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Nonverbal emotional communication in an anhedonic population

Claudia J. French

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NONVERBAL EMOTIONAL COMMUNICATION IN AN ANHEDONIC POPULATION

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Many strategies have been used to study the etiology and development of schizophrenia. Recently, there has been growing interest in the strategy of identifying and studying subjects in a nonclinical population who may be at risk for the development of the disorder. In order to identify such subjects, some investigators have developed measures of traits believed to characterize schizophrenia-prone individuals. Currently, longitudinal research projects designed to validate these measures as prognostic indicators are underway, as well as investigations of the functioning of high-scoring subjects in various areas.

The Physical Anhedonia Scale, a measure of an enduring characterological defect in ability to experience pleasure, has been developed as one measure of psychosis-proneness. Recent research has revealed some schizotypal-like characteristics in high scorers on the scale.

The present study compares 24 Anhedonic and 24 nonanhedonic college students on the nonverbal communication of emotion, a topic that has not been previously investigated in this population. An emotional communication task was used to assess subjects' skill in intentional communication of emotion; subjects also completed the Affective Communication Test and the Snyder Self-monitoring Scale. The hypotheses that Anhedonic subjects would perform more poorly than control subjects on the emotional communication task, and that Anhedonic subjects would score lower on the Snyder Self-monitoring Scale, were not supported. However, Anhedonic subjects did score significantly lower than controls on the Affective Communication Test, indicating that Anhedonic subjects tend to be less nonverbally emotionally expressive in their social interactions. The implications of the present findings are discussed, and suggestions for future research are proposed.
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INTRODUCTION

Interest in the etiology and development of schizophrenia has led to a considerable body of research in the past few decades. This research has been primarily retrospective in nature, involving study of the histories of schizophrenic individuals and their relatives through the use of school and medical records, clinical reports, and historical interviews. Recently, however, a number of investigators have focused on the identification and study of individuals who may be at high risk for developing the disorder in the future. One such group consists of Loren Chapman and his associates at the University of Wisconsin, who have conducted numerous studies aimed at the development and validation of several measures of traits believed to characterize schizophrenia-prone individuals. These researchers are currently involved in a longitudinal research project designed to assess the validity of their measures as prognostic indicators for schizophrenia. In addition, they have conducted studies that contribute to knowledge about the behavior of hypothetically high-risk subjects in various areas of functioning.

One topic of immense interest in the Chapman research project is that of interpersonal communication skills, since it is widely acknowledged that many schizophrenic and preschizophrenic individuals have difficulties in
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this area. The studies conducted up to this point have concentrated on verbal communication skills, and have yielded some interesting findings. However, the researchers have so far ignored nonverbal behavior, even though nonverbal behavior is known to play an important part in interpersonal communication skill. Furthermore, while schizophrenic and preschizophrenic individuals may have deficits in the verbal domain, one of the most commonly reported characteristics of this population is a disturbance in nonverbal communication of emotion, generally manifesting as "flat affect" or inappropriate emotional presentation.

The present study examines the nonverbal emotional communication behavior of high scorers on one Chapman measure—the Physical Anhedonia Scale—a group of subjects who have consistently shown communication deficits in other studies. The introductory section of this paper will first describe the Chapman research project, with emphasis upon the Physical Anhedonia Scale, and then examine the relationship between anhedonia and a population commonly acknowledged to be at high risk for developing schizophrenia. Next will be a review of the research on Anhedonic subjects, with a focus on the studies of verbal interpersonal communication skill conducted so far. The importance of nonverbal emotional communication will then be examined, along with a brief review of research methodology.
in the area. Following this will be a discussion of the emotional communication problems in known schizophrenia-prone groups.

Overview of the Chapman Research Project

The goals of the Chapman research project are to identify and evaluate people who are hypothesized to be at high risk for developing schizophrenia, and to differentiate between risk for different types of schizophrenia (Chapman, Edell, & Chapman, 1980). The strategy of Chapman and his associates is to find hypothetically high-risk individuals through the use of several self-report measures, and to examine these subjects for the kinds of deviance that are found in known schizophrenic and preschizophrenic groups. In addition, the investigators plan to remain in contact with these subjects and evaluate their psychological status in the future.

In order to develop measures of schizophrenia proneness, the project has focused on several of the most commonly described traits and characteristics of schizophrenia and preschizophrenia. Three scales that have received considerable research attention in the past few years are the Physical Anhedonia Scale, the Perceptual Aberration Scale, and the Magical Ideation Scale (Chapman, Chapman, & Raulin, 1976; Chapman, Chapman, & Raulin, 1978; Eckblad & Chapman, 1983). Within a college student population, the
Perceptual Aberration Scale and the Magical Ideation Scale correlate highly with each other, but the Physical Anhedonia Scale has slight negative correlations with both. For the Perceptual Aberration Scale, the correlation was $r = -0.22$, and for the Magical Ideation Scale, $r = -0.23$ (Chapman, Chapman, & Miller, 1982). In light of the fact that high-scoring subjects on all these scales have been found deviant on other indicators of schizotypal and schizophrenic-like thought and behavior (each group showing a slightly different pattern of findings), the authors have proposed that these scales may to some extent be tapping different varieties of psychosis proneness.

**The Physical Anhedonia Scale**

The present study is concerned with individuals who receive high scores on the Physical Anhedonia Scale because they have shown the most consistent deficits in interpersonal communication. The Physical Anhedonia Scale (Chapman, Chapman, & Raulin, 1976) is designed to measure an enduring, characterological defect in ability to experience pleasure. The scale is composed of 61 self-report items which tap a multitude of physical pleasures, such as touching, eating, feeling, sex, movement, smell, and sound. Illustrative scale items are "On seeing a soft, thick carpet, I sometimes have had the impulse to take off my shoes and walk barefoot on it" (keyed false), "Sex is OK,
but not as much fun as most people claim it is" (keyed true), and "I have had very little desire to try new kinds of foods" (keyed true). The scale has acceptable internal consistency (Coefficient alpha = .83 for males, and .78 for females; Chapman, Chapman, & Miller, 1982) and test-retest reliability (r = .78 for females and .83 for males; Haberman, Chapman, Numbers, & McFall, 1979). The validity of the scale will be examined in the following sections.

**Anhedonia and Schizotypal Personality Disorder**

High scorers on the Physical Anhedonia Scale and other Chapman scales have been hypothesized to have at least some similarities to individuals with Schizotypal Personality Disorder. Most theorists and clinicians agree that individuals with this disorder are at high risk for developing schizophrenia. The *Diagnostic and Statistical Manual of Mental Disorders (Third Edition-Revised)* (DSM-III-R, 1987) describes the disorder as follows:

The essential feature of this disorder is a pervasive pattern of peculiarities of ideation, appearance, and behavior and deficits in interpersonal relatedness, beginning by early adulthood and present in a variety of contexts, that are not severe enough to meet the criteria for Schizophrenia. The disturbance in the context of thought may include paranoia, suspiciousness, ideas of reference, odd beliefs, and magical thinking that is inconsistent with subcultural norms and influences the person's behavior....Speech may be impoverished, digressive, vague, or inappropriately abstract. Concepts may be expressed unclearly or oddly, or words may be used in an unusual way....Interpersonal relatedness is invariably impaired in these people. They display inappropriate or constricted affect, appearing silly or aloof and rarely reciprocating
gestures or facial expressions, such as smiling or nodding. They have no close friends or confidants (or only one) other than first-degree relatives, and are extremely anxious in social situations involving unfamiliar people. (p. 340-341).

Schizotypal individuals are commonly believed to be at high risk for developing full-blown psychoses. The plausibility of equating high scorers on the Physical Anhedonia Scale with schizotypal individuals will be examined presently. First, it is important to note the absence of explicit mention of anhedonia in the above description. It is possibly the only description of the disorder that does exclude anhedonia; perhaps this is due to the brevity of the DSM-III-R format. There is ample literature to support the inclusion of anhedonia in this constellation of personality characteristics. It should be noted that one might also expect to find anhedonia in some individuals who have Schizoid Personality Disorder, which has as its hallmarks indifference to social relationships and restricted emotional experience and expression (DSM-III-R, 1987).

In the past, schizotypal personality disorder has been referred to by many different names (e.g., borderline schizophrenia, ambulatory schizophrenia, etc.), but the characteristics described have been essentially the same as those in DSM-III-R, with the addition of anhedonia. Kraepelin (1896) and Bleuler (1911) -- two of the earliest and
most prominent psychopathologists—included the loss of the experience of pleasure as a feature in the development of myriad forms of schizophrenia. Others (Kety, Rosenthal, Wender & Schulsinger, 1968; Hoch & Cattell, 1959; Hoch & Polatin, 1949) have also given anhedonia a prominent place in their descriptions of the schizotypal personality.

Some writers (Meehl, 1973; Millon, 1981; Rado, 1956) have ascribed to anhedonia an especially crucial role in schizotypal disorder and schizophrenia. Specifically, these authors hypothesize that anhedonia is a manifestation of an inherited neural defect, and that it interferes with the normal development of social behaviors, sexual functioning, and ability to experience positive feelings toward self and environment.

In summary, most writers agree that anhedonia plays a major role in schizotypal disorder and in schizophrenia. In addition, some authors believe it accompanies (if not causes) social withdrawal and a poorly developed emotional life. These ideas will command more attention in a later part of this paper.

Research on Anhedonic Subjects

Given that anhedonia is a prominent characteristic in some schizotypal and schizophrenic individuals, it is plausible that subjects who achieve high scores on the Physical Anhedonia Scale may indeed be at higher risk for
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psychosis than the population in general. Data—cognitive, behavioral, and psychophysiological—have been gathered in support of this idea. Before detailing the work on the interpersonal communication skills of Anhedonic subjects, investigations of other areas of functioning will be discussed briefly. All of the studies to be reviewed have used college students as subjects, with males and females scoring at least two standard deviations above the Physical Anhedonia Scale mean constituting the experimental group.

Chapman, Edell, and Chapman (1980) conducted structured interviews with high scorers on the Physical Anhedonia Scale and other groups. The investigators used parts of Spitzer and Endicott's (1977) Schedule for Affective Disorders and Schizophrenia—Lifetime Version (SADS-L) for inquiry into symptoms. They also conducted a second interview to investigate social adjustment, heterosexual interests, and academic problems. Compared to a normal control group, the Anhedonic group was significantly more socially withdrawn, had less heterosexual interest and activity, and had more schizotypal symptoms (e.g., feelings of derealization, ideas of reference, odd communication, social isolation, etc.). In addition, the interviewers noted that the Anhedonics appeared to be more emotionally "flat" than the other groups (a characteristic noted in the descriptions of schizotypal personality disorder and schizophrenia). The Anhedonic
subjects did not report more depression than controls. The investigators proposed that the Anhedonic subjects' social withdrawal and reduced interest in the opposite sex supports the idea that a capacity for physical pleasure is part of the foundation of both social and sexual interaction.

In a study that assessed the performance of anhedonics and other groups on the Rorschach Inkblot Test, Edell and Chapman (1979) found that Anhedonic subjects' scores were more similar to schizophrenic and schizotypal individuals' scores on a measure of deviant verbalizations characteristic of schizophrenics than the scores of a control group. In addition, they gave considerably fewer responses. With regard to this latter finding, the authors hypothesized that the Anhedonic individuals, who are believed to derive scant pleasure from most activities, may have wished to end this activity as soon as possible—a goal easily accomplished by giving fewer responses.

