THE EFFECTS OF GENDER AND LEVEL OF SOCIOPATHY UPON REACTION TIME AND ERRORS ASSOCIATED WITH THE BIPOLAR EVALUATION OF FACIAL AND NON-FACIAL COMPLEX STIMULI

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PREFACE

Few research studies have been undertaken which attempt to explore individual differences based on diagnostic entities common to the practice of clinical psychology and psychiatry. Historically, demonstrable performance differences varying as a function of such nosologies have been rare and difficult to replicate empirically. The purpose of the present study is to investigate perceptual-motor sex differences as a function of "sociopathy", a widely used diagnostic entity. Delineating such differences may further the understanding of socially related cognitive-perceptual processes which serve to guide interpersonal behavior.

I wish to thank Bob Stanners, my research mentor throughout my graduate training, for all of the time and effort he has devoted to this and other studies. I would especially like to thank him for his availability, patience, and loyalty throughout the many twists and turns of the past five years. Words cannot express the appreciation I feel for his assistance and his friendship.

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CHAPTER I

INTRODUCTION

The meaning of facial expressions and all that is behaviorally mediated by them has been an important facet of human survival and evolution for millions of years. The entire range of emotional events experienced by our evolutionary forerunners are, in part, reflected in complex muscle action-patterns that we ourselves emit, observe, and evaluate. These muscle patterns provide us with varyingly reliable information about emotional events in others and, to a degree, reflect our own internal psychological events back to us, "through" other people. Although our experience and exposure has been vast, only recently have systematic efforts directed toward untangling some of the complexities associated with the categorization and interpretation of human facial expressions proven efficacious.

Physiognomy, the study of facial expressions, was speculated upon in an unscientific and frequently superstitious manner until the latter part of the eighteenth century. In 1789 a Calvinist cleric by the name of John Lavater published a five-volume series entitled Essays on Physiognomy, Designed to Promote the Knowledge and the Love of Mankind in London, England. Although this work was far from empirical, it did much to establish credibility and interest in an area of scientific inquiry which had become associated with charlatans and others of questionable repute.

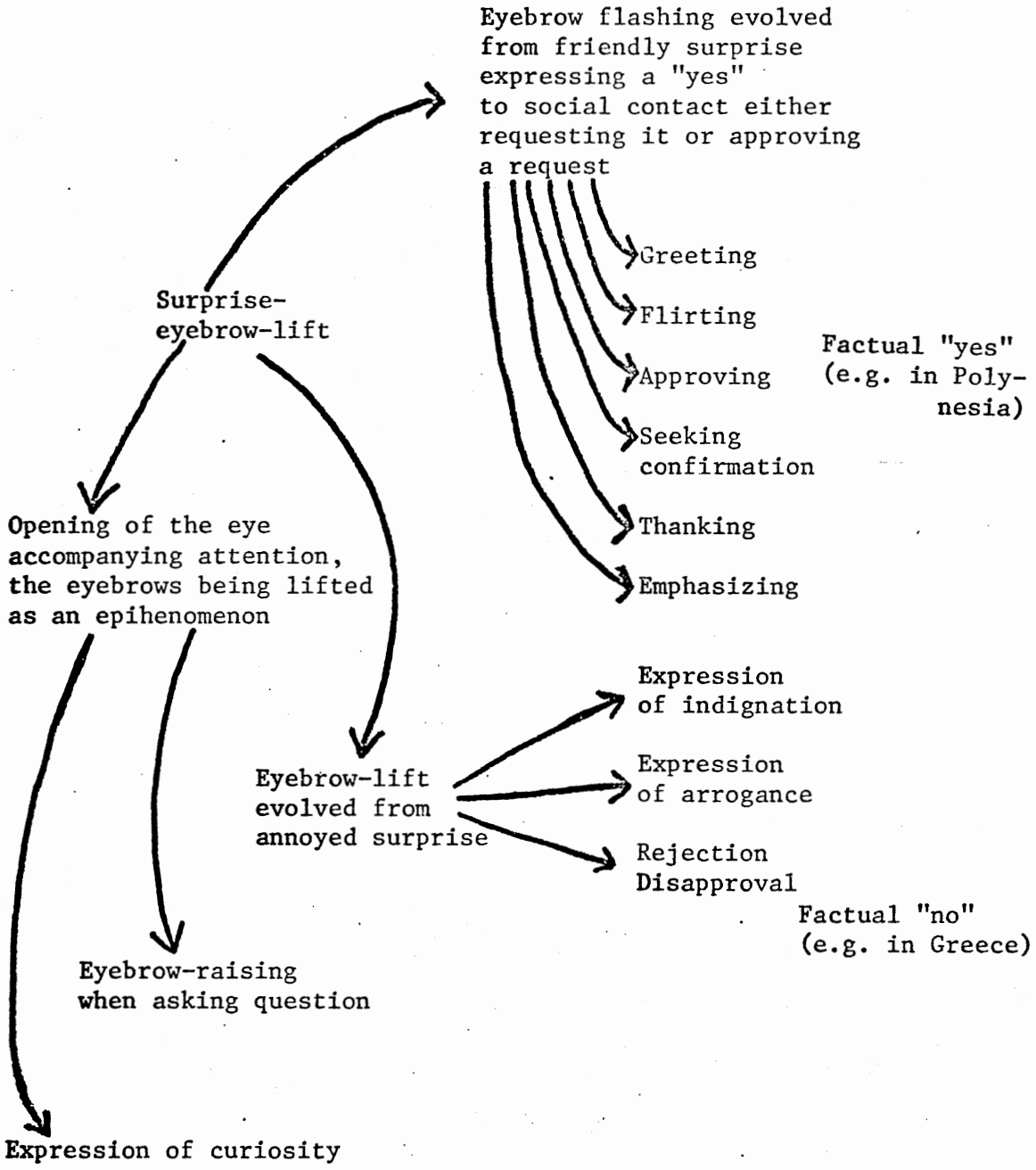
Nearly a century after Lavatar, Charles Darwin entered the physiognomy arena by interpreting facial expressions and other non-verbal "language" development within the context of his theory of evolution. Darwin theorized that facial expressions are not truly "expressive". Instead, he postulated that they are functional, in that they bring about survival-enhancing environmental impact over many successive generations. Viewed in this way, a smile may have been a primordial way of signalling that being within close proximity was acceptable or desired. A given expression probably had many functional uses which, if they remained functionally adaptive over many generations, became genetically incorporated as an "instinct". As man's brain became increasingly encephalated, the complexity and variability of expressions also increased. This increased range of expressive behavior -- both verbal and non-verbal -- has assisted man in the move away from a primitive interaction with the environment, to the present where humans are clearly at the apex of the planet's food chain. Successful procreation -- the ultimate interspecies goal -- has evolved to the point in humans where they now threaten to overload the earth's ecosystem.

Although Darwin's research methodology was very crude by today's standards, he performed cross-cultural studies in which he attempted to evaluate and describe emotional states from drawings and photographs of both people and animals. He soon discovered that evaluation between individuals judging facial expressions were highly variable except for certain extreme affective displays. He made no attempt to evaluate "trait" variables, but instead focused upon "state" variables. State variables relate to transient emotional experiences such as "surprise" or "fear". On the other hand, trait variable are related to personality

characteristics that are more constant over time such as "promiscuity" or "paranoia". There have been no successful attempts to reliably relate trait-type personality variables to facial features or expressions (e.g., Szondi test).

The evolution of facial expressions has been extensively researched in great detail by those in keeping with Darwinian theorizing. Van Hoof (1972) theorized that the primodial roots of laughter and smiling are evident in the lower primates. He suggested that laughter and smiling involve a continuum of "intergrading signals" which can be roughly divided into two dimensions of "friendliness" and "playfulness". The "broad smile" and "wide mouth laugh" represent the respective extremes of these dimensions which, Van Hoof posits, resemble the "silent bared-teeth display" and the "relaxed open-mouth display" of the lower primates. The former is an expressive movement which originally signalled fear. In humans, this has evolved to express non-aggression (e.g., friendliness) in greeting situations. For example, the relaxed open-mouth display is frequently evident during play behavior.

A much more focused and speculative study concerning the possible evolution of eyebrow movements and their meaning was undertaken by Eibl-Eibesfeldt (1972). She suggested that eyebrow movements convey similar messages across different cultures (see Figure 1). The cross-cultural similarities in these expressions purportedly illuminate the evolutionary origin of these movements. Obviously, eyebrow movements comprise only a minute protion of the total amount of information expressed by an individual's face. The face, in turn, is only one "channel" of the complex communication network that is observable in the totality of human behavior. Whether or not one accepts evolutionary theory that attempts to



*from Eibl-Eibesfeldt, 1972

Figure 1.* Hypothetical Evolution of Eyebrow Movements Into Signals in Man

functionally interpret and describe the development of non-verbal expressive behavior, it is evident that an inability to communicate non-verbally would present a significant handicap in today's highly socialized, technologically advanced world (e. g., in schizophrenia and other "thought disorders").

Of the five sensory modalities, few would argue that vision and hearing are not of primary importance for the survival of the majority of mammalian life forms, particularly the primates. The human eye is capable of perceiving more shapes and configurations of stimuli than any other organism due to its vast array of complex "edge detectors" within the retina. The evolution of our visual system may be directly linked to the survival value inherent in reading socially-related stimuli, the most complex of which may be facial expressions. Along with postural cues and hand-arm gesticulations, facial expressions inform us of others' attitudes, intentions, mood, and other important factors. Therefore, the ongoing interpretation of facial expressions serves an important guiding function for social interaction, which, in turn, is essential to almost all human survival.

Rapid and accurate decoding of facial expressions with subsequent and appropriate behavior on the part of the decoder comprises a major component of the total non-verbal information-processing that transpires between individuals (Izard and Nunnally, 1965; Frijda, 1958; Frijda and Philipzoon, 1963; Ekman, 1964). It is one of the primary assumptions of the present study that the interpretation of facial expressions serves to guide and initiate reactive (e. g., reciprocal) behavior on the part of the decoder. The decoding/encoding that takes place between two individuals can be conceptualized as an dynamic "feedback loop".

It is suggested here that a "cognitive-perceptual" style determines the decoder's "input" (reception/perception) parameters; whereas, a "cognitive-behavioral" style characterizes the decoder's subsequent behavioral encoding (transmission/behavior). Hereafter, these input/output styles will be referred to as perceptual and behavioral styles, respectively. The composite perceptual-behavioral style afforded by an individual's "personality organization" may have direct consequences in terms of his/her interpersonal behavior patterns. For example, Christie and Geis (1970) have presented evidence that highly "Machiavellian" male college students can perform a wide variety of competitive interpersonal tasks better than other males in face-to-face, small group settings. This may be due to more rapid and accurate perception of visual and auditory cues as well as a more functionally manipulative (e.g., aggressive) behavior style. The present study is concerned with the speed an affective decoding task can be performed and how differences in such decoding rates may provide an individual with advantages in the planning and execution of various interpersonal maneuvers. To begin this exposition, an analysis of empirical factors related to the decoding of facial expressions will be presented. An examination of the research-based development of reliable facial evaluation dimensions follows.

A Literature Review of Studies Investigating Properties Related to Facial Expressions

> . . . the term facial patterning or facial expression . . . does not mean merely something that happens as a result of the subjective experience of an emotion; that is, it is not merely expressive behavior. Rather, it is a component of emotion. Like all activity patterns, it has specific meaning

> and relationships with particular antecedents and consequents. It is expression, mainly in the sense that it communicates something both intrapsychically and socially (Izard, 1971).

The above quotation illustrates a position taken among psychologists only recently. Prior to 1950, the common-sense notion that each individual expression reflected the internal subjective experience of the person displaying it was prevalent, perhaps due to the intuitive appeal of such a notion and a decided lack of empirical evidence countering it. According to Rank (1932), the Babylonians attempted to relate expressions to psychological factors as early as 3000 B. C. The most ancient literature reflects an awareness of characteristic postures and facial expressions that convey meaningful information to the observer as to the emotional state of others, e. g., Cassius, "lean and hungry look". Numerous pseudoscientists attempted to make trait-type evaluations on the basis of facial expressions and configurations, notably, the phrenologists. The phrenologists felt that mental faculties were located in specific regions of the head and that intellectual and personality characteristics could be evaluated by noting the skull configuration and facial attributes of an individual. The phrenologists and similar practitioner/theorists did much to keep inquiry into the meaning of facial attributes and expressions out of the domain of "legitimate" science until relatively recent times.

Theorizing in the area of physiognamy flourished toward the end of the eighteenth century. Many loose theories were forwarded that attempted to link facial expressions and postures with personality characteristics. One of the most widely read physiognomists during this time was Lavater, an English cleric of Calvinist persuasion. His five-volume series on physiognomy in 1789 was apparently intended to

instruct the reader in the practice of physiognomy and was, in all probability, a state-of-the-art manual. Lavater instructed the reader to be as rigorous as possible, although he acknowledged that physiognamy was not likely to soon become acknowledged as a science.

> . . . my chief aim is to encourage the Reader himself to engage in the career of observation . . . Let us begin only by collecting a sufficient number of observations, and endeavoring to characterize them with all of the precision, all the accuracy of which we are capable (Lavater, 1789, Vol. I, p. 30).

According to Izard (1971), physiologists and biologists dominated the physiognamy scene during the nineteenth century, among them Darwin (1872). Darwin centered his attention on the "state" or situational variables associated with facial expressions. He administered questionnaires to missionaries and physicians from all over the world, accumulating photographs and drawings from these people at the same time. From this collection of materials he performed somewhat crude rating studies of affective displays that he integrated into his evolutionary theory in a book published in 1872, The Expression of the Emotions in Man and Animals. As presented earlier, Darwin felt that all facial movements were functional muscle action-patterns and not expressive of internal emotion. For example, any facial display that appears expressive was originally an adaptive, behavior-eliciting display that has maintained its functional utility over many successive generations, thereby becoming "inherent". Current theorists are not in total agreement with this "functional" hypothesis in that there is general agreement that facial expressions do, in part, indicate emotional states and/or internal events (Ekman and Friesen, 1971; Izard, 1971).

Darwin's work with photographs and drawings tended to stylize research done by the then emerging scientific psychologists. Prior to

1930 however, physiognomists did not take Darwin's lead and, instead, tended to focus on trait-type correlations between facial features and personality characteristics. Early studies (i. e., Pintner, 1918) in this area attempted to "judge" intelligence from photographs with an almost total lack of correlational results beyond the chance level. Several error-reducing strategies were employed such as taking multiple photographs of each subject, narrowing the age range of the subjects, maintaining constant camera/subject relationships, etc. However, in spite of refined techniques, correlations between personality traits (intelligence, etc.) and facial features (shape and positioning of eyebrows, lips, etc.) remained only slightly above that possible by chance agreement between evaluators.

Using photographs similar to those of Pitner, Anderson (1921) attempted to enhance the accuracy of judging intelligence by employing groups of judges, all of whom were either psychology professors or graduate students in psychology. He managed to achieve a correlation of + .27 (estimated IQ/psychometric I.Q.) for his efforts. The major source of error in this and similar studies appears to be due to evaluative variation in the bright-average, superior, and higher ranges of I.Q. "estimation". Anderson concluded that intelligence could not be reliably judged from facial features.

Based on some very early sketches by Piderit (ca. 1850), Boring and Titchner (1923) designed a "model face" to demonstrate the range of human facial expression to introductory psychology students at Cornell University. The model was constructed of several modular, interchangeable facial parts, the combination of which yielded a total of 360

different combinations of "expressions", although some of the combinations were very bizarre in appearance. Facial evaluation ratings with this apparatus consistently resulted in slightly above chance agreement between evaluators.

Hulin and Katz (1935) took hundreds of photographs of the famous actor, Frois-Wittmann, from which they selected a set of 72 photographs, each intended to depict a different emotion. Attempts to achieve interrater agreement failed to generate consistent results. Although initially lacking in empirical reliability, these photographs received considerable attention in the physiognomy literature some twenty years after their original use in Hulin and Katz's work.

The amount of physiognomy research generally decreased during the approximate period between 1930-1950. Several factors appear responsible for this diminution, the greatest of which was, in all likelihood, World War II. Although the period surrounding World War II constituted a boom period for psychologists, much of their efforts were devoted to personality assessment, clinical treatment, etc., in conjunction with extensive military efforts to deal more effectively with human factors. It is also possible that the frustrated efforts of early physiognomy researchers (trait-type) dampended interest in further physiognomic exploration. Another major blow to this research area was the emergence of behaviorism. Behaviorists generally denigrated the relevance and validity of "subjective" approaches to understanding behavior such as that engendered by those studying facial expressions and emotional factors related to them. As behaviorism and the S-R theories became increasingly dominant, research and theory focused upon stimulus factors and response parameters which, in so doing, partially and temporarily

returned physiognomy research to an unfavored realm, seemingly unfit for scientific inquiry. In what appeared to be an attempt to maintain recognition and standing in the scientific community, most physiognomy research of this period was concerned with the development of various categorization dimensions and schemas for the analysis of facial expressions.

A good example of this "interim period" research was conducted by Hanawalt (1944). Hanawalt had subjects rate both posed and "candid" photographs according to his own facial evaluation dimensions such as sulkiness, defiance, contempt, mirth, etc. He showed subjects the photographs in three different configurations: upper half of the face only; the lower half of the face only; and whole-face exposures. He concluded that the lower half of the face furnishes the best cues for the identifications of happy expressions and that, on the whole, the "happy" expressions are the most easily identified, e.g., the most obvious.

With crude equipment and statistical tools, progress in physiognomy research was laborious and very slow. For example, Brunswik (1956) relates research undertaken by himself and Reiter (Brunswik and Reiter, 1937) in which drawings of faces were systemmatically varied in 3 facial regions (height of forehead, mouth, height and spacing of nose). Brunswik felt that the extreme variability of facial expressions precluded the experimental use of live or photographed faces. His schematized drawings yielded a total of 189 variations, each of which had to be rated on the basis of seven physiognomatic features (e.g., beauty, intelligence, etc.) by each subject. Beyond arriving at a coding system

for the schematized faces (some of which had to be dropped due to their unusual or disruptively humorous appearance) the only notable result of the study was that subjects tended to prefer those facial expressions represented by the "middle" values of the movable facial segments.

Brunswik and Reiter's study is mentioned primarily because it made possible one of the first series of facial evaluation studies which produced reliable results. Samuels (1939) projected slides of 10 pairs of Brunswik and Reiters' schematized drawings of faces to a large group of judges for a maximum period of 30 seconds. Each pair of slides were extreme polar-opposites according to Brunswik and Reiter's 1937 categorization system which included mood, likeability (desirability), age, energy, beauty, character, and intelligence. Although 88% of the judges' ratings were in agreement with Brunswik and Reiter's, one is left to wonder at the magnitude of effects due to (1) group administration (e.g., mutual feedback), (2) a small sample size of the most disparate pairs of schematized faces, and (3) the increase in size of the viewable face due to the use of a slide projector. Nonetheless, this research constituted a forward step. Samuels ran three additional replication/extension studies of differing designs but with similar results. She concluded that the schematized faces effectively reduced the number of cues impinging upon the evaluator, and that this reduction of cues significantly enhances interrater agreement with Brunswik and Reiter's initial categories.

A later attempt to use the Brunswik and Reiter drawings was by Halstead (1951), originator of the Halstead-Reitan neuropsychological test battery. Halstead attempted to use the schematized faces to help differentiate between neurologically impaired and psychotic patients.

He attempted to achieve this differential diagnosis by simultaneously presenting a total of 9 faces in a 3 by 3 arrangement. Each face was chosen for its desirable/undesirable attributes as per the Brunswik and Reiter (1937) rating study. Each subject rated each face as being desirable/undesirable. Halstead expected to find a lack of agreement between the two experimental and one control group (psychotic, brain damaged, and normal, respectively), but instead, found approximately 80% agreement between all three groups. Not only was there considerable overlap between Halstead's clinical samples -- their ratings coincided with Brunswik and Reiter's ratings at nearly the level reported in the Samuel's studies.

A collection of eight studies undertaken by Secord and others, entitled "Personality in Faces", are reported by Secord (1958). From his series of studies and others related to them, Secord postulates a total of five inferential processes related to the decoding of affective displays:

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.

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 (Secord, 1958, pp. 313-314).

Secord's special interest in using the above inferential mechanism was to unravel the process of stereotyping, a categorical form of complex discrimination, especially as it related to the racist stereotyping of Negroes.

