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CUE INTERACTIONS IN THE ATTITUDINAL STEREOTYPING OF SCHEMATIZED FACES WITH VARIATIONS OF HEAD AND FACIAL HAIR.

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JOHN M. STEELE, JR.

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1970

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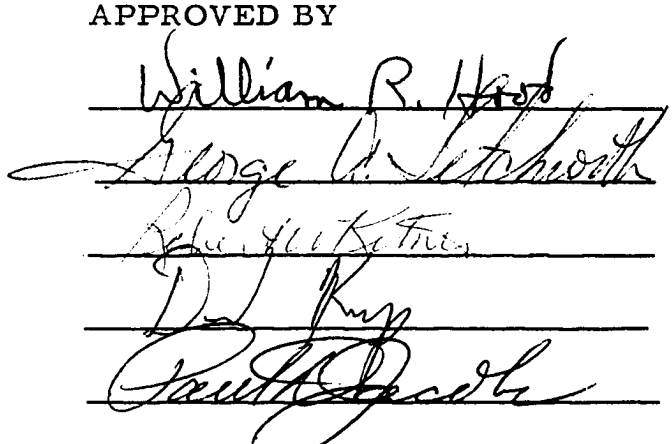
APPROVED BY



DISSERTATION COMMITTEE

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CUE INTERACTIONS IN THE ATTITUDINAL STEREOTYPING OF SCHEMATIZED FACES WITH VARIATIONS OF HEAD AND FACIAL HAIR

CHAPTER I

INTRODUCTION

The purpose of this study is to investigate the process of stereotyping of individuals with various styles of head and facial hair by delineating 1) the nature of the stereotype, 2) the cues that are utilized in the process, and 3) the interaction between the cues.

Need for the Study

The specific area of this study is that of "person perception" or "social perception." Tagiuri and Petrullo (1958) have specifically defined this area of investigation by stating:

> We propose using the term person perception whenever the perceiver regards the object as having the potential of representation and intentionality. What do we mean by this? As a physical stimulus a person is, of course, not different from other stimuli. In the sense that, through information gained via perception, we infer properties and potentialities of the object that are not immediately given, persons are doubtless special objects, for persons have psychological properties. Indeed, when we speak of person perception or of knowledge of persons, we refer mostly to the observations we make about intentions, attitudes, emotions, ideas, abilities, purposes,

> traits--events that are, so to speak, inside the person . . . Underlying this mode of comprehending human action is the capacity we have to note that the person whose actions we are following has within him a representation of his environment, that his actions are medicated by the representations he forms. We know, in fact we assume, that he is capable of watching, perceiving, remembering, and waiting for opportune circumstances. On this basis we can experience the other person as directing himself to us, with intentions, attitudes, and feelings (Tagiuri & Petrullo, 1958, pp. x-xi).

With regard to stereotyping, the area of person perception involves another difficulty--it is a reciprocal or mutually causal process. That is, if widely shared stereotypes exist for certain external characteristics and people tend to act toward a person with these characteristics in accord with the stereotype, then the individual with these characteristics may come to perceive himself in relation to these shared beliefs, and act accordingly. Many studies have been conducted to specify the nature of a stereotype (i. e., the shared beliefs) but relatively few have focused on the process itself or the nature of cue utilization in the process. However, the problems are not separable; in order to investigate cue utilization one must also investigate the nature of the stereotype.

In stereotyping another individual with regard to his inferred beliefs and intentions, on the basis of immediately available external characteristics, there are two cues that stand out as immediately available--hair styles and clothing. These cues are important because they are under the direct control of the individual who manifests them. Many of the studies in this area have focused on facial features which are difficult, if not impossible, short of surgery, for the individual to alter at

will. Hence these cues probably have a much lower "ecological validity" since the individuals' personality did not enter into their development. With the current popular trends in hair styles, it seems that people are directly attempting to manifest their intents and belief systems through alteration of the external characteristics of themselves which are immediately observable. Therefore, with the direct control of these cues residing in the individual, they should have exceptionally high "ecological validity."

The inferences we make of other persons' character form a large part of our social interactions and significantly influence our behavior toward others. No matter what degree of accuracy people actually have in judging other people's character, the average adult goes about this evaluation of others with or without an understanding of the process or cues that he uses. The judgment of the character and intentions of significant others on external facial and other features forms a large part of our day to day living.

Background for the Study

The human face and human physiognomy has been a focus of interest throughout recorded history. The early interests in human physiognomy expressed by poets, artists, and laymen did not seem to inspire psychologists to any great extent. In fact, their interests were primarily aimed at disproving the ability to judge character from facial features. This lack of interest was probably due in part to psychology's association with the ill-fated sciences of phrenology and characterology.

The attempts of Lombroso and other physiognomists to find correlations between the criminal behavior of man and the contours of the face or bumps on the head was a particularly unsavory association. However, interest in the human face as an indicator of character could not be avoided by psychology for long, since the judgments of character are of primary importance in predictions of other people's behavior. A mistake in prediction could be at least embarrassing, and sometimes physically damaging or even fatal.

The early studies by psychologists on facial physiognomy were directed toward two related areas--the recognition and identification of emotions in others and the judgment of personality. In this first area, Charles Darwin (1873) introduced the typical experiment. He put together a collection of photographs of people displaying various emotions, showed them to people, and asked them to judge the emotion from the expression. Agreement among the judges was good for some photographs and very poor for others. There are several good reviews of the evolution of this line of experiment by Woodworth and Schlosberg (1954), Schlosberg (1952, 1954), and Bruner and Tagiuri (1954). An extension of Schlosberg's type of investigation to cross-cultural studies can be found in Triandis and Lambert (1958).

The types of materials used in the studies of the perception of emotions indicate the ingenuity of investigators despite the ambiguous results. For example, Hulin and Katz (1935) used photographs of the actor Frois-Wittman who displayed seventy-two different emotions.

Piderit (1859), according to Brown (1965), made line drawings of faces to illustrate emotions. Boring and Titchner (1923) developed a series of interchangeable facial parts from the Piderit drawings from which they could display 360 combinations to be judged. Landis (1924) attempted to elicit "real" emotional expressions with such drastic techniqeus as decapitation of rats in view of the subjects. With these procedures he produced an almost unchanging "forced smile" in his subjects. Candid photographs clipped from Life and Look magazines were used by Munn (1940). But with all these ingenious techniques the results are very ambiguous.

The second early interest in human facial physiognomy--the judgments of personality--were not as ambiguous since they yielded almost totally negative results. One of the first aspects of personality investigated was the judgments of intelligence from facial features.

Pintner (1918) used college students to judge a series of photographs (taken and developed under conditions far from standard) of girls and boys ranging from four to sixteen years in age. These twelve social objects ranged unrepresentatively from extreme brightness to very feebleminded. Pintner found a mean rank correlation of +.10 between measured and judged intelligence. Pintner thus concluded that there was little or no ability, on the part of the subjects, to judge intelligence from photographs. Gaskill, Fenton, and Porter (1927) came to the same conclusions although their experiment was a considerable refinement over the Pintner procedure. They narrowed the age range to between eleven

and twelve years and used only boys as objects. Moreover, they controlled the camera angle and distance, used two facial views instead of one, and all the boys were photographed in a standard seated position. With these refinements they found a mean rank order correlation of +.425, but nevertheless concluded that boys falling in the normal to superior range cannot be accurately judged in intelligence.

Anderson (1921) used a more representative sample than did Pintner. He utilized the estimations of twelve judges (graduate students and instructors in psychology) who rated the intelligence of 69 employees of a business firm (superintendents, buyers, managers, and assistants). The judges' ratings were summed and a Pearson r correlation of +.27 between ratings and intelligence was found. These results showed a possible tendency, on part of the judges, to discriminate intelligence above mere chance selection. There was also considerable agreement on certain photographs by most of the judges. Anderson's suggestion for this was that people, in judging a person by his photographs, will usually pick out a particular feature upon which to base their judgment. Unfortunately, this experiment was not designed to test such an assumption. With all results analyzed Anderson concluded that it was very doubtful, for practical purposes, that intelligence can be gauged by the study of a photograph.

Hollingworth (1922) found that higher coefficients of correctness can be obtained from group averages, established by a single composite judge, rather than by averaging the correlations from the judges treated

as individuals. An average of the coefficients of ten subjects, who judged intelligence from photographs of twenty persons was .19 with a range from -.27 to +.51. He found also, however, that two "group judges" combining the ratings of 25 men and 25 women before correlations are computed, produced an average as high as +.51. Interestingly, the group averages, established by a single composite judge by Pintner (1918) and Anderson (1921) gave a correlation of judgments of intelligence of only .16 and .27 respectively.

Viteles and Smith (1932) used 25 members of a personnel association to judge 40 photographs of five successful and five unsuccessful men in the fields of law, medicine, education, or engineering. One picture was of the individual as a college senior, the other taken 25 years later. Separate cards were used to mount pictures of each of the twenty successful and twenty unsuccessful men. All of the judges were acquainted with one or another physiognomic system of character analysis, with ten having formal training. The conclusion was, after judging both younger and older pictures, trained personnel workers could not determine with any accuracy, the success or failure of an individual by simply studying photographs. A comprehensive review of personality judgments including the characteristics of the judges' personality can be found in Taft (1955).

In a break with the tradition of presenting photographs, Cleeton and Knight (1924) used groups of ten subjects (two of all women and one of all men) arranged on a stage. Seventy judges rated the subjects (by casual observation) on eight different traits ranging from intelligence to

impulsiveness. Some of the judges were close friends of the group, while others were casual observers. These conclusions of the study receive clear support. (1) The ratings of close associates are reliable. (2) The ratings of 70 casual observers are reliable. (3) The physical factors purporting to measure the same trait do not present even a suspicion of agreement. (4) The correlation between ratings of close associates and casual observation is slightly better than chance. (5) The correlation between ratings of casual observers and physical measurements is best represented by 0.000. (6) Physical measurements which underly character analysis agree neither with themselves nor with other measures of character.

Brunswik (1945) conducted an investigation which closely paralleled the Cleeton and Knight study. The results of this study are exhaustively reviewed in Brunswik (1956, pp. 26-39) and essentially support the findings of the earlier study by Cleeton and Knight.

A different approach to the investigation of the relations between personality characteristics and appearance was initiated by Brunswik and Reiter (1937), described in Brunswik (1956). This approach involved the use of schematized drawings of faces (see Fig. 1). Their design involved the systematic variation of forehead height, height of mouth, and height and position of the nose. There were three variations each in distance between the eyes, height of mouth, height of forehead, and seven variations in the nose, including length and position. The original goal of the experiment was to investigate the impression value

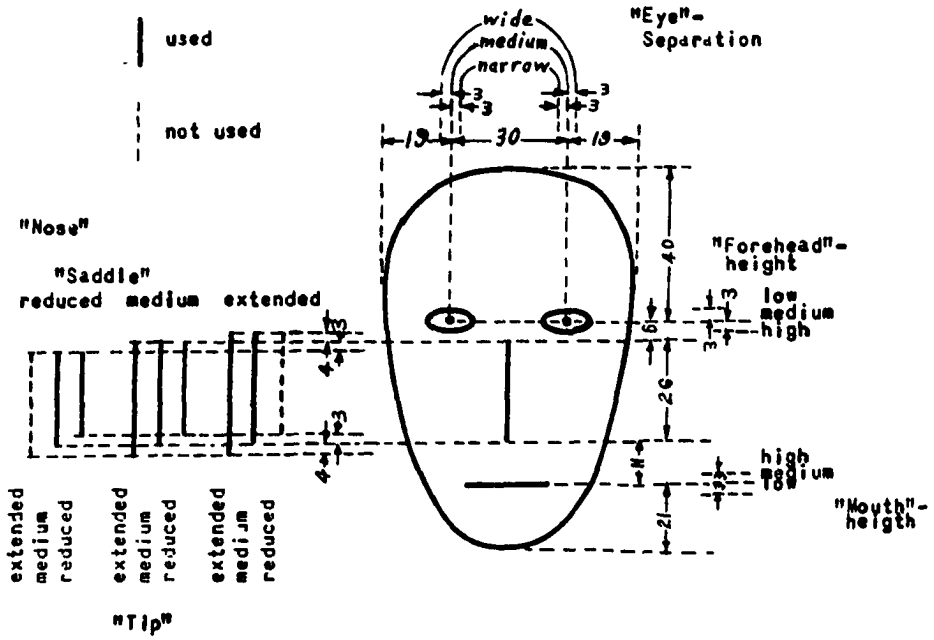

Fig. 1 Factorial Variation of a Schematized Face
(After Brunswik and Reiter, 1937.)

of a number of prominent features of the facial geometry including their combinations in patterns or "gestalten." They felt that actual photographs of real people were unacceptable because of the large number of uncontrolled factors.

The reported results of this early experiment by Brunswik and Reiter (1937) were obtained by an "informal evaluation." The results and reproduction of some of the figures can be found in Allport (1937), p. 483). The overall average responses of ten subjects, each of whom did about twenty hours of a complicated procedure of ranking the 189 drawings in seven physiognomic attributes, show a general curvilinear tendency in the graphs, indicating a preference for the middle value for all features. An extension and improved version of this experiment was

undertaken by Brunswik (1956). He describes the analysis of this experiment as a "truncated factorial design in studying the impression value of schematized faces (p. 100)." The truncation refers to the fact that two of the nine 'noses' that would result from all of the intercombinations "turned out so unrealistic and grotesque that they threatened to spoil the seriousness of an already precarious attitude on the part of the subject (p. 102)." The consequence of this "truncation" was a somewhat awkward and unorthodox factorial analysis of variance. Despite the problems of procedure and analysis, the original Brunswik and Reiter (1937) study instigated a series of studies using the schematized faces. A study by Samuels (1939), under the direction of Gordon Allport, was a replication and extension of the study by Brunswik and Reiter. She used ten of the schematized faces which were most extreme in expressiveness. Using 247 Harvard students as judges, she presented five pairs of faces on projection slides, each pair representing opposite extremes for facial dimensions. The subjects rated each pair during a 30 second presentation. The dimensions of judgment were identical to those used by Brunswik and Reiter (1937), i.e., mood, likeability, age, energy, beauty, character, intelligence. Her results averaged 88 percent correct according to Brunswik and Reiter's results.