Chapman, Chapman, and Miller (1982) investigated the intercorrelations of their scales and other measures of psychosis proneness. They found that Physical Anhedonia Scale scores were modestly, but significantly, positively correlated with two MMPI profile types (2-7-8 and 2-7-8-0) that are hypothesized to indicate schizophrenic and schizotypal personalities. Since patterns of scores comprise the profile types, the authors used two composite
scores as approximations for each profile type. When the composite score was a combination of all the items from the constituent scales into a single long scale, the correlation of the Physical Anhedonia Scale with the 2-7-8 profile type was $r = .26$ for females and .15 for males; for the 2-7-8-0 profile type, the correlation was $r = .34$ for females and .24 for males. When the composite score was the mean of the T scores of the constituent scales, the correlation for the 2-7-8 profile type was $r = .10$ for males and $r = .21$ for females, and the correlation for the 2-7-8-0 profile type was $r = .16$ for males and $r = .28$ for females.

Two psychophysiological studies have demonstrated some similarities between Anhedonic and schizophrenic subjects. Simons (1981) compared Anhedonic and control subjects on recorded heart rate and skin conductance responses in the context of a standard orienting paradigm. He found a deficit in orienting responses in Anhedonic subjects, similar to that of hyporesponsive schizophrenic subjects reported by Gruzelier and Venables (1975). Simons (1982) found differences between Anhedonic and control subjects in a study that measured cortical evoked potentials in response to auditory stimulation under simple orienting and signalled reaction time conditions. The response pattern of the Anhedonic subjects was similar to that observed in schizophrenic subjects in previous studies (Roth, 1977).
In summary, high scorers on the Physical Anhedonia Scale do have characteristics in common with schizotypal and schizophrenic individuals. These include various schizotypal symptoms noted in DSM-III-R, reduced sexual interest and activity, social withdrawal, and performance on various psychological and psychophysiological tests. This paper will now review in more detail the studies on interpersonal communication skill of Anhedonic subjects.

Interpersonal Communication Skill of Anhedonic Subjects

In the initial study of interpersonal communication skill in Anhedonic subjects, Haberman, Chapman, Numbers, and McFall (1979) compared the performance of Anhedonic, Perceptual Aberration (high scorers on another Chapman scale), and control subjects on a role-playing task. Their hypothesis that the experimental groups would do less well than the control groups was based on extensive literature (to be reviewed later) that suggests that schizotypal and schizophrenic individuals usually have poor communication skills.

The experimenters used a 25-item version of the Interpersonal Behavior Role-Playing Test (Goldsmith & McFall, 1975). This test presents the subject with tape-recorded descriptions of difficult social situations and requires the subject to say what s/he would say if the
situation were actually happening. Subjects' responses were taped, transcribed, and scored for "social skill." This entailed rating the responses on a three-point scale ranging from "absence of elements of a competent response" to "presence of all elements of a competent response." Results showed that the Anhedonic group was less socially skilled than the control group. In addition, upon closer analysis, it was found that only male Anhedonic subjects showed this deficit.

In a review of the above study, Numbers and Chapman (1982) suggested that the lack of a strong finding of poorer social skill for both males and females could be due to the fact that the study only assessed a narrow area of social skill. They argued that the literature on schizotypal social interaction points not so much to a deficit in skill in the sense of verbal effectiveness as to socially inappropriate qualities of avoidance, hostility, or oddness. Numbers and Chapman (1982) conducted a similar role-playing study with female subjects only, in which judges rated both skill in the previously defined sense (verbal effectiveness or competence) and the social appropriateness of transcribed responses. The skill level was rated on a five-point scale, ranging from "very competent or very effective" to "very unskilled or very ineffective." Social appropriateness was scored separately, with judges rating the responses for
avoidance, hostility, and oddness. A response was scored "avoidant" if the subject either did not make a response or if she seemed to ignore the particular demands of a situation (e.g., pretending not to hear, or changing the topic). A response was scored "hostile" if it was overly aggressive and/or unpleasant. "Oddness" was attributed to a response that appeared to have no relation to the item, or left the judge unsure as to the intent of the communication. Results again indicated that there was no difference between groups on verbal competence, but the Anhedonic group was found to be more avoidant and odd in their responses than were the control subjects.

Using methods similar to those described above, Beckfield (1985) assessed the effectiveness and devianthood of role-playing responses of male subjects only. Devianthood included six qualities selected from literature on schizophrenic and schizotypal populations: cognitive slippage, terseness, failure to respond, hostility, passivity, and oddness. Anhedonic subjects were found to give less competent and more terse responses than control subjects.

In reviewing the above studies, the question arises whether, in addition to level of anhedonia as measured by the Physical Anhedonia Scale, there were other systematic differences between groups that could account for the
differences found. Such variables as intelligence, socioeconomic status, and level of depression could reasonably be expected to have an effect on interpersonal communication skill. Haberman et al. assessed the socioeconomic status of the fathers of their subjects, and found no differences between groups. Numbers and Chapman assessed the verbal intelligence of their subjects, using Verbal subscales of the Wechsler Adult Intelligence Scale (WAIS). They found that the Anhedonics did score an average of six points lower than control subjects. However, after doing correlational analyses of the relation of IQ to the three measures of inappropriateness, they concluded that the differences between the groups in social appropriateness could not be interpreted as a possible artifact of differences in intelligence. Beckfield found no differences between the Anhedonic and control groups on mean Verbal WAIS scores. She also assessed level of depression with the Beck Depression Inventory (Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961), and found no differences between the Anhedonic and control groups.

In summary, the above three studies on interpersonal communication in role-playing tasks suggest that Anhedonic subjects do have deficits when compared to normal control groups. Specifically, males were found to be less verbally effective and to give more terse responses; females gave
more responses which had odd or avoidant qualities. These findings cannot be attributed to group differences in intelligence, and no differences between the groups have been found on the variables of socioeconomic status or depression.

**Interpersonal Communication of Emotion**

Many facets of the communication skills of anhedonic subjects remain unexplored. The studies completed thus far examine only the verbal domain of interpersonal communication. The present study is directed at another crucial aspect of communication skill: the intentional, nonverbal communication of emotions. This section will examine the definition and importance of this domain.

Psychologists and communication experts have defined nonverbal communication in many different ways. In a review of this literature, Harper, Wiens, and Matarazzo (1978) conclude that there are essentially five ways to communicate nonverbally in the interpersonal context: through the use of voice, facial expressions, body movements, eye contact, and physical distance.

Numerous authors agree that nonverbal, rather than verbal, factors are the main determinants of meaning in interpersonal communication (see Harper, Wiens & Matarazzo, 1978, for a review). According to Birdwhistell (1970), "probably no more than 30 to 35 percent of the social
meaning of a conversation or an interaction is carried by the words" (p. 158). Mehrabian, a prolific researcher in the area, estimates that fully 93 percent of message impact is due to nonverbal factors (Mehrabian, 1968).

Much of nonverbal communication involves the emotions, and the communication of emotion is essential in social interaction (Davitz, 1964; Friedman, 1979; Harper et al., 1978). In fact, Buck (1984) states that "emotion communication serves as the foundation of the social order in both humans and animals" (p. 3).

Buck (1984) emphasizes the social importance of what he calls "symbolic communication" of emotion. This is based on a socially-shared signal system, in which communicative behavior has a socially defined relationship with its referent, in this case an emotion or internal state. Symbolic communication is voluntary and intentional, and includes both verbal and nonverbal behaviors. It encompasses the communication of emotions that are truly experienced by the communicator, as well as those that the communicator may not actually feel, but simply wishes to present. "Display rules," which Buck defines as cultural rules or expectations about the management of emotion displays, play a crucial role in symbolic communication. Display rules are learned with experience, and in general, are used to generate (and interpret) socially appropriate
emotional expression.

As humans develop and are required to interact in an increasingly complex social world, the symbolic communication of emotion becomes more and more important. According to Buck, as a person becomes more intent upon being able to convey certain attitudes or emotions, skill in symbolic communication becomes more essential for normal social functioning.

Goffman (1959) is another theorist and researcher who places heavy emphasis on the symbolic communication of emotion. His dramaturgical approach to social interaction treats people as "actors," who manage the impressions they send to others regarding their emotions and intentions. Ring, Braginsky and Braginsky (1966) comment on the dramaturgical perspective:

In viewing interpersonal behavior as performance-giving, we mean to suggest that the actor is engaged in an attempt to convey to his audience only certain information about himself. Since it is the actor's function to control the impression his audience has of him, the actor's performance, if well-executed, will reveal only those aspects of himself which are congruent with the impression he wishes to foster. It is important to note that we do not assume that the actor is necessarily aware of the performance quality of his behavior or, even if he is so aware, that he is necessarily behaving in a way incongruent with his "true" or "real" feelings.

Those who adopt the dramaturgical approach to interpersonal communication regard the successful manipulation of nonverbal emotional cues such as facial expressions, bodily
gestures, and vocal modulation as being crucial to interpersonal competence.

According to Hall (1979), social communication ability is composed of a number of discrete skills that may or may not be related. People seem to differ greatly in their grasp of these skills, and this is probably due to both inherent personality differences, and to learning experiences. Hall's (1979) "action skills" involve the making and carrying out of decisions regarding how to act toward others. Skills in this category include: 1) ability to send to others nonverbal cues of intention and affect; 2) ability to articulate thoughts, desires, and emotions verbally; 3) ability to integrate verbal and nonverbal cues; and 4) ability to choose socially appropriate expressive behaviors from the many alternatives that exist. This latter ability includes both facility in enacting one's own role appropriately and the ability to take someone else's perspective in deciding how to act oneself. Thus, social communication ability requires both the ability to use one's own body to communicate nonverbally, and the cognitive sophistication for perspective-taking (Piaget & Inhelder, 1969).

In summary, the nonverbal communication of emotion is an essential aspect of interpersonal communication. This includes the both the communication of emotions that are
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truly felt, and of those that one merely desires to convey, whether felt or not. Although most people do not perpetually "act out" emotions that are different from how they actually feel, skill in the intentional communication of emotion via nonverbal behavior is one important feature of interpersonal communication.

The Study of Posed Emotional Communication

Many workers investigating the action skills involved in nonverbal symbolic communication of emotion refer to "posed sending ability" (Buck, 1984; Friedman, DiMatteo, & Taranta, 1980). Emotions are "posed" in the sense that they are intentionally communicated by the sender, who may or may not truly feel the emotions.

In an early review of the methodology for the study of posed nonverbal communication, Davitz (1964) notes that a common approach is to have subjects recite a portion of the alphabet while attempting to convey various emotions. This sort of "content-free" speech is likely to be emotionally neutral in itself. Another method is to have subjects recite content-standard sentences. Subjects' responses are generally recorded, and the recordings are presented to a team of judges, who determine sending ability by some variation of the following procedure. The judges attempt to guess what emotion is being communicated, and a subject's posed sending ability is measured by means of a score.
indicating the percentage of emotions accurately conveyed. Davitz concludes that emotions can be reliably communicated with the use of content-free or content-standard speech, and that nearly all subjects in numerous studies of sending and receiving emotions performed beyond chance level in communicating emotion. However, individual differences in ability appear to be great.