A more reliable and much less cumbersome evaluation scheme was undertaken by Schlosberg (1941, 1952, 1954) and others (Engen, Levey, and Schlosberg, 1958), who initially analyzed the Frois-Wittmann photographic series in terms of a two-dimensional model with encouragingly reliable results. The two dichotomous dimensions he chose were pleasantness-unpleasantness and attention-rejection. The former dimension is of specific concern to the present study and has appeared regularly in research and theory throughout the history of psychology. For example, Wundt, recognized as the founder of the first experimental psychology laboratory in Leipzig, Germany, proposed a three-dimensional theory of feeling (ca. 1900) in which he felt pleasantness-unpleasantness, excitement-depression, and tension-relaxation could best describe the range of human feelings.

Schlosberg and others went on to explore and further refine these dimensions (Engen, Levey, and Schlosberg, 1958), eventually adding a third dimension he called "activation". The most reliable of the three dimensions employed by Schlosberg has consistently proven to be the pleasant-unpleasant dichotomy or, sometimes, the positive-negative dichotomy. Several researchers have found this bipolar dimension to yield high interrater reliability for a variety of facial evaluation tasks

(Schlosberg, 1941, 1954; Buck et al., 1972; Osgood, 1966). Ekman and Friesen (1971) have postulated that universally distinctive patterns of facial expressions exist, much in keeping with Darwinian theorizing. They, along with Izard (1971) have found support for these cross-cultural similarities. In a very recent review of the literature, Ekman and Oster (1979) cite numerous cross-cultural studies which support the notion of facial expression universality. They relate that:

> The majority of observers in each culture interpreted the facial expressions as conveying the same emotions (five literate cultures; (43,55) nine literate cultures, 77). Similar experiments have obtained comparable results in Malaysia and in two states of the Soviet Union (p. 529)

Buck et al. (1972) contend that the majority of variance accounted for in these and similar studies is probably attributable to the pleasant-unpleasant (positive-negative) dimension. This they explain by stating:

> . . . judgments of pleasant-unpleasantness reflect a relatively global, undifferentiated kind of emotional response which . . . requires the fewest inferences about the individual expressing the affect (p. 370).

A seemingly important aspect of the pleasant-unpleasant dimension has, until very recently, been neglected. This neglected aspect of facial evaluation is the <u>time</u> it takes to make these evaluations. Previous research as cited above has mainly focused upon the types of evaluations made by individuals and the accuracy with which these evaluations can be made. The ability to decode extremely rapid sequences of verbal and non-verbal information is necessary to effectively engage in interpersonal exchanges of behavior. Persons with the ability to rapidly decode facial expressions at a high level of accuracy may have more time available to them to plan or guide their behavior. Reliably

accurate evaluative dimensions were needed before the actual time it takes to judge facial expressions could be studied. Clearly, the pleasant-unpleasant dimension has proven to be highly reliable and is of great potential utility in laying a foundation for the study of reaction-time differences in facial evaluation processing and, most important for the present study; in exploring the perceptual and behavioral styles that are associated with persons who require greater/lesser amounts of time to make facial evaluations. What is being suggested is that the reaction-times associated with the bipolar evaluation of facial expressions may illuminate decoding abilities which potentially affect the quality of interpersonal exchanges. The following section deals with a study designed to explore such temporal differences. Recent research by Stanners and Hernon (1976), Angus (1978), and Gabriel and Stanners (1978), will provide a backdrop for this study and, hopefully, future explorations.

The Present Study

The present study comprises an investigative attempt to define the personality characteristics related to the time it takes to make rapid pleasant/unpleasant facial evaluations in young college adults who exhibit varying degrees of "sociopathy" via self-report upon a psychometric test. Previous research (Angus, 1978) produced a significant interaction between high/low scoring (e.g., level of sociopathy) males and females in relation to the time needed to make bipolar facial judgments. High sociopathy males and low sociopathy females made significantly faster facial evaluations than their opposite-sociopathy level,

same-sex counterparts. This interaction will be examined further after reviewing the initial study by Stanners and Hernon (1976) which has led to previous and the present research.

In a departure from conventional facial evaluation research, Stanners and Hernon (1976) chose to assess the time it takes to evaluate facial expressions, instead of focusing upon the more traditional aspect of facial evaluation accuracy. They suggested that this temporal component of facial evaluation might reflect important differences between individuals due to different rates of social information processing. In examining these individual differences, they chose the bipolar dimension of pleasantness/unpleasantness for the classification of facial expressions, mainly for the high degree of reliability associated with this dimension and its possible relation to interpersonal guiding behavior.

In their 1976 study, Stanners and Hernon developed a set of 180 slides of faces that a total of 88 judges achieved 85% interrater agreement in making their pleasant-unpleasant judgments. The subjects were asked to display pleasant/unpleasant expressions as if in an actual interpersonal setting. These photographic subjects were white undergraduate students enrolled in various psychology courses at Oklahoma State University. Once a satisfactory level of interrater agreement had been achieved, the slides were then shown individually to male and female subjects, recording the time it took to judge the facial expressions as either pleasant or unpleasant and indicate a response-choice by throwing a switch in the appropriate (left/right) direction. Similarly, the subjects were shown letter strings and asked to respond as to whether the letter string was a word or non-word. Finally, they

were shown drawings of both circles and squares and asked to identify each by the appropriate left/right throw of the same switch. Each subject was required to make a bipolar decision when viewing three different stimuli: faces (pleasant/unpleasant), letter strings (word/non-word), and geometric figures (circle/square). Overall, it took subjects approximately the same amount of time to make the facial evaluation and word/non-word decision -- approximately 700 msec. The circle/square task required much less time on the average, taking only approximately 400 msec on the average. No overall reaction time differences resulted between male and female subjects on any of these perceptual-motor tasks.

Stanners and Hernon also administered the Bem Sex Role Inventory (Bem, 1974) to all subjects. The Bem Sex Role Inventory, hereafter BSRI, is a self-report instrument consisting of 60 items. Each item was chosen to reflect varying degrees of gender-related social desirability, i.e., the desirability of culture-bound sexual stereotypes. In taking the test, an individual rates each item on a scale of 1-7 (low-high "degree of truth", respectively), according to his/her view of the degree to which he/she feels the item reflects their personality in general. Three scores result: a "masculine" score, a "feminine" score, and a "neutral" score, the latter of which is based on items Bem found to be "unrelated" to sexual identity. Each of the three scores is an averaged value. These scores theoretically reflect the congruence of a person's self-concept with masculine/feminine stereotypes or, in other words, sexual identification.

In Stanners and Hernon's study, a correlational analysis between BSRI scores and reaction time (the time needed to evaluate facial

expressions and indicate decision) yielded consistent results -- correlations for females were all positive and insignificant while those for males were all negative and all but 2 (out of a total of 12) were significant beyond the .05 probability level.

A subsequent regression analysis on the relationship between individual BSRI scales and facial evaluation latency revealed a trend in the data which served as the starting point for the research immediately preceding the present study -- males who tended to highly endorse socially positive BSRI items, regardless of gender-relatedness (e.g., any of the three BSRI scales), performed the facial evaluation task significantly faster (approximately 200 msec) than males who did not endorse these items as highly. Furthermore, these high social-desirability males responded significantly faster than females in general, regardless of female item endorsement. Stanners and Hernon intrepreted this pattern of results as follows:

> . . . the variance in evaluation latency predictable from the BSRI is common to the three scales which strongly indicates that it is not the sexual identification aspect of the BSRI which is related to facial evaluation latency (p. 13).

There were no significant differences in accuracy of evaluation (percentage of agreement with original judges who had unlimited assessment time) between any of the above-mentioned groups. This posed strong evidence against the possibility of speed-accuracy tradeoffs on the part of the more rapid evaluations made by the high social-desirability males.

In discussing these results, Stanners and Hernon noted that:

> It really did not make any difference which scale was chosen to predict latency, and adding one or both of the other scales to the regression model did not improve predictability. The common characteristic of the three scales related to face

> evaluation latency would seem to be social desirability in a quite general sense. The higher the male subjects tended to evaluate themselves in a socially desirable way, the more rapidly they made evaluations of facial expressions (p. 17).

They went on to suggest that:

> . . . high scoring men should have evaluation latencies substantially below those of women . . . while there does not appear to be a general sex difference in the time it takes to evaluate facial expressions, there may be one which involves selected categories of men (p. 18).

Stanners and Hernon's conclusions led directly to research (Angus, 1978) which attempted to partially replicate and further explore the relationship between rapid facial evaluation and the male endorsers of the highly predictive BSRI items. Fifteen of these items appear in Table I:

TABLE I

BEM SEX ROLE INVENTORY ITEMS FOUND TO BE HIGHLY PREDICTIVE OF RAPID FACIAL EVALUATION FOR MALE SUBJECTS*

Aggressive	Eager to soothe hurt feelings
Competitive	Happy
Ambitious	Helpful
Forceful	Loyal
Acts like a leader	Sensitive to the needs of others
Dominant	Sympathetic
Athletic	Reliable
Strong Personality	

*Stanners and Hernon, 1976

The content of the items appearing in the left column of Table I appear to be related to aggressiveness and overlapped with Bem's

masculine scale heavily. The items appearing in the right hand column seem to reflect a more sensitive, passive quality and appear in the feminine and neutral Bem scales. Taken together, these two "types" of items seem almost contradictory, yet they may be related in terms of their positive scoial value. Furthermore, it was felt that these items reflected the external/internal (social appearance/underlying motives) rift notable among sociopathic males (Cleckley, 1964), i.e., the sociopath's outer appearance (acquiescent, socially fluent and desirable, unselfish) is markedly different from his underlying intentions (manipulation, deception, control). By appearing benevolently motivated, the bright or "complex" sociopath arouses minimal suspicion in his impulsive, gratification-seeking behavior. Although this description is somewhat contrived and surely does not fit the "pure" or "idiographic" psychopath, it was felt to illustrate a motivational/social facade discontinuity characteristic of sociopathic persons. The personality dimension of sociopathy was resultingly chosen for study, primarily on the basis of the highly predictive BSRI items which were felt to reflect the aggressive, controlled and perfectionistic self-report common to this population (Hare, 1970). Also, there was intuitive appeal to the notion that sociopaths, long noted for their skill and predatory orientation toward interpersonal manipulation, should possess above-average abilities to "read" social cues rapidly.

In order to screen subjects in terms of their degree of sociopathy, a relatively brief psychometric instrument was needed. Gilberstadt (1970) developed a self-report questionnaire the content of which seemed highly congruent with the content of the highly predictive BSRI items and the males suspected of endorsing them. Gilberstadt considered three

remarkable among sociopaths: freedom from physical complaints and concerns, high activity level, and extroversion. His descriptions of the patients used to norm his questionnaire seemed to fit the self-reports of the males in the Stanners and Hernon study who made rapid facial evaluations (e.g., athletic, active, aggressive, lead and/or exploit others, etc.; refer to Table I). Most important however, was that Gilberstadt's normative population was mostly non-criminal, providing a potentially better fit with the college population under study. It should be emphasized that the degree of sociopathy found in college populations is probably not of clinical proportions in most cases; however, the term will be used here to identify a personality trend. High male sociopaths in clinical populations are characterized by their lack of impulse control, inability to benefit from punishing experiences, predatory interpersonal orientation and aggressiveness, sometimes accompanied by physical assultiveness, etc. Highly sociopathic females are typically noted for their preference for acting out sexually and for their alliances with aggressive associates e.g., vicarious aggression (Lanyon, 1968). Females very low in sociopathy are characterized by stringent conventionality, over-sensitivity, low "energy level", anxiety, and passivity (Dahlstrom, Welsh, and Dahlstrom, 1972). Males similarly low in sociopathy resemble their female counterparts and, in addition, are noted for their low self-esteem and lack of heterosexual aggressiveness. It is doubtful that the clinical extremes of the sociopathic dimension would be well adapted to college success. Therefore, extremes in the college population probably do not correspond to extremes in clinical and criminal populations which may limit the generalizability of performance differences from the former to the latter two groups.

Over a period of years, Gilberstadt developed a 51 question inventory which he found to be very reliable in its correlation with sociopathic behavioral styles -- mostly male patients in a V.A. hospital setting. These true/false items were extracted from the Minnesota Multiphasic Personality Inventory, hereafter MMPI, progressively refined, then normed for ultimate application as a psychiatric screening instrument. So successful was Gilberstadt in this effort with this particular scale (he has developed some 15 as of this writing) that he stated:

> The personality descriptions abstracted from the case history correlates of the 4-9 profile type matches the APA diagnostic manual description of the sociopath more closely than does any other profile type with sufficient similarity so that there can be little doubt about the congruence of the two descriptions (p. 67).

Gilberstadt went on to state that extreme scores on the 4-9 scale would coincide with approximately 90% of the patients exhibiting impulsive acting out behaviors, typically sexual, aggressive, or substance abusing in nature (Gilberstadt, 1970). In addition to the reported validity of the Gilberstadt 4-9 scale, it was chosen for its briefness, its apparent actuarial consistency with the hypothesized target population, its normative population (which included females), its recency compared to other instruments, its perceived overlap with the highly predictive BSRI items, and its social desirability "directionality" (high scores reflect a socially desirable response pattern).

Over 500 potential subjects were administered the Gilberstadt 4-9 scale of which 64 were selected for participation in the study. Subjects were run in four separate groups assigned on the basis of two grouping factors: gender (male/female) and level of sociopathy (high/low). It was predicted that only the high sociopathy male group would

exhibit the rapid facial evaluation responses based on Stanners and Hernon's results. However, this hypothesis was only partially supported. Both the high sociopathy males and the low sociopathy females made significantly more rapid facial evaluations than their same-sex, opposite (sociopathy) level counterparts.

At this point, it is suspected that the latency differences presented above are the result of two major factors. The first factor, and one that is critical in all social learning is that of culture or, more specifically "cultural permission" (i.e., permission to exhibit certain behaviors). Gender-specific behavior patterns have evolved largely from the dimorphous roles of our primate predessors. Male primates are larger, more powerful and aggressive, in general. Female primates are smaller, less aggressive, and specially equipped with offspring-bearing reproductive organs. Pair-bonding in the higher primates has proven to be a powerfully adaptive unit in evolutionary terms. It may also be the locus around which gender-specific behavior has become differentiated. The gender-specific parameters of dimorphous human pair-bonding is evident throughout our many cultures. In other words, behavior, especially gender-appropriate behavior, is shaped and maintained within a cultural context. Culture reflects the behavioral parameters which have proven functionally adaptive over time. It is hypothesized that high sociopathy behavior in males is reinforced in our culture because it has a history of being adaptive behavior in males, e.g., the aggressive, predatory far-ranging manipulator of the environment. Low sociopathy behavior in females is culturally reinforced because it is consistent with historically adaptive female behavior, e.g. maternal, nuturant, etc.

Wilson (1975) clearly speaks to the social evolution of the adaptive male role in sociobiological terms:

> . . . a premium would have been placed on sexual selection involving both epigamic display toward the females and intrasexual competition among the males. The selection would be enhanced by the constant mating provocation that arises from the female's nearly continuous sexual receptivity. Because of the existence of a high level of cooperation with the band, a legacy of the original Australopithecus adaptation, sexual selection would tend to be linked with hunting prowess, leadership, skill at tool making, and other visible attributes that contribute to the success of the family and the male band. Aggressiveness was constrained and the old forms of overt primate dominance replaced by complex social skills. Young males found it profitable to fit into the group, controlling their sexuality and aggression and awaiting their turn at leadership. As a result the dominant male in hominid societies was most likely to possess a mosaic of qualities that reflect the necessities of compromise: controlled, cunning, cooperative, attractive to the ladies, good with the children, relaxed, tough, eloquent, skillful, knowledgeable and proficient in self-defense and hunting. Since positive feedback occurs between these more sophisticated social traits and breeding success, social evolution can proceed indefinitely without additional selective pressures from the environment (p. 569).

The resemblance of the adaptive male role presented by Wilson and the self-reports related by Gilberstadt (1970) (sociopaths), Christie and Geis (1970) (Machiavellian) and the BSRI items in Table I are striking.

Viewed in this way, perhaps what is now called sociopathy is a modern reflection of a more primitive, predominantly male behavior-pattern that has progressively become socially adapted and expressed interpersonally. If not yet apparent, the second major factor felt to be related to rapid facial evaluation is that of aggression as it relates to gender. Males are, in general, more aggressive and have historically not been as limited in terms of their spatial environments as females. This may provide males with slight advantages in the "range" of their manipulative attempts with the environment. Females have been more limited in terms of their range of environmental

experiences, due to their major investments in child-rearing and more domestic (e.g., field-restricted) concerns. Although the female may have historically been more field-dependent, such experience may facilitate the reading of facial cues within more limited contexts (such as family groups, etc.).

At moderately high levels of sociopathy for males, and moderately low levels of sociopathy for females (relative to college populations, not criminal or clinical populations), a facial evaluation latency advantage has been demonstrated. It is felt that these two groups conform to societal, cultural, and constitutional (e.g., aggressive) expectations for their respective genders more than the other subject groups do, and that this "congruence" is the collective basis for their relative speed advantage over high latency (low-congruence?) groups.

Congruence is defined as a relatively high degree of sex-role conformity with social expectations, especially those that are gender-related. High-congruence persons may elicit relatively little negative feedback (e.g., reinforcement) in social settings. The term negative refers to that which is experienced subjectively on the part of the facial evaluator when he/she is behaving in a non-congruent fashion. In other words, negative feedback results when a person violates family and social expectations that may be heavily gender-related, and in addition may vary greatly depending on cultural variables. Such feedback constitutes an attempt at a social level toward shaping non-congruent behavior within more "socially acceptable" parameters. Low congruence increases the amount of negative feedback which may narrow the range of people one is comfortable with and capable of interacting with and thus, result in relative facial evaluation deficits. Also,

if one receives a great deal of negative feedback, this may result in increased "self-awareness" as opposed to "other-awareness", which may also increase anxiety in social contexts, and, over time, have an effect on facial decoding skill.

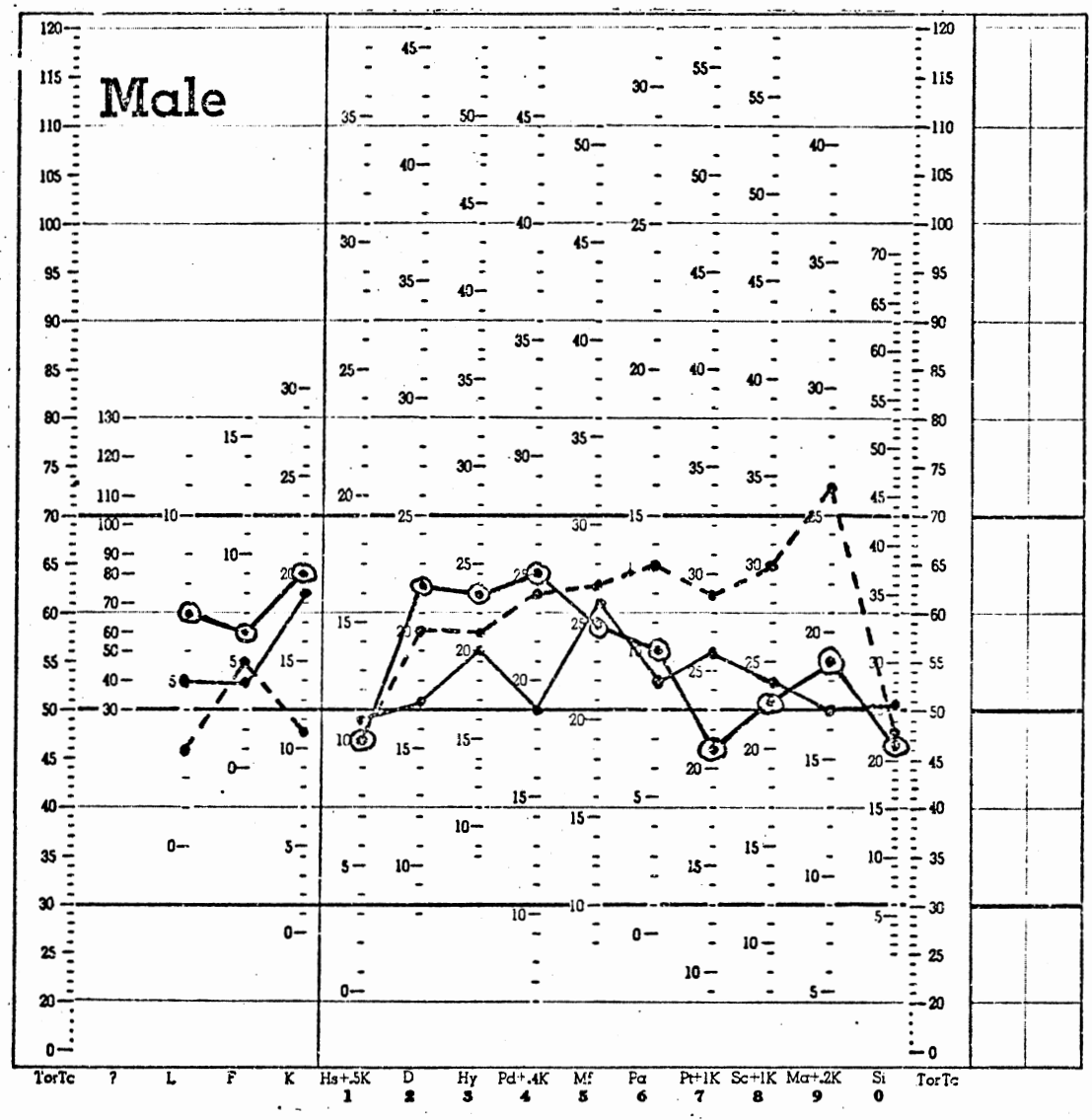
Following the 1978 study (Angus, 1978), certain subjects were recalled and administered MMPI's. This testing was undertaken to further explore possible defining personality characteristics of both the low and high facial evaluation latency groups. These subjects met two criteria:

1. They exhibited facial evaluation reaction times near the mean of their respective groups.
2. They obtained either very high or low scores on the Gilberstadt 4-9 scale.