Samuels (1939) performed three additional experiments extending the Brunswik and Reiter study. She selected pictures from college yearbooks which matched the schematized faces. Using 60 students and following the same procedure as the previous study, she found an average

percent agreement of 63 as compared with 88 for the corresponding pairs of schematized faces. Repeating the presentation of the photographs a second time, she asked the subjects to give their reasons for their original judgments. She indicates that:

> The reasons given for the judgments were considered to be the most valuable part of the experiment. These reasons were classed in three general categories: General Appearance and Expression, Expression of Specific Features, and Bony Structure. Cues for Character, Likeability, and Age were predominately of the first category; cues for Mood, Intelligence and Energy were predominately of the second category; and cues for Beauty, usually referring to the shape of the face or features, of the third. To a lesser degree, cues for Intelligence and Energy were also of the third category. On the whole, little reference was made to the controlled variables, such as length of nose, position of mouth, and distance between the eyes. Height of the forehead was mentioned frequently only in judgments of Intelligence. Expression of the eyes seemed to be the most important single cue, and was mentioned especially often in judgments of Mood, Character, Intelligence, and Energy.
>
> Frequent cross-outs and blank spaces left on the page, as well as contradictory and vague statements made about the features of the faces, indicated the difficulty with which the students accounted for their judgments (Samuels, 1939, pp. 22-23).

In a third variation Samuels presented the schematized faces first, followed by the photographs to see if there would be a carry-over of the dimensions of judgments. Forty-four women students averaged only 1.5 percent greater "correct" judgments as compared to the photographs alone. A fourth variation employed the judgmental dimensions of Energy and Determination only, since the dimension of likeability is a social evaluation dependent on personal preferences. The ratings of the photographed faces for energy and determination disagreed with that

found for the schematized faces. Samuels concluded:

> That judgments do not depend on the controlled variables, but on other cues not represented in Brunswik and Reiter's analytic classification . . . The striking uniformity obtained in judgments of schematized faces established beyond doubt the validity of Brunswik and Reiter's findings. So many cues are available in judging the real faces that it is not surprising that the observers varied more in their reactions to these faces than to the schematized faces (Samuels, 1939, pp. 24-25).

The schematized faces were used in studies by Halstead (1951a, 1951b) in an attempt to develop a test for brain damage or psychosis.

He used nine faces presented in a three by three square arrangement. Each face was selected for one of the desirable and undesirable alternatives in the Brunswik and Reiter (1937) study. Halstead indicates that, rating the faces on desirability, 103 psychiatric patients, 158 brain-damaged patients and 102 normal control patients demonstrated "striking similarities rather than . . . differences in the grouping of behavior (1951b, p. 124)." The results agreed an average of 80 percent (33 is chance level) for the three "desirable" faces when compared to the original Brunswik and Reiter study.

Rohracher (1952), according to Brunswik (1956), started with the schematized face but enhanced the originals with more lifelike features, and found substantially the same results.

Brunswik (1956) cites a study by Kremenak (1950) who varied the impression value of the eye region. "She varied the size and shape (thickness) of the eyebrows, their distance from the eyes, and the shape of the eyes . . . A total of 144 schematized faces were judged on nine

pairs of attributes by 50 judges who were evenly divided between the two sexes (p. 114)." The attributes were: good, sincere, careless, extroverted, gay, intelligent, energetic, handsome, and likeable paired with their opposites. She found the eyebrows had a greater impression value than the shape of the eyes. The shape of the eyebrows had the greatest influence and distance of brows from the eyes was next in order of influence.

In a further study at the University of Vienna, Winkler (1951), according to Brunswik (1956), studied the impression value of the mouth. She varied the shape, height, and the angle of incline. Using 238 configurations of the schematized faces with 50 subjects and the same dimensions of judgment as Kremenak she found the shape of the mouth had the greatest impression value. Brunswik (1956) cites another study by Seiller-Tarbuk (1951) who investigated the impression value of the hairline and of grooming of hair, beard, and mustache.

> A total of 224 configurations was used. Within this material the way the hair was placed on the head had the greatest influence. Hair style (parted at side, parted in middle, without part, bald) and kind of beard or mustache had decisive meaning only for the attribute pairs, gay-sad and energetic-unenergetic. Hair low on the forehead gave the impression of unintelligent, bad and unlikeable, while a higher hairline (also bald heads) gave the impression of intelligent, good . . .; beardless faces were judged as more intelligent, good natured and energetic than faces with beards (Brunswik, 1956, p. 115).

A series of studies entitled "Personality in Faces" by Secord, Dukes, and Bevan (1954), Secord and Muthard (1955a, 1955b), Secord and Bevan (1956), Secord, Bevan, and Katz (1956), Secord and Jourard

(1956), Stritch and Secord (1956), and Bevan, Secord, and Richards (1956) form a comprehensive study of the human face and personality judgments. A summary of these studies and others relating to the perception of facial features and personality can be found in Secord (1958). He concludes that:

> Studies of perception of photographed faces have accomplished the following:
>
> 1. The demonstration that impressions of personality formed from viewing the face are often based upon definite physiognomic cues.
>
> 2. The specification and denotation of physiognomic cues which are particularly relevant to impression formation.
>
> 3. The identification of various determinants which give direction to the formation of personality impressions.
>
> When the perceiver strives for definiteness in an impoverished situation such as facial perception, he is likely to make maximum use of inference and interpretation. Five inference processes relevant to facial perception have been tentatively proposed.
>
> 1. Temporal extension. The perceiver regards a momentary characteristic of the person as if it were an enduring attribute. Probably this process underlies, in varying degree, virtually all judgment of other persons.
>
> 2. Parataxis. The perceiver generalizes from a previous interpersonal situation with a significant other to an interpersonal situation with a new object person, whether they are appropriate or not.
>
> 3. Categorization. The perceiver uses cues to place the object persons in a category, which is associated with certain personality attributes. This is, of course, the basic process operating in stereotyping.
>
> 4. Functional inference. The perceiver infers that some aspect of the object person functions in a particular manner; from this he assumes that the individual possesses an associated attribute.

5. Metaphorical generalization. The perceiver makes an abstract generalization based upon an analogy between some denotable characteristic of the object person and personality attribute.

In some instances these inference processes contribute to consensus; namely, whereby some striking characteristic of the object person is widely used as a cue, and thereby tends to lead to the same inference for all perceivers (Secord, 1958, pp. 313-314).

Secord concludes his discussion by suggesting possible lines of research. This is in fact the area which the present study proposes to investigate.

> Perhaps the inference process most deserving of further study is categorization. Although social psychologists have long been aware of the stereotype, little effort has been extended in the direction of studying it as a perceptual cognitive process; instead, most investigators have been content with demonstrating its existence. The suggestion has been made that categorization of people is a fundamental process, which not only underlies ethnic stereotypes, but is also characteristic of many relatively autistic perceptions of people. Some of the questions which need to be answered on this topic are: What categories do people typically use in their perceptions of object persons, and how may these categories best be described and measured? To what extent do perceivers vary in their more general modes of categorizing the environment? What conditions facilitate or inhibit the process of categorization? (Secord, 1958, p. 313).

This study is directed primarily toward identification of the cues utilized by subjects to form their impressions and the interactions between cues. One of the cues which has often been found significant is that of hair style (head and facial).

It is reasonable to assume, that if strong stereotypes are related to different hair styles (head and facial hair), an individual may alter his hair style in the direction of a stereotype with which he would accept

identification. Or an individual might change his hair style in order to identify himself with a particular "reference group" or group whose popular stereotype best fits his self image. Another possible motivation for changing hair style is the desire to increase status by appearing older or more mature. In a recent article Freedman (1969) cites a study by one of his students, R. Parker. Parker altered some of the Thematic Apperception Test (TAT) cards by drawing a beard on a male figure. One group of 20 students responded to the altered cards, and a control group of 20 students responded to the unaltered cards. Female respondents were unefected by the alteration but the male students typically responded by making the bearded figure equal to or dominant in status to the other figure.

Hair style also seems to be a significant cue to the personality of the individual. A study by Johnson (1955), a student of Secord's, reversed the usual procedure of judging personality from faces. She gave 21 college freshmen two brief descriptions of fictitious persons:

> A. This man is warm hearted and honest and is intelligent and unbiased in his opinion. He is responsible and self-confident with an air of refinement.
>
> B. This man is ruthless and brutal. He is extremely hostile, quick-tempered, and overbearing. He is well-known for his boorish and vulgar manner and is a very domineering and unsympathetic person (Secord, 1958, p. 306).

The subjects were then asked to imagine what these two men looked like and to rate 32 facial features. The subjects had no difficulty in doing so and produced very different physiognomic ratings for the two men. Two of the 32 variables were "grooming of hair" and "waviness of hair."

These variables were significantly different ($p < .006$) for the two descriptions. Person A was described with "neat" hair and "average waviness" and Person B had "slicked down or disheveled" hair that was either "straight or wavy." It is interesting to note that 14 of the 25 significantly different attributes varied in being rated "average" for the favorable description, and at one or both extremes for the unfavorable description.

In summary, the earlier studies focused on the judgment of emotions or personality variables. The stimulus materials varied, in decreasing order of representativeness from live subjects on a stage, to photographs, to line drawings and finally to schematic line drawings of faces primarily focusing on structural properties of the face. The judgments were made by "crowds" of people in a carnival atmosphere, close acquaintances of the people judged, random groups of people unfamiliar with the subject, college freshmen, graduate students, and personnel directors trained in physiognomy and character analysis. The results vary somewhat but the general conclusion is that judgment of emotional states or personality characteristics has relatively little validity when compared to measurements of these attributes by established tests. Many statements by the earlier investigators indicate that the use of live subjects or photographs tend to introduce so many uncontrolled variables that the relationships between cues becomes unanalyzable. Therefore, this study with a focus on cue hierarchy rather than representativeness utilizes a variation of the schematized face of Brunswik and Reiter (1937,

Fig. 1).

Although the validity of character judgments is of very low order, the judgments are used as significant cues in interpersonal behavior. This study is, therefore, not another study in the validity or reliability of character judgment, rather the focus is on the process of judgment in terms of cue utilization and interaction.

This study will represent, then, an extension of judgments beyond the emotional and personality dimensions into the affective (evaluative) and behavioral components of attitudes.

Numerous studies have indicated that the Semantic Differential, developed by Osgood, Suci, and Tannenbaum (1957), is an effective instrument for the assessment of attitudes. In some recent studies by Triandis (1964), Triandis and Davis (1965), Triandis, Davis, and Takesawa (1965), an extension of the Semantic Differential to be a Behavioral Differential has been employed. The format of this instrument and an extensive discussion of its effectiveness can be found in Triandis (1967). The basic format looks like this:

A Negro female physician 50 years old
Would_____:_____:_____:_____:_____:_____:_____:Would Not
let go first through a door.

The technique of presentation was to present all possible combinations of these characteristics (e.g., A Negro male physician 50 years old would vary the sex characteristic).

The behaviors presented below the scale were also varied. Factor analysis of these behaviors indicated consistent factors emerging across

many different subject populations. Among the factors which consistently turned up were Respect, Friendship, Hostility, and Social Distance. Triandis (1967) indicates in a summary table the behaviors which gave the maximum variance within each of the above factors. In the present study, five of these behaviors have been selected for each factor (see Methods section).

Theoretical Background of Study

There are two relevant problems in the prediction of an individual's response to a complex stimuli--interactions between stimuli and interactions between response materials. Osgood, Suci, and Tannenbaum (1957) attempted to predict subjects responses to compound stimuli by means of congruity theory. Typically, the Semantic Differential is used to judge some stimulus (a single concept) against a series of bipolar scales. Osgood et. al. attempted to predict responses when two or more concepts are presented simultaneously (e.g., shy secretary). They maintained that when two or more concepts are presented, the "meaning" of the compound stimulus can be predicted from knowledge of the meaning of the components entering into it by means of the principle of congruity (pp. 199-209). In one study Osgood et. al. combined eight adjectives (artistic, hairy, listless, average, sincere, shy, treacherous, and breezy) with eight nouns (nurse, scientist, thug, prostitute, husband, comedian, imp, and secretary) and attempted to predict the meanings of the 64 combinations from the meanings of the individual components.

The combined meanings were predicted in the equation (p. 278).

$$dm = \frac{|da|\ (da) \quad + \quad |dn|\ (dn)}{|da| + |dn| \qquad\qquad |da| + |dn|}$$

Where dm is the deviation of the mixture from the point of neutrality on a particular factor (Evaluative, Potency, or Activity), $|d|$ represents the deviation from neutrality on the Semantic Differential scales in absolute value (regardless of sign) and (d) is the algebraic deviation from neutrality with regard to sign (-3 to +3).

The subscripts m, n, and a refer to mixture, noun and adjective respectively. Although Osgood et. al. obtained satisfactory predictions of the word mixtures, in many cases the obtained measures of word mixtures were closer to the adjective alone rather than the noun; while the predicted measures were closer to the mean of the measures obtained from the adjective and noun alone. The failures to predict were particularly numerous in the evaluative factor. The correlation between the predicted factor scores (Osgood's term for the sums across scales within a factor) and the measured factor scores was .86 for Evaluative, .86 for Potency, and .90 for Activity. On examinations of the prediction failures Osgood et. al. indicated a "pessimistic evaluative stickiness (p. 282)." That is, the more derogatory or unfavorable components always dominated the word-mixture. Osgood et. al. were somewhat discouraged by these failures of prediction and concluded by saying that "it is entirely possible, of course, that some formula other than that derived from the congruity principle would incorporate these word-mixture

results more adequately (p. 284)."

