# THE EFFECT OF PEOPLE-ORIENTATION AND MENTAL HEALTH ON EMPATHIC ACCURACY

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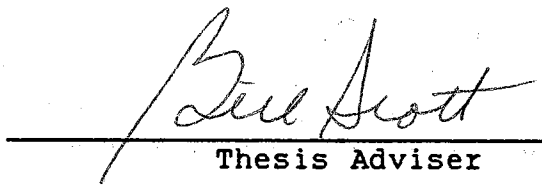

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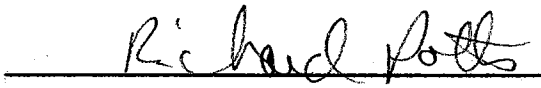

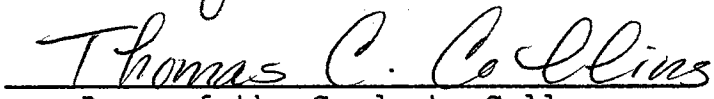

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# CHAPTER I

## INTRODUCTION

Are some persons consistently good at understanding how other people feel? If so, how could we identify these empathic individuals? What characteristics do they have in common? These questions have not been adequately answered although 60 years of research has been conducted in the area of person perception. Accurate person perception, empathy, is the ability to place oneself in another's shoes and see the world as they do, thus obtaining an understanding of the other person's feelings. In describing the psychosocial benefits of accurate empathy Hastorf, Schneider, and Polefka (1970) stated that "accurate judges may well occupy special positions in various social groups by virtue of their ability - or at least, it might be beneficial if they did (p. 26)". Accuracy of perception was therefore thought to be an important aspect of being empathic. Kruglanski (1989) points out that being accurate in empathic relating creates an ability to predict others which provides the empath with a degree of control over his social and physical environments. The accuracy of empathic relating therefore takes on a very important role in social functioning. Improvements in decision making, supervision, problem

solving and communications are all believed to occur when people are accurately empathic.

The ability to identify those individuals who were highly empathic, accurate in perceiving others, promised much in the selection of individuals for different tasks or jobs such as psychologist, teacher, physician and even politician. Empathy is also perceived as an important aspect of the therapeutic interaction that fosters rapport, understanding, self-disclosure and promotes mental health. The accuracy of empathic relating may also reflect the extent of reality contact an individual maintains. It therefore may be valuable in evaluating the effectiveness of a person's ability to manage problem situations. As a result, psychologists view empathy as a key factor in successful therapeutic outcomes. Carl Rogers (1987) views empathy functioning as a healing agent that confirms the client's identity and promotes understanding. Rogers succinctly describes the effect of empathy when he states "If a person can be understood, he or she belongs (p. 181)".

Empathy has been positively associated with mental health, leadership qualities, and helping behavior. However, the results of empathy research over the last sixty years paints a confusing picture of the topic due to two major problems: the multitude of empathy definitions and the problems adequately measuring empathic accuracy. In the first instance, the myriad of theoretical and operational definitions used in empathy research results in findings

that are difficult to integrate. Secondly, it has been very difficult to identify those individuals who are accurate empaths due to methodological difficulties measuring empathic accuracy.

## Theoretical Definitions of Empathy

Corsini (1985) broadly defined empathy as the "vicarious experiencing of the feelings, perceptions and thoughts of another" (P. 428). This definition is very different from how empathy was originally defined. Titchaner in 1915 originally defined empathy as the ability to imagine another's emotional feelings. It involved a "feeling into another person" that indicated another's feelings were experienced by the empath to some extent but somehow kept separate from their own feelings. The goal of empathy was the accurate understanding of the feelings of others. However, most research into empathy did not deal with emotion. Instead, empathy was interpreted to be a process by which an individual could predict the behavior, thinking, attitudes and sometimes things as arcane as the musical preferences of others. For some researchers empathy was synonymous with role reversal (Speroff, 1953), mutual transference (Stewart, 1954), esthetic sensitivity (Lifton, 1958), decentering (Chaplin & Keller, 1974) and emotional intelligence (Mayer, DiPaolo & Salovey, 1990). Harmon

(1986) reported that

> Empathy is considered to consist of role-taking ability and other abilities such as attending to another person in a way that is unbiased by preconceptions, an ego-involved relational perspective, or a nonpersonal analytic stance (Barrett-Lennard, 1981); detecting and describing with accuracy another's immediate affective experience (Danish & Kagan, 1971); communicating one's understanding of another effectively enough for the other to feel understood (Rogers, 1957); and consistently employing another's feedback to assess the accuracy of ones' empathic understanding (Rogers 1975) (p. 125).

Most research defines empathy in one of three ways: (a) Cognitive empathy or knowing how the other person feels (Dymond 1949), (b) Affective empathy or feeling what another person feels (Eisenberg, Fabes, Schaller, & Miller, 1989), and (c) Sympathy or compassionate responding to another's distress (Batson, O'Quin, Fultz, Vanderplas, & Isen, 1983). The confusion of sympathy with empathy has frequently occurred in the literature (Gladstein, 1983). The confusion stems from a failure to understand the "as if" quality of empathic experience where the empath feels what another feels in order to gain an understanding of them. When empathizing, the individual is aware that the feeling is a shared one and can differentiate it from their own feelings.

Sympathy is an emotional response of compassion or concern that may be created in an individual when they observe another's plight (Gruen and Mendelsohn, 1986). Sympathy is not a reflection of how the other person is feeling. Both sympathy and empathy may lead to helping behavior and they therefore may be easily confused if outcome alone is a criterion. In a similar fashion, empathy has also been confused with the process of identification in which one individual unconsciously forms an emotional tie with another and behaves as if they were the other person (Warren, 1992). The "as if" experience is lost as the identifying individual makes no distinction between their own feelings and the feelings of the other person.

Cognitive empathy is defined as "intellectually taking the role or perspective of another person. That is, seeing the world as the other person does (Gladstein, 1984, p. 117)". The cognitive empathy approach is frequently referred to as the role-theory method. Research into cognitive empathy is characterized by a concern with predictive accuracy. Accuracy in predicting others should be the result of obtaining knowledge of others through empathic relating. Therefore, most research into cognitive empathy has operationally defined empathy as the ability to accurately predict how others would rate themselves on a list of traits. This definition indicates that empathy is the ability to understand another person's personality characteristics. Emotions were not the focus of cognitive

empathy research efforts. Robert Hogan (1969) made a slight change in the focus of cognitive empathy research by investigating the personality of empaths. He developed a self-report empathy scale to measure the "empathic disposition" of people. Hogan views empathy as a process of re-creating another person's mental state. His empathy scale can be viewed as a measure of the personality characteristics that facilitate empathic relating.

Research into affective empathy investigates feelings and emotions, but frequently focuses on the feelings experienced by the empath rather than that of the target. As a result, the accuracy of the empath's perception of the target is not a major interest. In this approach affective empathy is defined as "a vicarious emotional response to the perceived emotional experiences of others (Mehrabian & Epstein, 1972, p. 525)". This means that the empath, through some unknown process, shares in the experience of another's emotion. The two types of empathic relating differ in terms of how the process is initiated. In cognitive empathy, awareness of affect in another person starts an empathic interaction to help label the observed affect. The empath may imitate the observed emotional behavior in an attempt to accurately label the experienced emotion. This is very different from the affective empathy approach where the empath is assumed to be sensitive enough to experience, through some emotional resonance, the emotion being observed in another. In strictly theoretical terms,

empathy involves the ability to accurately infer the feelings of another irrespective of the initiating process (Ickes, 1993). Mehrabian and Epstein's (1972) Empathic Tendencies Scale, a self-report measure of empathy, is considered a measure of affective empathy. Different disciplines in psychology sometimes make different distinctions between cognitive and affective empathy that add to the confusion. For example, developmental research defines cognitive empathy as the ability to perceive how the other is thinking and affective empathy as the ability to perceive how the other is feeling (Gladstein, 1983).

More recent theoretical conceptions of empathy describe it as a complex process that involves both a cognitive and an affective component. Barrett-Lennard (1981) developed a five stage model of the empathic interaction that postulates affective and cognitive components in the empathic relationship. The first stage of the model is the presence of an empathic attentional set which is an openness to another's feelings. This is followed by the second stage of empathic resonance in which the individual experiences, or shares, the emotion of another. In the third stage, expressed empathy, the individual communicates their experience of the emotion to the other. The fourth stage, received empathy, occurs when the other attends to the empathic communication and becomes aware of how well they are being understood. In the last stage, termed "feedback, fresh expression, and resonation", the other communicates

how accurate the empath is and provides more emotional expressions with which the empath can resonate. This conception definitely views empathy as an ongoing process of empathic understanding, expression, and communication. Empathic accuracy is usually measured at the initial understanding phase of the relational process. Barrette-Lennard concludes that contradictory findings between cognitive and affective empathy research is due to measuring different stages of the empathic relationship.

This complex view of empathy is reflected in the development of the Interpersonal Reactivity Index (IRI). The IRI does not measure empathy in terms of the stages of Barrett-Lennard's model. However, Davis (1983) recognizes the interplay of both cognitive and affective factors in empathic relating and provides scores for each factor on the IRI. Hogan's (1969) empathy scale and other affective measures of empathy were used to validate this questionnaire. Although the IRI has become a popular instrument in measuring different aspects of empathy, its' relationship to empathic accuracy has not been frequently investigated. Self-report measures of empathy are considered to be vulnerable to social desirability responses (Levenson and Reuf 1992) and to the respondents' lack of self-knowledge about how empathic they really are (Marangoni, Garcia & Ickes as cited in Ickes, 1993).

Few studies have investigated the relationship between self-report measures of empathy and empathic

accuracy. Ickes, Stinson, Bissonette, and Garcia (1990) found negative correlations between their subject's IRI and other self-report empathy scores and their ability to infer the specific content of another person's thoughts and feelings following an impromptu interaction. The researchers required subjects to accurately postdict both thoughts and feelings of their interview partner from selected portions of the surreptitiously videotaped interaction where subjects could remember experiencing specific thoughts and feelings. Similarity judgments made by trained, independent raters were used to compute consensus scores. Independent raters judged the similarity of subject and stimulus responses on a 3-point scale ranging from 0 (different content reported) to 1 (similar but not the same content) to 2 (essentially the same content). These consensus ratings were summed and averaged across raters to obtain an empathic accuracy score. Their results suggest self-report measures are poor predictors of empathic accuracy when accuracy is measured as consensus. However, the dependence on outside raters for consensus makes the criterion for accuracy one that is external to the viewed subject. This type of accuracy score tells more about the consensus raters than about the subjects being investigated. Consensus accuracy scores also fail to account for the judge's differing skills in rating different targets and different traits. The importance of accounting for these effects on ratings will be discussed later when Cronbach's

(1955) accuracy components are reviewed.

Accuracy is an important aspect of the definition of empathy. Although accuracy may not be expected or needed early in the empathic interaction, it would be very difficult to maintain an interaction with someone who consistently misunderstood feelings. Levenson and Ruef (1992) in an investigation of physiological aspects of empathy conclude that "without accurate perception of another's feelings, it would be difficult to feel what others feel or to respond compassionately to their plight" p. 235. They defined empathy, consistent with it's original meaning, as the ability to detect accurately the emotional information being transmitted by another person. Empathic accuracy therefore helps to maintain interactions and is an essential aspect of the definition of empathy. However most research into person perception has not focused on emotions. These different conceptions of empathy have resulted in vastly different operational definitions of empathy.

## Operational Definitions of Empathy

Gladstein (1983), in an extensive review of empathy research, concluded that theoretical and operational definitions of empathy contributed to the diversity of research findings on the topic. These differences in operational definitions have resulted in a myriad of findings, many of which are contradictory (Marks & Tolsma,

1986). Person perception research, the predominant approach to empathy, has used personality trait prediction as a criterion for empathic accuracy. This approach to empathy stressed the predictive accuracy of judgments of how other people rate themselves on different personality measures. Buchheimer (1963) reported that this method of operationalizing empathy left researchers questioning if they were measuring empathy, projection, attribution or similarity.

Dispositional empathy is the term frequently used to describe scores obtained from cognitive empathy self-report measures. Individuals high in dispositional empathy have been found to be more supportive (Trobst, Collins, & Embree, 1994) and report themselves to be more altruistic (Batson, Fultz, Schoenrade, 1987). Empathy in these cases, is operationally defined as high scores on these self-report instruments and are subject to the flaws of self-report measures indicated earlier.

Differences in operationalized definitions can also occur within measures of the same type of empathy. For example, Barrett-Lennard (1981) stresses the target's behavior in measuring affective empathy by focusing on the communication of empathic understanding. He therefore conceives of an expressive empathy and a receptive empathy depending on which stage of the empathic relating process is the focus of the operational definition. Truax and Carkhuff (1967) focus only on the empath's behavior. They

operationally define empathy as the ability to correctly determine empathic responses from videotaped interviews. Kurtz and Grummon (1972) correlated six commonly used empathy scales, including those of Kagan, Barrett-Lennard and Hogan, and found no significant statistical relationship among them. These findings suggest that if self-report scales do measure empathy they measure different aspects of it or some qualities different from empathy but perhaps related to it. Results from such diverse operational definitions makes it difficult to integrate findings from different studies.

Many instruments have been developed that purportedly measure empathic accuracy: The Affective Sensitivity Test (Campbell, Kagan, & Krathwohle, 1971), The Profile of Nonverbal Sensitivity (Rosenthal, Hall, DiMatteo, Rodgers, & Archer, 1979), the Social Interpretation Task (Archer & Akert, 1977). Buck (1984) noted these instruments are based on different operational definitions of empathy and have reliability and validity problems that undermine their utility. A second major problem with integrating results from different empathy studies is the various ways in which accuracy is measured.

## Problems With Empathic Accuracy

Historically the study of empathy has been approached from two perspectives - those studying emotion and those

involved with personality judgments. The former has concentrated primarily on how people communicate their feelings with facial expressions and the latter approach, termed person perception, focused on how accurate people were at judging more stable personality traits. Empathy was defined as accurate person perception derived by some process of experiencing the same feelings of the person being empathized with but without identifying completely with them. The facial expression research concentrated on what aspects of the face, such as eyes, forehead and mouth, allowed others to correctly identify the experienced emotion. Person perception research took on the difficult task of attempting to identify and characterize those individuals who were accurate in their perceptions of others.

In the person perception approach, empathy was usually measured by having people, termed judges, attempt to rate how other individuals, termed targets, would rate themselves on some measure of personality traits. These studies hypothesized that if an individual is empathic they should be able to accurately predict how others perceived themselves. The degree of agreement between the judge's ratings of the target and the target's self-ratings was termed empathic accuracy.

Dymond (1950) was the major proponent of measuring empathy in this fashion. She defined empathy as the imaginative transposing of oneself into the thinking,

feeling and acting of another and so structuring the world as he does" p. 127. In her initial research on the topic, she randomly assigned 29 females and 24 male students in her social psychology class to five groups of seven members each and three groups of six members each. They were given a group goal to facilitate member interaction and to develop a basis for making personality ratings. The groups met once a week for six weeks.

The student's rated themselves and target individuals in their group using a five point Likert scale. The scales consisted of six polar trait combinations: superior--inferior, friendly--unfriendly, leader--follower, shy--self-assured, sympathetic--unsympathetic, and secure--insecure. The rating process occurred in four stages. In the first stage, each person rated themselves on the six polar trait combinations. In the second stage, each student rated the other group members on the same six traits. In the third stage each subject predicted how the other group members rated themselves on each trait. Finally in the fourth stage, each subject predicted how he or she was rated by the others. In this study each subject was both a judge and a target. Dymond (1949) stated

> "In this way, a measure of one subject's ability to see things from the point of view of the other can be derived by calculating how closely his predictions of the other's ratings on part 3 and part 4, coincide with the other's actual ratings of himself and the

subject (on his part 1 and part 2), and vice versa" (p. 344).

Two types of accuracy were determined. The Right Score was the number of exactly correct predictions. The more commonly used Deviation Score consisted of the total number of points on the Likert scale that the selected judge was in error. That is, the judges's predicted ratings for the target on each scale were subtracted from the target's actual ratings to obtain an error score. The lower the Deviation Score the more accurate and therefore the more empathic the judge.

Several methodological problems were common to this early empathy research. The problems involved how the target's rated themselves and how the judge's made their predictions (Gage & Cronbach, 1955) as well as how the accuracy scores were derived (Cronbach, 1955).

First, researchers had a difficult time deciding what the target's self-ratings on the six bipolar adjectives represented. Did the personality ratings of the targets represent how they believed they really were, how they wanted to be seen, or how they thought they were seen by others? This criterion uncertainty led to an uncertainty about what accurate judges might be accurate at predicting. This rating complication affected accuracy scores by lowering their reliability. Judges that were initially accurate may not accurately predict the same subject's scores at a later time.

Secondly, the judges also had similar problems with their predictions. Were the judges predicting (ie. rating) the target as they thought the targets really were, or as they thought the target would tend to rate themselves on the personality measure? There was no way to be sure. More importantly, Cronbach (1955) found that some accurate judges tended to rate targets in a fashion very similar to how the judges rated themselves on the same personality measure. He termed this "assumed similarity". Accuracy in these cases was not due to a differential perception of an individual's traits but instead was the result of the judge being similar to the target on the traits measured and having a tendency to rate targets as they, the judge, rated themselves. Accuracy in these cases is an artifact of this alternate relationship.

Another difficulty with the judges' ratings involved how they tended to use the Likert scale on which bipolar personality traits were arranged. Some judges tended to use only one portion of the scale to rate the targets. That is, some judges tended to rate targets using only the high, middle or low end of the Likert scale. This meant that the judges' ratings did not demonstrate a real separation between targets on the traits listed even if the differences really existed. The combination of these three rating problems led to unreliable empathic accuracy scores and a general belief that empathic accuracy can not be reliably measured.

All of these difficulties could be attributed to the use of a faulty accuracy criterion and a tendency to misuse the Likert scale in making judgments. However, it was Cronbach's (1955) critique of the deviation accuracy score that proved most damaging to empathic accuracy research.

## Cronbach's Empathic Accuracy Components

Twenty years of research into empathy almost came to an end with Cronbach's (1955) critique of the Deviation accuracy score. Although in his critique Cronbach also provided his solution to this dilemma, the complexity of his analysis led to a general belief that empathic accuracy could not be reliably measured. He reported that the Deviation Accuracy score (Dymond, 1949) did not represent true accuracy. He demonstrated that the Deviation Accuracy score really consisted of four components: elevation, differential elevation, stereotype accuracy and differential accuracy. Only differential accuracy was considered "true accuracy". The other three accuracy scores are considered biases but are necessary for the computation of differential accuracy.

Both the judge's predictions and the target's self-rating on each trait are divided into these four components. The deviation accuracy score will vary depending on who is being rated, what is being rated and how the rating scale is used. The judge may be better at rating

some targets than others. This is reflected in their differential elevation accuracy score. The differential elevation score is a measure of the judge's ability to determine which targets rate themselves higher over all the traits.

Judge's also have their own ideas about what traits tend to occur together in a person or group. This is reflected in the judge's stereotype accuracy score. Stereotype accuracy is a measure of the judge's ability to determine which traits are more prevalent in the targets as a group.

How the judge uses the rating scale is measured by the elevation component. Elevation is the mean of all of a judge's ratings and reflects the tendency to rate all targets either high or low on the rating scale.

Differential accuracy is the extent to which the judge can accurately rate each individual on each trait and is obtained by subtracting the other components from the deviation accuracy score. A detailed description of Cronbach's method of deriving the various accuracy components is presented in Appendix A.

Many researchers continue to measure accuracy using variations of Dymond's (1949) method despite Cronbach's critique. Researchers have used as accuracy scores the number of correctly predicated responses to personality questionnaire items (Stelmachers and McHugh, 1964), the number of exact agreements on each item of the Cattell 16 PF

(Cloyd, 1977), the total number of correct predictions of situational behavior reported by group members (Sechrest & Jackson, 1960). Research by Harackiewicz and DePaulo (1982), DePaulo, Kenny, Hoover, Webb, and Oliver (1987) and Snodgrass (1985) are good examples of research using Cronbach's methodology to derive a true accuracy measure.

A more detailed refinement in measuring accuracy using Cronbach methodology is provided by Brems, Fromme and Johnson (1992). They "assessed the effectiveness of an operant group-modification paradigm as a training method to enhance empathy and self-disclosure" p. 190. They randomly assigned 36 female subjects to nine groups which met for 50 minute interaction sessions on three separate days. Three groups received training in empathic responding, three were trained in self-disclosure, and the remaining groups were controls. Their self-disclosing and empathic responses during the meetings were reinforced visually and auditorally. Reminiscent of Dymond (1949), following each meeting the group members completed a person perception Likert rating scale from four perspectives:

> (a) Self (S)-the subject's rating of herself; (b) other (O)-the subject's rating of each of the other group members; (c) self as seen by others (SO)-the subject's prediction of each of the other group member's rating of her; (d) other's self-ratings (OS)-the subject's prediction of each of the other group member's self ratings (p. 192).

