CORRESPONDENCE BETWEEN PERSONALITY DIMENSIONS AND EXPRESSIONS OF FACIAL AFFECT

By

Frances Wideha Stott

A DISSERTATION

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

DOCTOR OF PHILOSOPHY

Department of Counseling, Personnel Services
and Educational Psychology

1979

ABSTRACT

CORRESPONDENCE BETWEEN PERSONALITY DIMENSIONS AND EXPRESSIONS OF FACIAL AFFECT

By

Frances W. Stott

The purpose of the study was to investigate whether there are significant differences in expressions of facial affect as recorded on videotape and measured by trained judges between persons with specific personality characteristics as measured by pencil/paper personality instruments. The assumption that personality characteristics related to emotional style are discernable in the face by specific expressions of facial affect was the basis for this research. The potential use of such information for subsequent research efforts and therapeutic intervention provided impetus for the study.

One hundred sixty-eight undergraduate students at the University of Texas-Austin were administered a battery of pencil/paper personality instruments: the Plutchik Emotions Profile Index, the Eysenck Personality Inventory, and the Birkman Method. Sixty-two subjects were subsequently selected to participate in the interview phase, on

the basis of their high or low scores across the nine personality dimensions that were used as the independent variables for the study. Subjects were divided into two groups (high and low) for each of the personality dimensions used, based on their scores on one of the personality dimensions at a time.

The interviewer was the same for all subjects, and was instructed to engage in a responsive but non-confrontive manner. Subjects were asked to select an item of personal interest from the Mooney Problem Check List's "Personal Psychological Relations Scale," and then to talk with the interviewer about that topic for 15 minutes.

The interviews were videotaped, and a systematic sampling procedure was used to prepare the data for rating. There were 30 samples of facial affect per subject, or a total of 1,680 samples for the study. Three females were trained as raters, to recognize the categories of Enjoy, Anger, Surprise, Interest, Disgust, and Distress. These six categories, plus calculations regarding frequency of change from one affect category to another, and number of affect categories used, provided the total of 8 dependent measures for the study.

The fifteen hypotheses used in the study were stated so as to test the relationship between performance on specific personality dimensions and the type, range, or frequency

of change of facial affect expressed by the subject. Hypotheses were tested by a comparison of groups on the affective measures, using t-tests, with an alpha level set at .05. Supplementary analyses from the multivariate, univariate, and correlational aspects were also used for further exploration of differences and relationships.

Two of the 15 hypotheses were significant. A significant difference was found between high and low Distrustful groups on the affective measure of Disgust ($p=.008$) indicating that persons who score high on Distrustful tend to display more disgust than do persons who score low on this scale. A significant difference was also found between high and low groups of Getting Along With Others on the affective measure Range of Affect ($p=.028$), indicating that persons who score high on Getting Along With Others tend to display more types of affect than do persons scoring low on this scale.

Supplementary analyses did indicate further differences between groups: the independent variables Aggressive, Gregarious, Distrustful, and Getting Along With Others all showed evidence of (non-hypothesized) significant differences between their respective high and low groups on at least one affective measure at $p<.05$.

The discussion section noted implications for this study and for future research, as well as methodological

observations and recommendations for studies which use moving facial affect in the sampling procedures.

To my parents,

Wideha and Russell Stott

who long ago provided me with the affective basis for my interest in this research area,

who instilled values of intellectual curiosity and academic achievement that have served me in undertaking this degree program,

and most importantly, who now celebrate with me in the pride and satisfaction of its completion.

ACKNOWLEDGMENTS

As this dissertation is the culmination of a degree program in Counseling Psychology, so it began not with a research proposal but at the Listening Ear Crisis Intervention Center of East Lansing, Michigan. Consequently, I wish first to acknowledge June Jacobson and Dozier Thornton, founders of the Center and initiators of my enthusiasm and understanding for applied psychology. I would like to acknowledge the depth and richness of their personal friendships for me, and to thank them for the values of personal integrity, professional excellence, and caring that they imparted to us all.

I wish also to express many thanks to Bill Hinds, who was my first formal instructor in graduate psychology, who supported my application to this degree program, who served as academic advisor and dissertation chairperson throughout, and whose friendship I value highly.

I would like to acknowledge and thank each of my committee members, each of whom has had personal impact on my graduate career, and all of whom have offered thoughtful criticisms as well as interest and support toward this research project:

Bill Hinds, who introduced me to the area of facial

affect, graciously endured the agonies of long distance consultation, and responded both expediently and thoroughly to letters, calls, forms, and drafts;

Judith Taylor, who was singularly indispensable in her ability to make this research area a manageable one, to make research in general an intriguing and rewarding process, and in her generosity of time, expertise, personal interest, and an invaluable sense of humor;

Dozier Thornton, who consistently offered studied and helpful suggestions as well as a personal interest in my research efforts;

Joanne Hamachek, who conscientiously critiqued and consistently shared her enthusiasm;

Bill Farquahr, who thought through with me in the important, initial stages and has maintained a supportive stance throughout.

In addition, I would like to acknowledge Tim Sadler of Birkman and Associates, who provided computer resources and helpful suggestions along the way.

As this research was conducted on the University of Texas-Austin campus, there were numerous persons from that University involved with its progress. I would especially like to acknowledge Ira Iscoe of the Psychology Department who mobilized local resources, acted as a local sponsor,

and cared fervently that I was able to finish.

I would like to acknowledge the Departments of Communication and Psychology, which allowed me to solicit subjects from among their students; the College of Education which permitted me the use of its videotape equipment, and particularly Jim Spear, Royal Embree, and Coystal Stone who facilitated that process.

The University of Texas Counseling-Psychological Services Center allowed me the use of its facilities for the interviewing and videotaping of subjects, as well as for the drafting of the dissertation. I wish particularly to thank David Drum as its Director, Gus Baron who oversaw the project, and Rich Klein, who helped in setting up the equipment and literally abandoned his office space to two weeks of videotapes and clutter.

Frank Karass patiently interviewed all 62 subjects, and offered support and friendship, as always. Dusty Humes, Karen Hill, and Elizabeth Sackton worked conscientiously as raters, shared my enthusiasm for the research, and at times restored it. Patsy Stice waded through the data with me, helping to tabulate, compile, ponder, and yet maintain a perspective sense of humor. My parents, Wideha and Russell Stott, contributed vacation days in Austin to recording data, proofing tables, and generally cheering me on.

Susie Stiegelbauer contributed her artistry by drawing graphs and illustrations. To each, as well as to the 168 students who completed the instruments and the 62 who came for interviews, I express thanks and appreciation.

To the many friends in East Lansing who were pleased to note my progress, I express thanks as well as delight in our continued friendships; and particularly to Becky Hollingsworth and June Jacobson, who provided unwavering long distance encouragement, loved me throughout the project (and sometimes despite it) I am most grateful. Likewise, I express thanks to that small group of special Austin friends who insisted that I take time out to enjoy our friendships, and who generally kept my sense of warmth and playfulness alive.

Finally, I would like to mention Roger Hall, who had no direct contact with this research project, but who has gently shaped my attitudes toward professionalism and psychotherapy, and who has had profound impact on me and on my life throughout this period of time. I wish to acknowledge him for his clinical skills as well as his artistry in his work as a psychotherapist, and to thank him for valuing me as I have come to know and value myself.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

While philosophers, artists, scientists, and poets have speculated for centuries about the phenomenon called emotion, it has only been since the late 1800's that the study has been approached from a systematic viewpoint. Scientists of the evolutionary, physiological, and cognitive traditions have each begun to crystalize theoretical frameworks and compile empirical data in the area. Others have approached emotion from a psychometric tradition, and have worked to refine instruments that will yield data regarding the individual's affective or emotional orientation. As new data continue to emerge, there has been recent speculation about the use of facial emotion as a psychodiagnostic tool.

In a similar manner, the face itself received popular attention long before it became a topic of scientific inquiry. The seventeenth century salons of France for example, a popular gathering place of the literary set, were noted for such leisure time activities as speculation on facial type and corresponding personality characteristics (Adam, 1972). In recent popular literature, books

such as Face Reading (Mar, 1975) undertake to predict personality characteristics by a complex system of facial features, musculature, and bone structure. It is apparent that the face is a rich source of information; yet it remains unclear how we might systematically study and use this information for research purposes or therapeutic intervention. Only recently has empirical data begun to emerge that provides direction as to how we might use observations of the face for these purposes.

The facial expression of emotion was introduced by Darwin and has continued to attract researchers and theorists toward its exploration. Only in the last twenty years has the research and theoretical activity become sufficient to produce what is now an emerging body of literature. Based largely on the work of Sylvan Tomkins (1962, 1963, 1965, 1970) who has worked to establish a theoretical basis for emotional experience and psychological functioning with some speculation on facial relatedness, Paul Ekman and Carroll Izard are currently in the forefront of research in facial affect. Each has worked independently to establish systems for identifying emotions through facial expressions, to consolidate and establish major categories of facial affect, to train others in the recognition and identification of these categories, and Izard, to use these categories as

a basis for discerning psychological information about the individual.

Theory

The three theoretical assumptions upon which this study is based are as follows: 1) that the face provides immediate and specific information regarding human emotions; 2) that each fundamental emotion has a characteristic facial expression recognizable as distinct from the others; and 3) that the fundamental human emotions have a psychological relationship to the individual's personality.

That the face provides immediate and specific information regarding human emotions is in part based on evidence that facial expressions are instinctive and occur reflexively or automatically as a part of the experiential emotion process (Izard, 1977). While the adult may not be as spontaneous nor as automatic in expression as is the infant, this later inhibition is the result of learning and experience, and does not contradict the assumption that facial expressions are instinctive. Evidence that emotions are hereditary and bear a close resemblance to the expressions of nonhuman animals (Darwin, 1910; Izard, 1971) would seem in further support of these instinctual and reflexive qualities.

Studies of infants and mothers indicate that the face is an extraordinarily important social stimulus, and plays a vital role in the early bonding that takes place between mother and child (Tomkins, 1962; Izard, 1971, 1977). For human beings, evidence indicates that facial patterns as communication cues have gained independence and in many cases priority over posture, locomotion, and environment (Ekman, Friesen and Ellsworth, 1971; Izard, 1971).

The assumption that each fundamental emotion has a characteristic facial expression recognizable as distinct from the others has led researchers to investigate in one of two ways: to assume the existence of the discrete expressions and seek to determine the cause and role of the neuromuscular activity involved (Ekman, 1965); or to discover the degree of consensus which could be obtained in judging discrete facial expressions (Izard, 1971). Subsequently, Ekman has mapped the face, and Izard has established consensus.

In an effort to establish the cross-cultural validity of these discrete expressions, the work of Ekman and Izard has shown that certain emotions have the same expressions and experiential qualities in widely different cultures and throughout the world. While it is generally agreed that each culture has its own idiosyncratic rules for when

or under what circumstances an emotion can be appropriately displayed, and rules for how to inhibit or mask an emotion, it is nevertheless apparent that when the emotion is expressed, its corresponding facial expression is similar across peoples. Percentages of agreement upon discrete categories of facial affect range from 47 percent to 95 percent (Ekman, 1973a; Izard, 1977).

That fundamental human emotions have a psychological relationship to the individual's personality is based largely in the work of Tomkins and Izard. Tomkins (1962, 1963) maintains a distinction between emotions and drives, and the phenomenon he describes as the ideo-affective organization. This ideo-affective organization consists of a dynamic and relatively stable relationship between an affect (emotion and drive) on the one hand, and certain cognitive processes such as ideas and beliefs on the other.

Tomkins assumes that emotion is not a global, undifferentiated experience but rather that there are discrete emotions which interrelate in an overall emotions system, and that this emotions system regulates the drives as well as other personality subsystems. In this way, the emotions are both independent of cognition and interact with it.

Izard also speaks to the interaction between emotion and cognition, and conceptualizes it as an affective-cognitive structure. This psychological organization of affect and cognition he believes is a trait-like phenomenon that results from repeated interactions between a particular affect or pattern of affects and a particular set or configuration of cognitions (Izard, 1977). A complex affective-cognitive structure, or an interrelated set of structures, he posits, may constitute an affective-cognitive orientation, or a more global personality trait, trait complex, or disposition such as introversion.

In combination, these theoretical assumptions suggest that the face is a reliable source of information about human emotion, that it is possible to distinguish which emotion is being expressed on the basis of facial display, that these emotions have a psychological relationship to the individual's personality, and that, therefore, relationships between one's emotional experience and one's personality traits may be studied through observation of the facial expression of emotion.

Need

While there is growing evidence that an individual's emotional experience is accurately (and perhaps most fully) expressed in his face, and while there are

years of recorded speculations about the relationship between emotional orientation and personality characteristics, there is yet very little that addresses the question of relatedness of facial activity to personality. To establish this relatedness would mean that a whole range of psychotherapeutic possibilities and research questions currently unavailable might become promising to pursue.

If there is evidence that the type of facial affect one displays is related to personality dimensions, for example, then it becomes crucial to note the client who nearly always looks disgusted, or angry, or is smiling, and to begin exploring this predominant affect as a diagnostic tool. Similarly, for the client who has a limited range of affect display, and whose face never expresses more than two or three of eight basic affects, it may be possible that the observation can be used psychodiagnostically.

While research in the area of facial affect has demonstrated relationships between personality type and ability to identify facial affect in others, there is only minimal research to indicate a relationship between personality dimensions for corresponding expressions of facial affect. No study thus far has attempted to explore a variety of personality dimensions for corresponding expressions of facial affect. Thus it would seem that an initial study is

necessary to determine whether these questions of relatedness are even promising to pursue. In the event that meaningful relatedness can be established, then it would also seem promising to later explore the possibility of identifying and defining basic affective personality types from the facial affect perspective, as well as their corresponding treatment modalities.

Purpose

The primary purpose of this study is to explore the assumption that information about personality characteristics related to emotional style is expressed in the face. The secondary purpose of the study is to investigate whether methods used in this study appear adequate for use in subsequent research efforts in the field of facial affect.

The study will investigate whether there are significant differences in expressions of facial affect as recorded on videotape and measured by trained judges between persons with specific personality characteristics as measured by pencil/peper personality instruments. The specific questions that will be addressed are: Do persons on specified personality dimensions vary in the types of facial affect they express; Do

persons on specified personality dimensions vary in their frequency of change from one affect to another; and Do persons on specified personality dimensions vary in the range (or number of types of affects) they express.

The methodological purpose of the study will respond to the problems of measuring, quantifying, and of recording facial affect. The study is intended to contribute to that literature by describing any further refinements in techniques and procedures, and will continue to address the issue of whether current technology permits meaningful data in this area.

Hypotheses

The 15 hypotheses used in this study are designed to test the differences in expressions of facial affect between persons of specific personality types. This will be done by comparing groups of persons with these specific personality traits on affective measures designed to indicate type, range, and amount of affective change displayed. These hypotheses are theoretically based in the literature pertaining to facial affect, particularly in the work of Tomkins (1962, 1963, 1965 and Izard, 1971, 1972, 1977), and exploratory in nature.

The following are the research hypotheses, which are stated generally again in Chapter III, and for which the results are reported in Chapter IV.

H_1: The group mean of subjects who score high on the Gregarious scale will be significantly higher on the affective measure Enjoy than will be the group mean of subjects scoring low on the Gregarious scale, corresponding to the predominance of gregariousness they experience.

H_2: The group mean of subjects scoring high on the Distrustful scale will be significantly higher on the affective measure Disgust than will be the group mean of subjects scoring low on the Distrustful scale, corresponding to the predominance of distrustfulness they experience.

H_3: The group mean of subjects scoring high on the Depressed scale will be significantly higher on the affective measure Distress than will be the group mean of subjects scoring low on the Depressed scale, corresponding to the predominance of distress they experience.

H_4: The group mean of subjects scoring high on the Dyscontrolled scale will be significantly higher on the affective measure Surprise than will be the group mean of subjects scoring low on the Dyscontrolled scale, corresponding to the predominance of dyscontrol they experience.

H_5: The group mean of subjects scoring high on the Aggressive scale will be significantly higher on the affective measure Anger than will be the group mean of subjects scoring low on this scale, corresponding to the predominance of agression they experience.

H_6: The group mean of subjects who score high on the Getting Along With Others scale will be significantly higher on the affective measure Range of Affect than will be the group mean of subjects scoring low on this scale, corresponding to emotionality and a need for contact with others.

H_7: The group mean of subjects who score high on the Getting Alone With Others scale will be significantly lower on the affective measure Disgust than will be the group mean of subjects scoring low on this scale, corresponding to the minimization of rejection toward others.

H_8: The group mean of subjects who score high on the Getting Along With Others scale will be significantly higher on the affective measure Enjoy than will be the group mean of subjects scoring low on this scale, corresponding to a need for incorporation and social bonding with others.

H_9: The group mean of subjects who score high on the Getting Along With Others scale will be significantly higher on the affective measure Change of Affect than will be the group mean of subjects who score low on this scale, corresponding to expressed emotionality and a sensitivity toward others.

H_{10}: The group mean of subjects who score high on the Dominance scale will be significantly lower on the affective measure Distress than will be the group mean of subjects who score low on this scale, corresponding to need for authority and control, and a minimization of sensitivity to distress.

H_{11}: The group mean of subjects who score high on the Dominance scale will be significantly lower on the affective measure of Change of Affect than will be the group mean of subjects who score low on this scale, corresponding to a need for control in emotional expressiveness.

H_{12}: The group mean of subjects who score high on the Extraversion scale will be significantly higher on the affective measure Enjoy than will be the group mean of subjects who score low on this scale, corresponding to their desire for inclusion and social bonding.

H_{13}: The group mean of subjects who score high on the Extraversion scale will be significantly lower on the affective measure Disgust than will be the group mean of subjects who score low on this scale, corresponding to the need to include rather than to reject or push away from.

H_{14}: The group mean of subjects who score high on the Neuroticism scale will be significantly higher on the affective measure Change of Affect than will be the group mean of subjects who score low on this scale, corresponding to emotional liability as measured by this scale.

H_{15}: The group mean of subjects who score high on the Extraversion and Neuroticism scales (EN) will be significantly higher on the affective measure Range of Affect than will be the group mean of subjects who do not score high on both of these scales (ES, IS, IN), corresponding to emotional liability and freedom of experiences.

Overview

In Chapter II, the literature pertinent to the theory and research of facial affect is presented, with a focus on the areas of emotion, the facial expression of emotion, the scoring of facial affect, and the specific affect categories to be used in this study. Chapter III describes the subject sample, the instrumentation for personality dimensions, the research procedures, the measurement of facial affect, the hypotheses, the analyses, and the experimental design. The analysis of data for each hypothesis is presented in Chapter IV, along with the results of supplementary analyses used for exploratory purposes in this study. Chapter V includes a summary of this investigation, a discussion of the findings and the limitations, and implications for psychotherapy and for further research in the area of facial affect and personality dimensions.

CHAPTER II

REVIEW OF LITERATURE

This study focuses on the relationships between personality dimensions and the expression of facial affect. In order to provide the theory and supporting research upon which this study is based, literature will be reviewed in the areas of emotion, the facial expression of emotion, the scoring of facial affect, and for the specific affect categories to be used in this study.

Emotion

Definitions and Major Theorists

The phenomenon we describe as human emotion has for centuries been described, identified, researched, and debated and has, as yet, eluded any definitive or conclusive definition. Even the distinction between an emotion and a feeling is a clouded one, with its own historical and evolutional characteristics (Candland, 1977, p. 4). Despite this, however, emotion continues to be a concept central to psychological theorists and consistently utilized by the practicing psychotherapist. The DSM II (as an indicator of current trends in

psychiatry) devotes an entire section to "major affective disorders" and lists eight diagnostic categories within. Freud, Jung, Adler, Horney, Ellis, Rogers, and Perls each in some way incorporates the emotional experience into his or her theoretical approach and psychotherapeutic goal. And while strict behaviorists such as Wolpe focus specifically on the cognitive aspect for treatment, they are nevertheless striving to modify the affective experience of fear or anxiety.

Thus usage of the term and utilization of the concept remain consistently central to many areas of modern psychology, despite the lack of clarity or agreement about the phenomenon to which we refer as "emotion." Several theorists have suggested that the term "emotion" refers, in all probability, to a variety of experiences and processes, yet undifferentiated from one another (Candland, 1977; Izard, 1971; Kaywin, 1966; Arnold, 1960) which serves to perpetuate the divergence of thinking in the area. Additionally, however, lack of agreement does not imply fault, but rather reflects the complexity of the area and the fact that much remains to be learned. Candland (1977) asserts that there are yet two major disagreements: how emotion is to be defined; and (given our models of mind and

behavior) what is the nature of its logical structure (pg. 12).

With regard to these questions, three major schools of thought have emerged over the last century as theorists have addressed the problem from the evolutional, the biological, or the cognitive perspective. Each will be briefly summarized with regard to the major theorists and the primary contributions to the field of emotion.

The evolutional theorists. Of primary significance in this area is the work of Charles Darwin, and particularly his book entitled The Expression of Emotion in Man and Animals (1910). The work was intended to show that the ontogeny and phylogeny of emotion were susceptible to the principle of natural selection, though with the obvious shortcoming that there is no historical data from which to trace an evolutionary development. While Darwin was not the first to propose that characteristics may change slowly over time by a process of natural selection, he was clearly the most influential in his observations and writings of this phenomenon.

The impact of the evolutional approach has been to assume a survival value for finely differentiated

facial expressions and bodily postures, and attempt to determine the reason for their survival value (Candland, 1977). The work of Chevalier-Skolnikoff (1973) and of Izard (1971, 1972, 1977) is clearly influenced by this approach as they have sought to establish the functions and adaptive features of the expression of emotion in both primates and humans.

The biological theorists. While precursors of William James (including Aristotle and Descartes) looked toward the body and used physiological functioning as a primary source for understanding and explaining emotion, it was James (circa 1890) who brought physiological theories to the forefront within both the lay and scientific communities (Candland, 1977). The predominant characteristics of James' approach were the emphasis on the peripheral component of the emotional experience, and the emphasis on Darwin's work which incorporated the principle of natural selection. In the peripheral vs. central argument, James assumed that it was the peripheral body states which were initially altered, and then searched for accompanying changes in reported emotional state (James, 1890). In addition to popularizing and returning interest to the physiological approach in the study of emotion, James leaves us with two

major questions: are there physiological correlates of emotion; and if so, do we experience them before, after, or during the perception.

There has been considerable research interest in the area of physiological correlates of emotion (Black, 1970; Brady, 1970; Arnold, 1960a, 1960b, 1970; Ax, 1953), further stimulated by the fact that investigators have consistently found some relationship between the emotional state and the physiological state. This relationship, however, remains unspecific. It has not yet been possible to correlate a precise emotional state, or change from one specific emotion to another, with a measurable physiological change.

The cognitive theorists. Proponents of this approach hold that psychological understanding comes from examining consciousness, or objects as they are consciously perceived. In an attempt to meld psychological principles with newly discovered evolutional principles, or "to seek for principles and causes of mental evolution in man" (Romanes, 1884), George Romanes defined the mature mind as comprising emotion, will, and intellect.

It was Freud (1938), however, who spoke to the interrelatedness of these processes, and presented the

mind as a coherent whole, a body perceiving, apprehending, appraising, and acting as a cognitive agent. While Freud is not best known as a theorist or researcher in the area of emotion, his influence on the cognitive theorists has nevertheless had longlasting effects.

Schachter and Singer (1962) represent a contemporary version of the cognitive school of emotions by defining emotion as undifferentiated arousal plus cognition. In their view the underlying physiological state is the same for all emotions, and qualitative distinctions result from cognitive appraisal or evaluation of the situation that elicited the arousal.

More recently, however, Plutchik has developed an argument for interaction of cognition and emotion, and in his work "Cognitions in the Service of the Emotions" (1977), he carefully develops his thesis that cognitive functions have evolved "in the service of needs and emotions" (pg. 190). The argument is based on the premise that sensory stimulus is the primary emotional experience, but that evaluation of the stimulus event has led to an intricate and sophisticated system of cognition-affect relations. Congruent with principles in his basic theory of emotions (Plutchik, 1962), he develops this argument from an evolutionary

standpoint and in a context that includes all phylogenic levels of animal life. Thus Plutchik presents both emotional and cognitive processes as evolutionarily adaptive as well as vital to the organism, but in a manner which emphasizes their reciprocal nature.

The Measurement of Affective Orientations

Still another approach to the study of emotion has been to assume a theoretical position and then attempt to test it within the framework of personality measurement. Allen and Hamsher (1974) for example distinguished three aspects of emotionality: responsiveness (intensity of affect), expressiveness (interpersonal communication of affect), and orientation (attitudes toward emotion) and constructed a Test of Emotional Styles on this basis. Other instruments such as the Minnesota Multiphasic Personality Inventory have assumed a theoretical stance pertaining not so much to what emotion is, but rather how to distinguish normal from abnormal populations on the basis of emotion related behavior, and then pursued the usage of those distinctions as a psychodiagnostic tool.

Of particular interest to this study are three instruments which utilize very different constructs but all of which attempt to measure affective orientation in

some manner: the Eysenck Personality Inventory, the Birkman Method, and Plutchik's Emotions Profile Index.

The Eysenck Personality Inventory (based on the earlier Maudsley Personality Inventory) comes directly from the work of Heyman and Wiersma, who were among the first to use the modern approaches of measurement and calculation (Eysenck, 1969, p. 25). Similarly, Eysenck comes from a tradition of personality measurement rather than emotion theory; his primary focus was to describe behavior and classify personalities by certain hypothetical traits, while working to refine the empirical approach.