A study by Triandis and Fishbein (1963) attempted to extend the work of Osgood et. al. by focusing on complex stimuli representing persons who were described as to race, occupation, religion, and nationality. Such stimuli as "NEGRO, PORTUGESE, PHYSICIAN OF THE SAME RELIGION AS YOU ARE" (p. 447) were used to examine various methods of predicting judgments on the Semantic Differential from the judgments of the components within these stimuli.

Subjects judged six of these complex stimuli against sixteen S. D. scales. They found a stickiness with the occupation component in that the correlations between the measured S. D. judgments of the complex stimuli and judgments of the occupation of the stimuli were usually somewhat higher than the correlations between the measured judgments and the judgments predicted by Osgood's Congruity formula. They conclude that:

> the fact that the predicted judgments correlate significantly with the obtained judgments is much less interesting than had been previously thought. It will be suggested that the congruity principle be abandoned in favor of a new principle based on the work of Fishbein (1961). Triandis and Fishbein, (1963, p. 447).

Triandis and Fishbein (1963) review several theories of attitude organization and change by Ableson and Rosenberg (1958), Festinger (1957), Heider (1946, 1958), Lewin, Dembo, Festinger, and Sears (1944), Rosenberg (1956, 1960), and Zajonc (1954). They examined these theories in terms of four criteria:

Criterion 1. Is the theory designed to make predictions about a complex stimulus from a knowledge of its component parts, that is, does the theory consider descriptive or reportorial beliefs about an object?

Criterion 2. Does the theory make specific mathematical statements about how the evaluations are to be combined?

Criterion 3. Does the theory make predictions that are based on congruity theory?

Criterion 4. Can the theory be adequately tested with the existing data?

Although many of the theories met some of the criteria the theory finally selected was Fishbein's theory. One of the major considerations that led to the selection of Fishbein's theory was Criterion 3. Most of the other theories are cognitive balance rather than summation theories, and hence are likely to make predictions similar to those of congruity theory.... Since our explorations of other principles was prompted by the ineffectiveness of congruity theory to predict better than the occupational component of the complex stimulus, we were interested in using a principle that would be maximally different from congruity theory. Fishbein's theory predicts that an individual's attitude toward any object is a function of his beliefs about that object, and the evaluative aspect of those beliefs. A belief is described as an association between the attitude object and any other object, value, or goal. The evaluative aspect of a belief is defined as the evaluation of the object, value or goal associated with the attitude object. Thus, in the context of this paper, Fishbein's theory would predict that a subject's attitude toward any complex stimulus (e.g. NEGRO, BANK MANAGER, FRENCH, SAME RELIGION) would be a function of the subject's beliefs that the complex stimulus was (a) a NEGRO, (b) a BANK MANAGER, (c) FRENCH, and (d) of the SAME RELIGION as he was, and of his evaluation of each of the four components. Algebraically, this prediction can be expressed as follows:

$$A_o = \sum_{i=1}^{N} B_i a_i$$

Where:

A = the attitude toward the complex stimulus
o = the complex stimulus

B_i = belief i about o
a_i = the evaluative aspect of B_i
N = the number of beliefs about o (in this case, four)

Other things being constant, Fishbein's theory states that the evaluation of the complex stimulus is equal to some function of the sum of the evaluations of the components, while most of the other theories, like the congruity principle, state that the evaluation of the complex stimulus is equal to some function of the mean evaluation of all the components. That is, according to Fishbein's theory, each new component, if it is positively evaluated adds some positive evaluation to the complex stimulus. In the case of balance theories however, a new component, even though it has a positive valence, may actually lower the overall evaluation of the complex stimulus. This will occur if the new component has a less positive valence than the previous mean.

Fishbein's argument is consistent with the findings of Kerrick (1958), who found that combining pictures and captions and having the combinations and the elements rated on semantic differentials gave the following results: The congruity principle predictions and the obtained judgments had a correlation of .95; however, in the "22 cases where both the picture and the caption were originally judged on the same side of the scale, 15 of the combinations were more extreme in meaning than either element alone."

The congruity formula and most of the other theories must predict that the compound stimulus meaning will fall between the two elements. Further support for Fishbein's theory can be found in Fishbein and Hunter (1962, unpublished), (Triandis and Fishbein, 1963, pp. 450-452). (*note*--the Fishbein and Hunter paper is now published, 1964)

The results of their study indicate that Fishbein's theory yields consistently better predictions (higher correlations) than either congruity theory or predictions based on the occupational component alone. However, the problem of predicting the evaluation of a complex stimulus from knowledge of the evaluation of the separate parts cannot be so easily disposed of. An alternate averaging theory proposed by Anderson (1962) claims that the overall evaluation of a series of adjective scales describing

a person can be accurately predicted by the average evaluations on each of the adjectives in the set measured separately. In one version of this theory (Anderson, 1965a), it is assumed the subject has formed an impression of the stimuli after the n^{th} adjective in the list has been presented. The effect of the adjective n + 1 is to change the judgment in its direction. That is an averaging takes place such that the judgments after adjective n + 1 is now nearer the value of that adjective than it was before its occurrence. This takes place unless the value of the adjective n + 1 is exactly equal to the value of the judgment existing after the adjective n. The Triandis and Fishbein (1963) theory predicts that the effect of adjective n + 1 depends on whether it tends to elicit a positive, negative, or neutral evaluative response. If the value of the adjective n + 1 is on the same side of the neutral point as the judgment existing after the adjective n, the adjective n + 1 increases the polarization of the judgment. However, if the judgment is on the opposite side of neutral, the polarization of the judgment is decreased and may be reversed. Essentially, the averaging theory of Anderson and the summation theory of Triandis and Fishbein agree that a positive adjective make a negative judgment less negative and a negative adjective makes a positive judgment less positive (but they would predict different amounts of change). Their most clear-cut difference in prediction would occur when predicting the effect of an adjective, that is on the same side of neutral as the current judgment at the point of arrival of adjective n + 1. Triandis and Fishbein would predict that the effect would be a further polarization of judgment from the

neutral point whether or not the n + 1 adjective is more or less polarized than the current judgment. Anderson would predict that the judgment would become more polarized only if the n + 1 adjective was more polarized, but less polarized if the n + 1 adjective is less polarized than the current judgment. Anderson (1965b) has presented some further evidence, although not unequivocal, that casts some doubt on the summation theory. He combined some independently rated adjectives in lists of twos and fours, where all adjectives on any single list were on the same side of the neutral point. He found that the two highly polarized adjectives (positive or negative) tended to produce a more polarized judgment than a set with the same two adjectives combined with two or less polarized adjectives. The summation theory of Triandis and Fishbein would in fact predict the opposite effect.

Other studies of the same issue (Podell & Amster, 1966) found results which were more consistent with the summation theory of Fishbein but nevertheless do not invalidate the averaging theory of Anderson. This is indicated because these studies do not clearly demonstrate that the momentary judgment is actually higher than the independently scaled value of the adjective n + 1. The decision between these two theories is far from conclusive.

Some other studies are relevant to the problem of predicting overall judgments from information on judgments of the parts. Willis (1960) had one sample of subjects judge the "attractiveness" of photographs from a student yearbook by judging each picture individually. Another

group of subjects were then asked to judge photographs in sets of twos or threes, which were selected on the basis of the individual ratings. The final judgments of "attractiveness" of the pairs and triplets were then compared to the mean judgments on each photograph individually. The overall judgments were more polarized than judgments of individually judged photographs. The sets of three were even more polarized than the mean of the singly judged photographs. The greater the homogeneity of the individually judged photographs the greater the combined judgment exceeded the mean in polarization. Willis indicates that although this result is consistent with the predictions of summation theory it does not necessarily contradict averaging theory if one can assume a prior existing, less polarized "initial impression."

Podell and Podell (1963) and Manis, Gleason and Dawes (1966) studies have produced some evidence that the more polarized adjectives, in a relatively homogeneous set of adjectives, are more influential on the final judgment than less polarized adjectives.

A further study of averaging theory versus summation theory was performed by Hastorf, Osgood, and Ono (1966). They asked subjects to view photographs of an actor displaying different emotions. The photographs were presented in a stereoscope which would allow simultaneous presentation of different photographs to each eye. During the initial trials the two photographs were identical. On the subsequent trials various combinations of emotions (e.g. rage and glee) were presented to each eye. For most of the subjects the pair of different photographs "fused"

into a single face. The judgments made of the emotional state of the fused images indicated a compromise between the individually prejudged ratings of the photographs. This result would support the averaging theory rather than the summation theory.

A different theory relevant to this problem has been tested by Rosenberg and Gordon (1968). They describe an application of Luce's probabilistic theory of choice behavior to the resolution of referential ambiguity. A series of 48 sets of three photographs (faces) each and their 144 (3 x 48) subsets of two photographs were presented to 120 male undergraduates. An adjective description of the emotional expression of one or more faces in each set was presented along with its three subsets. The subject's task was to select the photograph in each case that best fit the descriptive adjective. A referentially ambiguous set or subset was defined in terms of the absence of an unanimous choice by the subjects. The Luce model accurately predicted the relations between the two and three choice data.

In summary the studies of the relationship between facial features and judgment of emotion or personality have proceeded through the early stages of gross evaluation in both the stimulus and the response material. The trend in research has moved from an overall "gestalt" orientation to a specification of the interactions between features of the human face in the stimulus dimension. Check lists of descriptive adjectives have been replaced by more sophisticated response instruments such as the Semantic and Behavioral Differential. The relationships between the order of

presentation, number of adjectives in a list, and "value" of the adjectives have been investigated. Several theories attempting to predict judges' responses to a combination of facial features from knowledge of the responses to each of the individual parts have been proposed. These theories are generally related to two different views of the underlying cognitive processes. They assume that the cognitive process is either an additive or summative evaluation of the stimulus elements or that the stimulus elements are combined by an averaging or balancing process.

In the context of attitude and attitude change the viewpoint supporting the averaging or balance model are those of Lewin, Dembo, Festinger, and Sears (1944), Osgood, Suci, and Tannenbaum (1957), Heider (1946, 1958), Zajonc (1954), Ableson and Rosenberg (1958) and Anderson (1962). Two of these theories (Osgood et. al., 1957, and Anderson, 1962) have made specific mathematical statements about how the evaluations are to be combined.

The theories proposing an underlying additive or summative cognitive process are exemplified by the works of Fishbein (1961), Triandis and Fishbein (1963) and Fishbein and Hunter (1964). The Fishbein theory has also been stated in the form of a specific mathematical equation.

These concepts of summation and averaging as explanations of cognitive processes have been with psychology for some time now. Helson's Adaptation Level Theory (1948), for example, proposes a process of pooling by which an organism arrives at some kind of average (although not an arithmetic average) of its perceptual experiences.

Brunswik's (1956) theory of "probabilistic functionalism" proposes the use of probability weightings on the part of the organism, where the probability is determined by the "trustworthiness" of cues in attaining stability in a semichaotic environment. The Cybernetic model of perception proposed by Pitts and McCulloch (1947) uses the analogy of integration (summation) over a range of values for the computation of invariants as sums or averages for all members of a group of transformations. The Sensory-Tonic Field Theory of Werner and Wapner (Werner, Wapner, & Chandler, 1951) assumes a cognitive averaging of sensory and motor elements. F. H. Allport's Event - Structure Theory (1955) indicates that weighting or pooling of energies is the central cognitive process underlying perception. In his review of the major theories of perception Allport states that:

> It is of much interest that in practically all the examples now to be given the weighting-and-pooling concept was assigned as the explanation of the dimensional or intensive aspect of perception (Allport, 1955, p. 604).

It seems doubtful that this time-honored conflict of summation versus averaging is near resolution. However, predictions of subjects responses to complex stimuli from knowledge of the subjects responses to each of the component parts are obtainable from three of the theories mentioned previously.

Specifically, the equation developed by Osgood, Suci, and Tannenbaum (1957, p. 207), based on the congruity principle, should predict subjects' responses to each scale on the Semantic Differential

and Behavioral Differential for each combination of hair, mustache, and beard style from the subjects' responses to each of these factors measured separately. For example, if the mean responses (across subject replications) to Figures 2, 3, and 5 were +2, -3, and -5 respectively on the good-bad evaluative scale, the Osgood equation would predict:

$$d_c = \frac{|d_h|\ (d_h) + |d_b|\ (d_b) + |d_m|\ (d_m)}{|d_h| + |d_b| + |d_m|}$$

$$d_c = \frac{|2|\ (+2) + |3|\ (-3) + |5|\ (-5)}{|2| + |3| + |5|} = -2.4$$

for the combination shown in Fig. 6 where: d_c = deviation from neutral point for the combined stimulus; d_h = absolute value of the deviation from neutrality of hair style alone; (d_h) = algebraic deviation from neutrality of hair style alone; d_b = absolute value of the deviation from neutrality of beard style alone; (d_b) = algebraic deviation from neutrality of beard style alone; d_m = absolute value of the deviation from neutrality of mustache alone; (d_m) = algebraic deviation from neutrality of mustache style alone.

The Anderson (1962) theory would predict that the response to the combination (Fig. 6) in the above example, would be the algebraic mean of each of the three factors (hair, Fig. 2, beard, Fig. 3, and mustache, Fig. 5) judged alone. Or:

$$\frac{[(d_h) + (d_b) + (d_m)]}{3} = \frac{[(+2) + (-3) + (-5)]}{3} = -2.0$$

Fishbein's (1961) theory would predict that the response to the combination (Fig. 6) is the algebraic sum of the responses to each of the

separate factors (i.e., Figures 2, 3, and 5).

$$(d_h) + (d_b) + (d_m) = (+2) + (-3) + (-5) = -6.0$$

However, some difficulty may be encountered in attempting to test the Fishbein theory with the Semantic Differential and Behavioral Differential scales. If the subject's responses to each of the separate stimuli sum to a number larger than seven, there is no way to compare the predicted score with the measured score on the same combination. Neither Fishbein (1961) nor Triandis and Fishbein (1963) indicate how to overcome this problem, although the latter study utilized a Semantic Differential Scale (good-bad) and apparently did not encounter this problem.

