

INDIVIDUAL DIFFERENCES IN RECOGNITION OF
FACIAL EXPRESSIONS OF EMOTION

by
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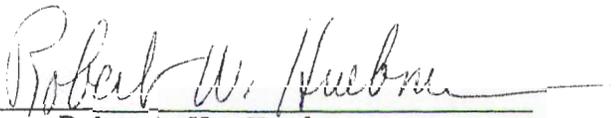
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ABSTRACT

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Margaret Sterner Jones, Doctor of Education, 1980

Dissertation directed by: Dr. Robert W. Huebner
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Accurate communication of emotional meaning through facial expressions is one of many communication systems which aid in building positive social interactions and human relationships. Numerous studies have confirmed that the face is an important vehicle for communication of emotional messages and that facial expressions of at least nine fundamental emotions appear to be recognizable across cultures. It has been supposed that one's level of accuracy in recognition of facial expressions of emotion is related to effective emotion communication, the development of empathy, and effective interpersonal relationships. However, there has to date been little research which has investigated individual differences in emotional sensitivity as expressed through accurate recognition of facial expressions of emotion.

The questions in this study asked whether differences in age, sex, education and occupation, intelligence,

psychological differentiation, empathy, extraversion, or neuroticism affect the ability to accurately recognize the facial expressions of interest, joy, surprise, distress, disgust, anger, shame, fear, and contempt.

Thirty-six women and nineteen men, ranging in age from 18 to 72 and representing five education levels and seven occupational categories participated in the study. They were asked to place each of 36 photographs of facial expressions (taken from Izard, 1971) into one of nine emotion categories. In addition, the subjects filled out a demographic sheet indicating age, sex, education level, major area of study and present occupation. Levels of intelligence, psychological differentiation, empathy, extraversion, and neuroticism were measured by the Western Personnel Test, the Group Embedded Figures Test, the Mehrabian-Epstein Empathy Questionnaire, and the Eysenck Personality Inventory respectively.

Nine emotion accuracy scores and a total emotion response score were generated and subjected to statistical analysis using the remaining scores as independent variables. Analyses included correlation, analysis of variance and multiple regression analysis as appropriate in order to answer the nine research questions.

Results showed significant relationships between total accuracy scores and age ($r = -.51$), empathy ($r = .32$) and a measure of "faking good" from the EPI ($r = -.23$). Women were significantly better than men in identifying Shame.

Persons with a Fine Arts background were better than other groups in identifying Disgust and Shame. Intelligence, extraversion, neuroticism, and psychological differentiation were not significantly related to emotion recognition scores.

It was concluded that emotional sensitivity declined with age and with level of empathy. Emotional sensitivity also declined as one's need to "fake good" increased. It was suggested that there exists an emotion awareness or emotion sensitivity factor which is independent of, but may interact with, cognitive, perceptual, and other personality variables. Results of the present study appear to provide support for Izard's theory of emotion. Several suggestions for future research to clarify the findings were made.

DEDICATION

To Bill

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April, 1980

Margaret Sterner Jones

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CHAPTER I

STATEMENT OF THE PROBLEM

One of the goals of today's socialization institutions and helping professions is to aid human beings in building effective interpersonal relationships. But as with any major project, the success of the ultimate design, no matter how elaborate, rests on the identification and appropriate usage of the basic building blocks, no matter how mundane. The basic assumption underlying the present investigation is that one such building block in the development of effective interpersonal relationships is emotional sensitivity as expressed by the ability to understand facial expressions of emotion. The questions which provide the focus for the present investigation concern individual differences in emotional sensitivity as they are related to other building blocks in the structure of effective interpersonal relationships, including sex, age, intelligence, education, occupation, psychological differentiation, extraversion, neuroticism, and empathy.

The face, which has been called the "window of the soul," has long been an object of wonder and investigation for both the scientist and the lay person alike. This is attested to both by the Rhetoric of Aristotle, in which specific

facial expressions of emotion and their elicitation were described in detail, and the ancient masks of Comedy and Tragedy which remain as symbols in our theaters today.

Recently, the scientific investigation of facial expressions of emotion has received impetus from many fields, including anthropology, sociology, psychology, medicine, education, the arts, communication theory, journalism, broadcasting, and even business management (Dittmann, 1972; Myers & Myers, 1976). Such study is predicated on the belief that effective interpersonal relationships are dependent upon accurate and meaningful communication. Such communication includes the exchange of thoughts, ideas, and feelings through words, gestures, and facial expressions. Effective communication, in turn, requires not only the correct interpretation of verbal exchanges, but also awareness of and correct interpretation of the nonverbal messages as well.

The importance of the nonverbal communication system has been emphasized by Birdwhistell (1970). He states that of the total messages sent and received in two-person communication, 35% of the meaning is provided through verbal channels, while 65% of the meaning is presented through nonverbal channels. This statement has also been verified by Mehrabian (1972). In addition, while verbal messages are the primary means of communicating thoughts and ideas,

nonverbal channels have been found to be the primary means of communicating emotional messages (Ekman, 1975). Finally, of the nonverbal channels, the expressions of the face have been found to be the most salient for communication of at-the-moment feelings and are believed to be essential components of the experience and communication of emotion (Ekman, 1973, 1975; Izard, 1971, 1977).

While the above linkages have provided justification for the study of facial expressions of emotion, the literature generated to date has focused primarily on the establishment of the universality of facial expressions of emotion (Ekman, 1973, 1975; Izard, 1971) or on the accurate description of specific expressions of emotion, e.g., happiness, fear, or surprise (Ekman & Friesen, 1975). A smaller body of literature has been devoted to exploring the properties of the stimulus or stimulus persons, e.g., tape versus still photograph, or the race, sex, or age of the person in the photograph, which affect accuracy in recognition of facial expressions of emotion (Eiland & Richardson, 1974; Ekman & Friesen, 1972; Izard, 1971). A still more limited body of research has been generated by investigation of the relationships between facial expressions of emotion and emotion theory (Izard, 1971, 1977).

A great deal of importance has been ascribed to the accurate interpretation of facial expressions of emotion in

establishing meaningful and accurate communication, as well as the role of facial expressions in emotion theory and experience. However, a review of the literature shows that to date there has been no direct investigation of individual differences in accuracy of emotion recognition. It is the goal of the present study to fill this void by exploring the relationships between emotional sensitivity as expressed by the identification of facial expressions of emotion and factors of sex, age, education, occupation, intelligence, psychological differentiation, extraversion, neuroticism, and empathy.

Due to the exploratory nature of the present study, the major question comprising the focus of this investigation thus becomes: What factors are related to individual differences in adults in the ability to understand facial expressions of emotion?

It is felt that identification of factors which are related to individual differences in emotional sensitivity so defined will aid in the clarification of the role of emotional sensitivity as a building block for the development of effective communication skills, and thus, more effective interpersonal relationships.

The following sections of this chapter will include a brief overview of the present status of the study of facial expressions of emotion and the major findings to date, a

discussion of the variables chosen for the present study as they related to individual differences in emotional sensitivity and to other psychological constructs, and finally, a statement of the specific questions to be answered by the present research effort.

Background of the Problem

A brief overview of the history of the study of facial expressions of emotion is presented here in order to provide background for the need for the investigation of individual differences in understanding facial expressions of emotion. As noted above, facial expressions of emotion have long been the subject of folklore and scientific investigation. However, the first attempt to scientifically document the relationships among facial expressions, emotion, and adaptive behaviors did not come until 1872, with the publication of Charles Darwin's The Expressions of Emotions in Man and Animals. Here was first put forth the thesis that human facial expressions reflected underlying emotions and that facial expressions played an important role in the development of adaptive human behaviors, notions which are still given much credence today (Ekman & Friesen, 1972).

Since that time, researchers have periodically re-emphasized the importance of facial expressions of emotion in the

development of interpersonal communication. For example, Gates (1923), in an introduction to her research on the identification of facial expressions of emotion in children stated:

The ability to meet successfully social situations depends in part, on the capacity to make the appropriate tactful, courteous, aggressive, etc., reaction, and, in part, on the ability to perceive accurately the conditions which are encountered. Of the latter requirement, adequate interpretation of the facial expressions of others forms an important ingredient (p. 449).

Tomkins and McCarter (1964) and Izard (1971, 1977), in the development of their theories of emotion, have stated that facial expressions are crucial to experiencing and understanding emotions in oneself and others. Izard (1971) went so far as to state that suppression of facial expressions of emotion in young children may lead to impoverished emotional lives as adults. And Ekman and Friesen (1975) have stated that facial expressions of emotion are the key to understanding the feelings and emotions of oneself and others. They go on to say that such understanding is crucial to accurate communication and the development of intimate relationships between persons. They further state that such understanding is particularly critical for

persons in professions such as psychology, medicine, and education who must understand and respond to the emotional messages of others.

Other authors have concurred in the conclusion that emotions and emotional expression are integral parts of healthy development. Wallon (1972) considers emotions to be the origin of consciousness, and Brannigan and Humphries (1973) see facial expressions and gestures as comprising an important form of human communication. Facial expressions are seen as a signalling system which is optionally independent of speech and a system which can influence and modify speech.

Given the importance ascribed to facial expressions of emotion in both emotion theory and emotion communication, much recent theoretical and descriptive research has been generated by attempts to answer anew such general questions as: Can emotional meaning be communicated accurately through facial expressions? Is there a specific pattern of development in the understanding and communication of emotional meaning? Are facial expressions of emotional meaning universal? What are the cultural and individual influences on the expression and recognition of emotional meaning?

Answers to these questions indicate that emotional meaning can be communicated accurately, that some emotions

such as happiness and sadness are understood more easily than others, that some of the same expressions and meanings are found in many cultures, and that culture can influence the intensity and timing of emotional expressions (Ekman & Friesen, 1972, p. 189). In addition, previous research has shown that children as young as three years old are able to distinguish between positive and negative feelings as communicated by facial expressions (Borke, 1973), and that most adults are able to distinguish among the following facial expressions of emotion: happiness/joy, sadness/distress, anger, fear, shame, disgust, contempt, surprise, and interest (Izard, 1971). Above all, research has supported the notion that facial expressions can be and are used as cues in the interpretation of emotional meaning in communication between persons (Ekman, 1972), and that understanding of facial expressions of emotion is important to the development of other psychological constructs such as empathy (Feshbach & Roe, 1968) and social competence (Weinstein in Goslin, 1969).

Izard (1971, 1977) has used the above conclusions, particularly those related to the universality of facial expressions of emotion, to develop a detailed theory of emotion. Briefly, he has proposed that emotion is one of six interactive subsystems of personality which include the homeostatic, drive, emotion, perceptual, cognitive, and

motor systems. He further states that the emotion system comprises the principal motivating system for personality. The emotion system itself is thought to include neurophysiological, neuromuscular, and phenomenological components. The role of facial expressions in this system is considered to be crucial to both internal and external awareness of emotion and to the recognition and regulation of emotion experiences. The emotion expressions themselves are believed to be innately programmed. In addition, Izard suggests that the "face is the supreme center for sending and receiving social signals that are crucial for the development of the individual, interpersonal communication, and the cohesiveness of the family and society" (1977, p. 67). He further states that suppression of facial expressions, particularly in young children, may lead to diffusion of emotion experience, inability to experience discrete emotions, and, ultimately, inability to deal effectively with emotions as adults.

In spite, however, of the increased attention being paid to the importance of recognition of facial expressions as a universal component in emotion communication, this question still remains: In what ways and for what reasons do individuals differ in their ability to recognize facial expressions of emotion? It is, again, this question which the present study has been designed to address.

Individual Differences in Emotion Recognition

As noted above, previous researchers in emotion recognition have frequently noted that individuals appear to differ in overall accuracy in emotion recognition. However, to date little has been done to explore the reasons why such differences exist.

Ekman (1973) and Izard (1971, 1977) have stated that learning theory and socialization processes play a role in the development of the ability to recognize facial expressions of emotion. This is felt to be particularly true of cultural differences which are said to affect labeling, reaction to specific situational stimuli, and suppression or distortion of facial expressions in accordance with culturally determined display rules.

Nevertheless, Ekman and Friesen (1975) state that it is through incidental or imitative learning, rather than through intentional or focused skill training, that such understanding is acquired. Mehrabian (1972) has pointed out that there are no explicit encoding or decoding rules for nonverbal communication in most cultures. Eakins and Eakins (1978) have emphasized that whatever informal nonverbal codes exist are not formally taught. In addition, the informal display rules posited by Ekman and Friesen (1973) differ among cultures and subcultures, and one's opportunity to learn about emotions and emotion expressions

from family and friends may also differ. Thus, it is not surprising that people exhibit varying degrees of ability to understand and express facial expressions of emotion (Ekman & Friesen, 1975), and that identification of a particular facial expression across persons rarely reaches 100% agreement.

The relative inability of some persons to understand the various emotional messages conveyed by the face and the misinterpretation of these messages by others is presumed to be related to inappropriate behavior and emotional responses, resulting in difficulties in relating to others (Cuceluglu in Speer, 1972; Ekman & Friesen, 1975; Izard, 1971, 1977). Improvements in communication are believed to require increased awareness of nonverbal cues and the subsequent application of this knowledge (Eakins & Eakins, 1978). Nevertheless, investigations of individual differences in expression or recognition of emotional messages via the face have largely been ignored (Hastorf, 1970; Knapp, 1978).

There have been some investigations of the developmental patterns of expressions and recognition of facial expressions of emotion in children. Such studies have reported relationships between recognition skills and intelligence, socio-economic level, visual-perceptual

skills, social adjustment, and empathy. However, with regard to adults, much is supposed and little is known.

Knapp (1978), in a review of the literature on individual differences in recognition of facial expressions of emotion has stated that "We also suspect that some people are able to judge emotions from faces with greater accuracy than others, but, again, we have only hints at what those characteristics might be" (p. 283). He suggests that factors affecting such differences might include the observer's own emotional state and degree of attentiveness. In addition, he suggests that individuals who monitor their own behavior closely or who are very facially expressive might be better judges of expressions than others. He also states that some people feel that intelligence accounts for a small portion of one's sensitivity to facial cues, while others feel that women are more accurate than men. In addition, he reports that some people feel that age might be a factor, with younger persons having insufficient experience and older persons possibly having difficulty picking up visual cues in the facial area. Finally, he states that some persons feel that individual differences are related to perceiving particular emotions while others feel there is a general ability for judging emotional meaning in a wide variety of situations.

Davitz (1964) has extensively investigated emotional sensitivity as expressed through recognition of vocal cues of emotion. Based on his results, he has proposed a general awareness or emotional sensitivity factor which he believes is related to cognitive and perceptual factors. He further states that this emotional sensitivity factor includes both facial and vocal cue recognition and that it may comprise a specialized form of nonverbal intelligence. He states that individual differences in emotion recognition are reflective of differences in overall emotion awareness.

In spite of these hints and suppositions, there have to date been no studies which have specifically looked at the factors which would account for individual variation at the adult level in the ability to recognize and label facial expressions of emotion.

It is the belief of the author that an exploration of the factors which might be related to individual differences in recognition of facial expressions of emotion could lead to identification of ways in which emotional communication, and thus effective interpersonal relationships, can be improved.

Variables to be Investigated

Out of the infinite world of variables to be investigated, each researcher must choose a finite number to

explore. Due to the lack of previous research focusing on individual differences in recognition of facial expressions of emotion, the present study takes on an exploratory nature, looking for possible relationships. This section presents the dependent and independent variables chosen for investigation, along with a brief justification for their relevance to the focal question of individual differences in emotional sensitivity as expressed through recognition of facial expressions of emotion.

First will be a discussion of the fundamental emotions which comprise the dependent variables in this study. This will be followed by a discussion of the independent variables which include sex, age, education and occupation, intelligence, psychological differentiation, and the personality characteristics of empathy, extraversion, and neuroticism.

The Fundamental Emotions

Research to date has identified at least nine fundamental emotions whose expressions comprise the stimuli for the present investigation (Ekman, 1975; Izard, 1977). These include interest/excitement, joy, surprise, distress/anguish, anger, disgust, contempt, fear, and shame. For each of these emotions, previous researchers have investigated the situations in which they might occur, the

universality of the facial expressions across cultures, and the detailed musculature of the face which is involved in the expression of the emotion. A brief description of these emotions is included in Appendix A, while more extensive reviews may be found in Ekman and Friesen (1975) and Izard (1977).

Ekman (in Siegman & Feldstein, 1978) has suggested that individual differences in interpretation of facial expressions in the general population may be more related to inability to recognize specific emotions than to differences in overall accuracy. He also states that such deficits may be related to long-standing personality characteristics or moods. Such suppositions are based on studies which show that normal and schizophrenic populations differ not so much in overall sensitivity as in recognition of Contempt and Fear (Muzekian & Bates, 1977; Shannon, 1970). Thus, the present study has included an investigation not only of relationships between overall emotional sensitivity and other variables, but also of the relationships between these variables and the nine specific emotions represented.

Sex

The exploration of correlates of individual differences in any skill or ability usually begins with sex of the subjects, a variable which becomes more and more complex

in an age of changing sexual roles and women's liberation. It has long been assumed that women, being the "gentler and more emotional sex," are more accurate than men in identification of emotions. In fact, early research with children (e.g., Gates, 1923) has shown that girls were more accurate than boys at similar ages.

Myers and Myers (1976), in reviewing the literature on sex differences in nonverbal communication have also concluded that women tend to be better than men in identifying nonverbal cues to emotion, including facial expressions. Mehrabian (1972) has further stated that this is due to the fact that women are better at identifying negative expressions than men. It has been variously hypothesized that these differences are due to women's intuition, the cultural suppression of emotion in males, the need for females as mothers to be attuned to emotional messages in infants, or the need for females as the oppressed persons in our society to be aware of the emotions, particularly the negative ones, of the oppressors (Eakins & Eakins, 1978; Myers & Myers, 1976; Mehrabian, 1972; Rosenthal in Stewart, 1977). Other researchers, however (Izard, 1971; Westbrook, 1974), have found no significant differences between males and females in the ability to recognize facial expressions of emotion, with Westbrook concluding that further investigation of hypotheses related to sex was unwarranted. Thus, the

question of the relationship of sex of the observer to accuracy in emotional sensitivity remains open to investigation.