Three subjects from each of the four groups (high/low sociopathy males, high/low sociopathy females) completed the testing. The average profiles that resulted from this testing appear in Figures 2 and 3. There are features in each of the profiles which may shed light on the personality correlates and interrelations of rapid (and slow) facial evaluators. It should be emphasized that the obtained "modal" profiles are extremely limited in terms of sample size and the following observations and interpretations are accordingly speculative.

High Sociopathy Males

The most notable characteristic of this profile is the pattern of the validity indicators -- scales L, F, and K. This pattern suggests a test-taking approach of guarded defensiveness and control. Such a pattern typically results in a suppression of the clinical scales' elevations, as it appears to have here (see Figure 2). All of the clinical



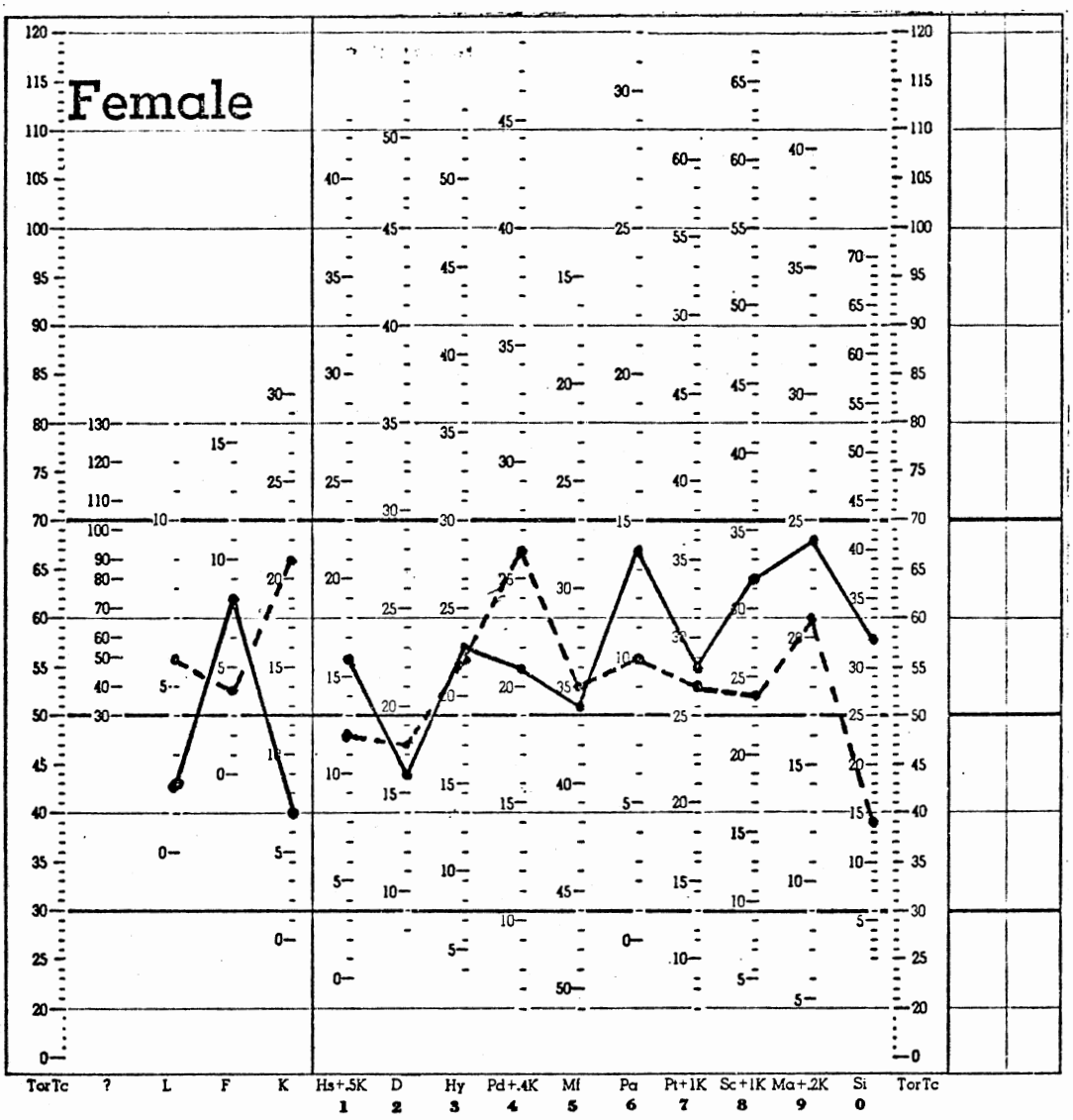
------ Low Sociopathy ($\bar{X}$ = 28.7)*, High Latency ($\bar{X}$ = 903 m sec) Males. N = 3

——— High Sociopathy ($\bar{X}$ = 42)*, Low Latency ($\bar{X}$ = 787 m sec) Males. N = 3

Type III, Non-psychotic Male Offenders (Blackburn, 1975). N = 19

*Level of sociopathy assigned according to scores on Gilberstadt 4-9 Scale (Gilberstadt, 1970). Score reflects total number of true/false items endorsed in "sociopathic" direction, e.g., 0 = low sociopathy, 51 = high sociopathy.

Figure 2. Sample of Male MMPI Profiles According to Level of Sociopathy and Average Facial Evaluation Latency



——— Low Sociopathy ($\bar{X} = 29$)*, Low Latency ($\bar{X} = 821$ m sec) Females. N = 3

——— High Sociopathy ($\bar{X} = 41.7$)*, High Latency ($\bar{X} = 928$ m sec) Females. N = 3

*Level of sociopathy assigned according to scores on Gilberstadt 4-9 scale (Gilberstadt, 1970). Score reflects total number of true/false items endorsed in "sociopathic" direction, e.g., 0 = low sociopathy, 51 = high sociopathy.

Figure 3. Sample of Female MMPI Profiles According to Level of Sociopathy and Average Facial Evaluation Latency

scales are within the normal range and are very near each other in terms of elevation (maximum spread = 11 T scores). This profile suggests that an attempt at "faking good" was made, e.g., attempting to appear socially desirable. Such an attempt on the part of the high sociopathy subjects is felt to support Stanners and Hernon's results -- rapid facial evaluation in males is associated with socially desirable self-reports. The average facial evaluation latency of the three subjects contributing to this averaged profile was 787 msec.

Although great caution must be used in interpreting an average profile using only three subjects, this profile bears a remarkable resemblance to one presented by Blackburn (1975). Blackburn attempted to make an empirical classification of psychopathic personalities by utilizing the Lorr-McNair cluster analysis procedure (Lorr, 1966). The multivariate analysis resulted in identifying four "mutually exclusive" classes or profile types, accounting for 44 of the 79 non-psychotic (convicted) male offenders used as subjects. Blackburn concluded that:

> The pattern suggests defensive denial of psychological problems and a high degree of control. Although apparently lacking anxiety, the members of this group do not other-wise display those attributes held to typify the psychopath (p. 459).

In light of Blackburn's conclusion, it appears that psychopathic-like behavior is possible (e.g., criminal behavior) without the "classical" or "idiopathic" psychometric features being apparent. Although Blackburn's "Type III" profile and the averaged profile presented in Figure 2 closely resemble each other, both may simply be the product of attempting to appear socially desirable. The present study will, in part, attempt to determine whether high Gilberstadt scores relate to either of these two possible "types" of sociopaths (or pseudo-sociopaths) for male subjects.

Low Sociopathy Males

The mean profile exhibited by the low sociopathy males is notably different than the high sociopathy profile. It is generally more elevated, more "pathological" items are endorsed, and there is a clear single spike on scale 9 (hypomania) which suggests problems in activation regulations, e.g., activity level. Carson (1970) describes the "spike 9" as:

> . . . warm, enthusiastic, expansive, generally outgoing, and uninhibited. They tend to become easily offended, however, and may be seen as tense and hyperactive. Many of these people have an unusual capacity for sustained activity and effort. T scores in the range of 60 to 70 suggest a pleasant outgoing temperament. Above this, there is increasing likelihood of maladaptive hyperactivity, irritability and insufficient inhibitory capacity (p. 294).

As can be seen in Figure 2, the average score obtained on scale 9 approaches a T score of 75, indicating problems with inhibition. Intuitively, one might suspect that "manic" individuals would be quite quick on reaction time tasks, as they move very quickly. This particular group, by no means collectively diagnosable as manic or hypomanic, averaged a facial evaluation latency of 903 msec. This suggests that "high energy level" alone may be negatively related to facial evaluation latency. Such a correlation would be consistent with the findings of Hemsley and Philips (1975) and others. In a simple reaction time experiment in which latency was measured in response to the appearance of a light signal, Hemsley and Philips (1975) found manic patients to be slower than normals and (non-manic) depressives. Also they found that manic patients tended to make more "errors" -- pressing the switch prior to the actual onset of the appropriate light. This may partially explain

the significantly higher error-rate among low sociopathy males in the previous experiment, although their errors were restricted to male faces (Angus, 1978).

Low Sociopathy Females

The three subjects who contributed to this averaged profile (see Figure 3) averaged approximately 821 msec in their facial evaluations. This is not a common profile for female college students, as it is quite elevated, especially on scales associated with the existence of thought disorders. The profile suggests a high energy level as in the previous section, and also a marked degree of sensitivity, perhaps approaching suspiciousness. Underlying these characteristics may be "blaming" mechanisms. The validity indicators reflect a test-taking attitude that suggests a somewhat negative self-concept through the endorsement of pathologically-loaded items. Relatively extreme elevations on scales 9 (paranoia) and 8 (schizophrenia) are related to the pattern observed in the validity indicators. One of the subjects in this group exhibited extreme elevations, particularly on scales 6, 8, and 9 (and, accordingly, F). These elevations were sufficiently high to "push" the other scores up considerably. This was also true for the other low-latency group -- the high sociopathy males, although to a lesser degree. Interestingly, the extreme MMPI-scoring female in this low sociopathy group exhibited the lowest average facial evaluation latency of all the female subjects and all but two of the male subjects. Highly variable profiles in conjunction with a very small sample make interpretation of the two low latency groups' profile tenuous.

High Sociopathy Females

The high sociopathy female group exhibited very homogeneous profiles which resulted in a clear 4-9 type group profile. Even more so than their male counterparts, these females exhibited a pattern of validity-scale scores that indicated a test-taking approach of extreme defensiveness and control related to a socially desirable presentation. This profile type is much more common in males and is noted for its reliable relation to disruptive, impulsive behavior in females, particularly with the low score on scale 0 (Dahlstrom, Welsh, and Dahlstrom, 1972). The very low score on scale 0 (extraversion) in conjunction with the 4-9 peaks suggests a somewhat compulsive socialization style, perhaps characterized by superficiality and flightiness (Carson, 1970). These three subjects averaged a mean facial evaluation latency of 928 msec -- the slowest of the four sampled groups. This group, more than the others presented above, is felt to support the screening reliability of the Gilberstadt inventory, and also supports the hypothesis that low congruence females exhibit greater reaction times in their evaluation of facial expressions.

Summary of MMPI Data

The MMPI profiles presented above are described to suggest that consistent trends associated with extreme scoring males and females on the Gilberstadt will appear. As such, these patterns of the validity indicators and/or clinical scales partially reveal the "fit" of the various subject groups in the social mileu. It has been suggested that, to the degree the male subjects' scores approximate a socio-pathic pattern, the lower the time the individual will require in order to

make bipolar facial judgments. The high sociopathy groups both showed very similar patterns in the validity indicators, suggesting that a conscious attempt was being made to appear socially desirable or "normal". This pattern should correlate positively with low latency for male subjects, while having the opposite relationship for females. The low sociopathy groups exhibited validity indicator patterning that suggested much less defensiveness and the admission of some "pathological" or non-socially desirable tendencies. These patterns should be associated with trends opposite of those mentioned above for the high sociopathy groups. This inverse trend is expected in part due to greater cultural permission for females to admit having flaws or problems. Too much interpretive significance should not be placed on the obtained clinical profiles due to the small sample size of each. However, the high sociopathy female group exhibited a clear 4-9 type profile with relatively little variation between subjects. These patterns are noted here to serve as a backdrop for the major hypothetical formulation and interpretation of both the Stanners and Hernon's, and Angus' results.

Hypotheses

The bulk of the material presented thus far has dealt primarily with the research program leading up to the present experiment and the expectation of replicating the gender by level of sociopathy interaction found in earlier research. Perhaps the most important aspect of this work will be the exploration of MMPI personality profiles associated with the four subject groups previously examined in terms of facial evaluation latency, and contrasting these findings with other data such

as that presented by Christie and Geis (1970). Consistent patterning of both the facial evaluation data and MMPI profiles will potentially allow a descriptive "bridging" of the perceptual styles explored here with behavioral styles variously presented in the research literature.

The following hypotheses are proposed:

1) The level of sociopathy as determined by the Gilberstadt 4-9 scale will differentially predict facial evaluation latency for males and females. High scoring males and low scoring females should exhibit the lowest latencies. Conversely, low scoring males and high scoring females should exhibit the greatest latencies.

2) Only slight differences should be exhibited between subjects on the covariate task (non-facial stimuli). This is hypothesized because the geometric drawings have no social cues associated with them. However, males may have slight performance advantages due to generally greater spatial abilities. The complex stimuli should aid in the reduction of the between-subjects error term in the analysis of covariance.

3) The well established patterning effect of the slides should replicate. This pattern has been: lowest latencies associated with female pleasant faces, the greatest latencies associated with the male pleasant faces, the other two groups of faces falling somewhere in between (female unpleasant and male unpleasant). This general pattern has been found in three separate studies using the same slides in subjects ranging from 11-25 years of age (Stanners and Hernon, 1976; Angus, 1978; Gabriel and Stanners, 1978).

4) For high Gilberstadt subjects, the MMPI profiles should approximate either the classic 4-9 profile or, perhaps resemble the group profile presented by Blackburn (1975). Low Gilberstadt subjects profiles should be consistent with relatively greater score elevations, greater admission of problems and concerns, and, in general reflect a greater level of subjective discomfort.

CHAPTER II

METHOD

Subjects

A total of 96 subjects, both male and female, were selected from 1,292 undergraduate students enrolled in various courses at Oklahoma State University. The subjects were selected on the basis of obtained (high scores = 41-46; low scores = 19-29) scores on the Gilberstadt (1970) 4-9 inventory, composed of a total of 51 Minnesota Multiphasic Personality Inventory items (see instrument, below). For inducement purposes, all subjects were given small extra credit "points" that counted toward their course grade. All participating subjects were of white or predominantly white ethnic extraction to reduce the possible differential influence of cultural factors on the scale scores, particularly those associated with scale 4 (Muphree, Karabelas, and Bryan, 1962).

Psychometric Instrument

A Gilberstadt (1970) 4-9 inventory was used to screen subjects on the basis of high/low sociopathy. This scale was selected for several reasons. First, it was initially normed on a predominantly male population. The scale was then cross-validated using female subjects. This fact may provide increased separation between groups split on the basis of gender. The test is felt to be more centered in the available

subject population than others examined (e.g., non-criminal). The high 4-9 type male should be very prevalent in the college population, in fact, the most prevalent type for college males (Dahlstrom, Welsh, and Dahlstrom, 1970). Gilberstadt states that he chose the individual items composing the scale because they tended to be endorsed by persons clinically exhibiting a cognitive-behavioral style similar to that described in the Diagnostic and Statistical Manual (second edition) as "anti-social personality". Gilberstadt considered three features remarkable among sociopaths: freedom from physical complaints and concerns, high activity level, and extroversion. His descriptions of patients used to norm the scale seem to fit the self-reports of the low-latency males in the Stanners and Hernon study (e.g., athletic, active, aggressive, lead and/or exploit others, etc.; see BSRI items, Table I).

The items employed on the Gilberstadt scale overlapped to a greater degree than other scales/tests considered (Symptom Check List 90; MMPI: various subscales, California Personality Inventory; Jesness Inventory; Quay Behavior Checklist; Maudsley Personality Inventory, etc.) with both the highly predictive BSRI items and other MMPI sub-scales designed to assess social desirability (e.g., Fordyce, 1956; Edwards, 1957; Wiggens, 1959). Another consideration that favors the Gilberstadt was that it was very recently normed, relative to other assessment tools.

Apparatus and Materials

The heart of the experimental apparatus was an ADS model #1800E Minicomputer used in conjunction with a dual random access projector equipped with an electronic tachistoscopic shutter. A total of 128 slides were used from Stanners and Hernon's original study. All slides

were randomized and presented using a general purpose RAP (Random Access Projector) control program (DRT II.06). The computer was programmed to replicate the temporal parameters in the original Stanners and Hernon (1976) study. The ADS 1800E provided complete control over slide randomization/presentation, reaction time recording in milliseconds, subject feedback (correctness or response, readiness for new trial), and data groups/printout.

The facial slides used consisted of three groups used in the original Stanners and Hernon (1976) study. These were:

24 practice slides. Reaction times for these slides were not recorded.

52 experimental slides (set-F-A). These slides consisted of four sets of 13 slides, varied equally according to sex (male/female) and expression (pleasant/unpleasant).

52 experimental slides (set-F-B). These slides were "matched opposites" of the set F-A slides. Each slide in set F-A (e.g., male-pleasant) had a correspondingly opposite slide (same person's face, opposite expression; e.g., male-unpleasant).

The use of two sets of "matched-opposite" slides required that the subjects be run in yoked pairs. This was done to allow the same face to appear in both pleasant and unpleasant modes while insuring that subjects saw the same face only once (in a single mode of expression). All slides were randomly presented and subjects were run in order of (random) enlistment.

The slides consisted of frontal shots, ending at the shoulder and taken at a distance of 70 inches (178 cm) with a 100 mm telephoto lens. All photographic subjects were white undergraduate Oklahoma State University students, both male and female. The faces were chosen on the basis of high interrater agreement among 88 judges in the Stanners and Hernon (1976) study. The non-facial slides consisted of:

20 practice slides. Reaction times for these slides were not recorded. These slides consisted of all squares with varyingly complex internal designs, 10 symmetrical and 10 non-symmetrical.

28 experimental slides (set NF-A). These slides consisted of circles and 45° ellipses with varyingly complex internal designs. The size of the projected drawing was matched so as to equal the "average head size" (approximately 9 inches) of the projected facial slides. One-half of the slides were symmetrical, the other half non-symmetrical.

28 experimental slides (set NF-B). These slides were the matched opposites of set NF-A. Each slide in set NF-A e.g., symmetrical ellipse) had a correspondingly opposite slide (e.g., the same symmetrical ellipse made non-symmetrical). This arrangement made for an exact matching and counter-balancing of the facial slides.