In the study by Triandis and Fishbein (1963) the differences between the correlations (predicted with observed responses) were used to test the accuracy of prediction between the Fishbein and Osgood equations. However, the correlation coefficient would not serve as a valid statistic to test the differences in accuracy of prediction between the three theories. Since the only difference between the Anderson and Fishbein theory is division by three, the linear correlation between the two theories should be +1.00. If this is true, the linear correlations between the predicted and observed deviations for the complex stimulus should be equal. An appropriate test of the Difference in accuracy of prediction must be based on the differences in variance, either between the predicted and observed deviations or between the dispersion about their respective regression lines. This latter variance is best estimated by regression coefficients for the three theories.

Hypotheses

In relation to the stated purposes of the study some specific hypotheses can be tested. The nature of the stereotype (i. e. the shared beliefs and attitudes toward various combinations of head and facial hair) will be indicated by significant main effects in the analyses of variance of the seven expected factors. The null hypothesis for these effects will be accepted at the .05 level of significance. Significant main effects in the analyses of variance of the factors (factor scores) would indicate the significant cue (beard, hair or mustache) that was used to make judgments within each factor.

Interactions between the cues can be determined by 1) significant second or third order interactions within the factors and 2) by the three previously mentioned theories predicting responses to a complex stimulus from responses to the separate stimuli. There are four possible predictions within each of the three hair styles, one for each combination of the three stimuli (cues) of hair, beard, and mustache style, each based on the responses to the stimuli considered separately. This would generate twelve predicted responses for each of the 35 scales within the Semantic and Behavioral Differential. The 420 (12 x 35) predictions will be correlated with the 420 measured responses to these combinations for each theory. The accuracy of prediction, or the theory most accurately predicting the interactions between stimuli (cues) will be indicated by the dispersion about the regression line for each theory. Since the tests of significance for differences in regression coefficients will involve the use

of multiple t ratios (3), the a priori level of significance should be conservatively high. The null hypothesis of no difference in accuracy of prediction will be accepted at the .001 level of significance (two tailed test).

CHAPTER II

METHOD

Subjects

The subjects were 270 students enrolled in freshman level classes at Central State College in Edmond, Oklahoma. Introductory psychology classes were deliberately not used to avoid any contamination effects due to familiarity with the investigator. One hundred and thirty of these students were males and 125 were females. Fifteen subjects failed to specify their sex. No special characteristics were required of the subjects. The subjects did not constitute a random sample since intact classroom groups were utilized.

Materials

The text booklet consisted of a cover sheet of instructions for the Semantic Differential (SD) and Behavioral Differential (BD), followed by two pages of SD and BD bipolar scales. In place of the usual concept, the SD and BD scales had one of the 27 combinations of faces at the top of the page. (See Appendix A)

Each of the faces were judged on a seven point scale in accordance with the Osgood, Suci, and Tannenbaum (1957, p. 191) method of assigning

the unfavorable pole (e.g., bad, weak, passive), the score "1", and favorable poles (e.g., good, strong, active), the score "7", regardless of the polarity of presentation (see Appendix A for the polarity and order of presentation).

The 27 factorial variations are illustrated in Figures 2 through 28. Each subject received only one of the 27 combinations with ten replications for each face combination.

The Semantic Differential consisted of five scales of bipolar adjectives in each of the three factors (15 scales total). The factors are Evaluative, Potency, and Activity described by Osgood, Suci, and Tannenbaum (1957). The scales within each factor were:

I.	Evaluative		
1)	Good	7 6 5 4 3 2 1	Bad
2)	Clean	7 6 5 4 3 2 1	Dirty*
3)	Honest	7 6 5 4 3 2 1	Dishonest
4)	Valuable	7 6 5 4 3 2 1	Worthless
5)	Familiar	7 6 5 4 3 2 1	Unfamiliar*
II.	Potency		
1)	Strong	7 6 5 4 3 2 1	Weak*
2)	Constrained	7 6 5 4 3 2 1	Free*
3)	Brave	7 6 5 4 3 2 1	Cowardly
4)	Serious	7 6 5 4 3 2 1	Humorous*
5)	Severe	7 6 5 4 3 2 1	Lenient
III.	Activity		
1)	Excitable	7 6 5 4 3 2 1	Calm*
2)	Rash	7 6 5 4 3 2 1	Cautious
3)	Active	7 6 5 4 3 2 1	Passive
4)	Complex	7 6 5 4 3 2 1	Simple*
5)	Fast	7 6 5 4 3 2 1	Slow

The asterisk indicates that the scale was presented in reversed order in the test booklet.

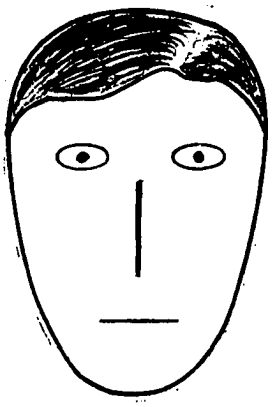

Fig. 2 $B_1M_1H_1$

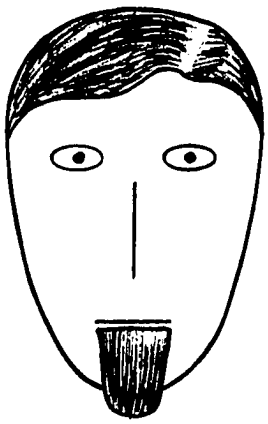

Fig. 3 $B_2M_1H_1$

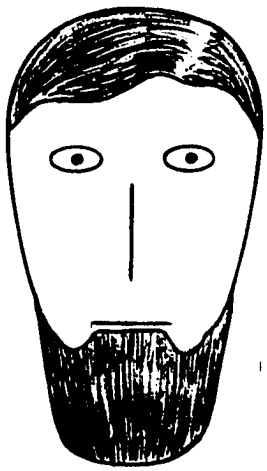

Fig. 4 $B_3M_1H_1$

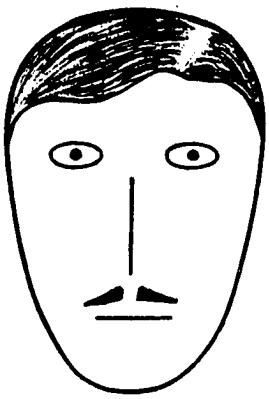

Fig. 5 $B_1M_2H_1$

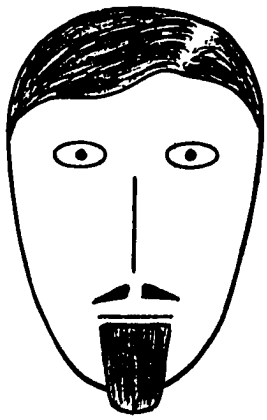

Fig. 6 $B_2M_2H_1$

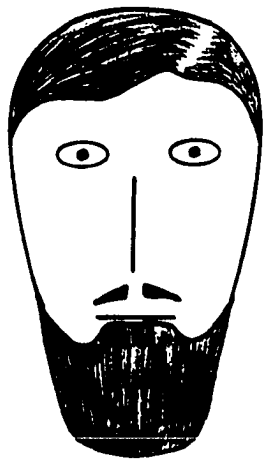

Fig. 7 $B_3M_2H_1$

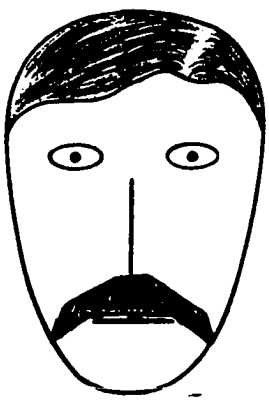

Fig. 8 $B_1M_3H_1$

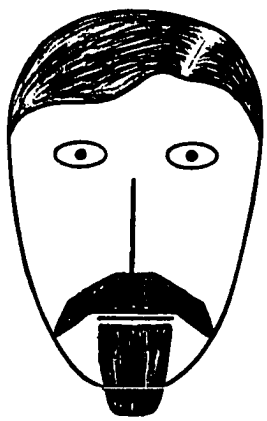

Fig. 9 $B_2M_3H_1$

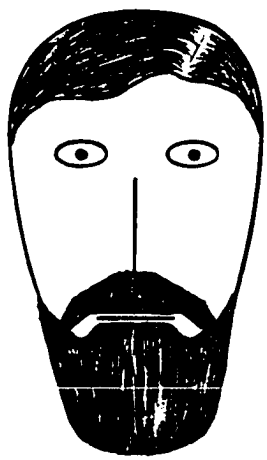

Fig. 10 $B_3M_3H_1$

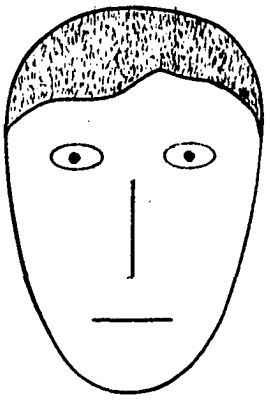

Fig. 11 $B_1M_1H_2$

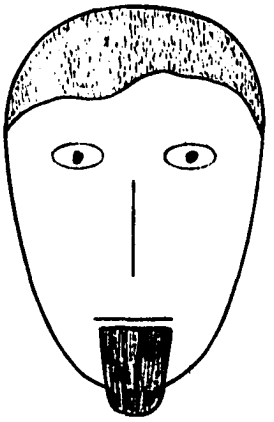

Fig. 12 $B_2M_1H_2$

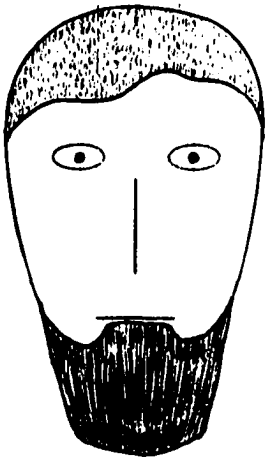

Fig. 13 $B_3M_1H_2$

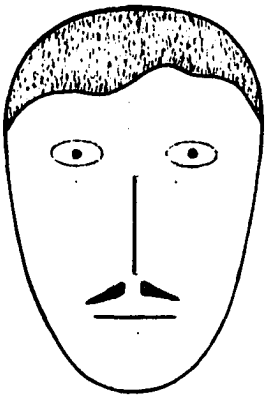

Fig. 14 $B_1M_2H_2$

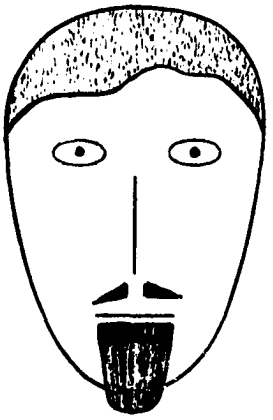

Fig. 15 $B_2M_2H_2$

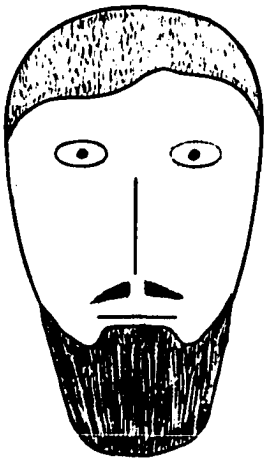

Fig. 16 $B_3M_2H_2$

Fig. 17 $B_1M_3H_2$

Fig. 18 $B_2M_3H_2$

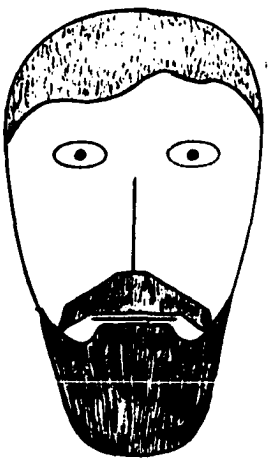

Fig. 19 $B_3M_3H_2$

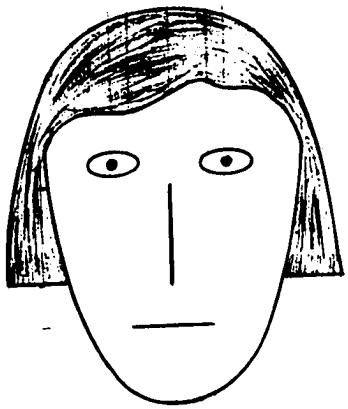

Fig. 20 $B_1M_1H_3$

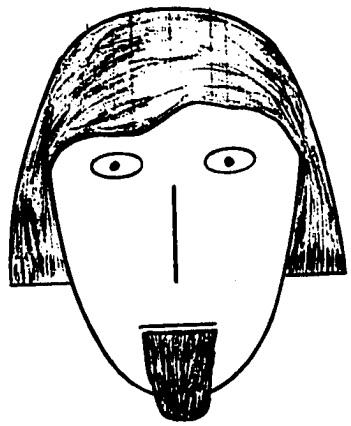

Fig. 21 $B_2M_1H_3$

Fig. 22 $B_3M_1H_3$

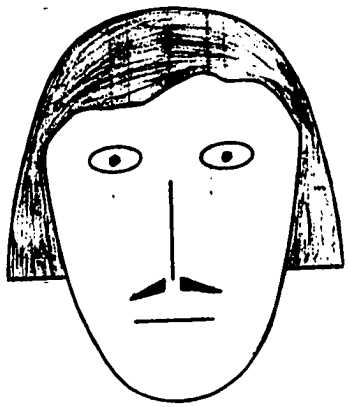

Fig. 23 $B_1M_2H_3$

Fig. 24 $B_2M_2H_3$

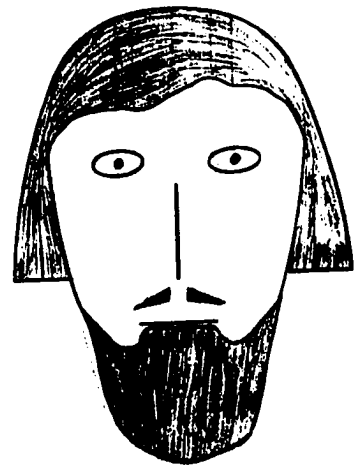

Fig. 25 $B_3M_2H_3$

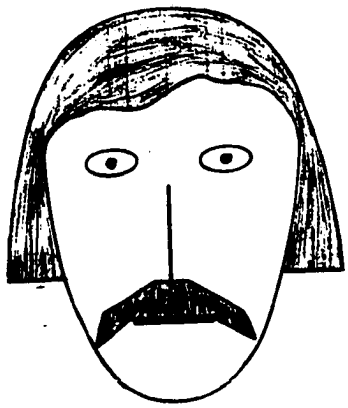

Fig. 26 $B_1M_3H_3$

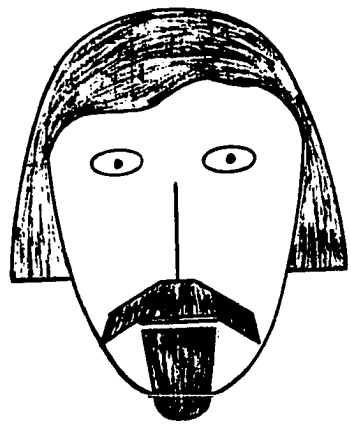

Fig. 27 $B_2M_3H_3$

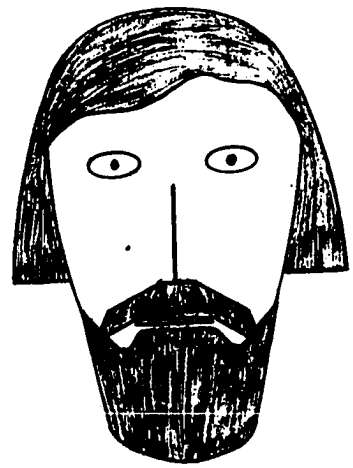

Fig. 28 $B_3M_3H_3$

The Behavioral Differential consisted of the following scales within each factor. These behaviors were selected from Triandis (1967, pp. 247-262) as the behaviors contributing maximum variance on the behavioral differential.