At an earlier point, Heyman and Wiersma had collected data on more than 2,000 individuals using a three-dimensional rating system composed of: emotionality, activity, and extraversion-introversion. In a later statistical analysis of the data, Eysenck determined that emotionality was relatively orthogonal but that activity and extraversion were highly correlated. Subsequently he eliminated activity and maintained the dimensions of emotionality or neuroticism, and extraversion-introversion, thereby incorporating elements of affective styles into his attempts to describe personality types.

As Eysenck points out, both his method and his

constructs are closely related to predecessors of the Greek and Renaissance periods, who attempted to classify man on the basis of temperament (sanguine, melancholic, choleric, and phlegmatic), and to Wandt who took the fourfold division and proposed two major divisions: strength of emotion, and speed of change of emotion. Wandt's dimensions became emotional-non-emotional, and changeable-unchangeable, and were based on an assumption similar to Eysenck's: that it is desirable to reduce the observed correlations between large numbers of traits to a smaller number of more fundamental dimensions or all-embracing types (Eysenck, 1969, p. 14).

Also from a measurement background, Birkman (1961) undertook to develop a personality inventory that would 1) survey personality differences using newly constructed social and self-perception questionnaires, and 2) provide data for analyzing these differences on the basis of positive or negative social perceptions.

Working from a theoretical point of view that assumes that behavior is a function of the meaning the individual assigns to stimuli, and that there are two pivotal points of positive and negative perception around which personality organizes (Birkman, 1961, p. 5), Birkman has constructed an instrument which

classifies the individual on the basis of twelve performance traits. The data from the social vs. self-perception dichotomy and the positive vs. negative social perceptions generated by the instrument are used to be able to predict interpersonal needs both in normal situations and in situations when the individual is under stress.

As with Eysenck, Birkman enters the literature on emotion from the standpoint of a psychometrist rather than as an emotions theorist. He incorporates emotional dimensions into the instrument by blending them with behavioral and attitudinal characteristics in order to define his basic personality traits. The self-consciousness dimension, for example, is a blend of emotionality, sensitivity to others, achievement orientation, and nervousness around superiors. Birkman's instrument, then, uses personality dimensions that are interpersonal in nature and provide a collection of statements about the individual's affective orientation in combination with a variety of other statements about his interpersonal style.

In contrast to Eysenck and Birkman, Plutchik is an emotions theorist and offers an instrument entitled Emotions Profile Index, which is based on his own previously noted theory of emotion. It is designed to

measure the relative importance to each individual of what he calls prototypic patterns of emotions. These eight prototypic patterns, so named because the behaviors are identifiable at all phylogenetic levels of animal life, are identified by terms such as destruction, protection, rejection, reproduction, exploration and orientation. These terms are intended to identify behavior patterns that are basic to all species in responding to stimuli, and suggest a clear evolutional function: "prototypic patterns of behavior are adaptive and help the organism in its struggle for survival" (1965, pg. 106).

Plutchik further proposes that "all other emotions are combinations of these few primary ones, just as all colors are mixtures of a few primary colors" 1965, p. 296). In addition, the prototypic patterns have been labeled in such a way as to emphasize the existence of bipolarities: destruction vs. protection, or incorporation vs. rejection. In situations where basic reaction patterns are aroused at the same time, for example destruction (or anger) and protection (or fear), a conflict develops. In general, says Plutchik, "situations which arouse opposite action tendencies generate conflict, and tend to produce inhibition or immobilization"

(p. 106, 1966). The therapeutic implications suggested here are to respond to the emotional conflict, either by discerning it from the situation presented, or by identifying it on the basis of the client's profile from Plutchik's Emotions Profile Index.

These instruments, the Test of Emotional Styles, the Minnesota Multiphasic Personality Inventory, the Eysenck Personality Profile, the Birkman Method, the Plutchik's Emotions Profile Index, are representative of current efforts to establish personality characteristics or affectively based interpersonal styles on the basis of the individual's emotional experience or affective orientation. While some address the issue of "what is emotion" more directly than others, all attempt to differentiate types of people into a manageable number of categories which describe traits or behavior related to the emotional experience.

Facial Expression of Emotion

As with the phenomenon of emotion itself, the concept that facial expressions are related to internal emotional experience has been assumed for centuries but elusive of systematic scientific investigation. The arts have made use of the concept despite its lack of

scientific validation. Delsarte's system for training actors relied heavily upon observations about individual parts of the body and the moods, attitudes, and emotions expressed by the specific position of the minutest detail. To express fury or madness, for example, the actor was trained to lower the brow portion nearest the nose, and to raise the brow near the outer edge (Stebbins, 1886, pg. 145). To express a neutral feeling, the eyeball must be "calm and midway between the two corners" (Stebbins, 1886, pg. 138).

Chekhov used his observations not to train others but to describe them. In his short story "The Kiss," Chekhov describes personalities at a dinner party by giving them types of faces: a flat face, a clever face, a well-fed face, and a face with forced smiles. Even the central character is revealed to us in this manner, as "one whose face seemed to say...'I am the shyest, most modest, and most undistinguished officer in the whole brigade!'" (Chekhov, 1965, pg. 1052).

A contemporary of Delsarte and Chekhov, it was Charles Darwin who first proposed from the scientist's standpoint that facial expressions were related to internal emotional states, and set about describing and recording his observations in a manner that has stimulated

scientific investigation up to the present day.

Darwin and The Expression of Emotion in Man and Animals

Published subsequent to his famous Origin of the Species, Darwin's The Expression of Emotion in Man and Animals applied the principles of evolution and natural selection to his notions about facial expressions of emotion, suggesting that they had a purposeful function and survival value for the organism. In this later work, Darwin presents three principles of expression: 1) that serviceable actions become habitual in association with certain states of the mind (and the subsequent passage of habits into reflex actions); 2) the principle of antithesis (or development of some behaviors simply because they are opposite to others rather than because they have functional value of their own); and 3) the principle of direct action of the excited nervous system on the body (or involuntary expression and behavior) (Darwin, 1910). Using examples from observations of children, animals, mentally ill, blind, and members of different cultures, Darwin identifies more than thirty emotions and expressions thereof, describing in detail the elements of the expression and theorizing about the function and survival purpose of the emotion.

While it was nearly a century before the tenets expressed by Darwin became active in empirical research (Ekman, 1973b), it is nevertheless clear that Darwin's observations and theoretical principles have served the function of pioneer work in the field, and have had profound impact on those who followed.

Current Theory and Research in Facial Expression of Affect

Proceeding from Darwin's assumptions that emotional experience and facial expressions are related, Sylvan Tomkins undertook a two-volume work entitled Affect, Imagery and Consciousness wherein he identifies and describes all major affect categories and hypothesizes in detail regarding the development of the specific affects as well as their psychodynamic functions. These psychodynamic functions will be addressed later under "Affect Categories to be Used in This Study" and are to date the primary theoretical basis for assuming a relationship between personality characteristics and expressions of facial affect.

It is Tomkins who introduces the term affect into the literature, and uses the term as synonomous with emotion. Tomkins conceives of affect as primarily

facial behavior, and secondarily as bodily (outer skeletal and inner visceral) behavior. When we become aware of our facial and/or visceral responses, he hypothesizes, we are aware of our affects (Tomkins, vol. 1, 1962). Thus Tomkins attempts the logical extension of Darwin's work, proceeding from biological on to psychological survival.

Both an active theorist and researcher, Izard has recently proposed that the facial expression of an emotion can actually determine the quality of the emotional experience. How specific, mixed, conflicted, or vague the emotional experience is, says Izard, is related to and/or determined by not only the visceral experience, but to what extent and in what manner the emotion is expressed in the face (1972). Thus Izard's position, along with that of Tomkins, emerges as compatible with Darwin's as each explores and argues the adaptive and functional purposes of emotion and the facial expression of emotion. Izard goes one step beyond by arguing that the expression of the emotion interacts with and shapes the emotional experience itself, and that it is the facial expression which we must study and regard as the critical feature in the process.

In this light, Izard has conducted exploratory

studies into the functional purposes of facial affect by surgically sectioning the facial nerve of rhesus monkeys (rendering them incapable of facial display or emotional expression in the face) and observing the subsequent effects on social status, mating, and child rearing (1971). While the findings from these studies are reported as preliminary, the subsequent increase in unusual behaviors, the loss of status among ruling females, and the social changes made within the observed monkey community point to this direction in research as promising.

Beyond the theories and research of Tomkins and Izard, which seek to substantiate the relationship of internal emotional experience and facial expression of affect as well as to address the psychological and social functions of those facial expressions, much of the research to date has centered around the identification and validation of facial affect categories (presented later under "The Scoring of Facial Affect"). An outgrowth of this research in affect categories has been to study the characteristics of how people apply the affect categories or are able to use them in identifying facial affect in others.

Zlatchin, for example, compared a group of male medical students to male and female Haight-Ashbury

residents and found that those persons who were more involved, steadfast, and better adjusted in terms of group norms had significantly higher overall accuracy in recognizing specific categories of emotion than were those who were alienated, depressed, or withdrawn (Zlatchin, 1974).

Both Schiffenbauer and Zuckerman have contrasted groups of males and females in their ability to label facial affect in same sex and opposite sex faces, and have found significant differences 1) in the females' ability to label more accurately (Schiffenbauer, 1976), and 2) in the attributions that males and females assign to faces expressing unexpectedly intense (non-normative) emotion (Zuckerman et al., 1976).

Dougherty, Bartlett, and Izard investigated the pattern of perceptual dysfunction in schizophrenics by comparing their judgments of facial affect to judgments by normals. This study produced significant findings in 1) the differential number of times specific categories were used by the two groups, and 2) the overall accuracy of the two groups in recognizing specific affect categories (Dougherty et. al., 1974).

Sackheim, Gur and Saucy have approached facial affect from the standpoint of facial symmetry and found

that left side composites of the face were judged to express emotions more intensely than right side composites. Findings of this study have stimulated speculations about using the face as a mode for examining the nature of functional brain symmetry as well as the neurologically based organization of emotions and emotional communication (Sackheim, Gur, Saucy, 1978).

Current theoretical and research efforts in this area, then, continue to seek refinement in describing the relationship between internal emotion states and facial expressions, and have begun to yield empirical data about ability to use facial affect categories as well.

Facial vs. Other Nonverbal and Verbal Expressions

To what extent the face is a reliable and accurate source of information has been investigated from a variety of approaches. The question of context, or whether knowledge of the situation precipitating the emotion is necessary in order to make a correct interpretation or judgment of the facial expression, is one addressed by both Munn (1940) and again by Turhan (1960). Munn developed two sets of slides, one with a context background and one with the face alone, and found no difference in the percentage of agreement

among his raters for the two sets. Turhan found that judgments of emotion based on the isolated face were considerably different from judgments of the same face when viewed in a context, and concluded that judgments of emotions depend heavily on the perception or interpretation of the total situation in which the stimulus face is involved.

Izard (1971) regards the argument in an evolutionary-phylogenetic perspective, and posits that "the importance of facial communication as compared with postural activity in emotion, and particularly in emotion differentiation and emotion communication, increases with phylogenetic and ontogenetic development" (1971, pg. 189). He illustrated this by citing the 1967 work of VanHooff, suggesting that facial displays become somewhat more independent of posture and locomotion in the anthropoid apes compared to the rhesus monkeys. Izard summarizes that in humans, there is mounting evidence to indicate that facial patterns as communicative cues have gained considerable independence from posture, locomotion, and context (1971, pg. 192).

Ekman (1965, 1967) found that in humans, posture indicates something of the intensity and of the global nature of the emotion, while the facial pattern is

characteristic of a particular discrete emotion and may convey additional information with regard to an emotion mixture or combination. In later, related experiments he has tested the prominence of facial vs. body cues by asking subjects to try to deceive judges (Ekman and Friesen, 1969a, 1974a). The results from these studies indicate that if a person is trying to disguise or hide his feelings, he will attend most carefully to his face as the area to be most controlled. In this situation, observers are reported to judge emotions more accurately from the body than from the face. In addition, Ekman has investigated the congruence between facial expression and verbal statements in an interview setting, and found a significant and reliable relationship between the two. Thus Ekman's work suggests the face as the more specific conveyor of emotion, but notes that it is also the more readily disguised communication source, suggesting not so much that it must be observed in context, but that it is useful to interpret in combination with other body cues.

Of particular research interest has been the question of whether facial affect is a pan-cultural or culture specific phenomenon. From Darwin's position of discrete emotions, each having a specific, innately

programmed facial pattern, the argument is pro cross-cultural or universal expressions. The research evidence is mixed at this point, but there is strong evidence to suggest that basic emotions such as anger, disgust, fear, surprise, and enjoyment are experienced and labeled similarly across cultures, while the more subtle emotions such as bliss, worry, and upset are more culture specific. As Harrison (1975) points out, there is not this same kind of agreement across cultures for "emblems" or non-facial gestures, indicating that nonverbal gestures with arms, hands, body posture, and physical proximity have been clearly substantiated as culture specific. The implicit relevance of this research is that work with nonverbally expressed emotions in culturally mixed populations must rely heavily in facial expressions as opposed to body cues, and will probably have greatest efficacy if restricted to the emotions previously researched and established as more basic to all cultures.

The face as an indicator of emotion, then, was introduced by Darwin and substantiated by Tomkins, Munn, Turhan, Izard, and Ekman, both in terms of the functional purposes of the emotion expressed, and the importance of the emotion expressed by the face. A proliferation of research headed by Iaard and Ekman suggests that the

face, in or out of context, in combination with other body cues, in congruence with verbal behavior, and as cross-culturally similar, is in fact not only a reliable and appropriate place to study affect, but perhaps one of the most important vantage points from which to study it.

Affective Facial Display as a Psychodiagnostic Tool

While viewing hours of client videotape for another purpose, Haggard and Isaacs stumbled across a phenomenon they later called micro-momentary expression: a facial expression so short-lived that it seems to be quicker than the eye (1966, pg. 154). As they further explored the phenomenon, establishing methods for recording and measuring it and searching for meaningful correlates, some interesting speculations regarding applications to psychotherapy began to emerge.

The rapid changes of MME's seemed to occur most often, for example, when normal defenses were functioning effectively (periods of general expressiveness) or in a conflict context (when denial statements or verbal blocking were evident as identified by incongruence between the verbal content and the facial expression). Based on these observations, Haggard and Isaacs

speculated that micromomentary changes appeared to be related to intrapsychic dynamics. This speculation was further supported by correlating the number of MME's to the manifest content with which they were associated during a therapy session, and finding a positive relationship between the frequency of the two (1966, pg. 162).

Haggard and Isaacs propose that micro-momentary expressions may be indicators of ego mechanisms, and observable in psychotherapy. They speculate that MME's might, for example, be particularly frequent during therapy when newly released but not yet integrated impulses and affects are sporadically monitored by previously established controls. During this phase of "transitional instability," the individual might allow split second expressions of new affect, resulting in an MME rather than a fully expanded expression of emotion. If that were, in fact, the case then an increased frequency of MME's could be an indicator of therapeutic change in process. While many of these speculations yet lack the empirical evidence to substantiate them, there is nevertheless sufficient evidence to suggest that they are promising directions in which to move.

Building from this work of MME's and ego

mechanisms, Wilson (1976a) investigated the relationship between repression and facial affect, hypothesizing that there would be a positive relationship between frequency of micro-momentary expressions and other indicators of psychological defense operations. "To the extent" says Wilson "that micro-momentary expression originates as a manifestation of self-deception, to that extent is it the result of repression-defense operations and fits Freud's view of repressive operations" (1976b).

While the study did not yield as clear cut a relationship as had been hoped for, there was nevertheless sufficient evidence to indicate that "in clinical settings, a high rate of emission of micro-momentary expressions suggests an hypothesis of difficulty with the expression of anger coupled with fear or anxiety over interpersonal safety" (1976b, pg. 7). In summary, Wilson concludes that micro-momentary expressions appear, at this point, to be a psychological trait related to trait defensiveness, and that the frequency of emission seems to be related to the expression of angry feelings.

Based on Kell and Mueller's observations of compacted affective experiences (1966), Hinds explores this phenomenon by positing the relationship between facial expressions and intrapsychic conflict. "Compacted affect" says Hinds "is the inhibition of one affect by the expression of another,

resulting in the compression of the affective experience and of its display on the face (1976, pg. 1). Hinds' theoretical position is that not only thoughts but affects serve as an internal stimulus for anxiety, which consequently serve to maintain the individual's neurotic behavior through negative reinforcement. The self-defeating behavior may be sustained, for example, in order to avoid the more painful affect such as fear or anxiety. Hinds' theory is that these painful affects are experienced, but the experience is compressed so as to minimize the discomfort; this compression of affect leaves the individual without a full range of affective experiences, thus limiting his behaviors, alternatives, and problem solving capacity. Hinds notes the use of facial affect as an important diagnostic tool for the therapist in this area and points to the potential for using facial affective patterning "as a means for therapists to discover how affects influence and maintain neurotic behavior" (1976, pg. 3).

Finally, Izard's work on emotion, and particularly on emotion as it is expressed in the face, has pointed again and again to the face as a potential psychodiagnostic cue. With regard to the symmetry of facial motion, he reports that subjects under LSD treatment show

a considerable decrease of symmetry quotients, and that movements become less extensive and synchronous for persons under mental stress (1971, pg. 354). Additionally Izard reports work using the assessment of expressions and gestures as a basis for a prognosis in behavior therapy with autistic children (1971, pg. 371); work with using the identification of facial affect in others as a psychodiagnostic cue (1971, pg. 372); and his own work with an electromyograph (EMG) on facial muscles to delineate different types of emotional tensions as well as in training subjects to become more sensitive to their own internal cues (1971, pg. 391).

While there are yet no readily available or widely substantiated techniques or procedures for using facial expressions diagnostically, there are nevertheless individual and isolated evidences that this is a promising area to explore. Haggard and Isaacs, Wilson, Hinds, and Izard all point to psychodiagnostic information potentially available through the face could be useful and is to some extent unavailable through other diagnostic measures.

Technological issues (to be discussed in "The Scoring of Facial Affect") are troublesome. To date,

the only instruments for recording facial data are video (still photos, movies, and videotapes) and physiological (as in the electromyograph); the equipment is cumbersome, expensive, and yields data that is time consuming to judge. In addition, the theoretical arguments and experimental results are clearly at an exploratory level in this area. Nevertheless the theoretical framework and technological data are already providing information useful to the trained eye of the psychotherapist, at least for his or her own speculative purposes.

The Scoring of Facial Affect

General Background

As the problems of measuring, judging, or scoring facial affect are reviewed, it becomes pertinent to return once again to the consideration of what an emotion is. Since this study is focused specifically on the facial expression of emotion, considerations and definitions at this point will be based on the literature in that area rather than the literature on emotion in general.

Izard offers a definition, however, that attempts a comparative perspective as well as a specifically useful guideline:

> Emotion is a complex concept with neurophysiological, neuromuscular, and phenomenological aspects. At the neurophysiological level emotion is defined primarily in terms of electrochemical activity in the nervous system, particularly in the hypothalamus, the limbic system, and the facial trigeminal nerves....At the neuromuscular level emotion is primarily facial activity and facial patterning, and secondarily it is bodily response. At the phenomenological level emotion is essentially motivating experience and/or experience which has immediate meaning and significance for the person (1972, pg. 185).

Emotion in the face, then, particularly as it can be described and identified on a neuromuscular basis, will be the context in which facial judgments are presented.

The early literature in this area includes the names of Langfeld (1918), Rumrick (1922), Frois-Wittmann (1930), Woodworth (1938), Schlosberg (1941), Munn (1940), Hanawalt (1944) and Coleman (1949), and argues issues such as whether or not emotions are discrete and unique expressions, and if so, how they are to be labeled or classified. Frois-Wittman worked to identify the role of facial muscles in emotion identification; Woodworth's contribution was to simplify the categorization process by reducing the number of categories from 110 to six. Munn, Hanawalt and Coleman

focused on the reliability of judgments by researching judgments made with and without contextual cues, and mouth region vs. eye region judgments.

Building on the work of these earlier research efforts, the two most widely regarded writers at this time are Carroll Izard and Paul Ekman. Izard (1965, 1971, 1972) has worked extensively to provide theory in the field, but additionally has developed a categorization system of facial affect as well as having contributed greatly in the areas of applied research. Ekman (in Ekman and Friesen, 1965, 1971, 1975) has been less concerned with theory, but has made significant contributions through procedures for the observing and judging of facial behavior.

Carroll Izard

Izard's primary contribution to the scoring of facial affect has been a set of research labels or affect categories, established to a large extent on the basis of his cross-cultural research and additionally "by theoretical observations, common-sense observations, previous descriptions from the literature, and from collaborative work with Tomkins" (1971, pg. 248). The eight categories he uses are: interest/excitement; enjoyment/

joy; surprise/startle; distress/anguish/ disgust/contempt; anger/rage; shame/humiliation; and fear/terror.

Izard describes his initial efforts in establishing these categories as attempts to establish the existence of discrete fundamental emotions common to all mankind. He relied heavily on the use of emotion labeling, showing photographs to members of four different cultures and collecting data on the basis of the free-response labels generated by the photos. The initial study provided 244 different words or free-response labels, which were sorted and reduces into eight categories, compatible with the same categories mentioned above.

He has subsequently used procedures of emotion recognition, emotion labeling, and attitudes toward emotions in establishing agreement within these categories across cultures. Enjoyment/joy typically has the highest percentage of agreement, ranging from 71-90%; shame/humiliation has the lowest percentage at 7.2%. The other six categories usually have from 30 to 90% agreement, with several marked male/female and cross cultural differences (Izard, 1971). The development of these categories, as well as the high degree of agreement elicited by them, provides an empirical argument for the existence of fundamental or basic emotions as well as a firm basis

for continued research.

Paul Ekman

Ekman describes his early work in the area of encoding and decoding of affect as having revolved around the construction of "an Atlas of the face" to depict photographically each of the universal facial expressions of emotion. He photographed models who were instructed to move particular facial muscles listed in the Atlas table, and separately photographed the three areas of the face capable of independent movement (brow/forehead, eyes/lid and root of nose, and lower face). Subsequently he made comparative studies with these photographs to study whether or not the Atlas was accurate, and in addition studied videotapes, isolating and measuring all muscular movements, and making independent measurements for each of the three facial areas. This work has provided the basis for all subsequent study of categories of facial emotion.

A second contribution of Ekman's was the identification and description of management techniques for the control of facial behavior. Ekman says there are four management techniques: intensifying an emotional expression; deintensifying it; neutralizing it; or

masking it by displaying another emotion instead. These management techniques are used in combination with display rules, which are norms that dictate with whom and in what circumstances these management techniques are to be used. Display rules are based on static characteristics of the person (age, sex, physical size); static characteristics of the setting (ecological factors and social definitions of the situation); transient characteristics of the person (role, attitude); and transient regularities during the course of the interaction (entrances, exits, periods of conversation and of listening). Display rules are established primarily on cultural and personal (idiosyncratic and familial) norms. The ability to manage the face, and the variety of procedures a person might use clearly presents a problem to the researcher trying to judge emotion in the face. Ekman suggests that individual differences in knowledge of display rules could be explored through self-report by subjects as a way to determine to some extent what management techniques the subject may be using (1975, 138-39).

Ekman has, at this time (1975) established six categories of facial affect for use in research studies: happiness, sadness, surprise, fear, anger, and disgust.

These categories, says Ekman, have been found "by every investigator in the last 30 years who sought to determine the vocabulary of emotion terms associated with facial expressions" (1975, pg. 22).

Using these six labels as the primary basis for research, much of Ekman's earlier research focused on judgment studies, where facial behavior was treated as the stimulus and questions were hypothesized with respect to the observers. From these as well as other research experiences, he speaks to the problems of sampling and establishing generality while recording and measuring the face.

With regard to sampling the behavior of the face, it is crucial that the sampling procedures be reported says Ekman, or the related question of how <u>often</u> the face provides accurate information (and for what kinds of observers, emotions, and circumstances) cannot be answered (1972, pg. 41). With regard to the sampling across persons, Ekman emphasizes the need for representative sampling in order to avoid error due to either morphological characteristics or differing ability to show certain emotions.

Establishing generality, for either posed or spontaneous circumstances, must consider issues across

circumstances, persons, time, decoding skills. Issues that Ekman presents, for example, are whether the findings in one eliciting circumstance or setting would be valid for another such circumstance or setting. If the spontaneous behavior elicited is in a laboratory setting, then the researcher must provide a discussion of the real life events to which this lab eliciting circumstance are relevant. Issues of generality across persons include considerations of whether the findings are general to most people, or just to trained persons such as actors. He reports that generality has been severely limited when the posers have been actors, but not when untrained persons pose emotions (1972, pg. 21).

With regard to generality across time, the researcher must consider whether his investigation has chosen a sample from an infrequent moment when the face showed something, or whether the facial behavior shown in the situation provides precise information for many points in time. Decoding considerations refer to how readily other observers could make the same judgments. Did the study use specially trained or gifted persons in this area, for example, or were enlargements or slowed motion required? If so, these elements will limit the generality of who could make these observations.

Beyond generality, Ekman introduces another aspect which adds to the difficulty of making accurate judgments: the phenomenon of blended emotions. Affect blends are thought to occur when 1) the emotion-eliciting circumstance by its very nature elicits more than one feeling, or 2) habits (common to a group, or idiosyncratic) link the elicited emotion to another, as for example when a second emotion is generated in response to the initially inspired one (1972, pg. 25). The frequent finding that observers disagree about which of two affects is present "can no longer be interpreted as evidence of low information in the face, but alternatively as the consequence of presenting a multiple message stimulus and allowing the observer only a single message judgment" (Ekman, 1972, pg. 25). This issue of blended affects represents a yet unresolved problem in the area of facial affect measurement, but is necessarily one that must continue to be addressed.