Age

Age of the subject as related to recognition of facial expressions of emotion has been largely confined to developmental studies which have shown that persons as young as three are able to differentiate among happy and sad expressions, with accuracy and number of emotions differentiated increasing with age through eighteen. Recent research in all areas, however, has shown that differences related to age do not disappear at age 18. It is not clear, however, if this is due to physiological or cultural effects. One study (Davitz, 1964) did report a tendency for age to be negatively correlated with emotional sensitivity as expressed by vocal cues of emotion. Because an increase in age may be accompanied by increased opportunity to either improve accuracy in communication through practice or by the possible development of stereotypical reactions to emotional expressions which result in decreased accuracy, the relationship of age to emotional sensitivity as expressed by recognition of facial expressions of emotion is of interest.

Education and Occupation

While one's educational background and training have been assumed by some to be related to one's ability to decode emotional messages, this relationship has not been explored directly. Harrison (1972) has simply stated that some people in professions such as psychiatry, nursing, and police work, either through training or natural talent, seem to demonstrate an excellent ability to recognize facial expressions of emotion. Ekman and Friesen (1975) have also emphasized the necessity for accuracy in understanding facial expressions of emotion, particularly for educators, medical personnel, and those in mental health professions. Nevertheless, there is to date little evidence that such relationships actually exist. The closest support for such a notion was reported as a by-product of other research by Rosenthal (in Stewart, 1970). He stated that men in occupations requiring nurturant, artistic, or expressive behaviors such as artists or dancers, tended to do as well as the women and better than other men on a test of nonverbal sensitivity. Again, it is not clear whether he felt this to be a result of training or of other factors related to choice of such occupations. The present study investigates the relationship between education level, major, and occupation and emotional sensitivity by including persons from the social sciences, the physical sciences, the arts,

education and business who have achieved various levels of educational preparation.

Intelligence

Intelligence, which is frequently thought of as a measure of learning rate, has been found to be related to numerous measures of social competence (Weinstein in Goslin, 1969). The relationship between intelligence and emotional sensitivity seems to be the one most clearly supported by the existing literature, with low, but positive correlations being consistently reported between the ability to identify facial expressions of emotion and various measures of intelligence (Davitz, 1964; Ekman, 1973; Izard, 1971; Rosenthal in Stewart, 1977). Intelligence has been included in this study of individual differences in order to account for this relationship while exploring the effects of other variables.

Psychological Differentiation

Because accurate recognition of facial expressions of emotion involves both verbal and perceptual components, it might be surmized that perceptual ability might affect accurate interpretation. In fact, Davitz (1964) did find that abstract nonverbal reasoning (measured by the Raven's Progressive Matrices and the Gottschalldt Embedded Figures Test) was related to the ability to understand vocal cues

of emotional meaning. One measure of perceptual ability which has been widely investigated is that of field-dependence or psychological differentiation (Witkin, 1950). This is described as the ability to ignore extraneous cues in order to selectively focus attention on the task at hand, a skill which would appear to be necessary in order to successfully decode facial expressions of emotion amidst the myriad signals and emblems which the face is capable of emitting (Ekman & Friesen, 1975). In addition, psychological differentiation has been related to occupational choice and success, empathy, self-assurance, and success in social interaction (Witkin, Lewis, Hertzman, Machover, Meissner, Wapner, 1954/1972).

Personality Variables

Investigations of individual differences in personality have been numerous. Investigation of the relationships among personality variables and emotional sensitivity would, therefore, appear to be the most fruitful in establishing the links between emotional sensitivity as measured by recognition of facial expressions of emotion and effective interpersonal relationships. The research in this area to date, however, has again been inconclusive. Davitz (1964) in a comprehensive investigation of the relationship between thirty-three personality variables and the ability

to identify emotional meaning from vocal cues found no significant relationships and concluded that perceptual and symbolic processes, rather than personality, were responsible for individual differences in emotional sensitivity. Other researchers (Mehrabian, 1972; Rosenthal in Stewart, 1977; and Zlatchin, 1974) have found, however, that those who score high on various measures of nonverbal sensitivity tend to function better than others socially and to do well on tasks measuring cognitive complexity and person perception. To date, however, there has been no direct investigation of emotional sensitivity as expressed by recognition of facial expressions of emotion and specific personality variables. Rather than using global personality measures which have proved ineffective in the past (Davitz, 1964), the present study has focused on three specific constructs: empathy, extraversion and neuroticism. These constructs have been widely investigated and appear to have both logical links to emotional sensitivity and empirical links to effective social interaction.

Empathy. A personality characteristic which has frequently been termed necessary for establishing effective relationships is that of empathy. Rogers (1957, 1975) and others (Hogan, 1975; Iannotti, 1975; Katz, 1963) have stated that empathy and the ability to understand emotions of

others is an important component in the counseling process as well as in the development of everyday relationships. Weinstein (in Goslin, 1969) and Hogan (1975) have emphasized the importance of empathy in developing social-interaction, role-taking, and interpersonal competence skills. It has been shown that those who score high on paper and pencil empathy measures are characterized by a patient and forbearing nature, an affiliative but socially ascendent tenderness, and a liberal and humanistic political and religious attitude (Hogan, 1973). They also score lower on signs depicting neurotic and psychotic disturbance than low empathy scorers (Hekmat, Khajavi, & Mehryar, 1975). High empathizers have also been shown to exhibit more helping behavior and to inhibit more aggression in certain situations than low empathizers (Mehrabian, 1972).

Extraversion. Another personality variable which has in the past been linked to a number of other measures of social functioning is one's level of extraversion. Among the findings to date, it has been determined that extraverts tend to be more outgoing, to be more impulsive and uninhibited, to have more social contacts, to take part in more group activities, to display a greater desire to work with people, to be less self-conscious, and to be more sensitive to social cues than introverts (Eysenck (ed.), 1971).

Neuroticism. Neuroticism refers to the general emotional over-responsiveness of a person to stress. Research has shown that degree of neuroticism is related to such factors as academic success, likelihood of neurotic behavior, and general adjustment (Eysenck & Eysenck, 1968).

Statement of the Research Questions

Based on the research to date, one can state that facial expressions are an important component in the total communication process, being the primary channel for provision of accurate and reliable information about emotions and attitudes. Facial expressions have been found to be related to specific emotional experiences on the part of the expressor and can be interpreted with a high degree of accuracy even by untrained observers. At least nine discrete emotions have been so identified: interest, joy, surprise, distress, disgust, anger, shame, fear, and contempt. While it appears that these primary affect expressions are characteristic of all human beings, cultural, sociological and psychological factors are also presumed to influence the ability to express and perceive facial expressions of emotion, leading to less than 100% accuracy in recognition and as yet undetermined patterns of individual differences in these abilities. It has been assumed that the degree of accuracy with which one can understand

facial expressions of emotion is an important factor in establishing interpersonal relationships, be they personal, professional, or therapeutic. The inability to perceive or the misinterpretation of emotional messages has been thought to ultimately lead to serious disturbance. To date, however, there has been no definitive research investigating individual differences in emotional sensitivity as expressed by the ability to accurately recognize facial expressions of emotion.

The major question posed by the present research effort is: What factors are related to individual differences in adults in the ability to understand facial expressions of emotion? There is no doubt that recognition and labeling of facial expressions of emotion are complex tasks, requiring the utilization of complex intellectual, cognitive, and perceptual skills. It would also appear that proficiency in emotion recognition is dependent to some extent upon educational background and training. In addition, personality characteristics such as empathy or extraversion would appear to affect one's overall sensitivity to the emotional cues which facial expressions provide, resulting in individual differences in patterns of response to specific emotions.

In light of the above, the following specific questions will constitute the focus of this investigation:

1. Do males and females differ in their ability to recognize facial expressions of emotion?
2. Is the ability to recognize facial expressions of emotion related to age in adults?
3. Do individuals with different educational and professional backgrounds differ in their ability to recognize facial expressions of emotion?
4. Is level of intelligence related to the ability to recognize facial expressions of emotion?
5. Is psychological differentiation related to the ability to recognize facial expressions of emotion?
6. Is empathy related to the ability to recognize facial expressions of emotion?
7. Is extraversion related to the ability to recognize expressions of emotion?
8. Is neuroticism related to the ability to recognize facial expressions of emotion?
9. To what extent can individual differences in accuracy in emotion recognition be predicted when the effects of sex, age, education level, intelligence, psychological differentiation, empathy, extraversion, and neuroticism are combined?

It is the belief of the author that the answers to the questions posed above will aid in determining more definitively the characteristics related to accurate communication

of emotional messages, will provide clues as to the development of accuracy in understanding emotional messages, and will establish more firmly the importance of identification of facial expressions of emotion as a building block for development of effective interpersonal relationships.

CHAPTER II

REVIEW OF RELATED LITERATURE

As outlined above, the basic questions posed by the present study involve investigation of factors which might account for individual differences in emotional sensitivity as expressed by the ability to accurately understand facial expressions of emotion, an ability which has been identified as necessary in the development of interpersonal communication systems (Buck, 1972). The review of the literature will be conducted in the following manner. First there will be an overview of the research and major conclusion reached with regard to recognition of facial expressions of emotion as related to questions of theory and universality. Second, there will be a review of the literature related to individual differences in emotional sensitivity, including facial, vocal, and other nonverbal cues of emotion. This review will focus on previously investigated differences in emotional sensitivity due to sex, age, educational background and occupation, intelligence, and general personality variables. This chapter will conclude with a brief review of the literature related to psychological differentiation, empathy, extraversion, and neuroticism, focusing on how these

variables are related to effective social interaction. It should be noted that these variables have to date not been specifically investigated as they are related to individual differences in recognition of facial expressions of emotion.

Research Pertaining to Facial Expressions of Emotion

One of the earliest publications concerning facial expressions of emotion was Charles Darwin's The Expressions of Emotion in Man and Animals, published in 1872. The aim of this treatise was to describe the chief expressive actions in man and the lower animals and to explain the origin and development of these actions by attempting to answer such questions as: What are the origins of the expressive movements in man? Are expressions innate or are they learned? What are the purposes or functions of facial expressions? Can the emotions being experienced be recognized from the expressions displayed? With evidence drawn from observations and anecdotal records covering non-human primates, infants and children, cross-cultural observations, the mentally ill, the blind, and the arts, Darwin concluded that the facial expressions of non-human primates and man are similar, that human facial expressions have evolved from those of man's non-human primate ancestors, and that these universal facial expressions serve a functional, even essential role in human communication. In an introduction to an extensive review of the literature in this field during the

100 years since Darwin's publication, Ekman (1973) states that many of Darwin's observations and a large part of his theoretical explanations are substantiated by current knowledge.

While this statement pays tribute to the genius of Darwin, it also is indicative of the relative lack of interest in facial expressions during the first part of this century. This lack has been credited in large part to psychology's shift toward behaviorism and an emphasis on learning, a shift leading not only to a rejection of Darwin's work on facial expressions due to his emphasis on innate determinants (Ekman, 1973), but also to eventual rejection of emotion itself as a topic worthy of investigation (Izard, 1971).

Typical of the early research which attempted to verify Darwin's hypotheses was that of Feleky (1914). She developed a series of 86 photographs, using her own face as model, which were shown to 100 subjects who were provided a list of 110 names of emotions. These subjects chose as many terms as necessary to accurately describe the emotion portrayed in each photograph. Feleky reported some agreement among the subjects, but found that the majority of subjects did not place most of the photographs in a single division.

Langfeld (1918) used artists' sketches which were taken from 105 photographs posed by a single bearded male actor. These were shown to six judges (four men and two women) who

wrote down the emotion portrayed in the picture. The procedure was repeated with the pictures shown in a different order. Langfeld concluded that on the whole the judgements were unexpectedly good and consistent.

Ruckmick (1921) had a female student with training in dramatics pose for 34 different expressions which he presented to ten observers. He obtained a wide variety of interpretations and found that those he termed the "primary" emotions (love, hate, joy, and sorrow) were more uniformly recognized than those termed "secondary" (repulsiveness, defiance, distrust, and surprise).

Landis (1924) chose 77 of the most expressive photographs from a previously developed set of 844 pictures and showed them to 42 judges who were asked to name the emotion and the situation or stimuli which evoked the emotion. The only emotion named with a high degree of consistency was joy, with two pictures being labeled sorrow by 83% and 63% of the judges. Landis concluded that it was practically impossible to name either the emotion expressed or the situation giving rise to it. His conclusions were seized upon by the learning theorists as supporting their contention that emotion was learned. While Landis himself later indicated that he felt the primary emotions of anger, fear, joy and sadness were, as Darwin had said, the product of

adaptive evolution, these later statements were largely ignored by others (Izard, 1971).

Frois-Wittmann (1930) produced one of the best and most comprehensive of the early studies of the judgement of facial expressions of emotion, using photographs of himself. He posed for this new series by practicing before a mirror and snapping his fingers when he was ready to be photographed. He selected a set of 46 based on ten judges' responses to the original set of 120 for use in his experiments. Judgements of the whole face, the eyes separately, and the mouth separately were obtained from 165 college students. He concluded that there were some rather specific facial expressions which were identified by a substantial proportion of judges and that each of these reliably identified emotions contained some characteristic muscular involvements or combinations of muscular involvements.

Woodworth (1938) was one of the first to present observers with a set of broad categories of emotions rather than specific terms. Using the six broad categories of (1) love, mirth, happiness, (2) surprise, (3) fear, suffering, (4) anger, determination, (5) disgust, and (6) contempt, he was able to get rather high consensus on a series of photographs like those of Ruckmick and Frois-Wittmann. He also concluded that the emotion terms lay on a continuum in the order presented above.

Schlosberg (1941) refined the Woodworth scale using seven categories. He presented 72 of the Frois-Wittmann photographs to 45 judges who placed them in bins arranged left to right: love, happiness, mirth; surprise; fear/suffering; anger/determination; disgust; contempt. He concluded that the scale should be considered a circular series, and he reaffirmed that the scale was continuous rather than a collection of single categories. Using the scale approach, Schlosberg continued his research based on the assumption that expressions of emotion could be differentiated in terms of particular dimensions, e.g., pleasantness-unpleasantness, and that specific emotion terms were unnecessary, a conclusion which others have disputed (Izard, 1972).

Tolch (1963), using a set of thirty slides of facial expressions, asked judges to match them to one of five different groups of words that were supposed to describe the expression in each picture. He concluded that "there seems little doubt that people can identify facial expressions of simulated emotion with a high degree of accuracy or consistency when certain factors of language are taken into account" (Tolch, 1963, p. 16).

Thompson and Meltzer (1964) found that "Happiness, love, and fear and determination were more often accurately recognized than disgust, contempt, and suffering" (p. 129). And Boucher (1969) found that observers could indeed distinguish

between expressions of fear, pain and sadness, and concluded that these could constitute separate categories.

Tomkins and McCarter (1964) showed a set of 67 facial photographs of models simulating affective neutrality and the eight primary affects of interest, enjoyment, surprise, distress, fear, shame, contempt, and anger to a group of 24 firemen who were asked to identify the affect in the photograph. Based on the responses given by these firemen, it was concluded that the subjects identified the primary affects in the photographs with above chance accuracy, that some groups of subjects confused some affects with others in a systematic fashion, and that some subjects evidenced individual biases in their judgements. These results were used in support of the general theory that affective responses constituted a primary motivation system in human beings.

Izard (1971, 1977), following the lead of Tomkins and McCarter, has developed an extensive theory of emotion, the details of which may be found in his books Emotion in the Human Face and Human Emotions. A summary of Izard's position shows that he believes that the emotional system comprises one of six major subsystems of personality, and that this system is in turn comprised of neuro-physiological, neuromuscular, and phenomenological components. He further theorizes that facial patterning is critical to the experience of the nine fundamental emotions, particularly in early

development. These fundamental emotions, which he believes are subserved by innate mechanisms, include joy, sadness, anger, shame, disgust, fear, surprise, contempt, and interest. Izard's thesis is that facial patterning, which occurs in response to many organism-environment interactions or intra-organism processes, triggers the remaining components of the emotion system, including glandular, visceral, and cardiovascular responses, as well as cognitive responses. While Izard believes that the development of mental images and the incorporation of socio-cultural rules may lead to eventual suppression of much observable facial patterning in certain situations, he also believes that:

If severely punitive parental attitudes toward facial expressions were to result in rather thorough repression of all expressive movement (in the infant or young child), the consequences will be devastating (1971, p. 192).

This, he believes, could lead to an extremely constricted emotion system and an impoverished emotional life, with the end result likely to be a maladaptive, subnormal, or abnormal personality functioning (p. 193). Izard's emphasis on the central role of facial patterning is re-emphasized in this statement:

In both the internal and external communication processes facial expression contributes critical

information for the experiences of emotion and for emotion-related action (1971, p. 196).

Izard, in developing support for the theory of emotion outlined above, introduced two tasks, emotion recognition and emotion labeling. In distinguishing between these two tasks, Izard stated that the former appeared to be "more nearly a direct and immediate function of the innate, fundamental emotions, and relatively less influenced by socio-cultural milieu and individual learning" than the latter (1971, p. 373).

Materials for these tasks were a set of 36 posed photographs, four for each of the nine fundamental emotions, which were pre-judged and placed in the appropriate category by 70% or more of a group of at least ten American subjects before being included in the final set. The selection of verbal labels for the categories for the emotion recognition task was based on agreement of 8 of 10 judges on words taken from a pool drawn from definitions and categories from previous research as well as dictionary searches.

Subjects for this work consisted of university students, ages 18-30, most of whom were enrolled in psychology classes, from nine countries: the United States, England, Sweden, Germany, France, Switzerland, Greece, Africa, and Japan. With the exception of the Africans, who were students at the

University of Paris, all groups were tested in their native tongue.

Results of the emotion recognition test in which photographs were placed into one of nine provided emotion categories, indicated that in all cultures subjects were able to identify emotions at levels significantly better than chance, with the total agreement for all emotions across all cultures reaching 78%.

The emotion labeling task called for free labeling responses by the subjects upon presentation of each photograph. While agreement across cultures was not as great in emotion labeling as in emotion recognition, the results were again significantly different from chance. Variation due to culture was not significant, although variations due to emotion and culture by emotion interactions were significant, indicating that culture samples responded somewhat differently to the fundamental emotions. Variation due to sex was not found to be significant.