Factor I. Respect
1) Admire ideas of
2) Admire character of
3) Believe
4) Depend upon
5) Elect to political office

II. Friendship
1) Be partners with
2) Eat with
3) Accept as intimate
4) Be on first name basis
5) Permit to do favor

III. Hostility
1) Argue with
2) Dislike
3) Disagree with
4) Hate
5) Fear

IV. Social Distance
1) Exclude from neighborhood
2) Prohibit from voting
3) Accept as close kin by marriage
4) Invite to join club
5) Work in same office with

Both the SD and BD scales were randomized in order of presentation between the four factors and randomized in the polarity of judgment. The format used to present the behavioral differential scales was of the following type:

Would 1:2:3:4:5:6:7 Would Not
Admire character of

Would 1:2:3:4:5:6:7 Would Not
Hate

The assignment of the score "7" to the "would not" end of the scale is consistent with the procedure used by Triandis (1964).

Design

The design constitutes ten replications of a 3 x 3 x 3 factorial design with each factor at three levels (3 beard, 3 mustache, and 3 hair style). The dependent variables were the subjects' responses to the Semantic and Behavioral Differential Scales.

Procedure

The test materials were distributed to the subjects at random in a classroom setting. The classes did not, however, constitute a random sample of subjects. Since each subject responded to only one of the 27 combinations of face, and there were ten replications, the replications do not constitute a variable in the design. The test was administered during a single day to prevent any "history" factor as a potential source of invalidity. Also, the test was administered by a single experimenter (not the author) to rule out experimenter effects. The experimenter was a clean shaven senior college student with "normal" hair style. His hair style was very close to the hair style of Fig. 2.

Instructions to Subjects

As the test forms were being distributed to the subjects, the class instructor stated:

I appreciate your participation in this study. It is a very important piece of research for friends of mine at the University of Oklahoma. I know that you will want to help in this research. It is not necessary for you to identify yourself on this test. My assistant will explain that to you in a minute. Also, let me emphasize that this task will in no way be a factor in the grade that you receive in this class. If you do not wish to participate in this study, you may feel free to leave; and there will be no reprisal of any kind. I am going to leave the detailed instructions to my able assistant--so thank you for your cooperation in this project.

At this point the regular class instructor left the room, and the assistant continued by saying:

As your instructor has already indicated, we are not interested in knowing who you are individually. Also, this test will in no way affect your grade in this course or any other course. We simply want to collect some information, and we feel that you will be inclined to respond freely if we are unable to identify you personally. One more thing--please answer these questions based on your own decisions, and do not discuss them with your neighbors. With this assurance of annonymity, please be as honest in your answers as you possibly can. Thank you.

He then instructed the class to read fully and carefully the instructions on the first page.

The present study is part of a graduate research project. This is <u>not</u> a test and there are no right and wrong answers. Please do <u>not</u> sign your name to this questionnaire.

Your cooperation in this study is purely voluntary, and you may quit at any time during the study. However, if you begin this study, it will be appreciated that you finish the questionnaire because an incomplete one will be of no value in the study. Is there anyone who does not wish to participate in this study? If not, would you please circle the following information:

Classification: Circle the correct one.

Fr. Soph. Jr. Sr. Unclassified Other

Sex: Circle the correct one.

Male Female

The purpose of this study is to measure the MEANING of certain male faces to various people by having them judge the faces on a series of descriptive scales. On the following pages a schematic drawing of a human male face is presented. On each page you will be given the same schematic male face to be judged, and beneath it, a set of scales. You are to rate the schematic male face on each of these scales in order.

In performing this task, please make your judgments on the basis of what the schematic male face means TO YOU.

For example, if you feel that the schematic male face at the top of the page is VERY CLOSELY RELATED to one end of the scale, you should place your checkmark as follows:

FAIR X : : : : : : UNFAIR

OR

FAIR : : : : : : X UNFAIR

If you feel that the schematic male face is QUITE CLOSELY RELATED to one or the other end of the scale (but not extremely), you should place your check as follows:

FAIR : X : : : : : UNFAIR

OR

FAIR : : : : : X : UNFAIR

The direction toward which you check, of course, depends upon which of the two ends of the scale seem most characteristic of the schematic male face you are judging.

If the schematic male face seems ONLY SLIGHTLY RELATED to one side as opposed to the other side (but is not really neutral), then you should check as follows:

FAIR : : X : : : : UNFAIR

OR

FAIR : : : : X : : UNFAIR

If you consider the schematic male face to be NEUTRAL on the scale, both sides of the scale EQUALLY ASSOCIATED with the schematic male face, then you should place your check mark in the middle space:

FAIR____:____:____: X :____:____:____UNFAIR

IMPORTANT:

(1) Place your check marks in the middle of the SPACES, not on the boundaries.

this not this

FAIR____: X :____:____:____X____:____UNFAIR

(2) Be sure to check the scale for every schematic male face, DO NOT OMIT ANY.

(3) Never put more than one check mark on a single scale.

Sometimes you may feel as though you've had the same item before on the task. This will not be the case, so DO NOT LOOK BACK AND FORTH through the task. MAKE EACH ITEM A SEPARATE AND INDEPENDENT JUDGMENT. Work at a fairly high speed through this task. It is your first impressions, the immediate "feelings" about the items, that we want. On the other hand, please do not be careless, because we want your true impressions. Thank you. Are there any questions? If not, please turn the page and begin.

The assistant then waited for everyone to finish reading the instructions and asked for any questions.

Treatment of Data

Analysis of the Semantic and Behavioral Differential data:

(1) The response scores of each subject to each scale were tabulated.

(2) The responses to scales presented in reverse order were subtracted from eight. Any missing responses were assigned the neutral score of 4.

(3) The response scores of each subject to each scale, corrected for reverse order, are tabulated in Appendix B. These scores

were also punched onto IBM cards and formed the input data for the factor analysis.

(4) The scores on the IBM cards are then summed across each subject responding to the same face combination (10 replications by 27 face combinations) for input to the prediction equations.

(5) The scores from (3) were summed across the 5 scales within each of the 7 factors.

(6) Seven complete factorial analyses of variance, one for each factor, were computed on the summed responses from (5).

In addition to the seven analyses of variances, a factor analysis of the subjects responses to each of the 35 scales was performed. The factor analysis was of the principle components type with orthogonal varimax rotation.

This analysis was performed to check the orthogonality of scale dimensions, although they have been found to be independent in many studies. If the scale dimensions are not independent, i.e., more or less than seven factors, it would contradict some previous findings. Some justification could be made for performing an analysis of variance of the rotated factor scores of the factors that emerged from the factor analysis, but this decision cannot be made before the fact.

The three equations developed previously will be used to predict the subjects scores to each of the 12 combination faces. The three correlations are based on 420 (12 x 35) predicted and observed responses. In addition, the regression coefficients for each of the three equations will be calculated to determine the significance of differences in the prediction accuracy of the three equations. This is essentially a test of the

variance of the set of observed by predicted points about their respective regression lines. The standard error of estimate or standard error of the regression coefficient for the t test between the regression coefficients is based on an equation developed by McNemar (1962, p. 143).

CHAPTER III

RESULTS

Table 1 and Table 2 list the mean responses for all subjects (270) for each of the 15 SD and 20 BD variables. For purposes of interpretation, the direction of the scale, i. e., the assignment of a one or seven to the bipolar pairs, must be considered. The number seven was consistently assigned to the favorable bipolar adjective in the scaling of the SD. For the BD scale the number seven was consistently assigned to the "would not" end. Table 3 lists the mean response on the 15 SD variables for each face combination. Face number two (see Fig. 2), for example, was rated more "good" than "bad" since the mean response for the ten subjects rating this face was 5. 1, with the neutral point of the scale at 4. An interpretation of the mean responses to the BD scale in Table 4 requires some additional care. Although the "would not" end of scale was consistently assigned the number seven, the meaning of the scales is reversed for the hostility and social distance factors when compared to the respect and friendship factors. A comparison of the mean of 2. 9 for variable 17 (Admire character of) and a mean of 3. 1 for variable 29 (Hate) indicates this reversal of evaluation.

Table 1

Means and Standard Deviations of the Semantic Differential Variables Across All Subject Replications

Variable	Mean	Standard Deviation
1. Good	4.09	1.56
2. Clean	4.62	1.66
3. Honest	4.15	1.68
4. Valuable	4.39	1.97
5. Familiar	3.64	1.81
6. Strong	3.97	1.73
7. Constrained	4.16	1.63
8. Brave	4.80	1.75
9. Serious	4.12	2.08
10. Severe	4.58	2.03
11. Excitable	4.26	1.74
12. Rash	3.84	1.86
13. Active	4.04	1.69
14. Complex	4.28	1.62
15. Fast	3.73	2.10

Note. -- N = 270

Table 2

Means and Standard Deviations of the Behavioral Differential Variables Across All Subject Replications

Variable	Mean	Standard Deviation
16. Admire ideas of	3.96	1.75
17. Admire character of	4.22	1.81
18. Believe	5.44	1.68
19. Depend upon	3.60	1.67
20. Elect to political office	2.88	1.60
21. Be partners with	4.50	1.72
22. Eat with	4.46	1.98
23. Accept as intimate	3.13	1.82
24. Be on first name basis	2.89	1.76
25. Permit to do favor	5.09	1.97
26. Argue with	4.42	1.86
27. Dislike	3.93	2.01
28. Disagree with	3.47	3.85
29. Hate	3.85	1.76
30. Fear	2.68	1.86
31. Exclude from neighborhood	2.43	1.72
32. Prohibit from voting	6.04	1.58
33. Accept as close kin	5.52	1.71
34. Invite to join club	3.26	1.96
35. Work in same office	2.81	1.91

Note. -- N = 270

An inspection of Tables 3 and 4 also indicates that the mean responses to the scales, which were supposedly within a single factor, are not consistent. For example, the first five variables in Table 3 are the typical evaluative scales of good, clean, honest valuable and familiar. The mean responses to these scales for the ten subjects rating face number two indicates that they rated face two as more good than bad, more clean than dirty, more honest than dishonest, slightly more valuable than worthless, but unfamiliar rather than familiar. The table of intercorrelation and table of factor loadings shown below also indicate that the subjects were not rating the variables familiar and valuable in the same manner as the other evaluative variables. This inconsistency of scales within a priori identified factors has considerable bearing on the interpretation of the results of the analyses of variance.

The accuracy of prediction of the three theories predicting subjects' responses to a complex stimulus (various combinations of beard, hair, and mustache) from subjects' responses to the separate elements can be seen in Table 5. The Anderson equation predicted most accurately, followed by Osgood, with the Fishbein equation showing the largest mean deviation or least accuracy. The deviations between predicted and observed scores were tabulated separately for deviations on the same side of neutrality (predicted and observed had the same sign) and for deviations on the opposite side (predicted and observed had opposite signs). The Fishbein equation deviations were substantially larger for the same side predictions than either the Anderson or Osgood equation.