As indicated in this section, the field of facial affect measurement is relatively young and faces many unresolved problems and issues. There remains a lot of work to be done. Nevertheless there is a history of early research that explored the problem of where and how to begin, and has provided a basis for later

refinements and continually developing new methodologies.

Izard and Ekman have contributed enormously by establishing categories and collecting empirical data within that framework. Despite the fact that their numbers of categories differ, and the category labels are slightly varied, these differences do not make the two systems incompatible; data generated by one set of categories is often applicable to the other.

Ekman's continued research and writing with regard to methodological procedures has been of significant importance to the field, and has been particularly useful in considering research procedures for this study.

Affect Categories to be Used in This Study

In considering what affect categories to use in this study, literature from Tomkins, Ekman, and Izard was reviewed as well as recent dissertation literature from Michigan State University. From Wilson's study (1976b) for example, it is clear that not all affects are likely to occur during an interview setting, so that fear, despite its high percentage of rater agreement, is for this study not a useful category for hypothesis

building because it is not likely to occur in the experimental setting. Inman (1976) provides additional information on the training of judges and percentage of agreement on categories used. He found (as has Izard) that shame has a very low agreement rate, thus while shame would be an appropriate and desirable category for testing against personality dimensions in this study, it will not be used because of the apparent difficulty in judging the emotion. The six affect categories to be used are: Interest; Anger; Disgust; Surprise; Enjoyment and Distress.

Interest

The literature on interest (Izard, 1971; Tomkins, 1962; Plutchik, 1962) suggests that this affect is a central one, yet it is also one of the most commonly used for masking other emotions as a facial management technique (Ekman, 1975). Tomkins states that the function "of this very general positive affect is to 'interest' the human being in what is necessary and in what is possible for him to be interested in" and continues by pointing out that "to the extent to which interest is attenuated later in life the individual thereby ceases to develop perceptually" (1962, pg. 342). Because it is

a more general affect, however, the category interest will not be treated as an affective category to be tested, and consequently will not appear in the formal statements of hypotheses.

For the purposes of this study, interest will be considered a neutral category and will be labeled only in the absence of an expression from one of the five other categories. This should provide some indication of the subject's usage and/or experience of interest without penalty to ratings in the other five areas.

Anger

Tomkins speaks of anger only as it can be a learned substitute for distress. The type of innate stimulation which activates distress, he proposes, is the same type of stimulation that activates anger. If the experienced distress is unrelieved for a period of time, "it can produce sufficient increment of stimulation to innately activate anger, then this sequence may be telescoped so that the beginning of the distress cry becomes the learned activator of anger" (1963, pg. 64). Whether or not the individual then experiences both emotions, in a chaining sequence similar to Hinds' proposal (1976), or whether the substitution takes place so rapidly

that only the anger is experienced, is not clear.

Darwin refers to anger as one of the more exciting emotions, particularly with regard to intensity, and proposes that it (like other emotions) is so closely connected to its expression that the emotion can hardly exist if the body remains passive (1910, pg. 237). The function of anger, Darwin postulates, is to prepare oneself against perceived or anticipated danger. He notes examples of animals bearing the canine tooth, and humans compressing the mouth while frowning the brow, as if in warning to the perceived enemy. While anger may not be expressed as typically in an interview setting as in other environments, it is nevertheless thought that the subject will display it as frequently in this setting as he would be likely to express it in everyday interaction.

Disgust

Disgust, says Tomkins, is designed to prevent ingestion of noxious material or to achieve its total rejection and regurgitation if it has been ingested. This is as true for psychic or psychological material as it is for the more physiologically based process. Its function is to guard against any type of

incorporation or increase in intimacy with the person/ object found to be noxious.

Clearly this is a distancing technique, although Tomkins points out that the experience of disgust can become central to the person, as opposed to an independently stimulated reaction:

> When the experience of disgust is recurrent and becomes central, there develops a cognitive elaboration which organizes these experiences into a relatively unified theory. The theory sensitizes the individual to contempt-relevant information and provides ready-made strategies for coping with these paradigms (1973, pg. 250).

Disgust is usually a more passive emotional experience than is anger, thus it is more possible for a person to sustain the expression facially for long periods of time. It is anticipated that disgust will be expressed frequently by some subjects during the interview sessions, and that it will be comparatively easy to measure.

Surprise

Surprise is neither a positive nor a negative affect by its own virtue, though a value is usually associated with it according to the stimulus event. Surprise functions as an interrupter to ongoing activity, so that the person may attend immediately to new information. It functions neurologically as a circuit breaker, and

according to Darwin is similar to anger in that it allows for preparation. It is believed that there will be a relationship between persons who frequently experience and/or allow themselves to express surprise and persons who find Plutchik's concept of dyscontrol important or central to their lives.

Enjoyment

Enjoyment is a social bond, says Tomkins, learned in early infancy through interactions with the mother. The smiling of the infant is quickly reinforced, and the socialization process begins. Children who are reared with a minimum of social interaction and of smiling will ordinarily become less social adults (Tomkins, 1972, pg. 404). An additional feature of the smile (a primary expression of enjoyment) is that it frees the individual to give positive rewards or feedback without the necessity of body contact; thus it is a method of social bonding that has versatility. Smiling is also a frequently used technique for facial management (Ekman, 1975), though the choice of this expression as a mask can of itself be a statement about the individual.

Distress

Distress, says Tomkins, is a natural part of the human condition; the differences are not whether but in how the individual experiences and expresses distress (1973, pg. 48). He outlines four modes of distress development, ranging from the healthy, flexible stance where it can be expressed when experienced, to the "iceburg mode" characterized by denial that becomes disruptive in crisis situations when the denial no longer suffices. Apart from the psychodynamic implications, distress in this study will be defined and measured by expressions of sadness, worry, or the more general distress musculature. It is usually a more difficult emotion to purposefully mask, and is anticipated that it will be relatively easy to measure.

Summary

Though not conclusively defined, human emotion has been studied from the evolutional, biological, and cognitive perspecitives, as well as from the psychometric standpoint, with each of these traditions offering its own contribution to an overall understanding of this phenomenon.

Charles Darwin was the first widely recognized scientist who proposed a relationship between facial expressions and internal emotional states. From the standpoint of natural selection, Darwin began to identify categories of emotion on the basis of facial expressions, and to speculate on the functional or survival value of each.

Subsequent to Darwin, Sylvan Tomkins developed a theoretical framework for the emotions system as it interplays with other physiological and psychological mechanisms, which includes the psychodynamic functions of the different affects and the relatedness of facial activity to the experience of these affects.

Based largely on the work of Darwin and Tomkins, other researchers such as Ekman and Izard have worked to more systematically classify categories of affect, develop labeling and recognition techniques for these categories, and generate empirical data about the labeling process as well as about the cross-cultural evidence for these fundamental categories. A recent development in this research area was stimulated by Haggard and Isaacs (1966), with the discovery that the expressions of facial affect may have a demonstrable relationship to certain aspects of psychological functioning, such as the presence of ego mechanisms.

The scoring of facial affect continues to be problematic, partly due to the subjective nature of the task, and partly due to the technological procedures, which for the most part are cumbersome and costly. Systematic procedures have been developed, nevertheless, to facilitate this process. Carroll Izard has worked extensively to continually refine fundamental categories of facial affect and to validate as well as establish reliability for the use of these categories. Paul Ekman has focused more on a study of the face itself, identifying specific muscle groups involved in the expression of different affects, and proposing guidelines for the sampling, generalizing, and accurate defining of expressions of facial affect.

In deciding upon which facial affect categories to use in this study, considerations of reported rater reliability and liklihood of occurance for each affect category were made. The categories of interest, anger, disgust, surprise, enjoyment, and distress were selected to be used as the dependent measures for the study. Additionally, however, it should be noted that interest is considered a neutral category and does not appear in the formal statements of hypotheses.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

This chapter is divided into 15 sections which cover the following areas: sample, instrumentation, selection of interview sample, interview and de-briefing procedures, the interviewer, videotape apparatus used during interviews, videotape editing, rater sample, rater training, rater reliability, rater agreement by affect category, research design, measurement of facial affect, research hypotheses, statistical analyses and procedure, and summary.

Sample

The sample for this study consisted of one hundred sixty-eight undergraduate students enrolled at the University of Texas-Austin during fall term, 1978. Approximately twenty percent of these students were solicited from Communications classes, and participated on a strictly volunteer basis. The remaining 80 percent were solicited from the Department of Psychology undergraduate subject pool. Psychology students who signed up for this particular research study received three hours of experimental research participation credit toward the six

hours required by their course. The only screening criterion used within this population was visibility of face; persons who wore glasses or who had beards were not selected for participation in the study.

Of the 168 subjects who completed the pencil/paper instruments, 97 percent of them were between the ages of 18 and 21. The remaining 3 percent were between the ages of 22 and 30. Fifty-five of these subjects were males; 107 were females.

Subjects were told that they would be participating in a study designed to investigate the relationships between personality characteristics and problem solving styles. The study was presented as a two phase process: during phase I subjects would be asked to complete three pencil/paper personality inventories; phase II would consist of a 15 minute interview which would be videotaped, wherein the subject would be asked to talk briefly about something that was of personal concern.

It was explained that not everyone taking the pencil/paper instruments would be asked to participate in the interview phase, and that subjects selected for participation in the interview would be on the basis of the experimenter's need for a balanced number of different types of subjects. Subjects were also informed that

expressed benefits of participation in the study were not contingent on their participation in the interview phase; namely that all subjects were eligible for one test interpretation of their choice as well as a written description of the results of the study upon its completion. All subjects were asked to fill out a Subject Consent Form (Appendix A), as well as a form for Birkman & Associates (Appendix A) allowing the firm to release their test scores to the experimenter. Subjects were instructed that they could discontinue participation at any time during the course of the study.

After testing, and based on test scores of balanced groupings, the total number of subjects selected to participate in the interview phase of the study was 62. This group was composed of 22 males and 40 females. Approximately 22 percent of this sub-sample was from the Communications pool; the remaining 78 percent from the Psychology Department pool. The racial and ethnic breakdown for this group was 57 Anglos, 1 Black, and 3 Hispanics. The breakdown of academic status was 35 freshmen, 16 sophomores, 7 juniors, and 4 seniors.

Instrumentation

Three pencil/paper personality instruments were

used in the study: the Plutchik Emotions Profile Index, the Birkman Method, and the Eysenck Personality Inventory.

The Plutchik Emotions Profile Index (EPI) was developed by Robert Plutchik and Henry Kellerman (1974) and is based directly upon the general theory of emotion developed by Plutchik (1962). The theory postulates eight basic emotion dimensions: Protection (or Timid), Destruction (or Aggressive), Reproduction (or Gregarious), Reintegration (or Depressed), Incorporation (or Trustful), Rejection (or Distrustful), Exploration (or Controlled), and Orientation (or Dyscontrolled). The EPI is designed to assess the relative importance of each of these eight emotions in a person's life.

The EPI consists of 62 items, in a forced-choice format. The test is based on 12 trait terms which are paired in all possible combinations, and which yield, in the final results, an "emotion circle" with a separate score for each of the eight basic emotions. The normative data presented by the manual is based upon 500 men and 500 women. The data include college students, housewives, nurses, motor vehicle inspectors, and public school teachers, and represent "a broad range of individuals characterized by a lack of overt pathology or

hospitalization" (Test Manual, pg. 2). Test-restest reliabilities for each scale are reported at over +.90. Split half reliabilities for individual scales range from +.61 to +.90.

Validity has been established through correlating individual scales to scales on the MMPI, the Edwards Personal Preference Schedule, the Gough Adjective Check List, the Barrett Impulsivity Scale, and the Clyde Mood Scale. In addition, distinctions between specific populations (hospitalized and normal women; matched groups of normal, neurotic, and psychotic subjects) have been illustrated by the EPI as further data for validity assessment.

Due to the specific traits Plutchik uses to define the eight basic emotion categories, only five of the eight categories or scales are facially measurable by current technological methods and thus usable for this study. The scales used are:

Aggressive	(primarily expressed by anger)
Gregarious	(primarily expressed by joy)
Depressed	(primarily expressed by sadness)
Distrustful	(primarily expressed by disgust)
Dyscontrolled	(primarily expressed by surprise)

Since only five of the eight scales are used, and because of the ipsative nature of the instrument, the composite profile cannot be compared across subjects nor used for

questions regarding the range of affects displayed or the frequency of change in affect. It is possible, however, to use the individual scales to determine whether or not an individual's facial display matches his reported frequency of experience of that emotion.

The Birkman Method (Roger W. Birkman, 1974) is an instrument based largely on the dissertation work and subsequent research of its author. Its theoretical and philosophical orientation is in the Maslovian concept of self-actualization. The focus of the instrument is to provide individuals with sufficient information about themselves from as many aspects as possible (both personal-social and vocational) so that they have an increased awareness of self as well as pertinent information upon which to base decisions about both setting and reaching personal-social and vocational goals.

The format of the test is divided into three parts: perceptions of self (forced choice, 125 items); perceptions of others (forced choice, 125 items); and preferred interests (48 sets of quadruple groupings of first and second choice rankings). The instrument is computer scored. The client is provided a computer print-out which focuses on six major areas of social needs: ability to get along with others; the way one

gives and accepts directions; how one handles conflict and competition; how one maintains emotional and physical stamina; how one organizes and plans activities; and the manner in which one makes effective decisions. In addition, a rank ordering of one's occupational interest areas is provided.

Reliability measures regarding internal consistency have been tested through odd-even item correlations (using the 120 items from both Self and Most People portions of the test), and have produced correlations from .78 to .95. Test-retest procedures have also been used. Immediate (same day) test-retest correlations are reported at .69 and above. Additionally, test-retest correlations of forms completed two weeks apart show more than half of the item-by-item correlations above $\underline{r} = .60$, and for almost all of the individual items, reliabilities were significantly different from zero.

Efforts have been made to establish criterion-related and content validity through subject self-report and by consultation with industrial clientele. The primary research regarding construct validity has utilized the intercorrelations between components of the Birkman and of specific scales from a variety of other well known standardized instruments. Personality and interest

instruments used in these studies include Cattell's Sixteen Personality Factor Questionnaire (Form A), the Strong Vocational Interest Blank for Males and Females, the Edwards Personal Preference Schedule, the Eysenck Personality Inventory (Form A), the Minnesota Multiphasis Personality Inventory, and the California Psychological Inventory. The test is normed on an industrial population ranging from senior management to hourly workers.

For the purposes of this study, two components of the Birkman Method will be used: 1) "Getting Along With Others" (a combination of the Self-Consciousness and Feelings Scales), and 2) "Need for Authority" (the Dominance Scale).

Persons who score high on the "Getting Along With Others" dimension typically exhibit a high awareness of others, a need for positive attention and empathy from others, difficulty in self-assertion, and a tendency toward shame over errors. Persons who score low on this component are more generally insensitive and aloof toward others, less reflective, and prefer more detached, logical relationships.

Persons who score high on the "Dominance" dimension tend to seek and exercise firm authority or control. They are assertive, directive,

demanding, and argumentative. Those who score low prefer autonomy, independence, and pleasant relationships, are uncomfortable exerting authority, and generally non-assertive and unable to discipline subordinates.

The Eysenck Personality Inventory (EPI) was developed by H. J. and Sybil B. G. Eysenck (1963). It is a revision of the earlier Maudsley Personality Inventory, and has two primary scales: E (extraversion-introversion) and N (neuroticism-stability). In addition, the EPI contains a Lie Scale which was developed and adapted from MMPI, but will be used in this study only for the purposes of descriptive statistics. The test consists of 57 items in a forced choice (yes-no) format. The test is published in both a British and an American edition. The manual for the American edition provides percentile norms, using American college students as the standardization group. Test-retest reliabilities range between .80 and .97, and correlations between forms A and B range from .75 to .91.

The test reflects Eysenck's previous research and theory, establishing extraversion-introversion and neuroticism-stability as two pervasive, independent dimensions of personality. Factorial and construct validity are spoken to in part by correlations between the

EPI and the MMPI, and the EPI and the California Personality Inventory. The E factor is regarded as extraversion at the high end and applies to individuals tending to be outgoing, impulsive, and uninhibited, having many social contacts and frequently taking part in group activities. The low score, reflecting introversion, refers to the more quiet, retiring sort of person who tends to be introspective, fond of books rather than of people, one who has reserve and who is distant except to intimate friends. This person tends to plan ahead, and to distrust the impulse of the moment. He does not like excitement, takes matters of everyday living with seriousness and likes a well-ordered mode of life (Buros, 1972).

The high end of the neuroticism dimension is indicative of emotional instability and over-reactivity. Persons scoring high on this factor tend to be emotionally over-responsive and have difficulties in returning to a normal state after emotional experiences. Such individuals frequently complain of vague somatic upsets of minor kinds such as headaches, digestive troubles, insomnia, and backaches. Such individuals are also predisposed to neurotic disorders under stress. Those persons with low scores on the neuroticism dimension tend

in general to be better adjusted and more emotionally stable. The N and E dimensions are reported as essentially uncorrelated.

Selection of Interview Sample

The three pencil/paper personality instruments used in the study were scored before the interview phase, in order to determine which of the subjects from the total sample would be selected to participate in this second part. Subjects for the interview phase were selected on scores from the nine specific dimensions that were to be the formal measures used in hypothesis testing. Those scales are as follows:

Emotions Profile Index	Aggressive Gregarious Depressed Distrustful Dyscontrolled
Birkman Method	Getting Along With Others Dominance
Eysenck Personality Inventory	E (Extraversion/Introversion) N (Neuroticism/Stability)

In order to determine who would participate in the interviews, groups of high and low scores were established for each of the Birkman and Eysenck scales by dividing the scores at the mean and considering all

scores that were 1/2 standard deviation above and below the mean on each scale. In order to establish high and low groups on the Plutchik scale, scores above the 70th percentile and below the 30th percentile were considered.

The next step was to consider all subjects who fell into either a high or low group on any of the scales, and to identify subjects who fell into the greatest number of high/low groups, so as to minimize the total number of subjects needed for interviews. An effort was made to include all subjects who fell at the extreme end of any one scale so as to maximize the differentiation between high and low groupings. In addition, an effort was made to proportionally balance the number of subjects used for any one scale, so that the two groups (high/low) did not exceed a 1.5 to 1 ratio.

Using these criteria, a total of 62 subjects were selected to participate in the interview phase of the study. This group of 62 was composed of 22 males and 40 females, as previously described on page 60.

Interview and De-briefing Procedures

The sixty-two subjects selected for interview participation were asked to come, by scheduled

appointment, to the Counseling Center where the interviews took place. All interviews were scheduled within a twelve-day period, approximately 10-30 days after the initial testing took place.

The interview setting was a room that approximates the typical office of a counselor at the University of Texas Counseling-Psychological Services Center, including several chairs, a small table, and a carpeted floor. The control of the video-tape equipment was managed from a room adjacent to the interview room, so that the interview could be taped without interrupting the interview itself.

At the beginning of the interview, the subject was presented with a stack of index cards containing individual items from the "Personal Psychological Relations" scale of the Mooney Problem Check List (see Appendix B for a complete listing of these items). The subject was asked to look at each card until he or she found an item of current interest or concern, and then to talk with the interviewer about that item for 15 minutes (see Appendix B for standardized script used by interviewer). In the event that the subject exhausted the topic before the 15 minutes had ended, the interviewer was instructed to suggest that the subject choose

another topic in the same manner described above.

Immediately following the interview, the subject was met by the experimenter, who guided him to a de-briefing room. At that time, the subject was given a self-report form to fill out (see Appendix B), inquiring about the nature of the feelings the subject has experienced during the day as well as during the interview. After this form was completed, the subject was given a written description of the specific nature of the study (Appendix B). The experimenter de-briefed the subjects by answering any further questions, and by inquiring about whether they had now any reservations or concerns about having participated in the study. At the end of the de-briefing session, the experimenter re-stated the nature of the study, the specific use of the video-tapes, and requested that the subject sign the video-tape release form if he or she was willing to do so. (See Appendix B for this form.) This was also the point at which subjects who were interested could sign up to participate in a test interpretation session and/or to have the results of the study mailed to them. (Subjects who did not participate in the interview were contacted by mail after all interviews were completed for these sign-up procedures.)

The Interviewer

The interviewer was the same individual for all subjects. He is a 40 year old male, employed at the time of the study as an intern at the University of Texas Counseling-Psychological Services Center. He was also at that time a graduate student in the Counseling Psychology doctoral program at the University of Texas.

In order to maintain a consistency of response across subjects the interviewer was instructed to engage with subjects in a responsive but non-confrontive manner. He was instructed to engage with subjects by reflecting feelings, paraphrasing content, or indicating understanding in a non-verbal manner as a way to encourage the subject to continue talking. He was not, however, to make any attempts to direct the interview or to challenge the subject. (See Appendix B for complete instructions to interviewer.)

The spontaneity of the interview procedure and possibility of contamination through the interviewer's interaction with the subject was presented as a limitation of the study. In order to minimize this limitation, the interviewer was requested to participate in preliminary practice sessions, whereby he was videotaped while performing in the interviewer role. Subsequently he

reviewed the tapes with the Experimenter, and received feedback on the extent to which he has appropriately maintained his role proscribed by the aforementioned guidelines. Additionally, the interviewer was asked to record brief anecdotal information about the nature of the interview after each subject was interviewed.

Videotape Apparatus Used During Interviews

Two Panasonic cameras were used for taping during the interview phase of the study. The two cameras provided for a split screen image that later facilitated the editing of the videotapes.

One camera, a Panasonic 16-54 mm zoom lens was situated in the corner of the interview room and focused for close-up shots of the subject's head and shoulders. This camera was stationery, and adjusted only at the beginning of each interview. Subjects were seated in a high backed chaise lounge so as to minimize head and shoulder movement.

The second camera, a Panasonic 14-70mm zoom lens, was operated from the adjacent equipment room and was focused on a digital clock with minutes and tenths of seconds. This image appeared in the upper right hand corner of the screen, and allowed for precise editing

of the tape at a later time.

The two Panasonic video cameras fed into a Panasonic Special Effects Generator (SEG-WS-545P) which resulted in the split-screen image. The interview was recorded in black and white on 3/4 inch cassetts videotapes, using a Panasonic NV-9200 3/4 inch cassetts videotape recorder. All videotaping procedures were performed and monitored from the equipment room adjacent to the interview room.

Videotape Editing

Each subject was videotaped throughout the full 15 minutes of the interview. The videotaped interviews were logged by subject code number. Master tapes were then prepared for rater viewing in the following manner.

Systematic sampling of the subjects' interview was achieved by beginning from the point at which the subject laid the deck of problem topic cards on the table and looked up to begin talking with the interviewer. Beginning at this point, a 3 second sample was taken every 20 seconds, for a total of 30 samples per subject, or a total of 1,860 samples for the study. This procedure allowed for discrete samples of facial affect, as well as for 10 seconds of blank tape between each sample.

In order to minimize rater response set, the order of subjects was randomly chosen, and subject samples were edited onto the master tape in sets of five. Because of the large number of samples collected, a total randomization was not attempted, but rather 3-5 subjects were randomly chosen at a time, and alternatively sampled in sets of five until the total of 30 samples from each subject had been edited onto the master tape. Raters were told not to assume that there was a chronological order either within the five samples per set, or in the order of the sets that they viewed for each subject.

The master tapes onto which the videotaped samples were edited were 3/4 inch black and white cassettes. The equipment used for this procedure was: two Sony television monitors; two Panasonic videotape recorders (Model #NV 9200); a video editor controlled (Model #NV-A950); a Panasonic editor recorder (Model #NV 9500); and a Microtime time base corrector (Model #1020).

Rater Sample

Three raters were used in this study to judge the videotaped facial expressions sampled from subject interviews. The raters were not paid for time spent during the training program, but were paid for time spent

rating the tapes. All three of the raters were female, and all between the ages of 25 and 30. At the time of the study, two of the raters were employed by the University of Texas Telephone Counseling & Referral Service, had undergone training for that position, and were experienced crisis and telephone counselors. One of these persons was also a graduate student in the M.S.W. School of Social Work program at the University of Texas, as was the third (non-TCRS) person.

Rater Training

The three raters underwent a rigorous training program which was based on programs developed by previous researchers in this area at Michigan State University (Inman, 1976; Wilson, 1976; Bowles, 1978). The training program focused on the six categories used in this study (Interest, Anger, Disgust, Surprise, Enjoy, Distress) and included diagrams, photos, slides, and videotapes using both posed and unposed samples of facial affect. Since there is no standardized package program for training in the recognition of moving facial affect, and since replicability of the study depends largely upon the ability to reproduce rater training and measurement procedures, the rater training program is described in

detail.

The program began with a brief discussion of facial affect and an overview of research on the area, particularly the research regarding the development of facial affect categories. Izard's research (1971) reporting the categories most commonly overlooked by males and those most commonly overlooked by females was noted and discussed.

The six affective categories were defined, and synonyms common to each of these affective labels were presented and discussed (see Appendix C). A description of each category as well as the dynamic function of the category was also presented and discussed (Appendix C). A diagram of facial musculature (Appendix C) was presented and the muscle groups involved with each affect category were illustrated and discussed. At this time, slides illustrating posed faces in each of these affect categories were also presented (Appendix C).