Most investigators in the field agree that posed sending is a crucial aspect of social competence, and that social awareness, self-awareness, and self-control are important for successful posed sending (Buck, 1984; Davitz, 1964; Friedman, 1979). Despite the considerable amount of research on this topic in recent years, there are still few solid findings contributing to an explanation of the large individual differences in ability (Buck, 1984). However, correlations between success on posed sending tasks and self-report personality inventories have yielded some information. Two studies (Friedman, DiMatteo, & Taranta, 1980; Friedman, Riggio, & Segall, 1980) have found that the ability to pose emotions accurately using facial expression and/or vocal modulation is positively correlated with ratings reflecting the personality characteristics of Dominance, Impulsivity, Exhibitionism, and Playfulness as measured by the Jackson (1974) Personality Research Form. There also appear to be fairly consistent gender
differences in ability to pose emotions. Hall (1979) reviews numerous studies, and concludes that there is strong evidence that females are more adept at both sending and receiving nonverbal emotional cues.

Emotional Communication in Schizotypal and Preschizophrenic Subjects

The evidence for deficits in verbal aspects of the interpersonal communication of anhedonic subjects has already been examined. There is good reason to believe that these subjects would show deficits in the nonverbal communication of emotions as well. Virtually all of the clinical literature on preschizophrenic and schizotypal individuals suggests that these individuals often evidence personality characteristics and lifestyles that might interfere with their ability in this realm.

"Preschizophrenic" is a term that has been used to refer to people who have later developed schizophrenia, and as previously discussed, schizotypal individuals are considered to be at high risk for developing schizophrenia. Disturbed emotional expression is one of the most frequently noted characteristic of these people. In some of the earliest writing on schizophrenic and preschizophrenic individuals, Kraepelin (1896) cited inappropriate or flattened affect as being a key symptom, and Bleuler (1911) noted that defects in the regulation of emotional expression were common.
Retrospective studies of the records of schizophrenic individuals who were seen in mental health clinics when they were children give extensive accounts of disturbed emotional presentation and its detrimental effect on social interaction. Fleming and Ricks (1970) noted that children who later became schizophrenic were much more likely than others to appear dazed, as if in a trance, or completely self-absorbed. Often, they seemed "robot-like" in their approach to others, avoiding eye-contact and moving and gesturing stiffly. Furthermore, they rarely seemed to have satisfactory relationships with peers or adults, and some reported that they felt unable to communicate their feelings to others. Similarly, Ricks and Berry (1970) state that such children seldom displayed empathic ties with peers. Friedlander (1945) found that these children often presented a general apprehensiveness and tenseness, with an easily upset emotional balance that seemed to have little to do with what was happening in their environment.

Hoch and Polatin (1949) found that schizotypal patients often showed a lack of modulation and flexibility in emotional display. Hoch and Cattell (1959) found that most schizotypal patients tended to be emotionally constricted, but that these same individuals would at times display incongruous emotions simultaneously or in rapid succession.
The literature is rich with explanations for the generally constricted, sometimes incomprehensible emotional presentation of schizotypal patients. According to Hoch and Cattell (1959), the self-image, body-image, and perceptions of reality held by these individuals change and shift rapidly, with consequent feelings of detachment, vagueness, and confusion. They typically report an absence of emotions, but what emotions they do feel are likely to confuse them. Furthermore, say these writers, schizotypal individuals are haunted by a dread of appearing conspicuous or foolish, so they generally try to keep their feelings from others, and prefer to function socially without emotional involvement.

Millon (1981) emphasizes the anhedonic aspect of schizotypal individuals in his description of their emotional life:

The deficient or disharmonious affect of schizotypals deprives them of the capacity to experience events as something other than flat and lifeless phenomena. They suffer a sense of vapidness in a world of cold and washed-out objects. Moreover, schizotypals feel themselves to be more dead than alive, insubstantial, foreign, and disembodied. Detached observers of the passing scene, these patients remain uninvolved, looking from the outside not only in regard to others, but with regard to themselves as well....The feeling of estrangement and depersonalization is an everpresent and insistent feature of the schizotypal's everyday existence. (p. 413)

Rado (1962) and Meehl (1973) both explain the emotional problems of schizotypal individuals in terms of inherited
defects—one of which is anhedonia—that severely affect self-awareness, self-confidence, and social relatedness.

According to Rado (1962):

In general, the absence of sufficient pleasure slows down and hinders psychodynamic integration, as the absence of an essential enzyme slows down or hinders a complex biochemical process. In particular, (1) it weakens the motivating power of the welfare emotions, such as pleasureable desire, joy, affection, love and pride; (2) it weakens the counterbalancing effect ordinarily exerted by the welfare emotions on the emergency emotions, thus allowing fears and rages to rise to excessive strength; (3) it reduces the coherence of the action-self, which is viewed as the highest integrative system of the organism, and the very basis of self-awareness; (4) it undermines the schizotypal's self-confidence and sense of security in relation to both himself and his social environment; (5) it makes the development of a well-integrated sexual function impossible; (6) it limits the schizotypal's capacity for the appropriate enjoyment of his life activities, as well as for love and affectionate give and take in human relationships.

All of the writers cited thus far emphasize that schizotypals usually have a flattened, or lifeless, style of emotional presentation, but that when they do show emotions, they are typically negative ones—such as fear, suspicion, hurt, anger, and rage. Gunderson and Singer (1975) also note that intense negative or hostile affect is sometimes present in schizotypal individuals. Zilboorg (1941) states that many are filled with anger and hatred that is usually directed against themselves. These negative emotions may manifest behaviorally as tenseness and nervousness, which interferes with the clear and accurate
expression of both unpleasant and pleasant emotions. While such a style might be characteristic of someone who would today be diagnosed as schizotypal (meeting the DSM-III-R criterion of "constricted affect"), it is more likely that uncontrollable anger and hatred, if at all noticeable, would now lead to the diagnosis of Borderline Personality Disorder (DSM-III-R, 1987) which places more emphasis on these emotions.

Another reason for the emotional presentation problems of schizotypal individuals may be that they lack the skills generally learned in the social environment. Recall that Buck (1984) stressed the importance of socially-shared display rules that guide the individual in the intentional emotional communication so crucial to healthy social functioning. In order for a person to learn and become adept in the usage of these rules, it is necessary that s/he have a sufficient amount of interaction with others. The authors cited above, and others (Bower, Shellhammer, & Daily, 1960; Kretschmer, 1925), note that social withdrawal is one of the most prominent characteristics of schizotypal individuals. Thus, they may have fewer opportunities to learn the social skills necessary for appropriate emotional presentation. This idea suggests the possibility of a vicious circle: schizotypal individuals may feel inept in their interpersonal communication skills, and thus withdraw
from social interactions (or be rejected), which in turn makes it more difficult for them to gain skills to break the cycle.

Despite the extensive clinical and case-study literature on the emotional presentation of schizotypal individuals, there does not appear to be any experimental research on either verbal or nonverbal presentation with this population. There are, however, a few studies on the emotional presentation of schizophrenic individuals. Gottheil, Parades, Exline, and Winkelmeyer (1970) asked schizophrenic and control subjects to relate happy, sad, or angry experiences. The stories were then presented to judges, who guessed what affect was being portrayed by attending to either verbal or nonverbal cues (by reading a transcript or listening to a content-filtered audiotape, respectively). The schizophrenic subjects were found to be less accurate than the controls in expressing happy affect verbally, and anger nonverbally. In a similar study, Levin, Knight, Hall, and Alpert (1985) investigated the emotional communication accuracy of schizophrenic and depressed subjects. These investigators divided their schizophrenic subjects into two groups: those who generally showed "positive symptoms" (e.g., anxiety, emotional lability, irritability, depression, euphoria, etc.) in their daily behavior at the hospital, and those who showed "negative
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symptoms" (e.g., flat, blunted, or inappropriate affect). They found that depressed subjects were least accurate in conveying emotions, positive-symptom schizophrenic subjects were most accurate, and negative-symptom schizophrenic subjects and normal control subjects fell between these extremes. The finding that depressed subjects were the least accurate in presentation of emotion is interesting. While high-scorers on the Physical Anhedonia Scale have not been found to be depressed (Chapman, Edell & Chapman, 1980; Beckfield, 1895), depressed individuals often appear to be anhedonic (Beck, 1976). Perhaps anhedonia is one cause of presentation inaccuracy in the above study. However, the negative-symptom schizophrenic subjects might be expected to be anhedonic as well, and they did not show less accuracy than the control group, and it is difficult to reach any firm conclusion about the role of anhedonia in the study. Furthermore, studies involving hospitalized schizophrenic and depressed subjects may say little or nothing about the nonverbal emotional communication abilities of schizotypal or high-risk individuals who are still members of a nonclinical population.

In summary, evidence from the clinical and case study literature makes it clear that schizotypal individuals frequently display emotional abnormalities, many of which are nonverbal in nature. Emotional presentation may be
constricted, incomprehensible, and/or excessively negative. This seems to be related to a deficient capacity to experience pleasant emotions (anhedonia), a lack of self-awareness and self-control, and social withdrawal. Although the distinction between truly-felt and posed emotional expression is not clear in this literature, it is likely that schizotypal individuals have difficulties with both.
RATIONALE FOR THE PRESENT STUDY

Evidence has been presented that suggests that some high-scorers on the Physical Anhedonia Scale have characteristics in common with schizotypal individuals. These characteristics include anhedonia, poor heterosexual adjustment, social withdrawal, terseness, oddness, and avoidance. Schizotypal individuals are commonly seen as having difficulties in interpersonal communication in general, and in nonverbal emotional presentation in particular. It is possible that Anhedonic subjects may show deficits in this realm, as well. The present study is designed to investigate this hypothesis by examining nonverbal emotional communication in Anhedonic subjects.

This study is of particular interest for two reasons. First, it addresses an important aspect of interpersonal communication that has not yet been investigated in other studies of this population. Thus, it contributes to knowledge about how high and low scorers on the Physical Anhedonia Scale compare with each other. Secondly, it is unique in that it examines posed emotional communication in a population that is hypothesized to be at high risk for schizophrenia. There do not appear to be any studies with either schizophrenic or schizotypal subjects that investigate this form of emotional communication.
The experimental task adapted for use in this study is similar to that used by Friedman, Prince, Riggio, and DiMatteo (1980) in their study of posed sending ability. These investigators have reviewed the methodology in the area, and used its most productive elements in their study. In the study, subjects were asked to portray six emotions (happiness, sadness, disgust, surprise, fear, and anger) while reciting letters of the alphabet and content-standard sentences. Subjects were videotaped, and their ability to pose emotions accurately was determined by the ratings of judges who attempted to identify the emotions intended by the subjects. The use of videotaping (as opposed to audiotaping) allows judges to get as full and rich an emotional presentation as possible; subjects are able to use voice, facial expression, and body movement to communicate the emotions. In addition, videotaping helps maintain controlled experimental conditions in that no observer besides the experimenter need be present during the experiment.

The present study also uses videotapes, and incorporates the same emotions, but omits the use of content-standard sentences. The present author agrees with Friedman et al. that the words in such sentences—no matter how "neutral"—may be incongruous with some emotions. Also, use of the overlearned letters of the alphabet almost invariably
eliminates the problem of forgetting the sentences, which can interfere with smooth presentation.