While Izard concluded that the results of the above research did not mean that there were no intercultural differences, he also concluded that these results supported the position that calls for the existence of discrete fundamental emotions common to all humanity.

Other research which has been carried out in order to reach and lend support to the conclusions and theoretical

positions outlined above is the cross-cultural work of Ekman and Friesen (1972). Here thirty photographs of fourteen different stimulus persons were selected from previously standardized series to represent the emotions happy, sad, surprise, anger, disgust/contempt, and fear. These photographs were shown to observers in five literate cultures who chose an emotion category from a list of six which had been translated into their own language. The results indicated that in these five cultures, Japan, Brazil, Chile, Argentina, and the United States, the same facial stimuli were judged as indicating the same emotions regardless of the culture of the observer. For example, the percentage of identical responses to the happy photographs ranged from 87% to 97% and to the sad photographs from 73% to 90% (Ekman, 1971, pp. 157-159).

In another study involving the preliterate cultures of Borneo and New Guinea, Ekman and Friesen (1972) altered the task to some extent. Here the observer was given three photographs at once, each showing a different face, and was told a story which involved only one emotion. The observer then pointed to the face he deemed appropriate to the story. The data indicated, for example, that when a face judged as happy in literate cultures was presented with two photographs usually judged in other literate cultures as showing another emotion, and a happy story was read to the observer, 92% of

the observers chose the happy photograph. The percentages for anger and surprise were 79% and 68% respectively. The data from these and similar experiments led Ekman and Friesen (1972) to conclude that there is "very strong evidence that facial expressions are universally associated with the same specific emotions" (p. 166).

Ekman (1973) has put together what appears to be the most complete review of the literature on facial expressions and emotion to date. It is his belief that faulty research design and misinterpretation of results in many early experiments involving the relationship of facial expressions to emotions led to confusion, contradiction, and negative findings, and an unjustified abandonment of the face as an appropriate topic for research. Ekman's own reanalysis of the existing literature as well as his own research (Ekman & Friesen, 1972) led him to the following conclusions: "When people look at the faces of other people, they can obtain information about happiness, surprise, fear, anger, disgust/contempt, interest, and sadness (p. 176)." "The face can provide accurate information. Such information can be interpreted, without any special training, by those who see the face" (p. 177). "There is one fundamental aspect of the relationship between facial behavior and emotion which is universal for man: the association between the movements of specific facial muscles and specific emotions" (p. 179).

Ekman also hypothesized culture-specific display rules which dictate how facial behavior is to be managed in particular social settings, by intensifying, deintensifying, neutralizing, or masking facial behavior associated with emotions, rules which could account for some of the variance in emotion communication patterns across cultures (p. 179).

It can be seen from the above review, that research to date has in fact supported the conclusions that facial expressions do convey emotional meaning, that such meaning can be identified at levels significantly beyond chance, and that this occurs across cultures.

Research Pertaining to Individual Differences
in Recognition of Facial Expressions
of Emotion

As can be seen from the above, the principle of the universality of facial expressions of emotion has been the focus of much of the research in this field. The existence of individual differences in the ability to identify facial expressions of emotion created problems for early researchers, who felt that anything less than 100% accuracy or agreement among persons in identifying an emotion meant that emotions could not be communicated accurately. But individual differences have become a given for modern researchers who have stated that 100% accuracy cannot be expected (Ekman, 1973). This attitude has given increased

impetus, with albeit somewhat limited effect, to the investigation of sources of individual differences and correlates of the ability to identify facial expressions of emotion.

Sex

Sex of the perceiver has been one of the most frequently cited characteristics in studies of individual differences in accuracy of identification of facial expressions of emotion, and the one with the most contradictory findings.

As early as 1924 Buzby (1924), in an investigation which showed that the upper part of the face was more important than the mouth in determining accuracy of judgement, found that women gave a slightly greater percentage of correct judgements than men. In addition, he found that both men and women showed a slight decrease in accuracy with increasing, but undefined, sophistication. Replications of this study, however, by Jarden and Fernberger (1921) and by Fernberger (1928) found no consistent differences due to sex of the observer.

Allport (1924) and Guilford (1929), while exploring the effects of training on increased accuracy in identifying the Rudolph pictures, found no reliable differences between men and women. However, Jenness (1932), who replicated their studies, found women to be significantly more accurate.

Kanner (1931) tested the ability of 364 males and 45 females to identify facial expressions of emotion. While he found that women obtained a slightly higher average score than men, he felt that the female population was too small to allow for generalization.

Coleman (1949), while investigating the portion of the face which was most important in identifying facial expressions of emotion found no differences between male and female judges. But Vinacke (1949) discovered that women showed higher interjudge agreement about the meaning of candid pictures presumably depicting expressions of emotion than did men. And Weisberger (1956) found female college students superior to their male peers in judging the Ruckmick pictures, a finding he attributed to the higher linguistic ability of the female sample.

Gitter, Kozel, and Mostofsky (1972) looked at the roles of race and sex of the expressor, as well as presentation mode, in the ability of 183 white male and female undergraduates to perceive emotional messages. They used a 2x2x4 factorial design in which the variables were sex of the perceiver, race of the female presenter, and mode of presentation (audio-visual tape, visual only tape, audio only tape and still pictures taken from the tape). They found that the audio-visual tape was interpreted significantly more accurately than the visual only than the audio

only than the still pictures. The race of the expressor presented mixed effects by sex and by mode of presentation and by emotion. Among the perceivers, females performed significantly better than males.

Westbrook (1974), in what was felt to be a definitive study, explored sex differences in the perception of emotion in 49 males and 51 females, ages 18-50. While males made more evaluation errors when judging positive and negative emotions expressed by females, there were no significant sex differences in the nine hypotheses tested. She concluded that continued research with emphasis on sex differences in the perception of emotion was questioned.

Eiland and Richardson (1976) investigated the influence of race, sex, and age in both expressers and perceivers on judgements of emotion portrayed in photographs. Eight models, including male and female, black and white, adults and children were asked to portray the emotions of happiness, sadness, fear, anger, and disgust. Forty of the most representative photographs as determined by three judges were presented to eighty subjects, 10 each of black, white, male, female, college students, or second grade children. They were asked to put the photographs into boxes labeled with the five emotion names. Results of the study indicated significant effects for race, sex, and age in the photographs. This was interpreted to mean that all people as a

group do not interpret messages sent by black faces the same as white faces, male faces the same as female faces, or young faces the same as old faces, leading to the conclusion that one should not generalize results beyond the race, sex or age group of the stimulus materials. No significant effects, however, were found for race, sex, or age of the persons judging the photographs. It should be noted that this study did not explore accuracy of judgement, but rather patterns of judgement, and the author indicated that the lack of effects due to race, sex and age might have been due to the design of the study.

Other researchers who have investigated other forms of nonverbal emotional sensitivity have also produced contradictory results. Davitz (1964) and his colleagues, in connection with the investigation of the expressions and recognition of communication of emotion through vocal cues found no sex differences in several studies, leading to the conclusion that the notion that women are more "intuitive" and more emotionally aware than men should be called into question.

Rosenthal, et al. (in Stewart, 1977) having become intrigued with the effect of perception of others on interpersonal relationships and expectations, developed a Profile of Non-verbal Sensitivity (PONS). The PONS is a forty-five minute film containing scenes of facial expressions and

spoken phrases consisting of tones and sounds, not words. After each scene, the test-taker chooses the appropriate situational label from two given situations on a standardized form, e.g., between "expressing jealous anger" and "talking about one's divorce." The final version contains 220 such scenes in varying combinations of single and mixed channel displays.

Results to date, based on the PONS, indicate that there is a strong correlation between sex and accuracy, with this difference being noted as early as third grade. Women showed a greater sensitivity to both male and female versions of the PONS, and did particularly well compared to men when body cues were included. It has been hypothesized by the authors that these differences are due to learning, related either to requirements that mothers be sensitive to nonverbal emotional cues in children, or to the necessity that women, being "socially oppressed" must be able to read the expressions of others in order to advance or survive.

In summary, the question of the relationship of sex to accuracy in understanding emotional messages has not been given a definitive answer, with the previous results being split between those that show no differences related to sex and those that show women to be more accurate in the recognition of such messages than men. These findings come not only from investigations of facial expressions of emotion,

but also from investigations of other nonverbal cues such as para-vocal cues and body postures. Explanations for differences which were found have been variously attributed to "woman's intuition," to differences in the kinds of feelings to which men and women are sensitive, or to cultural explanations such as the need for women to be more aware of their oppressors' feelings or the suppression of emotional expressions in males.

Age

The relationship of emotional sensitivity to age has received little or no investigation, in spite of the fact that even the general public is beginning to realize that growth and change do not automatically end after age 18. Davitz (1964) is the one researcher to report age as a variable in an investigation of emotional sensitivity to vocal cues. In a sample ranging in age from 21 to 51, Davitz reported a tendency for emotional sensitivity to decrease with age ($r = -.34$). This was attributed to several possible factors, including decreased perceptual attentiveness with age or educational or social status differences in the sample population. It was concluded that this finding should be viewed with caution. In another study, Davitz (1964) found as a by-product of his investigation of normals and schizophrenics that there was a tendency

for emotional sensitivity to vocal cues to be negatively correlated with age in a population ranging from 20 to 53 years.

Education and Occupation

In spite of the fact that several authors (Ekman & Friesen, 1975; Harrison, 1972; Rogers, 1975) have stated that persons in some occupations do, or should, exhibit more emotional sensitivity than others, e.g., those in education, medicine, and psychology, there has to date been no direct investigation of this relationship. Rosenthal (in Stewart, 1977) did report that men in nurturant or artistic professions were found to do as well or better than women on the PONS, a measure which had proven to be consistent in differentiating between men and women. Davitz (1964) reported a tentative positive relationship between level of education and the ability to recognize vocal cues of emotion.

Intelligence

In contrast to the contradictory findings about sex differences in relation to emotional sensitivity, most researchers who have looked at intelligence have found low, but positive correlations between the ability to identify facial expressions of emotion and various measures of intelligence. In an early study, Kanner (1931) reported a correlation of $r = .21$, while Weisberger (1956) reported a

correlation of $r = .20$. Levy, Orr, and Rosensweig (1960) compared the pleasant-unpleasant ratings made by college students and mental retardates on a series of photographs of facial expressions and found that the mean ratings did not differ significantly. However, these results were explained by indicating that pleasantness-unpleasantness was only one dimension among many, with the supposition being that accurately identifying facial expressions of emotion along several dimensions might require a good deal of intellectual ability.

Davitz (1964), in a review of his work on emotional sensitivity as measured by accuracy in identification of emotional meaning of vocal cues, also reported low, but positive correlations between emotional sensitivity and verbal intelligence. A study investigating the relationship between identification of emotional meaning of vocal cues and auditory ability, abstract symbolic ability, verbal intelligence and knowledge of vocal characteristics resulted in a multiple correlation of $R = .60$ being obtained between these four variables and the measure of sensitivity to vocal cues of emotion (Davitz, 1964), leading Davitz to conclude that there was a general emotional sensitivity factor which was comprised by cognitive and perceptual variables.

Personality

The absence of research focused on personality variables in relationship to individual differences in sensitivity to facial expressions of emotion is termed "remarkable" by Davitz (1964), particularly in light of the clinical interest in the personality of the sensitive clinician. Davitz attributed some of this gap in research to the fact that many studies of facial expressions were conducted prior to the increased interest in personality research.

In the one reported study investigating personality variables and recognition of facial expressions of emotion, Zlatchin (1974) examined this relationship in medical students and Haight-Ashbury residents. She found that accuracy in facial recognition was obtainable with even brief exposure to the pictures, but found no significant relationship between personality variables and accuracy scores. Among the Haight-Ashbury residents, there was a tendency for the more socially adjusted persons to do better.

Davitz (1964) found that high scorers in vocal sensitivity also described themselves as more sensitive than low scorers. He then conducted several studies exploring the relationship between the ability to identify vocal expressions of emotional meaning and personality variables. He obtained non-significant correlations between sensitivity to vocal cues and thirty-three personality variables, measured

by such instruments as the Guilford-Zimmerman Temperment Survey, the Allport-Vernon-Lindzey Study of Values, and the Edwards Personal Preference Schedule, as well as selected scales from the MMPI. He did find relationships between verbal intelligence, nonverbal intelligence, and field dependence and the ability to recognize vocal cues of emotion. He, therefore, concluded that emotional sensitivity was not related to personality traits as defined by the traditional paper and pencil techniques, but was rather a function of cognitive and perceptual variables.

Davitz (1964) also investigated the relationship between compatibility among college room-mates and their ability to understand each other's emotional meaning. The results suggested a curvilinear relationship between interpersonal compatibility and sensitivity to each other's expressions. Both very low and very high sensitivity were associated with low compatibility, while the high compatible pairs were neither too sensitive nor too insensitive to each other, suggesting that without a minimal level of sensitivity the result is ignorance of each other and that too great a sensitivity might interfere with interpersonal functioning.

Mehrabian (1972) also investigated the ability to communicate or infer positive and negative feelings through nonverbal means, this being an outgrowth of an interest in implicit communication factors. He conducted two experiments

in which high- and low-approval seeking subjects of both sexes first encoded and then decoded facial and vocal expressions of varying degrees of like-dislike. Results of these studies indicated that the facial channel was generally more effective than the vocal channel, in conveying attitudes of like-dislike, that negative attitudes were more readily conveyed than positive ones, and that low approval seekers were better at encoding variations in negative attitude than were high approval seekers, although there was no corresponding difference between the two groups' ability to decode positive or negative attitudes. Females were considerably better than males at communicating variations in negative attitudes, although males were somewhat better communicators of positive attitudes.

Rosenthal, et al. (in Stewart, 1977) found that high scorers on the PONS tended to function better socially and intellectually than low scorers, that task-oriented workers were better than "people-oriented" workers, and the democratic teachers were more sensitive than autocratic teachers. Those who did well on the PONS reported fewer friends, but warmer, more honest, and more satisfying same-sex relationships. Those who were the most accurate, particularly at high speed presentations, reported less satisfactory interpersonal relationships, supporting the stereotype of the "supersensitive" person who knows too much about others.

Nevertheless, a relationship was found between high PONS scorers and high scores on a test that measures a person's ability to predict events in another person's life (person perception), as well as measures of cognitive complexity.

An outgrowth of research investigating personality variables in normals is that which has investigated the differences between normal and emotionally disturbed populations in emotional sensitivity. Levy, Orr, and Rosensweig (1960) compared the ratings of facial expressions on a pleasant-unpleasant scale made by 50 acutely psychotic males and 96 normal college students. The two groups made similar judgments, with no consistent differences between mean ratings. The ratings of the psychotic group were, however, more variable than those of the college group.

Shannon (1970) compared male, 20-55 year old, normal, depressive, and schizophrenic patients in a VA hospital on their accuracy in recognition of facial expressions. While there were no significant differences in overall accuracy scores, there were some trends with regard to specific emotions. For example, schizophrenics were less accurate than depressives or normals in recognizing contempt and depressives were less accurate in recognizing fear. No differences were noted in the recognition of sadness.

Daugherty, Bartlett, and Izard (1974) presented photographs of facial expressions representing eight fundamental

emotion categories to comparable normal and schizophrenic samples in the United States and France (females only). Emotion recognition scores were about the same for the American and French samples, with the normal groups having significantly higher scores than the two schizophrenic groups. Schizophrenic subjects had the greatest difficulty with pictures depicting contempt and shame, and they exhibited a large positive response bias to the enjoyment categories. The results for emotion labeling were not as decisive, but they were generally similar to those for emotion recognition tasks.

Muzekian and Bates (1977) investigated accuracy of judgement of both posed facial expressions and nonverbal scenes of various emotions in 16 male and 16 female chronic schizophrenics and a normal control group. Results indicate that normal subjects were significantly more accurate than schizophrenics in identifying emotions from both the photographs and nonverbal videotape scenes. Sex was not found to be a factor for either schizophrenics or the normals in accuracy of response. Accuracy improved for both groups with the introduction of a multiple-choice as opposed to free response format, particularly for the schizophrenic group.

Davitz (1964) conceptualized schizophrenia as a deficit in communication of emotion due to either distortion of or

insensitivity to emotional cues, resulting in disturbance in interpersonal functioning. Results of a comparison between paranoid-schizophrenics, nonparanoid-schizophrenics, and a normal control group in judgements of vocal expressions of emotional meaning showed that schizophrenics varied more than non-schizophrenics in ability to identify emotion in speech sounds, and on the average they were inferior. No differences were found between paranoid and non-paranoid schizophrenics in average ability to identify vocal expressions of emotional meaning. Tentative conclusions suggested that among non-schizophrenic persons, this ability correlates positively with education level and negatively with age.

Rosenthal (in Stewart, 1977) found that psychiatric patients and alcoholics had difficulty on the PONS where too much information was presented, doing better with single channel items than with mixed channels and better with audio cues than visual cues.

In summary, the results of investigations of the relationship between personality variables and recognition of emotional messages, including facial expressions of emotion and vocal cues of emotion, remain inconclusive. While there has been a tendency for those who are more sensitive to be better socially adjusted, results also suggest that there is a curvilinear relationship between compatibility or social adjustment and emotional sensitivity. Those in the middle

appear to function better than those who are insensitive and those who are too sensitive. Other researchers have been emphatic in their rejection of a relationship between emotional sensitivity and personality. Research which has compared the emotion recognition accuracy of normals to emotionally disturbed populations has shown consistent differences, particularly with regard to the specific emotions of contempt and shame. Results of this work with normals and disturbed populations have been consistent enough for some (Cuceloglu in Speer, 1972 and Harrison, 1972) to suggest that the nature of specific emotional disturbances might be reflected in the specific affect disturbances noted, and that different emotional problems might be diagnosed by the way in which the patient can identify or express the primary affects.

While investigations of personality variables and overall accuracy in recognition of expressions of emotion have generally been negative, several authors have stated that even among normals, persons might differ not so much in overall accuracy as in responses to specific emotions, patterns which might be related to long standing differences in personality or mood (Ekman in Seigman & Feldstein, 1978).