Once the raters became familiar with the six affective categories, twenty-five slides of posed facial affect developed by Ekman (1976) were shown in groupings of five. Each slide was projected onto the screen for six seconds, after which raters were given a 10-second interval during which to write their judgments of the

category on an Affective Data Rating Form (Appendix D). The six-second stimulus with a 10-second interval for rating was used to approximate the timing sequence of the master tapes to be used in the formal rating procedure.

After each set of five slides was shown, randomly illustrating the affect categories used in the study, the correct answers were given. The slides were then shown for unlimited time periods, so that questions could be raised and discussed. After all 25 slides had been shown and discussed, a set of 15 more slides were shown for three seconds each at 10-second intervals. The Affective Data Rating Forms were used by raters to write their judgment for each of the 15 slides, and then collected in order to calculate rater reliability. Raters identified the same affective label for each of the 15 slides of posed facial affect with 95.5 percent agreement.

The final phase of the training program involved showing raters segments of unposed facial expressions of affect from a pilot videotape, edited to be identical in format to the master tapes which raters would later be judging for the study. The procedure for practice with rating moving facial affect was parallel to the procedure

used with the slides. The raters were first shown thirty samples of unposed facial expressions, in sets of five, and requested to write their judgments on an Affective Data Rating Form. After each set of five segments were viewed, correct answers were given, and raters were encouraged to compare answers as well as to raise questions. After all thirty segments had been viewed, rated, and discussed, raters were then shown thirty more segments and requested to write their judgments on an Affective Data Rating Form. These forms were then collected in order to calculate rater reliability. The raters identified the same affective labels for these thirty segments of unposed facial affect with 94.4 percent agreement.

Because of the problems unique to judging moving facial affect, the raters devised a set of rating rules based on Bowles' training program (Bowles, 1978) and on issues that arose while rating the pilot training tapes. Those rules are as follows:

1) If several categories of affect are observable, record the dominant or more intense affect category.
2) If unable to determine which affect category was dominant, record the first dominant

category of affect observed.

3) Only use the category interest if no other category of affect is clearly observable.

These rules were briefly written and taped to the bottom of the video monitor throughout the rating of the master tapes. In addition, each rater had a card on a table before her listing the six affect categories throughout the rating procedure.

Because the raters were not able to complete the rating task in a consecutive two day period, as had been previously anticipated, the first of the two training videotapes (which was accompanied by an answer key) was used to establish rater reliability at the beginning of each rating session. Raters were asked to come in before the beginning of the session and practice with the tape until they had established 90 percent agreement with the answer key. Despite the fact that practice effects began to occur by re-using the same videotape, this procedure nevertheless did serve to standardize the rater judgment process. The rating task was completed in four sessions, or a total of 20 hours.

Rater Reliability

Raters were able to choose only one affect

category for each sample they viewed. One thousand, eight hundred sixty samples were viewed and judged in this manner, resulting in a total of 5,580 affective labels assigned by the three raters. Samples which had no agreement across raters were counted as discards, thus every affect rating used had agreement by at least two of the three raters. A total of 130 samples were discarded, which came to an average of 2.09 discards per subject, or a total of 2 percent discard for the total sample.

For the purposes of this study, inter-rater reliability was established by percentage of agreement. This was calculated per subject by dividing the total number of ratings per subject (both discards and agreements) into the number of agreed upon ratings for that subject. The mean interrater reliability across subjects was 77.3 percent, which is generally high for the task of judging moving facial affect. It is of note that these scores varied from 60 to 90 percent, however, indicating that reliabilities for some subjects were much higher than for others. Figure 3.1 presents a graph based on percentage of rater agreement per subject.

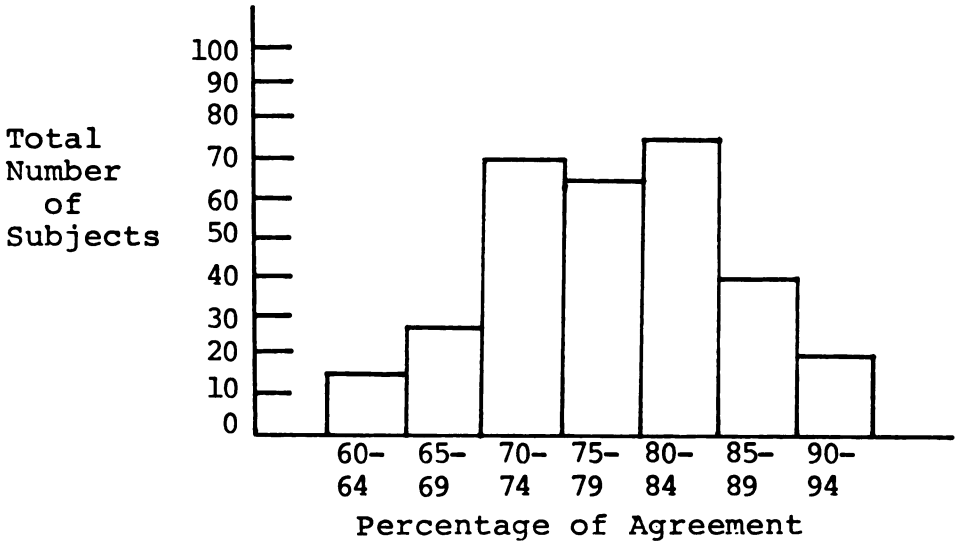


Figure 3.1. Percentage of rater agreement across 62 subjects.

Rater Agreement by Affect Category

In addition to varying by subject, rater agreement also varied by category of affect. Table 3.1 presents, by affect category, the percentage of times a rating was used when all three raters were in agreement, the percentage of times a rating was used when two of the raters were in agreement, the percentage of single ratings which became unscoreable data, and the total percentage of ratings that could be used as a judgment in the category. As indicated by Table 3.1, the category Enjoy had the highest total number of ratings (1,956) followed by Interest, Disgust, Distress, Anger, and finally Surprise. In the case of the first four

Table 3.1

Rater Agreement by Affect Category

Category	Ratings	Percentages of Ratings: 3 out of 3	2 out of 3	1 out of 3 (discard)	Total percentage of usable ratings
Interest	1,352	45%	33%	22%	78%
Distress	966	25	42	33	67
Surprise	56	22	14	64	36
Anger	121	15	33	52	48
Enjoy	1,956	71	20	9	91
Disgust	1,129	42	30	28	72

categories, the order of unanimous agreement was the same: Enjoy (71 percent); Interest (45 percent); Disgust (42 percent); and Distress (25 percent). Anger and Surprise reversed order, with Anger having only 15 percent unanimous agreement and Surprise 22 percent. When looking at the percentage of usable ratings, however, the order is once again parallel to that in the total number of ratings column: Enjoy (91 percent); Interest (78 percent); Disgust (72 percent); Distress (67 percent); Anger (48 percent); and Surprise (36 percent). Thus the categories with the highest number of ratings also had

the highest overall percentage of agreement by raters.

Differences between columns two and three indicate that while percentages of unanimous agreement (3 out of 3) were generally higher than percentages of two-rater agreement, this is not the case with Distress and Anger. Each of these categories has a higher percentage of agreement in the third column, suggesting it was less likely that all three raters would agree on the expression of this category, and more likely that only two out of the three would agree. In contrast, the large gap between columns two and three for Enjoy (51 percentage points) is also of note, indicating that raters were far more likely to agree on this category unanimously than on a two-rater basis.

The column of single ratings (1 out of 3) indicates high percentages for Surprise and Anger. Sixty-four percent of the ratings for Surprise were single ratings and subsequently not counted as a judgment; fifty-two percent of the ratings for Anger were single ones and likewise were lost as data toward the subject's affect score in this category.

Surprise, with the lowest number of total ratings for the study, had a relatively high percentage of unanimous agreement when compared to Disgress and Anger. Yet

it also had the highest percentage of single ratings for all categories indicating that it had the highest amount of disagreement among raters.

Finally, rater agreement was studied from the perspective of disagreement. Figures 3.2 through 3.7 are presented by affect category, and designed to illustrate what affect category the third rater chose when the other two raters were in agreement on one category.

As indicated by Figure 3.2, when two raters were in agreement on the category Interest, the third rater was most frequently in conflict by choosing the category Distress (91 ratings), next most frequently in conflict with the category Disgust (69 ratings) and least frequently in conflict with the categories Anger (12 ratings) and Surprise (6 ratings), suggesting in this case that it was most difficult for raters to distinguish between Interest and Distress.

As indicated by Figure 3.3, when two raters were in agreement on the category Distress, the third rater was most frequently in conflict by choosing the categories of Interest (83 ratings) or Disgust (80 ratings), and least frequently in conflict with the category Surprise (3 ratings), suggesting in this case that it was difficult to distinguish between Distress and either

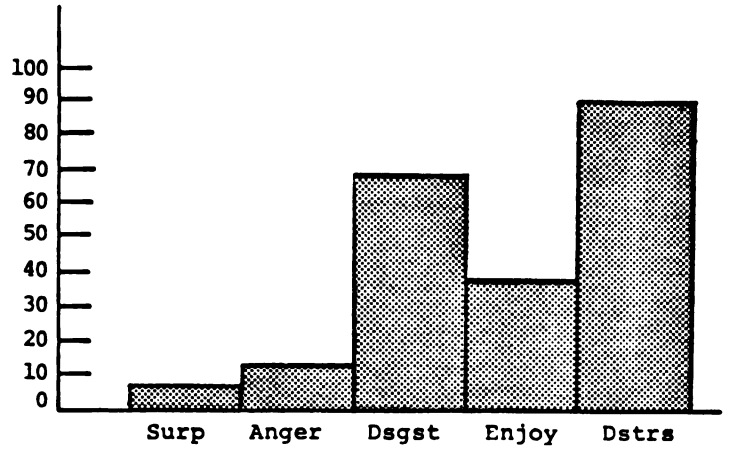


Figure 3.2. Third rater's category where two raters were in agreement on Interest. (n=216)

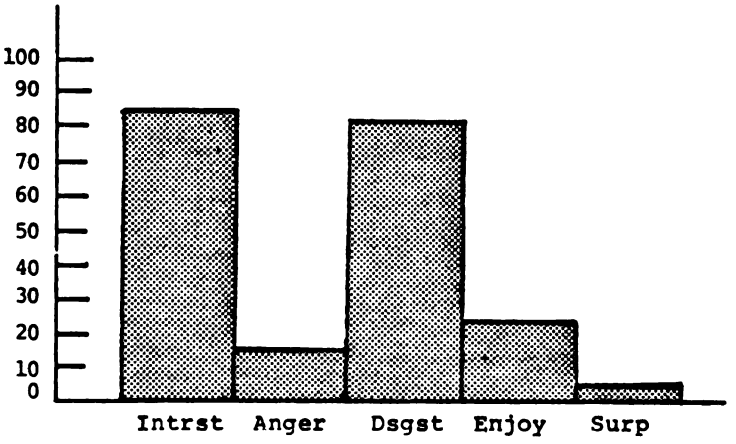


Figure 3.3. Third rater's category where two raters were in agreement on Distress. (n=202)

Figure 3.4. Third rater's category where two raters were in agreement on Surprise. (n=4)

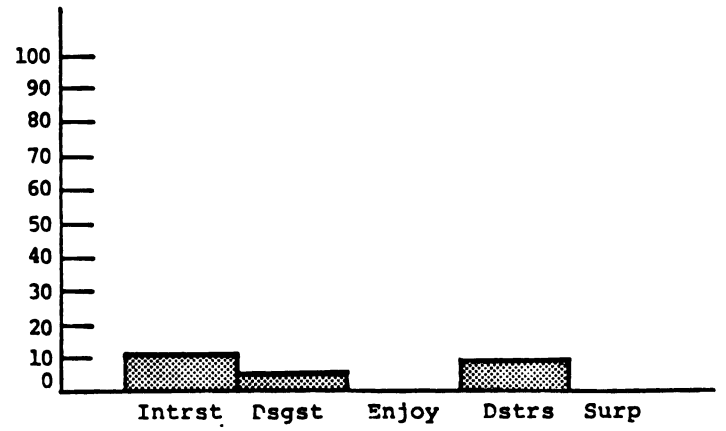


Figure 3.5. Third rater's category where two raters were in agreement on Anger. (n=21)

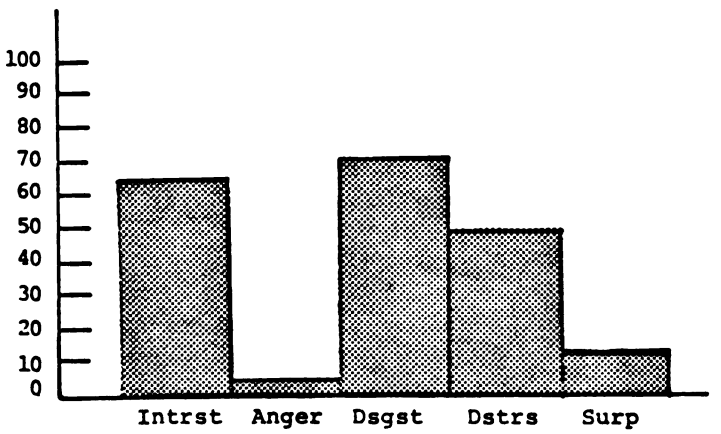


Figure 3.6. Third rater's category where two raters were in agreement on Enjoy. (n=195)

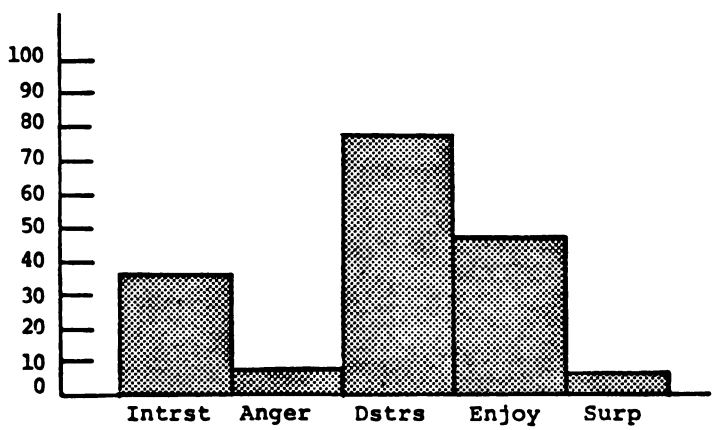


Figure 3.7. Third rater's category where two raters were in agreement on Disgust. (n=171)

Interest or Disgust.

Figure 3.4 indicates that when two raters were in agreement on Surprise, the third rater was in conflict by choosing either Interest (2 ratings), Anger (1 rating), or Enjoy (1 rating). Because of the small number of 2-rater judgments in this category, it is difficult to determine whether this pattern would be representative of a rating norm in a larger sample. The Figure does indicate, however, that the categories Interest, Disgust, and Enjoy were the most frequently disagreed upon in relationship to the category Surprise.

As indicated by Figure 3.5, when two raters were in agreement on Anger, the third rater was in conflict by choosing Interest (10 ratings), Distress (8 ratings), or Disgust (3 ratings). As with the previous figure illustrating Surprise, the number of 2-rater judgments in this category is so small that it is difficult to determine whether this would actually become a trend in a larger sample. It is indicated, however, that Interest, Distress, and Disgust were more difficult to distinguish from Anger than were Enjoy or Surprise.

Figure 3.6 indicates that when two raters were in agreement on Enjoy, the third rater was in conflict by choosing either Disgust (59 ratings) or Interest (64

ratings), and least frequently in conflict by choosing Surprise (10 ratings) or Anger (5 ratings), suggesting that as for the category Distress, it is most difficult for raters to distinguish between Enjoy and either Interest or Disgust.

Finally, Figure 3.7 indicates that when two raters were in agreement on Disgust, the other rater was most frequently in conflict by choosing the category Distress (78 ratings), and least frequently in conflict by choosing the categories Anger (7 ratings) and Surprise (4 ratings). This is in contrast to Figure 3.3 for Distress, where both Disgust and Interest had a high number of ratings. Distress was the single category most frequently in conflict when two of the raters were in agreement on Disgust.

In general, Interest, Disgust, and Distress were the three categories most frequently conflicting in rater judgments, with Enjoy the more clearly defined both by a higher percentage of unanimous agreement (Table 3.1) and by fewer ratings in conflict with the other categories. The only exception to this was with respect to agreement in the category Disgust, where Enjoy was the second most frequently chosen of the conflicting categories.

Anger and Surprise, the two categories with the lowest overall frequency throughout the study, occurred in small numbers of single ratings throughout the other categories. Anger, which had a higher total frequency than Surprise, also generally had more single ratings in conflict with judgments in other categories. Each of these categories had more single ratings than ratings which could be used as a judgment for a sample.

As indicated in Figures 3.4 and 3.5, the only two categories with entirely discrete ratings were Anger and Surprise. Neither of these categories were chosen by the third rater where the other two raters were in agreement on either Anger or Surprise.

While inter-rater reliability was high during the training sessions and with the training tape used at the beginning of each rating session (90 percent or above), the inter-rater reliability throughout the rating task varied considerably (from 60 percent agreement to 90 percent agreement across subjects). It should be noted, however, that the judgment of moving facial affect is considerably more complex and difficult than is the judgment of either posed or unposed facial affect in still form. The trends which have emerged regarding the variance of rater agreement across subjects as well as

across affect categories will be reviewed in the Discussion section in an attempt to provide still more specific guidelines for this task in the future.

Research Design

The research design of the study was developed to address a comparison of groups on the dependent measures. The purpose of this design was to determine whether subjects in the high group on any one of the independent measures differ in expression of facial affect from subjects in the low group on that same independent measure.

The independent measures used in the study were the Eysenck Personality Inventory, the Plutchik Emotions Profile Index, and the Birkman Method, all described previously in this chapter. In addition to using a total of nine independent scales from these three instruments, a combination of the Eysenck Extraversion and Neuroticism scales were used as a tenth independent variable.

The dependent measures used in the study were eight categories of facial affect: Interest, Disgust, Anger, Surprise, Distress, Enjoy, Range of Affect, and Change of Affect. The design used for hypothesis testing of group differences on these affective measures is

graphically displayed in Figure 3.8 .

High Group	S_1* : S_{20}	mean score on dependent variable
Low Group	S_{21} : S_{40}	mean score on dependent variable

Figure 3.8. Between group differences from independent variables on affective measures.

*These numbers are for illustration purposes only. While an attempt was made to have 20 subjects in each group, priority was given to maintaining balanced groups (see pg. 68).

Measurement of Facial Affect

The measurement of facial affect was designed to take into account the types of affect categories displayed, the range of affect, and the frequency of change of affect. The six types of affect categories used in the study are previously researched categories of emotional experience, defined by specific facial expressions (Ekman, 1975; Izard, 1971). Scores in these categories, Interest, Disgust, Anger, Surprise, Distress, and Enjoy, were determined by rater judgment. An agreement by two of the three raters constitutes a judgment in any one particular category. A disagreement across all three

raters on any one sample of facial affect constitutes a discard of that sample and becomes non-scoreable data. A subject's score for each affect category was based on the number of rater judgments in that category. Since the number of samples per subject would vary by the number of discarded samples, it was determined that the final subject's score for each category would be calculated on a percentage basis: total number of samples in the category divided by total number of samples used for that subject. (See Appendix D for subject scoring sheet.)

The category Range of Affect was determined by the number of affect categories for which the subject received at least one judgment. The highest possible score was six. (See Appendix D for an illustration of this calculation.)

The category Change of Affect was determined by the number of times a subject changed from one judgment of affect to another. Discards were not counted as a change in affect. In the case where a subject received a judgment in the category Surprise, followed by no judgment because of a discard, followed by a judgment in the category Interest, the change score for the sequence would be one. (See Appendix D for an illustration of

this calculation.)

In addition to these affective measures to be used in the formal hypothesis testing, two more measures, Percentage of Rater Agreement and Number of Discards Per Subject, were also used to provide further descriptive data.

Research Hypotheses

Fifteen hypotheses were generated to empirically test the relationship between performance on specific scales of the three pencil/paper personality instruments and the type, range, or frequency of change of facial affect displayed.

The null hypotheses may be generally stated as follows:

> Null Hypothesis: No difference will be found on the affective measure between the mean of the group scoring high and the mean of the group scoring low on the independent variable.
>
> $H_o: \mu_1 = \mu_2$
>
> alpha level of .05

The alternative hypotheses may be grouped into the following two categories:

> Alternative Hypothesis$_1$: The high group's mean score will exceed that of the low group's mean score on the dependent affective measure.

or $H_{1a}: \mu_1 > \mu_2$

Alternative Hypothesis$_2$: The high group's mean score will be less than the low group's mean score on the dependent affective measure.

$H_{2a}: \mu_1 < \mu_2$

Statistical Analyses and Procedure

Since all hypotheses were addressed as a comparison of groups on the dependent variables, and since equality of population variance, normality of distribution, and independence between each set of high/low grups was assumed, all hypotheses were tested by means of a t-test. The alpha level for each hypothesis was set at .05, which is of concern to the overall alpha level of the study and possibility for Type I error. Due to the exploratory nature of the study, however, it was considered more important to use a .05 alpha level for the individual hypotheses.

Also due to the exploratory nature of the study, analyses that would provide descriptive data beyond the formal hypothesis testing were also used. T-tests were used to explore the nature of group differences between all of the dependent and independent variables in the study. The high and low groups on each of the independent variables were subsequently tested for differences

on each of the dependent variables.

For exploration in the multivariate sense, a multivariate analysis of variance was used to examine the set of eight dependent measures as they relate to each of the independent measures.

Finally, an inter-correlational matrix made up of all independent and dependent variables as well as additional scales from Plutchik and Eysenck and the two additional rater affect measures was explored. Areas of focus for correlational relationships were: relationships within the scales of each personality instrument, relationships across the set of personality instruments, relationships across the set of affective measures, and relationships between the personality instruments and the affective measures. Pearson Product Moment statistics were used to estimate the correlations.

Summary

One hundred sixty-eight undergraduate students enrolled fall term at the University of Texas-Austin volunteered to participate in this study. These subjects were administered three pencil/paper personality instruments in order to determine which of them would participate in the interview phase. Cut-off points for high

and low groups on each of the research scales were established. Sixty-two subjects were then selected (22 males, 40 females) on this basis to participate in interviews.

Each of the 62 subjects participated in a 15 minute interview by choosing items from the Personal-Social Relations Scale of the Mooney Problem Check List and discussing that item with the interviewer. Data was collected by videotaping the interviews and then systematically sampling facial expressions by editing the tapes to 30 3-second segments per subject. A total of 1,680 samples were used for the study, and organized in semi-random order onto master tapes. Subject samples were grouped in sets of five and subjects were alternated by order of appearance on tapes.

Three female raters were trained to recognize and accurately label six affective categories of facial expression: Interest, Anger, Disgust, Surprise, Distress, and Enjoy. Affective data was then calculated by subject for: percentage of each type of facial affect category used; percentage of change from one category to another, and total number of categories used. Percentage of rater agreement per subject was also calculated as well as total number of discards per subject, in order

to provide further methodologically related data for the study.

The study was designed to address a comparison of groups on the affective or dependent measures. Hypotheses were developed to test the relationship between performance on specific scales of the three pencil/paper personality instruments and the type, range, or frequency of change of facial affect displayed. T-tests were used to empirically test these relationships, with the probability of significance set at the $p = .05$ level.

Due to the exploratory nature of the study, additional tests were used to further examine the relationships between the independent and dependent measures which had not been addressed in the hypothesis testing. Additional t-tests between all independent and dependent variables were run, as well as a MANOVA which examined the set of dependent measures as it relates to each of the independent measures.

Finally, an inter-correlational matrix was used to examine the relationships of all scores from personality instruments and affective measures, with a focus on relationships within the scales of each personality instrument, relationships across the set of personality instruments, relationships across the set of affective

measures, and relationships between the personality instruments and the affective measures. The analysis of this data is presented in Chapter IV.

CHAPTER IV

ANALYSIS OF DATA

This chapter is divided into three major sections for the purpose of reporting the results of the investigation. The first section presents the results of the hypothesis testing, the second section presents further analyses of group differences, and the third section reports correlational analyses.

Results of Hypothesis Tests

The fifteen hypotheses used in this study can be divided into three groups, corresponding to the three personality inventories used as independent measures. The first group of hypotheses (1-5) is related to the Plutchik Emotions Profile Index; the second group (6-11) is related to the Birkman Method; and the third group (12-15) is related to the Eysenck Personality Inventory. Following each group of hypotheses is the empirical data germane to the retention or rejection of the null hypothesis.

Hypotheses related to Plutchik's Emotions Profile Index (PEPI) propose a relationship between the

frequency of a specific affect expressed facially and the percentile score of that affective area on the subject's PEPI test profile.

Hypothesis 1

Null Hypothesis: There will be no significant difference on the affective measure of Enjoy between subjects who score above the 70th percentile on the Gregarious scale and the subjects who score below the 30th percentile on the Gregarious scale.

Alternative Hypothesis: The group mean of subjects scoring above the 70th percentile on the Gregarious scale will be significantly higher on the measure Enjoy than will be the group mean of subjects scoring below the 30th percentile on the Gregarious scale.

Hypothesis 2

Null Hypothesis: There will be no significant difference on the affective measure of Disgust between subjects who score above the 70th percentile on the Distrustful scale and subjects who score below the 30th percentile on the Distrustful scale.

Alternative Hypothesis: The group mean of subjects scoring above the 70th percentile on the Distrustful scale will be significantly higher on the measure Disgust than will be the group mean of subjects scoring below the 30th percentile on the Distrustful scale.

Hypothesis 3

Null Hypothesis: There will be no significant difference on the measure Distress between subjects who score above the 70th percentile on the Depressed scale and subjects who score below the 30th percentile on the Depressed scale.