Table 3

Mean response on Semantic Differential Variables to each face conbination across 10 replications

	Variable														
FACE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	5.1	5.6	5.5	4.3	2.4	3.8	4.3	5.3	4.0	4.4	4.2	4.2	3.4	4.7	4.4
3	3.6	4.4	3.8	4.3	3.8	3.2	3.8	4.7	3.8	4.5	4.0	4.1	3.4	4.0	3.6
4	4.5	3.7	3.9	5.2	4.5	5.7	4.8	4.9	4.6	4.9	5.0	4.3	5.1	4.6	3.0
5	3.1	6.1	3.8	5.1	3.5	4.2	5.3	4.3	4.6	4.3	4.6	4.0	4.2	4.3	3.0
6	4.6	4.4	3.9	5.5	2.8	4.3	3.9	5.7	3.4	4.7	4.4	3.2	4.1	5.1	4.5
7	3.7	5.1	3.7	3.1	3.8	3.7	4.3	4.6	3.8	5.2	3.9	2.7	4.3	4.2	2.6
8	4.5	5.3	4.6	4.4	3.3	3.8	3.8	4.7	2.8	4.9	3.8	4.6	3.7	3.9	5.3
9	4.7	4.6	3.8	4.4	3.2	3.6	3.9	5.1	3.1	5.3	4.5	2.7	4.1	4.8	3.3
10	4.2	4.8	4.4	4.9	2.9	3.9	4.0	5.5	4.7	5.1	4.4	3.9	3.8	4.6	3.5
11	5.4	5.3	5.3	3.5	3.3	4.5	4.9	4.5	4.8	5.9	4.5	4.2	5.1	4.5	4.6
12	3.9	4.4	4.5	5.2	3.8	3.6	4.2	5.7	4.2	4.1	3.9	3.6	3.8	4.1	3.7
13	3.9	4.8	4.5	4.0	3.6	4.2	3.2	5.2	4.4	4.7	4.8	3.5	4.2	4.5	4.9
14	3.6	4.8	2.3	4.4	2.6	3.0	4.5	5.5	3.8	4.6	5.0	3.0	4.7	3.4	5.3
15	3.4	4.4	3.3	4.6	4.0	2.7	4.4	3.8	3.7	3.7	4.8	2.6	3.0	2.7	4.1
16	3.6	3.6	3.2	4.6	3.1	4.0	4.9	4.1	3.1	5.5	4.2	4.6	4.2	4.5	3.3
17	4.6	4.7	5.0	4.5	4.2	3.8	3.6	3.7	4.4	3.2	4.5	3.8	3.8	5.2	3.3
18	4.4	4.9	3.1	4.7	3.9	4.8	3.6	4.8	4.6	3.7	4.6	3.2	4.3	3.9	4.2
19	4.5	4.5	4.5	3.3	3.4	4.8	3.7	3.6	4.6	5.1	4.3	3.7	4.5	4.4	3.2
20	3.9	5.3	5.1	2.9	3.3	3.7	3.1	5.5	3.0	5.1	4.0	4.4	3.7	3.8	3.9
21	5.7	3.8	4.5	4.3	4.8	3.3	3.5	4.8	4.2	4.7	4.0	4.2	3.4	4.0	3.7
22	4.9	4.7	3.9	4.0	4.5	4.3	4.5	4.6	5.0	3.4	4.4	4.8	4.3	4.8	3.5
23	4.2	4.6	4.7	4.3	3.0	2.8	4.1	4.5	4.1	4.1	3.3	3.7	3.6	3.7	3.6
24	3.4	4.4	3.2	3.9	4.3	4.6	4.7	4.5	4.5	3.8	4.2	3.3	3.5	3.9	3.6
25	4.3	4.0	5.0	5.3	3.7	4.4	4.6	5.1	4.8	4.9	4.0	3.9	4.5	5.1	4.0
26	3.6	3.8	3.7	4.1	4.6	4.4	4.3	4.2	5.0	4.1	3.6	4.3	3.9	4.2	2.8
27	4.1	4.7	4.8	5.3	3.9	3.6	4.3	5.5	4.0	5.3	4.4	4.4	4.4	4.6	3.3
28	3.1	4.1	4.1	4.5	4.0	4.5	4.1	5.0	4.3	4.5	3.7	4.8	4.2	4.0	2.5

Table 4

Mean response on Behavioral Differential Variables to each face combination across 10 replications

	Variable																			
FACE	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
2	4.0	2.9	5.1	2.0	3.5	4.9	3.0	4.3	2.9	5.8	4.6	4.0	2.2	3.1	3.3	2.5	6.1	5.3	2.0	2.2
3	3.2	3.2	4.9	3.1	3.2	4.1	4.2	2.9	2.5	3.4	4.4	4.6	3.2	3.5	2.8	3.0	6.0	6.0	3.6	3.3
4	3.8	4.8	6.2	3.3	2.8	4.4	4.3	3.2	2.6	4.4	3.4	3.0	3.0	3.8	1.7	2.0	7.0	5.8	1.8	3.3
5	4.0	3.8	4.6	3.5	2.7	4.6	4.4	3.0	3.2	4.0	4.8	5.2	3.8	4.5	2.7	1.6	5.6	5.8	3.6	2.4
6	3.3	4.1	5.3	4.4	3.1	4.1	4.1	3.1	2.1	5.4	4.7	3.6	2.9	3.8	3.3	2.6	6.6	5.7	2.9	3.1
7	3.7	4.4	5.0	2.9	3.4	3.3	4.3	3.0	2.9	5.2	4.8	3.6	3.0	3.9	2.5	2.9	6.7	5.7	3.1	2.3
8	4.0	4.4	6.1	3.8	2.2	3.9	4.9	3.5	2.6	5.2	4.4	4.4	4.2	4.2	3.1	2.1	6.7	5.5	3.9	3.1
9	3.9	4.1	5.5	3.7	2.9	4.2	4.0	3.4	3.0	4.8	3.9	3.6	3.7	4.1	2.7	2.8	5.5	6.2	3.4	2.4
10	3.2	5.4	4.7	3.2	1.9	4.9	3.4	2.6	2.0	5.9	3.3	2.8	2.9	3.4	3.3	2.0	5.9	5.6	2.1	2.7
11	3.4	3.7	5.1	3.1	3.6	5.8	3.8	3.3	3.0	6.3	3.1	3.1	3.6	3.5	2.7	2.7	5.9	5.4	2.6	3.3
12	3.4	4.1	5.8	3.0	2.9	4.9	4.8	3.6	3.3	5.8	4.8	4.6	3.8	3.5	3.0	2.6	5.5	4.8	3.8	2.4
13	4.0	4.4	5.2	3.3	3.0	4.5	4.3	2.9	2.1	4.2	4.6	3.4	3.3	4.1	2.0	1.8	7.0	6.4	3.2	2.4
14	5.0	5.7	5.0	4.8	2.2	3.8	5.1	2.8	3.3	4.7	4.9	5.9	4.1	4.6	3.1	2.6	5.6	4.7	4.2	2.6
15	3.5	4.8	5.0	5.3	2.7	4.4	4.4	2.9	3.6	5.3	4.2	4.0	3.7	4.5	3.1	1.7	5.8	4.9	3.7	3.6
16	4.3	4.3	6.0	4.4	2.9	4.5	4.8	2.8	3.0	5.5	5.1	3.8	3.0	4.0	2.7	2.4	6.4	5.9	2.9	2.7
17	4.8	4.3	5.1	4.3	2.9	3.9	4.8	2.7	3.3	5.0	4.5	4.2	4.6	4.2	2.7	3.1	5.1	5.4	3.8	4.2
18	4.2	4.7	5.0	3.5	1.9	4.9	4.3	2.8	2.9	5.1	4.1	4.3	3.7	4.2	3.2	2.6	5.3	5.2	3.3	3.2
19	3.2	4.2	6.2	3.2	2.7	4.6	4.5	3.0	3.1	6.0	4.2	3.7	2.8	3.3	2.1	2.7	6.9	5.4	3.8	2.7
20	4.1	4.5	5.6	3.3	2.9	4.5	5.0	2.2	2.6	4.0	3.9	3.4	4.5	3.4	2.7	2.5	6.0	5.8	2.6	2.6
21	4.4	3.4	5.9	3.6	2.8	5.0	3.8	3.0	3.8	6.6	4.7	3.5	2.6	4.0	2.4	2.2	6.2	6.2	2.9	2.7
22	4.3	3.9	5.2	3.6	3.4	5.2	4.2	3.6	2.4	5.8	4.3	3.3	2.9	3.9	1.7	2.9	6.1	6.3	3.6	2.3
23	4.1	4.1	5.7	3.3	2.8	4.8	4.4	2.6	2.5	4.6	4.3	3.3	2.9	3.7	1.6	1.9	5.8	5.9	3.0	2.3
24	5.3	4.1	5.0	3.9	3.0	3.7	6.0	4.3	3.9	2.7	5.4	3.5	4.9	4.0	3.3	4.6	5.0	3.7	4.3	2.7
25	3.6	3.8	5.8	3.9	3.3	5.0	3.9	3.4	3.0	4.9	4.0	3.8	3.0	3.0	2.9	2.2	6.6	5.6	3.5	2.3
26	4.3	4.5	5.8	4.0	3.5	4.6	4.8	3.9	3.1	5.2	4.7	4.3	4.2	4.2	2.3	1.7	6.5	5.1	3.6	3.0
27	4.4	3.7	6.3	3.3	2.5	4.6	4.1	2.9	2.3	5.9	4.6	4.8	3.1	3.2	2.1	1.3	5.9	5.1	3.0	2.3
28	3.5	3.6	5.9	3.5	3.0	5.3	5.4	2.8	3.0	5.6	5.2	4.4	4.5	4.7	3.4	2.7	5.3	5.3	3.9	3.9

Table 5

Deviations between Predicted and Observed Responses for each Theory

Combination Face	Theory					
	Anderson		Fishbein		Osgood	
	Sign of deviation		Sign of deviation		Sign of deviation	
	Same	Opposite	Same	Opposite	Same	Opposite
06	10.20	8.60	33.50	17.60	4.63	11.38
07	8.33	8.93	40.90	17.20	10.45	11.12
09	4.87	6.43	42.50	12.50	11.16	7.98
10	14.03	4.40	47.70	7.40	12.90	7.06
15	10.77	11.33	29.30	23.00	11.55	16.49
16	10.10	8.10	29.90	15.10	10.11	10.35
18	7.57	6.13	21.30	11.40	10.16	7.07
19	12.33	3.50	28.90	5.10	10.60	4.61
24	10.07	20.67	27.10	45.80	10.78	24.44
25	11.00	6.10	44.80	11.10	11.26	8.25
27	10.37	6.27	32.20	10.20	8.14	7.50
28	12.63	5.73	35.70	9.00	11.67	8.21
total	122.27	96.20	413.80	185.40	128.42	124.46
Sum total	218.45		599.20		252.88	
Mean deviation	.5201		1.4246		.6021	

Table 6 gives the correlation between the predicted deviation from neutrality and the observed deviations from neutrality for the prediction equations.

Table 6

Correlations between Predicted and Observed Deviations from Neutrality

Theory	Correlation Coefficient	Mean Observed	Mean Predicted	Stand. Dev. Observed	Stand. Dev. Predicted
Osgood	0.71433	0.01357	0.05600	0.97867	1.06407
Anderson	0.74394	0.01357	0.03603	0.97867	0.87055
Fishbein	0.74392	0.01357	0.10809	0.97867	2.61167

Note. -- N = 420 pairs

Although the correlation between the predictions of the Fishbein and Anderson equations differ by 0.00002, this difference should be considered within rounding error for single precision arithmetic on the IBM/360 computer. The correlations between the predicted and observed deviations for the Fishbein and Anderson equations should be exactly equal since the only difference between the equations is division by a constant. Therefore, the correlations between predicted and observed deviations cannot be used to test significance of the predictive ability of the two equations. Table 7 gives the intercorrelations between the predicted values for the three equations and further illustrates the near

perfect linear correlation between the predicted values.

Table 7

Intercorrelations between Predicted Deviations from Neutral Point

Theory	Osgood	Anderson	Fishbein
Osgood	1.0000	0.98094	0.97375
Anderson		1.00000	0.99845
Fishbein			1.00000

Although the correlations between predicted and observed deviations for the Anderson and Fishbein equation are identical within rounding error, the mean deviations between the predicted and observed are not the same. The tests of significance for accuracy of prediction given in Table 8 are based on the dispersions of predicted and observed deviations about the regression lines for the equations rather than the differences between linear correlations. The t tests in Table 8 utilized an equation developed by McNemar (1962, p. 143) to combine the sums of squares of deviations about the respective regression lines as the best estimate of the standard error of estimate of the respective regression coefficients. Since three non-independent t ratios were used to test the significance of the three regression coefficients, the a priori level of significance was established at a very conservative level (i.e., $p < .001$ for a two tailed test). All three tests indicated that the null hypothesis

of no difference in accuracy of prediction is untenable. The three t tests based on the regression coefficients indicate the same order of prediction accuracy as the table of mean deviations between predicted and observed values (Table 5).

Table 8

Tests of Significance for Accuracy of Prediction between the Theories

Theory	Regression coefficient	Theory			
		Anderson		Fishbein	
		Standard error of combined regression coefficient	t ratio	Standard error of combined regression coefficient	t ratio
Osgood	.7767	.0334	3.386***	.1275	9.476***
Anderson	.6618				
Fishbein	1.9853	.1199	11.039***		

Note. -- Since the tests of significance involved multiple comparisons of t ratios the level of significance for the comparisons was set at the very conservative level of $p < .001$ for a two tailed test. For 836 df, the t ratio must be ≥ 3.291.