They investigated two relationships among the ratings. Predictive accuracy is the relationship between SO and O ratings while predictive empathy is the relationship between OS and S ratings. Cronbach's (1955) accuracy components were obtained for both predictive accuracy and predictive empathy. The researchers could therefore investigate the relationship between person accuracy (differential elevation), situation accuracy (stereotype accuracy), and person x situation accuracy (differential accuracy). Self-report measures of self-disclosure, self-monitoring, and the Interpersonal Reactivity Index measure of empathy components were also administered along with two behavioral measures of altruism. Their results indicate that empathic verbalizations can be taught with a group modification method and that empathic and self-disclosure statements continued to increase through all three group meetings. Empathy group members reported more perspective-taking activities than the other groups.

Brems, Fromme and Johnson's (1992) results are particularly pertinent to this study because they were measuring actual empathic responding with an important distinction made between predictive accuracy and predictive empathy. Predictive accuracy refers to how well an individual can predict how others perceive him or her. However, predictive empathy refers to how well an individual can predict how other persons' rate themselves. Unlike Dymond (1949), Brems et al make a fine distinction about the

type of knowledge of which empathy consists. Their definition of predictive empathy utilizes person perception terms due to the nature of what is being predicted. However, a slight change in wording would bring the definition closer to the original meaning of empathy as concerned with feelings. In the current study, empathy is defined as the ability to accurately identify the feelings and emotions expressed in the facial expressions of others. Operationally, empathy is defined as the ability to accurately identify a stimulus person's intended emotional feeling from their posed facial expression. In the remainder of this study, the term empathic accuracy will be used to refer to this ability.

## Facial Expressions as an Accuracy Criterion

Although there are other modes of expressing emotion that are either verbal or postural, facial behavior has been found to be the most expressive and communicative of inner feelings (Ekman, 1984; Ekman & Friesen, 1975; Ekman, Friesen & Ellsworth, 1972). Many studies by Mehrabian (1968, 1971, 1972) and others (Mehrabian and Ferris, 1967; Mehrabian & Wiener, 1967) have found that approximately 55% of the communication of emotion can be attributed to facial expression. Although there is some reason to believe that this percentage is too high (Cline, Atzet & Homes, 1972; Archer & Akert, 1977) results do not disconfirm the

importance of facial behavior in the expression and communication of experienced emotion. Hall (1966) found that the 3 to 4 foot conversational distances maintained in western culture made the face the primary focus of the interaction due to difficulties viewing postural cues at that distance. People tend to focus on the facial cues even when presented postural information (Ekman and Friesen, 1969) primarily because the face possesses a greater ability to differentially express feelings than other nonverbal channels (Collier, 1985). If empathic relating is defined as a process by which an individual comes to know and understand another's feelings, then facial expressions are an excellent source of information to achieve that goal. The more empathic the individuals are, one may assume the more accurate they will be at judging another's emotional state from their facial behavior.

Perception of emotion in another person is part of the empathic process of relating. The perception of how another person feels is important to the creation of a similar feeling in the empathizer. Stotland, Mathews, Sherman, Hansson, and Richardson (1978) reflect this in their definition of empathy as "an observer reacting emotionally because he perceives that another is experiencing or about to experience an emotion" (p. 12). Mehrabian and Epstein (1972b) believed accuracy of perception had to occur before a person could "feel empathy". Levenson and Ruef (1992) in a study of shared physiological arousal between the empath

and the person being empathized with concluded that "without accurate perception of another's feelings, it would be difficult to feel what others feel or to respond compassionately to their plight (p. 235)". The accurate perception of emotion in the faces of others appears to be an important aspect of empathic relating. In the present study, empathy is operationally defined as the ability to correctly identify the emotion a stimulus person intended to communicate with their facial expressions. Therefore it seems reasonable that the more empathic a person is the more accurate they should be at identifying facial expressions of emotion both categorically and dimensionally.

## Measuring Empathy with Facial Expressions

To measure empathy as it was originally defined requires the use of a stable measure of how a person feels. Facial expressions of emotions are easily observable and considered to be innately related to how a person is feeling (Ekman, 1973; Tomkins, 1980). Therefore facial expressions are a more appropriate criterion for measuring empathic accuracy than the person perception method of predicting personality traits.

Charles Darwin postulated an innate link between felt emotion and spontaneous facial expressions. Ekman (1973) and Collier (1985) have surveyed the research and by meta-analysis of the data found that the results support

Darwin's hypothesis. These results indicate that spontaneous facial expressions are valid indicators of the emotions people are experiencing at the time. Facial expressions of emotion are viewed not only as an external aspect of emotion but also as such an integral part of the emotion as to share the same neurological bases (Tomkins, 1980). Pizzamiglio, Caltagirone and Zoccolotti (1989) in a review of the neuropsychological literature on facial expressions of emotion found spontaneous facial expressions of emotion to be influenced by extrapyramidal and limbic structures, providing support for the concept of a shared neurological basis.

Ekman (1973) also demonstrated the universality of some facial expressions of emotions with his cross cultural studies involving literate and preliterate peoples. In these cross cultural studies, Ekman found that even preliterate tribesmen who had never experienced access to mass communication devices like televisions were able to accurately identify photos of facial expressions. These results provide strong evidence for the validity and stability of facial expressions of emotions as a criterion for empathic accuracy. Some researchers, such as Ortony and Turner (1990) have challenged the existence of basic emotions. They state that facial expressions can occur without emotion. Ekman (1992) points out that all facial expressions are not emotional expressions and indicates that Ortony and Turner's alternative explanations of findings

contradict known facts.

## Posed vs Spontaneous Facial Stimuli

The photographs of facial expressions used by Ekman (1973) were posed and Darwin's theory was based on spontaneous facial expressions. The validity of Ekman's findings were challenged on the grounds that posed facial expressions of emotion, unlike spontaneous expressions, were intentional communication acts that occur without the actor actually experiencing the emotion. Spontaneous facial expressions were viewed as non-verbal behavior but posed expressions were considered non-verbal communication (Zuckerman, Hall, DeFrank, Rosenthal, 1976).

Other objections to posed emotions were that only peak aspects of an emotional expression were used in the photos and that subjects were allowed to view the photos until a decision was made. In real interpersonal interactions facial expressions of emotion occur quickly but provide more information about the emotion than a photo (Zuckerman et al, 1976). For example, there are usually context cues associated with an expression that help the observer identify the emotion. How well the observer knew the expressor might also determine degree of accuracy. In addition, because facial expressions are frequently continuous behavior, an observer has the target individual's prior and following expression as comparisons to facilitate

judgment.

Countering these objections to using posed facial expressions Kirouac and Dore (1984) investigated the influence of the length of exposure to slides depicting facial expressions and found that tachistoscopic presentations as short as 10 msec. could be accurately identified. This result suggests that accuracy with posed facial expressions remains high when length of exposure of the stimuli approaches length of exposure in real life situations outside the laboratory. Both Frijda (1953) and Stinson and Ickes (1992) found friends to be no more accurate than strangers at identifying facial expressions of emotion indicating that degree of acquaintance could influence accuracy.

Studies using posed facial expressions (Kirouac & Dore, 1984; Norwicki, Jr., & Hartigan, 1987) and studies using spontaneous facial expressions (Wagner, MacDonald & Manstead 1986; Zuckerman, Hall, DeFrank & Rosenthal, 1976) yield remarkably similar results. For example, women were found to be more accurate than men at decoding facial expressions of emotions whether the stimuli were posed or spontaneous. However, Buck (1984) reported that men have been found to be equal to and occasionally better than females with both posed and spontaneous stimuli. Female facial expressions of emotion were also more accurately identified than male expressions. There is no clear evidence which of the emotions are most easily identified due to the variety of

labels associated with facial expressions. What one experimenter calls love another may label happiness.

Zuckerman, Larraine, Hall, DeFrank and Rosenthal (1976) compared posed facial expressions with spontaneous facial expressions obtained by surreptitiously videotaping subjects watching four videotaped vignettes of a comedy, a neutral child interaction, a murder, and an auto accident. In terms of accuracy of identification of reported experienced emotion they found "the ability to decode posed cues was significantly correlated with the ability to decode spontaneous cues" (p. 975) and concluded that posed and spontaneous cues could be used interchangeably. These results provide strong support for the stability of posed facial expressions as a criterion for empathic accuracy.

## Empathy and Facial Expressions

Most empathy studies prior to 1955 possess methodological difficulties. As a result more recent studies have not measured empathic accuracy directly but have used self-report measures of empathy to identify people with purported empathic characteristics. However, the relationship between the self-report measures of empathy and empathic accuracy with facial expressions of emotion have not been extensively investigated. A study by Mayes, DiPaolo, and Saloney (1990) attempted to investigate the relationship between scores on the Emotional Tendencies

Scale (ETS), an empathy measure developed by Mehrabian and Epstein (1972), and the ability to recognize emotional content in faces, colors and abstract designs. Their study used 6 female faces expressing 6 emotions: happiness, sadness, anger, fear, surprise and disgust. The colors used were brick red, periwinkle blue, sea green, yellow, black and white. The six abstract designs employed both straight and curved line drawings. Subjects were 139 students recruited from psychology and art classes, law school and an engineering firm.

Subjects were required to rate each face, abstract design and color on a 5-point scale representing the six primary emotions. In this way they obtained scores indicating the extent to which each of the six emotions were present in each stimulus. However, they chose a consensus measure of accuracy that did not account for the effects of Cronbach's (1955) four accuracy components. Consensus was defined as "the ability to perceive emotions that were consensually viewed as present and the equally weighted ability to consensually agree when emotion was not present" p 776. Operationally a consensual response was a rating within 1 scale point of the modal response on each of the six emotion scales for each item. Each subject was awarded 1 point for each correct or consensual response and the sum of these scores across the 18 items became their accuracy score. The authors found that subjects scores on the ETS were significantly correlated with these consensus accuracy

scores. Ickes (1993) points out that accuracy should involve identifying the feeling the stimulus person is experiencing and that under the best of conditions consensual agreement resides outside of the observers. That is, subjects may agree on what they are viewing but still not be accurate. It is unfortunate that group differences were not reported as the groups may have differed in the degree of their accuracy. One question the current study attempts to answer is whether groups of students similar to those used in the Mayer et al study differ in their degree of people-orientation and if such differences might be related to differences in empathic accuracy. In order to determine if self-report empathy scores are related to empathic accuracy with facial expressions, the accuracy score must be based on agreement with the stimulus not the consensus of judges.

## Theories of Emotion

If emotional expressions are to be used as a criterion for empathy, the problem remains to decide which of the many emotions investigated by researchers should be used. Historically, the emotions that subjects are asked to identify varies greatly. Woodworth's (1938) research used six emotions reportedly found to demonstrate very little overlap in judgment. The six emotions are love-happiness, surprise, fear-suffering, anger-determination, disgust, and

contempt. Tomkins and McCarter (1964) used a circular arrangement of the eight emotions of enjoyment, interest, surprise, fear, anger, disgust, shame and distress. As can be seen by a comparison of these two lists, a particular emotion may have more than one label and the number of emotion labels considered to be primary emotions varies. A model of emotions might be considered useful if it provides distinct categories of primary emotions, allows prediction of secondary emotions and concomitant behavioral dispositions, as well as, account for the more general dimensional conceptions of emotion.

Several theorists have developed models using emotions considered to be primary emotions. All other emotions are thought to be combinations of these basic ones. In Woodworth's (1938) model the emotion category of anger-determination appears to confound two emotions while Tomkins and McCarter's (1964) model contains interest, an orienting response. Carroll Izard (1972) identified nine basic emotion categories: interest, joy, surprise, distress, anger, disgust, contempt, shame and fear. Izard postulates that facial muscles provide the important sensory feedback for the emotional experience. Izard's emphasis on facial expressions has some experimental support in that subjects experiencing an electric shock reported less pain when they maintained a neutral expression than when they overtly displayed their emotional experience (Colby, Lanzetta, & Kleck, 1977). However, Plutchik's (1980)

finding that subjects with facial paralysis still experience emotions indicates that facial feedback is not a necessary aspect of experiencing emotion. Indeed, Fromme and O'Brien (1982) propose that facial expressions are recent phylogenetic developments and are not necessarily reliable reflections of primary emotions.

Tomkins (1980) has developed a model of primary emotions based on facial expressions and it is vulnerable to the same criticisms applied to Izard. The Tomkins' model consists of eight of the nine emotions from Izard's list. Only Izard's emotion category of contempt is absent from Tomkins' list of primary emotions. Tomkins views emotions as accompanying and amplifying drive states and therefore deals with the resultant behavioral tendencies associated with these emotions. However, Fromme and O'Brien (1982) point out that both the Izard (1977) and the Tomkins (1980) models have difficulties accounting for secondary emotions.

Robert Plutchik (1980) has developed an important model of emotion and its circular arrangement is presented in Figure 1. Emotion categories are arranged in a circular order to display

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Insert Figure 1 about here.

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the relationship between and among the different emotions.

Emotion categories that are close to one another in the model are more similar to each other than those categories more distant. For example, in Figure 1 the emotion of anger is much more similar to the adjacent categories of disgust and anticipation than to the twice removed categories of joy or sorrow. Here, fear is considered the bipolar opposite of anger. Unlike Tomkins and Izard, Plutchik's selection and ordering of emotions is based on universally adaptive behavior associated with each emotion.

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Insert Figure 2 about here.

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Fromme and O'Brien (1982) developed a circular model of emotions which is depicted in Figure 2. Unlike the models discussed earlier, the Fromme and O'Brien model proposes an ordering of emotional categories based on the interaction of two bipolar behavioral dimensions (approach/avoidance and dominance/submission) with two bipolar physiological dimensions (hedonic and autonomic arousal). The behavioral dimensions are orthogonal, as are the two arousal dimensions. The model predicts low correlations between dimensions purported to be orthogonal and moderate correlations between non-orthogonal dimensions. The model emphasizes the behavioral consequences of the interaction of these two types of dimensions. For example, anger can be

seen as primarily a dominant and aroused emotion with an apparent contradictory secondary influence from pleasure and avoidance. The authors state that this apparent contradiction can be explained by pleasurable feelings that may accompany mastering the potential threat that creates anger. Threat results in increased sympathetic arousal which leads to a readying response of fight or flight. If the arousal is accompanied by a perception of dominance over the threat the resulting emotion will be anger and a direct attack on the threat. However, if the sympathetic arousal is accompanied by a perception that the threat cannot be mastered, then the resulting emotion is fear and the behavioral disposition is one of avoidance.

## Comparison of Circular Models of Emotion

The Fromme and O'Brien (1982) model of emotions differs from Plutchik's model in several ways: the arrangement of emotions in the model, the emotions used in the models, and the labeling of secondary emotions. As in Plutchik's model, adjacent emotional categories in the Fromme and O'Brien model are related. More distant categories are less related. The models have the five emotions of anger, joy, satisfaction/acceptance, fear, and grief in common, but their arrangement in the models are different indicating that the relationship between the emotions in each model is fundamentally different. The Fromme and O'Brien model

arrangement is based on the relationship among the four dimensions.

Elation, shock, and resignation are the emotions not found in Plutchik's model. These emotions and their placement in the Fromme and O'Brien model make a great deal of conceptual sense when the latter model's dimensional relationships are considered. For example, in the Fromme and O'Brien model resignation is the bipolar opposite of anger and represents the interaction of parasympathetic arousal and submission. Plutchik lists fear as the bipolar opposite of anger. Most researchers agree that errors in judgment that occur when people view facial expressions are not random but predictable. Therefore, most errors in identifying a specific emotion should occur to adjacent categories because of their great similarity of expression. Errors in identifying emotions categorically should decrease as the categories become more distant from each other and therefore less similar in expression. Fromme and O'Brien (1982) compared patterns of errors of postdiction produced by both models. Their results support the pattern of error distribution for the Fromme and O'Brien model and also provide support for resignation as the bipolar opposite of anger. Fear was found to be better placed in the Fromme and O'Brien circular model than in Plutchik's model.

Plutchik conceives of secondary emotions resulting from the combination of the models eight primary emotions, but this process seriously breaks down when the emotions

combined are distant from each other in the model. However, the Fromme and O'Brien model very successfully accounts for secondary emotions by postulating an interaction between the dimensions of hedonic and autonomic arousal with the processes of drive arousal, attention and cognitive appraisal.

Fromme and O'Brien (1982) also had students role play emotional dimensions to determine if they could be accurately transformed in to emotional categories. The authors reported that students were required to rely upon memories of stimulation in different dimensional states for their enactments. The results supported their model's order of emotion categories and confirmed the predicted error pattern described above. The results also confirmed the hypothesis that the categories in the model could be conceived of as the basis for emotional categories and behaviors. The authors conclude that their model is a viable alternative to Plutchik's model.

The Fromme and O'Brien (1982) emotion model is the only model that brings together both dimensional and categorical representations of emotion and was therefore selected for use in the current study. A secondary interest of the present study is the efficacy of the Fromme and O"Brien model with the present data. Specific predictions from the model that are examined are (a) whether ordering of decoding errors in identifying emotion from facial expressions are patterned such that no error is most common

and errors in assignment to adjacent categories decrease with increased distance from the correct assignment, (b) whether dominance/submission and approach/avoidance are orthogonal to each other and moderately related to the scores on the dimensions of arousal/relaxed and pain/pleasure, and (c) whether pleasure/pain and aroused/relaxed are orthogonal to each other and moderately related to the scores on the two behavioral dimensions.

## Facial Expressions and Cronbach's Accuracy Scores

If the result of empathy is a better understanding of the individual who is the target of the empathic relating, then the information gained by being empathic should be accurate. In terms of the ability to identify facial expressions, the three Cronbach accuracy scores represent different types of influence on accurate information. For example, there are several influences on the judges' ability to accurately identify emotional facial expressions: how well the target person can express each emotion (differential elevation accuracy), the judges' ability to discriminate between different emotions (stereotype accuracy) and how sensitive judges are to different emotions in each stimulus person's facial expressions (differential accuracy). Cronbach's elevation score is interpreted to be bias. Although elevation is not important as an accuracy score it does play an important role in deriving the other

three Cronbach accuracy scores.

Differential Elevation

Differential elevation accuracy with facial expression ratings reflects an encoder accuracy, an ability of the targets to express emotion with their face. Among the targets, as among the general population, some individuals will be better at communicating emotion with their face than others. The differential accuracy score indicates how well the targets were capable of adequately expressing to a judge the intended emotion with their facial expression. This accuracy is considered bias because the judge will be better at identifying those emotions the stimulus person is better at expressing. To obtain true accuracy this influence must be removed from the judge's deviation accuracy score.

Stereotype Accuracy

Stereotype accuracy concerns ratings of traits in the person perception approach to empathy. Cronbach considered this accuracy score to reflect how well the judge could predict people in general. Stereotype accuracy with facial expression stimuli reflects the ability of the judge to identify emotions, in general. That is, it reflects how well a judge can identify an emotion across targets on the average. If a judge cannot discriminate between emotions they will not be able to respond empathically. Therefore, stereotype accuracy reflects a general sensitivity to emotional expression in others. Each emotion has a stereotype accuracy score reflecting how generally sensitive

the judge is to that emotion. A comparison of stereotype accuracy scores for each emotion provides information about how generally accurate the judge is on each emotion compared with the remaining emotions. The lower the stereotype accuracy score the more accurate the judge. Although stereotype accuracy is very important, its' influence on the judge's deviation accuracy must also be removed to obtain true accuracy.

Differential Accuracy

Cronbach considered the differential accuracy score component the only true accuracy score. In the person perception approach, the differential accuracy score represents the judge's ability to predict how each target will respond to each item on a list of personality traits. In terms of identifying facial expressions of emotion, differential accuracy represents the ability of the judge to accurately identify each emotion in each facial expression of each target. The differential accuracy score reflects a sensitivity to the nuances of each emotional expression in each target person. Differential accuracy scores indicate a consistent accuracy in identifying each emotion in each individual and therefore reflects a skill. Unlike stereotype accuracy where the judge may be generally accurate at identifying or discriminating between or among emotions and differential elevation accuracy where the judge may be accurate only with certain targets, differential accuracy reflects the degree to which a judge is

consistently accurate in decoding each emotion in each target.

Differences in differential and stereotype accuracy may be due to differences in people-orientation. The more interested in people a judge is, the more accurate they may be at identifying facial expressions of emotion. Differences in differential elevation accuracy may also be due to degree of people-orientation, but this accuracy score more likely measures the encoding skills of the targets and is not a topic of this study.