Tomkins and McCarter (1964) reported that an analysis of errors made by subjects in identifying facial expressions

of emotion could be accounted for by either "common confusions," e.g., fear for anger, which were consistent across subjects, or by idiosyncratic error patterns which were stable within the individual and reflected individual emotional sensitivity difficulties.

Ekman (in Seigman & Feldstein, 1978) has reported the development of the Brief Affect Recognition Test (BART), in which subjects are asked to decode still photographs of standardized expressions of happiness, sadness, anger, fear, disgust and surprise when presented tachistoscopically at speeds of .01 to .04 second, timing which Ekman feels reflects normal communication conditions. While Ekman reports that he is still standardizing the BART in order to replicate earlier findings, results of two studies based on the hypothesis that people will differ in patterns of accuracy rather than overall accuracy have been reported. Shannon (1970) showed that normals, schizophrenics, and depressives differed in error patterns. Jones, Ekman, Friesen, and Malmstrom (1970) showed that persons who had ingested alcohol performed differently than those who had ingested marijuana and that there was a relationship between self-reported mood and accuracy in recognizing particular expressions.

Summary

A review of the literature as related to individual differences in recognition of facial expressions of emotion is inconclusive, particularly to the extent that very few studies have been conducted which had individual differences as a focus. While females tend to do better than males in some cases, many studies have shown no differences between males and females. While intelligence and education level have been found to be positively related to accuracy in identifying vocal cues of emotion, a tendency for a negative correlation with age has been found. While persons in some professions have been supposed to be more accurate in recognition of facial expressions than others, there is little evidence to support this position. And investigations of personality variables are few and inconclusive. Thus, one might say with Ekman (in Siegman & Feldstein, 1978) "While it is clear that individuals differ in facial expressiveness and in how well they understand facial expressions of others, little is known about how this operates and how it is related to personality" (p. 114).

Research Pertaining to Psychological Differentiation, Empathy, Extraversion, and Neuroticism

As outlined above, individual differences in recognition of facial expressions of emotion have focused to date

on sex, age, education and occupation, intelligence, and general personality, with no studies having as their major focus analysis of such differences. The present study has proposed that the specific factors of psychological differentiation, empathy, extraversion, and neuroticism might be related to individual differences in recognition of facial expressions of emotion. Literature related to these factors will briefly be reviewed below.

Psychological Differentiation

One way of conceptualizing the process involved in identifying facial expressions of emotion is to see it as attending to and recognizing a specific form, i.e., emotion expression, within a larger field, i.e., the face with all its signs and emblems (Ekman, 1975).

Witkin (1950), who was interested in individual differences in perceiving, devised several procedures which were used to measure an aspect of perception which has come to be known as field-dependence or psychological differentiation, defined as the perception of a part within a larger field. Among those procedures was the Embedded Figures Test (EFT) in which persons were asked to locate a simple figure within the structure of a complex figure (for a full description of the original development and standardization of the EFT, see Witkin, 1950). Since the introduction of the EFT, it has been used in a multitude of

studies which have investigated perception, cognitive functioning, and personality. Below will be presented a brief summary of the major findings with regard to this aspect of perceptual organization.

Witkin's first results (1950) indicated that on the average women required considerably more time than men to locate the simple figures in the complex figures. In addition, women displayed greater variability in time of response. Overall, subjects were fairly consistent across trials, with individuals displaying marked variability across subjects. In addition, Witkin reported that the perceptual differences revealed in the EFT were also operative in test situations where cognitive processes were more directly involved, influencing the ease with which the person solved the problems presented, as well as the manner in which the person went about solving them. In general, it was hypothesized that poor performers of the EFT reflected stronger adherence to the structure of the presented field.

In a comprehensive study involving the relationship of personality to perception (Witkin, et al., 1954) various measures of space-orientation, perceptual field tasks, and personality measures were explored. Among the pertinent findings, it was reported that individual differences in task performance on space-orientation tasks, including the

EFT, were definable in terms of degree of dependence on the structure of the prevailing field, ranging from great dependence, at one extreme, to great ability to deal with the presented field analytically, or to separate an item from the configuration in which it occurs, at the other. In addition, at all ages, females were more strongly influenced by the prevailing field than men, the discrepancy becoming more stable with adulthood. Results of correlations between personality traits evaluated through a structured interview and field dependence revealed a tendency for field-dependent perceptual performers to lack insight, to repress their impulses, to be passive, to yield to their inferiority feelings, and to be tense. Those displaying field-independence generally tended to show self-awareness, to express their impulses directly, to be active, to deal with inferiority feelings in a compensatory way, and to show self-assurance.

Results based on Rorschach responses showed that those who were very field-dependent also demonstrated, on the whole, a high degree of inadequacy in both coping and introspection areas, with self-awareness and self-acceptance being almost totally lacking, leading to the conclusion that the prevailing field was accepted by such people due to the absence of self-directed, self-propelled activity. In contrast, the independent or analytical perceptual

performer was able to act, to assert oneself, to organize, and to make use of relevant factors in the field. Results based on the TAT showed that field-dependent persons told more stories in which the central character was unassertive in dealing with the problems, while field-independent persons created stories with a self-assertive principal figure.

Holtzmann, Swartz, and Thorpe (1971) compared artists, architects, and engineers on several measures of visual experience and personality. No significant differences were found on the EFT, a result the authors attributed to the fact that the selected students were highly efficient in certain kinds of visual perception as compared to the general population. However, correlations between EFT scores for all three groups combined and the Holtzmann Inkblot Test showed that field-dependent subjects rejected the inkblots more, that they used more detail when they did respond, and that they were more likely to give responses which dealt with violations of body image.

DeRussy and Futch (1971) explored field-dependence as related to college curricula. Results of their study indicated that male chemistry, physics, and math students were more field-independent than were female science and male liberal arts students, who were more field-independent than female liberal arts students. This led to the

conclusion that field-dependence should be considered in career choice.

Finally, several studies have shown that more field-dependent persons are particularly attentive to faces of people around them. They literally look more at faces and are better at remembering faces (Witkin, et al., 1971). This has led Witkin to conclude that to the extent that the face is the major source of cues as to what another is feeling and thinking, it is reasonable to expect that field-dependent persons, who tend to define their view of themselves by others' reactions to them should be attentive to faces.

In summary, research has shown that field-dependent persons tend to be characterized by passivity in dealing with the environment; by unfamiliarity with and fear of their own impulses, together with poor control over them; and by the possession of a relatively primitive undifferentiated body image which is dependent upon feedback from others. Independent or analytical perceptual performers, in contrast, tend to be characterized by activity and independence in relation to the environment; by closer communication with and better control of their own impulses; and by relatively high self-esteem and a more differentiated, mature body image. Witkin, et al. (1971) also reports small but consistent sex differences in field-dependence, with men

being more field-independent than women. They also report a tendency for field-independence to decline with age at some point between 24 years old and old age.

Empathy

The concept of empathy, which refers to a sensitivity and responsiveness to the needs, feelings, and values of others, is a major element in role-theoretical accounts of interpersonal behavior (cf. Greif & Hogan, 1973) and the process of empathy is considered to be crucial to the success of the therapeutic relationship (Rogers, 1975). Given the importance thus ascribed to empathy, it is not surprising that the issues and answers surrounding the definition, development, training, and measurement of empathy are many and varied. Below will be outlined the major positions taken by researchers today with regard to the above issue, and the relationship between the global concept of empathy and emotional sensitivity as measured by accurate understanding of facial expressions of emotion will be discussed.

Hogan (1969) has developed a 64 item self-report measure of empathy which was constructed by comparing the responses of groups with high and low rated empathy, using a pool of items from the MMPI and the CPI. Hogan's theoretical orientation was a multidimensional theory of moral

development which was based on social role-taking theory (Hogan, 1969). Findings of studies which have used Hogan's Empathy Scale have shown that this scale is correlated with ratings of social acuity, likability, and communicative competence (Greif & Hogan, 1973), supporting the idea that empathy does facilitate social interaction. A factor analysis of Hogan's scale indicated that underlying empathy is a tolerant, even-tempered disposition, an affiliative, but socially ascendent tenderness, and a humanistic and tolerant set of socio-political and religious attitudes (Greif & Hogan, 1973). Hakmet, et al. (1975), using the Hogan scale, found that high empathy persons were significantly lower in signs depicting neurotic and psychotic disturbances as compared with low empathy persons. And Deardorff, et al. (1977) reported that empathy showed an inverse relationship with anxiety, but no significant correlation with locus of control. Hogan (1975) has also reported that an empathetic person should have considerable social self-confidence and tend to seek out and enjoy social interaction, while the empathetic "audience person" should tend to be a tactful and appreciative listener, providing an accepting and generally rewarding context for interaction.

Mehrabian and Epstein (1972) have defined empathy as both the recognition of another's feelings and the sharing

of those feelings, at least at the gross affect (pleasant-unpleasant) level, differentiating this form of empathy from social insight or predictive accuracy. The Mehrabian scale consists of thirty-three items which were drawn from a large set based on (a) insignificant correlations with a scale of social desirability, (b) significant .01 level correlations with the total score on the scale, and (c) content validity inferred in part from factor analysis of a larger pool of items. Several experiments were conducted to test the validity of the empathy measure. The first set of experiments showed that those scoring high in empathy aggress less when the victim is more immediate than did those scoring lower in empathy, supporting the hypothesis that empathic feedback does inhibit aggression. A second set of studies showed that helping behavior was a function of empathic tendency, supporting the idea that empathic persons are emotionally responsive to other's needs.

Both of the above scales were felt to measure trait empathy (Hogan, 1975) as opposed to state empathy, with the latter form being more fully explored and developed by those interested in the empathic process in counseling. Rogers (1975) who has consistently emphasized the importance of empathy in the counseling process, has defined empathy as a process which involves being sensitive to the

felt meanings in the other person, feeling what that person is experiencing, communicating those sensings of the other's world, and checking with the other as to the accuracy of the interpretation of those felt meanings. Operationally, this means that one listens to and says back the other person's feelings without including one's own thoughts or ideas.

Rogers (1975), after reviewing the research on empathy, reports the following conclusions: in the therapeutic setting the ideal therapist is first of all empathetic; empathy is correlated with self-exploration and process movement on the part of the client; empathy early in the relationship predicts later success; the more experienced the therapist the more likely he is to be empathetic; empathy is definitely offered more by a therapist than by a helpful friend; experience as a therapist does not guarantee empathy; the client is a better judge of degree of empathy than the therapist; the degree of empathy created by the therapist is not related to the therapist's accuracy or perceptions of the individual or his diagnostic competence; and an empathic way of being can be learned from empathic persons. He further states that the result of the empathic process is an accepting and non-judgemental climate in which the client can become free to change and grow.

Attempts to measure empathy in the counseling relationship have most frequently consisted of ratings of client-therapist interactions with various versions of the Truax-Carkhull scales which measure empathy, non-possessive warmth, facilitative genuineness, immediacy of relationship and facilitative self-disclosure, with most ratings being conducted using audiotapes (Barrow, 1977). While some research using audiotapes has shown empathy ratings to be related to the number of emotion-related statements made by the therapist (Barrow, 1977), Haase and Lepper (1972) have reported that when ratings are made using video-tapes, non-verbal behaviors such as eye-contact, trunk lean, body-orientation, and distance accounted for more variability in empathy ratings than did level of empathy in the verbal statements, supporting the notion that nonverbal channels have considerable importance in determining the level of empathic communication.

Much of the research on empathy has been generated out of a need to find ways to train counselors in empathy. Aspy (1975), using the Carkhuff model as a basis, states that in teaching trainees to be empathetic, a productive model includes listening for the feeling and then the thing that causes the feeling, followed by verbalization of a statement such as "you feel ----- because . . ." In this model empathy is defined as the ability to understand

and to communicate to another understandings of both the feelings and the reasons for the feelings being expressed. Aspy (1975) has reported that use of this model has resulted in training both counselors and teachers to increase levels of empathy in therapy and in the classroom, and he concludes his article by stating that empathy as a significant component in all human relationships should be taught to everyone.

Bullmer (1977) has taken this model a little further and has trained persons to recognize facial expressions of emotion as part of the empathy training process, with his results indicating that persons with such training displayed more empathy than did those without such training.

It is with regard to the accuracy of perception of the feelings of others as a component of empathy that the ability to decode facial expressions of emotion becomes important. While many definitions of empathy, including that of Rogers, do not directly deal with the issue of accuracy of perception, accuracy is clearly an important component of empathy. Weinstein (in Goslin, 1969) states that empathy required the actor to accurately assess the other's feelings and definition of the situation in order to accurately predict the impact the various lines of action will have on the other. And the developmental literature (Feshbach & Feshbach, 1969; Feshbach, 1975;

Ionatti, 1975) stresses that empathy must begin with accurate recognition of another's feelings, rather than identification of feelings through projection (e.g., the sad boy at the birthday party). And Ionatti (1975) has stated that in its broadest sense those individuals who are high in empathy are those who frequently and appropriately respond to the feelings of others. It is one of the purposes of the present study to investigate the relationship between emotional sensitivity as measured by accuracy in identifying facial expressions of emotion, which would appear to be part of the empathic process, and broader measures of empathy in order to further extend the relevance of the study of facial expressions of emotion.

Extraversion and Neuroticism

Another set of variables which has received a great deal of attention in relationship to personality and social adjustment includes extraversion and neuroticism as measured by the Eysenck Personality Inventory (Eysenck & Eysenck, 1968). Eysenck, who took his terms from Jung, believes that extraversion-neuroticism have psychological roots which are related to excitation and arousal levels in the brain, and he used this conceptualization as a basis for many predictions about the behavior patterns of introverts and extroverts. The accuracy of these predictions

was in turn used to validate the extraversion and neuroticism scales.

Eysenck and Eysenck (1968), in reviewing many of the physiological differences between introverts and extraverts, stated that among other things, extraverts were characterized by lower tolerance for deprivation, higher thresholds for pain and pain tolerance, poorer long-term memory recall, less suggestibility, less conforming, and less responsiveness to punishment and to conditioning than introverts.

Eysenck and Eysenck (1968) have also stated that extraversion applies to individuals tending to be outgoing, impulsive, and uninhibited, having many social contacts, and frequently taking part in group activities. The introvert is seen as a quiet retiring sort of person, introspective, fond of books rather than people, one who has reserve and is distant except to intimate friends. He tends to plan ahead, looks before he leaps, and distrusts the impulse of the moment; he does not like excitement; he takes matters of everyday life with proper seriousness, and likes a well-ordered mode of life.

Neuroticism refers to the general emotional over-responsiveness of a person and liability to neurotic breakdown under stress. Persons who obtain high neuroticism scores are described as having difficulty returning to a

normal state after emotional experiences, as complaining of vague somatic complaints, and as being predisposed to develop neurotic disorders under stress (Eysenck & Eysenck, 1968).

While better adjustment is reported to be associated with low neuroticism scores and with middle to above average extraversion scores, persons with slightly elevated neuroticism scores and lower extraversion scores can be expected to achieve greater academic success (Eysenck & Eysenck, 1968). They also report a significant trend for extraversion and neuroticism scores to decline with age and for women to score higher than men on neuroticism and lower on extraversion.

CHAPTER III

METHODS AND PROCEDURES

The major focus of the present study is the exploration of possible sources of variation in individuals in emotion sensitivity as expressed by the ability to recognize facial expressions of emotional meaning. In order to carry out this exploration and to answer the questions outlined in Chapter I, adults who had been selected from the general population were given an emotion recognition task designed to measure accuracy of forced choice matching of specific facial expressions to given categories. This task included nine emotions: interest, joy, distress, surprise, disgust, anger, contempt, fear, and shame. These nine specific emotions and the total recognition score provided the basis for testing overall accuracy and differential response patterns due to specific emotion. Demographic data, including sex, age, level and type of educational training, and present occupation were gathered. Measures of intelligence, psychological differentiation, empathy, extraversion, and neuroticism were administered.

Data gathered from the emotion recognition task, the demographic information, and the various measures outlined

above were correlated, subjected to analysis of variance, and were placed in a step-wise multiple regression equation as appropriate in order to obtain answers to the research questions. Information was related to both overall emotion recognition accuracy and to accuracy in recognition of the nine specific emotions.

The following sections describe in more detail the subjects, instruments, procedures, and methods of analysis which were used in this study.

Subjects

Subjects for this study included fifty-five persons drawn from the adult population in a suburban location who had volunteered to participate in a study of emotion recognition. These subjects were acquired primarily through personal contact with the researcher. The sample included 36 females and 19 males, all of Caucasian background. They ranged in age from 18 to 72, with a mean of 38.1 years. Among the subjects, seven had completed high school, fourteen had attended college or trade school, sixteen had completed college, thirteen had some graduate education, and five had obtained doctoral degrees. Distribution of the subjects among major and occupation categories may be found in Table 1. Average intellectual level for this population was at the 50th%ile for a professional population

(Gunn & Manson, 1962). (For a comparison of intelligence test scores and file rankings, see Appendix B.)

Table 1
Distribution of Subjects Among Major and
Occupation Categories
(N = 55)

Area	Major	Occupation
Social Sciences	11	7
Physical Sciences	7	4
Biological Sciences	2	1
Business	10	23
Education	9	9
Fine Arts	6	3
Other	10	8

Instruments

In order to measure emotion recognition, intelligence, psychological differentiation, extraversion, neuroticism, and empathy, several available instruments and published tests were utilized. These are described below.

Emotion Recognition

Previous researchers have developed several types of tasks related to the understanding of facial expressions of emotion, with stimulus materials and types of responses depending to some extent on the questions being asked. The

task chosen for the present research is one used by Izard (1971) in his cross-cultural research and is similar to those used by Ekman (1972) and others.

The materials for this task consisted of thirty-six 5 x 7 black and white photographs of human faces, including four posed representations of each of these nine emotions: interest, joy, surprise, distress, disgust, anger, shame, fear, and contempt. These photographs are identical to those previously used and standardized by Izard (1971). Empirical criteria for selection of these photographs for use in the Izard research consisted of at least 70% agreement by 10 or more American subjects, with a different person being represented in each of the four photographs for each emotion. (For a complete explanation of the selection procedure see Izard, 1971, pp. 235-236.) The present set of thirty-six photographs includes 16 white male adults, 19 white female adults, and 1 white female child. The selection process and the faces represented seem to meet Ekman's caution (Ekman & Friesen, 1975) that the photographs allow for generality across emotions and stimulus persons. For a listing of the percentage of agreement in the modal categories for each photograph by the Americans in Izard's (1971) final sample, see Appendix C.