Another way the present study differs from the Friedman et al. study is that judges rate the emotional communications for "expressiveness" and "clarity." The expressiveness rating—which requires judges to consider use of voice modulation, facial expression, and body movements—provides a measure of the "flatness" thought to characterize the emotional presentation of schizotypal individuals. The clarity rating allows judges to give their subjective impressions regarding the degree of clarity with which the emotions are expressed, apart from the amount of sheer nonverbal "action" measured by the expressiveness rating.

The present study also assesses subjects' comfort, enjoyment, and previous experience in being videotaped. These variables are considered to be important, in that they might have an effect on subjects' ability to communicate emotions in the task. Finally, this study differs from previous studies of emotional communication in that judges are trained to meet a criterion of interrater reliability before they judge the tapes. Although interrater reliabilities calculated after data collection have generally been adequate, the procedure used here helps avoid the potential problem of collecting the data, only to find that interrater reliability is poor.
Two self-report measures of emotional presentation that may be related to posed sending ability are also used in the present study. The Affective Communication Test (ACT) (Friedman, Prince, Riggio & DiMatteo, 1980) is designed to measure the degree to which subjects tend to be nonverbally emotionally expressive in their everyday social interactions. The second additional measure used in this study is Snyder's (1974) Self-monitoring Scale (SMS). It is designed to tap subjects' tendency to monitor and control their emotional expressiveness and self-presentation. More detailed information regarding the reliability and construct and discriminant validity of these two instruments is presented in the Method section of this paper.

Hypotheses

In light of the evidence for emotional presentation problems in schizotypal individuals, and the further evidence that anhedonic subjects share many characteristics with these individuals, the present study makes the following hypotheses: 1) Anhedonic subjects will be less accurate in their communication of emotions than nonanhedonic control subjects; 2) Anhedonic subjects will be rated as being less expressive in their emotional communications; 3) Anhedonic subjects will be rated as being less clear in their emotional communications; and 4) Both ACT and SMS scores will be significantly lower for Anhedonic
subjects than control subjects, indicating that Anhedonic subjects are less expressive in general, and have less of a tendency to monitor and control their emotional expressiveness and self-presentation. Confirmation of these hypotheses would support the idea that subjects who score highly on the Physical Anhedonia Scale are similar to preschizophrenic or schizotypal individuals, and thus may be at risk for developing schizophrenia.
Subjects

Subjects were 24 female and 24 male Introductory Psychology students at the University of Montana who received class credit or a small honorarium for their participation in the experiment. Subjects ranged in age from 18 to 27 years old, and the average age of the subjects was 20.18 (sd = 2.38). All subjects had completed the Physical Anhedonia Scale and several other scales (presented together in a mixed-item format) in a screening session, and were assigned to one of two groups on the basis of their scores. The Anhedonic group consisted of subjects who scored more than two standard deviations above the mean for their gender on the Physical Anhedonia Scale, but not on the Magical Ideation (Eckblad and Chapman, 1983) or Perceptual Aberration (Chapman, Chapman, and Raulin, 1978) Scales. The Control group consisted of subjects who scored no more than half a standard deviation above the mean for their gender on any of these scales. Groups were composed of equal numbers of males and females, with 24 subjects in each group.

In addition to the above criteria for inclusion in this study, subjects had to meet several other requirements. The Chapman Scales include an Infrequency Scale consisting of 13 items that, if answered in the keyed direction, indicate an untruthful test-taking strategy. For example, one item on
the Infrequency Scale is "There have been a number of occasions when people I know have said hello to me" (keyed false). Subjects were selected for participation in this study only if their scores on the Infrequency Scale were zero. Additionally, all subjects were Caucasion, less than 28 years of age, and had English as their first language.

Experimental Design

This study utilizes a between-within groups design for the communication task. A 2 x 2 x 6 between/within analyses of variance design, with anhedonia and gender as the two between-group factors and the six emotions as the within-group factor, is used for comparisons of emotional communication with regard to accuracy, expressiveness, and clarity. A 2 x 2 between-groups analysis of variance design, with anhedonia and gender as the two factors, is used for comparisons of scores on the SMS and the ACT.

Apparatus and Materials

Emotional Communication Task

The experiment was conducted in one of the therapy rooms in the Clinical Psychology Center at the University of Montana. A videotape-recorder and camera (visible to the subject) were used to record the subjects' responses. Seven 5 X 7 cards, each displaying the name of one emotion (i.e., happiness, sadness, anger, disgust, suprise, fear, and a "practice" emotion, doubtfulness) were used to inform
subjects of the emotions they were to communicate. The series of cards was designed so that they could be presented to each subject in a different random order.

**Self-Report Measures**

**Affective Communication Test**

The Affective Communication Test (ACT) (Friedman, Prince, Riggio, & Dimatteo, 1980), a self-report scale consisting of 13 items, was designed to measure nonverbal emotional expressiveness in everyday social interactions, a quality that the authors of the test have referred to as "charisma." In a series of studies, Friedman et al. (1980) have demonstrated good internal consistency (coefficient alpha = .77), and test-retest stability over a two-month interval (r = .90, p < .001) for the instrument, using an undergraduate population. The construct validity of the scale has been demonstrated in a number of ways. Scores on the ACT were found to correlate significantly with ratings by friends of a subject's general emotional expressiveness in face, voice, and body, and the degree to which the subject would "make a good actor" (for males, r = .43; for females, r = .30). High scorers were also found to participate more in activities that are thought to require expressive ability, such as giving lectures, acting, and working as a persuasive salesperson. For female but not male subjects scores on the scale were positively related
to posed sending ability ($r = .47, p < .01$), as measured by performance on a task requiring subjects to communicate emotions using both content-standard sentences and letters of the alphabet. In comparing responses on the ACT to those on other personality measures, the authors found a low positive correlation between ACT and Social Desirability (Crowne & Marlowe, 1964) scores ($r = .22, p < .06$), suggesting that the ACT does contain a small element of social desirability. The authors suggest the relationship exists because some of the items on the ACT seem to reflect popularity, a socially desirable attribute. Also, ACT scores were positively correlated with several scales on the Personality Research Form (Jackson, 1974), measuring the traits of Exhibitionism ($r = .60, p < .001$), Affiliation ($r = .42, p < .001$), and Dominance ($r = .45, p < .001$). Finally, the authors found that scores on the ACT were not related to the personality measures of Machiavellianism (Christie & Geis, 1970), trait anxiety (Taylor, 1953), internal-external locus of control (Rotter, 1966), and self-monitoring (Snyder, 1974), thus providing support for the discriminant validity of the ACT.

**Snyder Self-Monitoring Scale**

The Self-Monitoring Scale (SMS; Snyder, 1974), consisting of 25 true-false items, is a measure of a subject's tendency to monitor and control emotional
expressiveness and self-presentation. It has been shown to be internally consistent (K-R = .70), and to have reasonably high temporal stability (r = .83) over a period of one month (Snyder, 1974). Numerous studies have demonstrated its construct and discriminant validity. Snyder (1974) found that, compared to a population of college students, stage actors scored higher on the scale, and hospitalized psychiatric patients scored lower. Snyder (1979) also found that high scorers on the scale engaged in more socially appropriate behavior (according to peer ratings), showed more self-control of emotional expression, and demonstrated greater ability to create a desired impression via self-presentation. High self-monitoring subjects, compared to low self-monitoring subjects, have demonstrated a greater ability to pose emotions with content-standard speech (Snyder, 1974). In addition, high self-monitors are apparently better able to deceive another person in face-to-face interviews (Krauss, Geller, & Olson, 1976). Discriminant validity for the scale is provided by studies that have found little relationship between SMS scores and measures of locus of control, neuroticism, field-dependence, Machiavelianism, and extraversion, as well as the MMPI scales (Snyder, 1974).
Post-task Questionnaire

A post-task questionnaire, consisting of seven-point Likert scales, was used to assess subjects' level of comfort and enjoyment while doing the task, the emotions that they found easiest and most difficult to communicate, and the emotion that they felt was closest to how they were feeling at the time. In addition, the questionnaire assessed the subjects' amount of previous experience in being video-taped or filmed.

Procedure

Experimental Tasks

All subjects were run individually. Following assignment to groups subjects were contacted by the experimenter, who was blind to group membership, and invited to participate in the study. Depending upon their need for class experimental credits, subjects were offered either credits or a small honorarium for their participation and appointments were scheduled. The experimenter was an undergraduate research assistant who was trained to follow a standard procedure. The experimenter was blind to the group status of the subjects.

Upon arrival at the experiment, subjects were greeted by the experimenter, shown to a room (a different room from the one where they would be videotaped) and asked to complete the SMS and the ACT. The experimenter then left the room so
that subjects would be free from distraction. When the subjects finished these paper and pencil tasks, they were asked to read and sign an informed consent form that briefly described the experimental task and the fact that they would be videotaped. Subjects were presented with the informed consent form after completing the SMS and the ACT due to concern about possible demand effects that knowledge of the task they would be performing might have on subjects' responses to the personality scales. One subject declined to participate after reading the consent form.

After obtaining informed consent, the experimenter showed subjects to the room with the videotape-recorder and seated them eight feet in front of the camera, which was focused on their faces and upper torsos. The experimenter followed a standard script that went as follows:

"In this study, we are investigating peoples' ability to portray emotions even when they are not necessarily feeling the emotions. You will be given six cards, each with a different emotion written on it. Starting with the top card, I would like you to read it aloud, think about it briefly, and then try to communicate it while saying 'a b c d e f g' when I give the signal. [Experimenter recited the letters at the rate of one per second, and made a motion with his hand for the signal.] Try to imagine that you are communicating the emotion to another person while you are looking at the camera. Many people find this a little difficult to do, so we will do a couple of practice runs first."

The experimenter then gave the subject the practice card with "doubtfulness" written on it, and said:

"We'll just try it with this card. Go ahead and read it aloud, then think about it and try to communicate
doubtfulness while saying 'a b c d e f g,' when I give the signal.

All subjects were able to execute the task after one or two practice runs. The experimenter then said:

"Now we are going to do the other six emotions. I'd like you to start with the top card and work your way down. Remember, for each card, read the emotion aloud, think about it for a moment, then try to communicate it while saying 'a b c d e f g,' when I give you the signal."

The experimenter handed subjects the pack of six cards, which were in random order and face down. He then turned on the camera and said:

"Please do not turn over the cards until I tell you to. This time we'll be taping. Okay, now begin with the top card. Turn it over, read the emotion aloud, and wait for my signal."

After subjects had read the emotion, the experimenter waited ten seconds, then gave the hand signal. Following the first emotion, the experimenter waited approximately 10 seconds, then said, "Next card," and continued in this fashion until all six cards were finished.

Subjects then filled out the post-task questionnaire and were debriefed, thanked, and allowed to leave. In the debriefing, the experimenter explained that the experiment was designed to study differences in nonverbal communication styles. The present author was on hand in the event that subjects had further questions about the study. However, all subjects seemed satisfied with the debriefing.
Sixteen additional Introductory Psychology students were recruited via sign-up sheet, and run through the experimental task in the manner described above. The videotapes made from these subjects were to be used for practice by the judges, before they judged the actual experimental and control tapes.

