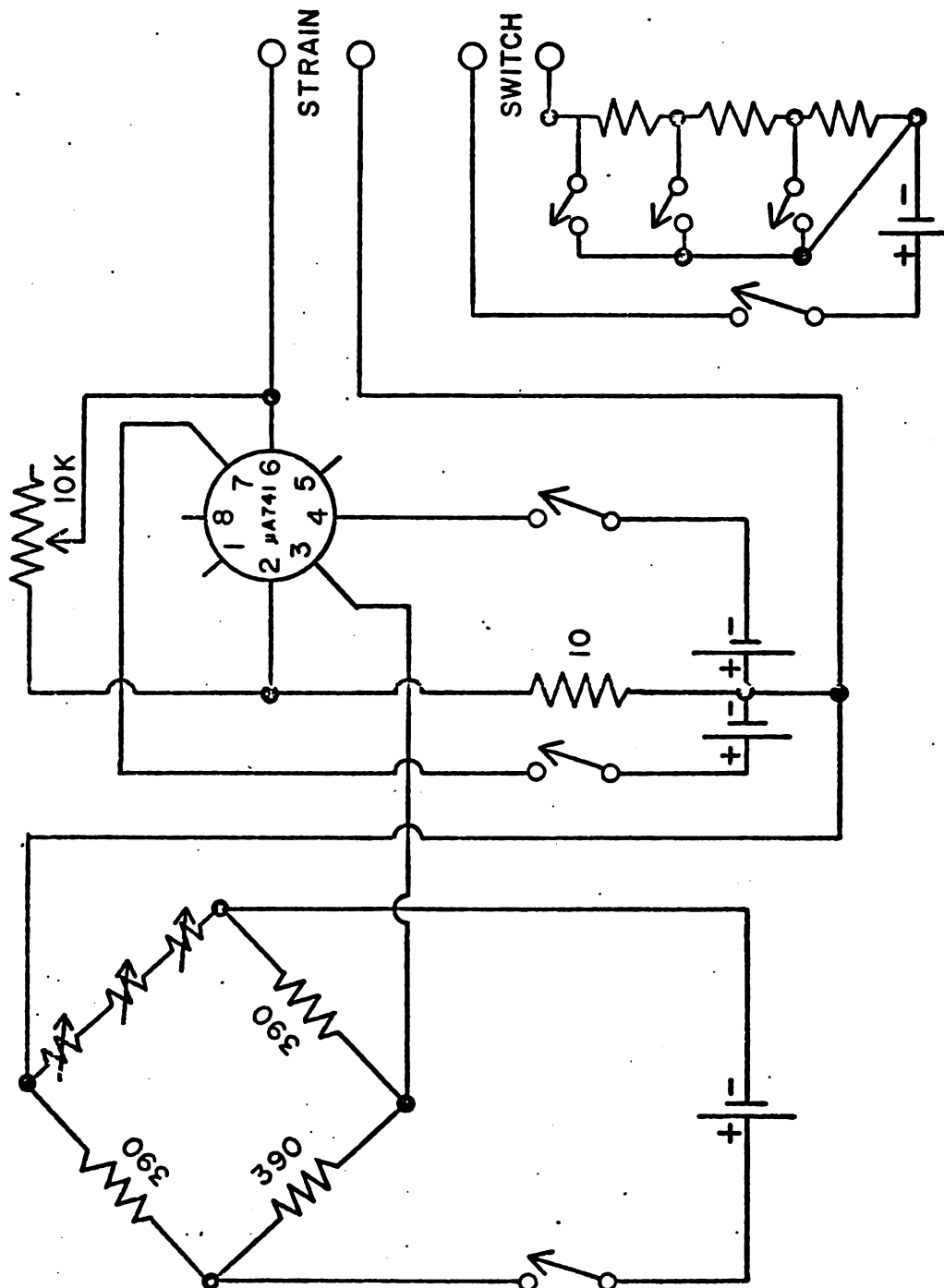


Figure 4.