It should be noted that, for the most part, accuracy scores in emotion recognition tasks have been used either

to provide evidence that recognition responses are systematic rather than random responses, with response patterns being significantly different from chance, or to compare the effects of the type of stimulus employed, e.g., still photographs versus tape, eyes versus mouth, or male versus female stimulus persons, on overall accuracy scores. To date, there has been little exploration of the variation in accuracy due to observer variables. Thus, while acknowledging the research which shows that video tapes or motion pictures can result in higher overall accuracy scores than still photographs, the stimuli for this study consist of still photographs.

In addition to the presentation of the photographs described above, each subject was provided with the list of the nine emotion categories and descriptive terms found in Table 2. In order to complete the emotion recognition task the subject was to choose the appropriate category for each photograph presented. These were compared with the pre-determined modal categories for each photograph. Overall accuracy scores (range 0-36) and specific emotion accuracy scores (range 0-4) were derived from the subjects' responses.

Table 2
Emotion Recognition Descriptions

Interest-Excitement:	Concentrating, attending, attracted, curious
Enjoyment-Joy:	Glad, merry, delighted, joyful
Surprise-Startle:	Sudden reaction to something unexpected, astonished
Distress-Anguish:	Sad, unhappy, miserable, feels like crying
Disgust-Revulsion:	Reaction to something which is spoiled
Anger-Rage:	Angry, hostile, furious, enraged
Shame-Humiliation:	Embarrassed, ashamed, guilty, shy
Fear-Terror:	Scared, afraid, terrified, panicked
Contempt-Scorn:	Sneering, scornful, disdainful

Demographic Data Sheet

In order to gather information about age, sex, level and type of education training, and present occupation, each subject was asked to fill out a data sheet, a copy of which may be found in Appendix D.

Western Personnel Test

In order to explore and control for the possible effects of general mental ability or intelligence on the

accuracy of emotion recognition, the Western Personnel Test, Form A (Gunn & Manson, 1962) was administered. This test consists of twenty-four items encompassing intellectual functions such as use of language, size of vocabulary, reasoning ability, numerical skills, perceptiveness, general alertness, and scope of background. This is a rapid test, taking five minutes to administer. Raw scores, which consist of the total number of correct responses, can be converted to percentile ranks for the general population or for each of five occupation groups. Reliability for the Western Personnel Test, Form A, using the Spearman-Brown formula of comparing odd-even test items, was reported to be $r = .927$. Validity was determined by comparing raw scores on the Western Personnel Test with raw scores on the Wonderlic Personnel Test, Form B. The reported correlation coefficient for Form A was $r = .851$. (For further information, see Gunn & Manson, 1962).

Group Embedded Figures Test

Witkin (1950) developed the Embedded Figures Test (EFT) as one measure of field dependence or psychological differentiation. The EFT was designed to determine an individual's capacity to extract specific information from the field in which it appeared, a process not unlike that involved in perceiving an emotional expression in the complex field of the face. The Group Embedded Figures Test

(GEFT) (Witkin, Oltman, Raskin, and Karp, 1971) was chosen for this study as a measure of psychological differentiation. The GEFT consists of seven practice problems and two sets of nine test problems which are presented in individual booklets. These are presented in timed sections, with the entire test taking about 15 minutes to complete. The subject must trace with a pencil in each complex figure the simple figure which is contained in it. Results are presented as raw scores, based on the number of correctly traced figures from the two test sections. A high score indicates greater psychological differentiation than a low score. Reliability as determined by the correlation of the two test sections scores, corrected by the Spearman-Brown prophecy formula was reported to be $r = .82$ for both males and females. Validity was determined by comparing GEFT scores to EFT scores, with a resulting validity coefficient of $r = -.82$ for males and $r = -.63$ for females. Quartile norms for males and females, based on a population of college students from an eastern liberal arts college are available. (For further information, see Witkin, et al., 1972.)

Empathy Questionnaire

Empathy is a complex and varied construct, with its exact meaning being contingent to some extent upon the various researcher's definitions, biases, and measuring

instruments. In whatever form, empathy has been called crucial to the establishment of a facilitative relationship (Rogers, 1957, 1975) as well as the development of interpersonal competence (Weinstein in Goslin, 1969). For purposes of this study empathy has been defined conceptually as one's ability to accurately recognize and share the feelings of others. Empathy has been defined operationally by Mehrabian and Epstein's Measure of Emotional Empathy (1972). Development and validation of this scale are discussed elsewhere (Mehrabian & Epstein, 1972), with a summary of that data indicating that this scale is significantly related to helping behavior and other behavioral representations of empathy.

The scale itself consists of thirty-three items and may be found in Appendix E. The subjects responded to each statement with Yes or No and these responses were given a value of 1 or -1 in accordance with the direction of scoring indicated by Mehrabian and Epstein (1973). A total empathy score was obtained by summing the values of the responses, with a high score indicating a greater degree of empathy.

Eysenck Personality Inventory

The Eysenck Personality Inventory (EPI) (Eysenck & Eysenck, 1968) has been the measure used in most of the research which has investigated the relationship between extraversion and neuroticism and other personality

variables. This scale consists of 57 items which are answered Yes or No, and results in three scores: E (extraversion, N (neuroticism), and L (lie). Higher scores on E and N reflect a greater degree of extraversion or neuroticism in the individual, with these scores being independent. A high L score is felt to be an indication of the individual's tendency to "fake good," similar to the Lie score on the Minnesota Multi-phasic Personality Inventory. Test-retest reliability reported for Form A ranged from .82 to .97 for E and .84 to .88 for N. A great deal of validity data is available for the E and N scales, including factorial, construct, and concurrent validity. While little information is available regarding the L score, Eysenck has stated that "Tendency to have high L scores may in itself be an interesting personality trait" (Eysenck & Eysenck, 1968, p. 20).

Procedures

The six tasks and scales comprising the measures for this study were given in the following order: demographic sheet, emotion recognition, Western Personnel Test, Eysenck Personality Inventory, and the Empathy Scale. Subjects were seen in groups ranging in size from 5 to 15. All tasks were presented to each group in a single session lasting about one hour.

Subjects were seen in large rooms containing chairs, writing surfaces, an opaque projector, and a screen. The only other standardization in the setting included placing the projector 20 feet from the screen in accordance with Izard's procedures. Assurance that all subjects could see the screen was also obtained.

The session began with a short introduction to the research project and a brief overview of the tasks to be presented. Subjects were then asked to fill in the demographic data sheet (see Appendix D).

The emotion recognition task was presented using the basic procedures taken from Izard (1971). Specific instructions for this task are given below:

In a few minutes I am going to show you some photographs of people who were trying to express an emotion. Some of the people tried to express a certain emotion, others tried to express another emotion, others still another, etc. When I project Photograph number 1 on the screen, look first at the photograph, then at the list of emotions provided you. The list contains nine different emotions, lettered A to I. Select the one emotion term which best describes the photo, then circle the letter beside the photo number which corresponds to that term. You may find that each emotion is represented by several photos. However,

for each photo decide what emotion it expresses best, then circle the letter of the emotion name in the row beside the photo number. First, take a few minutes to study the names and definitions of the emotions so you will be familiar with all of them and so you can easily locate the right letter for your response. Each photo will be displayed for 5 seconds. You will have 15 seconds to record your response. Answer sheets, which are duplicated in Appendix F, were presented with the introduction of this task.

The remaining tasks and scales were presented one at a time, with the appropriate instructions and materials being given in accordance with the authors' instructions.

Analysis

In order to answer the questions asked in this study, a number of statistical procedures were used. A series of correlation analyses were performed to examine the relationship between age, intelligence, psychological differentiation, empathy, extraversion, and neuroticism and the accuracy scores from the emotion recognition task (research questions 2, 4, 5, 6, 7, & 8). The correlations were examined in terms of being significantly different from zero and the amount of the variance explained.

Analyses of variance were used to test for differences in accuracy of recognition due to sex, major, and

occupation (research questions 1 & 3). Results were examined in terms of significant differences, with Scheffe tests being utilized where appropriate to further clarify obtained differences.

Multiple regression equations were generated to aid in determining the extent to which accuracy in recognition could be predicted by combining the effects of all the variables investigated (research question 9). The final equations were examined in terms of the significance of the multiple R, the number of variables included, and the overall amount of variance explained.

Post hoc inspection of the data was also utilized to aid in generating new hypotheses for later study.

The major calculations were carried out utilizing the appropriate SPSS package on a Univac 1100/40 computer at the University of Maryland Computer Science Center.

CHAPTER IV

RESULTS

Results of the data analysis will be presented in the following manner. First, the data pertaining to the dependent variables, including the nine emotion response scores and total score, will be presented. This data provided the basis for comparisons with all other data. This will be followed by data related to the independent variables, presented as it is related to the nine questions posed in Chapter I. Finally, data related to other findings of interest will be presented.

Emotion Recognition

Responses to the emotion recognition task were tabulated in terms of raw scores, each representing the number of correct responses. Possible scores for each of the nine emotions ranged from 0-4, with the total response score having a possible range of 0-36. The means, standard deviations and ranges for the nine emotions and total score for the 55 respondents are presented in Table 3. Mean scores for the nine emotions ranged from 2.4 for Shame to 3.9 for Joy, with a total score mean of 25.7.

Table 3
Means, Standard Deviations, and Ranges for
Nine Emotions and Total Score
(N = 55)

Variable	Mean	S.D.	Range
Interest	2.9	.9	1-4
Joy	3.9	.4	2-4
Surprise	3.5	.7	1-4
Distress	2.5	.8	1-4
Disgust	2.5	1.0	0-4
Anger	3.1	.8	1-4
Shame	2.4	1.1	0-4
Fear	2.6	1.1	0-4
Contempt	2.5	1.2	0-4
Total Score	25.7	4.1	13-33

Research Questions

Question 1

In order to obtain information related to question one, which dealt with emotion recognition differences due to sex, the nine emotion response scores and the total score were subjected to a one-way analysis of variance by sex. Means, standard deviations, and F -ratios for the emotion response items by sex are presented in Table 4. These results show a significant difference in mean scores for Shame ($F = 5.963$, $p < .05$), with females obtaining higher mean scores than

Table 4
 Means, Standard Deviations, and F-Ratios
 for Nine Emotions and Total Score by Sex
 Female: N = 36
 Male: N = 19

Variable	Mean	S.D.	F-Ratio
Interest		.9	1.426
Female	3.0		
Male	2.7	1.0	
Joy		.2	2.246
Female	3.9		
Male	3.8	.5	
Surprise		.7	.000
Female	3.5		
Male	3.5	.7	
Distress		.8	.122
Female	2.5		
Male	2.4	.8	
Disgust		1.0	3.747
Female	2.6		
Male	2.1	.9	
Anger		.9	1.097
Female	3.0		
Male	3.2	.6	
Shame		.9	8.197*
Female	2.7		
Male	1.9	1.1	
Fear		1.1	.950
Female	2.5		
Male	2.8	1.0	
Contempt		1.1	.053
Female	2.5		
Male	2.4	1.5	
Total Score		3.8	1.687
Female	26.3		
Male	24.7	4.7	

*p < .05

males. Of the remaining scores, while not significant, females obtained higher mean scores than males on all emotions except Anger and Fear.

Question 2

Data related to question two, which dealt with individual differences in emotional sensitivity as related to age, were analyzed by means of correlation. The resulting correlation coefficients between age and the nine emotions and total score are found in Table 5. The age range for the 55 subject sample was 18 to 72, with a mean of 38.1 and a standard deviation of 10.7. Significant correlations were found between age and total score, Surprise, Disgust, Anger, Shame, Fear, and Contempt. All correlation coefficients were negative. A partial correlation between age and total score, holding empathy constant, was also computed, resulting in $r = -.46$ compared to the zero-order correlation of $r = -.51$.

Question 3

Question three involved the relationship between emotional sensitivity and educational background, major, and present occupation. The sample of 55 subjects included seven who had completed high school, fourteen who had attended college or trade school, sixteen who had completed college, thirteen who had some graduate education, and five who had obtained doctorate degrees. Due to the rank

Table 5
Correlations of Nine Emotions and Total
Score with Age
(N = 55)

Variable	r	Variable	r
Interest	-.1986	Anger	-.3104
Joy	.0706	Shame	-.2730*
Surprise	-.4198***	Fear	-.3039*
Distress	.0412	Contempt	-.3537**
Disgust	-.3837**	Total Score	-.5096***

*p .05
**p .005
***p .001

ordering of the educational levels, correlations were obtained between the emotion response scores and education level. These are reported in Table 6. In acknowledgement of the fact that education level may not represent equal interval ranking, a one-way analysis on variance was also computed for the emotion response scores by education level groups. These results may be found in Appendix G. No significant relationships between education level and accuracy of recognition scores were found in either the correlation analysis or the analysis of variance procedures.

Table 6
Correlations of Nine Emotions and Total Score
with Education Level

Variable	r	Variable	r
Interest	-.08	Anger	.12
Joy	-.07	Shame	-.13
Surprise	-.03	Fear	.01
Distress	.05	Contempt	-.08
Disgust	-.01	Total Score	-.02

Distribution of the subjects among the various occupation groups may be found in Chapter III, Table 1. Due to the small number of subjects comprising the category Biological Science and due to the lack of consistency in the backgrounds reflected in the category Other, these two groups were omitted from the analyses of variance for major and occupation. Means, standard deviations, and F-ratios for the emotion response scores by major and occupation may be found in Tables 7 and 8, respectively. Results of these analyses show significant differences among the major groups for Distress ($F = 3.00, p < .05$) and for Shame ($F = 5.073, p < .005$). A significant difference among mean scores for the occupation groups is noted for Shame ($F = 3.871, p < .01$). In all three cases of significant differences the

Table 7

Means, Standard Deviations and F-Ratios for Nine Emotions and
Total Score by Major
(N = 43)

Variable	Social Science N = 11	Physical Science N = 7	Business N = 10	Education N = 9	Fine Arts N = 6	F-Ratio
Interest						
M	2.2	3.0	2.8	3.3	3.0	2.080
SD	.9	1.2	1.0	.9	.6	
Joy						
M	3.7	3.9	3.9	4.0	4.0	.767
SD	.6	.4	.3	.0	.0	
Surprise						
M	3.5	3.6	3.3	3.4	3.5	.145
SD	.7	.5	1.1	.7	.5	
Distress						
M	2.4	2.1	2.3	2.9	3.3	3.008*
SD	1.1	.7	.5	.6	.5	
Disgust						
M	2.8	2.1	2.0	2.8	2.2	1.438
SD	.9	.9	1.1	1.1	1.0	
Anger						
M	3.1	2.7	3.0	3.2	2.7	.611
SD	.5	.8	.8	.8	1.4	
Shame						
M	2.3	1.1	2.3	3.0	3.0	5.073***
SD	1.4	.4	.7	.7	.6	

Fear						
M	2.7	2.6	2.6	1.9	3.1	1.303
SD	1.1	1.1	1.2	1.1	1.2	.455
Contempt						
M	2.7	2.1	2.2	2.8	2.5	.901
SD	1.3	1.2	1.5	1.0	1.4	.829
Total Score						
M	25.2	23.3	24.5	27.1	27.3	1.207
SD	4.7	3.8	4.9	3.6	3.8	

*p < .05

**p < .01

***Scheffe test shows 2 subsets: Group 1: 2, 1, 3
 Group 2: 1, 3, 4, 5

Table 8

Means, Standard Deviations and F-Ratios for Nine Emotions and
Total Score by Occupation
(N = 46)

Variable	Social Science N = 7	Physical Science N = 4	Business N = 23	Education N = 9	Fine Arts N = 3	F-Ratio
Interest						
M	2.6	3.0	2.7	3.2	3.0	.733
SD	.8	1.4	1.0	.8	1.0	
Joy						
M	4.0	3.8	3.8	4.0	4.0	.853
SD	.0	.5	.5	.0	.0	
Surprise						
M	3.6	3.5	3.4	3.4	4.0	.486
SD	.5	.6	.8	.7	.0	
Distress						
M	2.4	2.3	2.3	2.9	2.7	.910
SD	1.0	.5	1.1	.6	.6	
Disgust						
M	2.7	2.0	2.3	3.0	2.7	1.193
SD	.8	.8	1.1	.9	.6	
Anger						
M	2.9	3.0	3.1	3.2	3.3	.284
SD	.7	.8	.8	1.0	.6	
Shame						
M	2.2	1.0	2.4	2.8	3.7	3.871*
SD	1.5	.0	.9	.8	.6	**

Fear						
M	2.4	2.8	2.6	2.2	3.3	.788
SD	1.1	1.3	.9	1.2	.6	
Contempt						
M	3.0	2.0	2.3	2.7	2.7	.679
SD	1.0	1.2	1.4	1.1	1.5	
Total Score						
M	25.6	23.3	25.0	27.2	29.3	1.364
SD	2.1	3.5	5.0	3.5	2.1	

*p .01

**Scheffe shows two subsets: Group 1: 2, 1, 3, 4
 Group 2: 1, 3, 4, 5

lowest means were obtained by the Physical Sciences group, while the highest means were obtained by the Fine Arts group. Post hoc analyses of group mean differences were conducted using the Scheffe Test. Results of this stringent test show that the Physical Sciences mean was significantly ($p < .05$) different from the Education and Fine Arts group means for Shame by major, and that the Physical Sciences group differed significantly from the Fine Arts mean for Shame by occupation.

Question 4

The fourth question which was asked dealt with the relationship between intelligence and emotional sensitivity. Raw scores from the Western Personnel Test ranged from 9 to 23 out of a possible range of 0 to 24, with a mean of 15.1 and a standard deviation of 3.3. For a comparison of these scores to the percentile distributions of the general and professional populations, see Appendix A. Product-moment correlations between raw scores on the WPT and the emotion recognition scores may be found in Table 9. (Note that the results for research questions 4, 5, 6, 7, and 8 are all reported in Table 9 in order to avoid duplication and to aid comparison.) These correlations ranged from $r = -.15$ for Distress to $r = .05$ for Fear, with no correlation approaching the significance level of $p < .05$.