Alternative Hypothesis: The group mean of subjects scoring above the 70th percentile on the Depressed scale will be significantly higher on the measure Distress than will be the group mean of subjects scoring below the 30th percentile on the Depressed scale.

Hypothesis 4

Null Hypothesis: There will be no significant difference on the measure Surprise between subjects who score above the 70th percentile on the Dyscontrolled scale and subjects who score below the 30th percentile on the Dyscontrolled scale.

Alternative Hypothesis: The group mean of subjects scoring above the 70th percentile on the Dyscontrolled scale will be significantly higher on the measure Surprise than will be the group mean of subjects scoring below the 30th percentile on the Dyscontrolled scale.

Hypothesis 5

Null Hypothesis: There will be no significant difference on the measure Anger between subjects who score above the 70th percentile on the Agressive scale and subjects who score below the 30th percentile on the Aggressive scale.

Alternative Hypothesis: The group mean of subjects scoring above the 70th percentile on the Aggressive scale will be significantly higher on the measure Anger than will be the group mean of subjects scoring below the 30th percentile on the Aggressive scale.

Table 4.1

Affective Scores for Subjects Selected for Analysis on Plutchik's Personality Dimensions

	Group	Affective Measure	n	$\bar{x}$	SD
H_1	High Gregarious	Percentage of ENJOY	25	37.88	23.30
	Low Gregarious		17	27.88	17.27
H_2	High Distrustful	Percentage of DISGUST	22	23.63	17.15
	Low Distrustful		23	12.52	12.27
H_3	High Depressed	Percentage of DISTRESS	19	17.92	17.66
	Low Depressed		28	16.19	15.44
H_4	High Dyscontrol	Percentage of SURPRISE	22	.48	1.25
	Low Dyscontrol		17	.62	1.38
H_5	High Aggressive	Percentage of ANGER	17	3.51	9.08
	Low Aggressive		27	1.08	2.47

Table 4.2

T-test Results for Between-Group Differences on Affective Measures

	Group	Affective Measure	t	p	Significant
H_1	High Gregarious contrasted with Low Gregarious	Percentage of ENJOY	1.51	.065	No
H_2	High Distrustful contrasted with Low Distrustful	Percentage of DISGUST	2.51	.008	Yes
H_3	High Depressed contrasted with Low Depressed	Percentage of DISTRESS	0.36	.361	No
H_4	High Dyscontrol contrasted with Low Dyscontrol	Percentage of SURPRISE	-0.32	.374	No
H_5	High Aggressive contrasted with Low Aggressive	Percentage of ANGER	1.32	.097	No

Statistical significance at the .05 level was not obtained for any of the Hypotheses 1, 3, 4, or 5, and therefore each null was not rejected. The test of Hypothesis 2, however, indicated a significant difference (with a t of 2.51 and a one-tailed probability of .008) between high distrustful and low distrustful groups on the affective measure Disgust. The mean for the high distrustful group was 23.63, and for the low distrustful group was 12.52, for a difference of 11.11 in the hypothesized

direction.

Hypotheses related to the Birkman Method propose a relationship between two specific personality dimensions (Dominance and Getting Along With Others) and affective facial display (including specific categories used, number of categories used, and frequency of facial changes).

Hypothesis 6

Null Hypothesis: There will be no significant difference on the measure Range of Affect between subjects who score high on the Getting Along With Others scale and subjects who score low on the Getting Along With Others scale.

Alternative Hypothesis: The group mean of subjects who score high on the Getting Along With Others scale will be significantly higher on the measure Range of Affect than will be the group mean of subjects scoring low on this scale.

Hypothesis 7

Null Hypothesis: There will be no significant difference on the affective measure of Disgust between subjects who score high on the Getting Along With Others scale and subjects who score low on the Getting Along With Others Scale.

Alternative Hypothesis: The group mean of subjects who score high on the Getting Along With Others scale will be significantly lower on the measure Disgust than will be the group mean of subjects scoring low on this scale.

Hypothesis 8

Null Hypothesis: There will be no significant difference on the affective measure of Enjoy between subjects who score high on the Getting Along With Others scale and subjects who score

low on the Getting Along With Others scale.

Alternative Hypothesis: The group mean of subjects who score high on the Getting Along With Others scale will be significantly higher on the measure Enjoy than will be the group mean of subjects scoring low on this scale.

Hypothesis 9

Null Hypothesis: There will be no significant difference on the measure Change of Affect between subjects who score high on the Getting Along With Others scale and subjects who score low on the Getting Along With Others scale.

Alternative Hypothesis: The group mean of subjects who score high on the Getting Along With Others scale will be significantly higher on the measure Change of Affect than will be the group mean of subjects who score low on this scale.

Hypothesis 10

Null Hypothesis: There will be no significant difference on the affective measure of Distress between subjects who score high on the Dominance scale and subjects who score low on the Dominance scale.

Alternative Hypothesis: The group mean of subjects who score high on the Dominance scale will be significantly lower on the measure Distress than will be the group mean of subjects who score low on this scale.

Hypothesis 11

Null Hypothesis: There will be no significant difference on the measure Change of Affect between subjects who score high on the Dominance scale and subjects who score low on the Dominance scale.

Alternative Hypothesis: The group mean of subjects who score high on the Dominance scale will be significantly lower on the measure Change of Affect than will be the group mean of subjects who score low on this scale.

Table 4.3

Affective Scores for Subjects Selected for Analysis on Birkman's Personality Dimensions

	Group	Affective Measure	n	$\bar{x}$	SD
H_6	High G.A.W.O.	Number of Affects Displayed (RANGE)	13	4.23	0.43
	Low G.A.W.O.		15	3.73	0.79
H_7	High G.A.W.O.	Percentage of DISGUST	13	21.52	12.96
	Low G.A.W.O.		15	16.17	16.80
H_8	High G.A.W.O.	Percentage of ENJOY	13	35.03	19.92
	Low G.A.W.O.		15	42.70	24.06
H_9	High G.A.W.O.	Percentage of CHANGE OF Affect	13	63.53	13.11
	Low G.A.W.O.		15	55.86	16.51
H_{10}	High Dominance	Percentage of DISTRESS	16	13.00	9.86
	Low Dominance		14	10.75	9.34
H_{11}	High Dominance	Percentage of CHANGE of Affect	16	61.00	18.69
	Low Dominance		14	56.42	15.81

Statistical significance at the .05 level was not obtained for Hypotheses 7-11, and therefore each null was not rejected. The test of Hypothesis 6, however, indicated a significant difference (with a t of 2.00 and a one-tailed probability of .028) in the number of affect categories used when the high Getting Along With Others and the low Getting Along With Others groups were

Table 4.4

T-test Results for Between-Group Differences on Affective Measures

	Group	Affective Measure	t	p	Signif-icant
H_6	High G.A.W.O. contrasted with Low G.A.W.O.	Number of Affects Displayed (RANGE)	2.00	.028	Yes
H_7	High G.A.W.O. contrasted with Low G.A.W.O.	Percentage of DISGUST	0.93	.175	No
H_8	High G.A.W.O. contrasted with Low G.A.W.O.	Percentage of ENJOY	-0.91	.185	No
H_9	High G.A.W.O. contrasted with Low G.A.W.O.	Percentage of CHANGE of AFFECT	1.35	.095	No
H_{10}	High Dominance contrasted with Low Dominance	Percentage of DISTRESS	0.64	.264	No
H_{11}	High Dominance contrasted with Low Dominance	Percentage of CHANGE of AFFECT	0.72	.239	No

compared. The mean of the high Getting Along With Others group was 4.23, and the mean of the low group was 3.73, for a difference of .50 in the hypothesized direction.

Hypotheses related to the Eysenck Personality Inventory propose a relationship between the personality characteristics Extraversion/Introversion and Neuroticism/

Stability, and facial affect display as measured by specific categories used, number of categories used, and frequency of facial changes.

Hypothesis 12

Null Hypothesis: There will be no significant difference on the affective measure of Enjoy between subjects who score high on the Extraversion scale and subjects who score low on the Extraversion scale.

Alternative Hypothesis: The group mean of subjects who score high on the Extraversion scale will be significantly higher on the measure Enjoy than will be the group mean of subjects who score low on this scale.

Hypothesis 13

Null Hypothesis: There will be no significant difference on the affective measure of Disgust between subjects who score high on the Extraversion scale and subjects who score low on the Extraversion scale.

Alternative Hypothesis: The group mean of subjects who score high on the Extraversion scale will be significantly lower on the measure Disgust than will be the group mean of subjects who score low on this scale.

Hypothesis 14

Null Hypothesis: There will be no significant difference on the measure Change of Affect between subjects who score high on the Neuroticism scale and subjects who score low on the Neuroticism scale.

Alternative Hypothesis: The group mean of subjects who score high on the Neuroticism scale will be significantly higher on the measure Change of Affect than will be the group mean of subjects who score low on this scale.

Hypothesis 15

Null Hypothesis: There will be no significant difference on the measure Range of Affect between subjects who score high on the Extraversion and Neuroticism scales (EN) and those who do not score high on both of these scales (ES, IS, IN).

Alternative Hypothesis: The group mean of subjects who score high on the Extraversion and Neuroticism scales (EN) will be significantly higher on the measure Range of Affect than will be the group mean of subjects who do not score high on both of these scales (ES, IS, IN).

Table 4.5

Affective Scores for Subjects Selcted for Analysis on Eysenck's Personality Dimensions

	Group	Affective Measure	n	$\bar{x}$	SD
H_{12}	High Extraversion	Percentage of ENJOY	25	40.29	24.04
	Low Extraversion		26	34.88	16.04
H_{13}	High Extraversion	Percentage of DISGUST	25	16.56	12.96
	Low Extraversion		26	20.08	17.14
H_{14}	High Neuroticism	Percentage of CHANGE of Affect	27	58.22	1.87
	Low Neuroticism		23	60.86	.99
H_{15}	EN	Number of Affects Displayed (RANGE)	16	3.75	.57
	IN, IS, ES		15	4.14	.70

Statistical significance at the .05 level was not obtained for Hypotheses 12-15, and therefore each null was not rejected. Hypothesis 15 was a contradictory finding, with

Table 4.6

T-test Results for Between-Group Differences on Affective Measures

	Group	Affective Measure	t	p	Signif-icant
H_{12}	High Extraversion contrasted with Low Extraversion	Percentage of ENJOY	0.95	.174	No
H_{13}	High Extraversion contrasted with Low Extraversion	Percentage of DISGUST	-0.82	.207	No
H_{14}	High Neuroticism contrasted with Low Neuroticism	Percentage of CHANGE of Affect	-0.61	.273	No
H_{15}	EN contrasted with IN, IS, ES	Number of Affects Displayed (RANGE)	-2.00	.027	No

a t of -2.00 and a one-tailed probability of p = .025. It should be noted that since the t value is negative (indicating a direction other than that which was hypothesized), the degree of probability used by this study is consequently in the wrong tail of the test, and the probability level of p .025 has no meaning for the tail in which it suggests significance.

Further Analyses of Group Differences

Multivariate Analyses of Variance

In order to explore how the two groups of subjects on each independent variable relate to the set of eight dependent measures, ten multivariate analyses of variance were performed. In Table 4.7 each independent variable is presented along with the empirical data germane to its significance test for group differences on the set of dependent measures.

Table 4.7

Multivariate Analyses of Variance for the Independent Variables on the Set of Dependent Measures

Independent Variable	F	p	Significant
Gregarious	1.91	.091	No
Distrustful	1.96	.079	No
Depressed	.77	.629	No
Dyscontrolled	.53	.828	No
Aggressive	1.40	.227	No
Getting Along With Others	.75	.648	No
Dominance	1.12	.385	No
Extraversion	.98	.464	No
Neuroticism	.61	.764	No
Extraversion/Neuroticism	.75	.647	No

Note: Significance is considered at an alpha level of .05.

Statistical significance at the .05 level was not obtained for any of the independent variables when tested by a multivariate analysis of variance.

Further Analyses of Interest

While the multivariate analyses of variance were not significant when used to relate the independent variables to the set of dependent measures, the univariate analyses of variance did indicate the presence of several significant relationships beyond those mentioned in the hypothesis tests. Univariate analyses were used to test group differences on each of the independent variables as they relate individually to each of the eight dependent measures. In addition, univariate analyses were used to provide further methodological information by testing group differences on rater agreement and number of discards per subject. It should be noted here that the term significant is used with caution since it was defined at an alpha level of .05 and does not speak to the problems of the overall Type I error rate.

In this section those independent variables showing significant differences on the affective measures are presented, along with the empirical data germane to the tests for significance and the tables that display the

nature of the significant differences. The independent variables presented are: Gregarious, Distrustful, and Aggression. Tables for univariate analyses of the remaining independent variables, Depressed, Dyscontrolled, Getting Along With Others, Dominance, Extraversion, and Neuroticism, can be found in Appendix E and will be referred to in the Discussion section, Chapter V.

No significant differences were found among the univariate analyses testing for group differences on the measures of rater agreement and of discards per subject. Tables presenting the empirical data for these tests can be found in Appendix E and will also be referred to in the Discussion section, Chapter V.

Table 4.8 presents the independent variable Gregarious along with the results of significance tests for between-group differences on each of the affective measures. As indicated in Table 4.8, six of the eight affective measures show no significant difference at the .05 level between high and low groups on Plutchik's Gregarious scale. Tests on two affective measures, however, Disgust and Change, indicate that there may be significant differences between high and low Gregarious groups in the percentage of disgust displayed, and in the percentage of affect changes the subjects displayed.

Table 4.8

T-test Results of Gregarious Group Differences on the Affective Measures

Dependent Variable	t	p	Significant
Percentage of Interest	0.07	.490	No
Percentage of Disgust	-2.30	.027	Yes
Percentage of Anger	-1.61	.116	No
Percentage of Distress	0.41	.682	No
Percentage of Surprise	1.24	.221	No
Percentage of Enjoy*	1.51	.065	No
Percentage of Change	-2.20	.034	Yes
# of Affects Used (Range)	-1.36	.180	No

*Hypothesis 1 (reported here as a one-tailed test).

Note: Significance is considered at an alpha level of .05.

The mean for the high Gregarious group was 15.16, and for the low Gregarious group 27.41 on the affective measure Disgust, for a difference of 12.25 between groups, at a probability level of $p = .027$. The mean for the high Gregarious group on the affective measure Change was 56.68, and for the low Gregarious group 66.82, for a difference of 10.14 between groups at a probability level of $p = .034$. (See Table 4.9 for a display of these differences.)

Table 4.9

Affect Scores for High and Low Gregarious Groups

Dependent Variable	Group	n	$\bar{x}$	SD
Percentage of Disgust	High Greg	25	15.16	15.85
	Low Greg	17	27.41	18.41
Percentage of Change	High Greg	25	56.68	15.23
	Low Greg	17	66.82	13.83

Table 4.10 presents the independent variable Distrustful along with the results of significance tests for between-group differences on each of the affective measures.

Table 4.10

T-test Results of Distrustful Group Differences on the Affective Measures

Dependent Variable	t	p	Significant
Percentage of Interest	-2.05	.047	Yes
Percentage of Disgust*	2.51	.008	Yes
Percentage of Anger	1.28	.207	No
Percentage of Distress	-0.50	.621	No
Percentage of Surprise	-1.72	.093	No
Percentage of Enjoy	-0.21	.832	No
Percentage of Change	-0.77	.448	No
# of Affects Used (Range)	-0.21	.836	No

*Hypothesis 2 (reported as a one-tailed test).

Note: Significance is considered at an alpha level of .05.

As indicated in Table 4.10, six of the affective measures show no significant difference at the .05 level between high and low groups on Plutchik's Distrustful scale. A significant difference is indicated between groups on the affective measure Disgust, as presented earlier in this chapter. In addition, the test between groups on the affective measure Interest indicates that there may be a difference in the percentage of interest displayed by those who score high on the Distrustful scale and those who score low on this scale. Those who score high on Distrustful have a mean interest score of 17.23, those who score low a mean Interest score of 26.54, for a difference of 9.31 at a probability level of $p = .047$. (See Table 4.11.)

Table 4.11

Affect Scores for High and Low Distrustful Groups

Dependent Variable	Group	n	$\bar{x}$	SD
Percentage of Interest	High Dstrfl	22	17.23	12.21
	Low Dstrfl	23	26.54	17.67

Table 4.12 presents the independent variable Aggression along with the results of significance tests for between-group differences on each of the affective measures.

Table 4.12

T-test Results of Aggressive Group Differences on the Affective Measures

Dependent Variable	t	p	Significant
Percentage of Interest	-1.99	.053	No
Percentage of Disgust	2.37	.022	Yes
Percentage of Anger*	1.32	.097	No
Percentage of Distress	-0.10	.919	No
Percentage of Surprise	-0.51	.612	No
Percentage of Enjoy	-0.81	.423	No
Percentage of Change	0.90	.375	No
# of Affects Used (Range)	1.03	.311	No

*Hypothesis 5 (reported as a one-tailed test).

Note: Significance is considered at an alpha of .05.

As indicated in Table 4.12, seven of the eight affective measures show no significant differences between high and low groups on the Aggression scale. The test between groups on the affective measure Disgust, however, indicates that there may be a difference in the percentage of disgust displayed between those who score high and low on Plutchik's Aggression scale. Those who score high on Aggression have a mean Disgust score of 25.75, those who score low a mean Disgust score of 13.92, for a difference

of 11.83 at a probability level of p = .022. (See Table 4.13.)

Table 4.13

Affect Scores for High and Low Aggression Groups

Dependent Variable	Group	n	$\bar{x}$	SD
Percentage of Disgust	High Aggr	17	25.75	17.57
	Low Aggr	27	13.92	15.17

It should be noted that the group differences in this section have been explored to provide further information about the relationships between the independent and dependent variables in this study. While tests for group differences did provide further evidence of significant relationships, these results should be looked at with caution since significance was defined at an alpha level of .05, and consequently information about the overall Type I error for these tests is inadequate.

Correlational Analyses

A 24 x 24 intercorrelational matrix was used to further explore relationships and provide descriptive information about the variables used in this study (see Appendix F for complete matrix). Following are data

which address relationships within and between the set of pencil/paper instruments, within the set of affective measures, and between the test instruments and the affective measures. In addition, two methodological measures, percentage of agreement among raters and percentage of discarded samples per subject, were included in the analyses and are presented at the end of this section. All data in this section are based on scores from the 168 subjects in the total sample, with the exception of data pertaining to the affective measures, for which there were only 62 subjects.

Within Instrument Correlations

The three pencil/paper instruments used in the study, the Plutchik Emotions Profile Index (PEPI), the Eysenck Personality Inventory (EPI), and the Birkman Method (BM) are all standardized instruments designed to measure affective orientation. The following data include all scales from each instrument used in this study, and in the cases of the PEPI and the EPI, the data includes all remaining scales of each instrument at well.

Plutchik Emotions Profile Index. The PEPI has a total of nine scales, five of which were used as independent variables in this study. The Bias scale is used as an indicator of social desirability, though it may

also be an accurate description of the person. A high score indicates a tendency to choose the more socially desirable descriptor (shy rather than resentful, adventurous rather than gloomy); a low score indicates the opposite tendency (brooding rather than obedient, quarrelsome rather than sociable).

The remaining eight scales are constructed so as to be four sets of bi-polar opposites. Figure 4.1 presents these eight scales graphically on Plutchik's "Emotion Circle," and includes the list of item descriptors from the test that make up each scale. (Note that the weights of the items per each scale are not included.)

Correlations between the scales of this instrument are presented in Table 4.14. It should be noted, however, that this is an ipsative instrument and that consequently the reported correlations between scales will be confounded by this factor. As indicated by Table 4.14, the range of correlations for the instrument is -.80 to +.79. Aggressive is the only scale which consistently shows relationships with all other scales, indicating that it might not be as independent a measure as the other scales.

The bi-polar pairs of scales have negative correlations ranging from -.19 to -.60: Dyscontrol/Control

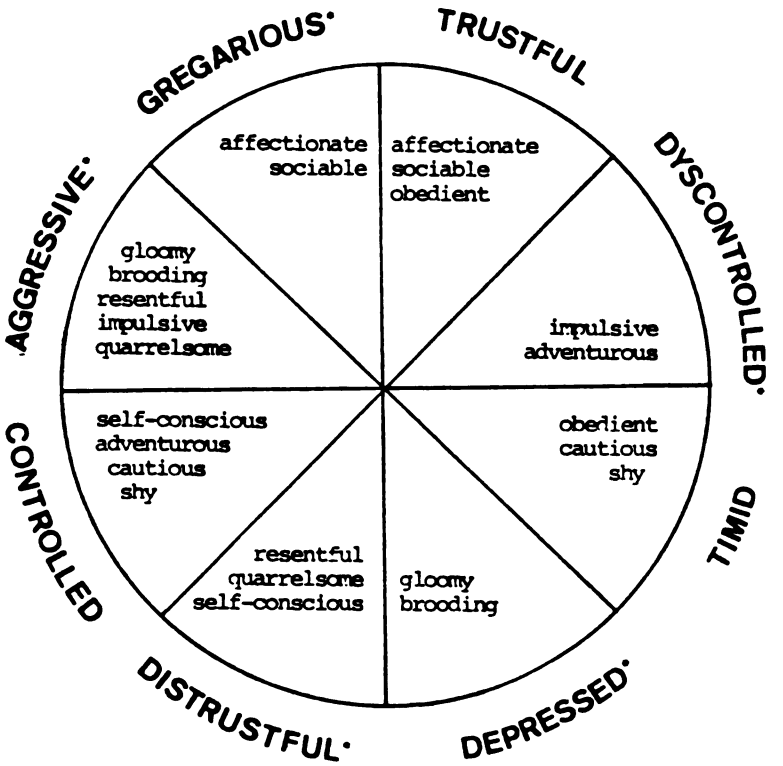


Figure 4.1. Plutchik's Emotion Circle

*Scales used in this study as independent variables.

with a negative relationship at -.19; Depressed/Gregarious with a negative relationship at -.33; Distrust/Trust with a negative relationship at -.58; and Aggressive/Timid with a negative relationship at -.60; suggesting that Distrust/Trust, and Aggressive/Timid may have stronger bi-polar relationships than do Dyscontrol/Control and Depressed/Gregarious.

Table 4.14

Inter-scale Correlations for PEPI

Dyscontrolled	1.00								
Depressed	-0.35	1.00							
Distrustful	-0.14	-0.07	1.00						
Aggressive	0.21	0.44	0.49	1.00					
Gregarious	0.15	-0.33	-0.51	-0.40	1.00				
Trustful	-0.06	-0.37	-0.58	-0.64	0.78	1.00			
Timid	-0.50	-0.05	-0.37	-0.60	-0.17	0.23	1.00		
Controlled	-0.19	-0.12	0.07	-0.34	-0.45	-0.34	0.55	1.00	
Bias	0.06	-0.55	-0.61	-0.80	0.61	0.79	0.42	0.09	1.00
	Dysco	Deprs	Distr	Aggr	Greg	Trust	Timid	Cntrl	Bias

The three categories most generally perceived as negative in social contexts (Depressed, Distrustful, and Aggressive) correlate negatively to the Bias scale, indicating that persons who choose the more socially desirable descriptor items would not have high scores on these three scales.

Figure 4.2 summarizes the relationships of the nine scales to one another by grouping them into categories of strong negative relationships (-.80 to -.35), strong positive relationships (.35 to .77) and minimal relationships (.00 to $\pm$.34).

Eysenck Personality Inventory. The EPI has a total of three scales: Extraversion and Neuroticism were used as independent variables in this study; the Lie scale was used only for the purpose of eliminating subjects at the high end from the interview phase of the data collection. The extraversion scale is constructed so that persons scoring at the high end are characterized as extraverted, and at the low end, as introverted. Similarly, the Neuroticism scale is constructed so that persons scoring at the high end are characterized as neurotic, at the low end, stable. In general, average scores on both scales fall between the 31st and 70th percentiles; persons scoring above or below these cutting points would

SCALE	Strong NEG (-.80 to -.35)	Strong POS (.35 to .77)	Minimal (.00 to ±.34)
Dyscontrolled	depressed, timid		distrustful, aggressive, gregarious, trustful, control bias
Depressed	dyscontrolled, trustful, bias	aggressive	distrustful, gregarious, timid, controlled
Distrustful	gregarious, trustful, timid bias	aggressive	dyscontrolled, depressed, controlled
Aggressive	gregarious, trustful, timid bias	depressed, distrustful	dyscontrolled, controlled
Gregarious	distrustful, aggressive, control	trustful, bias	dyscontrolled, timid, depressed
Trustful	depressed, distrustful, aggressive, bias	gregarious	dyscontrolled, timid, controlled
Timid	dyscontrolled, distrustful, aggressive	controlled, bias	depressed, gregarious, trustful
Control	gregarious	timid	dyscontrolled, depressed, distrustful, trustful aggressive, bias
Bias	depressed, distrustful, aggressive	gregarious, trustful, timid	dyscontrolled, controlled

Figure 4.2. Inter-scale Relationships for PEPI.

be characterized as above or below average on the trait under consideration.

Table 4.15 presents the inter-scale correlations for this instrument.

Table 4.15

Inter-scale Correlations for EPI

Extraversion	1.00		
Neuroticism	-0.05	1.00	
Lie Scale	-0.24	-0.23	1.00
	Extrv	Neurot	Lie

As indicated in Table 4.15, the relationship of the Extraversion and Neuroticism scale shows a slight negative correlation (-.05), which is congruent with Eysenck's findings (Eysenck, 1968). This data seem congruent with Eysenck's hypothesis that the two scales are essentially uncorrelated and are orthogonal in nature.