## People Orientation

Perception of emotion in another person is part of the empathic process of relating. The perception of how another person feels is important to the creation of a similar feeling in the empathizer. Stotland, Sherman and Shaver (1971) reflect this in their definition of empathy as "an observer reacting emotionally because he perceives that another is experiencing or about to experience an emotion" (p. 12). Mehrabian and Epstein (1970) believed accuracy of perception had to occur before a person could "feel empathy". Levenson and Ruef (1992) in a study of shared physiological arousal between the empath and the person being empathized with concluded that "without accurate perception of another's feelings, it would be difficult to feel what others feel or to respond compassionately to their

plight (p. 235)". The accurate perception of emotion in the faces of others appears to be an important aspect of empathic relating. In the present study, empathy is operationally defined as the ability to correctly identify the emotion a stimulus person intended to communicate with their facial expressions. Therefore it seems reasonable that the more empathic a person is the more accurate they should be at identifying facial expressions of emotion both categorically and dimensionally.

Early research into the characteristics of accurate predictors led to conflicting descriptions of the accurate empathizer. Daane and Schmidt (1957) reported that high empathic individuals scored higher than low empathic persons on measures of psychoticism and neuroticism on the Minnesota Multiphasic Personality Inventory. One of the leading researchers in the field at the time, Rosalyn Dymond, reached a different conclusion regarding the characteristics of empathic individuals. Dymond (1948) reported empathic individuals were characterized by being more open, flexible, spontaneous and optimistic in their emotionality than non-empathic persons. Empaths were also seen as socially oriented, displaying a great deal of outgoing behavior (Kerr, 1954). Despite the conflicting evidence, the accurate empath was generally perceived as an individual with good social and interpersonal skills.

More recent research into what makes an accurate empath supports the concept of them as people-oriented in their

behavior. People-oriented individuals tend to be friendly and at ease in interpersonal interactions. They view other people positively, enjoy working with them, and are alert to their feelings. Stotland, Matthews, Jr., Sherman, Hansson, and Richardson (1978) stated "one way of characterizing empathetic responding is to see it as an emotional investment in the feelings and problems of other people" (p. 88)". They postulated that this investment required empaths to be people-oriented and that a negative view of others would be incompatible with being empathic. To test this hypothesis Hansson (as cited in Stotland, Matthews, Jr., Sherman, Hansson, and Richardson, 1978) administered the Fantasy Empathy scale and the Philosophies of Human Nature scale (Wrightsman, 1964; 1972) to 62 undergraduate students. The Fantasy Empathy scale measures the subjects ability to imagine themselves in someone else's position. Wrightsman's Philosophies of Human Nature scale consists of six scales: 4 scales measuring Favorable Opinion of others and two scales measuring the complexity of one's perception of others. The results confirmed the hypothesis that high scorers on the Fantasy Empathy scale would view others more positively, than low scorers.

Wymer and Penner (1985) found scores on the Hogan Empathy scale to be associated with congruence of self and peer ratings regarding good social communication skills. Burleson (1983) found that individuals who reported possessing many empathic characteristics were sensitive to

the needs of others and to the comforting strategies needed to support needy others. Wiesenfeld, Whitman, and Malatesta (1984) using many physiological measures, found high empathic individuals to be more emotionally responsive to emotional stimuli from infants and to demonstrate a greater tendency to match their facial expressions than low empathizers. The Mehrabian and Epstein Emotional Tendencies Scale (ETS), a self-report empathy measure, was used to determine high and low empathizers. Empathic accuracy was not measured in their study. Hallenback (1981) states

> Of these characteristics of high-people oriented individuals the ability to put aside one's current mood if it was incompatible with those of another in order to facilitate understanding and the ability to differentiate between emotions and within levels of an emotion (eg. sad refined to disappointment, discouragement or mournfulness) are viewed as essential aspects of empathic relating (p 181).

These results suggest that the degree to which a person is people-oriented may be related to scores on self-report instruments measuring both cognitive and affective empathic dispositions. Whether or not those classified as empathic in these studies were accurate in their relating with others was not measured.

## Vocation and People-Orientation

If the degree of people-orientation influences empathic accuracy then highly people-oriented individuals should be more accurate identifying facial expressions of emotion than those less people-oriented individuals. An individual's choice of occupation can reflect their degree of people-oriented behavior. A tendency to consistently relate empathically to people would be evident in an individual's vocational choice. People who have a strong interest in others tend to choose occupations which reflect these interests. Students who are majoring in the social sciences, psychology and sociology, tend to be highly people-oriented. Hollands (1973) vocationally based personality types theory labels them as "social types" and describes them as people persons, who like using their feelings and helping others, who value interpersonal relationships and demonstrate empathy, perceptiveness and genuineness. Vocations associated with high interests in things and processes, such as medical technology, tend to attract students less people-oriented. Holland's theory calls these students the "investigatory type". These individuals are described as predominantly idea persons who are intellectual, introspective, unconventional and use information to achieve rather than associate with people and therefore may lack social skills. Research on vocational choice support these findings of less empathic relating

among medical technology students (Rovezzi-Carroll & Fitz, 1982). If the degree of people orientation influences empathic accuracy we would expect psychology majors who are high people-oriented to be more accurate at identifying facial expressions of emotion than medical technology students who are low in people-orientation.

## Empathy and Healthy Functioning

Another group of students who tend to be less empathic are those experiencing difficulties in personal and social adjustment. If empathy is positively associated with healthy functioning we would expect students in counseling to be less accurate at identifying emotion than other students. Their affective state and level of stress may interfere with their accurate perception of emotion in others. Their difficulties with adjustment could be related to an inability to predict accurately how other people feel or will feel in future situations. High scores on self-report measures of empathy, the Hogan Empathy Scale (Hogan, 1969) and the Emotional Empathic Tendency Scale (Mehrabian and Epstein, 1972), indicating a tendency to relate empathically have been found to be positively related to perceptual sensitivity (Brewer, 1974), cognitive flexibility (Passons & Olsen, 1969) and negatively related to a need for consistency and order (Bergin & Solomon, 1963). High scores on the Hogan Empathy Scale have also been positively related

to high scores on measures of social acuity (Hogan, 1969) and negatively associated with anxiety and psychopathology (Deardoff, Kendall, Finch & Sitartz, 1977). All of these results indicate that individuals who have personal and social adjustment problems don't describe themselves as responding empathically to others. They may also experience difficulties with empathic accuracy.

Research in the area of facial expressions of emotion and adjustment have found similar results. Schizophrenics have been found to identify emotion from facial behavior at a rate less than chance (Walker, Marwit & Elmory, 1980; Muzakari & Bates, 1977; Dougherty, Bartlett & Izard, 1974). Emotionally disturbed adolescents and adults have been found to be significantly less accurate in decoding emotion from facial expressions than healthy individuals (Forsyth, 1978; Izard, 1971). In each of these studies accuracy was measured in terms of proportion of correct responses. This type of accuracy score does not account for the biases affecting accuracy scores that Cronbach 1955 reported. Although these results indicate that individuals experiencing severe stress tend to experience difficulties accurately interpreting affect communicated by others, it is unknown if the poor accuracy is due to difficulties with particular subjects or with certain types of emotional expressions or both.

These studies have used subjects from inpatient hospitals and outpatient mental health clinics. Are

university counseling center clients different? Kirk (1973) reported that university counseling center clients demonstrated less anxiety and impulsiveness than users of outpatient mental health services. Rheinhold (1973) found counseling center clients to be less depressed and anxious than outpatients at mental health centers. However, when compared to students who do not use university counseling services, users were found to be more psychologically disturbed (Cooke & Kiesler, 1967), more anxious (King, 1968), and more willing to admit to experiencing psychological problems (Reinhold, 1973).

Students involved in therapy in university counseling centers may be less accurate in decoding facial expressions of emotion than students not involved in therapy. Aniskeiwicz (1979) using student scores on the Symptom Checklist-90-Revised found no difference in number or intensity of physical or psychological symptoms between students receiving therapy in a university counseling center or those receiving similar services in a mental health center. No gender differences were found. These results indicate that university counseling center clients may be more similar to mental health center clients than originally thought and may exhibit the impaired accuracy in empathic relating noted of the former. If counseling center clients experience many physical and psychological symptoms, as well as stress, then we would expect their empathic accuracy scores to be lower than students who experience few such

symptoms (psychology and medical technology students in this study).

Although empaths have been consistently reported to be people-oriented, interested in people, there has been no attempt to relate empathic accuracy to different levels of people-orientation or to determine if recent empathy inventories are associated with empathic accuracy using Cronbach's 1955 components. Are people-oriented individuals more empathically accurate than less people-oriented individuals? Is predictive accuracy with female faces better than with male faces? Does mental health influence empathic accuracy? Are self-report measures of empathy associated with empathic accuracy? What personality characteristics are associated with empathic accuracy? This study is an attempt to answer these questions. A unique contribution made by this study is the use of Cronbach's (1955) components to derive differential and stereotype accuracy scores with facial expression data. This methodological feature provides a predictive accuracy score in which bias due to target and emotion effects are eliminated by subtracting them from each of the judges' deviation score.

## Summary

The person perception approach to empathic accuracy encountered serious methodological problems measuring

accuracy. Cronbach's 1955 critique of the commonly used deviation accuracy score resulted in the derivation of four component accuracy scores elevation, differential elevation, stereotype accuracy and differential accuracy. Only differential accuracy is considered empathic accuracy. The person perception approach used personality trait prediction as an accuracy criterion and found it to be unstable. Facial expression research developed a more stable criterion, posed facial expressions, that has been demonstrated to be universally recognizable. Because of its stability, facial expressions of emotion may be a more appropriate criterion for empathic accuracy, especially when we consider the original definition of empathy with it's focus on understanding feelings and emotions. Although recent research results indicates that people-oriented persons and less stressed individuals report themselves being more empathic, the question of the accuracy of their empathic relating has not been addressed. This study attempts to address these questions by investigating the relationship among differential and stereotype accuracy scores of three groups of targets. Differential accuracy represents true accuracy and is the best measure of empathic accuracy. The lower the differential and stereotype accuracy scores the better the accuracy. A secondary interest of this study is the investigation of the efficacy of the Fromme and O'Brien (1982) model of emotions. The hypotheses investigated in this study are:

1. Groups higher in people-orientation will have higher categorical and dimensional differential accuracy scores.
2. Groups higher in people-orientation will have higher categorical and dimensional Stereotype Accuracy scores.
3. Female stimulus faces will be more accurately decoded for emotional content than male stimulus faces.
4. The frequency of errors for each emotion's categorical assignments will show an ordering in which the most errors will occur with adjacent categories of emotions and the least number of errors will occur to bipolar opposite emotional categories.
5. Correlations between the avoidance/approach dimension and the dominant/submissive dimension should be near zero. Correlations between the arousal/relaxed dimension and the pain/pleasure dimension should also be near zero. Moderate correlations are expected among the dimensions that are not considered to be orthogonal in the Fromme and O'Brien circular model of emotion.

In the exploratory portion of this study a hierarchical multiple regression analysis of the data was conducted to determine if personality measures from the NEO Five Factor Inventory and self-report measures of cognitive and affective empathy from the Interpersonal Reactivity Index are related to differential accuracy scores. No specific hypothesis about possible relationships between the specified measures and empathic accuracy scores were developed.

# CHAPTER II

# METHODS

## Subjects

A total of 113 student volunteers (18 male, 95 female) from 2 major universities in the southwest were recruited in three groups: 39 psychology majors from Oklahoma State University, 42 medical technology majors from the University of Texas Medical Branch at Galveston, Texas and 32 student clients in the counseling centers at both univerisities completed experimental procedures. The 18 male subjects (7 psychology, 11 medical technology) were dropped from the study for two reasons. First, the male sample size in each category was too small for analysis in this design. Second, there were no male volunteers from the counseling center. From the remaining 95 female volunteers (32 psychology, 31 medical technology, 32 counseling center) 2 psychology major volunteers and 1 medical technology major volunteer were dropped from the study due to completing facial ratings incorrectly and 2 female counseling center volunteers were dropped for scoring below a T-score of 63 on the Symptom Checklist 90-revised. The final subject pool for the experiment consisted of 90 female volunteers: 30 psychology

majors, 30 medical technology majors, and 30 counseling center clients. The psychology majors ranged in age from 19 years to 35 years (M = 20.56, SD = 1.17). The medical technology students ranged in age from 21 years to 30 years of age (M = 21.46, SD = .88 ) while the students in counseling ranged in age from 19 to 35 years (M = 21.38, SD = 2.76). Psychology and Medical Technology majors were required to have T-scores below 63 on the Symptom Checklist 90-Revised (SCL-90-R) to participate. This score reflected a mild level of symptom distress. The 30 students receiving counseling were required to have a T-score greater than 63 on the SCL-90-R indicating a greater than average level of reported symptomology.

In order to protect rights to privacy, guidelines for recruiting volunteers from the counseling centers prohibited personal solicitation and recruitment efforts were limited to posters describing the experiment and requesting interested individuals to call the experimenter for more information. Psychology and medical technology majors were solicited in class by the experimenter. Students interested in participating simply wrote their name, phone number and the times they would be available to participate. In four weeks all students recruited in class presentations had completed experimental procedures. However, four months were required to obtain 30 counseling student volunteers that met guidelines for participating in this study. The lack of response from male counseling students may indicate

they tend not to read informational materials in the counseling center or they may have a tendency to avoid identification as a counseling client and therefore did not participate in the study. Medical Technology students and students in counseling participated in this research for an opportunity to win a $5.00 gift certificate. Psychology majors received extra credit in their course for their participation.

## Procedures

The study consisted of three phases. The first, an encoding phase in which student volunteers, termed encoders, were videotaped posing different emotional facial expressions. The second phase consisted of 20 drama majors as expert decoders viewing the videotapes and identifying the emotional expressions both categorically and dimensionally. Based on a consensus among expert ratings six volunteers, 3 male and 3 female, were selected as stimuli for the third phase. In the third phase, all subjects in the three groups viewed the videotaped posed expressions and attempted to identify the emotion being expressed and completed questionnaires.

### Phase I: Encoding.

Nine students (5 female, 4 male) from an introductory

psychology class at Oklahoma State University volunteered to pose facial expressions for extra course credit. The students ranged in age from 19 years to 34 years of age ($M$ = 21.5 years, $SD$ = 4.96). The students posing the facial expressions of emotion were videotaped individually in a quiet room. Room contents consisted of a straight back chair situated in front of a blue screen. Eight feet directly in front of and facing the chair was a Sony VHS video camera for recording their facial expressions. Only the volunteer serving as the encoder of the emotion and the researcher were present in the room. The volunteers were allowed to inspect the camera and a short recording of them seated in the chair was completed and shown to them to provide a sample of how they would be videotaped while posing the emotional expressions. Only the head and shoulders of each student was videotaped.

Each of these volunteers, termed encoders of emotion, were presented with 8 randomly sorted short scripts each depicting one of eight emotions: resignation, joy, satisfaction, grief, fear, anger, euphoria, and shock. For example, the script for the emotional enactment of anger was "Your best friend has just revealed to others an intimate secret you confided in her. You are angry with her and are about to confront with her." The remaining scripts can be found in appendix B.

A neutral expression was also recorded to provide the decoders with a base line against which to make their

ratings. Without such a baseline, decoders would be at a strong disadvantage in accurately discriminating which aspects of facial features (eg. wrinkles around eyes and forehead, or curvature of lips and mouth) were part of the encoder's facial structure and which were part of the emotional expression. Encoders were asked to remove hats, earrings and glasses in order to provide the decoders with only facial information about the encoders and to provide an unobstructed view of their facial expression. Student encoders were given the following instructions:

> "I will give you a card on which is a description of an emotional situation. There are eight cards-one for each emotion to be posed. You are to read this description and use it as a way in which to begin to imagine yourself experiencing the emotion named on the card. You may use the wall mirror on your right to practice and make adjustments to your facial expression until you feel you have it right. I will then videotape your posed expression. While posing the expression for the camera you will say "My, oh my" in a manner you think appropriate for the emotion. Your voice may be as loud or as soft as you desire as the sound will not be recorded on tape. You must pay close attention to me to know when to begin and end your posing. Before recording the next emotional expression I will instruct you how to relax your face to remove any remaining stimulation of the last

emotional expression. If you make a mistake or are not satisfied with your posed expression you may try again. Do you understand what you are to do"?

A neutral expression was initially recorded following an abbreviated progressive muscle relaxation exercise to help the students with making the expression. This exercise consisted of deep breathing for thirty seconds while sitting comfortably followed by tensing and relaxing of facial muscles. This relaxation exercise was repeated prior to the start of the mirror practice session for each emotion. Following the recording of the neutral expression the emotional expressions of each encoder were recorded. The order in which each emotion was recorded was randomized for each encoder.

Each encoder's emotional expression was recorded for 6 seconds. Although 6 seconds is longer than the duration of most natural expressions, the extra time was required in order to edit the emotional expressions to approximately 3-4 seconds of on-screen viewing. The first three to four seconds of each emotional expression were used as the stimuli for this study. Videotape editing was completed using a Sony videotape editor VES 120.

Organization of Emotional Expressions.

A total of 72 facial expressions of emotion (8 emotions by 9 encoders) each immediately preceded by a 3 second

neutral expression were edited onto a single videocassette. To allow subjects time to score the expression, twenty-five seconds of blank screen was placed at the end of each emotional expression - between each encoder's emotional expression. This was followed by a five second title screen identifying the next emotional expression (ie. Expression No. 3) which alerted the decoder prior to the start of the next expression and helped them keep their place on the answer sheet. There were 40 seconds of blank screen between each encoders set of eight expressions. Facial expressions were arranged on the tape so that each encoder displayed all eight emotional expressions before the next encoder was viewed. Each encoder displayed each emotion only once.

Phase II: Selection of Stimuli.

Twenty female Drama majors from Oklahoma State University participated as expert decoders of facial expressions. Drama majors were selected as expert decoders due to their great use of facial expression in the theatre. Mimicry of emotional expressions in the theatre requires these students to be alert to subtle differences in facial muscle movements that create rather specific emotional expressions. As a result, they tend to be more deliberate observers of facial expressions and are more aware of differences in facial expressions. Based on this rationale

drama majors were selected as the expert judges in this study. Drama majors ranged in age from 18 to 24 years ($M$ = 20.3 yrs, $SD$ = 1.52 yrs). They were given the following instructions.

> Watch the TV monitor closely as the facial expressions you are about to see will be on the screen for approximately 5 seconds. You will see an initial neutral exression followed by an emotional expression like this (examiner demonstrates a neutral and then an emotional expression). Each person will display eight emotional expressions in this manner before another person's expressions are shown. Following each emotional expression you will have 25 seconds to mark your answers. First you will circle the emotion you believe the facial expression communicates. Then you will circle the number on each of the seven point scales to indicate where along the dimension you believe the emotional expression best fits. You will receive a warning five seconds prior to the start of the next facial expression to be scored. Do not spend too much time on any one answer as first impressions are usually best. The Emotion Definition List on this page provides information about each emotion that will help you make your judgments about which emotions you are seeing on the tape (read through the emotion and dimension list and answer questions). Remember you are to circle an emotion name and circle a number on

each scale for each facial expression. Any questions? Lets' begin.

Expert decoders then viewed 9 neutral and 72 emotional facial expressions and identified each emotional expression both categorically and dimensionally. Answer sheets consisting of a list of the eight emotion labels and four 7 point Likert scales for rating the dimensions of pleasure/pain, dominant-submissive, avoidance/approach, pain-pleasure. A sample answer sheet may be found in appendix C. After viewing each emotional expression each expert decoder circled one of the emotion labels that they judged to be portrayed by the encoder. They then rated the facial expressions on each of the seven point Likert scales from 1 (dominant/unpleasant/avoid/painful) to 7 (passive/pleasant/approach/pleasure). Based on the percentage of correct identifications by the expert judges, 6 encoders (3 female, 3 male) were chosen as stimuli for the study.

An encoder was determined to validly represent the designated emotions if at least 65 percent of the Theatre majors agreed on the emotion expressed. Ekman, Friesen, and Ellsworth (1982) reported that a particular facial expression is likely to be a blend of two emotions when the distribution of responses approaches a 60% to 40% split between two different emotions. They also reported that when the distribution of responses to a facial expression is approximately an 80% to 20% split between two emotions the

smaller percentage can represent a group with "uncommon shared confusions" about labeling emotions. The definition of emotion list discussed with each decoder was presented to decoders in an attempt to eliminate confusions in labeling emotions. Based on the percentage of correct identifications for each emotion, the six decoders who displayed the most number of emotional expressions receiving at least 65 percent aggreement were selected for use in this study. Table 1 presents the percentage of agreement among the 20 expert judges for each emotional enacment by each of the nine encoders. Expert judges displayed less than 60% aggreement on more than half of the emotional enactments by encoders numbered 3, 7 and 8. Therefore, these three encoders were dropped from the study. In Table 2 the overall percentage of agreement among expert judges for the six encoders chosen as stimuli for this study can be seen to meet or exceed the 65% agreement criterion chosen for inclusion in the study. Table 2 also presents the overall percentage of agreement for the three encoders dropped from this study. The highest agreement among expert judges for these three encoders is only 58% for the emotion of elation. A total of 48 emotional expressions (8 emotions by 6 encoders) were selected for use in this research. The six selected encoders were randomly edited onto a single videocassette using the same organizational framework described above.