***$p < .001$

The matrix of intercorrelations between the 35 SD and BD variables is presented in Table 9. A principle components factor analysis of this intercorrelation matrix gave eight factors accounting for 57 percent of the total variance of the matrix of intercorrelations. The program

Table 9

Intercorrelation between Variables

Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
2	31																						
3	47	38																					
4	-01	06	-02																				
5	-13	-31	-15	-08																			
6	06	11	13	31	-08																		
7	-03	01	-05	27	-07	23																	
8	-15	10	-11	03	-16	-03	-01																
9	08	-00	01	20	11	37	33	-08															
10	23	10	26	-08	-26	-08	-17	-02	-21														
11	-22	-06	-25	01	06	07	18	23	05	-13													
12	20	10	26	06	-04	22	12	-10	14	10	-18												
13	33	21	23	26	-14	48	27	-01	42	12	02	26											
14	37	31	48	30	-24	39	14	-08	21	20	-08	21	-16										
15	-32	05	-15	-07	-07	-10	-13	24	-27	-06	13	-21	-17	-12									
16	-35	-24	-42	-11	21	-17	-02	14	02	-26	16	-21	-22	-96	16								
17	-22	-25	-37	-09	09	-18	-07	11	-08	-22	14	-12	-21	-37	14	38							
18	09	06	16	05	-03	14	-02	00	-00	02	-03	09	13	16	-10	-17	-22						
19	-27	-34	-48	-05	20	-23	02	04	-04	-23	19	-17	-13	-32	13	48	49	-29					
20	19	06	14	-02	-11	11	-00	-03	04	03	-15	06	10	13	-02	-08	-11	06	-07				
21	15	22	31	-05	-16	22	04	-04	13	08	-15	22	22	20	-15	-30	-32	.44	-35	10			
22	-38	-22	-36	-15	16	-20	-02	17	-13	-14	07	-16	-32	-48	15	38	38	-15	30	-13	20		
23	05	00	-08	-00	00	10	10	-07	04	-09	-13	-01	-01	-07	-04	07	01	-04	03	49	-03	06	
24	-16	30	-30	-05	15	-22	08	04	-05	-20	17	-18	-19	-33	20	32	39	-22	45	01	-33	34	10
25	12	07	14	-04	-03	-10	-06	-03	03	12	-15	21	05	07	-15	-12	-08	29	-21	-04	32	-14	-06
26	-40	-27	-42	-09	12	-16	-00	28	-02	-25	15	-17	-34	-42	07	51	36	-07	34	02	-18	45	07
27	-14	-19	-26	-06	03	-17	00	02	-13	-16	03	-09	-19	-23	20	24	34	-11	33	-10	-24	32	07
28	-26	-19	-38	-14	10	-20	-07	12	-11	-16	09	-21	-22	-41	16	40	41	-24	49	-00	-30	48	12
29	-39	-95	-51	-18	27	-26	-00	09	-08	-22	19	-32	-34	-51	11	54	39	-19	53	-08	-30	49	07
30	-15	-19	-20	-02	01	-02	05	05	-08	-09	10	-13	-10	-12	20	-19	26	-31	99	05	-26	19	16
31	-03	-16	-26	-11	10	-08	07	-02	07	-11	04	-09	-05	-16	14	28	21	-41	34	10	-32	29	24
32	-03	06	01	-03	00	09	-01	-06	09	04	03	08	-00	-02	-11	-13	-04	38	-16	-01	20	-08	07
33	12	23	27	06	-14	07	05	03	-08	11	-02	04	07	22	-04	-24	-25	51	-34	01	45	-22	-12
34	-24	-22	-36	-09	07	-14	-04	05	01	-17	07	-16	-16	-31	08	39	37	-35	49	-05	-43	40	13
35	-06	-31	-22	-15	17	-19	-10	-03	-06	-18	-01	-09	-20	-30	10	24	28	-24	32	-00	-22	30	11

Table 9 - continued

	Variables											
	24	25	26	27	28	29	30	31	32	33	34	35
25	-20											
26	30	-05										
27	29	-08	28									
28	49	-23	42	35								
29	44	-13	43	30	54							
30	31	-27	20	22	38	35						
31	47	-27	22	16	41	32	36					
32	-30	19	01	-03	-10	-04	-25	-34				
33	-29	24	-15	-13	-38	-29	-33	-44	32			
34	43	-30	36	33	52	49	44	46	-23	-44		
35	43	-10	19	27	35	33	39	39	-28	-31	41	

extracted factors until the eigenvalue of a factor was less than or equal to 1. The first factor accounted for 22.9% of the variance with the remaining seven factors contributing 7.8%, 6.5%, 5.1%, 4.6%, 3.6%, 3.2%, and 3.1% respectively. The orthogonal varimax rotation of the principle components factor loading matrix is presented in Table 10. Although some effort has been made toward naming these factors, the factors are difficult to identify by a single lable. For example, the highest factor loading (+.78 in factor I is variable 18--Believe, followed by variable 33 (+.74)--Accept as close kin by marriage, variable 31 (-.57)--Exclude from neighborhood, and variable 32 (+.56)--Prohibit from voting.

In the following discussion of the factors all loadings of .500 or higher are presented along with the mean of each variable. The first factor loading exclusively on the Behavioral Differential variables can be interpreted as personal rejection coupled with socio-political acceptance.

Factor I: Personal rejection with Socio-political acceptance

Variable		Loading	Mean
18	Believe	+.78	5.44
33	Accept as close kin	+.74	5.52
21	Be partners with	+.62	4.50
32	Prohibit from voting	+.56	6.04
25	Permit to do favor	+.51	5.09
31	Exclude from neighborhood	-.57	2.43
34	Invite to join club	-.53	3.26

When the reversal of meaning for the scales within the respect and

Table 10

Rotated Principal Factor Matrix
by Varimax Technique

Item	Factor I	II	III	IV	V	VI	VII	VIII
1	04	-63	01	11	13	-18	-38	-06
2	12	-33	05	53	05	04	-10	20
3	16	-63	-05	19	04	-20	-20	17
4	-03	-17	54	03	-06	10	37	-14
5	-02	19	-03	-71	-09	07	-19	14
6	06	-18	67	08	16	-01	13	12
7	02	03	64	-02	02	05	02	-07
8	05	37	05	61	-13	26	-15	13
9	-02	06	68	-19	01	-23	-17	25
10	-07	-32	-30	37	-05	-30	18	07
11	00	26	28	04	-27	50	-05	06
12	11	-19	24	09	-05	-62	-09	-04
13	01	-34	65	19	-02	-20	-14	06
14	05	-63	40	22	00	-06	04	05
15	-04	01	-19	27	-02	57	-18	-30
16	-17	66	-00	-09	-02	12	-15	-07
17	-15	49	-05	-02	-13	-03	-04	-45
18	78	-09	07	-03	07	01	01	-02
19	-33	47	04	-19	-09	09	-08	-40
20	02	-10	04	09	81	00	-10	07
21	62	-18	11	13	10	-20	-21	20
22	-13	65	-17	04	-01	-02	-09	-17
23	-06	10	07	-06	84	-03	04	-06
24	-29	32	-00	-18	05	21	-37	-42
25	51	-03	-10	03	-14	-43	-19	02
26	00	77	-04	07	09	03	-05	-07
27	-02	26	-07	-01	-02	00	04	-72
28	-31	56	-10	05	13	03	-12	-35
29	-19	67	-13	-22	03	15	-08	-20
30	-45	16	04	03	18	16	-06	-40
31	-57	21	05	-06	24	03	-40	-15
32	56	12	03	-05	12	-14	39	02
33	74	-24	-00	11	-03	14	05	01
34	-53	45	-00	-02	07	-05	-06	-31
35	-30	19	-15	-26	08	-02	-42	-39

friendship factors as compared to the hostility and social distance factors is considered, Factor I can be meaningfully interpreted. For example, subjects who would not Believe, be partners with, permit to do favor, accept as close kin by marriage or prohibit from voting would exclude from neighborhood and would invite to join club. This apparent inconsistency is in fact an illustration of the strength of the social norm against prohibiting individuals from voting.

Factor II: Evaluative

Variable		Loading	Mean
26	Argue with	+.77	4..42
29	Hate	+.67	3.85
16	Admire ideas of	+.66	3.96
22	Eat with	+.65	4.46
28	Disagree with	+.56	3.47
1	Good	-.63	4.09
3	Honest	-.63	4.15
14	Complex	-.63	4.28

For this factor, if an individual were judged bad, dishonest, and simple you would not admire ideas of, admire character of, eat with, or depend upon. But you would argue with, disagree with, and hate. Factor II is a mixture of Semantic and Behavioral Differential variables which are clearly evaluative. This type of mixture of SD and BD variables is consistent with those found by Triandis (1967) when SD and BD variables are used simultaneously.

Factor III: Dynamism

Variable		Loading	Mean
9	Serious	+. 68	4. 12
6	Strong	+. 67	3. 97
13	Active	+. 65	4. 04
7	Constrained	+. 64	4. 16
4	Valuable	+. 54	4. 39

This factor appears to characterize the strong, silent, active type. Since Osgood et. al. (1957, p. 74) have found a coalescence of the potency and activity factors when judgments are limited to socio-political concepts (people and policies), Factor III could be labled a dynamism factor.

Factor IV:

Variable		Loading	Mean
8	Brave	+. 61	4. 80
2	Clean	+. 53	4. 62
5	Familiar	-. 71	3. 64

A reversal of signs for this factor would characterize "I know him well (familiar) and he is cowardly and dirty. "

Factor V: Personal and political acceptance

Variable		Loading	Mean
23	Accept as intimate friend	+. 84	3. 13
20	Elect to political office	+. 81	2. 88

Factor V is almost factorially pure since only two variables have high loadings on this factor. Although in some studies these two variables

have been associated with two different factors (i. e. respect and friendship) they emerge here as a single factor. These variables have no loadings greater than +. 10 on any other factor.

Factor VI: Activity

Variable		Loading	Mean
15	Fast	+. 57	3. 73
11	Excitable	+. 50	4. 26
12	Rash	-. 62	3. 84

The variable dislike is the only high loading on Factor VIII.

The analyses of variance of the seven expected factors was undertaken initially to determine the significant cues utilized (beard, mustache, or hair) in attitude judgments to the seven SD and BD factors. Since the seven expected SD and BD factors failed to emerge from the factor analysis of the data, the results are somewhat doubtful. Table 11 summarizes the analyses of variance on the expected factors of evaluative, potency, activity, respect, friendship, hostility and social distance in that order. Both the evaluative and friendship factors had one significant main effect. For the evaluative factor the main effect of mustache was significant. Since this source of variation was significantly larger than other sources in this factor, it could be considered the most influential cue utilized by the subjects in making judgments on this factor. In a similar manner, the variables hair in the friendship factor could be considered the most important cue. Although the variables beard for potency, hair for respect and mustache for social distance failed to exceed the required F ratio,

Table 11

Analyses of Variance for the Semantic and Behavioral Differential Factors

Source	df	Semantic Differential Factors						Behavioral Differential Factors							
		Evaluative		Potency		Activity		Respect		Friendship		Soc. Dist.		Hostility	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
B	2	8.73	0.51	52.84	2.90	36.94	2.06	2.19	0.13	0.38	0.02	69.63	1.59	11.47	0.83
M	2	51.30	3.00*	7.27	.40	35.03	1.95	33.58	1.93	12.00	.75	101.03	2.30	1.05	0.08
H	2	11.74	.69	10.91	.60	8.11	.45	47.94	2.75	54.11	3.39*	15.63	0.36	2.34	0.17
BxM	4	8.83	.52	17.24	.95	19.35	1.08	26.51	1.52	10.77	0.67	18.23	0.42	21.67	1.56
BxH	4	16.33	.95	14.78	.81	36.39	2.03	6.12	0.35	22.93	1.44	28.63	0.65	24.93	1.80
MxH	4	23.27	1.36	35.55	1.79	1.88	0.10	15.87	.91	4.44	0.28	31.40	0.72	7.64	0.55
BxMxH	8	21.33	1.24	28.33	1.56	24.72	1.38	6.81	.39	25.48	1.59	49.20	1.12	8.30	0.60
Error	243	17.13		18.21		17.92		17.41		15.98		43.89		13.88	

*$p < .05$

they obviously contributed the major part of the non-error variation for these factors.

Since the analyses of variance on the expected factors gave very little information about stereotypes or cue utilization, a second analyses of variance was undertaken. The second analysis was performed on the varimax rotated factor scores (FS). That is the varimax factor loading matrix (Table 10) was transformed into a factor score matrix by means of the matrix equation $FS = ZFE^{-1}T$, where FS is the matrix of factor scores, F the matrix of factor loadings (Table 10), E^{-1} is the inverse of the eigenvalue matrix, Z is the matrix of original scores in standard score form, and T is the varimax rotation, transformation matrix. This procedure is essentially the mathematically sophisticated equivalent of the first analysis. In the first analysis the "factor scores" were obtained by summing the scales within a factor. In the second analysis the factor scores are obtained by multiplying the obtained factor structure by the original scores (i. e. weighting the observed scores by the observed factor loading matrix). The two procedures should give equivalent results provided the a priori, expected factor structure is reasonably close to the observed factor structure. An analyses of variance of the factor scores is presented in Table 12. Three significant main effects are indicated by the analyses of the factor scores.

For factor VI (Activity) the main effects of both beard and mustache are significant. The cell means for the main effects within the variables excitable, rash and fast are given in Table 13.

Table 12

Analyses of Variance of the Factor Score Matrix

		Factor															
		I		II		III		IV		V		VI		VII		VIII	
Source	df	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
B	2	.56	1.95	4.83	.97	3.21	2.07	1.83	1.31	.16	.13	9.19	3.20*	3.54	1.64	13.76	1.62
M	2	.82	2.85	13.11	2.62	.09	.06	1.83	1.31	.96	.80	8.82	3.07*	1.78	.82	28.90	3.40*
H	2	.18	.61	6.38	1.27	.16	.10	3.57	2.56	.84	.70	3.53	1.23	6.37	2.95	12.47	1.46
BxM	4	.19	.64	5.06	1.01	.85	.55	4.10	2.94	1.84	1.54	2.31	.80	1.54	.71	5.95	.70
BxH	4	.13	.44	.40	.08	1.08	.69	.58	.42	.80	.66	.15	.05	3.85	1.78	3.00	.35
MxH	4	.04	.14	2.98	.60	1.80	1.16	1.64	1.18	1.52	1.27	1.15	.40	1.10	.51	6.32	.74
BxMxH	8	.40	1.38	5.25	1.05	2.00	1.29	1.58	1.13	1.25	1.05	3.06	1.07	1.18	.55	5.66	.66
Error	243	.29		5.00		1.55		1.39		1.20		2.87		2.16		8.51	

*$p < .05$

Table 13

Cell Means for the Main Effects of Beard and Mustache within Factor IV

Source	Variable		
	Excitable	Rash	Fast
B 1	4.17	4.02	4.02
B 2	4.31	3.48	3.78
B 3	4.30	4.02	3.38
M 1	4.31	4.14	3.92
M 2	4.27	3.93	3.78
M 3	4.20	3.93	3.48

Note. -- N = 90 for each mean

An examination of this table indicates that the significance for the main effect of both beard and mustache is due primarily to the variables Rash and Fast. Beard two (Figures 5, 6, 7, 14, 15, 16, 23, 24, and 25) was rated as more "cautious" than beards one and three. Beards two and three were rated as "slow" compared to beard one (no beard). Mustache three was rated as "slower" than mustache two in judgments of activity.