The relationship of each of these scales to the Lie Scale shows a slightly stronger negative correlation (Extraversion/Lie Scale at -.24 Neuroticism/Lie Scale at -.23), suggesting that in this sample subjects who score high on Extraversion and Neuroticism are less prone to "fake good" on the test. Eysenck does not provide inter-correlational data for this scale, and suggests only that

a score at 10 or above shows that "faking good" is likely to have occurred.

The Birkman Method. The BM has a total of eleven personality scales; two scales (Self-Consciousness and Depressed) were combined for the purposes of this study to create a research scale labeled Getting Along With Others. The other BM scale used in the study was Dominance. Table 4.16 presents the inter-scale correlations for these two scales.

Table 4.16

Inter-scale Correlations for BM

Dominance	1.00	
G.A.W.O.	.58	1.00
	Dom	GAWO

As indicated in Table 4.16, the relationship between Getting Along With Others and Dominance shows a positive correlation at .58 suggesting an overlap of approximately 31 percent between these scales for this sample. This corresponds to information reported by Birkman (1976) indicating that Dominance and the two scales combined to create Getting Along With Others (Self-Consciousness and Empathy) all have positive correlations to one another.

Between Instrument Correlations

Correlations of scales from Plutchik's Emotions Profile Index with scales from the Eysenck Personality Profile and the Birkman Method are presented in Table 4.17.

Table 4.17

Correlations of Scales from Plutchik with Scales from Eysenck and Birkman

Plutchik					
Dyscontrolled	0.38	-0.29	-0.10	0.09	-0.13
Depressed	-0.26	0.27	0.02	-0.04	0.11
Distrustful	-0.08	0.39	-0.24	0.17	0.18
Aggressive	-0.01	0.25	-0.16	0.13	0.09
Gregarious	0.44	-0.33	0.10	-0.23	-0.31
Trustful	0.32	-0.30	0.20	-0.14	-0.24
Timid	-0.40	-0.11	0.23	-0.06	0.14
Controlled	-0.42	0.03	0.03	0.02	0.20
Bias	0.14	-0.43	0.18	-0.17	-0.24
	Extra-versn	Neuro-ticsm	Lie	Domin-ance	G.A.W.O.
	Eysenck			Birkman	

As indicated by Table 4.17, the range of correlations between the Plutchik scales and those of Eysenck and Birkman is -.43 to +.43. Again it should be noted that the

Plutchik instrument is an ipsative one, so that correlations between its scales and the scales of the other two instruments may be confounded by this factor.

Of these between-instrument correlations, only four correlations indicate relationships at ±.40 or more. Gregarious and Extraversion show a positive correlation at .44; both Timid and Controlled show negative correlations to Extraversion at -.40 and -.42, respectively. The Plutchik Bias scale shows a negative correlation to the Eysenck Neuroticism scale (-.43) indicating an inverse correlation between those who score high on Neuroticism and those who choose the more socially acceptable descriptor items in describing themselves.

Neither of the Birkman scales shows evidence of strong relationships with any of the Plutchik scales. It is of interest to this study, however, that the Birkman scale Dominance indicates a positive relationship with Distrustful and Aggressive (.17 and .13, respectively) and a negative relationship with Trustful and Gregarious (-.14 and -.23, respectively). It is also of interest that the Birkman Getting Along With Others Scale shows a negative relationship with Gregarious and Trustful (-.31 and -.24, respectively).

Correlations between the scales of the Eysenck

Personality Inventory and the Birkman Method are presented in Table 4.18.

Table 4.18

Correlations Between Scales of the Eysenck Personality Inventory and the Birkman Method

Eysenck	Birkman	
Extraversion	0.05	-0.19
Neuroticism	0.10	0.36
Lie	-0.17	-0.20
	Dominance	G.A.W.O.

As indicated by Table 4.18, the range of correlations between the scales of Eysenck and Birkman is -.20 to +.36. All relationships between the scales of these two instruments are slight. Both Birkman scales have mild negative correlations to the Eysenck Lie scale. The two scales differentiate slightly, however, in their relationships to the Extraversion and Neuroticism scales. While Dominance shows virtually no relationship to Extraversion or Neuroticism, suggesting that it measures characteristics quite independent of these two scales, Getting Along With Others does suggest a slight overlap, with a mild positive relationship with Neuroticism (.36) and a mild negative relationship with Extraversion (-.19).

Correlations Within the Affective Measures

As previously noted, the data for these correlations is based only on the 62 subjects participating in the interview phase of the study. Table 4.19 presents the correlations within the eight affective measures used in this study.

Table 4.19

Correlations Within the Set of Affective Measures

INTEREST	1.00							
DISGUST	0.35	1.00						
ANGER	0.09	0.17	1.00					
DISTRESS	0.47	0.33	0.13	1.00				
SURPRISE	0.30	0.19	-0.04	0.17	1.00			
ENJOY	0.41	0.41	0.13	0.34	0.16	1.00		
CHANGE	0.75	0.67	0.28	0.68	0.26	0.69	1.00	
RANGE	0.73	0.67	0.31	0.69	0.35	0.75	0.96	1.00
	INTER-EST	DIS-GUST	ANGER	DIS-TRESS	SUR-PRISE	ENJOY	CHANGE	RANGE

As indicated by Table 4.19, all relationships within the set of affective measures are positive ones with the exception of Surprise and Anger, which show a negative correlation at -.04. As might be expected, due to their low frequency of occurrence during the interviews, Surprise and Anger in general show the lowest correlations to one

another and to all the other scales within the set of affective measures.

The four strongest relationships are within the categories of Change, Range, Interest, and Enjoy. The high positive correlation between Change and Range (.96) suggests that those who change from one category of affect to another most frequently are also most likely to display a wider range of affect categories. The high positive relationships between both Enjoy and Interest with Range (.75 and .73, respectively) suggest that those who most frequently use Enjoy and/or Interest are likely to display a wider range of affect categories. Finally, the high positive relationship between Interest and Change (.75) suggests that those who use Interest most frequently are also most likely to change from one affect category to another the most frequently.

With regard to potential patterns of usage among affect categories, correlations within the four most frequently used affects (Distress, Interest, Enjoy, and Disgust) do show some differential combinations. The highest correlates of Distress and Interest are one another, at a .47 correlation. The highest correlate for Disgust is Enjoy, at a .41 correlation. The highest correlates for Enjoy are Disgust and Interest, each at a .41

correlation. Thus Distress/Interest and Disgust/Enjoy seem to be the two most consistent sets of combinations.

Correlations Between Test Instruments and Affective Measures

Correlations between scales of the pencil/paper instruments and the eight affective measures are presented in Table 4.20.

As Table 4.20 indicates, the range of correlations between the affective measures and scales of the pencil/paper instruments is -.29 to +.27, suggesting only mild relationships between any of these dependent and independent variables. The affect measure Disgust shows the largest number of relationships at $\pm$.20 or above, and also has the highest correlational values, with a negative relationship with Trustful (-.29), a positive relationship with Distrustful (.27), and a negative relationship with Gregarious (-.25).

As previously noted, the data for correlations between the independent variables and the affective measures are based on scores from 168 subjects on the pencil/paper instruments and scores from 62 subjects on the affective measures. Since some of the earlier tests (based only on subjects who score high or low on the independent measures) do show significant relationships, the

Table 4.20

Correlations Between Instrument Scales and Affective Measures

EXTRAVERSION	-0.09	-0.12	-0.18	-0.06	-0.14	-0.06	-0.17	-0.16
NEUROTICISM	-0.08	0.06	0.04	0.08	-0.05	0.05	0.03	0.04
LIE SCALE	0.01	-0.06	-0.06	-0.06	0.01	-0.02	-0.04	-0.07
DYSCONTROLLED	-0.03	-0.03	-0.03	0.03	-0.03	0.00	-0.01	0.00
DEPRESSED	-0.07	0.02	0.15	0.04	0.06	0.03	0.05	0.05
DISTRUSTFUL	0.03	0.27	0.18	0.10	-0.08	0.09	0.14	0.16
AGGRESSIVE	-0.02	0.21	0.18	0.12	0.01	0.05	0.15	0.15
GREGARIOUS	-0.09	-0.25	-0.22	-0.09	0.05	-0.11	-0.23	-0.22
TRUSTFUL	-0.06	-0.29	-0.22	-0.11	-0.03	-0.10	-0.23	-0.23
TIMID	0.08	-0.13	-0.10	-0.11	0.00	0.00	-0.02	-0.06
CONTROLLED	0.15	0.11	0.06	0.06	0.07	0.08	0.17	0.16
BIAS	0.00	-0.24	-0.21	-0.14	0.02	-0.07	-0.18	-0.17
DOMINANCE	-0.01	0.02	0.12	-0.10	-0.12	-0.10	-0.03	-0.06
GETTING ALONG WITH OTHERS	-0.04	-0.01	0.02	0.03	0.03	-0.07	0.00	-0.03
	INTER-EST	DISGUST	ANGER	DIS-TRESS	SUR-PRISE	ENJOY	CHANGE	RANGE

generally weak relationships indicated by Table 4.20 suggest that there may be a curvilinear relationship between the independent and dependent variables. That is, relationships between test scores and affective measures appear more clearly differentiated when only high and low groups are compared on the affective measures, and not when the full range of test scores is compared on these measures.

Correlations Between Methodological Measures and Affective Measures

Rater scores on two measures, percentage of agreement per subject and number of discards per subject, were averaged and included in the correlational matrix. Table 4.21 presents correlations between these scores and subject scores in each of the affect categories.

Table 4.21

Correlations Between Methodological Measures and Affective Measures

Percentage of Agreement	0.76	0.65	0.22	0.63	0.29	0.82	0.93	0.96
# of Discards	0.45	0.62	0.15	0.56	0.25	0.58	0.75	0.75
	INTEREST	DISGUST	ANGER	DISTRESS	SURPRISE	ENJOY	CHANGE	RANGE

As indicated by Table 4.21, correlations between the percentages of rater agreement per subject and subjects' scores on affective measures all show positive relationships. Subjects who displayed high percentages of Enjoy show the strongest relationship to high percentages of rater agreement (.82) followed by subjects who displayed high percentages of Interest (.76), of Disgust (.65), of Distress (.63), of Surprise (.29) and of Anger (.22). These relationships are similar to those presented in Table 3.1 (Rater Agreement by Affect Category) where the category with the highest rater agreement was Enjoy, followed by Interest, Disgust, and Distress. Surprise and Anger switch order here, as the category Anger had a higher percentage of rater agreement than did Surprise, while subjects displaying a high percentage of the affect Surprise had a higher correlational relationship to rater agreement than did those displaying Anger.

Summary

The fifteen hypotheses used in the study were tested to determine group differences on the affective measures. The nine independent variables on which subjects were divided into high and low groups were Gregarious, Distrustful, Depressed, Dyscontrolled, Aggressive,

Getting Along With Others, Dominance, Extraversion, and Neuroticism. The affective measures used were Enjoy, Disgust, Distress, Surprise, Anger, Interest, Range of Affect, and Change of Affect. T-tests were used to test group differences, with the alpha level set at $p < .05$. Significant differences were found between high and low Distrustful groups on the affective measure of Disgust ($p=.008$); and between high and low groups of Getting Along With Others on the affective measure of Range of Affect ($p=.028$).

A multivariate analysis of variance was performed in order to examine how the two groups of subjects on each independent variable relate to the set of eight dependent measures. Significance was considered at an alpha level of .05 for this test. No significant differences were found for any of the independent variables on the set of eight affective measures.

Additional t-tests were used to further explore the relationships between independent and dependent variables not addressed in the hypotheses. In addition, t-tests were used to test group differences on two methodological measures, rater agreement and number of discards per subject. No significant differences were found between groups on the methodological measures.

Additional differences were found, however, between high and low Gregarious groups on the affective measure Disgust and on the affective measure Change of Affect; between high and low Distrustful groups on the affective measure Interest; and between high and low Aggressive groups on the affective measure Disgust. Significance was considered at an alpha level of .05 for these tests; evidence of significant differences, however, was regarded cautiously since there is inadequate information about the overall Type I error rate for this group of univariate analyses.

Correlational analyses were used to provide descriptive information about relationships within and between the set of pencil/paper instruments used as the independent variables, within the set of affective measures used as the dependent variables, and between the test instruments and the affective measures.

Scales from Plutchik's Emotions Profile Index were found to range in correlational values from -.80 to +.79. Scales comprising bi-polar pairs showed differential strengths of negative relationships, ranging from -.19 to -.60. It was noted that correlations within the scales of this test may be confounded by the ipsative nature of the instrument.

Scales from the Eysenck Personality Inventory were found to range in correlational value from -.24 to -.05, with the two major scales (Extraversion and Neuroticism) at -.05. This relationship seems congruent with Eysenck's hypothesis that the two scales are orthogonal in nature.

The two scales from the Birkman Method used in the correlational analyses show a positive relationship at .58, suggesting a moderate overlap between these two dimensions.

Correlations between the instruments range from -.43 to +.43 for Plutchik and Eysenck, from -.31 to -.20 for Plutchik and Birkman, and from -.20 to +.36 for Eysenck and Birkman. Relationships that were of interest to the study were noted and will be discussed further in Chapter V.

Correlations within the set of eight affective measures ranged from -.04 to +.96. The strongest correlational relationships were found between the measures of Change and Range (.96), Enjoy and Range (.75), Enjoy and Interest (.73), and Interest and Change (.75). The possible implications of these relationships will, again, be discussed in Chapter V.

Correlations between test instruments and affective measures ranged from -.29 to +.29, suggesting only mild relationships between any of the independent and dependent variables. Since the earlier t-tests (using only high and low scores from the independent variables) indicated stronger relationships than did the correlations (which included all scores from the independent variables) it was noted that there may be a curvilinear relationship between the sets of independent and dependent variables.

CHAPTER V

SUMMARY, CONCLUSIONS, AND DISCUSSION

In this chapter, the study is summarized, conclusions based on data analysis and methodology are explored, and a discussion of suggestions for future research and implications for therapy is presented.

Summary

The primary purpose of this study was to investigate whether there are significant differences in expressions of facial affect as recorded on videotape and measured by trained judges between persons with specific personality characteristics as measured by pencil/paper personality instruments. The specific questions addressed were: Do persons on specific personality dimensions vary in the types of facial affect they express; Do persons on specific personality dimensions vary in their frequency of change from one affect to another; and Do persons on specific personality dimensions vary in the range (or number of types of affects) they express.

The secondary purpose of the study was a methodological one, and responded to the problems of measuring,

quantifying, and recording facial affect. The study was intended to contribute to the methodological literature by describing any further refinements in techniques and procedures, and by continuing to address whether current technology permits meaningful data in this area.

The assumption that personality characteristics related to emotional style are discernable in the face by specific expressions of facial affect was the basis for this research. The potential use of such information for subsequent research efforts and therapeutic intervention provided impetus for the study.

A review of the literature was conducted in four related areas: Emotion, Facial Expression of Emotion, The Scoring of Facial Affect, and Specific Affects to be Used in This Study. The summary of Emotion noted that while this phenomenon has been studied from the evolutional, biological, and cognitive perspectives, as well as from the psychometric standpoint, it has not yet been successfully delimited nor conclusively defined. Darwin, as the first widely recognized scientist to propose a relationship between facial expressions and internal emotional states, began to identify categories of emotion on the basis of facial expressions, and to speculate on the functional or survival value of each.

Subsequent to Darwin, Sylvan Tomkins developed a theoretical framework for the emotions system as it interplays with the other physiological and psychological mechanisms, and includes the psychodynamic functions of the different affects and the relatedness of facial activity to the experience of these affects.

Based largely on the work of Darwin and Tomkins, other researchers such as Ekman and Izard have worked to more systematically classify categories of affect, develop labeling and recognition techniques for these categories, and generate empirical data about the labeling process as well as about the cross-cultural evidence for these fundamental categories. A recent development in this research area was stimulated by Haggard and Isaacs, with the discovery that the expressions of facial affect may have a demonstrable relationship to certain aspects of psychological functioning, such as the presence of ego mechanisms.

The scoring of facial affect continues to be problematic, partly due to the subjective nature of the task, and partly due to the technological procedures, which are for the most part cumbersome and costly. Systematic procedures have been developed, nevertheless, to facilitate this process, and were used where applicable as guidelines for research procedures in this study.

In deciding upon which facial affect categories to use in this study, considerations of reported rater reliability and likelihood of occurance for each affect category was made. The categories of interest, anger, disgust, surprise, enjoyment, and distress were selected to be used as the dependent measures for the study. It was noted, however, that interest was used as a neutral category and did not appear in the formal statements of hypotheses.

Subjects were solicited from the undergraduate population of the University of Texas-Austin. One hundred sixty-eight subjects were administered the battery of pencil/paper research instruments used in the study. Sixty-two were subsequently selected to participate in the interview, on the basis of their high or low scores across the nine personality dimensions used.

The three pencil/paper instruments used to assess personality characteristics were the Plutchik Emotions Profile Index, the Eysenck Personality Inventory, and the Birkman Method. Subjects were divided into two groups (high and low) based on their scores on one of the personality dimensions at a time.

The interviewer was the same individual for all

subjects, and was instructed to engage in a responsive but non-confrontive manner. Subjects were asked to select an item of personal interest from the Mooney Problem Check List's "Personal Psychological Relations" scale, and then to talk with the interviewer about that topic for 15 minutes.

The interviews were videotaped, and a systematic sampling procedure was used to prepare the data for rating. The last three seconds of each 20 second interval of the interview was recorded as a discrete segment onto a master tape, resulting in a total of 1,860 samples for the study. Samples from individual subjects were grouped in sets of five, and arranged in semi-random order on the master tapes so as to minimize response set on the part of the raters. Raters subsequently scored 30 individual samples of facial affect for each subject.

Three females were trained as raters for the study. The training was an intensive five hour program based on techniques developed by other researchers in the area at Michigan State University (Inman, 1976; Wilson, 1976; Bowles, 1978). The training included the use of both slides and videotapes, with both posed and unposed samples of facial affect. The six categories used in the study (Interest, Anger, Disgust, Surprise, Enjoyment, and

Distress) were clearly defined, and criterion characteristics labeled. Two additional measures, Change of Affect and Range of Affect, were compiled on the basis of calculating number of changes from one category to another and number of categories used, from the rater scoring sheets.

A judgement for any one of the six categories was defined as agreement between at least two of the three raters. In the case where there was no agreement for a specific sample, the sample was considered unscoreable data. Judges did not begin the rating task until a .8 percentage of agreement had been established.

All hypotheses were stated so as to test the relationship between performance on specific personality dimensions and the type, range, or frequency of change of facial affect. Hypotheses were tested by a comparison of groups on the affective measures, using t-tests, with an alpha level set at .05. Supplementary analyses from the multivariate, univariate, and correlational aspects were also used for further exploration of differences and relationships.

Results

The fifteen hypotheses used in the study were designed to determine group differences on the affective

measures. The nine independent variables on which subjects were divided into high and low groups were Gregarious, Distrustful, Depressed, Dyscontrolled, Aggressive, Getting Along With Others, Dominance, Extraversion, and Neuroticism. The affective measures used were Enjoy, Distress, Disgust, Surprise, Anger, Interest, Range of Affect and Change of Affect. All hypotheses were tested at an alpha level of .05.

The null hypothesis was rejected for two of the 15 hypotheses. A significant difference was found between high and low Distrustful groups on the affective measure of Disgust (p=.008) indicating that persons who score high on Distrustful tend to display more disgust than do persons who score low on this scale. A significant difference was also found between high and low groups of Getting Along With Others on the affective measure Range of Affect (p=.028), indicating that persons who score high on Getting Along With Others tend to display more types of affect than do persons scoring low on this scale.

While the hypothesized differences for Distrustful and Getting Along With Others were significant and congruent with Tomkins (1962, 1963), the lack of support for the remaining hypotheses may, tentatively, indicate a lack of empirical support for Tomkins' suggested relationships between facial affect and personality characteristics. This lack of support might have been more a

measurement than a theoretical problem, since the variance within groups indicated that means between high and low were not as independent as would have been desired; nevertheless, the lack of significance for predicted relationships and the evidence of significance for non-predicted relationships (discussed under Findings) remains troublesome.

Discussion

The discussion section will be presented in two parts: Findings and Methodology. The Findings section will present conclusions and limitations related to the hypothesized relationships between facial affect and personality dimensions, and to the supplementary analyses pertinent to this issue. The Methodology section will present conclusions and limitations related to the use of raters and affect categories in the study.

Findings

Significant findings of hypothesized differences were limited, but additional t-tests did show evidence of further differences between high and low groups on the independent variables. The independent variable Dyscontrol was the single personality dimension which failed to show any evidence of group differences on any one of the

affective measures.

The independent variables Gregarious, Distrustful, Aggressive, and Getting Along With Others all showed evidence of significant differences between their respective high and low groups on at least one affective measure at $p < .05$. The high Gregarious group showed less Disgust ($p=0.27$) and less Change of Affect ($p=.034$) than did the low Gregarious group. The high Distrustful group showed less Interest ($p=.047$) than did the low Distrustful group. The high Aggressive group showed more Disgust ($p=.022$) than did the low Aggressive group. The high Getting Along With Others group showed greater Range of Affect ($p=.028$ as reported under Hypothesis 6) than did the low group.

In addition, Gregarious and Aggressive did show group differences between means in hypothesized directions, but the high within-group variances may have obscured significance. The high Gregarious group had a higher mean than the low Gregarious group on the measure Enjoy, at $p=.065$; the high Aggressive group had a higher mean than the low Aggressive group on the measure Anger, at $p=.097$ (see Appendix E for these tables).

The four remaining independent variables, Depressed, Dominance, Extraversion, and Neuroticism, all showed evidence of group differences, though not always in the

hypothesized direction, nor on the affective measure addressed in the hypothesis testing. Depressed showed no evidence of high/low group differences on the hypothesized measure of Distress, but did show group differences on the measures of Interest, Anger, Range of Affect, and Percentage of Rater Agreement, at probability levels of .164 or less.

Dominance showed evidence of high/low group differences on the hypothesized measures of Distress and Change of Affect, but in the direction opposite of that hypothesized, at probability levels of .264 and .239, respectively.

Extraversion showed evidence of high/low group differences on the measures of Enjoy and Disgust, at probability levels of .174 and .175, respectively, and in the hypothesized directions. In addition, there was evidence for group differences on the measures Range of Affect, Change of Affect, and Anger at probability levels ranging from .063 to .118.

Finally, Neuroticism did not show evidence of group differences on the hypothesized measure Change of Affect, but did show evidence of group differences on the measure Interest at p=.080.

The probability level of these later tests is such that they must all be viewed with caution; nevertheless

there appears to be evidence beyond the two hypotheses showing significant test results that high and low groups on these personality dimensions do differ in their expressions of facial affect when measured by the categories in this study. While this evidence for further differences is encouraging, it is nonetheless difficult to interpret. Evidence of further differences between these groups on the affective measures mentioned in some cases appears to contradict theoretical relationships proposed by Tomkins (1962, 1963), and in many cases appears to be without theoretical underpinnings and is consequently left unexplained.

Aside from the basic question of whether there is sufficient theory upon which to base predictable differences, a second question is whether a broader population containing more extreme personality scores might be needed in order to find the differences postulated by this study. Noting that there was evidence of a curvilinear relationship between the independent and dependent variables, it is possible that while the population in this study did range from high to low on the independent measures, it was too homogeneous or too limited in its extremes to allow evidence for clearer differences between groups.

In addition, the subjects used for high and low

groups on the independent measures overlapped, so that one subject was used in from two to five of these high/low subgroups, thereby decreasing the independence of affective measures between these subgroups. The limitations of the subject pool, then, both in terms of extreme scores and in terms of overlap, may have contributed to the lack of significant group differences, despite the fact that group differences were found on some of the measures.

A third question is whether the differences predicted on the affective measures between these personality types are observable in the interview setting that was used. While this setting was purposefully designed to be a neutral stimulus so that natural interaction patterns might emerge, it was limited to a 15 minute time frame, and might have elicited only those patterns which are present in the initial phase of an interaction between two strangers. It is possible that samples of facial affect over a much longer period of time would reflect an increase of self-disclosure such as that described by Jourard (1964), and would be different from the introductory behaviors that were measured by this study.

Finally, there is the question of whether the affective measures used as dependent variables were the appropriate ones for which to test these differences. Since

these behavioral measures are considerably more specific than the more global trait measures to which they were compared, it may be that the information they yield is too limited to establish significance on these grosser personality measures. A more appropriate procedure might have been to have established a single, primary mode of affect for each subject which could then have been tested across personality dimensions. A second possibility would have been to collapse the specific affect categories into grosser measures such as happy and unhappy, or into the more general depressed/non-depressed categories used by Ekman and Friesen (1974b) in their study of depression in a clinical population.

In conclusion, while it was possible to establish empirical support for two of the hypotheses, and to establish evidence of differences or of significant differences between personality traits on the affective measures, it remains unclear whether the lack of support for the remaining hypothesized differences is a result of inadequate theory or of the limitations of the study. The following section addresses further limitations in considering the methodological aspects of the study.