All the geometric drawings were photographed using Kodak LPD 4 film which allowed for the drawing to appear on a clear background, thereby matching the brightness of the background material (See Appendix C).

Procedure and Design

As stated previously, the subjects were run in order of enlistment to participate. Males and females were randomly sorted into equal groups and randomly assigned either set A or set B of slides. Each member of a pair saw the same slide-presented faces but with opposite expressions. No single subject ever viewed the same face (of an individual) more than once, including practice slides. The slides were arranged in four sets of 13 slides each: female-pleasant, female-unpleasant, male-pleasant, male-unpleasant. Analogous groups were arranged for the non-facial stimuli. Both types of stimuli were presented randomly.

After the subject was greeted by the experimenter, he/she was seated in an 8' x 10' room in which the Ramdon Access Projector (RAP)

and associated hardware was located. Directly in front of the subject's chair was a back-projection screen upon which the slides of the faces appeared life size. The screen was situated approximately at the same height as the subject's head, and approximately 42 inches in front of him/her. This distance conforms to Hall's (1974) "personal -- not close" spatial interval.

A tape recorded set of instructions was played for each subject prior to the facial evaluation task as the experimenter pointed out various parts of the apparatus in sequence with the following instructions:

> This is an experiment concerned with the time it takes to evaluate facial expressions. It is not an intelligence test of any kind and it should not be interpreted as such. Also, there is no electric shock nor any other unpleasant stimulus involved. Although the task may seem like a very simply one, our research shows that it can provide important information concerning social processes, so we need your close cooperation. If for any reason during the course of the experiment you feel that you cannot fully cooperate, please let the experimenter know.
>
> On the table in front of you, you will notice a control panel with three switches on it. The switches on each end of the control panel are identical and perform the same function. A trial can be started by flipping either of these end switches in either up or down directions, whichever you prefer. A picture of a face will then appear on the screen in front of you. Your job is to decide as quickly as possible whether or not the expression on the face is either pleasant or unpleasant. You will indicate your decision by moving the center switch either to the left or right. Make sure that when you activate one of the slide switches to start a trial you are holding the center switch. If the expression on the face is a pleasant one, move the switch all the way in the direction indicated on the card (E indicates). If the expression on the face is an unpleasant one, move the switch in the opposite direction. When you make your response, move the switch all the way in the appropriate left/right direction. Facial attractiveness is not of concern in this experiment, so do not let how attractive a person's face is enter into your decision. Simply indicate whether the expression is pleasant or unpleasant.

> After you have indicated your response choice by throwing the center switch, release it and it will return to a central position. The slide of the face will then disappear from the screen. After a momentary pause, a lighted sign will appear on the panel in front of you, indicating if your response is correct or incorrect. During this time the two end switches will be inoperative. Shortly, a ready light will appear on the left side of the panel, signalling that the end switches can once again begin a new trial.
>
> Make sure that when you press the end switches you are paying close attention to the screen and that you are holding the center switch properly (E indicates). If you are ready to respond when you press the end switches, your responses will be faster. It is very important for a successful experiment that you concentrate fully on each item, and classify each facial expression as quickly and accurately as possible. You do not have to start another trial immediately after the ready light appears. If you want to take a short break, that is okay. If you wear prescription glasses, please put them on as we are ready to begin the experiment. I will be in the other room during the experiment if you need me for any reason. Are there any questions?

After listening to the taped instructions, the subject completed a total of 24 practice slides to familiarize him/her with the operation of the apparatus. The practice slides consisted of four groups of six slides each, equally representing the four slide categories and presented in random order. Reaction time data was not recorded for the practice slides. Following the practice slides, each of the 48 male and 48 female subjects were shown the remaining 52 slides. Reaction times were recorded in milliseconds starting with the presentation of the slide and ending at the instant of contact of the center switch. After the subject had completed the facial evaluation series, he/she was played a second set of tape recorded directions that provided an instructional set for the complex stimuli evaluation task as follows:

> The next task is essentially the same as the task you have just completed. However, instead of evaluating facial expressions, you will now be asked to make a decision about the symmetry or non-symmetry of some geometric drawings. What is meant by symmetry is, in general, equality or

sameness of corresponding halves of a whole figure. The experimenter will show you drawings that illustrate the concept of symmetry. A symmetrical figure can be cut into two halves which are exactly the same on each side -- like a mirror-image of each other. The two symmetrical halves match each other exactly. A non-symmetrical figure, on the other hand, cannot be divided so that two equal or matching halves are obtained. Your job is to decide as quickly as possible whether or not the drawing that appears on the screen in front of you is either symmetrical and therefore equally sided or whether the drawing is non-symmetrical and therefore non-equally sided.

As in the last portion of the experiment, you may begin a trial by flipping either of the end switches. The drawing will then appear on the screen. Make sure you are holding the center switch before you begin a new trial so that you can respond as quickly as possible. Throw the center switch in the direction which corresponds to your decision as to the symmetry or non-symmetry of the drawing. Again, it is important that you indicate your response-choice as quickly and accurately as possible. The correctness of your decision will immediately be presented to you, and after a momentary pause, the ready light will appear signaling that a new trial may begin.

Make sure that when you press the end switches you are paying close attention to the screen and that you are holding the center switch properly (E indicates). If you are ready to respond when you press the end switches, your responses will be faster. It is very important for a successful experiment that you concentrate fully on each item, and classify each drawing as quickly and accurately as possible. You do not have to start another trial immediately after the ready light appears. If you want to take a short break, that is okay. We are now ready to begin this portion of the experiment. I will be in the other room if you need me for any reason. Are there any questions?

As in the facial evaluation series, the practice slides latencies were not recorded. All of the latencies associated with the 28 experimental slides were recorded so that they could be employed as a concominant variable. The geometric drawings were employed because previous research (Angus, 1978) found differences in facial evaluation latency between male and female subjects on the basis of the level of socio-pathy. Such differences are inherently "between subjects", that is,

they can be examined only via a subject to subject comparison. As a result, the error term used in the analysis for significant effects between subjects (here, the effect of sociopathy upon facial evaluation latency) is characteristically large, due to the existence of relatively large differences in the time required to evaluate faces between subjects. In an attempt to partially rectify this problem, the present study employed a concomitant variable (covariate) that consists of judging the geometric drawings either symmetrical or non-symmetrical. To the degree that latencies associated with the time it takes to perform this task are correlated to facial evaluation latency, an "adjustment" will be made possible to reduce variation associated with the between-subjects perceptual-motor component of the facial evaluation task. In other words, the use of the covariate -- drawings of circles and ellipses judged upon a bipolar dimension -- will allow an adjustment of the non-social (perceptural-motor) component of the facial evaluation tesk from the social, e.g., more "affective" component. This may also reduce the size of the between-subjects error term and effectively increase the precision of the statistical analysis of gender and level of sociopathy intereffects.

After completing the non-facial stimuli task, each subject was administered an MMPI, Form R. The two slide evaluation tasks required approximately 30 minutes to complete whereas at least 45 minutes was required to complete the MMPI. After completion of the MMPI, the subjects were debriefed, any questions were answered, and an experimental credit slip was assigned for their participation.

CHAPTER III

RESULTS

Introduction

The results will be presented in five separate sections: (1) An examination of the Gilberstadt 4-9 frequency distribution from which the research participants were selected and the statistical model used to analyze the obtained data, (2) Facial evaluation latency data, i.e., an examination of reaction times associated with correct facial evaluation for the four subject groups, (3) Data relating to facial evaluation error, (4) The impact and utility of the non-facially-analogous concomitant variable, and (5) Interrelationships between obtained MMPI group profiles and the facial evaluation latency data. Information relating to the latency data, the error data, and the non-facial complex stimuli data will be presented primarily in terms of four subject groups, each a factorial combination of the following classification factors: Gender (Male/Female) and Level of Sociopathy (High/Low) according to the obtained score on the Gilberstadt 4-9 scale. Low Gilberstadt subjects obtained scores between 19-29 on the Gilberstadt scale whereas high Gilberstadt subjects' scores ranged between 41-46 (of a possible 51 items). A 2 x 2 arrangement of the classification factors resulted in the following groups:

(1) FL: Low-scoring female subjects (19-29 true/false "sociopathic items endorsed);

(2) FH: High-scoring female subjects (41-46 true/false "sociopathic" items endorsed);

(3) ML: Low-scoring male subjects (20-29 true/false "sociopathic items endorsed); and

(4) MH: High-scoring male subjects (41-46 true/false "sociopathic" items endorsed).

Subject Selection Parameters and Statistical Procedures

Approximately 2,000 Gilberstadt 4-9 questionnaires and answer forms were distributed to undergraduate students early in the Fall and Spring semesters of the 1978-79 academic year at Oklahoma State University. A total of 1,292 of these were completed and returned. See Figure 4 for the resulting distribution of Gilberstadt scores. Female students account for approximately 67% of the scores represented in Figure 4. Scores ranged from a low of 19 to a maximum of 46 (range = 0-51) with a mean of 35.49 and a standard deviation of 4.81. These figures compare favorable to Gilberstadt's cross-validation sample which resulted in a mean of 33.53 and a standard deviation of 4.95 (Gilberstadt, 1970). As found previously (Angus, 1978), the mean of the distribution is shifted approximately 10 units above a theoretically normal probability curve -- in the "sociopathic" direction.

In recruiting subjects, an attempt was made to use only the most extreme scorers, to ensure maintaining maximum separation between subject groups. As can be seen in Figure 4, the average subject's Gilberstadt score fell $\pm$ 1.78 standard deviations from the population mean. Approximately equal proportions of subjects scoring in these sampled regions participated in the study. No subjects were recruited whose

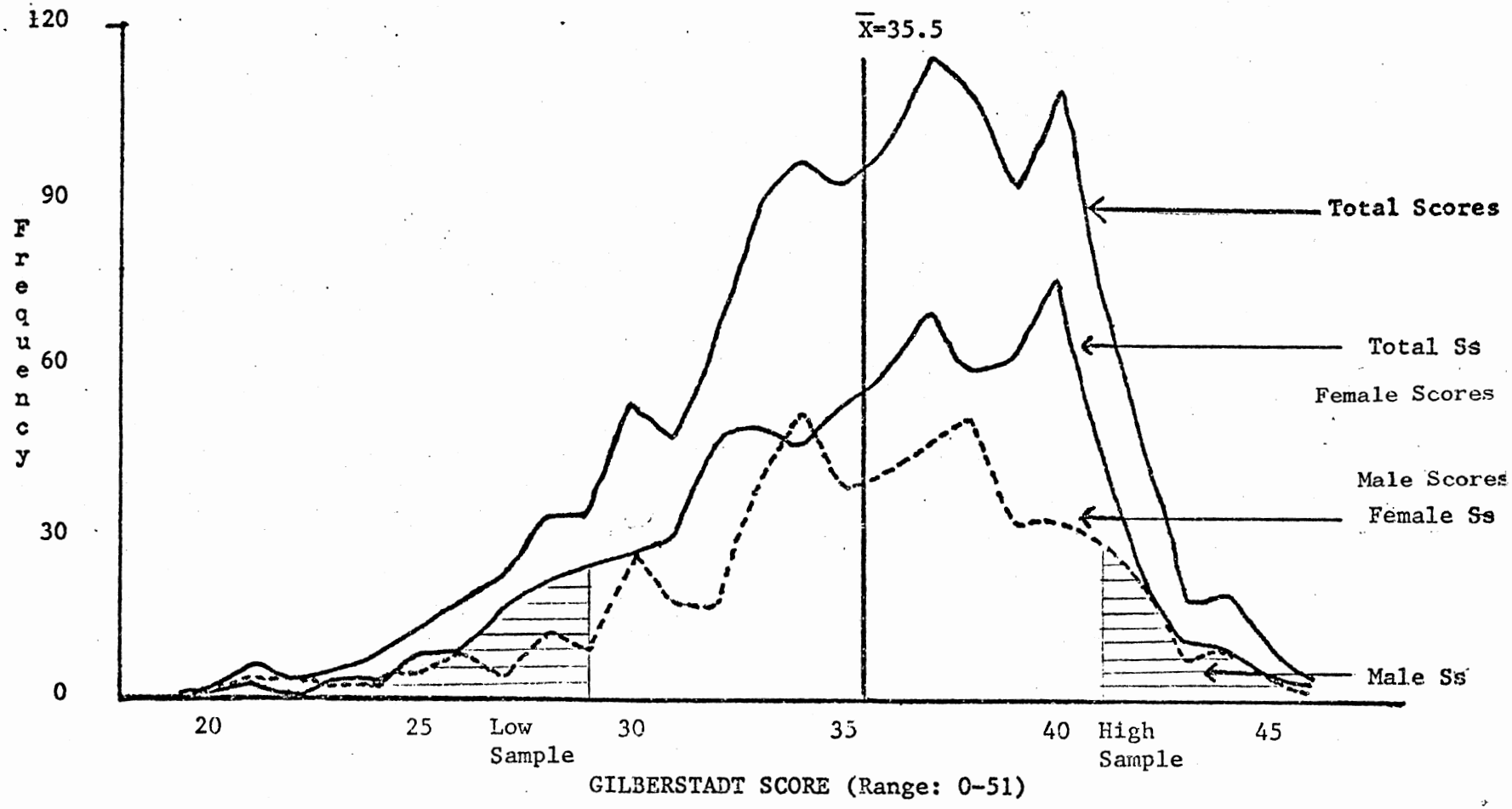


Figure 4. Total Distribution of Gilberstadt Scores for Male and Female Subjects (N = 1292)

scores fell in the central 2 standard deviations of the distribution (scores between 30-40, inclusive). The relative incidence of male and female scores are highly similar within the regions sampled.

A 2^4 factorial, mixed effects, repeated measures analysis of covariance (ANOCOVA) was used to analyze the data generated by the present study and incorporated the following four factors, each a two levels:

A) Gender (G) of the subject (male/female)

B) Level of sociopathy (L), as measured by the Gilberstadt 4-9 scale (high/low)

C) Expression mode (E) of the slide-presented face (pleasant/unpleasant)

D) Sex (S) of the slide-presented face (male/female)

A concomitant variable was employed for a between-subjects reduction of error variance. The covariate was also intended to provide an adjustment for general perceptual-motor ability in rapidly evaluating a complex stimuli.

Two dependent measures were recorded consisting of (1) latency measures (reaction time in milliseconds) associated with "correct" evaluations of the slide-presented faces, and (2) errors made in evaluating the slide-presented faces. Errors were defined as a lack of consensus with the judges' ratings in the Stanners and Hernon (1976) study, as mentioned above. Equipment malfunction did lead to the discontinuation of 8 subjects, and may have contributed to slightly higher error rates than previously observed (Angus, 1978). An "elimination threshold" for the complex stimuli was arbitrarily set at 5,000 milliseconds. This response ceiling proved highly satisfactory in that it eliminated very close to the same percentage of "flyers" as did the 2,500 millisecond

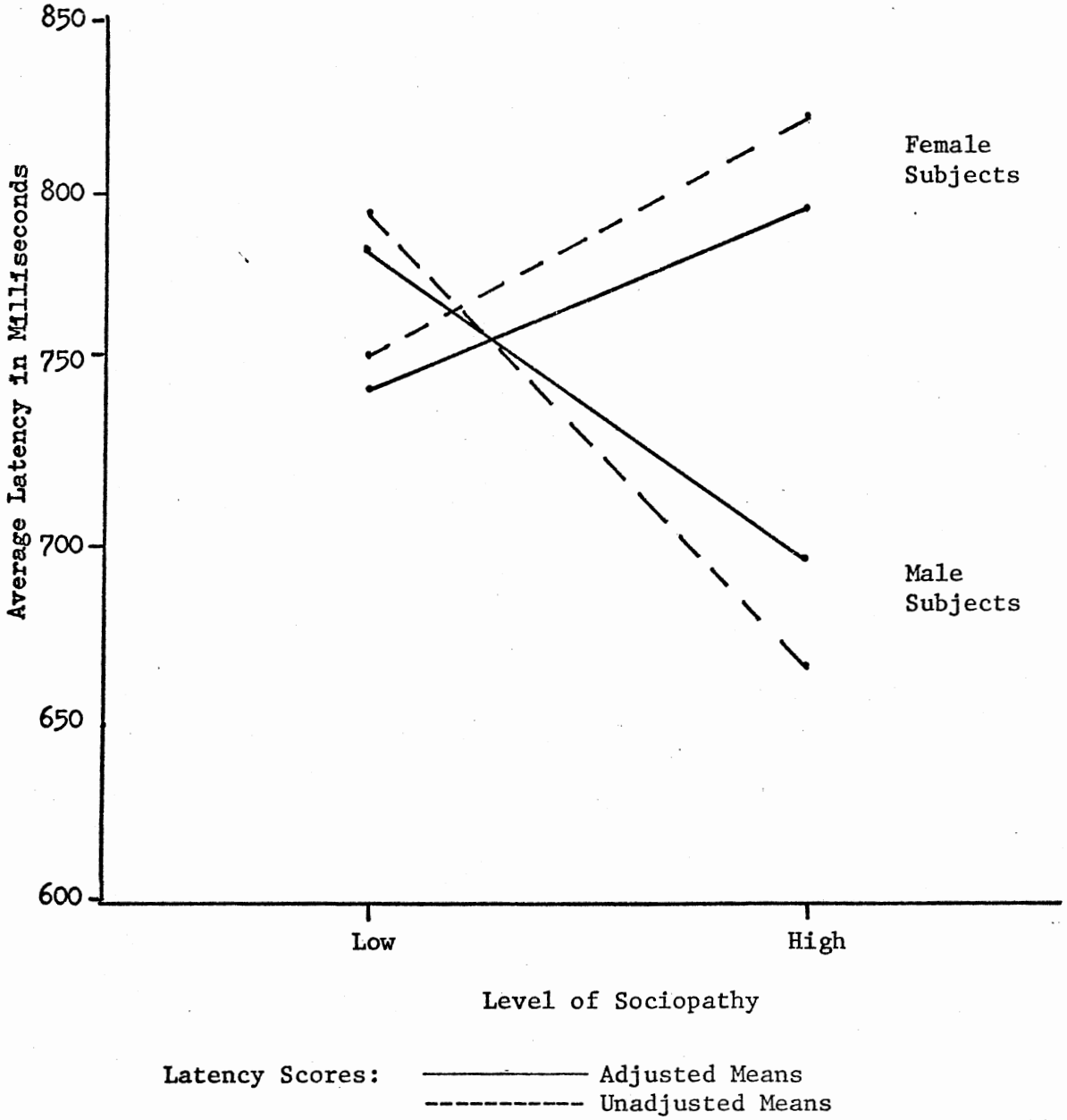


Figure 5. Facial Evaluation Latency as a Function of Gender and the Level of Sociopathy: Adjusted and Unadjusted Means for Male and Female Subjects

ceiling for facial slides (1.6% and 1.8%, respectively). These relatively long latency responses probably reflect a disruption of task-orientation.

Data Relating to Facial Evaluation Latency

Only "correct" responses which required less than 2,500 milliseconds were used in the calculations of the facial evaluation latency data. Female subjects made a total of 209 errors (8.4%) while their male counterparts made a total of 241 errors (9.7%) in their evaluations of the facial slides. A total of four facial evaluation means were calculated for every subject, each being the mean of the correct evaluations per slide-group (female-pleasant, female-unpleasant, male-pleasant, male-unpleasant). A 4-way analysis of variance with covariate adjustment was used to evaluate this data.