Table 9

Correlations of Nine Emotions and Total Score with Intelligence, Empathy, Psychological Differentiation, Extraversion, Neuroticism, and Lie Scores
(N = 55)

Variable	Intelligence	Empathy	Psychological Differentiation	Extraversion	Neuroticism	Lie
Interest	.02	.22	.11	.06	.12	-.04
Joy	-.13	.14	-.08	.02	.07	-.09
Surprise	-.03	.22	-.11	.10	.13	-.02
Distress	-.15	.14	-.17	-.03	-.07	-.25*
Disgust	-.08	.35***	.05	.21	.05	-.11
Anger	-.02	-.08	.12	-.01	-.10	-.01
Shame	-.07	.22	-.22	.21	.09	-.001
Fear	.05	.01	.06	.07	.05	-.33**
Contempt	.05	.15	-.01	.11	.05	-.10
Total Score	-.05	.32**	-.04	.19	.11	-.23*

* $p < .05$

** $p < .01$

*** $p < .005$

Question 5

Question five dealt with the relationship between psychological differentiation and emotion recognition, with data being obtained through the Group Embedded Figures Test. Scores on this test ranged from 0 to 18 out of a possible range of 0 to 18, with a mean of 11.8 and a standard deviation of 5.0. A high score is indicative of a greater degree of psychological differentiation. Correlations between psychological differentiation and the emotion response variables may be found in Table 9. These correlations ranged from $r = -.22$ for Shame to $r = .12$ for Anger, with that for Shame being the only correlation to approach the significance level of $p < .05$ ($p = .057$ for Shame).

Question 6

The data related to question six, which dealt with the relationship between empathy and emotion recognition were obtained by means of the Empathy Questionnaire. Raw scores on this measure ranged from 13 to 29, with a mean of 22.4 and a standard deviation of 3.9. A high score indicates a greater degree of empathy. Correlations between empathy scores and the emotion recognition scores may be found in Table 9. Correlations which were significantly different from zero were found between Empathy and Disgust ($r = .35$, $p < .005$) and between Empathy and Total Score ($r = .32$,

$p < .01$). A partial correlation between empathy and total score, holding age constant, was computed with the following result: $r = .25$.

Questions 7 and 8

Questions seven and eight had to do with the relationship between extraversion and neuroticism and emotion recognition, with data being obtained through the Eysenck Personality Inventory. Extraversion scores ranged from 2 to 19 and neuroticism scores ranged from 1 to 19, with a higher score indicating a greater degree of the trait measured. The means and standard deviations for extraversion and neuroticism were $M = 11.3$, $S.D. = 4.5$ and $M = 9.5$, $S.D. = 4.2$, respectively. The obtained correlations between extraversion and neuroticism and the emotion response variables may be found in Table 9. None of these correlations reached a level which was significantly different from zero.

A third score generated by the Eysenck Personality Inventory is Lie, with a higher score indicating a tendency toward attempts at "faking good." While no specific question regarding this score was asked, correlations between Lie and the emotion response variables were computed and may be found in Table 9. Significant, negative correlations were found between the Lie score ($M = 2.5$, $S.D. = 1.5$) and Distress, Fear, and Total Score.

Question 9

In order to determine the predictive effectiveness of the independent variables as related to the nine emotions and total emotion recognition score, stepwise multiple regression equations were calculated. In this procedure all variables were free to enter the equation until such point as no significant increment in the multiple R could be obtained. The variables were entered into the equation based on the amount of residual variance explained by the variable. Variables entered into the calculation included sex, age, intelligence, education level, psychological differentiation, empathy, extraversion and neuroticism. Lie was also included in the analysis, even though it had not been included in the original questions, due to the obtained relationship between Lie and emotion recognition.

A summary table of the multiple regression equation for total score may be found in Table 10. This table includes the variables entered into the final equation along with the Beta weights, the squared semi-partial correlations, the multiple R, and the coefficients of determination (R^2). Multiple R, R^2 and the variables included for each equation generated for each of the nine emotions may be found in Table 11. More detailed summary tables for the nine emotions may be found in Appendix H.

Table 10

Summary Table for Multiple Regression Analysis Showing
Beta-weights, Squared-semi-partial Correlations,
R and R²

Variables in Equation	Beta	SP ²	R	R ²
Total Score				
Age	-.521	.259	.509	.259
Lie	-.245	.050	.557	.310
Empathy	.239	.038	.590	.348
Education	.339	.026	.613	.376
Intelligence	-.256	.040	.645	.416
Extraversion	.071	.004	.648	.419
Neuroticism	.020	.000	.648*	.420

*p < .01 (F = 4.86935, DF 7/47)

Table 11
Multiple R, R², and Variables Included in the
Multiple Regression Equations for Each
of Nine Emotions

Emotion	Variables in Equation	R	R ²
Interest	Empathy, psychological differentiation, age, neuroticism, sex, education, intelligence, extraversion, lie	.341	.116
Joy	Lie, age, intelligence, neuroticism, psychological differentiation, education, extraversion	.283	.080
Surprise	Age, empathy, sex, psychological differentiation, education, neuroticism, intelligence, lie	.549	.301*
Distress	Lie, intelligence, education, psychological differentiation, neuroticism, empathy, extraversion	.456	.208
Disgust	Age, empathy, education, intelligence, extraversion, psychological differentiation, lie, sex, neuroticism	.584	.341**
Anger	Age, education, intelligence, sex, psychological differentiation, lie, neuroticism, extraversion	.447	.199
Shame	Sex, age, extraversion, education, psychological differentiation, empathy, lie, neuroticism	.471	.222
Fear	Lie, age, sex, extraversion, intelligence, education, psychological differentiation, neuroticism, empathy	.487	.237
Contempt	Age, education, empathy, lie, intelligence, extraversion, psychological differentiation, sex, neuroticism	.443	.196

*p < .05 (F = 2.48, DF 8/46)
**p < .05 (F = 2.59, DF 9/45)

Obtained multiple R's for the nine emotions and total score ranged from $R = .283$ for Joy to $R = .648$ for Total Score. Of these, only the R's for Surprise, Disgust, and Total Score were significantly different from zero.

In order to examine the relative predictive value of the independent variables, the equations were examined using an arbitrary cut off value of explaining less than one percent of the variance. Table 12 shows the independent variables included in the multiple-regression equations for each of the nine emotions and total score under the cut off criterion. Note that under this criterion, age is included in all equations except that for Distress, while neuroticism and extraversion are included in only two equations each, those being Surprise/Distress and Disgust/Shame, respectively.

Other Findings

Emotion Recognition

The responses to the nine emotions and total score were tabulated in terms of intercorrelations. The resulting correlation matrix is presented in Table 13. All correlations between the nine emotions and total score were significantly different from zero at the $p < .01$ level or higher, with r values ranging from $r = .36$ for Disgust and Total Score to $r = .74$ for Contempt and Total Score.

Table 12

Variables Which Contributed More than 1% to the Explained Variance in the
Multiple Regression Equations for Nine Emotions and Total Score

	Age	Sex	Intell.	Psych. Diff.	Empathy	Ext. Neurot.	Lie	Ed. Level
Total Score	*		*				*	*
Interest	*			*	*			
Joy	*	*					*	
Surprise	*	*		*	*	*		*
Distress			*	*	*	*	*	*
Disgust	*	*	*	*	*	*	*	*
Anger	*	*	*					*
Shame	*	*		*		*		*
Fear	*	*					*	
Contempt	*				*			*

Table 13

Intercorrelations Among Nine Emotions and Total Score

Variable	1	2	3	4	5	6	7	8	9	10
1. Interest	-									
2. Joy	.50***	-								
3. Surprise	.29**	.23*	-							
4. Distress	-.03	.18	.08	-						
5. Disgust	-.01	.19	.26*	.12	-					
6. Anger	-.09	-.17	.11	.08	.23*	-				
7. Shame	.14	.26*	.23*	.07	.26*	.04	-			
8. Fear	.01	.17	.40***	.08	.28*	.00	.19	-		
9. Contempt	.34**	.29*	.48***	.23*	.31**	.28*	.25*	.18	-	
10. Total Score	.42***	.47***	.64***	.36**	.57***	.34**	.54***	.53***	.74***	-

*p < .05
 **p < .01
 ***p < .001

Responses were also analyzed in terms of percentage of correct response versus percentages of incorrect response for each of the remaining emotions (summing across four pictures for each emotion for each of 55 subjects). These percentages were found in Table 14. (For a comparison of percentage of correct response for each separate photograph compared to those reported by Izard [1971], see Appendix C.) Note that the order of difficulty for recognition, based on percentage of correct response, was (from highest to lowest) Joy (97), Surprise (89), Anger (76), Interest (72), Fear (66), Distress (62), Disgust (62), Contempt (62) and Shame (61). For Interest, the most frequent error choice was Joy; for Joy it was Interest; for Surprise it was Fear; for Distress it was Shame; for Disgust it was Contempt; for Anger it was Contempt; for Shame it was Interest; for Fear it was Surprise; and for Contempt it was Disgust.

Independent Variables

Correlations among the independent variables of empathy, psychological differentiation, intelligence, extraversion, neuroticism, lie, age, and education level were calculated and may be found in Table 15. Education was significantly related to all other variables except Lie. Significant positive correlations were found between empathy and

Table 14
 Percentage of Responses Chosen for Nine Emotions
 (N = 220 Responses)

Variable	Percentage of Responses								
	1	2	3	4	5	6	7	8	9
1. Interest	72	3.6	8.6	4.5	.5	.5	4.1	2.7	3.2
2. Joy	2.3	97	-	.5	-	-	-	-	-
3. Surprise	2.3	2.7	89	.5	-	.5	-	4.5	.5
4. Distress	4.5	.9	2.7	62	4.5	1.8	13.0	8.6	2.3
5. Disgust	1.8	.5	3.6	7.7	62	1.8	.9	6.8	16.0
6. Anger	.9	-	.5	5.5	4.0	76	1.4	.5	10.9
7. Shame	14.5	-	2.7	10.0	2.7	-	61	.5	8.6
8. Fear	-	-	26.0	4.0	1.4	.9	1.8	66	-
9. Contempt	9.5	-	1.4	3.6	16.4	.9	5.9	-	62

Table 15
Intercorrelations Among Seven Independent Variables
(N = 55)

Variable	1	2	3	4	5	6	7	8
1. Empathy	-							
2. Psychological Differentiation	-.21	-						
3. Intelligence	-.15	.51***	-					
4. Extroversion	.21	-.12	.03	-				
5. Neuroticism	.27*	-.17	-.11	.07	-			
6. Lie	-.07	-.05	-.19	-.19	-.22	-		
7. Age	-.23*	.04	-.05	-.30*	-.02	.003	-	
8. Education Level	-.33**	.46***	.49***	-.38**	-.24*	.01	.23*	-

*p < .05
**p < .01
***p ≤ .001

extraversion and between psychological differentiation and intelligence.

Differences in the independent variables which were due to sex were analyzed by one-way analysis of variance. Means, standard deviations, and F-ratios may be found in Table 16. Significant differences between males and females were found for psychological differentiation, intelligence, and education level, with males obtaining higher means on these variables. Females obtained significantly higher means than males on empathy and neuroticism.

Analyses of variance were also calculated for the independent variables by major and occupation categories, with means, standard deviations and F-ratios for significant differences being found in Table 17. Significant differences among means were found among the groups based on major for Lie and sex, and for the groups based on occupation for education level. The Scheffe Test, a post hoc analysis of mean differences, showed that for Lie by major differences, the Fine Arts group score was significantly lower than the Education group score.

Table 16

Means, Standard Deviations, and F-Ratio for
Seven Independent Variables by Sex

Variable	Mean	S.D.	F-Ratio
Psychological Differentiation			
Female	10.4	5.0	9.358**
Male	14.4	4.0	
Intelligence			
Female	14.3	3.1	5.518*
Male	16.4	3.1	
Extraversion			
Female	11.5	4.3	.205
Male	11.0	5.0	
Neuroticism			
Female	10.4	4.4	5.802*
Male	7.6	3.4	
Lie			
Female	2.7	1.5	1.237
Male	2.2	1.5	
Age			
Female	37.0	11.0	1.438
Male	40.5	9.9	
Empathy			
Female	24.1	2.9	35.357***
Male	19.0	3.4	
Education Level			
Female	2.6	1.1	7.511*
Male	3.4	1.1	

*P < .05

**p < .005

***p = .0000

Table 17

Means, Standard Deviations and F-Ratios for Significant Group Differences
by Major and Occupation

Variable	Social Science	Physical Science	Business	Education	Fine Arts	F-Ratio
Lie x Major						
M	2.8	3.0	1.9	3.4	.8	3.814*
SD	1.2	1.8	1.2	1.9	.4	3.814**
Sex x Major						
M	1.5	1.7	1.5	1.0	1.3	2.723*
SD						
Education x Occupation						
M	3.0	4.3	2.6	3.6	3.7	3.462*
SD	1.3	1.5	.9	.7	1.2	

* $p < .05$

**Scheffe shows two subsets: Group 1: 5, 3, 1, 2
Group 2: 3, 1, 2, 4

CHAPTER V

CONCLUSIONS, DISCUSSION, AND IMPLICATIONS

The focus of the present investigation was the examination of individual differences in an adult population in overall emotional sensitivity as expressed by the accurate recognition of facial expressions of emotion. It was assumed that emotional sensitivity so expressed was a component of effective interpersonal relationships. The major questions asked by this study concerned the ways in which biological, educational, intellectual, perceptual, and personality variables might be related to individual differences in emotional sensitivity. The conclusions, discussions and implications which come from the results of this study will be discussed in the following manner. First, conclusions and discussion for each specific research question posed by the study will be presented. This will be followed by a discussion of other findings of interest. Next will be a statement of possible restraints on the interpretation of the results. This chapter will conclude with a statement of implications for theory, practice, and research generated by the present study.

Conclusions and Discussion

Question 1

Do males and females differ in their ability to recognize facial expressions of emotion? On the basis of findings that men and women differ from each other only in the recognition of Shame, it is concluded that men and women do not differ in overall emotional sensitivity as expressed by accurate recognition of facial expressions of emotion.

This conclusion is consistent with those of previous studies which have reported no significant differences between men and women in overall emotional sensitivity or recognition accuracy (Izard, 1971; Westbrook, 1974). Men and women did, however, differ in recognition of Shame, with women being more accurate. This finding should be interpreted with caution in that it might be viewed as a chance finding, given the total number of non-independent statistics generated in the analysis of data. Nevertheless, this finding, plus the finding that women tended to be more accurate than men in identification of Joy, Interest, Surprise, Disgust, Distress, and Contempt, lend some support to the suggestion that women are more accurate than men in identifying specific emotions, rather than in overall sensitivity. Men tended to be more accurate in the recognition of Anger and Fear. This is somewhat

inconsistent with the results of Davitz (1964) and Mehrabian (1972) who suggested that women were more accurate than men in identifying negative emotions rather than in overall recognition accuracy. This finding is consistent with the position of Ekman (in Seigman & Feldstein, 1978), who stated that individual differences might be more reflective of differences in identification of specific emotions than in differences in overall recognition accuracy. It should be noted that men and women did not differ in overall emotional sensitivity in spite of the fact that women were found to be more empathetic than men.

Question 2

Is the ability to recognize facial expressions of emotion related to age in adults? On the basis of the finding that age was significantly related to total emotion recognition scores ($r = -.51$), it is concluded that emotional sensitivity is related to age and that emotional sensitivity declines as one grows older. This result is consistent with the trend toward declining emotional sensitivity to vocal cues of emotion which was reported by Davitz (1964). Accurate recognition of the specific emotions declined with age for all emotions except Interest, Joy, and Distress. It should be noted that the relationship between overall emotional sensitivity and age remains

significant even when other correlates of age such as empathy, extraversion, and educational level are held constant.

Several hypotheses can be generated with regard to the finding that overall emotional sensitivity declines with age. For example, it may be that as a person grows older, that person begins to rely on stereotypical responses to facial expressions of emotion and to take note of fewer and fewer cues with which to discriminate among emotions. In other words, decreasing attentiveness to the discriminative cues has resulted in a decrease in accuracy as one grows older. Such inattentiveness may be the result of lack of interest in the emotions or feelings of others or a reliance on other types of cues in the discrimination of emotions of others.

A second explanation for the decrease in emotional sensitivity with age might be suggested by the assumption of a decrease in cognitive, perceptual or acuity variables. However, there was little or no relationship found between intelligence and psychological differentiation and age in the present investigation. It should also be noted that neither of these variables were in themselves related to emotional sensitivity. This investigation did not look at visual acuity or visual discrimination skills, leaving open

the hypothesis that as one grows older one becomes less able to see the discriminative cues.

A third explanation might involve a tendency to suppress emotion in oneself as one grows older. This might result from several factors, including negative experiences with emotion or even cultural patterns calling for suppression of emotion. This in turn may lead to less awareness of emotions in others and a resulting decrease in accuracy in interpretation of facial expressions of emotion. Support for this position might be found in the negative relationship found between age and other measures of awareness of others and their feelings, including empathy and extraversion.

Another explanation for the apparent decline in emotional sensitivity over time might be related to cultural differences. For example, it may be that the younger persons in the present sample have simply been brought up in a subculture which has placed more emphasis on awareness of emotions than did the subculture of the older persons in the sample, thus creating the illusion that emotional sensitivity declines with age.

Question 3

Do individuals with different educational and professional background differ in their ability to recognize facial expressions of emotion? The findings indicate that

education level, education major, and present occupation are not related to overall recognition accuracy. Therefore, it is concluded that individuals differing in educational or professional background do not differ in overall emotional sensitivity.

This conclusion does not support the tentative finding reported by Davitz (1964) of a positive relationship between level of education and the ability to recognize vocal cues of emotion. It may be that in the present study any relationships between emotional sensitivity and education level were confounded by the positive relationship between age and education level and the negative relationship between age and emotional sensitivity.