Methodology

While rater agreement was generally high for the

task of rating moving facial affect, it was less than optimal for considerations of accuracy and replicability. In comparison to Izard's study reporting percentage of agreement among American females for labeling affect categories, the inter-rater reliability per affect category for the raters in this study was generally five to fifteen percentage points higher for each category (Izard, 1971, pg. 272). For the categories of Anger and Surprise, however, agreement was considerably lower than than reported by Izard (Anger, 48 vs. 70 percent; Surprise, 36 vs. 89 percent). Low percentages of rater agreement for Surprise and Anger in this study were confounded by the fact that the two affects appeared so infrequently they had few total ratings on which to establish a percentage of agreement. A second consideration, however, is that of the six types of affects used, Anger and Surprise are typically the most intense but also the most fleeting of these. Thus their transient nature not only makes them more difficult to sample, but also more difficult to judge.

It is also of note that Izard's percentages of agreement are based on judgments of photos or slides, thus while an adequately high percentage of agreement has been established for these categories on the basis of still samples, agreement based on this study suggests that these

categories might be much less reliable measures in the judgment of moving facial affect.

Of the four categories used most frequently by subjects (Enjoy, Interest, Disgust, and Distress), Disgust and Distress had the lowest agreements and seemed the most difficult to differentiate from one another (indicated by Figures 3.2 through 3.7 showing rater disagreement). It is difficult to determine whether the problem was confusion about the distinctions between the two categories, whether both appeared in the same 3-second sample and there was disagreement about which to label as predominant, or whether they were experienced simultaneously by the subject and thus expressed as a blended affect. Since Enjoy is also a frequent component of blended affect, however (Ekman and Friesen, 1975), and since the distinctions between Enjoy and either Distress or Disgust seemed much clearer (Figure 3.6), it seems more likely that the problem was in adequately distinguishing them from one another, rather than that they occurred as blends or consistently together within the same samples.

The subjectivity of the rating task remains a perplexing issue. Informal observations suggested that it was difficult for raters to maintain a consistent standard for whether an expression of affect was sufficiently strong

to be labeled as such. While raters maintained agreement with one another, they were more demanding of a strong, clear affect display at the beginning of a rating session in order to consider it different from neutral; toward the end of a rating session they were more likely to accept subtle expressions as sufficiently different from neutral to be judged as one of the other categories.

Some subjects were more difficult to rate than others, as evidenced by Figure 3.1, which indicates a range of 30 percentage points of agreement across subjects. There is also evidence to suggest that percentage of rater agreement may vary with personality type in some cases. The supplementary univariate analyses, for example, show rater agreement as higher for those scoring low on Getting Along With Others and on Dominance (p=.078; p=.077, respectively) than for those who scored high on these measures. (See Appendix E for Group Differences on Percentage of Rater Agreement.)

A final problem was with the affect measures themselves, in that raters commented on differences between some subjects which were not captured by the affect categories used in this study. On an informal basis, for example, raters agreed that some faces were distinctly more labile than others, and that this dimension was not always

reflected in the Change of Affect measure. Additionally, they agreed that types of smiles between subjects were qualitatively different (anxious smiles; rigid, mask-like smiles; relaxed, casual smiles) and were not discriminated for by the one measure of Enjoy.

In conclusion, for the task of rating moving facial affect it was possible to establish normatively high rater agreement for categories of Enjoy, Interest, Distress, and Disgust, but not for Anger and Surprise. While this might be reflected as a limitation of the study, in that the neutral setting did not elicit these affects as frequently, or in that the methodology did not provide for proportional sampling of these categories, it may also imply that the reliability for these affects is not sufficiently high to use with moving facial affect.

In addition, it was difficult to distinguish between Distress and Disgust, suggesting that these two categories may yield less reliable data and might profit from the development of more clearly differential criteria regarding their respective qualities.

While subjectivity was controlled for at the beginning of each rating session by re-viewing the training tape, there were differences in rater standards between the beginning and end of a session, suggesting that this must

still be considered a limitation of the methodology as well as of the study.

Finally, there were observable differences between subjects that were not scoreable by existing measures, which did not appear to influence the reliability of the measures used, but did result in a loss of data that might have been pertinent to this particular study.

A notable deficit in the scoring of moving facial affect is the lack of a standardized, packaged training program such as Ekman's "Facial Affect Scoring Technique" (Ekman, Friesen and Tomkins, 1971), which was developed for use with still samples. While standards of reliability established by percentage of rater agreement were viewed as adequate for the purposes of this study, the replicability is severely limited by the subjective and idiosyncratic nature of the training program, and of the process itself. Repeated use of this methodology with different samples, however, might allow for the development of a standardized rater training program for use with videotape or moving affect.

Implications

Suggestions for Further Research

The field of facial affect is a relatively new

one, and the possibilities for relating expressions of facial affect to personality dimensions or using them as psychodiagnostic information is even more recent (Haggard and Isaacs, 1966; Wilson, 1976a; Izard, 1971; Ekman and Friesen, 1974b). While this study shows only limited empirical support for these efforts, it nevertheless does not contradict these possibilities. Of primary importance is a tighter, more comprehensive theory to provide direction in this area. Continued research efforts can provide more stimulus for theoretical models, as well as empirical support or lack thereof for existing theory.

In order to work within the current state-of-the-art perspective, more descriptive studies should be done in order to factor out which variables can be most profitably considered. Measurement, research conditions, and population parameters must continue to be investigated in order to determine which procedures may be most useful.

In order to overcome the possible effects of homogeneity within the sample, the current study should be replicated with a larger sample, and with a sample substantially more diverse on the abnormality/normality continuum with respect to each of the independent measures used.

Finally, considerations of facial affect measurement based on this study suggest that at this stage, it may

be more profitable to establish a primary mode of affect for each subject, which can be compared across independent measures, rather than to consider a multiple set of affects in comparison to a diverse set of personality dimensions, with an insufficient amount of theory to direct hypothesized differences. Secondarily, it may be more appropriate to use grosser measures such as micro-momentary expressions or happy/unhappy dimensions than it is to use the more discriminate categories of facial affect to relate to the more global personality measures such as those used by this study. It is of utmost importance that methodological considerations continue to form part of the basis for future research in this area.

Implications for Therapy

Due to the exploratory nature of this study and the aforementioned limitations, results must be regarded with caution, and particularly those which were not formally hypothesized. There is evidence to suggest, nonetheless, that the clinician who observes facial affect might begin to speculate on the amount and type of information available through these facial expressions. Based on this study, the clinician might begin to observe whether, indeed, a high frequency of the affect Disgust

signals personality characteristics of high Distrustfulness or Aggression, or of low Gregariousness; or whether a wide range of affect signals a personality characteristic of internal sensitivity, such as that described by the Getting Along With Others scale.

Hopefully, for those who use nonverbal information in the clinical setting, this research has pinpointed one particular area of nonverbal behavior in a manner that will stimulate further thought and observation, as well as having explicated it in such a way that the limited amount of information we do now have in this area can become useful.

APPENDIX A

SUBJECT CONSENT FORMS FOR RESEARCH PARTICIPATION

SHORT CONSENT FORM FOR RESEARCH STUDY

I, _____, hereby give my consent to participate in research study on _____, the general plan of which has been explained to me including anticipated benefits, risks, and potential complications.

I fully understand as it has been explained to me that by notice given to the undersigned principal investigator that I may withdraw from this research project anytime that I may elect to do so.

_____ _____

Parent's/Guardian's Signature in the case of a minor (under 18 yrs of age)

Participant's Signature

* * * * * * * * * *

I hereby certify that I have given to the above individual(s) an explanation of the contemplated study and its risks and potential complications.

_____ _____

Date

Signature of Principal Investigator

REV. 8-76

THE BIRKMAN METHOD
INFORMATION SHEET

File No.: _____

Date: _____

Name: _____ Phone number where you can be reached _____
Last First Middle

Address: _____
Street City State Zip

Present Employer: _____

Present Job Title: _____

Reason for completing Birkman Questionnaire (Check one):

☐ Job Applicant ☐ Counseling ☐ Seminar ☐ Other _____

If Job Applicant, Company Applied To: _____

Position Applied For: _____

Have you completed the Birkman Method Questionnaire before: ☐ Yes ☐ No

If yes, for whom: _____

The following information will be used for research on fair employment practices only. Please complete; however, you are under no obligation to do so.

Age _____ Sex _____ Race _____ Educational level _____

PROFESSIONAL PARTICIPATION AGREEMENT

I hereby authorize Birkman & Associates, Inc., to report to _____ the results of their analysis of The Birkman Method forms as completed by me today. I authorize this same person or organization to use these forms and the Birkman Reports for research purposes.

Signature _____

APPENDIX B

INTERVIEW MATERIALS

Items of the Personal Psychological Relations

Scale of the Mooney Problem Check List

16. Being timid or shy
17. Being too easily embarrassed
18. Being ill at east with other people
19. Having no close friends in college
20. Missing someone back home

71. Wanting a more pleasing personality
72. Losing friends
73. Wanting to be more popular
74. Being left out of things
75. Having feelings of extreme loneliness

126. Feelings too easily hurt
127. Being talked about
128. Being watched by other people
129. Worrying how I impress people
130. Feeling inferior

181. Being too envious or jealous
182. Being stubborn or obstinate
183. Getting into arguments
184. Speaking or acting without thinking
185. Sometimes acting childish or immature

236. Disliking someone
237. Being disliked by someone
238. Feeling that no one understands me
239. Having no one to tell my troubles to
240. Finding it hard to talk about my troubles

291. Too self-centered
292. Hurting other people's feelings
293. Avoiding someone I don't like
294. Too easily led by other people
295. Lacking leadership ability

VERBAL INSTRUCTIONS TO SUBJECTS DURING INTERVIEW

(As subject enters the interview room) Hi, my name is _____. (Wait for subject to respond with his/her name; if s/he doesn't, ask "What's your name?") (Motion for subject to sit in appropriate chair while explaining.) This is the interview part of the research study. We'll be talking for about 15 minutes about something that is of concern to you. I'd like you to take this stack of cards (hand subject the index cards) and just turn them over, one by one, until you see a topic that is of concern or interest to you. Stop with the first topic you find that you can talk about; then just let me know what the topic is as you begin to talk about it.

Interviewer instructions, as previously stated in "Procedures" are to indicate understanding by nonverbal acknowledgement, or to verbally reflect or briefly paraphrase the content that the subject is presenting. The interviewer will not challenge, nor lead the subject in a specific direction, but rather engage in a more passive style that simply encourages the subject to continue talking.

If the subject exhausts the topic before the 15 minutes are us, s/he may look at the cards again, select another topic, and begin again. In the event that a subject appears particularly anxious and unable to explore any chosen topic at length, the interviewer may respond to the anxiety in a reflective manner, and encourage the subject to stay with a topic a little longer by considering different aspects of the issue.

Code #_____

Age_____ Male Female

Fresh Soph Jr Sr

SELF-REPORT FORM

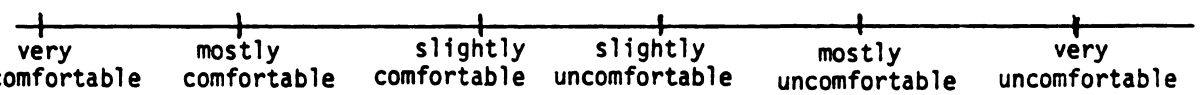
1) Check any of the following adjectives that apply to how you have been feeling in general today:

ANGRY	CONTENT	DISAPPOINTED		UPSET	SURPRISED
HAPPY	IRRITATED	ANXIOUS	SAD	INTERESTED	WORRIED
DISGUSTED	SCARED	FRUSTRATED	CYNICAL	EMBARRASSED	

2) Were any of these feelings particularly strong for you during the 15 minute interview? If so, which one(s)?

3) How are you feeling now?

4) Please check the level of comfort you felt in talking with the interview person:



5) Were you aware of any emotions that you experienced during the interview, but tried not to let the interview person know about? If so, please list those emotions here:

Thanks again for your cooperation. Your participation has been greatly appreciated.

Fran Stott, Staff Member
Counseling Center,
and Principal Investigator

Augustine Baron, Jr., Psy.D.
Chairman, Research Committee
Counseling Center

AUDIO/VISUAL RELEASE FORM

I understand that my signature below gives the experimenter permission to keep and use the audio/visual tape recording made during my interview, and to take selected samples from it in the preparation of a master tape that will be used to rate facial affect.

I understand that the primary purpose of these tapes will be for the collection of dissertation data, and that their primary use will be for observation and scoring by trained judges participating in the study. I also understand that segments of the tapes may on occasion be used for teaching purposes or presentations to professional groups.

I understand that the confidentiality of the material will be protected, and that in no way will my name or other personally identifying information be linked with the audio or video taped material. I also understand, however, that inasmuch as my facial features will be a part of the recording, there is a possibility that I may be recognized by those to whom the recorded material is played, and for this I do not hold the experimenter or her associates responsible.

SIGNATURE_____

DATE_____

EXPLANATION OF THE STUDY

There is a good deal of recent literature to suggest that one's emotions or emotional experiences can be studied on the basis of facial expressions. The type of emotions that we express on our faces, the emotions that we try to hide or cover up, and even the emotions that never appear can all be clues to the emotions we are experiencing, or to our emotional experience.

This project has undertaken to study the facial expression of emotion in three ways: by the types of emotions that are expressed facially, by the range of types that are expressed, and by the frequency of change from one emotion to another. This information about the facial expressions will be correlated to information about particular personality characteristics as measured by the three instruments completed earlier in the study, in order to examine possible relationships between personality characteristics and facial affect.

The interview setting was designed so that participants would be talking about a problem or personal concern, and so that the facial expressions recorded would to some extent provide information about the emotions the individual normally experiences in a problem solving setting. This information, in combination with the other test instruments, should provide new and useful

information regarding the manner in which students cope with problems. It is hoped that this information can be useful in designing programs and interventions that will be helpful to students in the future.

We would prefer that you not discuss the focus on facial affect with other participants until after all interviews have been completed. Our experience has been that people become very self-conscious when aware that their faces are being studied, thus this information could distort or alter the facial expressions we are videotaping. Our preference is that participants be aware of the more general nature of the study--the issue of problem solving styles--until they are de-briefed following this interview.

Again we thank you for your cooperation and participation in this study. Should you wish to receive a report on the outcome of the research, please write your name and address on the attached sign-up sheet.

Fran Stott, Principal Investigator
Counseling Center
University of Texas, Austin

APPENDIX C

RATER TRAINING MATERIALS

CROSS-CULTURAL SIMILARITIES IN FREE-RESPONSE LABELING OF EXPRESSIONS (Izard)

N= 268: 89 Americans, 62 British, 67 French, 50 Greeks
A Priori definitions of emotion categories are centered, followed by correct transcultural free-response labels in columns.

INTEREST-EXCITEMENT
concentrating, attending, attracted, curious

attentive	fervor (b)	questioning
concentration	inquisitive	reflection (a)
concern (a)	interest	religious fervor (b)
contemplation (a)	ovservation (b)	seriousness
curiosity	pensive	somber reflection
deliberating	pondering	thoughtfulness
excitement (b)	puzzlement	wonder
expectation (a)		

ENJOYMENT-JOY
glad, merry, delighted, joyful

amusement	gratitude (b)	playful
bliss (a)	happiness	pleasantness
clowning	humor (a)	pleasure
contentment	jovial	rapture
delight (a)	joy	satisfaction
ecstasy	laugh	sees something pleasant
elation	merry	self-satisfaction (a)
enjoyment (b)	mystical ecstasy	serenity (a)
gaiety	optimism	smile
glee (a)		

SURPRISE-STARTLE
sudden reaction to something unexpected, astonished

amazed	pleasant astonishment	surprise
amused surprise (b)	pleasant surprise (b)	joyful surprise
astonishment	shock	startle (a)
fearful astonishment		

---

a) most commonly used by females
b) most commonly used by males

DISGUST-CONTEMPT
sneering, scornful, disdainful, revulsion

aversion (b)
contempt
cynical
derision
disapproval
disdain
disgust
dislike
distaste
insolence (b)
mockery (a)
repugnance (a)
repulsion
sarcasm
scorn
skepticism
smirk (a)
smug (b)
sneer
superiority

ANGER-RAGE
angry, hostile, furious, enraged

aggressive
anger
bitterness (b)
enmity (a)
ferocity (a)
furious
fury
mad
rage
revenge (a)
spite
vengeful (a)
vexation (b)

DISTRESS-ANGUISH
sad, unhappy, feels like crying

about to cry (a)
anguish
bad news
crying
dejected
dejection
depression
despair
disappointment
distress
grief
hurt
loneliness
melancholy (b)
misery (a)
not going well
pain (a)
pathetic
pity (b)
sad
sorrow
suffering (a)
troubled (a)
uneasiness
unhappy
unloved (a)
upset (a)
worry

From Izard, Carroll, 1971.

DESCRIPTION OF FACIAL AFFECT CATEGORIES

A. INTEREST

(1) Description: Interest is usually aroused when one spontaneously attends to the environment.

(2) Duration: Most people can maintain this affect over long periods of time.

(3) Function: The function of Interest is taking in information about the environment.

(4) Synonyms: Curious, concentrating, attending, absorbed, involved, attracted, intense, fascinated.

(5) Facial Components: Eyebrows level but may be slightly raised or lowered. Eyes open and usually fixated. Lips may be parted and jaw dropped slightly.

B. ENJOYMENT

(1) Description: Enjoyment is most people's favorite affect--stimulated either by the onset of pleasant stimuli or the cessation of unpleasant/painful stimuli.

(2) Duration: The duration of this emotion varies with intensity. Mild enjoyment can be maintained for extended periods of time while ecstasy is maintained for shorter periods.

(3) Function: The function of Enjoyment includes both an internal component (self reinforcement) and an external component (social bonding).

(4) Synonyms: Happy, glad, merry, joyful, cheerful, blissful, jubilant, gay, elated, ecstatic, gleeful, jovial.

(5) Facial components: Eyebrows level or slightly lowered. Eyes bright or may be partially closed; eyes often have wrinkles ("crows' feet") in the outer corners. Corners of the mouth lifted back and up (exaggerated with laughing). Teeth often partially exposed, upper lip tensed. Nasolabial folds (running from the nose to the outer edge of the mouth) are evident.

C. SURPRISE

(1) Description: Surprise is triggered by the unexpected. If one anticipates an event, then it is impossible to be startled or

surprised. Dramatic examples of stimuli that trigger the surprise/startle response include an unexpected gunshot, or a flashbulb going off close at hand.

(2) Duration: Surprise is distinguished by its very brief duration. It is sudden in its onset and fades quickly.

(3) Function: The function of Surprise is the clearing of the sensory systems for assimilation of new information.

(4) Synonyms: Astonished, amazed, shocked, flabbergasted.

(5) Facial Components: The brows are raised so that they are curved and high, the forehead wrinkles horizontally. The eyes are widened so that the white is visible above and sometimes below the pupil. The jaw drops so that the lips are loosely parted.

D. DISGUST

(1) Description: Disgust is aroused by a disagreeable sensory experience: a "yeechhy" taste, a bad smell, an unpleasant sight, or a repulsive feeling object. More complex stimuli, such as ideas, things, or people can arouse disgust as well. There is an aloofness and a distancing or "put-down" component to the emotion Disgust; a sense of getting away from or getting rid of.

(2) Duration: In mild to moderate forms, Disgust may be experienced for extended periods of time. However as disgust increases in intensity, so does the probability of nausea and vomiting, thus people often try to "leave the scene" before the feeling becomes this intense.

(3) Function: The function of Disgust is expulsion, a getting rid of or getting away from the disagreeable object or experience.

(4) Synonyms: Scornful, disdainful, skeptical, condemning, critical, arrogant, sarcastic, spiteful, revolted, indignant.

(5) Facial Components: The brow is lowered; one or both cheeks are raised; the nose is sometimes wrinkled. One or both sides of the upper lip are raised and protrude slightly; teeth are sometimes exposed. At times the tongue is slightly extended.

E. ANGER

(1) Description: Anger is likely to be triggered by frustration, physical threat, psychological hurt, violation of values, and

failure to fulfill expectations.

(2) Duration: Anger can be of short or long duration depending on circumstances and the reaction received from the environment. Duration does not vary with intensity; one may be mildly angry for a short or a long period of time and one may also be intensely angry for a short or a long period of time.

(3) Function: The function of Anger is to mobilize the individual's resources for confrontation with a disturbing element in the environment. Further, Anger serves to arouse fear in others--fear of loss of control on the part of the angry individual--creating distance.

(4) Synonyms: Irritated, hostile, mad, hateful, aggressive, annoyed, cranky, cross, disagreeable, furious, resentful.

(5) Facial Components: Brows are lowered and drawn together, creating vertical lines in the forehead. Eyes have a hard stare and a bulging appearance. Lips are either firmly pressed together with corners down or drawn back in a squarish shape, baring the teeth.

F. DISTRESS

(1) Description: Distress is stimulated by loss: loss of a loved one, loss of an opportunity, loss of self-esteem, loss of health, loss of security are all experiences which stimulate feelings of distress. One can also experience distress in anticipation of a loss.

(2) Duration: Distress is often a prolonged feeling, lasting more than a few minutes, often hours, sometimes days, and occasionally a year or more.

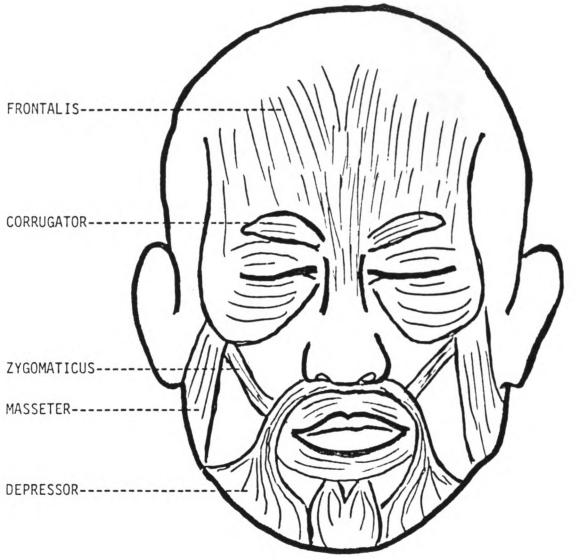
(3) Function: Distress communicates deficiency to others in the environment and attracts help-givers.

(4) Synonyms: Sad, unhappy, miserable, hurt, dejected, depressed, despondent, dismal, low, grieved, suffering, worried.

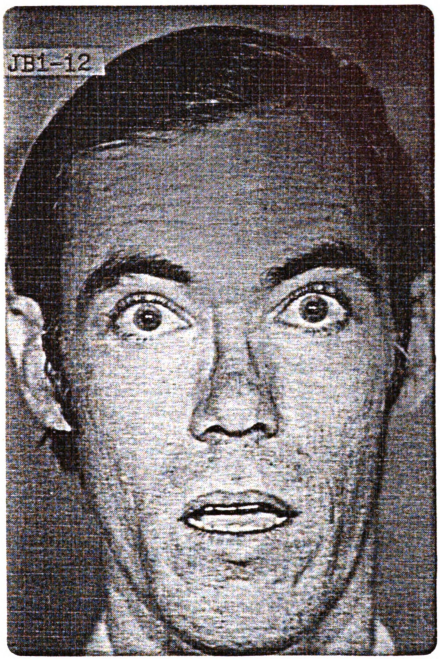
(5) Facial Components: Inner corners of the eyebrows are drawn up, vertical wrinkles in the forehead often appear. The skin below the forehead is triangulated with the inner corner up. The corners of the mouth are down and the lower lip may be trembling.

From Inman, David, 1976.

FACIAL MUSCLE STRUCTURE*



From Wilson, Frederick, 1976b.



Surprise*

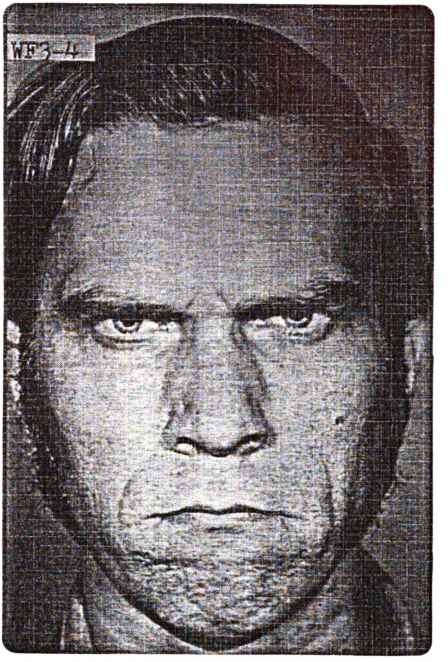
*Taken from Ekman and Friesen slide series (1976).

Distress*

*Taken from Ekman and Friesen slide series (1976).

Disgust*

*Taken from Ekman and Friesen slide series (1976).

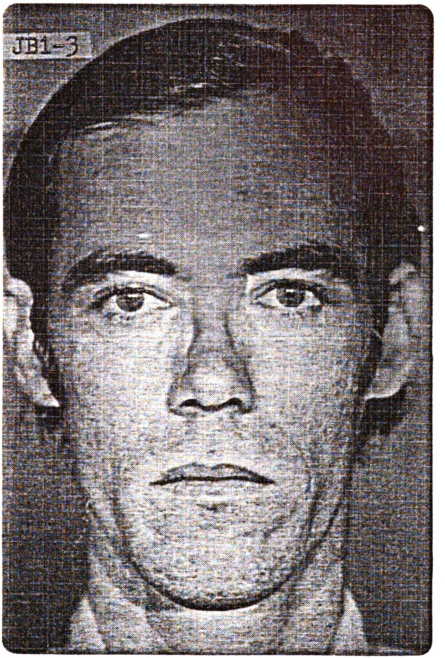


Anger*

*Taken from Ekman and Friesen slide series (1976).

Enjoyment*

*Taken from Ekman and Friesen slide series (1976).