The primary hypothesis of the present study serves as a prerequisite for further exploration of potential "personality factors" associated with efficient social information processing. This hypothesis related to the differential predictability of rapid facial evaluation on the basis of a "sociopathy" score on an actuarially-derived, "diagnostic" questionnaire. Direct support of this hypothesis is evident in the significant interaction of the two between-subjects factors, gender and the level of sociopathy, F (1/91) = 5.19, $p < .025$ (see Table II). The "crossed", first-order interaction shown in Figure 5 indicates that males who obtain high scores on the Gilberstadt scale and low-scoring female subjects tended to evaluate facial expressions significantly faster than their same-sex, opposite sociopathy-level counterparts. (see Figure 5). The dotted lines in Figure 5 represent the cell means

TABLE II

ANALYSIS OF COVARIANCE SUMMARY TABLE FOR THE EFFECTS OF GENDER, LEVEL OF SOCIOPATHY OF SUBJECTS, SEX OF FACE, AND MODE OF EXPRESSION UPON FACIAL EVALUATION LATENCY FOR MALE AND FEMALE SUBJECTS

SOURCE	SS	df	MS	F	p
Between Ss	10622702.	1	10622702.	123.51	0.000
Gender of Ss (G)	90735.	1	90735.	1.05	NS
Level of Sociopathy (L)	29410.	1	29410.	0.34	NS
GxL	446335.	1	446335.	5.19	0.025
1st Covariate	2008649.	1	2008649.	23.35	0.000
Error	7826843.	91	86009.		
Within Ss					
Sex of Face (S)	78862.	1	78862.	12.10	0.0008
SxG	11.	1	11.	0.00	NS
SxL	7731.	1	7731.	1.19	NS
SxGxL	2683.	1	2683.	0.41	NS
Error	599665.	92	6518.		
Within Ss					
Expression Mode (E)	144111.	1	144111.	14.32	0.0003
ExG	29068.	1	29068.	2.89	NS
ExL	10976.	1	10976.	1.09	NS
ExGxL	109.	1	109.	0.01	NS
Error	925717.	92	10062.		
Within Ss					
SxE	255183.	1	255183.	44.89	0.0000
SxExG	1764.	1	1764.	0.31	NS
SxExL	701.	1	701.	0.12	NS
SxExGxL	32395.	1	32395.	5.70	0.02
Error	523012.	92	5685.		

prior to adjustment by the covariate (see Table III for the summary of adjusted and unadjusted means relating to Figure 5). Separate analyses of covariance for males and females fail to produce significant latency difference for female subjects on the Gilberstadt factor, but a significant effect was found for male subjects F (1/45) = 4.05, $p < .05$. High Gilberstadt males exhibited a significantly faster average facial evaluation than the low Gilberstadt males (adjusted mean difference = 72 msec). Although the adjustment brought the means closer together, the difference was still significant. Thus, it appears that "general perceptual-motor ability", insofar as it was assessed by the covariate, was adjusted out of the mean comparison.

The effects associated with slide characteristics were again found to be statistically significant. A reliable interaction of the mode of expression and sex of the slide-presented face was observed, F (1/92) = 44.89, $p < .0001$ (see Table IV). The pattern of means plus corresponding standard deviations contributing to this interaction can be seen in Table V. A graphic representation appears in Figure 6 (see Figure 6). For the pleasant expression, female faces can be evaluated faster than male faces, but this is not so for the unpleasant expression. The female pleasant faces were the most rapidly evaluated. The remaining three slide groups cluster closely together in terms of mean latencies.

All of the results appearing above are qualified by a significant 4-way interaction among all of the experimental factors (excluding the covariate), F (1/92) = 5.70, $p < .02$. The significant four-way interaction may be conceptualized as a difference between male and female subjects in the three-way pattern of interaction involving sex of

TABLE III

ADJUSTED MEANS AND STANDARD DEVIATIONS FOR THE ANALYSIS OF FACIAL EVALUATION LATENCY UNDER FOUR SLIDE CONDITIONS AS A FUNCTION OF LEVEL OF SOCIOPATHY FOR MALE AND FEMALE SUBJECTS

Group (N=24 ea)	Female Faces: Pleasant Expressions		Female Faces: Unpleasant Expressions		Male Faces: Pleasant Expressions		Male Faces: Unpleasant Expressions	
	M	SD	M	SD	M	SD	M	SD
Female Subjects								
Low Level of Sociopathy	706 msec (-5)	168	774 msec (-5)	152	755 msec (-5)	192	754 msec (-5)	155
High Level of Sociopathy	734 msec (-21)	193	821 msec (-21)	182	854 msec (-21)	258	787 msec (-21)	172
Male Subjects								
Low Level of Sociopathy	708 msec (-5)	161	837 msec (-5)	247	797 msec (-5)	201	800 msec (-5)	202
High Level of Sociopathy	643 msec (+29)	93	721 msec (+29)	106	707 msec (+29)	143	723 msec (+29)	170

Direction and amount of mean adjustment indicated in parenthesis

TABLE IV

ANALYSIS OF COVARIANCE SUMMARY TABLE FOR THE EFFECTS OF LEVEL OF SOCIOPATHY, SEX OF FACE AND MODE OF EXPRESSION UPON FACIAL EVALUATION LATENCY FOR MALE SUBJECTS

SOURCE	SS	df	MS	F	p
Between Ss	3851700.	1	3851700.	63.20	.000
Level of Sociopathy (L)	246898.	1	246898.	4.05	.05
1st Covariate	1884480.	1	1884480.	30.92	.000
Error	2742344.	45	60940.		
Within Ss					
Sex of Face (S)	40368.	1	40368.	5.89	.02
SxL	653.	1	653.	0.10	NS
Error	315141.	46	6851.		
Within Ss					
Expression Mode (E)	151313.	1	151313.	24.58	.000
ExL	4447.	1	4447.	0.72	NS
Error	283147.	46	6156.		
Within Ss					
SxE	107258.	1	107258.	20.77	.000
SxExL	11781.	1	11781.	2.28	NS
Error	237524.	46	5164.		

TABLE V

ADJUSTED MEANS AND STANDARD DEVIATIONS FOR THE ANALYSIS OF FACIAL EVALUATION LATENCY UNDER FOUR SLIDE CONDITIONS AS A FUNCTION OF LEVEL OF SOCIOPATHY FOR MALE SUBJECTS

Slide Condition	Low Level of Sociopathy		High Level of Sociopathy	
(N=13 ea, max)	M	SD	M	SD
Female Faces				
Pleasant Expressions	689 msec (-24)	161	637 msec (+23)	93
Unpleasant Expressions	818 msec (-23)	247	715 msec (-23)	106
Male Faces				
Pleasant Expressions	778 msec (-23)	201	702 msec (-24)	143
Unpleasant Expressions	780 msec (-24)	202	717 msec (+32)	169

Direction and amount of mean adjustment indicated in parenthesis

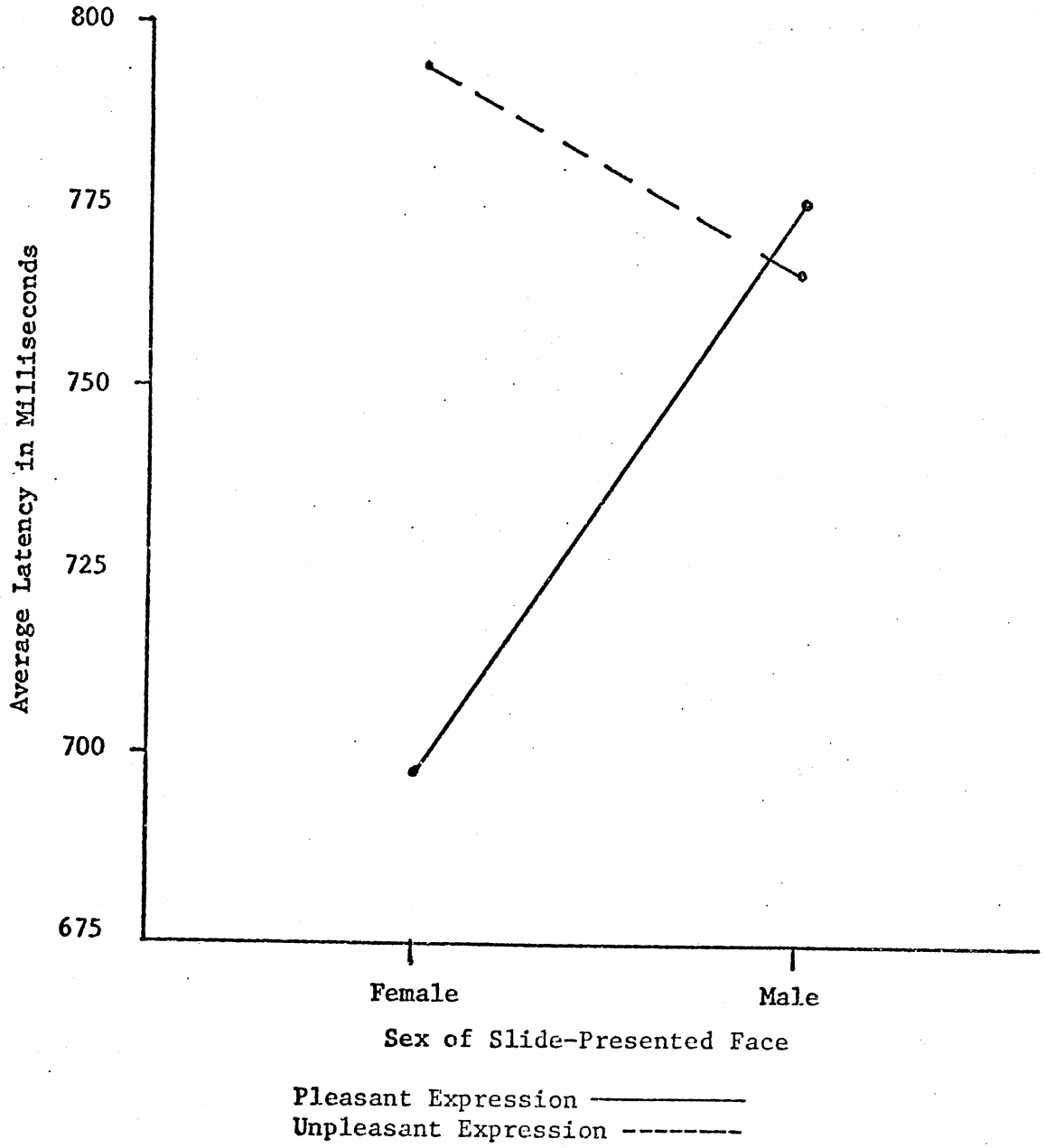


Figure 6. Facial Evaluation Latency as a Function of Expression Mode and Sex of Slide-Presented Face

slide, expression, and level of sociopathy. Although neither of these three-way interactions achieve statistically significant levels, (the effect for females approached significance, F (1/46 = 3.43, $p < .07$) the difference between them is significant. However, the degree to which this interaction qualifies the above-mentioned significant effects is probably very slight.

In summary, almost all of the significant effects reported here replicate earlier findings by this and other researchers. As in Angus (1978) the gender by level interaction has occurred at a statistically reliable level. A significant simple main effect of level of sociopathy occurred for male subjects in the present study whereas in Angus (1978), this effect was somewhat smaller and non-significant. The use of the covariate in the present study indicates that the gender by level of sociopathy effect observed in Angus (1978) was not simply a result of quite general perceptual-motor ability differences. As in previous research, there were significant effects due to the sex, mode of expression and interactions between these within-subject variables. The relevance of these findings will be examined in the following chapter.

Data Relating to Facial Evaluation Error

A four-factor analysis of covariance was performed on the number of errors subjects made (see Table VI). As mentioned previously, errors were defined as disagreements with the judges' consensus in the rating study (Stanners and Hernon, 1976). The same factors involved in the analysis of the latency data apply here, including the covariate adjustment (the number of errors made on the complex stimuli). Cell means

TABLE VI

ANALYSIS OF COVARIANCE SUMMARY TABLE FOR THE EFFECTS OF GENDER, LEVEL OF SOCIOPATHY OF SUBJECTS, SEX OF FACE, AND MODE OF EXPRESSION UPON FACIAL EVALUATION ERROR FOR MALE AND FEMALE SUBJECTS

SOURCE	SS	df	MS	F	p
Between Ss	181.895	1	181.895	86.64	0.0000
Gender of Ss (G)	2.670	1	2.670	1.27	NS
Level of Sociopathy (L)	0.035	1	0.035	0.02	NS
GxL	2.179	1	2.179	1.04	NS
1st Covariate	3.154	1	3.154	1.50	NS
Error	191.044	91	191.044		
Within Ss					
Sex of Face (S)	23.503	1	23.503	14.19	0.0003
SxG	1.378	1	1.378	0.83	NS
SxL	0.315	1	0.315	0.19	NS
SxGxL	1.148	1	1.148	0.69	NS
Error	152.406	92	152.406		
Within Ss					
Expression Mode (E)	0.753	1	0.753	0.53	NS
ExG	0.003	1	0.003	0.00	NS
ExL	1.148	1	1.148	0.80	NS
ExGxL	3.190	1	3.190	2.23	NS
Error	131.656	92	131.656		
Within Ss					
SxE	6.773	1	6.773	5.58	0.02
SxExG	0.211	1	0.211	0.17	NS
SxExL	0.065	1	0.065	0.05	NS
SxExGxL	0.003	1	0.003	0.00	NS
Error	111.698	92	111.698		

and standard deviations for the error data appear in Table VII (see Table VII). Only one simple main effect (for sex of face) and one two-way interaction (sex by mode of expression) appeared in the error data. As in previous studies the main effect for sex of face proved highly reliable, F (1/92) = 14.19, $p < .0003$. This effect is the result of the subjects making more errors (overall) in their evaluations of male faces. The interpretation of the effect of sex of face is qualified by a significant two-way interaction involving sex and expression mode of the faces presented on the slides, F (1/92) = 5.58, $p < .02$. This interaction is due to mean error differences for male and female faces being greater between unpleasant expressions than pleasant expressions. There were no significant effects due to grouping factors in the four-factor ANOCOVA for errors.

Data Relating To The Non-Facial Complex Stimuli

A two by two factorial, completely randomized analysis of variance was used to evaluate both the latency and error data associated with the complex stimuli. The complex stimuli took approximately 1,131 msec on the average to evaluate. This evaluation time is approximately one and one-half times that which was required for the facial slides. None of the effects related to complex stimuli latency were significant (see Table VIII; see Table IX for a summary of corresponding cell means and standard deviations). The analysis of variance of the errors made in the evaluation of the complex stimuli did yield a significant interaction between gender and level of sociopathy, F (1/92) = 6.29, $p < .01$. The AOV summary table plus the means and standard deviations for complex stimuli errors appear in Tables X and XI (see Tables X and XI,

TABLE VII

ADJUSTED MEANS AND STANDARD DEVIATIONS FOR THE ANALYSIS OF FACIAL EVALUATION ERROR UNDER FOUR SLIDE CONDITIONS AS A FUNCTION OF LEVEL OF SOCIOPATHY FOR MALE AND FEMALE SUBJECTS

Group (N=24 ea)	Female Faces				Male Faces			
	Pleasant Expressions		Unpleasant Expressions		Pleasant Expressions		Unpleasant Expressions	
	M	SD	M	SD	M	SD	M	SD
Female Subjects								
Low Level of Sociopathy	0.98 errors (+.01)	1.00	0.77 errors (+.01)	0.79	1.36 errors (+.01)	1.38	1.52 errors (+.01)	1.54
High Level of Sociopathy	0.90 errors (-.02)	0.87	0.48 errors (-.02)	0.46	1.31 errors (-.02)	1.29	1.40 errors (-.02)	1.38
Male Subjects								
Low Level of Sociopathy	1.23 errors (-.02)	1.21	0.57 errors (-.02)	0.54	1.48 errors (-.02)	1.46	1.40 errors (-.02)	1.38
High Level of Sociopathy	1.30 errors (+.03)	1.33	1.18 errors (+.03)	1.21	1.18 errors (+.03)	1.21	1.72 errors (+.03)	1.75

Direction and amount of mean adjustment indicated in parenthesis

TABLE VIII

ANALYSIS OF VARIANCE SUMMARY TABLE FOR THE EFFECTS OF GENDER AND LEVEL OF SOCIOPATHY UPON LATENCIES ASSOCIATED WITH THE EVALUATION OF NON-FACIAL STIMULI FOR MALE AND FEMALE SUBJECTS

SOURCE	SS	df	MS	F	p
Between Ss	122817553	1	122817553	863.75	0.0000
Gender of Ss (G)	392448	1	392448	2.76	NS
Level of Sociopathy (L)	44548	1	44548	0.31	NS
GxL	392448	1	392448	2.76	NS
Error	13081546	92	142191		

TABLE IX

MEANS AND STANDARD DEVIATIONS FOR THE ANALYSIS OF LATENCIES ASSOCIATED WITH THE EVALUATION OF NON-FACIAL STIMULI FOR MALE AND FEMALE SUBJECTS

Group	Low Level of Sociopathy		High Level of Sociopathy	
(N=24 ea)	M	SD	M	SD
Female Subjects	1153 msec	315 (.37)	1237 msec	439 (.23)
Male Subjects	1153 msec	415 (.68)	982 msec	323 (.72)

Pearson r correlation (mean facial latency/mean non-facial latency) indicated in parenthesis

TABLE X

ANALYSIS OF VARIANCE SUMMARY TABLE FOR THE EFFECTS OF GENDER AND LEVEL OF SOCIOPATHY UPON ERRORS ASSOCIATED WITH THE EVALUATION OF NON-FACIAL STIMULI FOR MALE AND FEMALE SUBJECTS

SOURCE	SS	df	MS	F	p
Between Ss	472.5938	1	472.5938	129.16	0.0000
Gender of Ss (G)	0.2604	1	0.2604	0.07	NS
Level of Sociopathy (L)	0.5104	1	0.5104	0.14	NS
GxL	23.0104	1	23.0104	6.29	0.014
Error	336.6250	92	3.6590		

TABLE XI

MEANS AND STANDARD DEVIATIONS FOR THE ANALYSIS OF ERRORS ASSOCIATED WITH THE EVALUATION OF NON-FACIAL STIMULI FOR MALE AND FEMALE SUBJECTS

Group	Low Level of Sociopathy		High Level of Sociopathy	
(N-24 ea)	M	SD	M	SD
Female Subjects	2.58	2.24	1.75	1.45
Male Subjects	1.71	1.73	2.83	2.12

Error means are for n=28 trials

respectively). Less than 10% of the total complex stimuli evaluations made were errors. By comparing the latency means with the error means (see Tables IX and XI, respectively), it can be seen that the more rapidly a subject in a particular group made non-facial evaluations, the greater was his or her error on the average. This suggests a time-speed trade off for the complex stimuli. However, this error-patterning may simply reflect an attempt on the part of the low facial latency groups (high Gilberstadt males and low Gilberstadt females) to maintain a relatively rapid response rate established during the facial evaluation task.

The beta estimates associated with the facial latency ANOCOVA for males and females were .27 and .12, respectively. Due to the robustness of the ANOCOVA with equal and relatively large cell-sizes (n=24, each), the difference in beta estimates is not sufficient to invalidate pooling over gender (Glass et al., 1972). According to Glass et al. (1972), the impact of this difference upon significance levels is very slight and statistically conservative.