The findings with regard to occupation show that persons with a Fine Arts background, including study in music and art, were more accurate than others in identifying Disgust and Shame, while those from the Physical Sciences, i.e., chemists and mathematicians, were less accurate than others in identifying these emotions. This finding is consistent with the intuitive assumption that persons in the Fine Arts are more aware of feelings and emotions than persons who deal primarily with numbers and ideas. These findings might also be seen as being consistent with Rosenthal's report (in Stewart, 1977) that men in nurturant or artistic professions were able to perform as

well as women and better than other men on the PONS test of emotional sensitivity.

Nevertheless, these results must be treated with caution due to the small number of subjects representing each group and the unequal distribution by sex, i.e., the Fine Arts group having more women than the Physical Sciences group.

It should be noted that these findings do not support the contention of many (Harrison, 1972; Ekman & Friesen, 1975) that persons in people-oriented professions such as Education or the Social Sciences should be, and therefore presumably are, more accurate than others in recognition of facial expressions of emotion.

Question 4

Is intellectual level related to the ability to recognize facial expressions of emotion? Based on the finding of a low, negative correlation between intelligence and overall emotional recognition, it is concluded that intelligence is unrelated to individual differences in overall emotional sensitivity. The obtained result, which accounts for less than 1% of the variance in emotional sensitivity, runs counter to previous research which has shown low, but positive and significant relationships between intelligence and emotional sensitivity (Davitz, 1964; Izard, 1971). It may be that this result is due in part to a constricted

range situation brought about by the fact that the sample population was above average in intelligence as compared to the general population. It may be that a minimal level of intelligence is necessary for accurate emotion recognition and that this level was attained by all members of the sample. The inconsistency between this finding and those of previous researchers may also be due to the measures used. That is, many previous researchers relied on measures of verbal ability or vocabulary knowledge to measure intelligence, while the measure used in the present study utilized a combination of verbal and numerical items. This reduces the comparability of the tasks and, thus, of the results.

Question 5

Is psychological differentiation related to the ability to recognize facial expressions of emotion? Based on the finding of an extremely low, negative correlation between psychological differentiation and total emotion recognition, it is concluded that psychological differentiation is not related to overall emotional sensitivity. The findings also show that psychological differentiation is unrelated to the accurate recognition of specific emotions.

These results are inconsistent with those reported by Davitz (1964) who found that accuracy in identifying vocal cues of emotion was significantly related to scores on the Gottschalet Embedded Figures Test and the Raven's Test of

Progressive Matrices, tests similar to that used in this study. Based on his findings, Davitz had concluded that emotional sensitivity was dependent upon cognitive and perceptual factors, a conclusion which must be challenged by the present results.

Question 6

Is empathy related to the ability to recognize facial expressions of emotion? Based on the finding of a significant, positive correlation ($r = .32$) between empathy and total emotion recognition, it is concluded that individuals who are more empathetic than others are more accurate in recognition of facial expressions of emotion. The obtained correlations show that empathy accounts for about 10% of the variance in individual differences in emotional sensitivity. These results support the assumption made by those in the helping professions that accurate interpretation of facial expressions is related to the establishment of empathy in the therapeutic relationship. These results are also consistent with those reported by Davitz (1964) who found a positive relationship between self-reported sensitivity to emotions and sensitivity to emotional expressions in speech, music, and art.

It should be noted that the relationship between empathy and emotional sensitivity remains even when accounting for a negative relationship between empathy and

age. It should also be noted that among the nine specific emotions investigated, the only significant relationship found was that between empathy and Disgust.

The obtained relationship between a paper and pencil measure of one's awareness of the feelings of others and the ability to accurately recognize feelings of others via facial expressions gives some support to the obvious. However, the present results do little to further the understanding of this relationship, i.e., does empathy lead to recognition or is recognition a prerequisite of empathy, or is there a third factor which might account for both? It can be suggested that there is a relationship between one's ability to recognize and admit to verbally described feelings in oneself and others and the ability to accurately recognize the facial expressions of those feelings. In other words, denial of emotional experiences in self and others (low empathy) is related to inaccuracy in recognition of the facial expressions of emotion.

Questions 7 and 8

Is extraversion or neuroticism related to the ability to recognize facial expressions of emotion? Based on the findings of non-significant positive correlations between extraversion and neuroticism scores of total emotion recognition, it is concluded that differences in extraversion and neuroticism are not related to individual

differences in emotional sensitivity. The findings also support the conclusion that extraversion and neuroticism are not related to accuracy in identification of specific emotions. These results are consistent with those of Davitz (1964) who found no relationship between thirty-three broad personality variables and the ability to identify vocal cues of emotion. In fact, it was this result which led Davitz to abandon the search for personality correlates of emotional sensitivity in favor of cognitive and perceptual variables.

In contrast, however, a measure of "faking good" which is a part of the EPI, did relate significantly to overall emotional sensitivity and to accuracy in identifying Distress and Fear. That is, those who scored higher than others in the denial of negative feelings in themselves were less accurate in the identification of facial expressions of emotions in others.

This result was unexpected and reasons for such a relationship are at best speculative, given the little information available with regard to this score and its interpretation. It should be noted that the authors of the EPI (Eysenck & Eysenck, 1968) simply state that the Lie score can be interpreted as a tendency to "fake good" and that investigation of this tendency might be interesting in and of itself. Present results might be construed to

aid in such interpretation. That is, it is possible to conceive the need to "fake good" to be one aspect of denial of emotions, particularly negative emotions, in oneself. It is conceivable that a person who must deny feelings in oneself might also be less aware of or unable to accurately identify those emotions in others. Such an interpretation might be substantiated by the fact that the Lie score was significantly related to Distress and Fear as well as overall emotional sensitivity, emotions which might be the most subject to denial or covering up. It should be noted that such an interpretation should be viewed with caution until such time as those results are replicated.

Question 9

To what extent can individual differences in accuracy of emotion recognition be predicted when the effects of sex, age, education level, intelligence, psychological differentiation, empathy, extraversion, and neuroticism are combined? The findings with respect to the multiple regression analysis show that 42% of the variance ($R = .648$) in overall emotional sensitivity can be accounted for by combining the effects of age, lie, empathy, education level, intelligence, extraversion and neuroticism, noting that the last two variables account for less than 1% of the variance between them. This represents an increase of 14% over the variance accounted for by age, the best single predictor,

alone. Beta weight comparisons show that age is weighted more heavily than any of the other variables, again attesting to the significance of the relationship between age and emotional sensitivity. Examination of the regression equations generated for the nine specific emotions shows that the independent variables investigated by the study can account for approximately 8% of the variance in Joy, 11% of the variance in Interest, 20% of the variance in Distress, Anger and Contempt, 22% in Shame, 24% in Fear, 30% in Surprise, and 34% in Disgust. Based on the findings, it is concluded that only for Total Score, Surprise, and Disgust can a significant amount of variance in individual differences in recognition be explained, with age and empathy explaining most of this variance. Age was included as a major contributor to the multiple R for all emotions except Distress. Examination of the amount of variance in accuracy of emotion recognition explained by each of the independent variables included in the regression equations, as well as the Beta weights assigned, indicate that empathy, lie, sex, and education level, in addition to age, contribute more to prediction of accuracy than do psychological differentiation, intelligence, extraversion, and neuroticism. It should be noted that the combinations of variables in the equations, as well as their addition to the explained variance, varies with the specific emotions involved.

Other Findings

The percentages of correct responses to each emotion across subjects are nearly identical to those reported by Izard (1971) for his American sample and are consistent with his conclusion that photographs of emotion are judged accurately by naive observers at a level greater than chance. The order of difficulty of recognition, based on percentage of correct response, is also similar to those reported previously (Ekman & Friesen, 1975; Izard, 1971; Ruckmick, 1921). Joy and Surprise were more readily recognized than Anger and Interest. Fear, Contempt, Distress, Disgust and Shame were the least readily recognized. However, even Shame received 61% correct response.

An examination of the common confusions, i.e., the most frequently chosen error responses, is somewhat consistent with the continuum of Schlosberg (1941), remembering that he did not include Interest or Shame and that he combined Fear and Distress. The most common errors made in the present study included Surprise for Fear and vice versa, Fear for Distress and vice versa, and Contempt for Disgust and vice versa.

Statements about individual differences in recognition of specific emotions are somewhat limited. Women and those with a Fine Arts background were more successful than others in recognition of Shame. Those who were more empathetic

than others were more successful in recognition of Disgust, while those evidencing a high need to "fake good" were least successful in recognizing Fear. Success in recognition of Distress was associated with a low need to "fake good" and a Fine Arts background. Accuracy in recognition of all emotions except Joy, Interest, and Distress was associated negatively with age. It is difficult, based on these findings to make any generalizations with regard to individual differences in recognition of specific emotions, except to say that differences do exist and that they appear to be more associated with negative than with positive emotions. The findings are consistent with those reported by Shannon (1970), Dougherty, Bartlett, and Izard (1974) and Muzekian and Bates (1977) who all investigated differences between normals and schizophrenic populations in emotion recognition and found that differences in recognition clustered around Contempt, Fear, and Shame. It may be that these findings are in part due to the overall difficulty in recognition of these emotions as compared to Joy, Interest, or Surprise.

The relationships among the independent variables, as reflected in the correlation matrix and analysis of variance computations are generally consistent with previous findings. Intelligence was positively related to psychological differentiation and education level, with the men in

the sample receiving higher scores than the women in all three of these measures. Degree of neuroticism, which measures tendency to be emotional under stress, was related to degree of empathy. Negative relationships were found between empathy and age and between empathy and education level. Women were more empathetic than men and obtained higher neuroticism scores than the men. Extraversion was found to decline with age and education level, while neuroticism declined only with education level. Education majors, who tended to be women, also tended to obtain higher Lie scores than other major groups.

Cautions

In addition to the cautions noted in the above discussions, several other restraints on interpretation of this data should be offered. First, while the age range of the present study was broad (18 to 72), no attempts were made to obtain subjects at each age level within that range. Therefore, half of the subjects ranged in age from 18 to 37, while the remainder covered the range from 37 to 72. This left some gaps in the upper ranges which might have affected the relationships found in this study. Secondly, while a sample of adults selected from the general population might lend itself to more generalization than a sample of college students, this sample was not designed to be representative of the general population in every way. For example, the

male/female ratio in the present sample was 34:66, while the general population ratio is closer to 50:50. The sample was also all white, with subjects generally coming from a suburban area and representing the middle to upper middle socio-economic bracket. In addition, the sample was more like a professional population than a general population in distribution of intelligence, extraversion, and neuroticism scores. While education levels ranged from high school graduates to doctoral degrees, the mean level of education was higher than that found in the general population. These sample characteristics must thus limit the generalizability of the findings.

It is possible, too, that the emotion recognition task itself might limit the generalizability of the findings. For example, individual differences in emotion recognition were based on five second exposures to the photographs, while emotion recognition in every-day encounters must take place in seconds or even micro-seconds (Ekman in Seigman & Feldstein, 1978). It should also be noted that rates of recognition accuracy, while comparable to and consistent with those found using the same photographs in other studies (Izard, 1971), in some cases approached 100%. In addition, each emotion was represented by only four photographs. This results in limiting the discriminability of

the task, as well as the response possibilities, and thus reduces the probability of finding explanations for individual differences.

Implications

The present investigation of individual differences in emotional sensitivity was predicated on the assumption that facial expressions of emotion represented an important component in establishing effective interpersonal relationships. An exploration of the relationships between cognitive, perceptual, and personality variables, as well as sex, age, and education and professional variables was conducted. The implications of the findings will be presented as they are related to theory, practice, and further research.

Theory

Based on the findings of this research, it has been concluded that there is a decrease in the ability to identify facial expressions of emotion with an increase in age. In addition, as one's level of empathy increases, so does one's accuracy in recognition of expressions of emotion. Finally, as one's need to put up a good front or "fake good" increase, one's recognition accuracy decreases. It has also been concluded that there are no differences in overall emotional sensitivity due to sex, extraversion, neuroticism,

intelligence, psychological differentiation, education level, or occupational background.

Taken together, the above conclusions suggest that individual differences in emotional sensitivity are related more to factors tapping general and specific awareness of emotional experiences in self and others than to cognitive, perceptual, or other personality variables. It also is apparent that such awareness to emotional cues decreases with age.

It is suggested, therefore, on the basis of these findings, that there exists a general emotional awareness or emotional sensitivity factor of which recognition of facial expressions of emotion is just one part. In general, such a position is consistent with the position of Davitz (1964), who posited such an emotional sensitivity factor as a result of his work with recognition of vocal cues of emotion. Among his findings were relationships among sensitivity to emotional cues for speech, music, and art, as well as relationships between expressing and perceiving emotion, and finally, relationships between recognition of vocal cues and recognition of facial expressions of emotion.

In describing this emotional sensitivity factor, Davitz concluded that emotional sensitivity was related to cognitive and perceptual variables and that it constituted a specialized form of nonverbal intelligence. He also

rejected the notion that emotional sensitivity was related to broad personality variables.

Results of the present study, while consistent with the supposition of an emotional sensitivity factor, do not support the relationship between emotional sensitivity and level of intelligence or perceptual ability as measured through psychological differentiation as proposed by Davitz (1964). It may be that minimal levels of such abilities are necessary for accuracy in recognition of emotional cues, but that other factors play a more important role in individual differences. It may also be that intellectual and perceptual factors are more critical to recognition of vocal cues of emotion than to recognition of facial expressions of emotion.

A more fruitful approach to looking at emotional sensitivity as related to recognition of facial expressions of emotion appears to be Izard's theory of emotion (Izard, 1971, 1977) (see Chapters I and II). The role of facial expressions in this system is considered to be crucial to both internal and external awareness of emotion and recognition and regulation of emotion experiences, with the expressions themselves being innately programmed. It is also felt that suppression of expressions results in diffusion of emotion experience and impoverished, possibly abnormal, emotional lives as adults.

The present findings appear to be more consistent with this theory of emotion than with the emotional sensitivity factor of Davitz. First, Izard has proposed that the perceptual, cognitive, and emotion subsystems are interactive but independent. In fact, the present findings show no significant relationship between perceptual and cognitive factors and emotional sensitivity, although they do not rule out the possibility of needing minimal levels of perceptual and cognitive abilities. The findings do suggest a positive relationship between general emotion awareness and accurate recognition of facial expressions of emotion. It is suggested, therefore, that the recognition of facial expressions of emotion is related to a general emotion awareness factor, separate from cognitive and perceptual factors. This would seem to support Izard's notion of independent, interacting subsystems of personality as outlined above, with recognition of facial expressions being part of the emotion subsystem.

Izard has also stated that suppression of facial expressions, particularly in children, can lead to later inability to distinguish among emotions and to possible distortion or disturbance in interpersonal relationships. The negative relationship between accurate recognition of facial expressions of emotion and suppression of emotion in self, as evidenced by denial of negative feelings ("faking

good") would seem to support this position. Such a position is also consistent with researchers who have reported positive relationships between ability to express emotions and ability to recognize emotional expressions (Davitz, 1964) and those who have found poor expressors to experience more diffuse physiological reactions than others (Buck, 1972).

In addition, Izard states that cultural rules and personal experience may lead to suppression of facial expressions in adults in certain situations. It may be that this suppression of facial expressions in adults over time leads to less awareness of discrete emotion experience in self, and may then lead to decreased awareness of and accuracy in recognizing discrete emotional expressions on others. The finding that accuracy of recognition decreases with age is consistent with and seems to support this position.

Practice

The relationship between empathy and emotion recognition would seem to have implications for both theory and practice. It is felt by many that empathy, i.e., the awareness of emotions and feelings in others, plays a large role in inhibiting aggressions and increasing positive interaction between persons (e.g., Mehrabian, 1972). In addition, it is theorized that empathy is an important

component in the helping relationships such as those between student-teacher, therapist-client, or physician-patient (Ekman, 1975). It is also felt that recognition of facial expressions of emotion is a necessary but not necessarily sufficient condition for development of empathy in children (Feshbach & Roe, 1968) for the development of interpersonal competence (Weinstein in Goslin, 1969). While present results are not clear in the causal relationship between empathy and emotional sensitivity, they are clear in supporting the correlational relationship. It would appear, therefore, that specific training in recognition of facial expressions of emotion might play a role in aiding the development of empathy.

In daily practice it is rare to find a specific program or curriculum which focuses on feelings and on teaching accurate recognition of emotions, either in self or others. One exception may be found in some programs for aiding emotionally handicapped students (Izard, 1971; Long, 1971). Another is a program prepared by Bullmer (1977) who found that counselors trained in recognition of facial expressions of emotion also obtained increased ratings in empathy. The findings of this study suggest that emotion recognition relates positively to empathy and that both decline with age in adults. In addition, contrary to popular belief, persons in traditionally interactive

professions such as education or the social sciences are not more accurate in recognition of facial expressions of emotion than others. It is suggested, therefore, that a continuing, concerted effort to teach all persons accurate emotion recognition skills would be appropriate, rather than allowing such skills to be developed in a haphazard way. The resulting increased awareness of emotion in both self and others would seem to be of benefit to both individual relationships and to society. Ekman and Friesen (1975) have in fact developed a textbook for doing just that, and it is felt that the present investigation lends empirical support to his approach.

Ekman (in Seigman & Feldstein, 1978), Harrison (1972) and others have suggested that difficulty in recognizing the expressions of specific emotions might be related to difficulties in dealing with that emotion in interpersonal relationships. They have also suggested that patterns of difficulty in recognition of specific emotions might eventually be used to aid in diagnosis of mental illness. The findings of this study suggest that persons who have difficulty recognizing Distress and Fear also have a high need to "fake good." Accurate recognition of Disgust is related to a high degree of empathy, while those who accurately recognize Shame tend to be women or persons associated with the Fine Arts. While these findings can only

be described as suggestive, they do indicate that the above position deserves further investigation.

Future Research

The present investigation represents the first attempt to look directly at correlates and possible sources of individual differences in emotional sensitivity as expressed through accurate recognition of facial expressions of emotion. As such, the results must be subjected to further investigation, clarification, and replication. While the findings suggest that there is a general emotion awareness factor which is related to age, empathy, and one's openness to experience emotion in self, many questions remain.