Phase III: Obtaining Accuracy Data.

In this phase of the experiment the three groups of 30 female subjects each viewed the selected stimuli and judged each emotional facial expression in the exact same manner as the expert witnesses in phase II of this experiment. Decoder subjects, in groups ranging in size from 2 to 8 viewed the 48 selected silent emotional expressions on a 19 inch Panasonic television set. Decoders sat at desks approximately 6 feet from the television screen. On each scoring sheet the names of the eight emotions from the Fromme and O'Brien (1982) circumplex model of emotions were listed in a randomized order. A second page defining each emotion and dimension (See Appendix D) was provided to each decoder to assist them in using the emotional labeling correctly. Half of the subjects in each group completed the questionnaires first and half viewed the videotape first.

Categorical Scoring

Fromme and O'Brien's (1982) circumplex model of emotions was used to score the decoders' responses to each facial expresssion. This model is presented in Figure 3 along with an example of the scoring procedure for fictional data for the emotion of joy. This model allows the scoring of the degree of error of the subject's judgment about the emotion the encoder intended to convey. An exact match

Insert Figure 3 about here

between judgment and the intended emotion of joy received a deviation score of zero (no deviation from the intended emotion). The extent to which the decoder's judgment deviated from the correct answer can be determined from looking at the model displayed in Figure 3. For example, if the emotion displayed was joy and the decoder's judgment was elation or satisfaction they received a deviation score of one. In a similar fashion, a decoder's judgment of the encoder's joy expression as anger or resignation resulted in a deviation score of two. The decoder's deviation scores could range from zero to four with four representing assignment to the bipolar opposite of the criterion - the worst accuracy. Therefore, a low deviation score indicated low error in judgment of emotional expression. The judgments of facial expressions becomes more inaccurate as these deviation scores increase. The deviation scores were then transformed into stereotype accuracy and differential accuracy scores using the Cronbach (1955) method discussed above and detailed in Appendix A.

Dimensional Scoring

The subjects scored each of the 48 emotional expressions along the four dimensions of dominance/submissiveness, approach/avoid, pleasure-pain, and arousal/relaxed that make up the structure of the Fromme and O'Brien (1982) circumplex model of emotions. Each dimension was scored on a 7 point Likert scale: 1 (dominance) to 7 (submissive), 1 (pain) to 7 (pleasure), 1 (arousing) to 7 (relaxed), 1 (avoid) to 7 (approach). Dimensional accuracy scores are based on deviations of decoder ratings from the criterion established for each dimension on each emotion using the Fromme and O'Brien model displayed in Figure 2. As with categorical scoring, the larger the deviation from the dimensional criterion the lower the dimensional accuracy. Recall that in the Fromme and O'Brien model each emotion consists of a combination of the dimensions adjacent to it. For example, elation consists primarily of feelings of dominance and pleasure with arousal and approach playing a secondary role in the emotion. An accurate rating of the dimensions for the emotional enactment of elation should reflect this ordering. That is, elation enactments should be rated more dominant than submissive, more pleasureable than painful, more aroused than relaxed and more approachable than avoiding. Decoder dimensional ratings for elation that indicate avoidance, pain, submissivenss, and relaxation reflect inaccuracy as they represent the polar

opposites of each of the dimensions the model predicts for elation. Each emotional enactment would have a different ordering of dimensions. For enactments of joy the primary dimensions are pleasure and approach and the secondary dimensions are dominance and relaxation. Accurate dimensional decoding of joy should then reflect this ordering.

A four point deviation scoring procedure for dimensional ratings was assigned to each dimension rating scale to reflect the ordering of dimensions discussed above. The encoder's ratings on each dimension were then transposed to a deviation from criterion score using the four point deviation scale. For example, one primaray scale for the elation enactment extends from 1 (dominant) to 7 (submissive). With the four point deviation scoring procedure a decoder's dominance/submissive scale rating of 1 or 2 was assigned a deviation score of zero indicating high accuracy in rating this dimension with regards to elation. An encoder's rating of 5 on this scale was then assigned a deviation score of 1, a scale rating of 4 was assigned 2 deviations from criterion, etc. The largest possible deviation from criterion score of 4 was assigned to scale ratings of 6 and 7 which indicate relaxation, the polar opposite of aroused.

The deviation scale for scoring the secondary dimension of arousal/relaxed for the elation enactment was similarily structured. The arousal/relaxed dimension scale ranges from

1 (aroused) to 7 (relaxed). The Fromme and O'Brien model predicts that arousal is a part of elation but is secondary in importance to dominance and pleasure. This means that decoders should rate elation enactments as more dominant and pleasureable than aroused. Therefore, the criterion for accuracy on the aroused/relaxed dimension was assigned to the scale rating of 3. This scale score reflects the moderate amount of arousal the model predicts is present in the elation enactment. The scale score of 3 therefore received a deviation score of zero indicating high accuracy in rating arousal in elation enactments. Likert scale ratings of 2 and 4 were assigned a deviation score of 1, ratings of 1 and 4 were assigned a deviation score of 2, etc. The largest deviation score of 4 was assigned to a rating of 7 indicating the polar opposite of aroused. The deviation scores for each emotional enactment were obtained in this manner and transformed into stereotype accuracy and differential accuracy scores using the Cronbach (1955) process outlined in Appendix A.

## Measures

Symptom Checklist 90 - Revised (SCL-90-R). The SCL-90-R is a 90 item self-report symptom inventory designed to provide scores on the nine primary symptom dimensions of Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety

Paranoid Ideation, and Psychoticism. Three summary scores are provided as a measure of the general level of psychological distress experienced by the respondent within the last week: Positive Symptom Distress Index (PSDI), Positive Symptom Total (PST), and Global Severity Index (GSI). The GSI score was used to screen volunteers for participation as it is the best single measure of the individual's current psychological distress level. Following guidelines established by Derogatis (1994), a T-score of 63 was established as a criterion for participation. T-scores greater than 63 reflect a higher than average level of distress. Counseling Center Clients were required to obtain a T-score greater than 63 to participate and all other volunteers were required to obtain a T-score less than 63.

The NEO Five Factor Inventory (NEO-FFI). The NEO-FFI is a 60 item self-report personality inventory. It consists of five 12-item scales that measure the following five personality factors:

Neuroticism (N) - High scores reflect maladjustment and the tendency to experience negative affects. Low scorers are seen as emotionally stable.

Extraversion (E) - High scorers are described as assertive, active and optimistic. Low scorers are viewed as reserved, independent and evenpaced.

Openness (O) - High scorers are seen as having an active imagination, attentiveness to inner feelings, and to

experience emotions more keenly than low scorers. Low scorers are conventional in behavior and conservative in outlook.

Agreeableness (A) - High scorers are altruistic and believe that others will also be helpful. Low scorers are egocentric, skeptical and competitive.

Conscientiousness (C) - High scorers are seen as displaying self-control, organizing and carrying out tasks. Low scorers are lackadaisical in work and hedonistic (Costa & McRae, 1992).

Subjects are asked to rate the extent to which each inventory item reflects their opinion of themselves on a scale from Strongly Disagree (0) to Strongly Agree (4). Raw scores may range from 0 to 48 and can be transformed to T-scores for norm comparisons.

Interpersonal Reactivity Index (IRI). The IRI is a 28 item self-report empathy inventory consisting of four subscales measuring the following four aspects of empathy:

Perspective Taking (PT) - 7 items measuring the tendency to spontaneously adopt the psychological point of view of others.

Fantasy Scale (FS) - 7 items measuring the tendency to imaginatively put oneself into the feelings of fictious characters in movies and books.

Empathic Concern (EC) - 7 items measuring other-oriented feelings of warmth, sympathy and concern for unfortunate others.

Personal Distress (PD) - 7 items measuring self-oriented feelings of personal anxiety and unease in tense interpersonal situations.
Subjects are to indicate how well each item describes them on a scale from "Does not describe me well" (0) to "Describes me very well" (4). Raw scores may range from 0 to 28 on each scale (Davis, 1984).

## Design

The dependent variables in this study are the differential accuracy and stereotype accuracy scores of female student judges. There are two independent variables: Groups (high & low people-orientation, mental health) and stimulus gender (male, female). High and low people-orientation groups consisted of 30 psychology majors and 30 medical technology majors respecitively. The mental health group consisted of 30 counseling center clients. The stimulus gender variable is the gender of the face being decoded by the three groups.

In this study, a repeated measures design is used with the three groups identifying videotaped male and female posed emotional facial expressions. A 2 (gender) X 3 (people-orientation) X 8 (emotional enactment) Doubly Multivariate Repeated Measures MANOVA analysis with repeated measures on the first and third variable was performed on 10 dependent variables: differential accuracy and stereotype

accuracy for categorical ratings, dominance-submissiveness ratings, arousal-relaxed ratings, avoidance-approach ratings and pain-pleasure ratings. In the exploratory part of this study the differential and stereotype accuracy scores were dependent variables in a hierarchical multiple regression analyses. The set of nine predictor variables were the five scores from the NEO Five Factor Inventory and the four scores from the Interpersonal Reactivity Index.

# CHAPTER III

## RESULTS

There are four types of data used in this analysis: Categorical and dimensional differential accuracy scores for male and female facial expressions, categorical and dimensional stereotype accuracy scores with male and female facial expressions, judge's NEO Five factor personality scores, and the judge's IRI empathy scores.

### Participant Characteristics

Table 3 presents the means and standard deviations for the IRI empathy scale and NEO-FFI personality scale scores for the three groups. A 3 (groups) x 4 (NEO-FFI subscales) ANOVA with repeated measures on the second variable indicate that differences in NEO-FFI subscales are due to group membership, $F$ (8, 384) = 12.19, $p < .001$. A Tukey HSD analysis of the means for this interaction presented in

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Insert Table 3 about here.

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Table 3 indicate that the low people-oriented group scored higher than the high people-oriented group on the neuroticism and extraversion scales of the NEO-FFI. This higher scores on both neuroticism and extraversion indicates that the low people-oriented judges are more emotional than high people-oriented judges as they tend to experience more negative and positive emotions. Results in Table 3 also reveal that the mental health group judges experience more negative emotions than high people-oriented judges indicating they tend to be less stable than the high people-oriented group as predicted. However, the mental health group was not found to be less stable than the low people-oriented group. The mental health group judges also report being more open or receptive to their own inner feelings and emotions and to experiencing their emotions more deeply than the low people-oriented judges.

A 3 (groups) x 4 (IRI empathy scales) ANOVA analysis with repeated measures on the second variable reveals a significant main effect result for IRI empathy subscale scores, $F$ (3, 261) = 19.49, $p < .001$. No other significant ANOVA results were found. A Tukey HSD analysis of the four empathy subscale means reveal that judges scored higher on the empathic concern scale ($M$ = 21.17) than on the remaining three scales indicating all judges reported themselves as selflessly concerned with others feelings. The personal distress scale ($M$ = 11.01) was significantly lower than all the other subscales confirming Davis' (1983)

assumption that low personal distress is associated with higher empathic concern scores. The perspective-taking mean ($M$ = 18.87) and the fantasy scale mean ($M$ = 18.77) did not differ significantly but both were significantly larger than the personal distress scale mean. Subjects in the three groups did not differ in age.

## How Accurate Are the Judges?

Each judge in the three groups received a differential and a stereotype accuracy score on each of the eight emotions for categorical and dimensional judgments. To determine how accurate the judges are, their differential and stereotype accuracy scores were compared to differential and stereotype accuracy scores that they would receive if they responded randomly to each target's emotional enactments. Random responding is defined as a response pattern in which each possible response has an equal chance of occurring. In terms of this study, random responding indicates that each of the possible five responses to the emotional enactment has an equal chance of occurring with each of the six targets. As possible responses to each of the six targets range from 0 (perfect accuracy) to 4 (perfect inaccuracy) each score would be expected to occur six times over the six targets. The average deviation response expected to occur randomly to each emotional enactment is a deviation of 2 from perfect accuracy. Random

differential and stereotype accuracy scores were generated by having six deviation scores, one for each target, randomly selected for each emotional enactment. The one requirement for the generation of the random deviation scores is that their average across the six targets should equal two. When Cronbach's (1955) component accuracy procedure was applied to the 48 (6 targets x 8 emotions) randomly generated deviation scores a mean differential accuracy score of 2.18 (SD = .60) and a mean stereotype accuracy of .08 (SD = .02) were obtained.

The 95 percent confidence interval for differential accuracy scores is 1.196 to 3.167, and for stereotype accuracy scores is .0471 to .1129. As lower means represent higher accuracy in this study, those differential and stereotype accuracy scores that do not exceed the respective lower limits of the confidence intervals reported above are considered to be significantly different from chance at $p < .05$. Based on these criteria, the stereotype accuracy means for the three experimental groups with categorical and dimensional judgments were found not to differ significantly from stereotype accuracy obtained by chance. As a result, only differential accuracy scores for categorical and dimensional judgments were analyzed. Mean stereotype accuracy scores for the categorical and dimensional judgments are presented in Appendixes E through I.

## Categorical Accuracy

### The Effect of People-Orientation and Mental Health on Empathic Accuracy.

The mean differential accuracy scores for categorical judgments of emotions are presented in Table 4. A 2 (stimulus gender) x 3 (groups) x 8 (emotional enactments) ANOVA with repeated measures on the first and third variables was performed on the judges' differential accuracy scores to determine if the three groups differed as

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Insert Table 4 about here

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hypothesized. Repeated measures ANOVA results for differential accuracy (Table 5) revealed nonsignificant differences between groups for differential accuracy disconfirming the hypothesis that groups would be ordered high people-oriented, low people-oriented, and mental health group in terms of descending accuracy. The differential accuracy means for the high people-oriented group ($M$ = .360, $SD$ = .48), low people-oriented group ($M$ = .475, $SD$ = .45), and the mental health group ($M$ = .475, $SD$ =

Insert Table 5 about here.

1.35) were ordered as predicted but did not significantly differ. These results mean that differences in people-orientation and mental health do not affect a judge's ability to categorically identify different emotional enactments in each target (empathic accuracy). However, the results in Table 5 indicate that categorical differential accuracy scores are influenced by the combination of the gender of the face and the particular emotion being viewed, $F$ (7, 609) =10.52, $p$ = .01. This result is due mostly to the judges' ability to identify the emotions of elation and anger.

The Effect of Stimulus Gender on Differential Accuracy with Categorical Judgments.

The means for the Stimulus Gender X Emotional Enactment interaction for the differential and stereotype accuracy scores displayed in Table 6 reveal that female facial expressions of emotion are not uniformly more accurately identified than male facial expressions. In Table 6 lower means represent higher accuracy. The largest differences in differential accuracy due to stimulus gender occurs to

emotional expressions of elation and anger. Tukey Honestly

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Insert Table 6 about here.

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Significant Difference (HSD) test results for the differential accuracy means reveal that only for the emotion of elation are judges more differentially accurate with

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Insert Table 7 about here.

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female faces as hypothesized. Male facial expressions of anger are significantly more accurately identified than female anger expressions. The large mean for female enactments of anger is significantly larger than all other emotional enactment means except male enactments of fear (Table 7). With male faces, the judges were most accurate identifying anger and least accurate identifying elation. With female faces the relationship between anger and elation were reversed.

A Tukey HSD analysis of the means in Table 7 indicate that the judges' empathic accuracy with female anger is

significantly worse than all other emotional expressions except those of fear. For male expressions the judges differential accuracy was significantly better with joy, anger, and satisfaction than with fear. The arrangement of emotions for differential accuracy in Table 7 indicate that the judges' empathic accuracy is best with male joy and anger and female elation and joy.

Summary.

Repeated measures ANOVA results indicate that differential accuracy scores with categorical judgments are not influenced by people-orientation, mental health. Gender of the stimulus face being viewed has a strong effect on the judges' differential accuracy scores only with emotional enactments of elation and anger. Most notably, female judges had the greatest difficulty identifying female enactments of anger. They were significantly better at identifying elation in female enactments. Overall, the results do not support the hypothesized ordering of groups in terms of differential accuracy. Differential Accuracy is a measure of predictive empathy. These results indicate that empathic accuracy is not influenced by people-orientation and mental health. Judges tend to be most empathic with female expressions of elation and male expressions of anger. Judges are least empathic with female expressions of anger and male expressions elation.

## Dimensional Accuracy

### People-Orientation, Mental Health and Dimensional Judgments of Emotions.

The means and standard deviations for differential accuracy for the behavioral dimensions of dominant/submission and avoidance/approach are presented in Appendixes J and K respectively. The means and standard deviations for differential accuracy scores for the physiological dimensions of aroused/relaxed and pain/pleasure are presented in Appendixes L and M respectively. A 2 (stimulus gender) x 3 (group) x 8 (emotional enactments) Doubly Multivariate Repeated Measures

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Insert Table 8 about here.

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MANOVA analyses of these data indicate that it is the interactions among the variables in this study that best explain differences in the judges' differential accuracy scores on the four dimensions (Table 8). MANOVA results indicate a significant main effect for groups. However, follow-up repeated measures ANOVA results indicate that the groups did not vary as predicted. Repeated measures ANOVA

summary table results for differential accuracy (Table 9)

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Insert Table 9 about here.

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indicate that the judges ability to identify dominance/submission in each emotional enactment in each target (differential accuracy) are not affected by group membership. A Tukey HSD analysis of the group means for differential accuracy on each dimension indicate that the hypothesis that the groups would be ordered from high-people oriented, low people-oriented, to mental health group, in terms of decreasing accuracy, is not confirmed (Table 10). The low people-oriented group was more differentially

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Insert Table 10 about here.

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accurate than the other two groups at identifying arousal/relaxation in facial expressions. The high people-oriented group was more accurate than the other two groups at identifying avoidance/approach in facial expressions. Both the high people-oriented and the low

people-oriented groups were significantly better than the mental health group at identifying pain/pleasure in facial expressions. No significant group or group interactions were found for differential accuracy scores on the dominant/submission dimension. The follow-up repeated measures ANOVA results for each of the three remaining dimensions are presented below.

The Arousal/Relaxation Dimension - Repeated measures ANOVA results (Table 9) indicate that the ability to accurately identify aroused/relaxation in each emotional enactment in each target is influenced by group membership, $F(2,87) = 4.49$, $p < .01$. For differential accuracy, the low people-oriented group is more accurate than the other two groups at identifying arousal/relaxation (Table 10). This result indicates that the absence of significant psychological stress and a low interest in people enhances the ability to identify arousal and relaxation in each facial expression of each target.

The Avoidance/Approach Dimension - Repeated measures ANOVA results for differential accuracy (Table 9) reveal that the judges' ability to identify avoidance/approach in each emotional enactment in each target is influenced by the combination of group membership and the particular emotional enactment being viewed, $F$ (14, 609) = 1.91, $p < .05$. The Group x Emotional Enactment interaction means for differential and stereotype accuracy are presented in Table 11. A Tukey HSD analysis of the differential accuracy means

Insert Table 11 about here.

in this table indicate only one significant difference - the high people-oriented group is more differentially accurate than the mental health group at identifying avoidance/approach in expressions of satisfaction. As satisfaction is associated with the approach pole of this dimension (see Figure 2) this result suggests that the absence of psychological distress in highly people-oriented individuals enhances their ability to accurately identify approach in facial expressions of satisfaction. The emotions primarily associated with the avoid/approach dimension-joy, satisfaction, fear and shock-should be identified more accurately than the remaining four emotions. There are no significant differences between differential accuracy means within each group indicating that none of the groups were more differentially accurate with the four emotions primarily associated with this dimension.

The Pain/Pleasure Dimension - Repeated measures ANOVA results for differential accuracy (Table 9) reveal that the judges' ability to identify pain/pleasure in each emotional enactment in each target is influenced by the combination of group membership and the particular emotional enactment being viewed, $F$ (14, 609) = 5.91, $p < .001$. The Group x

Emotional Enactment interaction differential accuracy means for this dimension are presented in order of decreasing accuracy in Table 12. Differential accuracy scores on each emotion did not differ significantly across groups.

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Insert Table 12 about here.

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The pleasure pole of this dimension is primarily associated with the emotions of elation and joy. The pain pole is primarily associated with the emotions of shock and grief (see Figure 2). The pain/pleasure dimension should be most accurately identified in these four emotions. Table 12 presents the Group X Emotional Enactment interaction means in decreasing order of accuracy within each group. As can be seen in Table 12 all three groups are most accurate at identifying pleasure in elation and joy. However, a Tukey HSD analysis of the means within each group indicate that only the high people-oriented group is significantly better identifying pleasure than pain (Table 12).