**Editing of Tapes**

After all subjects completed the study, the response videotapes were divided into units, each of which consisted of one subject presenting one emotion, and showed only the subject saying "a b c d e f g." This procedure yielded $48 \times 6 = 288$ units. The units were then arranged in order, so that the 48 subjects were seen consecutively, first presenting their first emotion, then their second, and so on. In this way, all same-subject units were reliably separated from each other by 47 units, lessening the possibility of within-subject halo effects on the raters. Since subjects had been given the emotion cards in random order, emotions appeared randomly throughout the tape. Thus, the judges viewing the tapes had no extra cues to help them guess which emotion was being communicated in a given unit.

**Judging of Tapes**

Three graduate students in clinical psychology (two female and one male) served as judges of the response tapes.
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The judges were blind to the group status of the subjects. For each unit (consisting of one subject communicating one emotion), the judges guessed the emotion that was being communicated, and also rated the unit for expressiveness and clarity, using two five-point Likert scales. For rating clarity, judges were instructed to indicate their subjective impression regarding the degree to which the emotion was clearly communicated. Ratings ranged from one (unclear—cannot tell what emotion is being communicated) to five (very clear—am convinced that the emotion guessed is the one the subject intended to communicate). For rating expressiveness, judges were instructed to consider the expressive modalities of facial expression, voice tone and pacing, as well as body movement and positioning. The rating scale for expressiveness was as follows: 1—Flat affect. No usage of any expressive modalities; 2—Almost flat affect, with just a hint of usage in one or more modalities; 3—Obvious usage of one modality; 4—Obvious usage of two modalities; 5—Obvious usage of three modalities.

Using the practice tapes, judges practiced rating expressiveness and discussed their judgements after rating each unit. This process was continued until an interrater reliability criterion (Pearson $r = .85$ or above) was reached for each pair of judges. Judges then rated the experiment
response tapes, as described above. Interrater reliability was computed for these ratings, as well.
RESULTS

Interrater Agreement

Three judges attempted to identify the emotions that subjects tried to communicate (yielding the accuracy rating), and rated the communications for degree of expressiveness and clarity. Measures of interrater agreement were computed for these measures, where appropriate.

For the expressiveness ratings, Pearson product moment correlation coefficients were computed for each pair of judges. These coefficients were transformed to their $z$ equivalents for averaging, and an average interrater reliability coefficient of $r = .89$ was obtained. Table 1 shows the coefficients for each pair of judges. An

Insert Table 1 about here

...interrater reliability coefficient of .89 is of sufficient magnitude to indicate that judges tended to agree with one another.

For the accuracy ratings, percent agreement between judges was calculated for each pair of judges, yielding an average percent agreement of .69. This suggests that judges had common perceptions of their task, and were able to perceive emotions in a reasonably consensual manner.
Some variation in the judges' agreement on emotions was expected, given that many subjects did not communicate various emotions effectively enough for two or three judges to identify them accurately; thus, percent agreement on this measure was not expected to be extremely high. Table 2 shows the percent agreement data for each pair of judges. A final measure of interrater agreement was computed for those instances in which either none or one of the judges accurately guessed the emotion (two or three judges "missed" the emotion). It was of interest whether in those cases the judges who "missed" the intended emotion agreed in their judgements, or were failing to guess the emotion in a random way. A ratio of number of times two or three judges agreed in those cases, to the total number of such cases was computed, yielding a percent agreement of 82%. This indicates that for the most part, the judges were in agreement with each other, even when subjects failed to communicate the target emotion.

Judges also gave their impressions regarding the degree of clarity with which emotions were communicated. No attempt was made to establish interrater reliability for these ratings, since they are basically confidence ratings.
for the judgements of the particular emotion communicated.

**Emotional Communication Task**

After the judges looked at the tapes, separate scores were computed for each subject for accuracy, expressiveness, and clarity, for each of the six emotions. For a given subject/emotion unit, the accuracy score was the total number of judges that correctly identified the emotion; these scores ranged from 0 to 3. The clarity score was the sum of the three judges' clarity ratings on 5-point Likert scales, and thus ranged from 3 to 15. Similarly, the expressiveness score consisted of the sum of the three judges' expressiveness ratings, and also ranged from 3 to 15.

In order to determine if there were significant main or interaction effects due to the independent variables (anhedonia and gender) on the dependent variables of accuracy, expressiveness, and clarity, three separate 2 x 2 x 6 between/within analyses of variance were conducted. The two between-group factors were anhedonia and gender, and the within-group factor consisted of the six emotions. In addition to addressing the question of group differences across all six emotions, the 2 x 2 x 6 ANOVA yields information about differences between emotions across all groups, and about emotion x group interactions.
Accuracy

The hypothesis that subjects in the Anhedonic group would be less accurate in their communication of emotions than the control group was not supported by the results of this study. Average accuracy scores across the six emotions were computed for each subject. Table 3 shows the means and standard deviations of these scores for each group. The maximum possible score was 3, with higher scores indicating more accurate communication of emotion. Although the group means for Anhedonic and control subjects differ in the predicted direction, no significant differences were found between them, as can be seen in Table 4.

Table 4 shows the results of the $2 \times 2 \times 6$ ANOVA for the accuracy scores. As previously mentioned, the $2 \times 2 \times 6$ ANOVA utilizes data for each emotion; thus it yields more information about differences between groups and emotions than do comparisons of groups on scores averaged across emotions. There were no significant main effects for the between-group factors of anhedonia ($F[1,44] = 2.38$, $p = .126$) or gender ($F[1,44] = 1.61$, $p = .209$). It is interesting to note, however, that the analysis revealed a near significant gender $\times$ emotion interaction.
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($F_{[5,220]} = 2.19, p = .056$), suggesting that the patterns of degree of accuracy for the different emotions came close to being significantly different for the male and female groups.

There was a significant main effect for the within-group factor of emotion ($F_{[5,220]} = 7.90, p < .0001$). This indicates that subjects, irrespective of group status, tended to communicate some emotions more accurately than others. Table 5 displays the mean emotion scores for accuracy across all groups, in ascending order, and shows the results of a Newman-Keuls multiple comparisons test that was used to determine significant differences between emotions.

Expressiveness

The hypothesis that Anhedonic subjects would be less expressive in their communications was also not supported. Group means and standard deviations are presented in Table 6. As with the accuracy data, each subject's expressiveness score was computed by averaging across the six emotions.
Scores ranged from 3 to 15, with higher scores indicating greater expressiveness. As can be seen in Table 7, the 2 x 2 x 6 ANOVA revealed no significant main effect for anhedonia ($F[1,44] = .03, p = .868$). The analysis did reveal significant main effects for gender ($F[1,44] = 4.73, p = .033$) and emotion ($F[5,220] = 4.19, p = .001$), as well as a significant gender x emotion interaction ($F[5,220] = 2.73, p = .020$). Female subjects were rated as being more expressive than male subjects, and the patterns of degree of expressiveness for the different emotions varied between the groups. Tables 8 and 9 show the mean expressiveness scores for each emotion and the results for the Newman-Keuls multiple comparisons procedure, for females and males respectively.

It is worth noting that there was a near significant anhedonia x emotion interaction for expressiveness.
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\( F[5,220] = 1.84, p = .105 \), indicating that Anhedonic and control groups approached a significant difference in patterns of degree of expressiveness for various emotions.

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Insert Table 9 about here

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Clarity

Table 10 displays the group means and standard deviations on the clarity ratings. Again, subjects' scores were averaged across emotions, and the scores ranged from 1 to 15, with higher scores indicating greater clarity. Results of the 2 x 2 x 6 ANOVA are presented in Table 11. Similar to the findings for accuracy and expressiveness, the results yielded no significant main effect for anhedonia, thus providing no support for the hypothesis that Anhedonic subjects would be less clear in their emotional communication. Main effects for gender \( (F[1,44] = 6.20, p = .015) \), and emotion \( (F[5,220] = 5.64, p < .0001) \) were found, with no gender x emotion interaction.

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Insert Table 10 about here

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Insert Table 11 about here
Table 12 in the Appendix displays the means for each emotion and the results of the Newman-Keuls multiple comparisons procedure.

ACT and SMS

The means and standard deviations for each group on the Affective Communication Test are displayed in Table 13. Scores ranged from 29 to 103, with higher scores indicating greater reported nonverbal emotional expressiveness in social interactions. The hypothesis that Anhedonic subjects would achieve lower scores than control subjects on the ACT was supported in this study. As can be seen in Table 14, a 2 x 2 between-groups analysis of variance yielded a main effect for anhedonia ($F[1,44] = 7.24, p < .01$). This indicates that Anhedonic subjects see themselves as being less nonverbally emotionally expressive in their social interactions than do control subjects. A main effect was also found for gender ($F[1,44] = 4.88, p < .05$),
indicating that female subjects reported more nonverbal emotional expressiveness in social interactions than did male subjects.

Table 15 shows means and standard deviations for each group on the Snyder Self-Monitoring Scale. Scores ranged from 3 to 22, with higher scores indicating greater reported tendency to monitor and control emotional expressiveness and self-presentation.

Table 16 displays the results of the two-way ANOVA, which revealed no significant effects for either anhedonia ($F[1,44] = .19, p > .25$) or gender ($F[1,44] = 3.62, p > .05$). The data do not support the hypothesis that Anhedonic subjects would have lower scores on the SMS than control subjects.

Post-Task Questionnaire

Table 17 shows the means for Anhedonic, control, male and female groups for the first four questions on the post-task questionnaire. The questions were as follows: Question 1--How uncomfortable were you when communicating
the emotions?; Question 2—How much did you enjoy communicating the emotions?; Question 3—How much previous experience have you had being videotaped?; Question 4—How much acting (theatrical) experience have you had? Subjects responded to each question on a 7-point Likert scale, with 1 indicating "not at all" or "none," and 7 indicating "very much" or "a lot." 2 x 2 between-groups ANOVAS were computed for each question, and no significant differences were found between groups on any of the measures.

Responses to the last three questions on the post-task questionnaire are shown in Table 18. These questions were as follows: Question 5—Which emotion was easiest for you to communicate?; Question 6—Which emotion was most difficult for you to communicate?; Question 7—Which emotion is closest to how you are feeling today? Subjects could choose any of the seven emotions (including the practice emotion "doubtfulness") that they attempted to communicate. As can be seen from the table, there do not appear to be notable differences between the male, female, Anhedonic, or control groups on responses to any of the questions. It was not possible to analyze the data further with the chi square procedures that are typically employed with such data.
because the expected frequencies for many of the cells were too low. However, it is highly unlikely that any differences would have been found, given the similarities between groups that are evident on inspection.

Insert Table 18 about here
Nonverbal Communication in Anhedonics

DISCUSSION

It was hypothesized that Anhedonic subjects would perform more poorly than control subjects on a nonverbal emotional communication task. It was further hypothesized that Anhedonic subjects, compared to control subjects, would report being less nonverbally emotionally expressive in their social interactions, and report less of a tendency to monitor and control their emotional expressiveness and self-presentation. The results of the current research provide only partial support for these hypotheses. The details and implications of these findings are discussed below.