One set of questions has to do with generalization of the results. The present subject sample, while drawn from the general population, did not attempt to replicate the general population in terms of ethnic, cultural, socio-economic, or intellectual factors, to name a few. Therefore, replication of the study with more diverse populations or direct comparisons of groups by race, socio-economic status, or intellectual level might aid in generalizing these findings to other populations.

Several limitations related to the emotion recognition task have been noted, including the limited number of photographs for each emotion (four), the length of exposure of the photographs (5 seconds), and the fact that overall

accuracy rates approached 100% for some emotions. Therefore it is suggested that future research explore the effects of these limitations by increasing the number of photographs and varying the exposure time in order to increase the discriminability of the task.

Further investigation of the relationship of emotional sensitivity to age is also warranted. This might be accomplished by using a larger number of subjects across age groups, particularly above age forty. Longitudinal, rather than cross-sectional studies might also aid in examining changes in emotion recognition and emotional sensitivity over time. This might include looking at the quantity, quality, and accuracy of emotional communication at various ages. Investigation of cultural rules and regulations for emotion expression and suppression in cross-cultural or cross-age groups might also serve to clarify the present findings with regard to age. For example, it may be that the younger persons represented here were influenced by a subculture which has placed more emphasis on feelings and emotions than did that of the older persons in this sample.

A limitation of correlational studies is that they can only suggest possible relationships. Experimental designs which focus on equalization of groups and manipulation of variables in a systematic way are also necessary for

clarification of the findings. For example, a factorial design which included age and empathy might serve to clarify the relationships suggested here between these variables and emotional sensitivity. Direct investigation of patterns of differences in recognition of specific emotions might be accomplished by directly comparing those who score high and those who score low in recognition of specific emotions on various measures of interest.

Finally, in light of the suggested emotion awareness factor related to recognition of facial expressions of emotion, empathy, and "faking good," other measures of emotional awareness should be investigated. This might include investigation of other modes of emotion communication, including vocal cues, gestures, body movement, as well as verbal communication of emotions. In addition, the relationship between emotional sensitivity and other measures of communication, effectiveness, social competence, and person perception should be pursued to aid in clarifying the dimensions of an emotional sensitivity factor. Further investigations of the relationships between emotion expression and emotion recognition in self and others would also seem to be warranted as a means of exploring the role of emotion denial in emotional sensitivity.

APPENDIX A

Description of the Nine Emotions

Research to date has identified nine fundamental emotions whose expressions comprise the stimuli for the present investigation. Brief descriptions of these emotions, including reference to situations in which they might occur and a brief description of the facial expression are presented below, with these descriptions being based on the extensive descriptions presented by Izard (1977), to whom the reader is referred for in-depth explanations.

Interest-Excitement

Interest is described as the most frequently experienced positive emotion and is felt to be the only motivator that can sustain day-to-day work in a healthy fashion. The expression of interest is characterized by a slightly raising or lowering of the eyebrows and a slight widening or narrowing of the eyelid opening as though to increase the field of vision. This is accompanied by a general increase in muscle tone, resulting in the countenance of a person who is tracking, looking, listening, and maintaining a high degree of attention and alertness.

Joy

Joy is characterized by a sense of confidence and significance, a feeling of being loved or loveable and is

acceptant of at least momentary contentment with self, others, and the world. The joyful face is characterized by an expression which pulls the lips back and curves them gently upward like a crescent moon and puts a twinkle in the eyes, i.e., the smile of joy.

Surprise-Startle

Surprise or startle is activated by a sharp increase in neural stimulation, with the external conditions for surprise being any sudden or unexpected event. In the look of surprise the brow is lifted, creating wrinkles across the forehead; the eyebrows are raised, giving the eyes a large, rounded appearance; and the mouth is opened to an oval shape.

Distress-Anguish

Distress and anguish or sadness is the most common negative emotion and occurs in response to a continued high level of stimulation, including pain, cold, noise, hurt, and the more commonly known experiences of disappointment, failure, and loss. Separation, whether physical or psychological, is the most basic and common cause of distress. In the expression of distress the eyebrows are arched upward and inward, the inner corners of the eyelids are drawn up, and the lower eyelids may appear to be pushed upward. The

corners of the mouth are drawn downward, and the chin muscles push upward and raise the center of the lower lip.

Anger

A common cause of anger is the feeling of being either physically or psychologically restrained from doing whatever one intensely desires to do, whether in terms of physical barriers, rules, regulations or one's own incapability. Other causes of anger include personal insult, everyday frustration, interruption of interest of joy, or being compelled to do something against one's wishes. In the expression of anger, the muscles of the brow move inward and downward, creating a frown and a foreboding appearance about the eyes, which seem to be fixed in a hard stare toward the object of anger. The nostrils dilate, the lips are opened and pulled back, revealing clinched teeth, and often the face flushes red.

Disgust-Revulsion

Disgust usually occurs in response to things that are deteriorated or spoiled, either organically or psychologically. In the full expression of disgust one appears as though one is gagging or spitting out. There is also a pulling upward of the upper lip and a wrinkling of the nose, making the eyes appear to squint.

Contempt-Scorn

Contempt is generally elicited in situations in which one needs to feel stronger, more intelligent, more civilized, or in some way better than the person one is contending with, including situations that also elicit jealousy, greed, and rivalry. In contempt the eyebrow is cocked, the face stretched longer, and the head lifted up, giving the appearance of looking down on someone while at the same time pulling away and creating distance between self and the other.

Fear

Fear can be the most toxic of all the emotions, and generally occurs in response to internal or external events which signal danger. These situations may be either physical or psychological and specific activators of fear may be either primarily innate or primarily learned. In fear the eyebrows are approximately straight and appear somewhat raised, the inner corners of the brow are drawn together and there are horizontal wrinkles across the forehead. Fearful eyes are more widely opened than eyes in the interested pose, but appear smaller than surprise eyes. The mouth is also opened and the lips are tense and drawn back tightly.

Shame-Shyness

In shame, the self is experienced as the object of contempt or scorn and is seen as foolish, inept, out-of-place. Shame is usually accompanied by some measure of failure or defeat and is also characterized by embarrassment and humiliation. In shame, one averts one's eyes, lowers the head, and moves one's whole body in an attempt to appear smaller. Shame is also frequently accompanied by blushing.

APPENDIX B

Distribution of Intelligence Scores
From the Western Personnel Test*

Raw Score	Frequency	Cumulative Percentage	General Population Percentage	Professional Population Percentage
9	1	1.8	50	5
10	1	3.6	55	5
11	4	10.9	65	10
12	6	21.8	70	30
13	7	34.5	75	35
14	7	47.3	80	45
15	11	67.3	85	50
16	5	76.4	85	55
17	2	80.0	90	65
18	1	81.8	90	75
19	2	85.5	95	80
20	2	89.1	95	85
21	4	96.4	95	90
22	1	98.2	99	95
23	1	100.0	99	99

M = 15.055

S.D. = 3.26

*Based on percentile ranks provided in the test manual (Gunn and Manson, 1962).

APPENDIX C

Percentage Agreement in Modal Categories Among Americans for 36 Photographs

Emotion	Photo No.	% (N = 164)*	Average	% (N = 55)**	Average
Interest-Excitement	6	71		56	
	7	65		74	
	29	82		85	
	35	60		72	
			(70)		(72)
Enjoyment-Joy	2	96		100	
	8	97		96	
	20	92		95	
	33	98		98	
			(96)		(97)
Surprise-Startle	11	96		93	
	28	94		96	
	32	79		87	
	36	84		80	
			(88)		(89)
Disgust-Anguish	1	87		67	
	4	81		83	
	24	87		34	
	27	70		62	
			(81)		(81)
Disgust-Revulsion	12	58		60	
	15	76		58	
	18	58		65	
	31	67		62	
			(65)		(62)

Anger-Rage	9	84		87	
	16	86		85	
	19	60		45	
	25	79		87	
			(77)		(76)
Shame-Humiliation	14	47		45	
	17	75		82	
	21	60		53	
	26	63		64	
			(61)		(61)
Fear-Terror	10	84		84	
	13	61		65	
	22	65		62	
	23	59		53	
			(67)		(66)
Contempt-Scorn	3	52		58	
	5	63		76	
	30	78		58	
	34	59		56	
			(63)		(62)

*Taken from Izard, 1971.

**Present study.

APPENDIX D

Demographic Data Sheet

Identification number _____

Sex: Male _____ Female _____

Age: _____

Educational background:

_____ Less than 8th grade

_____ High school

_____ High school graduate

_____ College

Major

Minor

_____ College graduate

_____ Graduate school

_____ Master's degree

_____ Doctorate

_____ Other (Explain _____)

Have you ever had any training or experience in the fine arts (e.g., music, art, drama) other than that described above? Yes _____ No _____

If so, please describe _____

Present Occupation:

Area

Title

Social sciences

Physical sciences

Biological sciences

Business

Education

Fine arts

Not employed

Other

APPENDIX E

Empathy Questionnaire*

Identification
Number:

Please answer the following questions YES or NO as you feel that they apply to you.

1. It makes me sad to see a lonely stranger in a group.
2. People make too much of the feelings and sensitivities of animals.
3. I often find public displays of affection annoying.
4. I am annoyed by unhappy people who are just sorry for themselves.
5. I become nervous if others around me seem to be nervous.
6. I find it silly for people to cry out of happiness.
7. I tend to get emotionally involved with a friend's problems.
8. Sometimes the words of a love song can move me deeply.
9. I tend to lose control when I am bringing bad news to people.
10. The people around me have a great influence on my morals.
11. Most foreigners I have met seemed cool and unemotional.
12. I would rather be a social worker than work in a job training center.
13. I don't get upset just because a friend is acting upset.
14. I like to watch people open presents.

- ___15. Lonely people are probably unfriendly.
- ___16. Seeing people cry upsets me.
- ___17. Some songs make me happy.
- ___18. I really get involved with the feelings of the characters in a novel.
- ___19. I get very angry when I see someone being ill-treated.
- ___20. I am able to remain calm even though those around me worry.
- ___21. When a friend starts to talk about his problems, I try to steer the conversation to something else.
- ___22. Another's laughter is not catching for me.
- ___23. Sometimes at the movies I am amused by the amount of crying and sniffing around me.
- ___24. I am able to make decisions without being influenced by people's feelings.
- ___25. I cannot continue to feel OK if people around me are depressed.
- ___26. It is hard for me to see how some things upset people so much.
- ___27. I am very upset when I see an animal in pain.
- ___28. Becoming involved in books or movies is a little silly.
- ___29. It upsets me to see helpless old people.
- ___30. I become more irritated than sympathetic when I see someone's tears.
- ___31. I become very involved when I watch a movie.
- ___32. I often find that I can remain cool in spite of the excitement around me.

___33. Little children sometimes cry for no apparent reason.

*Mehrabian and Epstein, 1972.

APPENDIX F

Emotion Response Sheet

Identification Number _____

- A. INTEREST-EXCITEMENT: Concentrating, attending, attracted, curious.
- B. ENJOYMENT-JOY: Glad, merry, delighted, joyful.
- C. SURPRISE-STARTLE: Sudden reaction to something unexpected, astonished.
- D. DISTRESS-ANGUISH: Sad, unhappy, miserable, feels like crying.
- E. DISGUST-REVULSION: Reaction to something which is spoiled.
- F. ANGER-RAGE: Angry, hostile, furious, enraged.
- G. SHAME-HUMILIATION: Embarrassed, ashamed, guilty, shy.
- H. FEAR-TERROR: Scared, afraid, terrified, panicked.
- I. CONTEMPT-SCORN: Sneering, scornful, disdainful.

- | | | | |
|-----|-------------------|-----|-------------------|
| 1. | A B C D E F G H I | 19. | A B C D E F G H I |
| 2. | A B C D E F G H I | 20. | A B C D E F G H I |
| 3. | A B C D E F G H I | 21. | A B C D E F G H I |
| 4. | A B C D E F G H I | 22. | A B C D E F G H I |
| 5. | A B C D E F G H I | 23. | A B C D E F G H I |
| 6. | A B C D E F G H I | 24. | A B C D E F G H I |
| 7. | A B C D E F G H I | 25. | A B C D E F G H I |
| 8. | A B C D E F G H I | 26. | A B C D E F G H I |
| 9. | A B C D E F G H I | 27. | A B C D E F G H I |
| 10. | A B C D E F G H I | 28. | A B C D E F G H I |
| 11. | A B C D E F G H I | 29. | A B C D E F G H I |
| 12. | A B C D E F G H I | 30. | A B C D E F G H I |
| 13. | A B C D E F G H I | 31. | A B C D E F G H I |
| 14. | A B C D E F G H I | 32. | A B C D E F G H I |
| 15. | A B C D E F G H I | 33. | A B C D E F G H I |
| 16. | A B C D E F G H I | 34. | A B C D E F G H I |
| 17. | A B C D E F G H I | 35. | A B C D E F G H I |
| 18. | A B C D E F G H I | 36. | A B C D E F G H I |

APPENDIX G

Means, Standard Deviations, and F Ratios for Nine Emotions and Total Score by Education Groups

Variable	High School (N = 7)	College (N = 14)	College Graduate (N = 16)	Masters (N = 13)	Doctorate (N = 5)	F Ratio
Interest						
M	3.0	3.0	2.8	2.8	2.8	
SD	.8	.9	1.0	.9	1.3	.111
Joy						
M	3.9	4.0	3.8	8.9	3.8	
SD	.4	.0	.5	.3	.4	.584
Surprise						
M	3.7	3.6	3.3	3.6	3.6	
SD	.5	.5	.9	.7	.5	.579
Distress						
M	2.3	2.6	2.3	2.5	2.6	
SD	.5	.9	.7	1.0	.5	.461
Disgust						
M	2.4	2.6	2.1	2.7	2.2	
SD	1.0	1.2	1.0	.9	.8	.967
Anger						
M	3.0	2.9	3.0	3.2	3.2	
SD	.6	1.0	.7	.9	.4	.294
Shame						
M	2.5	2.5	2.4	2.6	1.6	
SD	1.0	.9	1.0	1.2	1.3	.937
Fear						
M	2.7	2.7	2.3	2.6	3.0	
SD	.8	1.0	1.0	1.3	1.2	.528

Contempt						
M	2.0	2.6	2.2	3.0	2.0	
SD	1.0	.7	.6	1.0	1.4	1.334
Total Score						
M	25.6	26.6	24.4	26.8	24.8	
SD	3.5	2.6	5.8	3.2	4.1	.896

APPENDIX H

Summary Tables of Regression Equations for Each
of Nine Emotions

Variable in Equation	<u>Interest</u>			
	Beta	SP ²	R	R ²
Empathy	.144	.050	.224	.050
Psychological Differentiation	.232	.027	.279	.078
Age	-.157	.022	.317	.100
Neuroticism	.075	.008	.330	.109
Sex	-.090	.004	.337	.113
Education Level	-.045	.001	.339	.115
Intelligence	-.030	.000	.340	.115
Extraversion	-.024	.000	.340	.116
Lie	-.021	.000	.341	.116
	<u>Joy</u>			
Sex	-.245	.040	.201	.040
Lie	-.156	.015	.236	.056
Age	.102	.011	.260	.067
Intelligence	-.137	.007	.273	.075
Neuroticism	.040	.001	.277	.076
Psychological Differentiation	.044	.001	.280	.078
Education Level	.053	.000	.281	.079
Extraversion	.042	.001	.283	.080
	<u>Surprise</u>			
Age	-.449	.176	.419	.176
Empathy	.332	.017	.439	.193
Sex	.370	.036	.479	.229
Psychological Differentiation	-.183	.018	.498	.248
Education Level	.225	.019	.517	.268
Neuroticism	.179	.021	.538	.289
Intelligence	-.100	.008	.545	.297
Lie	.066	.003	.549	.301

APPENDIX H--Continued

Variable in Equation	<u>Distress</u>			
	Beta	SP ²	R	R ²
Lie	-.348	.064	.254	.064
Intelligence	-.249	.042	.327	.107
Education Level	.265	.032	.373	.139
Psychological Differentiation	-.181	.022	.402	.161
Neuroticism	-.185	.019	.425	.181
Empathy	.178	.026	.455	.207
Extraversion	-.026	.000	.456	.208
	<u>Disgust</u>			
Age	-.344	.147	.383	.147
Empathy	.219	.071	.467	.218
Education Level	.328	.026	.495	.245
Intelligence	-.307	.023	.518	.268
Extraversion	.190	.027	.544	.296
Psychological Differentiation	.198	.017	.559	.313
Lie	-.150	.011	.570	.325
Sex	-.184	.014	.582	.339
Neuroticism	-.041	.001	.584	.341
	<u>Anger</u>			
Age	-.411	.096	.310	.096
Education Level	.232	.039	.368	.135
Intelligence	-.266	.026	.402	.162
Sex	.154	.029	.437	.191
Psychological Differentiation	.100	.006	.445	.198
Lie	-.042	.001	.446	.199
Neuroticism	-.026	.000	.446	.199
Extraversion	-.018	.000	.447	.199

APPENDIX H--Continued

Variable in Equation	<u>Shame</u>			
	Beta	SP ²	R	R ²
Sex	-.398	.132	.365	.133
Age	-.205	.046	.425	.180
Extraversion	.172	.015	.443	.196
Education Level	.140	.007	.451	.203
Psychological Differentiation	-.123	.012	.465	.216
Empathy	-.096	.004	.469	.220
Lie	-.048	.001	.471	.222
Neuroticism	-.022	.000	.471	.222
	<u>Fear</u>			
Lie	-.328	.106	.326	.106
Age	-.372	.094	.449	.201
Sex	.159	.018	.469	.220
Extraversion	-.049	.005	.475	.226
Intelligence	-.133	.005	.481	.231
Education Level	.095	.005	.486	.236
Psychological Differentiation	.027	.000	.486	.237
Neuroticism	.024	.000	.487	.237
Empathy	.021	.000	.487	.237
	<u>Contempt</u>			
Age	-.383	.125	.353	.125
Education Level	.318	.028	.391	.153
Empathy	.156	.015	.411	.169
Lie	-.076	.008	.420	.177
Intelligence	-.110	.008	.430	.185
Extraversion	.073	.004	.435	.189
Psychological Differentiation	-.067	.001	.440	.194
Sex	.087	.002	.440	.194
Neuroticism	.053	.002	.443	.196

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