Stimulus Gender and Dimensional Judgments of Emotion

The hypothesis that judges would be better at identifying the four dimensions in female facial expressions

of emotion than in male expressions is disconfirmed by doubly multivariate repeated measures MANOVA findings of a nonsignificant stimulus gender main effect with differential accuracy (Table 8). MANOVA summary table results presented in Table 8 indicate significant Gender x Emotional Enactment and Gender x Group interactions for differential accuracy. Follow-up repeated measures ANOVAs were completed on differential accuracy scores to determine on which dimensions the stimulus gender interactions proved to be significant. Follow-up ANOVA results reveal that gender was not a significant influence on differential accuracy scores on the avoidance/approach dimension (Table 9). Significant repeated measures ANOVA results for each dimension are discussed below.

The Dominance/Submission Dimension - Repeated measures ANOVA results indicate that the ability to accurately identify dominance/submission in each emotional enactment in each target is influenced by the combination of stimulus gender and the emotional enactment being viewed, $\underline{F}$ (7, 609) = 15.59, $\underline{p}$ = .001. The means for the Stimulus Gender x Emotional Enactment interaction are presented in Table 13. A Tukey HSD analysis of these means reveals that judges are more differentially accurate identifying dominance/submission in female enactments of elation and male enactments of anger (Table 13). Elation and anger are the primary emotions associated with dominance while

Insert Table 13 about here.

resignation and grief are associated with the submission pole of this dimension. Resignation and grief have relatively large means indicating judges are less accurate identifying submission regardless of gender of the face being viewed. The emotion in which dominance is most accurately identified is male anger, and it is most inaccurately identified in female enactments of anger. The large difference between these two means indicates that female judges view male anger as a more dominant response than female anger. They also view female elation as a more dominant response than male anger.

The Aroused/Relaxed Dimension - Follow-up repeated measures ANOVA results indicate that the ability to accurately recognized aroused/relaxation in each emotional enactment in each target is influenced by the combination of stimulus gender and emotional enactment, $F$ (7, 609) = 4.03, $p < .001$. The judges are more differentially accurate at recognizing arousal in male enactments of anger (Table 14). All other differences between gender means for the same emotion in Table 14 are not significant. This result indicates that female judges see more arousal in male anger expressions than in female anger expressions. Table 15

Insert Table 14 about here.

presents the means for the Stimulus Gender x Emotional Enactment interaction in order of decreasing accuracy. Lower means represent higher accuracy. Because

Insert Table 15 about here.

anger and fear are the emotions primarily associated with arousal while satisfaction and resignation are the emotions primarily associated with the opposite pole of relaxation, the judges should be most accurate at identifying arousal and relaxation in these four emotional enactments (see Figure 2). However, the data presented in Table 15 reveals that relaxation is poorly recognized in both gender's facial expressions. Data in Table 15 also indicates that judges exhibit the most difficulty identifying aroused/relaxed in female enactments as differential accuracy means for all four of the emotions primarily associated with the dimension are among the five largest means for female enactments

The Pain/Pleasure Dimension - Follow-up repeated

measures ANOVA summary table for differential accuracy scores on this dimension reveals a significant Group x Stimulus Gender and Stimulus Gender x Emotional Enactment interactions, $F$ (2, 87) = 3.65 and 1.91, respectively, $p < .05$. The Group x Stimulus Gender interaction is impressive because the three groups are very similar. The mental health group's mean differential accuracy scores with male faces ($M$ = .419) and female faces ($M$ = .396) were significantly greater than high people-oriented group's means with male faces ($M$ = .261) but not greater than their mean with female faces ($M$ = .362). For the low people-oriented group, the mean differential accuracy score with male faces ($M$ = .341) was not significantly better than the mental health group mean scores. However, the low people-oriented group was better at identifying pain/pleasure with female faces ($M$ = .294) than the mental health group with male faces. The differences among the groups on this dimension are due to the high people-oriented group being better with male faces and the low people-oriented group being better with female faces. A Tukey analysis of the Stimulus Gender x Emotional Enactment means presented in Table 16 reveals that judges are more accurate identifying pain/pleasure in female expressions of satisfaction. However, differential accuracy for the other seven emotions is not significantly affected by gender of the face being viewed. Stimulus gender does not influence the ability to identify pain/pleasure in each

Insert Table 16 about here.

emotional enactment in each target as predicted. In Table 17, the emotions are ordered from most to least accurate.

Insert Table 17 about here.

Lower means represent higher accuracy. Elation and joy are the emotions primarily associated with pleasure while shock and grief are primarily associated with the pain pole of this dimension. Judges should be most accurate with these four emotions. Data in Table 17 confirm that joy and elation are the emotions in which judges most accurately identify pleasure. Pain is less well recognized in shock and grief in the faces of both genders.

Summary of Dimensional Results.

People-orientation and mental health do not have a strong consistent influence on the judges' differential accuracy scores on any of the four dimensions. Female

targets have been found to be more accurately decoded in prior research. However, the present results indicate that when both the judge's ability to generally recognize specific emotions and the target's ability to express the emotions are removed, the gender of the face being viewed has minimal impact on differential accuracy. As differential accuracy is a measure of empathic accuracy, the current results do not support the major hypotheses of this study.

## Efficacy of the Fromme and O'Brien Circular Model of Emotions

The Fromme and O'Brien model predicts that categorical scoring errors are not random. A Jonckheere Test for Ordered Alternatives (Hollander, 1973; Siegel & Castellan, Jr., 1988)) for the predicted ordering of frequency of errors over all emotions confirmed the hypothesized error pattern predicted by the model, $J = 23.8945$, $p < .01$. The Jonckheere test results for each emotion is presented in Table 18. These results confirm that the pattern of error

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Insert Table 18 about here.

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assignment predicted by the model holds for each emotion providing support for the efficacy of the model with categorical judgments.

The hypothesis regarding the predicted relationships among the dimensions in the model was also confirmed by the data. Table 19 presents the intercorrelations among the differential accuracy scores for the three groups' judgments on the four dimensions. Some of the lowest correlations

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Insert Table 19 about here.

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occur between dimensions presented as orthogonal in the Fromme & O'Brien circular model. All three groups display near zero correlations between the orthogonal dimensions of aroused/relaxed and pain/pleasure as well as between the orthogonal dimensions of dominant/submissive and avoid/approach.

The model also predicts that a moderate association should exist between pain/pleasure and the two behavioral dimensions. A lower correlation is expected between arousal/relaxed and the two behavioral dimensions. However, the high people-oriented group and the mental health group display correlations near zero between avoidance/approach and the aroused/relaxed dimensions disconfirming the

expected moderate association. The hedonistic arousal dimension of pain/pleasure demonstrated the predicted moderate association with the behavioral dimension of dominance/submission in the high people-oriented and low people-oriented groups. However, the high people-oriented groups' differential accuracy with dominance/submission is more associated with hedonistic arousal ($r$ = .38) while the low people-oriented groups' differential accuracy is more associated with physiological arousal ($r$ = .44).

## Hierarchical Multiple Regression Analysis Predicting Differential and Stereotype Accuracy

This part of the research is exploratory and no hypotheses were developed to be tested in the regression analyses of personality and self-report empathy scores on differential accuracy scores. The objective of the regression analysis was to determine if certain personality characteristics and self-report measures of empathy were related to differential accuracy (empathic accuracy). There are 12 independent variables from three sets of variables used in the regression analysis: five from the NEO-FFI personality inventory, the three group memberships, and the four scores from the IRI self-report empathy scale. A substantial correlation among these independent variables was found necessitating the use of a hierarchical regression analysis (See Appendices N through R).

One way of dealing with the difficulties of multicollinearity that still allows the investigation of each independent variable is to develop a hierarchical sequencing of the independent variables based on a causal priority which will reduce spurious relationships among the variables. Independent variables are ordered in such a way that each preceding variable has a causal effect on the variables following it in the regression equation. Variables entering into the equation later should have no causal effect on variables entering earlier. The advantage of this type of analysis is that the contribution of each independent variable to the total variance due to regression may be analyzed. The hierarchical regression therefore involves the analysis of squared semipartial correlations (Cohen and Cohen, 1983).

The twelve independent variables were entered into the hierarchical regression in the following order: Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness, high people-oriented group membership, low people-oriented group membership, mental health group membership, Personal Distress, Fantasy Scale, Perspective Taking, and Empathic Concern. The rationale for this ordering is that personality variables are seen as influences on both group membership and empathic behavior. Although both group membership and empathic behavior may have reciprocal effects on personality, it seems reasonable to assume that personality variables occur first temporally. The four IRI

empathy scale scores are entered last. It is assumed here that groups exert a great influence on the interpersonal behavior of its members and therefore influence their empathic behavior.

The sequencing of the IRI scales reflects Davis' (1983) analysis of the scales. The presence of personal distress in an individual tends to reduce their perspective taking behavior. Personal distress may also reduce fantasy behavior and empathic concern because it tends to increase a self-centered rather than an other-centered concern that is more typical of empathic relating. Fantasy appears to be more positively related to empathic concern than perspective taking. Placing fantasy in the regression equation prior to empathic concern and perspective taking controls for its differential influence on the scales which are viewed as the primary components of empathy. Perspective- Taking is a cognitive component and Empathic Concern an affective component of empathy. Although positively correlated, Perspective Taking and Empathic Concern appear to be complimentary aspects of empathic behavior rather than causally related (Davis, 1983). Perspective Taking was entered into the regression equation prior to Empathic Concern with this relationship in mind. The NEO-FFI factors were entered in the order of development by the authors. There are no causal relationships among the groups. Groups were simply entered in the order of their purported level of accuracy: high people-oriented, low people-oriented, mental

health. Hierarchical regression analyses were completed on categorical and dimensional judgments separately. Within these two types of judgments the hierarchical multiple regression analyses were completed separately on male and female enactments on differential accuracy scores. The results of the hierarchical multiple regression analysis predicting differential accuracy with male and female faces for categorical judgments are reported in Table 20. Regression results for differential accuracy for judgments on the four dimensions are reported in Table 21.

Personality Predictors of Differential Accuracy with Categorical Judgments.

Table 20 presents the squared semipartial and squared partial correlations for the independent variables that account for significant variation in differential accuracy

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Insert Table 20 about here.

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with categorical judgments. These results reveal that for decoding male enactments, membership in the high people-oriented group accounts uniquely for about 14% of the dependent variable variance, but 17% of the dependent

variable variance not accounted for by all the other independent variables. The sign associated with the standardized Beta value is positive indicating that judges that are interested in people and enjoy working with others tend to be able to accurately identify each emotion in each of the male targets facial expression.

For categorical decoding of female enactments three of the independent variables were found to account for significant variance: neuroticism, personal distress, and extraversion. Personal distress accounts for about 9% of the unique variance in differential accuracy with female enactments and about 11% of the variance not accounted for by the other independent variables. Only neuroticism with 7% of the unique variance and 10% of the variance not accounted for by all other independent variables comes close to being as important to decoding female enactments. The signs of the standardized Beta weights for the three variables indicate that the greater ability to identify each emotion in each facial expression of female targets is associated with a tendency to be very sensitive to negative affect (positive Beta weight for neuroticism) but not overwhelmed by or incapacitated by these emotions (negative Beta weight for personal distress). They tend to be more independent, reserved and formal in their interpersonal interactions (negative Beta weight for extraversion).

Personality Predictors of Differential Accuracy with Dimensional Judgments.

Dominance/Submission Dimension and Differential Accuracy Predictors - Results of the hierarchical multiple regression analysis with differential accuracy scores for dominant/submission are presented in Table 21. These results reveal that for decoding male enactments, Fantasy accounts uniquely for about 6% of the differential accuracy variance with male faces and 7% of variance not accounted for by all the other independent variables. The sign of the

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Insert Table 21 about here.

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standardized Beta weight for Fantasy is negative indicating that judges who are more empathically accurate at identifying dominance/submission in each facial expression of each target tends to be practical, objective and tend not imagine themselves in the place of fictional others. No independent variables accounted for significant variance with female enactments on this dimension.

Avoid/Approach Dimension and Differential Accuracy Predictors - No independent variables accounted for significant variance in differential accuracy with male enactments on this dimension. However, for female

enactments the hierarchical multiple regression analysis results in Table 21 indicate that only perspective-taking accounts for significant variance in differential accuracy scores with avoid/approach dimensional judgments. Perspective-taking accounts uniquely for about 6% of the variance in these differential accuracy scores and for about 7% of the variance not accounted for by all the other independent variables. The sign for the standardized Beta weight for perspective taking is positive indicating that judges who are differentially accurate identifying avoid/approach in female emotional enactments tend to be socially competent, possess high self-esteem, and are selfless in their concern for the feelings of others.

Arousal/Relaxed Dimension and Differential Accuracy Predictors - The results of Table 21 reveal that both Extraversion and high people-orientation account for significant variance in differential accuracy scores with judgments of arousal/relaxation in male enactments. High people-orientation accounts uniquely for 10% of the variance in these differential accuracy scores but 13% of the variance not accounted for by all the other independent variables. Extraversion accounts for uniquely only 5% of the variance in these differential accuracy scores and 8% of the variance not accounted for by all the other independent variables. The signs for the standardized Beta weights for both of these independent variables are positive indicating that judges who display high differential accuracy with the

arousal/relaxed dimension tend to be warm, friendly individuals who are interested in and enjoy working with people. No independent variables accounted for significant variance with female enactments on this dimension.

Pain/Pleasure Dimension and Differential Accuracy Predictors - The hierarchical multiple regression analysis results in Table 21 indicate that only Neuroticism accounts for a significant amount of variance for differential accuracy scores with pain/pleasure dimensional judgments. Neuroticism accounts uniquely for 16% of the differential accuracy variance on this dimension and almost 20% of the variance not accounted for by all the other independent variables. The sign associated with the standardized Beta weight for Neuroticism is negative indicating that judges who display high empathic accuracy with pain/pleasure tend to be emotionally stable, self-confident, and other-centered.

The data in Table 21 reveals that only low people-orientation accounts for significant variance in differential accuracy with pain/pleasure with female enactments. Low people-orientation accounts uniquely for about 6% of the pain/pleasure variance with female enactments and about 8% of the variance not accounted for by all the other independent variables. The sign associated with the standardized Beta weight for low people-orientation is negative indicating that membership this group reduces differential accuracy with female enactments of

pain/pleasure. No independent variables accounted for significant variance with enactments of either gender on the avoid/approach dimension.

# CHAPTER IV

# DISCUSSION

## The Fromme and O'Brien Circular Model of Emotion

The two predictions based on the Fromme and O'Brien model of emotion are confirmed by the data providing support for the usefulness of the model's structure for relating dimensional and categorical aspects of emotion. The error pattern for judging emotions categorically matched the model's prediction. This result provides support for the arrangement of emotions in the circular model of emotion. Dimensionally, the models structure involving orthogonal dimensions is confirmed. The expected moderate associations between the nonorthogonal dimensions were confirmed but the predicted greater association of the behavioral dimensions with hedonistic arousal was only partially confirmed. The relationship between the high people-oriented group's ability to identify dominance/submissiveness and avoidance/approach in facial expressions is more associated with hedonistic arousal than autonomic arousal as predicted. However, autonomic arousal was more associated with dominance/submissiveness and avoidance/approach with the other two groups. These results supporting the Fromme and

O'Brien circular model of emotion indicate the utility of the dimensional relationships to emotion categorization. The results also support the use of the model in investigating empathic accuracy in this study.

## People-Orientation, Mental Health and Empathic Accuracy

People-orientation and mental health as operationally defined in this study do not significantly influence empathic accuracy with categorical judgments. All three groups displayed better than chance accuracy in identifying emotional expressions categorically. Indeed, differential accuracy scores for all three groups is very low indicating a high degree of accuracy identifying emotional expressions categorically. Both of these results suggest two other possible reasons for the failure to find group differences in empathic accuracy: the groups do not really differ in terms people-orientation and mental health, and a ceiling effect may limit obtaining real differences in empathic accuracy.

Group make-up consisted of psychology majors, medical technology majors and counseling center clients. All students making up these groups were undergraduates. Students tend to change their majors many times prior to graduating reflecting a process of discovery and adjustment to their skills and abilities. The high and low-people oriented groups may not differ very much as each group is a

self-selected group whose major may change with time and information. This suggests that membership in each group may not be stable. One solution to this difficulty would be to administer vocational testing, taking high scorers in each field to make-up the high and low people-oriented groups forming a stronger dichotomy between groups. The choice of medical technology students for the low people-oriented group does not represent a strong dichotomy with psychology majors. Medical technology students do not function in isolation and are involved with helping and caring behaviors that may facilitate empathic accuracy. The choice of engineering majors as members of the low people-oriented group may well represent a stronger dichotomy with psychology majors.

The small differential accuracy scores representing high empathic accuracy that was obtained by all groups could reflect a ceiling effect. Accuracy at identifying primary emotions is well documented and may have represented too easy a task for the three groups resulting in little variance in differential accuracy scores between the three groups. Future research with empathy using facial expressions of emotion may benefit from having judges make differentiations within each emotion. That is, judges who are empathic should be able to identify differences in intensity within different emotions such as rage, anger, and annoyance or between grief, sadness, and disappointment. The presence of blends was carefully controlled in this

study. The presence of two emotions in a single facial expression is labeled a blend. The identification of blends requires a fine discriminating sensitivity to different emotions in a single facial expression. More empathic individuals may be more accurate at identifying blends in facial expressions. Controlling for emotional blends in this study may have eliminated a source of variance intimately related to empathic accuracy. Future research into empathy and emotions should also consider using identification of blends as one measure of empathic accuracy.

When identifying dimensions in each emotion, the groups differed in identifying avoidance/approach in only one emotion. There were no significant differences among groups with pain/pleasure dimensional judgments on the same emotions. The low people-oriented group's significantly better accuracy identifying arousal/relaxation disconfirmed the hypothesis that they would be less accurate than the high people oriented group and more accurate than the mental health group. However, this result is consistent with data derived in testing the circular model. That is, low people-oriented subjects do tend to be sensitive to arousal/relaxation in facial expressions of others. This group consisted of medical technicians that frequently perform painful medical procedures on others. They may be alert to the physiological arousal in the faces of others because noticing this arousal may prove beneficial to

completing their task efficiently.

These result may be due to differences between the experimental situation and real-life interactions. There is no guarantee that individuals who are attentive to another's facial expressions in the experiment will also be attentive to them in real-life situations. Ross Buck (1984), in a review of emotion recognition research, stated that the accurate identification of emotional facial expressions were due to two key factors: attention to facial stimuli and interpretation of the observed stimuli. Difficulties with functioning in either area would result in inaccuracy. If attention to stimuli is held constant, as in this study, the differences in accuracy are due to differences in ability to interpret emotional stimuli in facial expressions. In this context, the high people-oriented group and the mental health group judges' low differential accuracy score with arousal/relaxation can not be attributed to a failure to attend to the stimuli as the experimental situation requires attention. Their lower differential accuracy must therefore be the result of improper interpretation of the observed facial enactments. However, the significance of the low people-oriented group's higher differential accuracy on the arousal/relaxation dimension must be qualified. The results indicate that when low people-oriented judges do attend to stimuli their ability to identify arousal/relaxation in emotional expressions is better than the high people-oriented and mental health groups' ability. The

finding that the three groups do not significantly differ in empathic accuracy with categorical judgments and with almost all dimensional judgments suggests that there are no real differences between the groups' ability to interpret facial expressions in forced attention situations. Overall, these results suggest that it may be a willingness to attend to facial expressions, ie., to relate empathically, rather than an inability to accurately identify how others are feeling that differentiates individuals who are high in empathic accuracy from those low in empathic accuracy.

These results may also be due to differences in psychological distress among the groups. Although the mental health group met Costa and McCrae's (1992) clinical guidelines for distress, the mental health group's SCL-90-R scores still represent a mild level of distress. Higher levels of psychological distress may be more of a negative influence on empathic accuracy. Recently, Ekman (1993) reported that distinguishing between the negative emotions depends more on contextual knowledge than on facial expression. This suggests that the judges inaccuracy with grief, fear, anger and possibly resignation enactments may be due to lack of contextual cues rather than an inability to identify their facial expressions.

## Stimulus Gender and Empathic Accuracy

Prior research with facial expressions of emotions have

found judges to be more accurate with female facial expressions. However, the results of this study found a significant advantage in accuracy with female faces only with the emotion of elation. The female judges were more accurate with male expressions of anger. This finding is not surprising as the expected sex role behavior for males allows them greater freedom than females in the expression of dominance or anger. Broverman (1972) had 74 male and 80 female college students complete a questionnaire on gender stereotypes and found males positively valued competence, rationality, and dominance. Female students reported placing greater value in warmth and emotional expressiveness. The tendency for the female judges in this study to judge female expressions of elation as a more dominant response than female anger may also reflect expected sex role behavior.

The large differences in accuracy with male and female enactments of anger may also reflect safety considerations. Female judges may be more keenly aware of dominance and arousal in male faces because this combination results in anger and the possibility of aggressive behavior. Male aggressive behavior carries a greater potential for physical harm than female aggression suggesting that there is a distinct advantage for females to be alert to this emotion in males. However, stimulus gender does not have a significant influence on empathic accuracy with most emotional expressions used in this study.