APPENDIX C

OUTPUT SAMPLE OF MAIR

Output Sample of MAIR

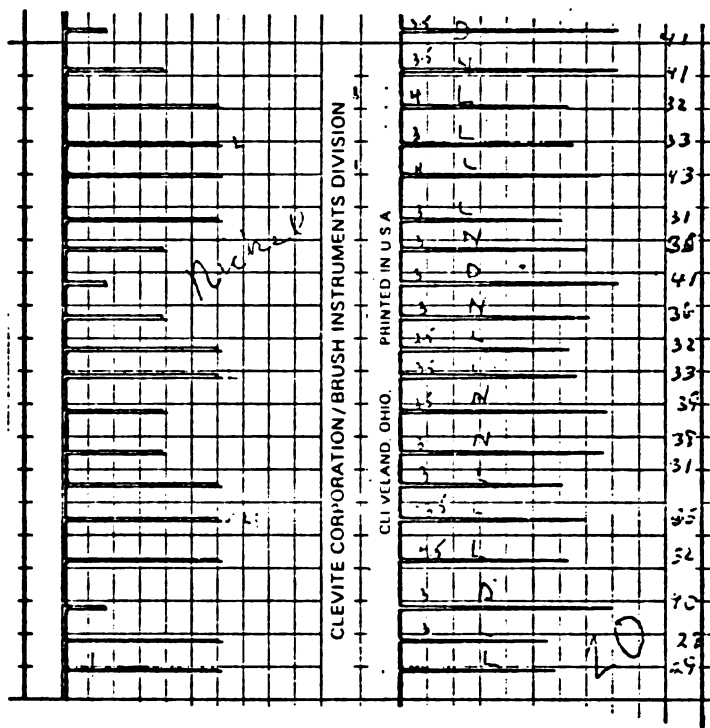


Figure 5.

APPENDIX D

EXPERIMENT II

MANIPULATION CHECK OF ATTITUDE EXTREMITY

MANIPULATION CHECK OF ATTITUDE EXTREMITY

M.S.U. - FOOD SCIENCE

Preference Test

Name: _____ Plate No: _____ Date: _____

	Like Extremely	Like Moderately	Neither like Nor dislike	Dislike Moderately	Dislike Extremely
SAMPLE 17:	_____	_____	_____	_____	_____
SAMPLE 83:	_____	_____	_____	_____	_____
SAMPLE 59:	_____	_____	_____	_____	_____
SAMPLE 2:	_____	_____	_____	_____	_____
SAMPLE 96:	_____	_____	_____	_____	_____
SAMPLE 6:	_____	_____	_____	_____	_____
SAMPLE 7:	_____	_____	_____	_____	_____

APPENDIX E

EXPERIMENT IV

ATTITUDE QUESTIONNAIRE

ATTITUDE QUESTIONNAIRE

Name:

Opinion Profile

Please answer the following items by circling the response which most nearly agrees with the way you feel. All data collected will be confidential and no one's name will be used in any description of this research.

1. In our country, the sentences handed out to criminals are usually too light.
Agree Strongly Agree Neutral Disagree Disagree Strongly
2. This country would be better off if religion had a greater influence on daily life.
Agree Strongly Agree Neutral Disagree Disagree Strongly
3. Police should be allowed to forcibly remove protesters who refuse to obey the law.
Agree Strongly Agree Neutral Disagree Disagree Strongly
4. If radical students and protesters don't like their country, they should leave it.
Agree Strongly Agree Neutral Disagree Disagree Strongly
5. By and large, I support the people who protest against the war.
Agree Strongly Agree Neutral Disagree Disagree Strongly
6. A man who is ready to die for his country deserves the highest honor.
Agree Strongly Agree Neutral Disagree Disagree Strongly
7. Hippies are mainly spoiled kids who refuse to work and who are parasites.
Agree Strongly Agree Neutral Disagree Disagree Strongly
8. We owe our progress to radically minded people rather than to the conservatives.
Agree Strongly Agree Neutral Disagree Disagree Strongly
9. I don't like the "Afro" hair style worn by many black men.
Agree Strongly Agree Neutral Disagree Disagree Strongly

10. I think that the modern art paintings that look like splattered paint on a canvas are as valid as any other type of painting style.
Agree Strongly Agree Neutral Disagree Disagree Strongly
11. I think that the Black Militant movement is a good thing.
Agree Strongly Agree Neutral Disagree Disagree Strongly
12. The government should allocate more money to the cities and less to the war.
Agree Strongly Agree Neutral Disagree Disagree Strongly
13. The average man today is getting less than his rightful share of our national wealth.
Agree Strongly Agree Neutral Disagree Disagree Strongly
14. The United States should be willing to surrender some of its rights to strengthen the United Nations.
Agree Strongly Agree Neutral Disagree Disagree Strongly
15. Every man should have a guaranteed minimum wage from the government.
Agree Strongly Agree Neutral Disagree Disagree Strongly
16. I like the idea of huge rock festivals where people come from miles around - like the one at Woodstock New York.
Agree Strongly Agree Neutral Disagree Disagree Strongly
17. I am in favor of constructive participation in student government.
Agree Strongly Agree Neutral Disagree Disagree Strongly
18. I support our flag.
Agree Strongly Agree Neutral Disagree Disagree Strongly