Interrelationships Between MMPI Groupings, Subject Groupings and Perceptual-Motor Performance

It was hypothesized that the high and low scoring Gilberstadt scorers would exhibit profiles appropriate to the Gilberstadt level, e.g., high Gilberstadt subjects would exhibit high 4-9 peaks on their MMPI clinical profiles. Each subject was given a MMPI (Form R) directly following the completion of the experimental tasks. The scores were tabulated, converted to T scores for each individual, then a group mean was assembled for each of the four subject groups (n=24, each). See

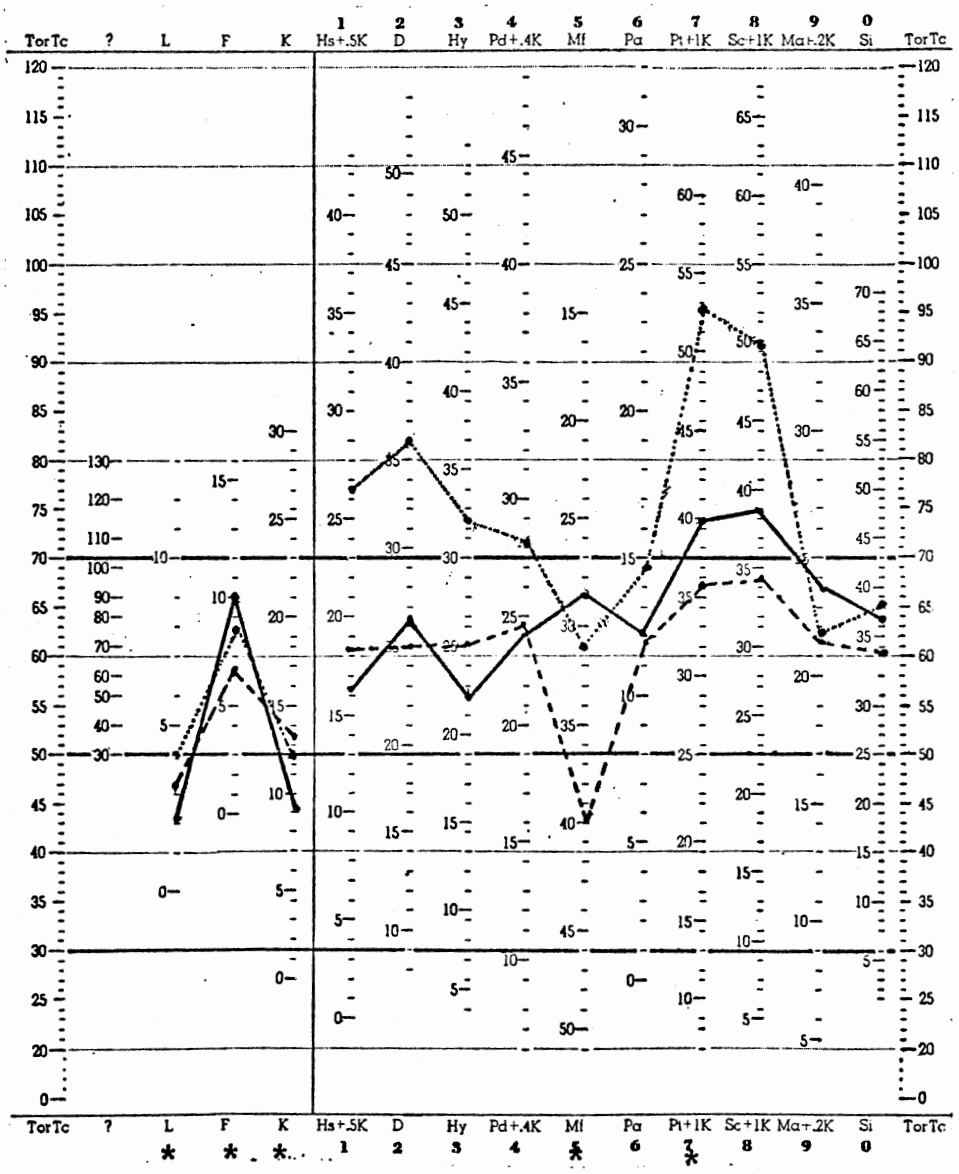
Figures 7 and 8 for the resulting group profiles. The profiles are similar within a Gilberstadt level but different between levels. For the low Gilberstadt groups the mean profile peaks occur on scales 7 and 8 and the validity indicators are "peaked" similarily. For the high Gilberstadt subjects a different, more "defensive" pattern is seen in the validity indicators. Also, the two highest peaks for these two groups are on scales 4 and 9, respectively. Although the 4-9 profiles are not elevated such that they meet the profile rules outlined by Gilberstadt and Ducker (1965) the configuration of the profile is consistent with these rules. The group profiles exhibited by both female and male low Gilberstadt groups are consistent with profile rules for the 7-8 profile type. In Gilberstadt's classification system or the 7-8 type is clinically diagnosable as psychoneurosis, obsessive-compulsive type, and the 4-9 profile type is diagnosable as sociopathic personality. It should be noted that these are group profiles and, as such, speak to a general "type" of personality organization. It is notable, however, that the same-level, opposite-sex subject groups exhibit such similarities in their profile configurations.

The same-level, opposite-sex profile configurations appearing in Figures 7 and 8 are very similar in elevation and overall shape (see Figures 7 and 8). Twenty-six t-tests were calculated for each same-level pair of means to test for significant differences, e.g., the standard error of the difference between the two means. The mean differences, standard error, and observed t-values (46 df) for all of the MMPI data appear in Appendix D (see Table XII and XIII, Appendix D). All significant mean differences at beyond the .05 level of probability are denoted by an asterisk.

The low Gilberstadt level profiles shown in Figure 7 differ significantly on scales L, F, K, Mf, and Pt (see Figure 7). The entire validity patterns are significantly different and this suggests that the low Gilberstadt males' defenses are currently less effective in coping with stress, in general. This is also reflected in the significantly elevated score on scale 7 (psychasthenia). This scale corresponds with intellective defenses such as rationalization, intellectualization, obsessive-rumination, etc. The significantly elevated score on scale 5 theoretically reflects "male sex-role inversion" but scores in this range are normative for young college males (Dahlstrom, Welsh, and Dahlstrom, 1972). The Gilberstadt 7-8 profile superimposed on Figure 7 is clearly of clinical proportions and probably accompanies extreme anxiety and other debilitating affective states.

The mean profiles for the high Gilberstadt male and female subjects are presented in Figure 8 (see Figure 8). These two profiles are extremely consistent in overall configuration and elevation. The only significant mean difference between groups is for scale F, the "pathology barometer" (t (46) = 2.15, $p < .05$). This difference suggests that the male subjects endorsed more items reflecting emotional problems and concerns (e.g., less "socially desirable"). Again, the profile patterns are consistent with the overall configuration of the Gilberstadt 4-9 profile, but are not as elevated on scales 4 and 9 (psychopathic deviate and hypomania, respectively). This suggests that the subjects sampled here may have better "impulse control", are more "in charge" of their activity level, and are not, in general, experiencing and/or expressing as much hostility and resentment as the "clinical" 4-9 patient might.

Male and female subjects who scored similarly on the Gilberstadt



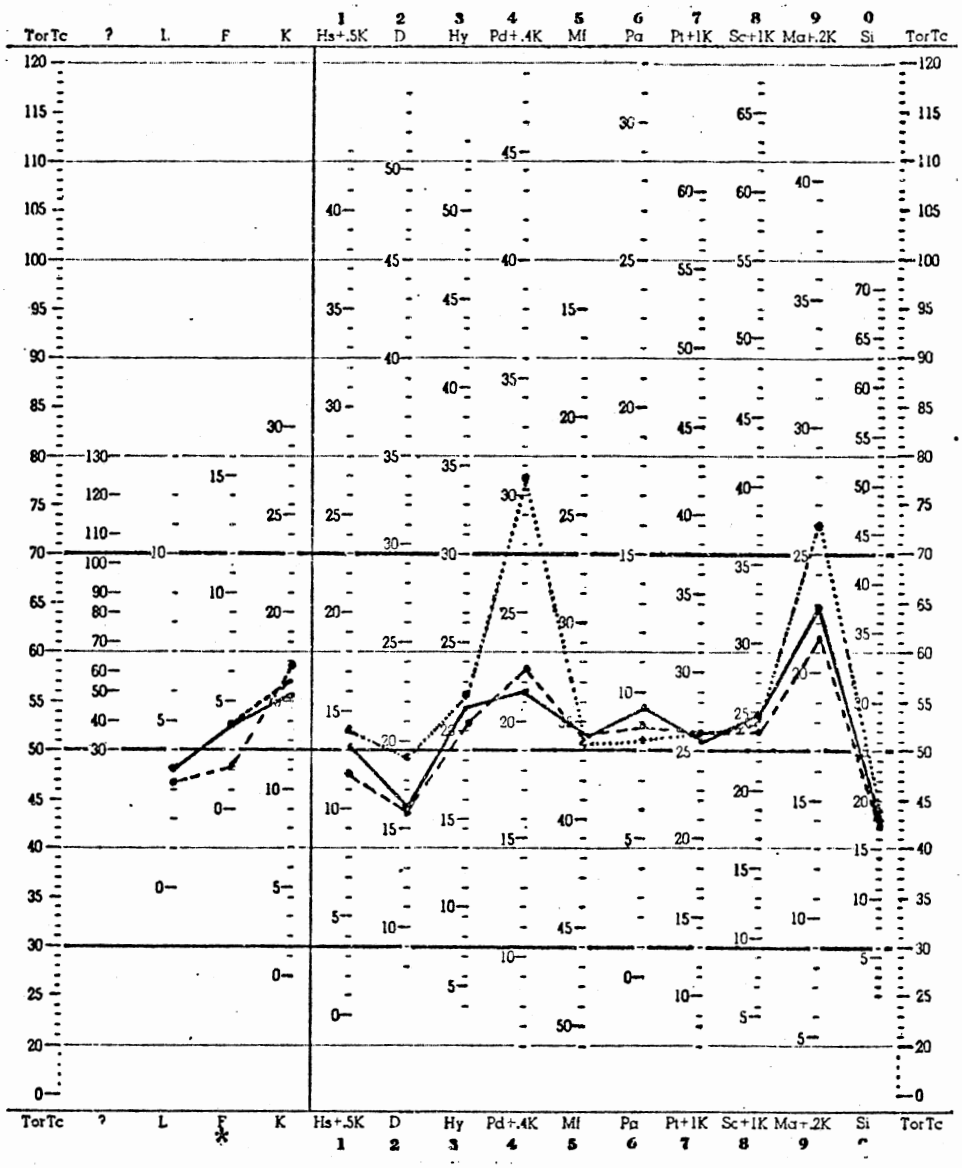
* Indicates significant mean difference (See Table 12)

Male Subjects ————————

Female Subjects - - - - - - - -

Gilberstadt 7-8 code type ••••••

Figure 7. Mean MMPI Profiles for Low Gilberstadt Level Subject Groups



* Indicates significant mean differences (See Table 12)

Male subjects ————————

Female subjects - - - - - - - - -

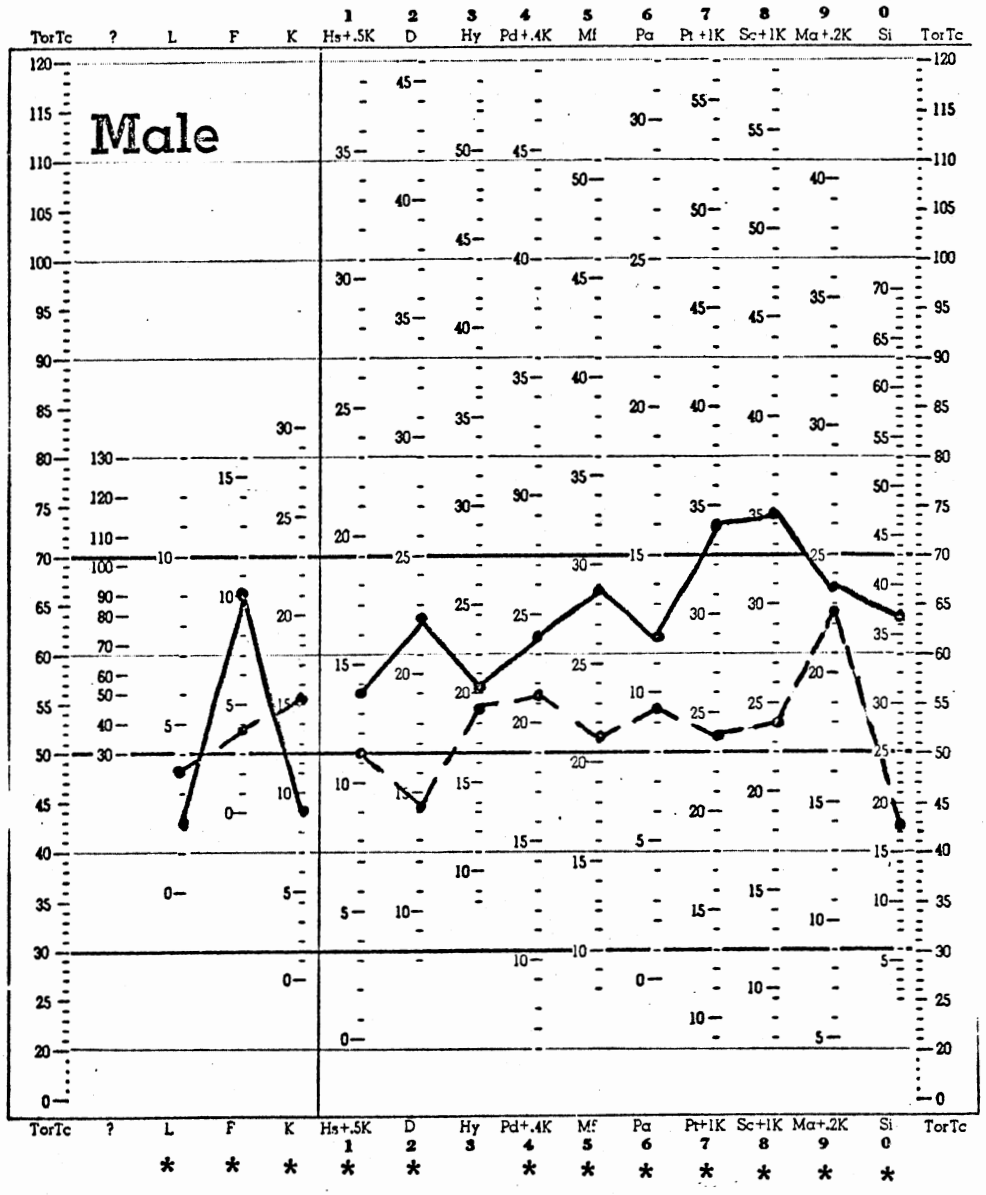
Gilberstadt 4-9 code type • • • • •

Figure 8. Mean MMPI Profiles for High Gilberstadt Level Subject Groups

scale exhibited significant mean differences for 6 of the 26 t-tests. This pattern of results is felt to support the hypothesis that extreme scores on the Gilberstadt coincide with highly similar MMPI profiles for both males and females. This seems especially true for high scoring subjects. Whether these psychometric similarilities correspond to "types" of personality organization or traits, or observable behavior is unknown but felt to be likely given the actuarial development of the Gilberstadt profile types.

In the same manner that the preceding section dealt with the question of profile similarities, this section will focus upon significant differences in MMPI profiles on the basis of level of sociopathy. See Figures 9 and 10 for illustrations of the mean MMPI profiles for male and female subjects, respectively. Figures 9 and 10 are between-level comparisons of the mean MMPI profiles generated by the four subject groups. For male subjects, only the scale 3 means (hysteria) were not significantly different. All others differed at or beyond the .05 probability level. Although this lack of significant difference could be due to sampling fluctuation, it may reflect a common defensive operation of the high and low level males -- denial. The female mean profiles differed on all mean comparisons except for scales L and 9 (the "lie" scale and hypomania, respectively). This may reflect similarities in general activity level and "cognitive rigidity", but should not be over-interpreted.

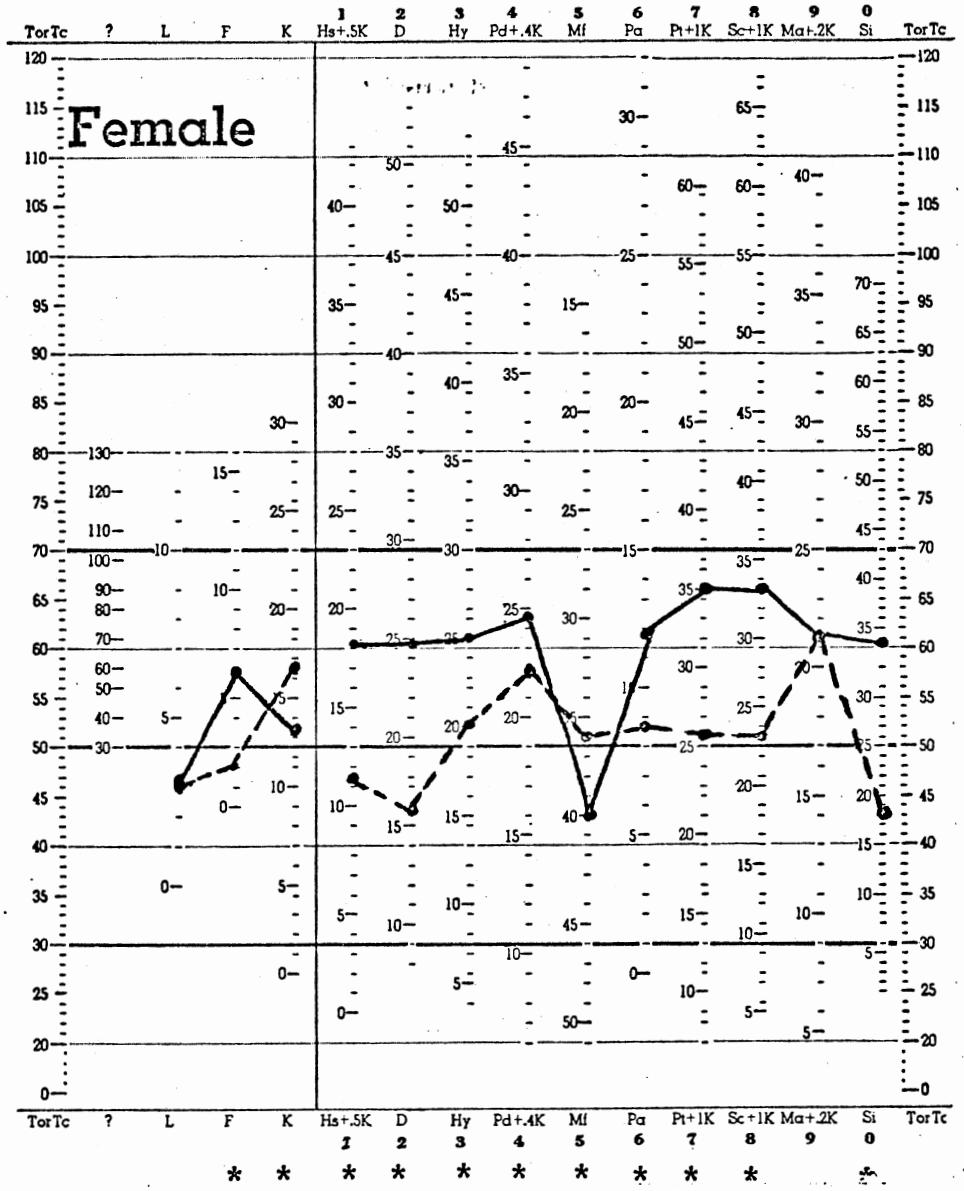
A final attempt was made to explore other personality factors related to latency differences by dividing each group into high and low latency sub-groups (n = 12 per sub-group). By holding Gilberstadt scores and group membership constant, fluctuations in the profiles (at



* Indicates significant mean differences (See Table 13)

Low Gilberstadt scores ————
High Gilberstadt scores - - - - - - -

Figure 9. Mean MMPI Profiles for Male Subject Groups



* Indicates significant mean differences (See Table 13)

Low Gilberstadt scores ————

High Gilberstadt scores - - - -

Figure 10. Mean MMPI Profiles for Female Subject Groups

different mean latencies) may provide clues as to personality factors which differentially affect facial evaluation latency. Unfortunately none of these mean differences were significant, probably due to the small size of the sub-groups and relatively large between-subjects score variation.

CHAPTER IV

DISCUSSION

The major focus of the present study was to replicate and further extend earlier work which found a relationship between facial evaluation latency and the personality characteristics identified by extreme scores on the Gilberstadt 4-9 scale (Gilberstadt, 1970). The MMPI was used in an attempt to identify personality factors related to differences in mean (group) facial evaluation latency for both males and females. Consistent patterning was found in both the latency and MMPI data on the basis of gender and level of sociopathy. In most general terms, these differences suggest that similar personality styles in males and females differentially mediate the speed with which bipolar facial evaluations can be made. More specifically, the interaction indicates that, as the level of sociopathy increases, facial evaluation latency significantly decreases for males. Before examining these differences in greater detail, the secondary hypotheses presented earlier will be reviewed.

It was predicted that only slight mean differences would result between subjects on the complex stimuli task. Although a 255 msec difference appeared between the high Gilberstadt subjects' latency means, this difference was not significant due to large between-subjects differences in reaction times. A significant interaction of gender and level of sociopathy was observed in the error data wherein the low

latency subjects tended to make more errors on the average. This may be evidence of (1) a trade-off between accuracy level and speed, (2) a decrease in vigilance accompanied by less "attention to detail", and/or (3) an attempt to evaluate the complex stimuli as rapidly as the facial slides. Average latencies on the complex stimuli task correlated with the facial latencies to a greater degree for males ($r = .69$) than for the female subjects ($r = .30$), overall. This indicates a greater perceptual relatedness between the two tasks for males, in general. Since the complex stimuli were used as a concomitant variable, this perceptual relatedness tended to be adjusted "out" of the latency analysis. Although this adjustment reduced the size of the mean differences relative to the unadjusted differences, the gender by level interaction involving facial evaluation remained significant. Also, there was a significant effect for level of sociopathy for male subjects. High Gilberstadt males evaluated faces significantly faster than their opposite-level counterparts, on the average. The high Gilberstadt males consistently evaluated the slide-presented stimuli faster than the remaining three groups, overall. These mean differences were only significant for facial stimuli; however. Although the high Gilberstadt males may have a very generalized reaction-time advantage compared to the other subject groups, (at equivalent levels of evaluation accuracy), they appear to be particularly advantaged in terms of their rapid facial evaluations.