Personality and Empathic Accuracy

The purpose of the hierarchical regression is to determine if three sets of variables, NEO-FFI personality scales, IRI Empathy scales, and group membership are associated with differential accuracy in judging emotional expressions categorically and dimensionally. Scales from the IRI Empathy scale have been found to be significantly correlated with other self-report measures of empathy. Two of these scales, the fantasy scale and the perspective-taking scale were found to account for unique variance in empathic accuracy scores on the dimensions of dominant/submission and avoid/approach respectively. Perspective-taking scores on the Interpersonal Reactivity Index are positively related to predictive empathy with avoid/approach judgments indicating that empathic accuracy is associated with role-taking and concern for others. This result confirms the expected role that placing oneself in another's shoes will increase predictive empathy. However, the fantasy scale is negatively related to dominant / submission judgments. This result contradicts Davis' (1983) findings that fantasy scale scores are positively related to emotional empathy. Rather, it suggests that a detached objectivity results in better empathic accuracy with male expressions of dominance / submission. Personal distress, another IRI scale, is found to be negatively related to empathic accuracy with categorical judgments of female

facial expressions. This result confirms hypotheses that increased personal distress tends to inhibit empathy (Davis, 1983). However, personal distress did not account for significant variance in any other judgments. Overall, IRI Empathy scale scores were related Empathic concern, the remaining IRI scale was not found to be associated with empathic accuracy in this study.

Individually, neuroticism and extraversion from the NEO-FFI personality inventory account for a significant amount of unique variance in male expressions with the dimensions of pain/pleasure and arousal/relaxation respectively. The scales also combine to account for significant variance in categorical judgments of female enactments. Neuroticism is a measure of sensitivity to negative emotions and extraversion a measure of sensitivity to positive emotions. Low scores on the neuroticism scale and high scores on the extraversion scale have been found to be associated with emotional stability (Costa and McCrae, 1992). This relationship between the two scales is important to predictive empathy. The more psychologically stable the person, the more empathic they should be. However, greater empathic accuracy is found to be associated with more emotional instability in both categorical and dimensional judgments. Only with judgments of arousal/relaxation is emotional stability a good predictor of predictive empathy. The relationship between personality and empathy is clearly a complex one. No NEO-FFI scale

accounts for more than 20 percent of the unique variance in predictive empathy scores. Although this is a large amount of variance for a single scale to account for, it indicates that other important predictors are not included in the regression model.

Caveat

The results of this study may have been influenced by design factors. The judges saw each target express each emotion only once. Under these conditions judges may have misidentified emotions simply because they did not have a clear enough reference point. That is, judges may confuse joy with elation simply because the elation expression occurred first and there was no reference point to adequately distinguish it from joy. The use of only six encoders may also have influenced accuracy. These aspects of the experiment may have played an important role in lowering predictive empathy with categorical judgments. More targets expressing several emotional enactments for each emotion would provide a better test for differences in empathic accuracy.

Having the judges view all the expressions of one target before seeing all the expressions of the next target may have facilitated differential accuracy and hampered stereotype accuracy. Because differential accuracy involves differentiating between each emotion in each target, this manner of presenting facial expressions would make differentiating between them easier

within subjects while making between subjects judgments (stereotype accuracy) more difficult.

## Future Directions

Empathy's purported association with healthy psychological functioning presents the possibility that including empathy training in therapeutic treatment plans may improve functioning and relieve stress. However, some controversy has developed concerning whether empathy can be taught. Brehms, Fromme, and Johnson (1991) found that empathy training involving a group modification method effectively increased empathic verbalizations and effective interpersonal behavior providing support for the efficacy of empathy training. The results of the current study suggest that differences in empathic accuracy may be due more to a tendency not to attend to emotional facial expressions than to an inability to adequately interpret them. If true, this means that therapists need not teach empathy but should help their clients manage behavior that will increase their attentiveness to emotional expressions in others. Mayer, Salovey, Gomberg-Kaufman and Blainey (1991) found that emotion management dimensions of plan of action, suppression, and denial predicted variables such as empathy better than the pain/pleasure and arousal/relaxation dimensions.

The results of the current study also indicate that

unhappiness, neuroticism, and a sensitivity to negative emotions is associated with empathic accuracy in some cases. It may turn out that certain symptom patterns in psychologically distressed individuals is associated with good empathic accuracy. Studies on the relationships between symptom patterns and empathic accuracy may help therapists determine which clients may benefit most from a treatment involving empathy training.

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# APPENDIXES

# APPENDIX A

## Cronbach Procedures for Deriving Accuracy Components

Cronbach (1955) reported two methods of deriving Differential Accuracy scores. The first is the additive method. It involves subtracting and squaring the differences between respective components in the prediction and criterion matrices yielding scores labeled E, DE, SA, and DA. When added together these components sum to the squared deviation accuracy score. The second approach involves correlating the respective components in the prediction and criterion matrix after the grand mean has been subtracted from them. These scores are labeled DEr, SAr, DAr. The additive method derives the components that are correlated in the later method. Only the additive method will be described here.

Cronbach preferred a squared deviation accuracy score because "Our measure has the important property of being invariant under orthogonal rotation of the axes (p. 192)". Therefore, Cronbach defined accuracy as

$$ACCj2 = 1/kN \sum o \sum i \ (Y_{oij}' - X_{moi}')^2$$

In this equation

$$X_{oi}' = X_{oi} - \overline{X}_{o.} - \overline{X}_{.j} + \overline{X}_{..}$$

$$Y_{oi}' = Y_{oi} - \overline{Y}_{o.} - \overline{Y}_{.i} + \overline{Y}_{..}$$

In the squared deviation accuracy equation $Y_{oij}'$ is a judge's rating of target o on item i and $X_{oi}'$ is the target's self-rating on item i. Dymond's Deviation accuracy score is broken down into the four Cronbach components for analysis. Cronbach's computational equations for each of his components are listed in Figure A1. In the top part of Figure A2 a judge's fictional ratings on intelligence, friendliness and honesty on three targets are presented. The three target's self-ratings on the three characteristics are presented below the line in Figure A2. An Elevation score of .09 for the judge in Figure A2 is obtained by squaring the difference between the grand mean of the judge's prediction matrix (3.0) and the grand mean of the targets' rating matrix (3.33).

---

Insert Table A1 about here

---

Differential Elevation (DE) and Stereotype Accuracy (SA) are computed by first expressing each column and row mean in both rating matrices as a deviation from their respective grand means. In figure A2 these remainders are labeled target effects for columns and trait effects for rows. This procedure holds constant the effect due to elevation. The difference between each judges' deviation ratings and corresponding target's deviation ratings are squared and averaged to find the DE and SA scores. For the ratings in Figure A2, DE = 2.38. In a similar fashion using the row deviations from the grand mean yields a stereotype accuracy score (SA) of .599.

---

Insert Table A2 about here

---

Finding Differential Accuracy (DA) is more complicated. Each rating in each cell of both matrices in Table A1 must first be expressed as a deviation from its own row and column means, plus its' grand mean. In Figure A3 are the deviation ratings matrices containing these results for calculating the differential accuracy score for the judge in Figure A2. The differences between each judge's cell

---

Insert Table A3 about here.

---

deviation ratings and corresponding targets' cell deviation ratings is squared and averaged to produce the DA score. In the example in Figure A3, the differential accuracy score for the fictional judge is .17. In this form, the four accuracy scores are error measures and therefore the smaller the score the higher the accuracy.

# APPENDIX B

## Emotion Scripts for Encoding of Eight Emotions

| Emotion | Script |
|---|---|
| Elation | You have just finished first in a difficult race. As you cross the finish line you experience a strong feeling of elation as you raise your arms and shout. |
| Joy | You are at the airport about to greet a friend you have not seen for six months. As you greet them and you experience joy. |
| Satisfaction | You have just received a good grade on a school assignment as you expected. As the teacher hands you your assign he comments "Good job". You feel satisfied with your performance. |
| Resignation | You have received a speeding ticket you deserve. The fine is large. You wish you didn't have to pay it but you know a warrant will be issued for your arrest if you don't. With a feeling of resignation you hand the check to the clerk. |
| Grief | You take your best friend to the airport. They are moving from the area. You say goodbye and experience grief. |
| Shock | You are standing next to a busy street when |

| | |
|---|---|
| | you notice a small child dart into the road. As cars come to a screeching halt you are frozen in the experience of shock. |
| Fear | Your landlord is knocking on your door and demanding the rent and threatening to evict you. You don't have the money and experience the fear of losing your apartment. |
| Anger | Your best friend has just revealed to others an intimate secret you confided in her. You are angry and about to confront her. |

# APPENDIX C

## Facial Expression Research Data Sheet

Name_____

Date_____

Age_____ Major_____

Year_____
(Jr., Sr., Grad.)

Gender: Male_____ Female _____

Are you participating for course credit? Yes_____

No_____

If yes, which course? Course No._____

Your instructor's name?_____

ID#:_____

---

ID#_____

Person # 1

Expression

No. EMOTIONS (Circle one)

1. Elation Joy Satisfaction Resignation Grief

Shock Fear Anger

CATEGORIES (Circle one number on each line)

Dominant 1____2____3____4____5____6____7 Submissive

Arousing 1____2____3____4____5____6____7 Relaxing

Avoid 1____2____3____4____5____6____7 Approachable

Painful 1____2____3____4____5____6____7 Pleasant

# APPENDIX D

## Emotion and Dimension Definition List

### EMOTIONS

| | |
|---|---|
| Elation | To fill with joy or pride, euphoria. |
| Joy | The emotion evoked by well-being, success, or good fortune or by the prospect of possessing what one desires. A state of happiness. |
| Satisfaction | The quality or state of contentment. |
| Resignation | To accept something as inevitable: submit. |
| Grief | Deep and poignant distress caused by bereavement. |
| Shock | A sudden or violent mental or emotional disturbance. |
| Fear | An unpleasant often strong emotion caused by anticipation or awareness of danger. |
| Anger | An intense emotional state induced by displeasure. |

### DIMENSIONS

| | |
|---|---|
| Dominance | Commanding, controlling or prevailing over all others. |
| Submission | Humble or compliant. |
| Arousing | To stimulate to action or to physiological readiness for activity: excite. |
| Relaxation | Being at rest or at ease. |
| Avoidance | To keep away from: shun. |

(Table continues)

| | |
|---|---|
| Approach | To draw closer to: near. |
| Painful | Acute mental or emotional distress or suffering. |
| Pleasure | A source of delight or joy. |

Source: Merriam Webster's Collegiate Dictionary, Tenth Edition, 1993

APPENDIX E

Means and Standard Deviations for Stereotype Accuracy with Categorical Judgments

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .046 | .061 | .037 | .038 | .082 | .096 |
| Female | .043 | .044 | .104 | .169 | .096 | .073 |
| Joy | | | | | | |
| Male | .064 | .073 | .062 | .064 | .065 | .075 |
| Female | .032 | .036 | .064 | .066 | .047 | .070 |
| Satisfaction | | | | | | |
| Male | .038 | .056 | .053 | .068 | .053 | .055 |
| Female | .054 | .080 | .048 | .054 | .090 | .185 |
| Resignation | | | | | | |
| Male | .082 | .088 | .081 | .086 | .073 | .071 |
| Female | .039 | .043 | .045 | .064 | .040 | .057 |
| Grief | | | | | | |
| Male | .074 | .196 | .098 | .110 | .074 | .106 |
| Female | .051 | .081 | .084 | .162 | .097 | .097 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .093 | .118 | .102 | .114 | .150 | .246 |
| Female | .030 | .037 | .058 | .099 | .033 | .042 |
| Fear | | | | | | |
| Male | .157 | .188 | .126 | .153 | .193 | .195 |
| Female | .039 | .056 | .146 | .208 | .050 | .080 |
| Anger | | | | | | |
| Male | .164 | .374 | .127 | .086 | .136 | .090 |
| Female | .236 | .292 | .254 | .247 | .423 | .366 |

Note. Lower means represent higher accuracy

APPENDIX F

Means and Standard Deviations for Stereotype Accuacy with Dominance/Submission Judgments

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .231 | .348 | .196 | .269 | .166 | .206 |
| Female | .415 | .423 | .415 | .435 | .345 | .263 |
| Joy | | | | | | |
| Male | .067 | .096 | .086 | .125 | .108 | .127 |
| Female | .128 | .136 | .112 | .130 | .101 | .105 |
| Satisfaction | | | | | | |
| Male | .143 | .171 | .113 | .106 | .236 | .305 |
| Female | .161 | .225 | .098 | .131 | .175 | .224 |
| Resignation | | | | | | |
| Male | .163 | .219 | .212 | .301 | .179 | .238 |
| Female | .165 | .235 | .087 | .110 | .141 | .159 |
| Grief | | | | | | |
| Male | .298 | .404 | .374 | .594 | .265 | .345 |
| Female | .354 | .384 | .378 | .489 | .312 | .314 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .209 | .260 | .199 | .308 | .198 | .240 |
| Female | .428 | .514 | .405 | .432 | .336 | .391 |
| Fear | | | | | | |
| Male | .214 | .258 | .302 | .395 | .157 | .191 |
| Female | .156 | .196 | .196 | .254 | .108 | .130 |
| Anger | | | | | | |
| Male | .435 | .316 | .393 | .309 | .330 | .242 |
| Female | .269 | .411 | .201 | .254 | .226 | .281 |

Note. Lower means represent higher accuracy.

APPENDIX G

Mean Stereotype Accuracy Scores for Judgments of Emotional Enactments on the Avoid/Approach Dimension

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .040 | .053 | .052 | .065 | .098 | .111 |
| Female | .034 | .040 | .120 | .134 | .180 | .177 |
| Joy | | | | | | |
| Male | .077 | .074 | .142 | .116 | .133 | .149 |
| Female | .033 | .050 | .111 | .089 | .131 | .130 |
| Satisfaction | | | | | | |
| Male | .048 | .051 | .044 | .063 | .133 | .189 |
| Female | .038 | .047 | .050 | .053 | .080 | .099 |
| Resignation | | | | | | |
| Male | .062 | .056 | .080 | .102 | .051 | .085 |
| Female | .034 | .030 | .064 | .118 | .064 | .054 |
| Grief | | | | | | |
| Male | .041 | .057 | .054 | .073 | .081 | .106 |
| Female | .037 | .042 | .045 | .053 | .078 | .190 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .049 | .067 | .077 | .085 | .098 | .148 |
| Female | .039 | .043 | .102 | .117 | .082 | .098 |
| Fear | | | | | | |
| Male | .066 | .063 | .098 | .104 | .124 | .138 |
| Female | .036 | .039 | .169 | .169 | .085 | .088 |
| Anger | | | | | | |
| Male | .052 | .092 | .114 | .094 | .153 | .155 |
| Female | .053 | .107 | .043 | .082 | .086 | .111 |

Note. Lower means represent higher accuracy.

APPENDIX H

Mean Stereotype Accuracy Scores for Judgments of Emotional Enactments on the Arousal/Relaxed Dimension

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .135 | .130 | .091 | .137 | .062 | .074 |
| Female | .066 | .092 | .079 | .112 | .072 | .091 |
| Joy | | | | | | |
| Male | .311 | .430 | .175 | .203 | .173 | .252 |
| Female | .118 | .320 | .357 | .380 | .250 | .326 |
| Satisfaction | | | | | | |
| Male | .180 | .196 | .284 | .344 | .301 | .356 |
| Female | .235 | .408 | .139 | .175 | .155 | .174 |
| Resignation | | | | | | |
| Male | .110 | .109 | .220 | .263 | .233 | .281 |
| Female | .128 | .209 | .135 | .123 | .205 | .234 |
| Grief | | | | | | |
| Male | .159 | .167 | .105 | .176 | .105 | .154 |
| Female | .131 | .140 | .181 | .214 | .170 | .229 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .082 | .093 | .104 | .080 | .111 | .145 |
| Female | .088 | .080 | .152 | .168 | .099 | .101 |
| Fear | | | | | | |
| Male | .176 | .222 | .158 | .208 | .194 | .240 |
| Female | .157 | .213 | .183 | .216 | .212 | .271 |
| Anger | | | | | | |
| Male | .222 | .245 | .326 | .213 | .361 | .237 |
| Female | .163 | .284 | .225 | .219 | .227 | .291 |

Note. Lower means represent higher accuracy.

# APPENDIX I

## Means and Standard Deviations for Stereotype Accuracy with Pain/Pleasure Judgments

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .200 | .122 | .142 | .123 | .198 | .195 |
| Female | .169 | .104 | .184 | .106 | .165 | .128 |
| Joy | | | | | | |
| Male | .183 | .143 | .171 | .109 | .153 | .146 |
| Female | .161 | .116 | .147 | .103 | .136 | .124 |
| Satisfaction | | | | | | |
| Male | .084 | .106 | .070 | .090 | .059 | .099 |
| Female | .084 | .107 | .072 | .065 | .067 | .087 |
| Resignation | | | | | | |
| Male | .073 | .093 | .075 | .078 | .093 | .099 |
| Female | .113 | .107 | .058 | .107 | .092 | .129 |
| Grief | | | | | | |
| Male | .129 | .139 | .098 | .151 | .121 | .144 |
| Female | .102 | .120 | .102 | .091 | .099 | .107 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .106 | .122 | .080 | .102 | .106 | .172 |
| Female | .132 | .131 | .102 | .104 | .061 | .053 |
| Fear | | | | | | |
| Male | .057 | .077 | .048 | .055 | .090 | .122 |
| Female | .085 | .085 | .077 | .126 | .068 | .085 |
| Anger | | | | | | |
| Male | 1.138 | .803 | 1.162 | .633 | .762 | .734 |
| Female | 1.010 | .825 | .939 | .569 | .725 | .730 |

Note. Lower means represent higher accuracy.

APPENDIX J

Mean Differential Accuracy Scores for Judgments of Emotional Enactments on the Dominant/Submission Dimension

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .712 | .619 | .525 | .759 | .696 | .946 |
| Female | .210 | .241 | .343 | .609 | .295 | .458 |
| Joy | | | | | | |
| Male | .375 | .326 | .340 | .285 | .257 | .166 |
| Female | .193 | .196 | .329 | .370 | .351 | .361 |
| Satisfaction | | | | | | |
| Male | .567 | .532 | .519 | .480 | .965 | .797 |
| Female | .563 | .481 | .550 | .549 | .603 | .723 |
| Resignation | | | | | | |
| Male | .653 | .665 | .520 | .761 | .521 | .598 |
| Female | .590 | .663 | .540 | .373 | .598 | .544 |
| Grief | | | | | | |
| Male | .661 | .663 | .816 | .840 | .006 | .781 |
| Female | .868 | .846 | .732 | .624 | .893 | .865 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .730 | .556 | .530 | .739 | .751 | .682 |
| Female | .555 | .719 | .681 | .609 | .615 | .568 |
| Fear | | | | | | |
| Male | .656 | .569 | .732 | .629 | .709 | .764 |
| Female | .394 | .484 | . 607 | .632 | .541 | .713 |
| Anger | | | | | | |
| Male | .157 | .289 | .084 | .197 | .353 | .730 |
| Female | 1.009 | .922 | 1.193 | .946 | .968 | 1.010 |

Note. Lower means represent higher accuracy.

APPENDIX K

Mean Differential Accuracy Scores for Judgments of Emotional Enactments on the Avoid/Approach Dimension

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .247 | .461 | .396 | .316 | .330 | .243 |
| Female | .334 | .468 | .383 | .344 | .413 | .497 |
| Joy | | | | | | |
| Male | .254 | .141 | .213 | .256 | .299 | .324 |
| Female | .202 | .192 | .202 | .297 | .261 | .398 |
| Satisfaction | | | | | | |
| Male | .189 | .233 | .502 | .403 | .488 | .505 |
| Female | .214 | .213 | .315 | .220 | .457 | .563 |
| Resignation | | | | | | |
| Male | .218 | .208 | .240 | .236 | .266 | .323 |
| Female | .260 | .223 | .236 | .255 | .281 | .377 |
| Grief | | | | | | |
| Male | .311 | .294 | .308 | .430 | .231 | .214 |
| Female | .308 | .240 | .188 | .346 | .317 | .306 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .348 | .391 | .412 | .332 | .493 | .387 |
| Female | .251 | .246 | .373 | .292 | .487 | .411 |
| Fear | | | | | | |
| Male | .178 | .185 | .290 | .300 | .328 | .332 |
| Female | .199 | .186 | .312 | .408 | .456 | .407 |
| Anger | | | | | | |
| Male | .306 | .296 | .242 | .208 | .284 | .234 |
| Female | .218 | .187 | .478 | .408 | .340 | .454 |

Note. Lower means represent higher accuracy.