APPENDIX F

EXPERIMENT IV

DESCRIPTION OF SLIDE STIMULI

DESCRIPTION OF SLIDE STIMULI

1. Roadside near Vermont
2. Chicago police removing protesters
3. Radical students protesting
4. A demonstration against the war
5. Small lake in Maine
6. Hippies
7. Street scene near Detroit
8. Afro haircut on a black man
9. Modern art painting
10. Black militant movement
11. Roadside construction site
12. Black militant students on campus
13. New England church
14. Black power sign at the Olympics
15. Rock concert
16. Speaker at a student government convention
17. Girls burning toy flag
18. Winter scene at Michigan State University

APPENDIX G

EXPERIMENT IV

SAMPLE ATTITUDINAL STIMULI

Sample Attitudinal Stimuli

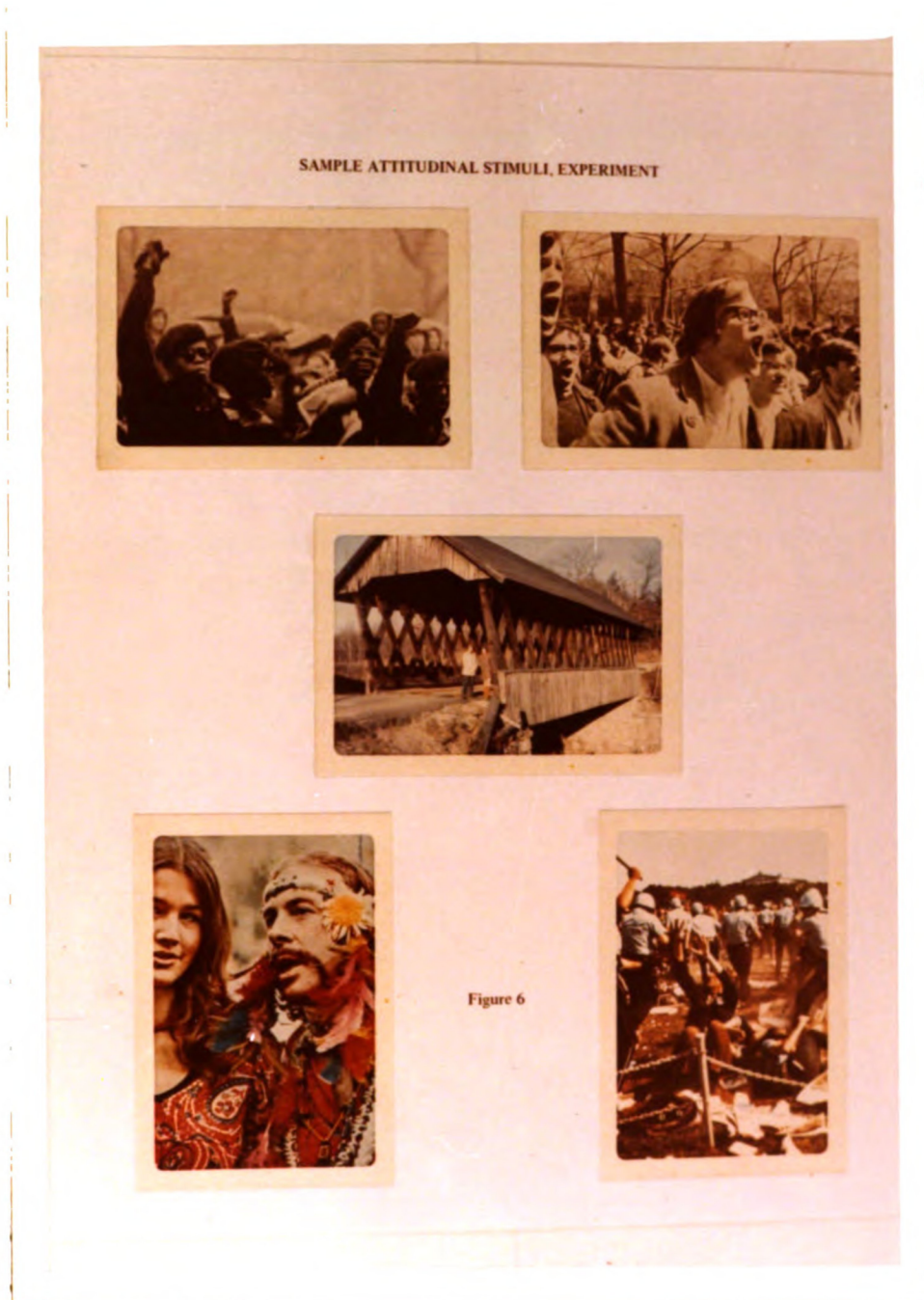


Figure 6.

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