Interest*

*Taken from Ekman and Friesen slide series (1976).

APPENDIX D

RATER AND SCORING FORMS USED IN MEASUREMENT OF FACIAL AFFECT

Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______	Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______	Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______
Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______	Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______	Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______
Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______	Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______	Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______
Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______	Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______	Code # ______ 1. ______ 2. ______ 3. ______ 4. ______ 5. ______

Tape # ______ Page # ______

	INTEREST	DISGUST	ANGER	DISTRESS	SURPRISE	ENJOYMENT
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Code # _____

Interest _____ %

Disgust _____ %

Anger _____ %

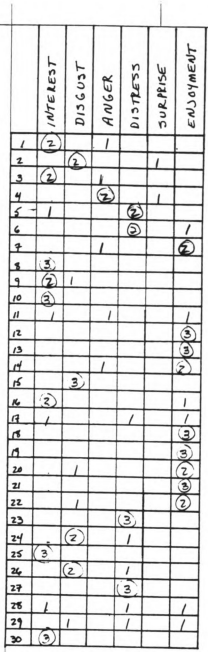
Distress _____ %

Surprise _____ %

Enjoyment _____ %

of changes _____ %

categories used _____



	INTEREST	DISGUST	ANGER	DISTRESS	SURPRISE	ENJOYMENT
1	(7)		1			
2		(1)			1	
3	(2)		1			
4			(7)		1	
5	1			(6)		
6				(2)		1
7			1			(7)
8	(3)					
9	(2)	1				
10	(3)					
11	1		1			1
12						(3)
13						(3)
14			1			(2)
15		(3)				
16	(2)					1
17	1			1		1
18						(3)
19						(3)
20		1				(2)
21						(3)
22		1				(2)
23				(3)		
24		(2)		1		
25	(3)					
26		(2)		1		
27				(3)		
28	1			1		1
29		1		1		1
30	(3)					

Code # Sample

# Interest	8	% 30.7
# Disgust	4	% 15.3
# Anger	1	% 03.8
# Distress	4	% 15.3
# Surprise	0	% —
# Enjoyment	9	% 34.6

# of changes	16	% 61.5
# categories used	5	

# of Samples used 26

% age Pitts Agreement 71 %

APPENDIX E

SUPPLEMENTARY UNIVARIATE ANALYSES

T-test Results of Depressed Group Differences on the Affective Measures

Dependent Variable	t	p	Significant
Percentage of Interest	-1.45	.154	No
Percentage of Disgust	0.12	.907	No
Percentage of Anger	1.42	.164	No
Percentage of Distress*	0.36	.361	No
Percentage of Surprise	0.86	.395	No
Percentage of Enjoy	0.20	.840	No
Percentage of Change	0.74	.466	No
# of Affects Used (Range)	1.53	.133	No

*Hypothesis 3 (reported as a one tailed test).

T-test Results of Dyscontrol Group Differences on the Affective Measures

Dependent Variable	t	p	Significant
Percentage of Interest	-0.25	.805	No
Percentage of Disgust	0.12	.902	No
Percentage of Anger	-0.86	.394	No
Percentage of Distress	0.49	.627	No
Percentage of Surprise*	-0.32	.374	No
Percentage of Enjoy	0.13	.900	No
Percentage of Change	0.63	.533	No
# of Affects Used (Range)	1.18	.246	No

*Hypothesis 4 (reported as a one-tailed test).

T-test Results of Getting Along With Others Group Differences on the Affective Measures

Dependent Variable	t	p	Significant
Percentage of Interest	-0.19	.853	No
Percentage of Disgust*	0.93	.175	No
Percentage of Anger	-0.10	.921	No
Percentage of Distress	0.52	.607	No
Percentage of Surprise	1.08	.291	No
Percentage of Enjoy*	-0.91	.185	No
Percentage of Change*	1.35	.095	No
# of Affects Used (Range)*	2.00	.028	Yes

*Hypotheses 6-9 (reported as one tailed tests).

T-test Results of Dominance Group Differences on the Affective Measures

Dependent Variable	t	p	Significant
Percentage of Interest	0.55	.589	No
Percentage of Disgust	1.09	.284	No
Percentage of Anger	0.98	.335	No
Percentage of Distress*	0.64	.264	No
Percentage of Surprise	-1.61	.118	No
Percentage of Enjoy	-1.91	.066	No
Percentage of Change*	0.72	.239	No
# of Affects Used (Range)	0.03	.974	No

*Hypotheses 10-11 (reported as one tailed tests).

T-test Results of Extraversion Group Differences on the Affective Measures

Dependent Variable	t	p	Significant
Percentage of Interest	-0.11	.911	No
Percentage of Disgust*	-0.82	.207	No
Percentage of Anger	-1.70	.096	No
Percentage of Distress	0.51	.615	No
Percentage of Surprise	-1.31	.196	No
Percentage of Enjoy*	0.95	.174	No
Percentage of Change	-1.59	.118	No
# of Affects Used (Range)	-1.90	.063	No

*Hypotheses 12-13 (reported as one tailed tests).

T-test Results of Neuroticism Group Differences on the Affective Measures

Dependent Variable	t	p	Significant
Percentage of Interest	-1.79	.080	No
Percentage of Disgust	1.06	.296	No
Percentage of Anger	-0.07	.943	No
Percentage of Distress	0.31	.760	No
Percentage of Surprise	-0.88	.386	No
Percentage of Enjoy	0.49	.627	No
Percentage of Change*	-0.61	.273	No
# of Affects Used (Range)	-0.84	.403	No

*Hypothesis 14 (reported as a one tailed test).

T-test Results of Group Differences

on Percentage of Rater Agreement

Group		n	$\bar{x}$	SD	t	p	Signif-icant
Extra-version	High	25	77.64	7.60	0.44	.663	No
	Low	26	76.69	7.80			
Neuroti-cism	High	27	76.81	7.58	-.40	.688	No
	Low	23	77.69	7.78			
Gregari-ous	High	25	76.36	7.28	.68	.499	No
	Low	17	74.82	6.96			
Distrust-ful	High	23	77.63	7.93	.54	.591	No
	Low	22	76.34	8.01			
Depressed	High	19	74.52	7.26	-1.61	.115	No
	Low	28	78.14	7.76			
Dyscon-trolled	High	22	76.36	8.81	-.24	.812	No
	Low	17	77.00	7.42			
Aggres-sive	High	17	76.35	8.93	-.83	.412	No
	Low	27	78.29	6.62			
GAWO	High	13	75.00	5.76	-1.84	.078	No
	Low	15	79.60	7.26			
Dominance	High	16	75.63	7.30	-1.84	.077	No
	Low	14	80.14	5.96			

T-test Results of Group Differences on

Number of Rater Discards

Group		n	$\bar{x}$	SD	t	p	Significant
Extra-version	High	25	2.56	1.87	.03	.974	No
	Low	26	2.57	1.74			
Neuroticism	High	27	2.62	1.73	.21	.836	No
	Low	23	2.52	1.92			
Gregarious	High	25	2.64	1.72	-1.40	.171	No
	Low	17	3.41	1.80			
Distrustful	High	23	2.45	1.89	-0.51	.609	No
	Low	22	2.73	1.81			
Depressed	High	19	3.05	1.78	.88	.386	No
	Low	28	2.57	1.89			
Dyscontrolled	High	22	2.86	1.96	.06	.949	No
	Low	17	2.82	1.88			
Aggressive	High	17	3.05	2.30	1.45	.156	No
	Low	27	2.25	1.37			
GAWO	High	13	2.76	1.59	1.62	.117	No
	Low	15	1.86	1.36			
Dominance	High	16	2.69	2.24	1.04	.307	No
	Low	14	2.00	1.11			

APPENDIX F

24 X 24 INTERCORRELATIONAL MATRIX

Extr[a]	1.00																						
Neur	-.05	1.00																					
Lie	-.24	-.23	1.00																				
Dysc[b]	.38	-.29	-.10	1.00																			
Depr	-.26	.28	.02	-.35	1.00																		
Dist	-.08	.39	-.24	-.14	-.07	1.00																	
Aggr	-.01	.25	-.16	.21	.44	.49	1.00																
Greg	.44	-.33	.10	.15	-.33	-.51	-.40	1.00															
Trst	.32	-.30	.20	-.06	-.37	-.58	-.64	.78	1.00														
Timd	-.40	-.11	.23	-.50	-.05	-.37	-.60	-.17	.23	1.00													
Cont	-.42	.03	.03	-.19	-.12	.07	-.38	-.45	-.34	.55	1.00												
Bias	.14	-.43	.18	.06	-.55	-.61	-.80	.61	.79	.42	.09	1.00											
Dom[c]	.05	.10	-.17	.09	-.04	.17	.13	-.23	-.14	-.06	.02	-.17	1.00										
GAWO	-.19	.36	-.20	-.13	.11	.18	.09	-.31	-.24	.14	.20	-.24	.58	1.00									
Intr[d]	-.09	-.08	.01	-.03	-.07	.03	-.02	-.09	-.05	.08	.15	.00	-.01	-.04	1.00								
Dsgt	-.12	.06	-.06	-.03	.02	.27	.21	-.25	-.29	-.13	.11	-.23	.02	-.01	.35	1.00							
Angr	-.18	.04	-.06	-.03	.15	.18	.18	-.22	-.22	-.10	.06	-.21	.12	.02	.09	.17	1.00						
Dstr	-.06	.08	-.06	.03	.04	.10	.11	-.09	-.11	-.11	.06	-.14	-.10	.03	.47	.33	.13	1.00					
Surp	-.14	-.05	.01	-.03	.06	-.08	.01	.05	-.03	.01	.07	.02	-.12	.03	.30	.19	-.04	.17	1.00				
Enj	-.06	.05	-.02	.00	.03	.09	.05	-.11	-.10	.00	.08	-.07	-.10	-.07	.41	.41	.13	.34	.16	1.00			
Chng	-.17	.03	-.04	-.01	.05	.14	.15	-.23	-.23	-.02	.17	-.18	-.03	.00	.75	.67	.28	.68	.26	.69	1.00		
Rnge	-.16	.04	-.07	.00	.05	.16	.15	-.22	-.23	-.06	.16	-.17	-.06	-.03	.73	.67	.31	.69	.35	.75	.96	1.00	
Agr[e]	-.12	.02	-.03	-.02	.01	.16	.11	-.18	-.18	-.04	.15	-.14	-.07	-.07	.76	.66	.23	.63	.29	.82	.93	.96	1.00
Dscd	-.13	.08	-.08	-.01	.07	.11	.16	-.18	-.17	-.05	.04	-.15	-.06	-.01	.45	.62	.15	.56	.25	.58	.75	.75	.69

Extr Neur Lie Dysc Depr Dist Aggr Greg Trst Timd Cont Bias Dom GAWO Intr Dsgt Angr Dstr Surp Enj Chng Rnge Agr Dscd

[a] Eysenck EPI: Extraversion, Neuroticism, Lie Scale

[b] Plutchik PEPI: Dyscontrolled, Depressed, Distrustful, Aggressive, Gregarious, Trustful, Timid, Controlled, Bias

[c] Birkman Method: Dominance, Getting Along With Others

[d] Affective Measures: Interest, Disgust, Anger, Distress, Surprise, Enjoy, Change, Range

[e] Rater Measures: Agreement, Discard

BIBLIOGRAPHY

BIBLIOGRAPHY

Abbott, R. "Improving the validity of affective self-report measures through constructing personality scales unconfounded with social desirability: A study of the personality research form." Educational and Psychological Measurement. 1975, 35, 361-370.

Adam, A. Grandeur and Illusion; French Literature and Society 1600-1715. London: Weidenfeld and Nicolson, 1972.

Allen, J. "Correlates of emotional styles." Journal of Consulting and Clincial Psychology. 1976, 44(4), 679.

Allen, J. & Hamsher, J.H. "The development and validation of a test of emotional styles." Journal of Consulting and Clinical Psychology. 1974, 42(5), 663-668.

Argyle, Michael. "The laws of looking." Human Nature. January, 1978, 32-40.

Arnold, M. Emotion and Personality: Neurological and Physiological Aspects. New York: Columbia University Press, 1960a.

Arnold, M. Emotion and Personality: Psychological Aspects. New York: Columbia University Press, 1960b.

Arnold, M. (Ed.) Feelings and Emotions - The Loyola Symposium. New York: Academic Press, 1970.

Ax, A.F. "The physiological differentiation between fear and anger in humans." Psychosomatic Medicine. 1953, 15(5), 433-442.

Birkman & Associates, Inc. The Birkman Method: An Interpretative Handbook for Participants. Unpublished manual, 1974*

*Materials available from Birkman & Associates, Inc., 3637 West Alabama, Houston, Texas 77024.

Birkman & Associates, Inc. The Birkman Method: Reliabilities and Validities for Business and Industry. Unpublished report, January 15, 1975.*

Birkman, R.W. Development of a Personality Test Using Social and Self-Perception Inventories. Unpublished Ph.D. Dissertation, University of Texas-Austin, 1961.*

Black, P. (Ed.) Physiological Correlates of Emotion. New York: Academic Press, 1970.

Bowles, J.M. Learned Helplessness: Personality Correlates and Affective Responses. Unpublished Ph.D. Dissertation, Michigan State University, 1978.

Brady, J.V. "Endoctrine and autonomic correlates of emotions." in Black, P. (Ed.), Physiological Correlates of Emotion. New York: Academic Press, 1970.

Buros, O.K. (Ed.) The Seventh Mental Measurements Yearbook. Highland Park, New Jersey: The Gryphon Press, 1972.

Candland, D.K. "The persistent problems of emotion." in Candland, D.K. et al., Emotion. Monterey, California: Brooks/Cole Publishing Co., 1977.

Chekhov, A. "The Kiss." in Mack, M. (Ed.), World Masterpieces. New York: W.W. Norton and Company, 1965.

Chevalier-Skolnikoff, S. "Facial expressions of emotion in nonhuman primates." in Ekman, P. (Ed.), Darwin and Facial Expression: A Century of Research in Review. New York: Academic Press, 1973.

Clynes, M. Sentics: The Touch of Emotions. Garden City, New York: Anchor Press/Doubleday, 1977.

Coleman, J.C. "Facial expressions of emotion." Psychological Monographs. 1949, 63 (1, whole No. 296).

Darwin, C. The Expression of the Emotions in Man and Animals. New York: D. Appleton and Co., 1910. (originally published in 1872.)

Diagnostic and Statistical Manual of Mental Disorders. Washington, D.C.: American Psychiatric Assoc., 1968.

Dougherty, F., Bartlett, E., & Izard, C. "Responses of schizophrenics to expressions of fundamental emotions." Journal of Clinical Psychology. 1974, 30(3), 243-246.

Ekman, P. "Body position, facial expression, and verbal behavior during interviews." Journal of Abnormal and Social Psychology. 1964, 68, 295-301.

Ekman, P. "Differential communication of affect by head and body cues." Journal of Personality and Social Psychology. 1965, 2(5), 725-735,

Ekman, P. "Universals and cultural differences in facial expressions of emotion." in Cole, J.D. (Ed.), Nebraska Symposium on Motivation, 1971. Lincoln: University of Nebraska Press, 1972.

Ekman, P. "Universal facial expressions in emotion." Studia Psychologica, 1973a, 15(2), 140-147.

Ekman, P. Darwin and Facial Expression. New York: Academic Press, Inc., 1973b.

Ekman, P. & Friesen, W. "Head and body cues in the judgment of emotion: a reformulation." Perceptual and Motor Skills. 1967, 24, 711-724.

Ekman, P. & Friesen, W. "Nonberbal leakage and clues to deception." Psychiatry. 1969a, 32(1), 88-106.

Ekman, P. & Friesen, W. "The repetoire of nonverbal behavior: Categories, origins, usage, and coding." Semiotica. 1969b, 1, 49-98.

Ekman, P. & Friesen, W. "Constants across cultures in the face and emotion." Journal of Personality and Social Psychology. 1971, 17(2), 124-129.

Ekman, P. & Friesen, W. "Detecting deception from the body or face." Journal of Personality and Social Psychology. 1974a, 29(3), 288-298.

Ekman, P. & Friesen, W. "Nonverbal behavior and psychopathology." in Friedman & Katz (Eds.), The Psychology of Depression. Washington, D.C.: V.H. Winston & Sons, 1974b.

Ekman, P. & Friesen, W. Unmasking the Face: A Guide to Recognizing Emotions from Facial Expressions. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1975.

Ekman, P. & Friesen, W. "Pictures of Facial Affect" (slide series). Palo Alto, California: Consulting Psychologists Press, Inc., 1976.

Ekman, P., Friesen, W. & Tomkins, S. "Facial affect scoring technique: A first validity study." Semiotica. 1971, 3, 37-58.

Ekman, P., Friesen, W. & Ellsworth, P. Emotion in the Human Face. New York: Pergamon Press, 1972.

Ekman, P. & Oster, H. "Facial Expressions of Emotion." Annual Review of Psychology. 1979, 30, 527-554.

Ekman, P., Sorenson, E.R. & Friesen, W. "Pan-cultural elements in facial displays of emotion." Science. 1969, 164, 86-88.

Eysenck, H.J. & Eysenck, S.B. Manual for the Eysenck Personality Inventory. San Diego: Educational and Industrial Testing Service, 1968.

Eysenck, H.J. & Eysenck, S.B. Personality Structure and Measurement. San Diego: Robert Knapp, Publisher, 1969.

Finalyson, G. "Effects of exposure to and re-appraisal of facial expressions depicting affect." Dissertation Abstracts International. 1974, 34(10-B), 5188.

Forrest, D.W. & Lee, S.G. "Mechanisms of defense and readiness in perception and recall." Psychological Monographs. 1962, 76(4), (No. 523).

Freud, Sigmund. The Basic Writings of Sigmund Freud. New York: Random House, 1938.

Frois-Wittmann, J. "The judgment of facial expression." Journal of Experimental Psychology. 1930, 13, 113-151.

Gordon, Jesse, "Interpersonal predictions of repressors and sensitizers." Journal of Personality. 1957, 25, 686-698.

Haggard, E. & Isaacs, K. "Micromomentary facial expressions as indicators of ego mechanisms in psychotherapy." in Gottschalk, L. & Auerbach, A. (Eds.) Methods of Research in Psychotherapy. New York: Appleton Century Croft, 1966, 154-165.

Hanawalt, N.G. "The role of the upper and lower parts of the face as a basis for judging expressions." Journal of General Psychology. 1944, 31, 23-36.

Harrison, R. & Crouch, W. "Nonverbal communication: theory and research." in Hanneman, G. & McEwen, W. (Eds.), Communication and Behavior. New York: Addison-Wesley, 1975.

Harrison, R. Controversy On the Face. Kenilworth, N.J.: Schering Corporation, 1977.

Harvey, N. The Feelings of Man: Their Nature, Function, and Interpretation. Baltimore: Warwick & York, Inc., 1914.

Hill, D.J. The Elements of Psychology: A Textbook. New York: Sheldon, 1888.

Hinds, W.C. "Compacted affect: a therapeutic concept." Paper presented at 84th Annual Conference of the American Psychological Association, Washington, D.C., September 7, 1976.

Inman, D.J. "Investigation of affective facial expressions through slow motion and normal speed videotape techniques." Unpublished Ph.D. Dissertation, Michigan State University, 1976.

Izard, C. The Face of Emotion. New York: Appleton-Century-Crofts, Meredith Corporation, 1971.

Izard, C. Patterns of Emotions: A New Analysis of Anxiety and Depression. New York: Academic Press, 1972.

Izard, C. Human Emotions. New York: Plenum Press, 1977.

James. W. The Principles of Psychology. New York: Holt, 1890.

Jourard, S. The Transparent Self. New York: Van Nostrand Reinhold Company, 1964.

Jung, C.W. Analytical Psychology: Its Theory and Practice. New York: Random House, 1968.

Kaywin, L. "Notes on the psychoanalytic theory of affect." Psychoanalytic Review. 1966, 53, 112-118.

Keen, Ernest. "Emotion in personality theory." in Candland, D.K. et al., Emotion. Monterey, California: Brooks/Cole Publishing Company, 1977.

Kell, B.L. & Mueller, W.J. Impact and Change: A Study of Counseling Relationships. New York: Appleton-Century Crofts, 1966.

Laird, J. "Emotion and touch: interesting observations and a discordant theory." Contemporary Psychology. 1977, 22, 570-571.

Langfeld, H.S. "The judgment of emotions from facial expressions." Journal of Abnormal and Social Psychology. 1918, 13, 172-184.

Lazarus, R.S. "Emotions and adaptation: conceptual and empirical relations." in Arnold, W. (Ed.), Nebraska Symposium on Motivation. Lincoln: University of Nebraska Press, 1968.

Lazarus, R., Averill, J. & Opton, E. "Psychological approaches to the study of emotion." in Arnold, M (Ed.), Feelings and Emotions: The Loyola Symposium. New York: Academic Press, 1970.

Leathers, D.G. Nonverbal Communication Systems. Boston: Allyn & Bacon, Inc., 1976.

Mar, T. Face Reading. New York: The New American Library, 1975.

Mooney, R. Mooney Problem Check List. New York: The Psychological Corporation, 1950.

Munn, N.L. "The effect of knowledge of the situation upon judgment of emotion from facial expression." Journal of Abnormal and Social Psychology. 1940, 35, 324-338.

Plutchik, R. "The Multifactor-analytic theory of emotion." Journal of Psychology. 1960, 50, 153-171.

Plutchik, R. The Emotions: Facts, Theories and A New Model. New York: Random House, 1962.

Plutchik, R. "What is an emotion?" Journal of Psychology. 1965, 61, 295-303.

Plutchik, R. "Emotions as adaptive reactions: Implications for therapy." Psychoanalytic Review. 1966, 53, 106-110.

Plutchik, R. "Emotions, evolution and adaptive processes." in Arnold, M. (Ed.), Feelings and Emotions: The Loyola Symposium. New York: Academic Press, 1970.

Plutchik, R. "Individual and breed differences in approach and withdrawal in dogs." Behavior. 1971, 40, 302-311.

Plutchik, R. Foundations of Experimental Research. New York: Harper & Row, 1974.

Plutchik, R. "Cognitions in the service of emotions." in Candland, D. et al., Emotion. Monterey, California: Brooks/Cole Publishing Company, 1977.

Reymert, M. (Ed.) Feelings and Emotions: The Wittenberg Symposium. Worcester, Mass: Clark University Press, 1928.

Rockberger, H. "The role of an eclectic affect theory in multiple therapy." Psychoanalytic Review. 1966, 53, 120-128.

Romanes, G. Mental Evolution in Animals. New York: Appleton, 1884.

Sackeim, H., Gur, R. & Saucy, M. "Emotions are expressed more intensely on the left side of the face." Science. 1978, 202, 434-436.

Schachter, S. & Singer, J. "Cognitive, social, and physiological determinants of emotional state." Psychological Review. 1962, 69, 379-399.

Schiffenbauer, A. "Sex role stereotypes and the spontaneous attribution of emotion." Journal of Research in Personality. 1976, 10(2), 137-145.

Schlosberg, H. "A scale for the judgment of facial expressions." Journal of Experimental Psychology. 1941, 29, 497-510.

Schlosberg, H. "Three dimensions of emotion." The Psychological Review. 1954, 61(2), 81-88.

Sloman, C. "Micromomentary facial expressions and the actor: an investigation." Empirical Research in the Theatre. 1972, 2(1), 52-60.

Stebbins, G. Delsarte System of Dramatic Expression. New York: Edgar S. Werner, 1886.

Strongman, K. The Psychology of Emotion. London: John Wiley & Sons, 1973.

Tomkins, S. Affect, Imagery, and Consciousness: Vol I, The Positive Affects. New York: Springer Publishing Company, 1962.

Tomkins, S. Affect, Imagery, and Consciousness:Vol II, The Negative Affects. New York: Springer Publishing Company, 1963.

Tomkins, S. "Affect as the primary motivational system." in Arnold, M. (Ed.), Feelings and Emotions: The Loyola Symposium. New York: Academic Press, 1970.

Tomkins, S & Izard, C. (Eds.) Affect, Cognition, and Personality: Empirical Studies. New York: Springer Publishing Sompnay, 1965.

Turhan, M. "Uber die deutung des gesichtsausdrucks." Psychologic Beitrage. 1960, 5.

Wilmot, T. "The effects of sensitizing clients in therapy to the analysis of facial expressions." Dissertation Abstracts International. 1973, 34(2-A), 574.

Wilson, F.R. Micro-Momentary Facial Expressions and Psychological Defenses. Unpublished Ph.D. Dissertation, Mighigan State University, 1976a.

Wilson, F.R. "Repression and affect: a facial cue to defense operations." Paper presented at the 84th Annual Meeting of the American Psychological Association, Washington, D.C., September 7, 1976b.

Winer, B.J. Statistical Principles in Experimental Design. New York: McGraw-Hill, 1962.

Woodworth, R.S. Experimental Psychology. New York: Holt, 1938.

Young, P. Emotion in Man and Animal. New York: John Wiley & Sons, Inc., 1943.

Zerba, M. Labeling and Recognition of Izard's Facial Expressions by Three Age Groups. Unpublished Ph.D. Dissertation, Michigan State University, 1977.

Zlatchin, C. "Accuracy and inaccuracy in the recognition of facial affects and the relationship to personality." Dissertation Abstracts International. 1974, 34(12-B, Part 1), 6228.

Zuckerman, M., DeFrank, R., Hall, J & Rosenthal, R. "Encoding and decoding of spontaneous and posed facial expressions." Journal of Personality and Social Psychology. 1976, 35(5), 966-977.