APPENDIX L

Mean Differential Accuracy Scores for Judgments of Emotional Enactments on the Aroused/Relaxed Dimension

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .570 | .562 | .410 | .494 | .431 | .370 |
| Female | .364 | .445 | .229 | .223 | .433 | .364 |
| Joy | | | | | | |
| Male | .500 | .629 | .464 | .441 | .458 | .371 |
| Female | .574 | .541 | .349 | .357 | .472 | .430 |
| Satisfaction | | | | | | |
| Male | .785 | .573 | .613 | .488 | .819 | .619 |
| Female | .394 | .531 | .561 | .676 | .859 | .887 |
| Resignation | | | | | | |
| Male | .734 | .800 | .453 | .416 | .656 | .676 |
| Female | .505 | .603 | .685 | .623 | .565 | .547 |
| Grief | | | | | | |
| Male | .307 | .219 | .396 | .433 | .486 | .326 |
| Female | .658 | .724 | .419 | .326 | .480 | .451 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .611 | .456 | .225 | .235 | .528 | .500 |
| Female | .649 | .761 | .265 | .369 | .316 | .379 |
| Fear | | | | | | |
| Male | .576 | .591 | .269 | .211 | .374 | .445 |
| Female | .493 | .598 | .424 | .433 | .501 | .589 |
| Anger | | | | | | |
| Male | .307 | .350 | .178 | .215 | .233 | .507 |
| Female | .449 | .462 | .409 | .472 | .738 | .926 |

Note. Lower means represent higher accuracy.

APPENDIX M

Mean Differential Accuracy Scores for Judgments of Emotional Enactments on the Pain/Pleasure Dimension

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .072 | .081 | .320 | .418 | .295 | .329 |
| Female | .199 | .690 | .212 | .435 | .353 | .624 |
| Joy | | | | | | |
| Male | .113 | .192 | .143 | .160 | .319 | .301 |
| Female | .157 | .305 | .117 | .186 | .285 | .378 |
| Satisfaction | | | | | | |
| Male | .394 | .408 | .584 | .596 | .555 | .480 |
| Female | .265 | .288 | .268 | .282 | .301 | .238 |
| Resignation | | | | | | |
| Male | .194 | .167 | .281 | .336 | .296 | .358 |
| Female | .610 | .724 | .253 | .200 | .465 | .512 |
| Grief | | | | | | |
| Male | .177 | .201 | .375 | .383 | .491 | .570 |
| Female | .357 | .355 | .271 | .341 | .551 | .529 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .599 | .644 | .368 | .391 | .553 | .529 |
| Female | .260 | .310 | .327 | .416 | .504 | .544 |
| Fear | | | | | | |
| Male | .275 | .253 | .337 | .281 | .433 | .443 |
| Female | .312 | .297 | .368 | .229 | .371 | .237 |
| Anger | | | | | | |
| Male | .265 | .278 | .323 | .428 | .409 | .417 |
| Female | .734 | .817 | .535 | .461 | .342 | .348 |

Note. Lower means represent higher accuracy.

## APPENDIX N

Intercorrelation Matrix for Male and Female Differential Accuracy Scores with Twelve Independent Variables

| | MA | FA | G1 | G2 | G3 | N | E | O | A | C | FS | EC | PT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FDA | 13 | - | | | | | | | | | | | |
| G1 | 10 | 26 | - | | | | | | | | | | |
| G2 | -17 | 06 | -49 | - | | | | | | | | | |
| G3 | 07 | 22 | -49 | -50 | - | | | | | | | | |
| N | 08 | 27 | -38 | -23 | 63 | - | | | | | | | |
| E | -22 | -31 | 39 | -13 | -24 | -40 | - | | | | | | |
| O | -14 | 06 | 09 | -25 | 16 | 06 | 23 | - | | | | | |
| A | -17 | -01 | 41 | 06 | -47 | -24 | 25 | 07 | - | | | | |
| C | -09 | -10 | 19 | 02 | 22 | -35 | 34 | -07 | 18 | - | | | |
| FS | -12 | -14 | 10 | -09 | -02 | 02 | 25 | 41 | 23 | 00 | - | | |
| EC | -12 | -15 | 35 | -33 | -01 | 07 | 42 | 39 | 38 | 07 | 40 | - | |
| PT | -25 | -02 | 10 | -13 | 06 | -01 | 23 | 46 | 17 | 00 | 15 | 42 | |
| PD | 13 | -21 | -08 | -06 | 16 | 35 | -10 | -21 | -03 | -12 | 02 | 00 | -21 |

Note. MA = Male Differential Accuracy Score, FA = Female Differential Accuracy Score, G1 = high people-oriented group, G2 = low people-oriented group, G3 = mental health group, N = Neuroticism Scale, E = Extroversion scale, O = Openness, A = Aggreeable, C = Conscientiousness, FS = Fantasy Scale, EC = Empathic Concern, PT = Perspective-Taking, PD = Personal Distress. Correlations larger than .18 are significant at $p < .05$.

## APPENDIX O

Intercorrelation Matrix for Male and Female Differential Accuracy Scores with Dominant/Submission Judgments with Twelve Independent Variables

| | MDA | FDA | G1 | G2 | G3 | N | E | O | A | C | FS | EC | PT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FDA | 11 | - | | | | | | | | | | | |
| G1 | -01 | 12 | - | | | | | | | | | | |
| G2 | -16 | 07 | -48 | - | | | | | | | | | |
| G3 | 19 | 04 | -49 | -50 | - | | | | | | | | |
| N | 07 | -13 | -38 | -23 | 63 | - | | | | | | | |
| E | 14 | 25 | 39 | -13 | -24 | -40 | - | | | | | | |
| O | 21 | 05 | 09 | -25 | 16 | 06 | 23 | - | | | | | |
| A | -11 | -09 | 41 | 06 | -47 | -24 | 25 | 07 | - | | | | |
| C | -01 | 18 | 19 | 02 | -22 | -35 | 34 | -07 | 18 | - | | | |
| FS | -15 | 14 | 10 | -09 | -02 | 02 | 25 | 41 | 23 | 00 | - | | |
| EC | 08 | 02 | 35 | -33 | -01 | -07 | 42 | 39 | 38 | 72 | 40 | - | |
| PT | 02 | 10 | 10 | -13 | 06 | -01 | 23 | 43 | 17 | 01 | 15 | 42 | - |
| PD | -04 | -01 | -08 | -06 | 16 | 35 | -10 | -21 | -03 | -12 | 02 | 00 | -21 |

Note. MA = Male Differential Accuracy, FA = Female Differential Accuracy, G1 = high people-oriented group, G2 = low people-oriented group, G3 = mental health group, N = Neuroticism, E = Extroversion, O = Openness, A = Aggreeable, C = Conscientious, FS = Fantasy Scale, EC = Empathic Concern, PT = Perspective-Taking, PD = Personal Distress. Correlations larger than .18 are significant at $p < .05$.

APPENDIX P

Intercorrelation Matrix for Male and Female Differential Accuracy Scores with Arousal/Relaxation Judgments wih Twelve Independent Variables

| | MA | FA | G1 | G2 | G3 | N | E | O | A | C | FS | EC | PT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FDA | 08 | - | | | | | | | | | | | |
| G1 | 28 | 08 | - | | | | | | | | | | |
| G2 | -33 | -20 | -49 | - | | | | | | | | | |
| G3 | 08 | 14 | -49 | -50 | - | | | | | | | | |
| N | 04 | 08 | -38 | -23 | 63 | - | | | | | | | |
| E | 19 | 13 | 39 | -13 | -24 | -40 | - | | | | | | |
| O | 03 | -04 | 09 | -25 | 16 | 06 | 23 | - | | | | | |
| A | -08 | -20 | 41 | 06 | -47 | -24 | 25 | 07 | - | | | | |
| C | 04 | 06 | 19 | 02 | -22 | -35 | 34 | -07 | 18 | - | | | |
| FS | -03 | -16 | 10 | 09 | -02 | 02 | 25 | 41 | 23 | 00 | - | | |
| EC | 19 | -09 | 35 | 33 | -01 | -07 | 42 | 39 | 38 | 07 | 40 | - | |
| PT | 13 | 13 | 10 | -13 | 06 | -01 | 23 | 46 | 17 | 00 | 15 | 42 | |
| PD | 12 | 08 | -08 | -06 | 16 | 35 | -10 | -21 | -03 | -12 | 02 | 00 | -21 |

Note. MA = Male Differential Accurac, FA = Female Differential Accuracy, G1 = high people-oriented group, G2 = low people-oriented group, G3 = mental health group, N = Neuroticism, E = Extroversion, O = Openness, A = Aggreeable, C = Conscientiousness, FS = Fantasy Scale, EC = Empathic Concern, PT = Perspective-Taking, PD = Personal Distress. Correlations larger than .18 are significant at $p < .05$.

# APPENDIX Q

Intercorrelation Matrix for Male and Female Differential Accuracy Scores with Avoidance/Approach Judgments wih Twelve Independent Variables

| | MA | FA | G1 | G2 | G3 | N | E | O | A | C | FS | EC | PT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FDA | 27 | - | | | | | | | | | | | |
| G1 | -31 | -27 | - | | | | | | | | | | |
| G2 | 10 | -01 | -49 | - | | | | | | | | | |
| G3 | 20 | 28 | -49 | -50 | - | | | | | | | | |
| N | 13 | 11 | -38 | -23 | 63 | - | | | | | | | |
| E | -18 | -13 | 39 | -13 | -24 | -40 | - | | | | | | |
| O | -07 | -06 | 09 | -25 | 16 | 06 | 23 | - | | | | | |
| A | -25 | -19 | 41 | 06 | -47 | -24 | 25 | 07 | - | | | | |
| C | -01 | -04 | 19 | 02 | -22 | -35 | 34 | -07 | 18 | - | | | |
| FS | -13 | -18 | 10 | -10 | -02 | 02 | 25 | 41 | 23 | 00 | - | | |
| EC | -15 | -11 | 35 | -33 | -01 | -07 | 42 | 39 | 38 | 07 | 40 | - | |
| PT | 02 | 18 | 10 | -13 | 06 | -01 | 23 | 46 | 17 | 01 | 15 | 42 | - |
| PD | 17 | -12 | -08 | -06 | 16 | 35 | -10 | -21 | -03 | -12 | 02 | 00 | -21 |

Note. MA = Male Differential Accuracy, F = Female Differential Accuracy, G1 = high people-oriented group, G2 = low people-oriented group, G3 = mental health group, N = Neuroticism, E = Extroversion, O = Openness, A = Aggreeable, C = Conscientiousness, FS = Fantasy Scale, EC = Empathic Concern, PT = Perspective-Taking, PD = Personal Distress. Correlations larger than .18 are significant at $p < .05$.

APPENDIX R

Intercorrelation Matrix for Male and Female Differential Accuracy Scores with Pain/Pleasure Judgments wih Twelve Independent

Variables

| | MA | FA | G1 | G2 | G3 | N | E | O | A | C | FS | EC | PT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FDA | -24 | - | | | | | | | | | | | |
| G1 | -35 | 03 | - | | | | | | | | | | |
| G2 | 00 | -19 | -49 | - | | | | | | | | | |
| G3 | 36 | 19 | -49 | -50 | - | | | | | | | | |
| N | 39 | 18 | -38 | -23 | 63 | - | | | | | | | |
| E | -23 | 04 | 39 | -13 | -24 | -40 | - | | | | | | |
| O | 04 | 04 | 09 | -25 | 16 | 06 | 23 | - | | | | | |
| A | -18 | 17 | 41 | 06 | -47 | -23 | 25 | 07 | - | | | | |
| C | -06 | -11 | 19 | 02 | -22 | -35 | 34 | -07 | 18 | - | | | |
| FS | -03 | 21 | 10 | -09 | -02 | 02 | 25 | 41 | 23 | 00 | - | | |
| EC | -05 | 27 | 35 | -33 | -01 | -07 | 42 | 39 | 38 | 07 | 39 | - | |
| PT | 04 | 15 | 10 | -13 | 06 | -01 | 23 | 46 | 17 | 00 | 15 | 42 | - |
| PD | 13 | 08 | -08 | -06 | 16 | 35 | -10 | -21 | -03 | -12 | 02 | 00 | -21 |

Note. MA = Male Differential Accuracy, FA = Female Differential Accuracy, G1 = high people-oriented group, G2 = low people-oriented group, G3 = mental health group, N = Neuroticism, E = Extroversion, O = Openness, A = Aggreeable, C = Conscientiousness, FS = Fantasy Scale, EC = Empathic Concern, PT = Perspective-Taking, PD = Personal Distress. Correlations larger than .18 are significant at $p < .05$.

# APPENDIX S

## IRB FORM

**OKLAHOMA STATE UNIVERSITY**
**INSTITUTIONAL REVIEW BOARD**
**HUMAN SUBJECTS REVIEW**

**Date:** 12-08-94 **IRB#:** AS-95-029

**Proposal Title:** EMPATHIC ACCURACY AND THE PERCEPTION OF FACIAL EXPRESSIONS OF EMOTION

**Principal Investigator(s):** Donald Fromme, Harry R. Lowe

**Reviewed and Processed as:** Exempt

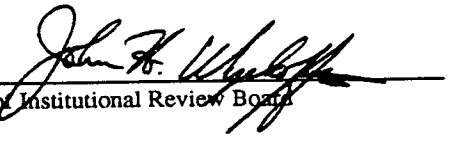
**Approval Status Recommended by Reviewer(s):** Approved

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

---

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Provisions received and approved.

Signature:  Date: February 1, 1995

Chair of Institutional Review Board

Table 1

Percentage Agreement of Expert Judges on Nine Encoder's Emotional Enactments

| | | Emotional Enactment | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Encoder | Gender | E | J | S | R | G | SH | F | A | Mean |
| 1 | Male | 85 | 75 | 70 | 74 | 80 | 70 | 80 | 95 | 79 |
| 2 | Female | 90 | 70 | 65 | 60 | 85 | 65 | 80 | 75 | 74 |
| 3 | Female | 60 | 55 | 40 | 35 | 45 | 40 | 45 | 35 | 45 |
| 4 | Female | 75 | 75 | 65 | 60 | 80 | 85 | 70 | 70 | 73 |
| 5 | Male | 80 | 85 | 65 | 70 | 75 | 85 | 70 | 85 | 77 |
| 6 | Female | 75 | 85 | 60 | 55 | 85 | 65 | 75 | 65 | 71 |
| 7 | Male | 75 | 65 | 40 | 35 | 45 | 40 | 40 | 55 | 49 |
| 8 | Female | 40 | 50 | 30 | 35 | 40 | 45 | 50 | 45 | 42 |
| 9 | Male | 80 | 75 | 70 | 65 | 80 | 80 | 75 | 85 | 76 |
| | Mean | 73 | 71 | 56 | 54 | 68 | 64 | 65 | 67 | |

Note. E = Elation; J = Joy; S = Satisfaction; R = Resignation; G= Grief; SH = Shock; F = Fear; A = Anger. Means are rounded to nearest whole number.

Table 2

Overall Percent of Expert Judge Agreement for Accepted and Rejected Encoders

| | Encoders | |
|---|---|---|
| Emotion | Accepted | Rejected |
| Elation | 81 | 58 |
| Joy | 78 | 57 |
| Satisfaction | 66 | 37 |
| Resignation | 65 | 35 |
| Grief | 81 | 43 |
| Shock | 78 | 42 |
| Fear | 75 | 45 |
| Anger | 79 | 45 |

Note. Accepted encoders are the six encoders whose facial expressions were used as stimuli in the study. Rejected encoders are the three encoders that were not used in the study. Numbers in the table represent the percentage of expert judges that correctly identified each emotion in each group.

Table 3

Means and Standard Deviations for Judges' NEO-FFI and IRI Empathy Subscale Scores

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Test | M | SD | M | SD | M | SD |
| NEO-FFI | | | | | | |
| Neuroticism | $20.83_{a}$ | 5.64 | $22.53_{b}$ | 4.57 | $31.13_{b}$ | 5.83 |
| Extraversion | $33.50_{a}$ | 5.51 | $29.53_{b}$ | 4.43 | $28.67_{ab}$ | 5.38 |
| Openness | $29.67_{ab}$ | 5.62 | $26.90_{ab}$ | 5.76 | $30.33_{a}$ | 5.82 |
| Agreeableness | 33.50 | 5.14 | 31.07 | 3.34 | 27.37 | 4.23 |
| Conscientious | 34.10 | 4.77 | 32.66 | 5.03 | 30.77 | 6.28 |
| IRI Empathy | | | | | | |
| F Scale | 19.43a | 4.47 | 18.23a | 4.06 | 18.63a | 3.81 |
| EC Scale | 22.80b | 3.90 | 19.60b | 2.91 | 21.10b | 2.40 |
| PT Scale | 19.40c | 4.88 | 18.07c | 3.82 | 19.27c | 4.55 |
| PD Scale | 10.43d | 4.80 | 10.67d | 3.42 | 11.93d | 3.97 |

Note. MH = Mental Health; HPO = High People-Oriented; LPO = Low People-Oriented. EC = Empathic Concern Scale; PT = Perspective Taking Scale; PD = Personal Distress Scale; F = Fantasy Scale. Means in the same row that do not share subscripts differ at $p < .05$ in the Tukey HSD comparison.

Table 4

Mean Differential Accuracy Scores for Categorical Judgments of Emotional Enactments

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| Emotion | M | SD | M | SD | M | SD |
| Elation | | | | | | |
| Male | .275 | .237 | .296 | .299 | 1.283 | .946 |
| Female | .165 | .233 | .174 | .176 | .191 | .145 |
| Joy | | | | | | |
| Male | .216 | .222 | .177 | .195 | .165 | .124 |
| Female | .156 | .173 | .163 | .155 | .261 | .271 |
| Satisfaction | | | | | | |
| Male | .216 | .247 | .281 | .533 | .146 | .249 |
| Female | .211 | .251 | .345 | .503 | .264 | .310 |
| Resignation | | | | | | |
| Male | .470 | .812 | .295 | .560 | .414 | .576 |
| Female | .179 | .157 | .281 | .265 | .303 | .504 |
| Grief | | | | | | |
| Male | .511 | .460 | .492 | .330 | .449 | .418 |
| Female | .379 | .348 | .370 | .325 | .341 | .362 |

(Table continues)

| | | | | | | |
|---|---|---|---|---|---|---|
| Shock | | | | | | |
| Male | .579 | .439 | .515 | .359 | .691 | .489 |
| Female | .187 | .156 | .229 | .196 | .397 | .283 |
| Fear | | | | | | |
| Male | .685 | .486 | .585 | .455 | .776 | .486 |
| Female | .220 | .245 | .661 | .783 | .518 | .629 |
| Anger | | | | | | |
| Male | .320 | .641 | .116 | .125 | .177 | .367 |
| Female | .996 | .810 | .953 | .567 | 1.228 | .597 |

Note. Lower scores represent higher accuracy.

Table 5

Repeated Measures Analysis of Variance for Differential Accuracy with Categorical Judgments of Emotional Enactments

| Source | df | MS | F |
|---|---|---|---|
| | Between subjects | | |
| Group (A) | 2 | 1.939 | 2.14 |
| Error | 87 | .905 | |
| | Within subjects | | |
| Stimulus Gender (B) | 1 | .574 | .67 |
| A X B | 2 | .781 | .91 |
| Error | 87 | .857 | |
| Emotional Enactment (C) | 7 | 4.118 | 6.05* |
| A X C | 14 | .757 | 1.11 |
| Error | 609 | .681 | |
| B X C | 7 | 7.079 | 10.52** |
| A X B X C | 14 | .877 | 1.30 |
| Error | 609 | .673 | |

*$p < .05$, **$p < .01$

Table 6

Means for Stimulus Gender X Emotional Enactment Interaction of Differential Accuracy with Categorical Judgments

| | Differential Accuracy | |
|---|---|---|
| Emotion | Male | Female |
| Elation | .618 | .177* |
| Joy | .185 | .193 |
| Satisfaction | .214 | .273 |
| Resignation | .393 | .254 |
| Grief | .484 | .363 |
| Shock | .595 | .271 |
| Fear | .682 | .466 |
| Anger | .204 | 1.059* |

Note. Lower means represent higher accuracy. Asterisk indicates that means in same row differ at $p < .05$ in a Tukey honestly significant difference (HSD) comparison.

Table 7

Tukey Honestly Significant Difference Analysis of Means for Stimulus Gender X Emotional Enactment Interaction of Differential Accuracy with Categorical Judgments

| Stimulus Gender | | Stimulus Gender | |
|---|---|---|---|
| Emotion | Male | Emotion | Female |
| Joy | .185 | Elation | .177 |
| Anger | .204b | Joy | .193 |
| Satisfaction | .214b | Resignation | .254 |
| Resignation | .393ab | Shock | .271 |
| Grief | .484ab | Satisfaction | .273 |
| Shock | .595ab | Grief | .363 |
| Elation | .618ab | Fear | .466 |
| Fear | .682a | Anger | 1.059a |

Note. Lower means represent higher accuracy. Means in same column that do not share a common subscript differ at $p < .05$ in a Tukey honestly significant difference comparison.