Emotional Communication Task

Subjects engaged in a task designed to tap their ability in the nonverbal communication of six emotions: happiness, sadness, anger, fear, surprise, and disgust. It was hypothesized that Anhedonic subjects would be less accurate, expressive, and clear in their communications than control subjects. Although the group means for the accuracy scores were in the predicted direction, and the difference between them approached significance ($p = .126$), groups were not significantly different from each other. It appears, then, that Anhedonic subjects are able to deliberately communicate emotions nearly as accurately as nonanhedonic subjects. The hypothesis regarding expressiveness was also not supported by the findings. Judges rated the groups as about equal on
this dimension, indicating that they did not find the groups to be noticeably different in the amount of effort put into voice modulation, facial expression, and body movement. Finally, Anhedonic and control groups were judged to be equally clear in their emotional communications. The present findings indicate that Anhedonic and control subjects have a comparable grasp of how to communicate various emotions nonverbally. Furthermore, they are able to use various nonverbal cues effectively on demand.

Although they are not directly related to the hypotheses of the present study, several significant gender differences on emotional communication task performance are worthy of mention. Female subjects were rated as being more expressive and more clear than male subjects. This is in agreement with several studies reviewed by Hall (1979) that have found females to be more adept than males in sending and receiving nonverbal emotional cues. It was also found that the patterns of degree of expressiveness for different emotions varied between the male and female groups.

Self-Report Measures

In addition to performing the emotional communication task, subjects were asked to complete two self-report scales believed to tap aspects of emotional presentation. It was hypothesized that Anhedonic subjects would achieve lower scores than control subjects on the Affective
Communication Test. This hypothesis was supported by the results, indicating that Anhedonic subjects, compared to control subjects, see themselves as less nonverbally emotionally expressive in everyday social interactions. A consideration of the previously reviewed literature on the ACT suggests that in social interactions, Anhedonic subjects are less outgoing and less able to express emotions comfortably and effectively than control subjects. As with the findings for emotional communication task, females and males were found to differ significantly on the ACT. Females achieved higher scores on the scale than did males.

The hypothesis that Anhedonic subjects would score lower than control subjects on the Snyder Self-Monitoring Scale was not supported by the findings. Thus, the groups apparently do not differ in their tendency to monitor and control emotional expressiveness and self-presentation.

Implications of the Present Study

The finding that Anhedonic and control subjects performed similarly on the communication task is unexpected, given that Anhedonic subjects were observed to be more emotionally "flat" than other subjects in an interview setting (Chapman, Edell, & Chapman, 1980) and that Anhedonic subjects were found to be more verbally terse, odd, and avoidant than controls in interpersonal role-playing tasks (Beckfield, 1985; Numbers & Chapman,
However, there are important differences between the experimental tasks in the present study and the previous ones. The present task was designed to assess nonverbal, rather than verbal behavior. Also, the present task was more circumscribed and structured than was the case in the other studies; a task in which subjects are required to communicate emotions while saying letters of the alphabet provides much more structure for subjects than do social role-playing tasks and interviews. It may be that Anhedonic subjects are able to perform as well as controls do under structured conditions, but might show deficits in a less artificial situation, where there is more ambiguity regarding appropriate behavior. The findings on the ACT support this idea. On this self-report measure, Anhedonic subjects described themselves as being less emotionally expressive in social situations than did controls.

The ACT differs from the emotional communication task in several respects. The ACT, in contrast to the laboratory task, is a self-report measure that taps subjects' perceptions of their functioning in a wide range of situations outside of the laboratory. Furthermore, the emotional communication task focuses on nonverbal behavior; while the ACT is primarily a measure of nonverbal communication, it includes some questions that assess both
nonverbal and verbal behavior (e.g., "I can easily express emotion over the telephone.").

Given the ACT results, it is likely that in everyday interactions Anhedonic subjects tend to be less outgoing and perhaps less comfortable and effective in their emotional communication than control subjects. Given that nonverbal communication plays an important part in the enhancement of one's social interactions, such a deficit suggests that Anhedonic subjects are likely to be less interpersonally successful and more prone to problems in social adjustment. Although no marked deficits in the Anhedonic subjects' nonverbal communication were found in the present study, it is possible that deficits would emerge in a less structured situation. Anhedonic individuals may be more shy, reclusive, and less assertive than their peers. If this tendency were taken to an extreme, it could lead to social withdrawal, which is often associated with the development of psychosis. Evidence that Anhedonic subjects do tend to withdraw socially and have poor heterosexual adjustment compared to nonanhedonic subjects was provided by Chapman, Edell, and Chapman's (1980) interview study.

In these speculations, it is important to note that being less emotionally expressive than the norm can serve a protective, adaptive function, as well as being an alleged pathological trait. Anhedonic individuals derive scant
pleasure from the things that most people enjoy. For such individuals, a great deal of emotional expression might serve to alienate them still further from others.

The present study contributes to the accumulating body of knowledge on the Chapman scales, and suggests that, in the area of nonverbal communication, high scorers on the Physical Anhedonia Scale are similar to low scorers in some ways, but different in others. Specifically, while there is no evidence to suggest that high scorers and low scorers differ in their understanding of and ability to use nonverbal emotional cues on demand, it is suggested that high scorers are less likely to engage in—and feel comfortable and effective in engaging in—emotional expressiveness in their social interactions, as evidenced by the results of the ACT. To the degree that a deficit in this area affects social adjustment in a negative way, this tendency may present difficulties for them.

Although the findings do not suggest that high scorers on the Physical Anhedonia Scale in general show the more severe sorts of deficits in nonverbal communication found in schizotypal and schizophrenic populations, they do provide evidence suggestive of the hypothesis that high scorers have potential problems in this area. Thus, the results of this study provide limited support for the hypothesis that the Physical Anhedonia Scale can make a useful contribution as
one indicator of proneness to the development of psychosis. There remains, however, a great deal of ambiguity surrounding the status of this scale as such an indicator. In regard to the present research, while it is clear that anhedonia and deficits in expressiveness are found in preschizophrenic and schizophrenic individuals, such characteristics would seem as likely to be symptoms of depression. Although two studies previously reviewed have found Anhedonic subjects to be no more depressed than control subjects, this does not rule out the possibility that it is depression--rather than schizophrenia--for which high scorers on the Physical Anhedonia Scale are at risk. Furthermore, in the absence of longitudinal data, the relationship between this and the other Chapman scales and risk for psychological disorders of any type remains open to question.

Limitations of the Present Study and Suggestions for Future Research

A weakness of the present research is the small number of subjects employed. Although 24 subjects for each group is fairly common in research with high scorers on the Chapman scales, this n is at the low end of acceptability for statistical analyses, and may detract from effect sizes that would be strong with larger samples. For instance, in this study, the effect for communication accuracy, which was in
the predicted direction and approached significance, might have been strengthened if there had been more subjects. Persons who scored high enough on the Physical Anhedonia Scale—and also scored low enough on the Infrequency Scale—to be eligible for this study are rare. Thus, research projects of this type may take considerably longer to complete than do studies involving more common populations. Those interested in future research with the Anhedonic population should bear this in mind and allow extra time, when possible. It should be noted that the present study excluded subjects who had an Infrequency Scale score greater than zero, to insure the veracity of the subjects’ self-reports to the greatest extent possible. Most of the Chapman studies have utilized less stringent criteria, excluding subjects only if they had Infrequency Scale scores of three or more (e.g., Chapman, Chapman, & Raulin, 1976; Eckblad & Chapman, 1983).

In the present study, a highly structured and artificial situation was employed to study nonverbal communication. This strategy was useful in that it allowed for controlled conditions in which to examine subjects’ responses, and it is believed that such a strategy was necessary for preliminary work. However, it is likely to have been detrimental to the external validity of the experiment; in other words, there is little similarity between the
conditions of the experimental task and real-life communication situations. Given the fact that anhedonic subjects did report being less nonverbally emotionally expressive in everyday social interactions, further research on situations with more external validity is a natural next step. Extending investigations of this topic to more realistic settings is also important for research involving questions about a potentially psychosis-prone population, considering reports that psychosis-prone individuals may handle nonstressful, superficial situations well, but be less competent under more stressful, emotionally charged conditions (Deutsch, 1942; Millon, 1981). One possibility for more realistic, yet still reasonably controlled, experimental conditions would be to use more complex role-playing tasks, similar those that have already been used in investigations of verbal social skills.

A related problem with the present study is that the one finding that differentiated between anhedonic and control groups occurred with a paper-and-pencil self-report measure. The veridicality of information derived from such measures is always difficult to establish, and these scores must be interpreted with caution. Such caution is even more strongly warranted in this case, as the criteria for selecting subjects for the two groups in the first place was also based on a self-report measure. While paper-and-
pencil measures are widely used and well-respected in psychological research, it is important to gather data using other methods as well. Previous research with Anhedonic subjects has established several findings that are grounded in more direct observational methodology, and the investigation of nonverbal behavior should continue to be conducted with this ideal in mind.

In the present study, judges rated the emotional communication tapes utilizing cues from the expressive modalities of facial expression, voice tone and pacing, and body movement. An interesting avenue for future work in the area of the nonverbal communication of Anhedonic subjects would be to use a similar emotional communication task, but to separate facial and paralinguistic expression during judgments of the tapes. For example, judges could rate the communications using sound only, or use only visual information without sound. Content-filtered speech without visual cues could also be rated. Such an experiment would probe the intricacies of subjects' nonverbal communication skill by examining various expressive modalities in isolation. It is possible that group differences might be discovered for different communicative modalities.

Another suggestion for future research involves the investigation of nonverbal communication skill for "positive" verses "negative" emotions. Many authors
(e.g., Rado, 1962; Zilboorg, 1941) have noted that schizotypal individuals tend to show more negative emotions such as anger and fear, compared with positive emotions such as happiness and joy. The present study did not explicitly investigate the question of differential communication skill for positive and negative emotions, but the $2 \times 2 \times 6$ analyses of the emotional communication task revealed no differences between Anhedonic and control groups in patterns of communication skill for the various emotions. However, these results are not conclusive, particularly because the present study utilized the six emotions of happiness, surprise, anger, fear, sadness and disgust. An array of emotions that was balanced with respect to positive and negative emotions would facilitate a more appropriate assessment of possible differences in nonverbal communication skill for these two categories of emotions.

Finally, as already emphasized, the most essential type of design for investigations involving the Chapman scales is longitudinal. While studies such as the present one do provide important evidence regarding the characteristics of high and low scorers, it is primarily through longitudinal research that the crucial questions surrounding the scales' validity as an assessment device for psychosis-proneness will be answered.
Nonverbal Communication in Anhedonics

Summary

The present study examined the nonverbal emotional communication skills of a nonclinical group of college students who scored high on the Physical Anhedonia Scale, believed to be a potential indicator of high risk for the development of schizophrenia. In keeping with the strategy of previous research with this population, subjects who scored high on the Physical Anhedonia Scale were compared with low scorers on experimental tasks, with the expectation that high scorers would perform in a manner more characteristic of members of schizophrenic or schizotypal populations.

Previous research, using various measures of interpersonal communication skill, has revealed some schizotypal-like style and performance deficits in Anhedonic subjects. The present study focused on nonverbal emotional communication, an area of functioning that is noted to be problematic for schizotypal and schizophrenic individuals and is also an area that had not been explored previously for high scorers on the Physical Anhedonia Scale.