Extreme scores on the Gilberstadt 4-9 scale were associated with highly similar MMPI profiles both within the four subject groups and between levels (Gilberstadt). This was especially true for the high Gilberstadt groups. The mean profiles exhibited by the high Gilberstadt groups were not as elevated as the 4-9 code type illustrated by

Gilberstadt (1970), but the configuration of both the validity indicators and the clinical scales clearly approximated the actuarily-derived profile. This consistent pattern of scores suggests that the high Gilberstadt subjects have significant sociopathic personality trends that are not psychometrically related to the "pseudopsychopathic" personality related by Blackburn (1975, Figure 2).

As hypothesized, the low Gilberstadt groups obtained relatively equivalent group profiles. These profiles closely approximate Gilberstadt's 7-8 profile in configuration but not in elevation. This suggests that the low-scoring groups may be sub-clinical (or sub-acute) manifestations of the obessive-compulsive neurosis (Gilberstadt, 1970), Dahlstrom, Welsh, and Dahlstrom, 1972). Under stress, individuals with "premorbid" profiles such as this tend to more closely approximate the 7-8 profile in terms of overall elevation and may appear more "schizoid" clinically. Taken as a whole, the MMPI data is extremely consistent within groups and across levels. However, this profile "interaction" does not provide information as to personality factors for between-level comparisons that might be related to latency differences. For example, the greatest difference in facial evaluation latency means was between the high Gilberstadt male and female groups. In spite of this large mean latency difference, the obtained MMPI group profiles were nearly identical. This indicates that, for this set of comparisons, gender may be the differentiating factor more than "personality", per se, at least as measured by the MMPI.

The MMPI was useful in identifying group "personality types" for males and females at both Gilberstadt levels. As mentioned previously, high Gilberstadt scores resulted in group profiles consistent with sociopathic personality trends, whereas the low Gilberstadt groups

produced profiles suggesting obsessive-compulsive personality trends. There are three generally recognized personality attributes that differentiate these two "types" of persons.

	4-9 type	7-8 type
Defenses:	Major defense is action (activity) accompanied by affective discharge. Exhibits avoidance also.	Major defense is thought. Ruminates, intellectualizes, and rationalizes.
Conscience:	Very low sense of guilt, remorse, e.g., "lack of conscience".	Very restrictive conscience that serves to inhibit behavior.
Anxiety Level:	Very low	Very high

In presenting clinical summaries of the "2-point" profile types listed above, Dahlstrom, Welsh, and Dahlstrom (1972) contend that only the female 4-9 "type" requires differential interpretation:

> . . . because of the different social standards applied to women and their lesser opportunity for acting out, more care should be given to the absolute elevations for scales 4 and 9 in order to determine just how much of this behavior (aggressive, impulsive, violent, etc.) is actually overt as compared to her male counterpart (p. 274).

It should be noted that the subjects selected for the present study were probably well functioning individuals. Their selection on the basis of extreme scores on the Gilberstadt does not necessarily indicate gross psychopathology. Therefore, it is felt that the term "sociopath" is a misnomer in that it exaggerates the degree of psychopathology evident in the sampled population. Its use is accordingly qualified in this thesis. The subjects who participated in the study were very homogeneous in terms of race, age, cultural background, intellectual level, etc. Clinical populations may show very differenent patterns of average latencies due to differences in functional ability and

related factors. These factors tend to limit the degree to which the present results can be generalized to more heterogeneous populations.

The profile patterning in the MMPI data is felt to be evidence of the gender-related differential treatment of the same "personality type" in our culture, when viewed in conjunction with the facial evaluation data. For example, the same "type" of female made the slowest average facial evaluation compared to her male counterpart who made the fastest average evaluations. Negative social feedback during critical developmental periods may restrict the 4-9 females "range" of affective experience such that they learn to rely on non-visual channels of social information and alternate methods of "passively" discharging affect such as vicarious aggression, aggressive fantasy, verbal aggression, etc. High Gilberstadt females may learn to meet their need for stimulation by openly displaying their lack of gender-appropriateness in social settings. Conversely, the low Gilberstadt females may acquire relatively rapid facial evaluation abilities by learning to conform to social expectations. Anxiety related to the maintenance of this social congruence may facilitate their visual information processing. Hall (1978), who suggests a general female superiority in non-verbal information processing, presents a hypothetical process through which females acquire their superior decoding abilities:

> . . . it is possible that females learn early (very early, judging from the results here) "how a girl ought to act". This learning would probably both directly produce a performance advantage in judging nonverbal cues, but over time the added motivation to relate to others expressively and practice at attending to interpersonal expression might result in females superior judging ability (p. 854.)

The gender-specific learning model presented by Hall (1978) may be more characteristic of the low Gilberstadt females. High Gilberstadt females

may resist such cultural pressures (e.g., "antisocial") and resultingly develop qualitatively different perceptual abilities.

It is possible that the stimulus factors associated with the slides reflect such culturally-mediated perceptual differences. Cultural stereotyping of gender-appropriate behaviors may tend to shape different sets of affective displays for males and females. This may result in different learning patterns in children due to differences in reinforcement, exposure, and modeling. Such differences could explain the greater error rates associated with the male faces. For example, males may be taught to supress certain affective displays and also limit exposure to male models exhibiting these expressions. At the developmental level, this may act as a "frequency effect" and limit practice and exposure rates for males. In the experimental task, the male subjects who posed for the slides may have been disadvantaged in producing certain affective displays (e.g., pleasant expressions) due to lack of "practice". Therefore, the male faces may have been more difficult to decode in general because they were more difficult for the males to encode them and, resultingly appear more ambiguous.

The sex of the face was also a significant slide factor. This was primarily due to the female pleasant slides being more rapidly evaluated than the other three slide-types (see Figure 6). A straightforward explanation of this effect is possible, but may be subsumed under the "differential reinforcement" notion presented above. Female pleasant faces may be more obvious to decode. This may be due to muscle-pattern synchronicity (e.g., all muscles are oriented in "pleasant" configurations) or it may simply be of greater stimulus amplitude (e.g., "louder"). For example, more females' teeth were exposed in the female

pleasant slide group as compared to the male pleasant group. Hanawalt (1944) concluded that the lower half of the face furnishes better cues for "happy" expressions, while the upper half is superior for "surprise" or "fear". Cues specific to particular regions of the face may constitute a "microscopic" level of gender-appropriate expressive behavior. The significant effects associated with the slide factors are felt to provide further support for the "cultural learning" model presented here, especially in terms of gender-differentiation.

Greater cultural "permission" for males to be more overtly aggressive may be a primary factor in the high Gilberstadt males' ability to rapidly process social information. The significant interaction of gender and the level of sociopathy indicates that, as the level of sociopathy increases, facial evaluation latency significantly decreases for males. Greater assertion on the part of the high Gilberstadt males may allow them to transcend environmental factors which might otherwise serve to limit the range and variability of early social object relations. In a highly active fashion, these males may acquire the ability to use their social perceptions in executing ego-defending operations (affective discharge, avoidance, heightened stimulation, etc.). The sociopath's behavior defends him from anxiety--he learns to manipulate social information impulsively, e.g., "instinctually" because such is the fuel for his defensive operations. His aggressiveness is "permitted" because it is gender-appropriate and resultingly reinforced. In this way, the developing sociopath's motorically active (and aggressive) behavioral style leads to more numerous, varied, and reinforcing early social experiences. However, a need for constant social stimulation may develop in order to maintain psychological homeostasis.

In contrast, the low Gilberstadt males may have experienced more limited social interaction developmentally. The high introversion scores obtained by this group may reflect "social anxiety" due to lack of experience and social skills. Without socially gratifying experiences, the low Gilberstadt male may "retreat" and come to increasingly rely on cognitive processes to structure the environment and guide his behavior. Avoiding sensory stimulation is one of the cardinal characteristics of anxious, introverted persons (Eysenck et al, 1958). The low Gilberstadt male may be more prone to introversion than his female counterpart, due to the lower social congruence associated with anxious and withdrawn males. Viewed in this fashion, the low Gilberstadt females' anxiety may be more "optimally arousing" (Helson, 1964) and result in slight perceptual advantages compared to both the high Gilberstadt female and the low Gilberstadt male. The main differentiating factor for the high Gilberstadt subjects is felt to be aggression which is differentially reinforced for males and females. The male is reinforced for being aggressive (and may have a greater basis for aggression in light of his greater size and testosterone compliment) whereas the female is more restricted in terms of displaying her aggression. This contrast is consistent with Dahlstrom, Welsh, and Dahlstrom's (1972) differential interpretation of the 4-9 MMPI profile for females. Interestingly, the differential diagnosis for the 4-9 profile are (1) passive-aggressive personality, aggressive type and (2) passive-aggressive personality, passive type. In considering the above descriptions, it seems that the high Gilberstadt, low facial latency male may exhibit behavior consistent with the "aggressive type" while the behavior of the high Gilberstadt, high latency female may more closely

resemble the "passive type" of passive-aggressive personality.

The above speculations relate to etiological factors which hypothetically result in perceptual-behavioral styles consistent with the four subject groups of the present study. However, the data presented here relates to slide-presented stimuli which was collected under highly controlled conditions. Although the significant effects mentioned above have been replicated and appear very reliable, it is unclear whether or not a relatively rapid decoding ability actually facilitates in the guiding of interpersonal behavior. Furthermore, personality factors may impede an individual's ability to behaviorally mobilize his or her faster decoding rates. The facial evaluation task provides an assessment of the time it takes to make bipolar facial judgements in a quiet, darkened room, while seated. A significant 100 msec difference under such conditions may be of little use in a social situation where numerous channels of information are operating. Rapid facial evaluators may or may not be equally facile in decoding other nonverbal channels. It is possible that such individuals are deficient in other channels due to an over-reliance upon visual (e.g., facial) information. Ekman and Oster (1979) address the issue of channel preference by stating that:

> There is no evidence that individuals in actual social interaction selectively attend to another person's face, body, voice, or speech or that the information conveyed by these channels is simply additive. The central mechanisms directing behavior cut across channels, so that, for example, certain aspects of face, body, voice, and speech are more spontaneous, while others are more closely monitored and controlled. It might well be that observers selectively attend not to a particular channel but to a particular type of information (e.g., cues to emotion, deception, or cognitive activity), which might be available within several channels. No investigator has explored the possibility that different individuals may typically attend to different types of information (p. 545).

Another factor limiting the ecological validity of the present results is the uncertain relationship between encoding and decoding abilities. Ekman and Oster (1979) have reviewed the literature in this area and conclude that there is no clear empirical relationship between encoding and decoding abilities, except in psychiatric populations (e.g., schizophrenia). In these populations, both encoding and decoding ability are extremely deficient, relative to non-patients. Additionally, the present study relates to simple bipolar evaluations which may not relate to more differentiated and complex facial analysis, especially considering the rapid sequencing that occurs interpersonally. Compounding the complexity factor is the fact that facial expressions are almost always "embedded" in speech.

In order to generalize the present findings to actual social behavior, "in situ" data is needed to assess the interpersonal application of rapid facial evaluation. The scope of the present study is limited to the perceptual style of an individual in terms of social information processing rates. Fortunately, a large body of research is available which seems to overlap considerably with the data presented. The present research began as an attempt to relate rapid facial evaluation to a group of males identified by their socially desirable response patterns in the Stanners and Hernon (1976) study. Male sociopaths were selected as a subject population because it seemed intuitively plausible that these "social predators" required both rapid and accurate facial evaluation abilities in order to successfully engage in their manipulative and frequently exploitative enterprises. In an attempt to identify and examine extremely manipulative individuals, Christie and Geis (1970) developed a self-report instrument designed to select persons high in "Machiavellian"

orientation. A total of five scales were developed through research and the resulting social performance data and personality descriptions reported by these authors (and others) bears a striking resemblence to the performance data and suspected "personality types" in this and previous research (Angus, 1978).

Christie and Geis (1970) progressively refined their "Mach" scale (I-V) on the basis of continuing research in actual small group settings. A number of social interaction experiments were undertaken, all of which centered around competitive, manipulative, or deceptive issues. The authors developed a self-report test which they state will select for interpersonal manipulation abilities. They have repeatedly found a strong sex difference--hi Mach females do relatively poorly in interpersonal manipulation tasks. On the other hand, hi Mach males proved to be reliably more deceptive, manipulative, and, in general, interpersonally skillful in small group, face-to-face interactions. Rosenthal (1978) focused on the hi Mach female in a study designed to assess manipulative behavior in a seven-person group. This study was a replication of an earlier study conducted by Christie and Geis (1970). Rosenthal stated that:

> The rationale behind the study was that given a setting with face to face interaction, latitude for improvisation, and the potential for emotional involvement those persons with a desire or propensity to manipulate would surface. This was supported by the higher point totals accumulated by subjects scoring high on Mach V. Also, high Machiavellians made fewer errors of negotation than low Machiavellians, presumbly because of their ability to concentrate on the process of bargaining and manipulation without becoming emotionally involved with the issues (p. 156).

This was Rosenthal's account of Christie and Geis' (1970) findings at

the outset of the experiment. After replicating the experiment using female subjects, he concluded that:

> . . . the concept of Machiavellianism, as measured by Mach V, does not apply to females. Any gender related differences in manipulative strategy are not geing detected by the scale. This study serves to illustrate, once again, some of the difficulties involved in extending personality attributes from same-sex studies to a total population. It also raises some question about the Mach V scale and its usefulness outside of a population of male college students (p. 158).

The manipulative advantage of the hi Mach males seems restricted to face-to-face interactions. They do not compete as successfully when removed from an interpersonal setting. This may relate to and reflect the perceptual advantage of the high Gilberstadt male in the present study.

Christie and Geis (1970) report a study which is particularly germane to the present study. They selected four groups of subjects on the basis of gender and Mach scores. They then asked these subjects, in groups, to pick a beauty contestant "winner" out of a composite photograph consisting of parts of 6 different womens' faces. Only the hi Mach males and low Mach females were capable of performing this task at significantly beyond a chance level. In juxtaposition with the present data patterns, this may suggest a relative superiority in facial evaluation on the part of high Gilberstadt males and low Gilberstadt females.

Many of Christie and Geis' (1970) "personality" descriptions of hi Mach males coincide with clinical descriptions of male sociopaths. They are described as having a relative lack of affect in interpersonal relationships; being relatively unconcerned with conventional morality (e.g., antisocial); not exhibiting gross psychopathology; and they are extremely manipulative, as well as (psychometrically) hostile and aggressive. Christie and Geis (1970) relate that the hi Mach males

slogan might be "People are no damn good. So what? Take advantage of it" (p. 38).

The potential for tying together the perceptual styles of the hi/low Gilberstadt results with the interpersonal (behavioral) style of the hi/low Machiavellian is evident. Coincidence of the data obtained herein with a replication using Mach scores would allow for the generalization of the gender by level of sociopathy interaction and potential verification of the personality traits thought to relate to different rates of social information processing.

The results of the present study relate to temporal affective decoding parameters as a function of gender and "sociopathy" of young college individuals. A significant interaction between these two factors has replicated and seems to be highly reliable. Its stability over time is not known, although the stability of the instrument employed to assess "sociopathy" level has high test-retest reliability ($r = .87$); (Angus, 1978). The differences found in this study are felt to be the result of early learning which is, to a large degree, gender-specific and culturally determined. The microscopic effects examined here may well be the reflection of dimorphous sex-roles which have evolved from prehistoric human pair-bonding. Role specificity is currently eroding in this era of human liberation. It is possible that, with these social changes, factors relating to the perception of social information will become less differentiated on the basis of gender. Further research in this area will hopefully assist in providing information that can increase our understanding of each other, erase current biases and, through progressive human technology, promote a peaceful adaptation to our world.

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APPENDIXES

APPENDIX A

LIST OF ITEMS ON THE GILBERSTADT 4-9 SCALE

TRUE - FALSE INVENTORY

INSTRUCTIONS: This inventory consists of 51 numbered statements. Read each statement and decide whether it is TRUE AS APPLIED TO YOU or FALSE AS APPLIED TO YOU. You are to mark your answers on the anser sheet provided (along with your name, telephone number, etc.). USE ONLY THE FIRST TWO "SLOTS" FOR YOUR ANSWERS. If a statement is TRUE OR MOSTLY TRUE, as applied to you, blacken in the first "slot". If a statement is FALSE OR USUALLY NOT TRUE, as applied to you, blacken in the second "slot". DO NOT, FOR ANY REASON, MAKE MARKS ON ANY OF THE LAST THREE SLOTS. Start with item 1 on the answer sheet and continue through item 51. Do not skip any items and make complete erasures, if necessary. Remember to give YOUR OWN OPINION of yourself and not to skip any items. Now begin with item 1:

- -

1. Whenever possible I avoid being in a crowd.
2. I do not tire quickly.
3. Sometimes I have the same dream over and over.
4. I have been afraid of things or people that I knew could not hurt me.
5. I dream frequently about things that are best kept to myself.
6. I enjoy many different kinds of play and recreation.
7. Most people are honest chiefly through fear of being caught.
8. I cannot understand what I read as well as I used to.
9. I think most people would lie to get ahead.
10. I frequently find it necessary to stand up for what I think is right.
11. Religion gives me no worry.
12. My relatives are nearly all in sympathy with me.
13. I enjoy social gatherings just to be with people.
14. I am a good mixer.
15. I loved my father.
16. I hardly ever feel pain in the back of the neck.
17. I am apt to hide my feelings in some things, to the point where people may hurt me without their knowledge about it.

- - -PLEASE CONTINUE ON THE FOLLOWING PAGE- - -

18. I cannot keep my mind on one thing.

19. There seems to be a fullness in my head or nose most of the time.

20. I find it hard to make talk when I meet new people.

21. Sometimes I become so excited that I find it hard to get to sleep.

22. I like to go to parties and other loud affairs where there is lots of loud fun.

23. I have no difficulty in starting or holding my bowel movement.

24. People can pretty easily change me even though I thought that my mind was already made up on a subject.

25. I prefer to pass by school friends, or people I know but have not seen for a long time, unless they speak to me first.

26. I feel tired a good deal of the time.

27. I have few or no pains.

28. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things.

29. I have never indulged in any unusual sex practices.

30. My speech is the same as always (not faster or slower, no slurring; no hoarseness).

31. I am fascinated by fire.

32. Sometimes I feel as if I must injure either myself or someone else.

33. I am very seldom troubled by constipation.

34. At times I feel like picking a fist fight with someone.

35. I seldom worry about my health.

36. I do not often notice my ears ringing or buzzing.

37. I find it hard to keep my mind on a task or job.

38. I have little or no trouble with my muscles twitching or jumping.

39. I dislike to take a bath.

40. I feel weak all over much of the time.

41. I have very few headaches.

---PLEASE CONTINUE ON THE FOLLOWING PAGE---

42. The future seems hopeless to me.

43. I know who is responsible for most of my troubles.

44. I am bothered by people outside, on streetcars, in stores, etc. watching me.

45. Often I feel as if there were a tight band about my head.

46. Most of the time I feel blue.

47. I have never been paralyzed or had any unusual weakness of any of my muscles.

48. I am happy most of the time.

49. Policemen are usually honest.

50. My judgement is better than it ever was.

51. I should like to belong to several clubs or lodges.

---STOP---

PLEASE CHECK YOUR ANSWER SHEET AND MAKE SURE THAT ALL ITEMS, 1-51 IN CLUSIVE, ARE FILLED IN, USING ONLY THE FIRST TWO SLOTS. ALSO, MAKE SURE YOUR NAME, TELEPHONE NUMBER AND ADDRESS ARE PRINTED/FILLED IN IN THE APPROPRIATE BOXES. THANK YOU VERY MUCH FOR YOUR PARTICIPATION.