The significant main effect for Factor VIII (Dislike) was mustache. An examination of the cell means for this main effect indicated an unexpected finding. Mustache three (large) was rated 4.16 (would not dislike),

mustache two (small) was rated 3.76 (would dislike), and mustache one (none) was rated 3.66 (would dislike).

In summary, the results of the study lend support to these conclusions:

(1) The summative theory of Anderson predicted the responses to the combined stimulus from the observed responses to the separate elements with significantly less error than the Osgood or Fishbein equations. In terms of the interaction between cues, the algebraic averaging theory of Anderson was supported, although all three predicted significantly better than chance.

(2) The Osgood equation based on congruity theory predicted with significantly less error than the Fishbein equation.

(3) The analyses of variance of the seven a priori factors should be considered as a doubtful indicator of cue utilization within the factors, since the factor analysis indicated a different factor structure.

(4) The analyses of variance of the varimax factor score matrix indicated that the cues of beard and mustache are the significant cues in subjects judgments on the activity factor (Factor VI).

(5) The analyses of variance of the factor score matrix demonstrate that the cue mustache was significant in judgments of dislike.

CHAPTER IV

DISCUSSION

A stated purpose of the study was to investigate the process of stereotyping by delineating 1) the nature of the stereotype, 2) the cues that are utilized in the process, and 3) the interactions between the cues. The first analysis of the data failed to yield any information on the nature of the stereotype due to the inconsistency between the expected and obtained factor structure. The second analysis based on the factor score matrix did reveal some information relevant to the independent variables of head and facial hair.

The significant main effect within the factor activity (VI) indicated that the bearded faces were rated as "slow" compared to the neutral rated, unbearded face. This result is consistent with the earlier study by Seiller - Tarbuk (1951) who found that the "kind of beard or mustache had decisive meaning only for the attribute pairs, gay-sad and energetic-unenergetic" (see p. 15). The mustached faces were also rated "slower" than the faces without mustaches.

The significant main effect of mustache for the factor "dislike" (VIII) revealed an unexpected result. The faces with mustaches were rated would not dislike while the faces without a mustache were rated

would dislike. The result contradicts the results of other studies. However, the results of this study have little external validity in that these results cannot be generalized beyond the college sophomore population. For other subject populations this rating may vary.

The overall results regarding the nature of the stereotypes is both encouraging and unexpected considering the relatively few significant stereotypes. There were indications from both results and feedback from the subjects participating in the study that their judgments were based as much on the social desirability of their responses as on the stimulus material. The feedback from the subjects also indicated that they "saw-through" the purpose of the study. The use of an undisguised--structured instrument for attitude studies in the area of stereotyping is questionable.

Considering the second objective of the study--identifying the cues that are utilized in the process of stereotyping--the analyses of the factor scores indicated that the cues of mustache and beard were related to the dimensions of judgment. The fact that variations in head hair style were insignificant is an unexpected finding. Either there are relatively few stereotypes related to head and facial hair styles, or the procedure followed in this study is incapable of measuring them. In the present study each subject rated only one of the 27 face combinations. The subjects therefore had little or no frame of reference for responding to the schematized faces. A study mentioned earlier by Willis (1960) indicated that the amount of polarization of judgment increases when photographs are judged in groups of twos and threes when compared to ratings of

photographs rated one at a time. Although the procedure of presenting only one face combination to each subject was considered a priori to be a good procedure, a comparison should be made with groups of faces.

In relation to the third goal of the study--interactions between the cues--the inconsistency of the scales within the factors had little or no effect. The results of the prediction equations were based on each of the 35 scales considered separately rather than a summation of scales within expected factors. Moreover, the test of significance between the prediction equations were based on the variation about the regression lines of the equations rather than the linear correlation between the predicted and observed measures. The study of Triandis and Fishbein (1963) based the difference in prediction ability on the differences between the correlation coefficients. Since Triandis and Fishbein were comparing the prediction accuracy between the Fishbein and Osgood equations, the ineffectiveness of the difference between correlations was not as obvious as when comparing the Fishbein and Anderson equations.

As a final recommendation for further research in this area, the a priori assumption of the factor "purety" of scales, which has not been tested in new combinations, is risky. When a new stimulus dimension is combined with an untested combination of scales this assumption is unjustified. A procedure for analysis which begins with a factor analysis and includes the computation of factor scores for later analysis would be a better approach. The term factor scores here refers to the matrix formed by the post multiplication of the original observations in normal

score form by the normalized factor loading matrix (i. e., the factor loadings post multiplied by the inverse of the eigenvalues). This procedure would avoid many of the potential difficulties resulting from a priori assumptions of factor consistency.

CHAPTER V

SUMMARY

The study was an attempt to extend the means of measuring the process of stereotyping by combining pictorial stimulus material with a multidimensional attitude instrument.

Two hundred and seventy subjects judged schematic faces with 27 factorial variations of head and facial hair on 15 Semantic Differential (SD) and 20 Behavioral Differential (BD) scales. Each subject rated only one of the 27 faces with ten replications of a single face.

The scales within the SD were selected for their high loadings on the three underlying factors of Evaluation, Potency, and Activity. The 20 scales within the BD were selected as those representing the four underlying factors of Respect, Friendship, Hostility, and Social Distance. A factor analysis of the data failed to support the assumption that the 35 scales were represented within these seven factors. The factors emerging from the analysis indicated no clear pattern of SD or BD factors, but mixtures of the two.

An analyses of variance on the varimax factor scores indicated significant main effects for the independent variables beard and mustache but, not for head hair style. Unexpectedly the faces with mustaches were

rated favorably on the factor dislike. Faces with beards and faces with mustaches were rated less active than faces without facial hair.

In addition, three theories predicting subjects' responses to a complex stimulus figure as a function of their responses to the separate elements of the complex stimulus were tested. Although these theories were initially developed to make inferences about cognitive interaction processes within a single individual, they also accurately predicted the responses between individuals, both in this study and other studies. The results indicate significant differences in the prediction accuracy between the theories. For this particular study the theory proposed by Anderson predicted the subjects deviation scores for the complex stimulus significantly more accurately than either the Osgood equation or the Fishbein equation. The Osgood equation predicted significantly more accurately than the Fishbein equation. Both the Anderson theory and the Osgood theory are based on the assumption of a summation of mean deviations from neutrality. The simpler Anderson equation assumes a summation of the mean algebraic deviations. The Osgood equation is a summation of the products of absolute and algebraic deviations divided by the total absolute deviation. The Fishbein equation predicts that the response to a complex stimulus is a function of the sum of the algebraic deviations from neutrality. All three equations predicted the subjects' responses significantly better than chance, but the assumption of a summation of mean deviations found greater support than the assumption of a summation process alone.

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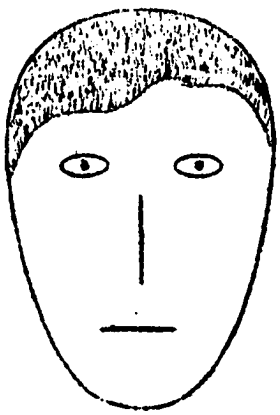
APPENDIX A

SEMANTIC AND BEHAVIORAL DIFFERENTIAL SUBJECT RESPONSE FORM



GOOD_____:_____:_____:_____:_____:_____:_____BAD

DIRTY_____:_____:_____:_____:_____:_____:_____CLEAN

WEAK_____:_____:_____:_____:_____:_____:_____STRONG

CALM_____:_____:_____:_____:_____:_____:_____EXCITABLE

CONSTRAINED_____:_____:_____:_____:_____:_____:_____FREE

HONEST_____:_____:_____:_____:_____:_____:_____DISHONEST

RASH_____:_____:_____:_____:_____:_____:_____CAUTIOUS

ACTIVE_____:_____:_____:_____:_____:_____:_____PASSIVE

BRAVE_____:_____:_____:_____:_____:_____:_____COWARDLY

VALUABLE_____:_____:_____:_____:_____:_____:_____WORTHLESS

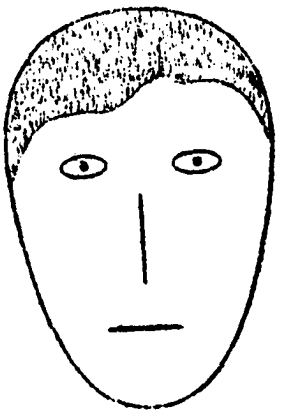
SIMPLE_____:_____:_____:_____:_____:_____:_____COMPLEX

FAST_____:_____:_____:_____:_____:_____:_____SLOW

HUMOROUS_____:_____:_____:_____:_____:_____:_____SERIOUS

SEVERE_____:_____:_____:_____:_____:_____:_____LENIENT

UNFAMILIAR_____:_____:_____:_____:_____:_____:_____FAMILIAR



WOULD____:____:____:____:____:____:____WOULD NOT
ADMIRE IDEAS OF

WOULD____:____:____:____:____:____:____WOULD NOT
BE PARTNERS WITH

WOULD NOT____:____:____:____:____:____:____WOULD
ACCEPT AS INTIMATE FRIEND

WOULD____:____:____:____:____:____:____WOULD NOT
DISLIKE

WOULD NOT____:____:____:____:____:____:____WOULD
EXCLUDE FROM NEIGHBORHOOD

WOULD NOT____:____:____:____:____:____:____WOULD
DEPEND UPON

WOULD____:____:____:____:____:____:____WOULD NOT
ACCEPT AS CLOSE KIN BY MARRIAGE

WOULD NOT____:____:____:____:____:____:____WOULD
HATE

WOULD____:____:____:____:____:____:____WOULD NOT
FEAR

WOULD____:____:____:____:____:____:____WOULD NOT
BE ON FIRST NAME BASIS

WOULD____:____:____:____:____:____:____WOULD NOT
ADMIRE CHARACTER OF

WOULD NOT____:____:____:____:____:____:____WOULD
BELIEVE

WOULD____:____:____:____:____:____:____WOULD NOT
WORK IN SAME OFFICE WITH

WOULD____:____:____:____:____:____:____WOULD NOT
ARGUE WITH

WOULD NOT____:____:____:____:____:____:____WOULD
PERMIT TO DO ME A FAVOR

WOULD NOT____:____:____:____:____:____:____WOULD
DISAGREE WITH

WOULD____:____:____:____:____:____:____WOULD NOT
PROHIBIT FROM VOTING

WOULD____:____:____:____:____:____:____WOULD NOT
ELECT TO POLITICAL OFFICE

WOULD NOT____:____:____:____:____:____:____WOULD
EAT WITH

WOULD____:____:____:____:____:____:____WOULD NOT
INVITE TO JOIN CLUB

APPENDIX B

ORIGINAL OBSERVATIONS

Original Observations

Card Column	Content
1-2	Replication number
2-4	Schematic face number
5	Blank
6	Sex of subject, 1 = male, 2 = female
7	Blank
8	Subject classification, 1 = Freshman 2 = Sophomore 3 = Junior 4 = Senior 5 = Unclassified 6 = Other
9	Blank
10	Good - Bad
11	Clean - Dirty
12	Honest - Dishonest
13	Valuable - Worthless
14	Familiar - Unfamiliar
15	Blank
16	Strong - Weak
17	Constrained - Free
18	Brave - Cowardly
19	Serious - Humorous
20	Severe - Lenient
21	Blank
22	Excitable - Calm
23	Rash - Cautious
24	Active - Passive
25	Complex - Simple
26	Fast - Slow
27	Blank
28	Admire ideas of
29	Admire character of
30	Believe
31	Depend upon
32	Elect to political office
33	Blank
34	Be partners with
35	Eat with
36	Accept as intimate

Original Observations - continued

Card Column	Content
37	Be on first name basis
38	Permit to do favor
39	Blank
40	Argue with
41	Dislike
42	Disagree with
43	Hate
44	Fear
45	Blank
46	Exclude from neighborhood
47	Prohibit from voting
48	Accept as close kin by marriage
49	Invite to join club
50	Work in same office with

ORIGINAL OBSERVATIONS

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0104  1  2  62452  56666  54563  22624  43326  46232  27621
0105  1  2  37372  57761  77425  57164  15161  77561  44444
0106  1  2  66644  44464  27461  21422  61116  11141  17711
0107  1  2  36443  35227  71441  23731  44147  44451  27711
0108  1  1  35253  34432  36226  66461  24517  66765  44444
0109  2  1  44433  33636  41446  44742  57447  43131  42734
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0114  1  2  35222  37662  52127  66761  56217  77671  17711
0115  2  1  15171  27511  71217  57471  27172  67777  37477
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0117  1  2  44455  45354  55453  44441  44117  43442  17741
0118  2  1  52221  65673  63712  44464  67444  71564  47761
0119  2  1  43422  24767  44362  44744  44447  74441  27644
0120  1  1  33525  36453  62133  67761  47244  75476  44764
0121  1  1  17517  11711  11147  75554  37737  77471  37773
0122  1  4  44444  44444  44444  44444  44444  44444  44444
0123  2  1  14241  11627  31114  74741  47142  74771  14471
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0125  2  1  56446  44645  34542  45764  71327  31131  17711
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ORIGINAL OBSERVATIONS

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0204 2 1 67664 64717 74674 47741 14172 22442 17711
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0206 2 2 44274 35742 71746 14711 41117 41111 17711
0207 2 2 47321 24541 61446 35434 44435 22443 47544
0208 2 1 33346 26322 32236 66662 27462 66764 47447
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0210 1 3 42366 21645 14223 27441 47144 67764 47344
0211 1 2 34467 77771 74746 76264 66177 63674 64243
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ORIGINAL OBSERVATIONS

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ORIGINAL OBSERVATIONS

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ORIGINAL OBSERVATIONS

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ORIGINAL OBSERVATIONS

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ORIGINAL OBSERVATIONS

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ORIGINAL OBSERVATIONS

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1008	2	1	56372	47517	45454	26731	68646	46441	27731
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1028	2	1	14251	13727	43115	27726	67777	75773	17612

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