Anhedonic and control groups did not differ significantly in their performance of the emotional communication task, nor did Anhedonic subjects report monitoring or controlling their emotional expressiveness and self-presentation less than control subjects. However,
Anhedonic subjects did report being less nonverbally emotionally expressive in their social interactions than did control subjects, thus providing support for one major hypothesis of this study.

The results of the present study are congruent with previous investigations of high scorers on the Physical Anhedonia Scale, in that they provide some limited support for the hypothesis that the scale may make a useful contribution in the assessment of psychosis-proneness. However, it is emphasized that the findings of the present research are limited and subject to various interpretations, and thus should be viewed cautiously. At this point, the necessary steps for further investigations of the nonverbal emotional communication of this population involve designing more realistic experimental conditions and using larger sample sizes.

Longitudinal research is essential in order to answer the enduring questions surrounding the potential usefulness of the Physical Anhedonia Scale and other Chapman scales for the identification of psychosis-proneness. However, the present study makes a unique and important contribution to knowledge about the differences between high and low scorers on the Physical Anhedonia Scale in the area of nonverbal emotional communication.
Nonverbal Communication in Anhedonics

REFERENCES


Nonverbal Communication in Anhedonics


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Ricks, D. F., & Berry, J. C. (1970). Family and symptom patterns that precede schizophrenia. In M. Roff & D. F. Ricks (Eds.), *Life history research in psychopathology* (pp. 31-50). Minneapolis: University of Minnesota Press.


APPENDIX A

The Physical Anhedonia Scale

1. I have sometimes enjoyed feeling the strength in my muscles.

2. On seeing a soft, thick carpet, I have sometimes had the impulse to take off my shoes and walk barefoot on it.

3. There just are not many things that I have ever really enjoyed doing.

4. The sound of rustling leaves has never much pleased me.

5. I have always hated the feeling of exhaustion that comes from vigorous activity.

6. I don't understand why people enjoy looking at the stars at night.

7. I have been fascinated with the dancing of flames in a fireplace.

8. I have often enjoyed receiving a strong, warm handshake.

9. The color that things are painted has seldom mattered to me.

10. The taste of food has always been important to me.

11. I have always loved having my back massaged.

12. The bright lights of a city are exciting to look at.

13. The sounds of a parade have never excited me.

14. The beauty of sunsets is greatly overrated.

15. When I have seen a statue I have had the urge to feel it.

16. After a busy day, a slow walk has often felt relaxing.

17. I have always had a number of favorite foods.

18. It has always made me feel good when someone I care about reaches out to touch me.
19. Sex is okay, but not as much fun as most people claim it is.

20. When I have walked by a bakery, the smell of fresh bread has often made me hungry.

21. Flowers aren’t as beautiful as many people claim.

22. It has often felt good to massage my muscles when they are tired or sore.

23. Poets always exaggerate the beauty and joys of nature.

24. I have usually finished my bath or shower as quickly as possible just to get it over with.

25. I have seldom cared to sing in the shower.

26. I’ve never cared much about the texture of food.

27. When I pass by flowers, I have often stopped to smell them.

28. I like playing with and petting soft little kittens or puppies.

29. Beautiful scenery has been a great delight to me.

30. I never wanted to go on any of the rides at an amusement park.

31. I have sometimes danced by myself just to feel my body move with the music.

32. I have often found walks to be relaxing and enjoyable.

33. I have never found a thunderstorm exhilarating.

34. I never have the desire to take off my shoes and walk through a puddle barefoot.

35. When eating a favorite food, I have often tried to eat slowly to make it last longer.

36. I think that flying a kite is silly.

37. I have usually found lovemaking to be intensely pleasurable.
38. I have had very little fun from physical activities like walking, swimming, or sports.

39. A good soap lather when I'm bathing has sometimes soothed and refreshed me.

40. The first winter snowfall has often looked pretty to me.

41. When I'm feeling a little sad, singing has often made me feel happier.

42. One food tastes as good as another to me.

43. My hearing is sometimes so sensitive that ordinary sounds become uncomfortable.

44. I have had very little desire to try new kinds of foods.

45. I have always found organ music dull and unexciting.

46. I have seldom enjoyed any kind of sexual experience.

47. Sex is the most intensely enjoyable thing in life.

48. I don't know why some people are so interested in music.

49. I have usually found soft music boring rather than relaxing.

50. Standing on a high place and looking out over the view is very exciting.

51. The smell of dinner cooking has hardly ever aroused my appetite.

52. I have often felt uncomfortable when my friends touch me.

53. Dancing, or the idea of it, has always seemed dull to me.

54. Sunbathing isn't really more fun than lying down indoors.

55. Trying new foods is something I have always enjoyed.

56. The sound of organ music has often thrilled me.
57. The sound of the rain falling on the roof has made me feel snug and secure.

58. The warmth of an open fireplace hasn't especially soothed and calmed me.

59. On hearing a good song I have seldom wanted to sing along with it.

60. I have often enjoyed the feel of silk, velvet, or fur.

61. I've never cared to sunbathe; it just makes me hot.
APPENDIX B

The Infrequency Scale

1. At times when I was ill or tired, I have felt like going to bed early.

2. There have been times when I have dialed a telephone number only to find that the line was busy.

3. There have been a number of occasions when people I know have said hello to me.

4. I cannot remember a time when I talked with someone who wore glasses.

5. I cannot remember a single occasion when I have ridden on a bus.

6. I go at least once every two years to visit either northern Scotland or some part of Scandinavia.

7. On some mornings, I didn't get out of bed immediately when I first woke up.

8. Driving from New York to San Francisco is generally faster than flying between these cities.

9. Sometimes when walking down the sidewalk, I have seen children playing.

10. I believe that most light bulbs are powered by electricity.

11. On some occasions I have noticed that some other people are better dressed than myself.

12. I find that I often walk with a limp, which is the result of a skydiving accident.

13. I have never combed my hair before going out in the morning.
APPENDIX C

The Affective Communication Test

Please Read These Instructions Carefully. Below you will find a series of statements indicating an attitude or behavior that might be true as it applies to you or might not be true of you. Your task is to read carefully each statement and circle the number between minus four (-4) and plus four (+4) that best indicates your answer. The more negative your answer, the more you believe the statement is false as it applies to you. The more positive your answer, the more you believe the statement is true of you.

Example:

I feel happy when I see pretty flowers.

<table>
<thead>
<tr>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all true of me</td>
<td>very true of me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Circling number 2 would indicate that you feel somewhat happy when you see flowers but not as much as if you had circled number 4. If you had circled -4, this would mean that the opposite is true—that you feel very unhappy when you see flowers.

There are no right or wrong answers. Please circle only one number on each scale. Read each statement carefully and indicate an answer for every one.

1. When I hear good dance music, I can hardly keep still.

<table>
<thead>
<tr>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all true of me</td>
<td>very true of me</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

2. My laugh is soft and subdued.

<table>
<thead>
<tr>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all true of me</td>
<td>very true of me</td>
<td></td>
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</tr>
</tbody>
</table>
Nonverbal Communication in Anhedonics

3. I can easily express emotion over the telephone.

-4 -3 -2 -1 0 1 2 3 4
not at all true of me
very true of me

4. I often touch friends during conversations.

-4 -3 -2 -1 0 1 2 3 4
not at all true of me
very true of me

5. I dislike being watched by a large group of people.

-4 -3 -2 -1 0 1 2 3 4
not at all true of me
very true of me

6. I usually have a neutral facial expression.

-4 -3 -2 -1 0 1 2 3 4
not at all true of me
very true of me

7. People tell me that I would make a good actor or actress.

-4 -3 -2 -1 0 1 2 3 4
not at all true of me
very true of me

8. I like to remain unnoticed in a crowd.

-4 -3 -2 -1 0 1 2 3 4
not at all true of me
very true of me

9. I am shy among strangers.

-4 -3 -2 -1 0 1 2 3 4
not at all true of me
very true of me

10. I am able to give a seductive glance if I want to.

-4 -3 -2 -1 0 1 2 3 4
not at all true of me
very true of me
11. I am terrible at pantomime as in games like charades.

-4 -3 -2 -1 0 1 2 3 4
not at all very true
true of me of me

12. At small parties I am the center of attention.

-4 -3 -2 -1 0 1 2 3 4
not at all very true
true of me of me

13. I show that I like someone by hugging or touching that person.

-4 -3 -2 -1 0 1 2 3 4
not at all very true
true of me of me

Note: The title on the subject's copies was "Self-Description Questionnaire."
The statements on the following pages concern your personal reactions to a number of different situations. No two statements are exactly alike, so consider each statement carefully before answering. If a statement is TRUE or MOSTLY TRUE as applied to you, check ( ) the space under T. If a statement is FALSE or NOT USUALLY TRUE as applied to you, check ( ) under F. It is important to answer as frankly and as honestly as you can. Your answers will be kept in the strictest confidence.

<table>
<thead>
<tr>
<th></th>
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<th>Question</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>1. I find it hard to imitate the behavior of other people.</td>
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<tr>
<td></td>
<td></td>
<td>2. My behavior is usually an expression of my true inner feelings, attitudes, and beliefs.</td>
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<tr>
<td></td>
<td></td>
<td>3. At parties and social gatherings, I do not attempt to do or say things that others will like.</td>
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<td></td>
<td></td>
<td>4. I can only argue for ideas which I already believe.</td>
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<td></td>
<td>5. I can make impromptu speeches even on topics about which I have almost no information.</td>
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<tr>
<td></td>
<td></td>
<td>6. I guess I put on a show to impress or entertain people.</td>
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<tr>
<td></td>
<td></td>
<td>7. When I am uncertain how to act in a social situation, I look to the behavior of others for cues.</td>
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<tr>
<td></td>
<td></td>
<td>8. I would probably make a good actor.</td>
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<tr>
<td></td>
<td></td>
<td>9. I rarely need the advice of my friends to choose movies, books, or music.</td>
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<td>Question</td>
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<tr>
<td>T</td>
<td>F</td>
<td>10. I sometimes appear to others to be experiencing deeper emotions than I actually am.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. I laugh more when I watch a comedy with others than when alone.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12. In a group of people I am rarely the center of attention.</td>
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<td></td>
<td></td>
<td>13. In different situations and with different people, I often act like very different persons.</td>
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<td></td>
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<td>14. I am not particularly good at making other people like me.</td>
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<td></td>
<td></td>
<td>15. Even if I am not enjoying myself, I often pretend to be having a good time.</td>
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<td></td>
<td></td>
<td>16. I'm not always the person I appear to be.</td>
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<tr>
<td></td>
<td></td>
<td>17. I would not change my opinions (or the way I do things) in order to please someone else or win their favor.</td>
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<tr>
<td></td>
<td></td>
<td>18. I have considered being an entertainer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19. In order to get along with and be liked, I tend to be what people expect me to be rather than anything else.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20. I have never been good at games like charades or improvisational acting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21. I have trouble changing my behavior to suit different people and different situations.</td>
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<tr>
<td></td>
<td></td>
<td>22. At a party I let others keep the jokes and stories going.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23. I feel a bit awkward in company and do not show up quite so well as I should.</td>
</tr>
</tbody>
</table>
Question

____  ____  24. I can look anyone in the eye and tell a lie with a straight face (if for a right end).

____  ____  25. I may deceive people by being friendly when I really dislike them.

Note: The title on the subjects' copy was Attitude and Experience Scale
APPENDIX E

INFORMATION AND INFORMED CONSENT FORM

This is a study of personality and emotion communication styles. In this part of the study, you will be asked to try to communicate several different emotions. People differ greatly in their styles of emotional communication, and this study is interested in these differences. In order that communication style may be studied, it is necessary to videotape this portion of the experiment. Only the experimenter with you now and some assistants to the experiment will view these tapes.