APPENDIX B

MMPI CONSENT FORM

C O N S E N T F O R M

I hereby consent to take the Minnesota Multiphasic Personality Inventory for research purposes. I do so with the understanding that my name will not be used in any way, that the purpose for taking this test is involved with the exploration of personality factors associated with the time it takes to evaluate human facial expressions and other stimuli, and that no clinical interpretation of the test will be given to me. I also understand that I may choose not to complete the Minnesota Multiphasic Personality Inventory at any time without losing experimental credit.*

Signed_____ Date_____

Experimenter_____

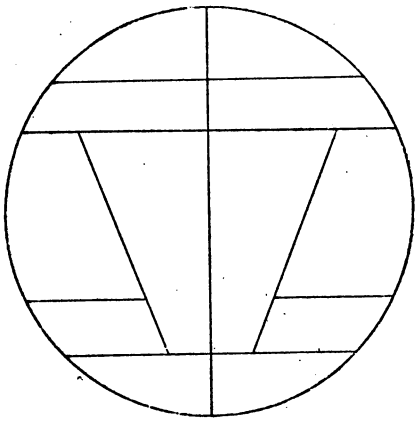
*inclusion in the present study is not possible without the MMPI data.

APPENDIX C

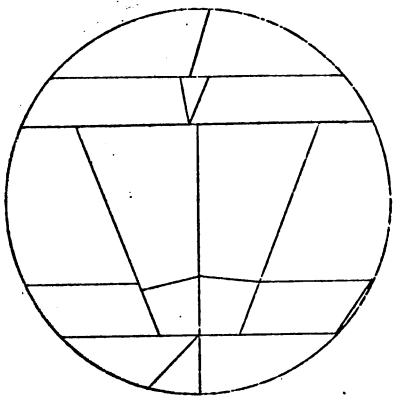
SYMMETRICAL AND NON-SYMMETRICAL COMPLEX STIMULI

SYMMETRICAL AND NON-SYMMETRICAL
COMPLEX STIMULI

CIRCULAR NON-FACIAL STIMULI

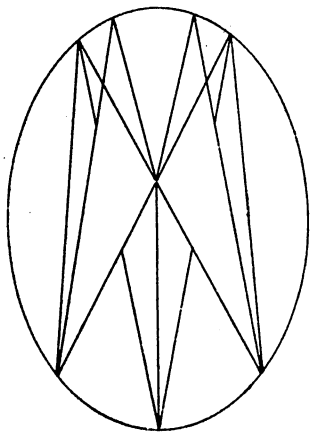


Symmetrical

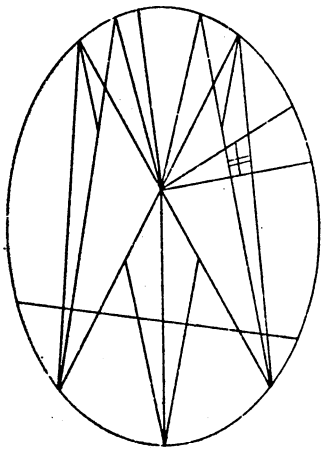


Non-Symmetrical

ELLIPTICAL NON-FACIAL STIMULI



Symmetrical



Non-Symmetrical

APPENDIX D

TABLES XXII AND XIII: STANDARD ERROR OF THE DIFFERENCE BETWEEN MMPI SCALE MEANS

TABLE XII

STANDARD ERROR OF THE DIFFERENCE BETWEEN INDIVIDUAL MMPI SCALE MEANS AS A FUNCTION OF GENDER FOR MALE AND FEMALE SUBJECTS

Group (N = 24 ea)	MMPI Scale L	F	K	1	2	3	4	5	6	7	8	9	0
Low Gilberstadt Scoring Subjects													
Mean Difference (t)	1.1	5.4	3.1	10.2	15.6	6.4	7.4	7.9	7.0	14.5	13.5	2.8	17.2
Standard Error	1.37	2.90	2.60	2.92	3.53	2.99	3.98	2.86	3.78	3.40	4.57	3.20	2.92
t_{obs}	2.69**	2.86**	3.03**	NS	NS	NS	NS	7.94**	NS	2.15*	NS	NS	NS
High Gilberstadt Scoring Subjects													
Mean Difference (t)	1.2	4.1	3.1	3.0	0.9	2.4	2.4	1.1	2.4	0.4	2.0	3.1	0.5
Standard Error	1.52	1.91	2.12	1.74	1.56	2.08	2.42	2.66	2.66	2.13	2.30	2.75	1.67
t_{obs}	NS	2.15*	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

* = $\underline{p} < .05$ ** = $\underline{p} < .01$

TABLE XIII

STANDARD ERROR OF THE DIFFERENCE BETWEEN INDIVIDUAL MMPI SCALE MEANS AS A FUNCTION OF LEVEL OF SOCIOPATHY FOR MALE AND FEMALE SUBJECTS

Group (N = 24 ea)	MMPI Scale L	L	K	1	2	3	4	5	6	7	8	9	0
Female Subjects													
Mean Difference (t)	0.1	9.5	6.2	13.2	16.5	8.8	5.0	6.8	9.4	14.9	15.5	0.2	17.7
Standard Error	1.63	1.93	2.51	2.22	2.83	2.50	3.22	2.62	2.61	2.38	2.89	3.06	2.47
t_{obs}	NS	4.87**	2.47**	5.94**	5.83**	3.52**	NS	2.60*	3.60**	6.26**	5.36**	NS	7.17**
Male Subjects													
Mean Difference (t)	4.8	13.7	11.0	6.0	19.3	1.6	6.3	14.8	7.3	21.8	21.0	2.6	20.9
Standard Error	1.53	2.58	2.23	2.58	2.63	2.65	1.94	2.90	3.82	3.23	4.22	2.91	2.29
t_{obs}	3.14**	5.32**	4.94**	2.32*	7.35**	NS	3.23**	5.10**	NS	6.74**	4.98**	NS	9.12**

* = $\underline{p} < .05$ ** = $\underline{p} < .01$

APPENDIX E

TOTAL MMPI ITEM COMPLIMENT AND RESPONSE DIRECTION OF THE 51 ITEM GILBERSTADT 4-9 SCALE

TOTAL MMPI ITEM COMPLIMENT AND
RESPONSE DIRECTION OF THE 51
ITEM GILBERSTADT 4-9 SCALE

MMPI Scale	True Scored Items	False Scored Items	Totals
L	0	0	0
F	2	2	4
K	0	2	2
1	4	7	11
2	2	8	10
3	3	8	11
4	3	4	7
5-M	1	5	6
5-F	2	4	6
6	1	3	4
7	6	1	7
8	5	5	10
9	1	3	4
0	5	7	12
TOTALS	34 (38%)	55 (62%)	89

APPENDIX F

PERSONAL COMMUNICATION

VETERANS ADMINISTRATION
HOSPITAL
54TH STREET AND 48TH AVENUE SOUTH
MINNEAPOLIS, MINNESOTA 55417

October 4, 1978

IN REPLY REFER TO: 618/116B3

Mr. Craig M. Angus
Rural Route 1, Box 132-B
Arcadia, Oklahoma 73007

Dear Mr. Angus:

The statement in the MMPI HANDBOOK, Vol. 2, that the means and standard deviations given therein were based on 48 items was due to some technical problem with our earlier MMPI computerization. I would recommend that you use the 51 items listed in the HANDBOOK since these lists are correct.

Sincerely,

H. Gilberstadt

HAROLD GILBERSTADT, Ph.D.
Research Clinical Psychologist

Show veteran's full name, VA file number, and social security number on all correspondence.

APPENDIX G

MMPI DATA FOR THE FOUR SUBJECT GROUPS

Low Gilberstadt Scoring Female Subjects
MMPI Data

T Scores													Rank-Order of Scales									
L	F	K	1	2	3	4	5	6	7	8	9	0										
60	55	57	72	57	64	57	43	70	69	61	55	63	1	6	7	3	0	8	4	2	9	5
46	48	53	48	65	50	64	59	56	63	65	50	61	8	2	4	7	0	5	6	9	3	1
53	62	49	68	86	72	68	37	82	69	78	50	72	2	6	8	0	3	7	4	1	9	5
46	50	53	46	69	49	57	28	65	67	47	35	66	2	0	6	4	7	3	8	1	9	5
44	55	55	48	57	64	53	47	41	61	57	58	52	3	7	9	8	2	4	0	1	5	6
44	53	46	54	55	68	62	47	53	55	58	65	47	3	9	4	8	7	2	1	6	0	5
44	58	48	60	65	77	79	34	67	71	67	60	53	4	3	7	8	6	2	9	1	0	5
46	50	44	66	55	77	83	37	61	68	67	73	53	4	3	9	7	8	1	6	2	0	5
44	60	44	46	65	38	74	43	56	73	64	54	72	4	7	0	9	2	8	6	1	5	3
44	50	73	58	61	54	67	34	62	63	58	55	65	4	0	6	5	2	8	1	9	3	5
36	86	40	60	76	66	100	53	65	78	98	78	80	4	8	0	9	7	2	3	6	1	5
53	64	46	60	42	61	39	47	67	55	60	65	52	6	9	3	8	1	7	0	5	2	4
44	55	44	72	70	64	71	57	47	76	78	65	60	8	7	1	4	2	9	3	0	5	6
46	53	70	64	61	66	57	41	70	71	64	48	69	7	6	0	3	8	1	2	4	9	5
46	60	51	78	80	70	79	41	65	86	81	73	73	7	8	2	4	1	0	9	3	6	5
46	70	57	74	88	72	79	26	65	91	97	48	68	8	7	2	4	1	2	0	6	9	5
53	68	49	60	51	59	55	47	62	66	74	63	66	8	0	7	9	6	1	3	4	2	5
44	55	40	68	53	68	60	32	67	58	63	78	55	9	3	1	6	8	4	7	0	2	5
60	55	62	50	44	59	55	53	56	56	54	68	40	9	3	7	6	4	8	5	1	2	0
53	50	68	56	46	57	62	51	65	68	64	75	34	9	7	8	6	4	3	1	5	2	0
44	66	48	68	53	64	59	49	79	65	78	83	56	9	6	8	1	7	3	4	0	2	5
44	50	46	56	49	50	46	41	56	65	67	68	64	9	8	7	0	6	1	3	2	4	5
40	60	48	70	51	52	41	57	44	60	64	48	67	1	0	8	7	5	3	2	9	6	4
46	53	66	46	51	45	53	41	53	50	44	53	54	0	9	6	4	2	7	1	3	8	5

High Gilberstadt Scoring Female Subjects
MMPI Data

T-Scores													Rank-Order of Scales
L	F	K	1	2	3	4	5	6	7	8	9	0	
56	50	72	55	42	63	62	51	56	53	57	43	44	3 4 8 6 1 7 5 0 9 2
56	46	57	46	53	57	53	55	56	48	46	50	50	3 6 5 4 2 9 0 7 8 1
44	46	62	50	47	63	55	68	59	53	52	50	42	5 3 6 4 7 8 9 1 2 0
46	44	75	50	42	54	62	47	53	55	58	50	35	4 8 7 3 6 9 1 5 2 0
53	48	66	52	51	64	60	39	62	58	55	63	40	3 9 6 4 7 8 1 2 0 5
44	55	49	44	51	45	64	39	44	36	47	58	50	4 9 2 0 8 3 6 1 5 7
44	55	51	58	38	49	60	63	44	46	43	60	49	5 9 4 1 0 3 7 6 8 2
56	46	66	48	42	57	67	47	62	50	57	63	33	4 9 6 8 3 7 1 5 2 0
46	58	44	44	51	50	64	41	59	48	41	63	48	4 9 6 2 3 0 7 1 8 5
56	46	62	48	44	52	67	51	53	53	51	63	46	4 9 7 6 3 8 5 1 0 2
46	48	57	44	30	49	43	43	56	48	49	55	50	6 9 0 8 3 7 1 5 4 2
53	50	66	54	49	59	55	70	59	60	63	60	42	5 8 9 7 6 3 4 1 2 0
46	44	61	44	36	49	53	55	35	43	48	53	39	5 9 4 3 8 1 7 0 2 6
44	46	57	52	42	56	57	53	41	55	47	65	43	9 4 3 7 5 1 8 0 2 6
40	46	59	46	49	57	64	49	62	63	58	68	30	9 4 7 6 8 3 5 2 1 0
40	48	59	44	46	40	67	43	44	51	51	68	39	9 4 8 7 2 6 1 5 3 0
50	48	59	50	47	49	63	55	47	55	55	63	42	9 4 8 7 5 1 3 6 2 0
41	53	46	39	46	56	71	63	53	51	57	81	42	9 4 5 8 3 6 7 2 0 1
46	48	55	42	44	54	50	37	53	43	46	53	46	3 9 6 4 0 8 2 7 1 5
50	50	53	48	36	38	57	47	67	50	51	78	40	9 6 4 8 7 1 5 0 3 2
44	48	55	42	47	55	50	47	53	58	49	60	45	9 7 3 6 4 8 5 2 0 1
40	48	49	42	40	47	55	47	44	55	49	63	43	9 7 4 8 5 6 3 0 2 1
41	40	70	46	42	49	53	41	45	58	54	75	42	9 7 8 4 3 1 6 0 2 5
40	48	57	42	38	43	48	55	44	45	51	65	37	9 5 8 4 7 6 3 1 2 0

Low Gilberstadt Scoring Male Subjects
MMPI Data

T-Scores													Rank-Order of Scales									
L	F	K	1	2	3	4	5	6	7	8	9	0										
41	70	33	65	80	67	50	61	56	76	73	70	77	2	0	7	8	9	3	1	5	6	4
46	78	36	72	77	78	86	67	88	87	78	65	65	6	7	4	8	3	2	1	5	0	9
46	70	53	49	89	56	76	74	56	99	86	45	82	7	2	8	0	4	5	6	3	1	9
44	64	44	59	63	84	71	76	62	88	84	70	63	7	8	3	5	4	9	0	2	6	1
44	60	41	52	53	44	71	47	62	77	69	68	61	7	4	8	9	6	0	2	1	5	3
44	48	51	59	60	53	59	63	62	55	53	53	58	5	6	2	0	4	1	7	9	8	3
46	73	50	54	60	53	60	59	62	73	69	58	64	7	8	0	6	4	2	5	9	1	3
44	55	36	52	65	49	43	76	44	71	67	55	69	5	7	0	8	2	9	1	3	6	4
44	73	40	47	82	55	65	71	62	78	82	75	76	8	2	7	0	9	5	4	6	3	1
46	55	51	62	60	65	64	69	56	64	71	53	55	8	5	3	7	4	1	2	6	0	9
50	66	48	72	56	47	62	96	82	75	86	78	52	5	8	6	9	7	1	4	2	0	3
40	80	40	57	70	51	81	69	76	89	90	73	75	8	7	4	6	0	9	2	5	1	3
40	70	44	70	75	58	76	78	79	78	86	68	65	8	6	7	5	4	2	1	9	0	3
36	98	40	57	80	60	71	57	100	105	130	78	78	8	7	6	2	0	9	4	3	5	1
44	73	38	41	65	60	68	67	70	71	80	70	62	8	7	9	6	4	5	2	0	3	1
50	73	44	70	65	67	55	67	59	84	94	86	62	8	9	7	1	5	3	2	0	6	4
40	58	36	52	53	55	57	78	50	69	71	70	68	5	8	9	7	0	4	3	2	1	6
41	78	40	49	56	49	69	53	59	67	80	75	60	8	9	4	7	0	6	2	5	3	1
44	53	51	72	65	67	67	65	59	69	78	81	44	9	8	1	7	4	3	5	2	6	0
36	66	70	62	68	53	74	65	67	64	57	73	52	4	9	2	6	5	7	1	8	3	0
40	55	60	44	44	47	47	65	56	64	55	68	55	9	5	7	6	0	8	4	3	2	1
46	55	44	44	56	45	43	55	30	60	55	60	56	9	7	0	2	8	5	3	1	4	6
44	58	36	36	53	44	34	61	33	54	44	55	68	0	5	9	7	3	8	3	1	4	6
40	58	42	49	44	44	43	49	53	54	50	60	65	0	9	7	6	8	5	1	3	2	4

High Gilberstadt Scoring Male Subjects
MMPI Data

T-Scores													Rank Order of Scales									
L	F	K	1	2	3	4	5	6	7	8	9	0										
50	53	59	49	56	65	62	59	62	54	57	60	41	3	6	4	9	5	8	2	6	1	0
56	48	59	47	36	55	53	55	50	48	53	53	44	5	3	9	4	8	6	7	1	0	2
53	55	53	44	48	58	41	49	44	38	48	55	48	3	9	5	0	8	2	6	1	4	8
46	53	57	44	48	60	64	67	59	65	53	50	38	5	7	4	3	6	8	9	2	1	0
44	46	68	65	46	65	71	71	65	62	61	53	39	4	5	6	3	1	7	8	9	2	0
50	58	55	52	48	55	67	39	62	46	57	60	44	4	6	9	8	3	1	2	7	0	5
46	58	59	52	46	56	67	53	50	56	53	65	42	4	9	7	3	8	5	1	6	2	0
40	55	51	47	41	53	46	55	65	58	57	55	45	6	7	8	9	5	3	1	4	0	2
46	50	52	57	46	47	50	47	65	64	50	58	38	6	7	9	1	4	8	5	3	2	0
40	64	48	49	48	60	67	57	79	56	55	75	39	6	9	4	3	5	7	8	1	2	0
56	46	48	47	46	47	41	39	35	36	46	55	51	9	0	3	1	8	2	4	5	7	6
40	48	59	65	44	56	48	47	53	58	59	68	41	9	1	8	7	3	6	4	5	2	0
50	50	66	57	48	64	55	63	53	56	53	70	34	9	3	5	1	7	4	8	6	2	0
50	50	62	62	44	64	62	47	62	54	51	70	39	9	3	4	6	1	7	8	5	2	0
46	50	62	49	41	58	62	45	56	46	57	81	39	9	4	3	8	6	1	7	5	2	0
46	50	44	49	44	58	69	53	56	52	53	88	37	9	4	3	6	8	5	7	1	2	0
50	64	48	41	41	53	62	49	47	48	51	70	52	9	4	3	0	8	5	7	6	2	1
56	58	53	41	34	40	53	41	44	46	48	70	46	9	4	8	0	7	6	5	1	3	2
44	50	62	47	48	47	55	41	33	46	55	65	46	9	4	8	2	3	1	0	7	5	6
53	46	62	52	48	62	62	53	53	56	59	78	41	9	4	3	8	7	6	5	1	2	0
46	58	44	49	53	38	41	57	62	52	55	68	64	9	0	6	5	8	2	7	1	4	3
53	44	59	44	36	47	46	47	50	40	46	53	41	9	6	5	3	4	8	1	0	7	2
46	48	48	39	41	53	48	65	53	42	50	58	39	5	9	6	3	8	4	7	2	0	1
46	55	55	54	44	51	50	35	50	66	59	68	41	9	7	8	1	3	4	6	2	0	5

VITA

Craig M. Angus

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE EFFECTS OF GENDER AND LEVEL OF SOCIOPATHY UPON REACTION TIME AND ERRORS ASSOCIATED WITH THE BIPOLAR EVALUATION OF FACIAL AND NON-FACIAL COMPLEX STIMULI

Major Field: Psychology

Biographical:

Personal Data: Born in Hyannis, Massachusetts, September 27, 1951, the son of Lt. and Mrs. John C. Angus.

Education: Graduated from Dennis-Yarmouth Regional High School, South Yarmouth, Massachusetts, in June, 1969; received Bachelor of Science degree in Psychology from the University of Massachusetts, Amherst, Massachusetts, in May, 1973; received Master of Science degree in Psychology from Oklahoma State University in May, 1976; enrolled in Doctor of Philosophy program in Clinical Psychology at Oklahoma State University in August, 1976; completed requirements for the Doctor of Philosophy in Psychology in July, 1979.

Professional Experience: Psychological Associate at the Psychological Services Center in Stillwater, Oklahoma, 1974-1975; Psychiatric Aid, Level One, Stillwater Municipal Hospital, in Stillwater, Oklahoma, May-September, 1975; Group Cotherapist, Tri-County Youth Services, Stillwater, Oklahoma, October-December, 1975; Psychological Associate, Payne County Guidance Center, Stillwater, Oklahoma, September-December, 1975; Psychology Consultant, IOA Youth Ranch, Perkins, Oklahoma, September-December, 1975; Psychology Intern, Garfield County Guidance Center, Enid, Oklahoma, January-May, 1976; Clinical Administrative Assistant, Psychological Services Center, Stillwater, Oklahoma, 1976-77, Psychological Associate, Psychological Services Center, Stillwater, Oklahoma, 1976-77; Clinical Psychology Trainee, level three, Veterans Administration Medical Center, Oklahoma City, Oklahoma, 1977-1978; Clinical Psychology Intern, Oklahoma University Health Sciences Center Consortium, Oklahoma City, 1978-1979.