Table 8

Doubly Multivariate Repeated Measures MANOVA Results of Differential Accuracy for Judgments from Four Dimensions

| Source | df | Wilks lambda | p |
|---|---|---|---|
| Group (A) | 8/168 | .69362 | .000 |
| Stimulus Gender (B) | 4/84 | .99417 | .974 |
| A X B | 8/166 | .82708 | .039 |
| Emotional Enactment (C) | 28/60 | .16030 | .000 |
| A X C | 56/118 | .33800 | .025 |
| B X C | 28/60 | .29678 | .000 |
| A X B X C | 56/120 | .37191 | .077 |

Table 9

Repeated Measures ANOVA Summary Table Results for Differential Accuracy with Judgments on Four Dimensions

| Variable | df | Error df | MS | MSE | F |
|---|---|---|---|---|---|
| **Group Main Effects** | | | | | |
| Dominant/Submission | 2 | 87 | .80 | .74 | 1.08 |
| Arouse/Relax | 2 | 87 | 2.61 | .58 | 4.49** |
| Avoid/Approach | 2 | 87 | 1.34 | .18 | 7.32*** |
| Pain/Pleasure | 2 | 87 | 1.41 | .24 | 5.77** |
| **Stimulus Gender Main Effect** | | | | | |
| Dominant/Submission | 1 | 87 | .06 | .59 | .10 |
| Arouse/Relax | 1 | 87 | .08 | .28 | .28 |
| Avoid/Approach | 1 | 87 | .01 | .12 | .11 |
| Pain/Pleasure | 1 | 87 | .03 | .20 | .18 |
| **Group by Gender Interaction** | | | | | |
| Dominant/Submission | 2 | 87 | .79 | .59 | 1.33 |
| Arouse/Relax | 2 | 87 | .25 | .28 | .89 |
| Avoid/Approach | 2 | 87 | .09 | .12 | .74 |
| Pain/Pleasure | 2 | 87 | .74 | .20 | 3.64* |

(Table continues)

| | | | | | |
|---|---|---|---|---|---|
| **Emotional Enactment Main Effect** | | | | | |
| Dominant/Submission | 7 | 609 | 4.09 | .36 | 11.34*** |
| Arouse/Relax | 7 | 609 | 1.74 | .26 | 6.67*** |
| Avoid/Approach | 7 | 609 | .54 | .10 | 5.04*** |
| Pain/Pleasure | 7 | 609 | 1.38 | .16 | 8.43*** |
| **Group by Emotional Enactment Interaction** | | | | | |
| Dominant/Submission | 14 | 609 | .23 | .36 | .65 |
| Arouse/Relax | 14 | 609 | .36 | .26 | 1.39 |
| Avoid/Approach | 14 | 609 | .20 | .10 | 1.90* |
| Pain/Pleasure | 14 | 609 | .31 | .16 | 1.91* |
| **Stimulus Gender by Emotional Enactment Interaction** | | | | | |
| Dominant/Submission | 7 | 609 | 5.89 | .37 | 15.58*** |
| Arouse/Relax | 7 | 609 | .91 | .22 | 4.02*** |
| Avoid/Approach | 7 | 609 | .12 | .10 | 1.21 |
| Pain/Pleasure | 7 | 609 | .97 | .16 | 5.90*** |
| **Group by Stimulus Gender by Emotional Enactment Interaction** | | | | | |
| Dominant/Submission | 14 | 609 | .37 | .37 | .99 |
| Arouse/Relaxed | 14 | 609 | .48 | .23 | 2.08 |
| Avoid/Pain | 14 | 609 | .11 | .10 | 1.22 |
| Pain/Pleasure | 14 | 609 | .31 | .16 | 1.93 |

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

Table 10

Tukey Honestly Significant Difference Analysis of Differential Accuracy Means for Four Groups

| Dimension | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| | M | SD | M | SD | M | SD |
| Dominant/Submission | .56 | .62 | .57 | .66 | .63 | .73 |
| Arousal/Relaxation | .53a | .58 | .40 | .44 | .52a | .57 |
| Avoidance/Approach | .25a | .28 | .32b | .33 | .36b | .39 |
| Pain/Pleasure | .31a | .46 | .32a | .38 | .41 | .45 |

Note. Lower means represent higher accuracy. Means in same row that do not share a common subscript differ at $p < .05$ in a Tukey honestly significant difference comparison.

Table 11

Means for Group X Emotional Enactment Interaction of Differential Accuracy with Judgments on the Avoid/Approach Dimension

| Emotion | Group | | | | | |
|---|---|---|---|---|---|---|
| | HPO | | LPO | | MH | |
| | M | SD | M | SD | M | SD |
| Elation | .29 | .46 | .39 | .32 | .37 | .39 |
| Joy | .23 | .17 | .21 | .27 | .28 | .36 |
| Satisfaction | .20a | .22 | .41ab | .33 | .47b | .53 |
| Resignation | .24 | .21 | .24 | .24 | .27 | .34 |
| Grief | .31 | .26 | .25 | .39 | .27 | .26 |
| Shock | .30 | .32 | .39 | .31 | .49 | .39 |
| Fear | .19 | .18 | .30 | .35 | .39 | .37 |
| Anger | .26 | .24 | .36 | .34 | .31 | .36 |

Note. Lower means represent higher accuracy. Means in the same row that do not share a common subscript differ at $p < .05$ in a Tukey honestly significant difference comparison.

Table 12

Tukey Honestly Significant Difference Analysis of the Group x Emotional Enactment Interaction Differential Accuracy with Pain/Pleasure Dimensional Judgments

| HPO | | LPO | | MH | |
|---|---|---|---|---|---|
| Emotion | Group | Emotion | Group | Emotion | Group |
| Elation | .14c | Joy | .13c | Joy | .30a |
| Joy | .14c | Elation | .27abc | Elation | .32a |
| Grief | .27ab | Resignation | .27ab | Anger | .38a |
| Fear | .29ab | Grief | .32ab | Resignation | .38a |
| Satisfaction | .33ab | Shock | .35ab | Fear | .40a |
| Resignation | .40ab | Fear | .35ab | Satisfaction | .43a |
| Shock | .43ab | Satisfaction | .43ab | Grief | .52a |
| Anger | .50a | Anger | .43a | Shock | .53a |

Note. Lower means represent higher accuracy. HPO = high people-oriented group; LPO = low people-oriented group; MH = mental health group. Means in the same column that do not share a common subscript differ at $p < .05$ in a Tukey honestly significant difference comparison.

Table 13

Means for the Stimulus Gender X Emotional Enactment Interaction of Differential Accuracy with Dominance/Submission Dimensional Judgments

| Emotion | Stimulus Gender | | | |
|---|---|---|---|---|
| | Male | | Female | |
| | M | SD | M | SD |
| Elation | .64 | .78 | .28* | .46 |
| Joy | .32 | .27 | .29 | .32 |
| Satisfaction | .68 | .64 | .57 | .58 |
| Resignation | .57 | .67 | .58 | .53 |
| Grief | .83 | .76 | .83 | .78 |
| Shock | .67 | .66 | .62 | .63 |
| Fear | .70 | .65 | .52 | .61 |
| Anger | .20 | .47 | 1.06* | .95 |

Note. Lower means represent higher accuracy. Asterisk indicates row means differ at $p < .05$ in a Tukey honestly significant difference comparison.

Table 14

Means for the Stimulus Gender X Emotional Enactment Interaction of Differential Accuracy with Arousal/Relaxation Dimensional Judgments

| | Stimulus Gender | |
|---|---|---|
| Emotion | Male | Female |
| Elation | .470 | .342 |
| Joy | .474 | .465 |
| Satisfaction | .739 | .605 |
| Resignation | .614 | .585 |
| Grief | .397 | .519 |
| Shock | .455 | .410 |
| Fear | .406 | .473 |
| Anger | .239 | .532* |

Note. Lower means represent higher accuracy. Asterisk indicates row means differ at $p < .05$ in a Tukey honestly significant difference comparison.

Table 15

Tukey HSD Analysis of Means for the Stimulus Gender X Emotional Enactment Interaction of Differential Accuracy with Arousal/Relaxation Dimensional Judgments

| Gender | | Gender | |
|---|---|---|---|
| Emotion | Male | Emotion | Female |
| Anger | .239c | Elation | .342bc |
| Grief | .397bc | Shock | .410abc |
| Fear | .406bc | Joy | .465abc |
| Shock | .455bc | Fear | .473abc |
| Elation | .470bc | Grief | .519abc |
| Joy | .474bc | Anger | .532abc |
| Resignation | .614ab | Resignation | .585ab |
| Satisfaction | .739a | Satisfaction | .605a |

Note. Lower means represent higher accuracy. Means in the same column that do not share a common subscript differ at $p < .05$ in a Tukey honestly significant difference comparison.

Table 16

Means for the Stimulus Gender X Emotional Enactment Interaction of Differential Accuracy with Pain/Pleasure Dimensional Judgments

| | Stimulus Gender | |
|---|---|---|
| Emotion | Male | Female |
| Elation | .229 | .255 |
| Joy | .192 | .186 |
| Satisfaction | .511 | .278* |
| Resignation | .257 | .443 |
| Grief | .347 | .393 |
| Shock | .506 | .364 |
| Fear | .349 | .350 |
| Anger | .332 | .537 |

Note. Lower means represent higher accuracy. Asterisk indicates row means differ at $p < .05$ in a Tukey honestly significant difference comparison.

Table 17

Tukey HSD Analysis of the Means for the Stimulus Gender X Emotional Enactment Interaction of Differential Accuracy with Pain/Pleasure Dimensional Judgments

| Gender | | Gender | |
|---|---|---|---|
| Emotion | Male | Emotion | Female |
| Joy | .192b | Joy | .186b |
| Elation | .229b | Elation | .255b |
| Resignation | .257b | Satisfaction | .278b |
| Anger | .332ab | Fear | .350ab |
| Grief | .347ab | Shock | .364ab |
| Fear | .349ab | Grief | .393ab |
| Shock | .506ab | Resignation | .443ab |
| Satisfaction | .511a | Anger | .537a |

Note. Lower means represent higher accuracy. Means in the same column that do not share a common subscript differ at $p < .05$ in a Tukey honestly significant difference comparison.

Table 18

Summary of the Jonckheere Test for Ordered Alternatives for Eight Emotional Enactments

| Emotional Enactment | Standard Normal Approximate |
|---|---|
| Elation | 12.296 |
| Joy | 11.570 |
| Satisfaction | 11.682 |
| Resignation | 11.471 |
| Grief | 11.331 |
| Shock | 12.526 |
| Fear | 10.359 |
| Anger | 6.667 |

Note. All Jonckheere values are significant at the $p < .0001$.

Table 19

Intercorrelation Matrix of Differential Accuracy Scores for Three Groups on Four Dimensions

| | Aroused | Avoid | Dominant | Pain |
|---|---|---|---|---|
| **High People-Oriented Group** | | | | |
| Aroused | - | .04 | .12 | -.04 |
| Avoid | | - | -.06 | -.27 |
| Dominant | | | - | .38* |
| **Low People-Oriented Group** | | | | |
| Aroused | - | -.15 | .44* | .08 |
| Avoid | | - | .13 | .16 |
| Dominant | | | - | .17 |
| **Mental Health Group** | | | | |
| Aroused | - | .07 | .25 | -.07 |
| Avoid | | - | -.13 | .34 |
| Dominant | | | - | .05 |

*$p < .05$. **$p < .01$.

Table 20

Results of Hierarchical Regression Analysis for Variables Predicting Differential Accuracy with Categorical Judgments of Emotion

| Variable | B | $R^2$ | $sr^2$ | $pr^2$ | F |
|---|---|---|---|---|---|
| Male Emotional Enactments | | | | | |
| HPO Group | .32 | .14 | .07 | .07 | 6.29* |
| Female Emotional Enactments | | | | | |
| Personal Distress | -.34 | .28 | .09 | .09 | 9.71** |
| Extraversion | -.24 | .12 | .05 | .12 | 4.22* |
| Neuroticism | .27 | .07 | .07 | .07 | 6.04* |

Note. The F test reported is for the significance of the squared semipartial and squared partial correlation.

*$p < .05$. **$p < .01$.

Table 21

Results of Hierarchical Regression Analysis for Variables Predicting Differential Accuracy with Dimensional Judgments of Emotion

| Dimension | Variable | B | $R^2$ | $sr^2$ | $pr^2$ | F |
|---|---|---|---|---|---|---|
| | Male Emotional Enactments | | | | | |
| Dom/Submission | Fantasy | -.30 | .16 | .06 | .07 | 5.82* |
| Aroused/Relaxed | Extraversion | .24 | .05 | .05 | .08 | 4.07* |
| | HPO Group | .38 | .17 | .10 | .13 | 9.56** |
| Pain/Pleasure | Neuroticism | .39 | .16 | .16 | .20 | 14.15** |
| | Female Emotional Enactments | | | | | |
| Avoid/Approach | PT | .27 | .20 | .06 | .07 | 6.14* |
| Pain/Pleasure | LPO Group | -.37 | .16 | .06 | .08 | 5.83* |

Note. Fantasy = IRI Fantasy scale; PT = IRI Perspective Taking scale; HPO = High People-Oriented Group; LPO = Low People-Oriented Group. The F test reported is for the significance of the squared semipartial and squared partial correlation.

*$p < .05$. **$p < .01$.

Table A1

Cronbach's Equations for the Elevation, Differential Elevation, Stereotype and Differential Accuracy Scores

| Component | Equation |
|---|---|
| Elevation | $E = (\bar{Y}..j - \bar{X}..)^2$ |
| Differential Elevation | $DE = 1/N \sum [(\bar{Y}o.j - \bar{Y}..j) - (\bar{X}o. - \bar{X}..)]^2$ |
| Stereotype Accuracy | $SA = 1/k \sum [(\bar{Y}.ij - \bar{Y}..j) - (\bar{X}.i - \bar{X}..)]^2$ |
| Differential Accuracy | $DA = 1/kN \sum \sum (Yoij' - Xoij')^2$ |

Table A2

Judge and Target Rating Matrices for Ratings on Intelligence, Friendlyness, and Honesty

Judge's Rating Matrix

| Traits | Targets 1 | 2 | 3 | Mean | Trait Effect |
|---|---|---|---|---|---|
| Intelligence | 6 | 7 | 2 | 5 | 2 |
| Friendliness | 2 | 2 | 2 | 2 | -1 |
| Honesty | 1 | 3 | 2 | 2 | -1 |
| Mean | 3 | 4 | 2 | | |
| Target Effect | 0 | 1 | -1 | | |

Target's Self-Rating Matrix

| Traits | Targets 1 | 2 | 3 | Mean | Trait Effect |
|---|---|---|---|---|---|
| Intelligence | 7 | 5 | 3 | 5 | 1.67 |
| Friendliness | 3 | 4 | 2 | 3 | .33 |
| Honesty | 2 | 3 | 1 | 2 | -1.33 |
| Mean | 4 | 4 | 2 | | |
| Target Effect | .67 | .67 | -1.33 | | |

Table A3

Judge and Target's Deviation Ratings Matrices

Judge's Deviation Ratings Matrix

| Traits | Targets 1 | 2 | 3 |
|---|---|---|---|
| Intelligence | -.7 | 1.3 | -1.7 |
| Friendliness | -2.7 | .7 | -.7 |
| Honesty | -1.7 | 3.3 | -1.7 |

Target's Deviation Ratings Matrix

| Traits | Targets 1 | 2 | 3 |
|---|---|---|---|
| Intelligence | .6 | -.4 | - .4 |
| Friendliness | -2.4 | - .4 | -.4 |
| Honesty | -1.4 | .6 | .6 |

Figure 1. Plutchik's circular model of emotions.

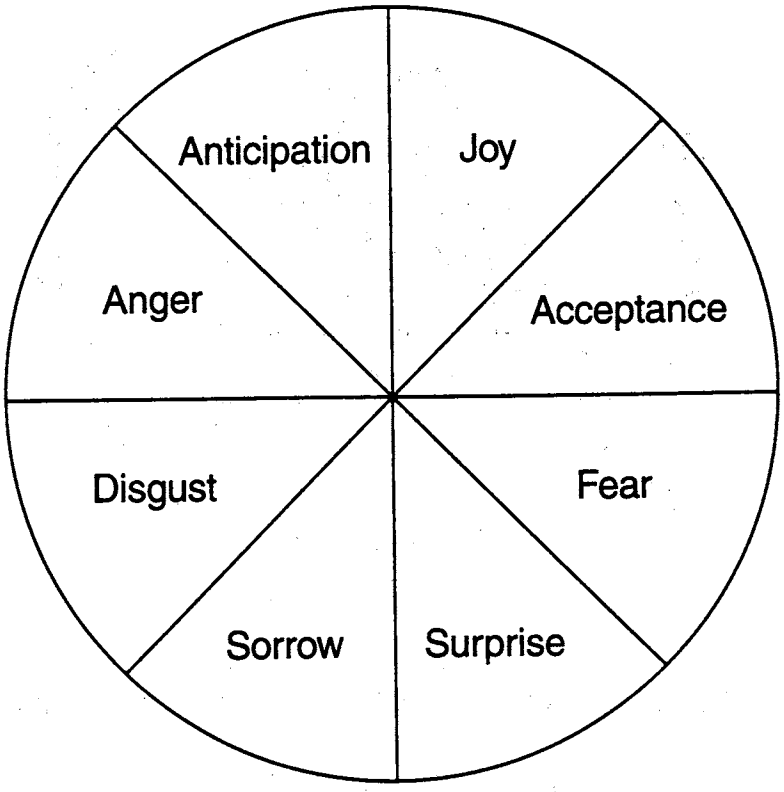


Figure 2. Fromme and O'Brien's circular model of emotion.

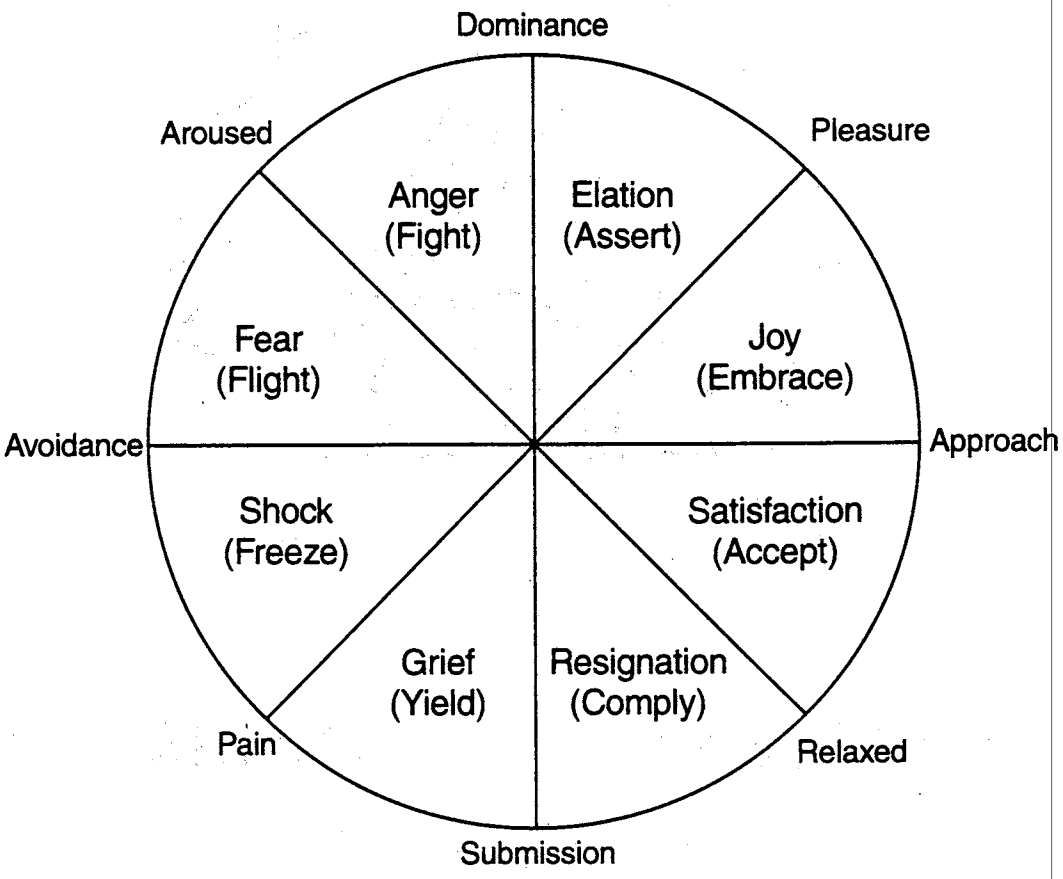


Figure 3. Example of scoring procedure for emotion of joy from the Fromme and O'Brien circular model of emotion.

# VITA

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