All aspects of your participation in this study will be kept confidential; no names will be used in analyses of the questionnaires or the tapes.

If you have any questions about this study, please feel free to discuss them with the experimenter afterward.

You are reminded that you are free to discontinue participation at any time. If you decide to do so, you will still receive full credit for the experiment.

I have read this statement and agree to participate in this study.

__________________________  __________________________
(signature)                 (Date)
APPENDIX F

Post-task Questionnaire

1. Please circle the number that is most true for you.
   a. How uncomfortable were you when communicating the emotions?
      
      1  2  3  4  5  6  7
      not at all somewhat very uncomfortable

   b. How much did you enjoy communicating the emotions?
      
      1  2  3  4  5  6  7
      enjoyed somewhat enjoyed very much
      not at all somewhat enjoyed very much

   c. How much previous experience have you had being videotaped or filmed?
      
      1  2  3  4  5  6  7
      none some a lot

   d. How much acting (theatrical) experience have you had?
      
      1  2  3  4  5  6  7
      none some a lot

2. Which emotion was easiest for you to communicate? (Please write only one emotion.)

   ________________

3. Which emotion was most difficult for you to communicate?

   ________________

4. Which emotion is closest to how you are feeling today?

   ________________
APPENDIX G

Sample Judges' Rating Form for the Emotional Communication Task Tapes

1.  HAPPINESS SADNESS ANGER DISGUST SURPRISE FEAR

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>unclear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderately clear</td>
<td></td>
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2.  HAPPINESS SADNESS ANGER DISGUST SURPRISE FEAR

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3.  HAPPINESS SADNESS ANGER DISGUST SURPRISE FEAR

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4.  HAPPINESS SADNESS ANGER DISGUST SURPRISE FEAR

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</tr>
<tr>
<td>very clear</td>
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</tbody>
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<table>
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<th>moderate expressiveness</th>
<th>very much expressiveness</th>
</tr>
</thead>
</table>
APPENDIX H

To: Art Beaman, Ph.D., Chairperson, Institutional Review Board for the Use of Human Subjects in Research

From: Claudia J. French, Graduate student in clinical psychology, and Dr. David Schuldberg, Clinical faculty member.

Date: April 19, 1986

IRB Human Subjects Proposal

1. Description of the research. This study explores the nonverbal communicative behavior related to a personality and cognitive style identified by Chapman and Chapman at the University of Wisconsin, who have developed a measure tapping a self-reported lack of pleasurable experiences. Chapman and Chapman have found that normal college students who score highly on this index perform on many tasks and measures in ways characteristic of schizophrenic subjects in prior studies. The intent of the present study is to extend the Chapmans' research into a new area of functioning—that of nonverbal emotional communication. It will compare the performance of high and low scorers on the Chapman measure on a task that requires subjects to intentionally express several different emotions, and on some other self-report measures of expressiveness.

2. The subjects of the study may perhaps benefit in terms of self-awareness as a result of participation. Many people find questionnaires interesting, and many also enjoy doing something novel, such as the communication task. Furthermore, an informative explanation about the subject matter of the study will be given to those who express an interest.

   The study will enhance scientific knowledge because it investigates a previously unexplored—but very important—aspect of interpersonal functioning in a population that has commanded considerable attention in recent years.

3. Subjects from the Psychology 110 subject pool will have been administered the paper-and-pencil Chapman scale mentioned above, as part of an ongoing IRB-approved study
of personality and thinking styles by Dr. David Schulberg. Groups of subjects scoring high and low will be recontacted and invited to participate further in the study. Participation will either be rewarded by further experimental credits, or—in cases where no more credits are needed—by a small honorarium.

Upon arrival to the experiment, subjects will be informed of the nature of the task and will sign an informed consent sheet including consent to be videotaped. They will then fill out two self-report questionnaires: Snyder's Self-Monitoring Scale and Friedman's Affective Communication Test. Following this, they will participate in the emotional communication task. This task requires subjects to communicate six different emotions (written on cards) one at a time, while reciting the first seven letters of the alphabet. Subjects will be video-taped, and their performances will later be judged by three graduate students.

4. Subjects will be members of the Psychology 110 pool.

5. It is possible that some subjects will be uncomfortable in a videotaping situation. This discomfort will be dealt with in a debriefing session, if the experimenter believes this is appropriate. (See below.)

6. Subjects will be fully informed about the videotaping at the beginning of the experimental session, and be given the option to forego participation (see attached briefing and informed consent form). In addition, they will be given some practice trials in front of the camera to help them get used to being filmed. Finally, they will be assured that their names will not be used in data analyses, and that only the three graduate students and the experimenter will have access to the tapes. In the unlikely event that a subject experiences psychological discomfort as a result of participation in the study, he or she will be further debriefed as necessary.

7. All subjects will be identified only by code number, and findings will refer only to groups of subjects. Information regarding the names of subjects will be kept separate from the data, and be safeguarded by the experimenter. Only the experimenter and three other graduate students (who are aware of the ethical requirements of human subjects use) will have access to the data.

8. See attached sheet.
9. Not applicable

10. Covered in the above items 5-8, and in the American Psychological Association's Ethical Guidelines for Research with Human Subjects. In addition, the study will be supervised by Dr. David Schuldberg, a clinical psychology faculty member.

Claudia J. French

Dr. David Schuldberg
Nonverbal Communication in Anhedonics

TABLES

Table 1
Interrater Reliability for Expressiveness Scores

<table>
<thead>
<tr>
<th>Pairs of Judges</th>
<th>r</th>
<th>Average r</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>.90</td>
<td>.89</td>
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<td>1-3</td>
<td>.89</td>
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<td>2-3</td>
<td>.88</td>
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</table>

Table 2
Percent Agreement for Accuracy Scores

<table>
<thead>
<tr>
<th>Pairs of Judges</th>
<th>% Agreement</th>
<th>Average</th>
</tr>
</thead>
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<td>.69</td>
</tr>
<tr>
<td>1-3</td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td>.67</td>
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</tbody>
</table>
## Table 3

### Means and Standard Deviations for Accuracy Scores

<table>
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<th>Group</th>
<th>n</th>
<th>Mean</th>
<th>sd</th>
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</thead>
<tbody>
<tr>
<td><strong>Anhedonic</strong></td>
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<td></td>
</tr>
<tr>
<td>Males</td>
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<td>1.42</td>
<td>.62</td>
</tr>
<tr>
<td>Females</td>
<td>12</td>
<td>1.64</td>
<td>.66</td>
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<tr>
<td><strong>Control</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Males</td>
<td>12</td>
<td>1.69</td>
<td>.82</td>
</tr>
<tr>
<td>Females</td>
<td>12</td>
<td>1.99</td>
<td>.70</td>
</tr>
<tr>
<td><strong>All Anhedonic</strong></td>
<td>24</td>
<td>1.53</td>
<td>.63</td>
</tr>
<tr>
<td><strong>All Control</strong></td>
<td>24</td>
<td>1.85</td>
<td>.76</td>
</tr>
<tr>
<td><strong>All Males</strong></td>
<td>24</td>
<td>1.56</td>
<td>.72</td>
</tr>
<tr>
<td><strong>All Females</strong></td>
<td>24</td>
<td>1.81</td>
<td>.69</td>
</tr>
</tbody>
</table>

*Note: Maximum possible score is 3, with higher scores indicating greater accuracy.*
### Table 4

*2 x 2 x 6 Between/Within ANOVA of Accuracy Scores*

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anhedonic/Control (A)</td>
<td>7.03</td>
<td>1</td>
<td>7.03</td>
<td>2.37</td>
<td>.13</td>
</tr>
<tr>
<td>Male/Female (B)</td>
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<td>1</td>
<td>4.75</td>
<td>1.61</td>
<td>.21</td>
</tr>
<tr>
<td>A x B</td>
<td>.09</td>
<td>1</td>
<td>.09</td>
<td>.03</td>
<td>.86</td>
</tr>
<tr>
<td>Error</td>
<td>130.21</td>
<td>44</td>
<td>2.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotions (C)</td>
<td>44.81</td>
<td>5</td>
<td>8.96</td>
<td>7.90</td>
<td>.00***</td>
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<td>1.31</td>
<td>.29</td>
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<td>5</td>
<td>2.48</td>
<td>2.19</td>
<td>.06</td>
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<td>A x B x C</td>
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<td>5</td>
<td>.80</td>
<td>.70</td>
<td>.63</td>
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<td>249.54</td>
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***p < .0001
Table 5

Overall Means for Each Emotion and Newman-Keuls Multiple Comparisons Procedure on Accuracy Scores

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<th>Fear</th>
<th>Disgust</th>
<th>Anger</th>
<th>Happiness</th>
<th>Sadness</th>
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<tbody>
<tr>
<td>Means</td>
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<td>1.38</td>
<td>1.52</td>
<td>1.67</td>
<td>1.98</td>
<td>2.38</td>
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</table>

Differences Between Pairs

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<tr>
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<th>Fear</th>
<th>Disgust</th>
<th>Anger</th>
<th>Happiness</th>
<th>Sadness</th>
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</thead>
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<tr>
<td>Surprise</td>
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<td>.33</td>
<td>.48</td>
<td>.79*</td>
<td>1.19*</td>
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<tr>
<td>Fear</td>
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<td>.29</td>
<td>.60*</td>
<td>1.00*</td>
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<td></td>
</tr>
<tr>
<td>Disgust</td>
<td>.15</td>
<td>.46</td>
<td>.85*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>.31</td>
<td></td>
<td>.71*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happiness</td>
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<td></td>
<td></td>
<td></td>
<td>.40</td>
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Note: The difference between pairs of emotions are shown at the intersections of rows and columns. Asterisks indicate significant differences of p < .05.
### Table 6

**Means and Standard Deviations for Expressiveness Scores**

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean</th>
<th>sd</th>
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<td></td>
</tr>
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<td></td>
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<tr>
<td>Males</td>
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<td>3.00</td>
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<td>Females</td>
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<td>2.94</td>
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<td>9.12</td>
<td>2.66</td>
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<td><strong>All Females</strong></td>
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<td>2.37</td>
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</table>

*Note: Maximum possible score is 15, with higher scores indicating greater expressiveness.*
Nonverbal Communication in Anhedonics

Table 7

2 x 2 x 6 Between/Within ANOVA of Expressiveness Scores

<table>
<thead>
<tr>
<th>Source of Variation</th>
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<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
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<td><strong>Between</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Anhedonic/Control (A)</td>
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<td>1.00</td>
<td>.03</td>
<td>.87</td>
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<td>7.67</td>
<td>.20</td>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotions (C)</td>
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<td>15.23</td>
<td>4.19</td>
<td>.00**</td>
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<td>A x C</td>
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<td>1.84</td>
<td>.11</td>
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<td>9.92</td>
<td>2.73</td>
<td>.02*</td>
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<tr>
<td>A x B x C</td>
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<td>4.41</td>
<td>1.21</td>
<td>.30</td>
</tr>
<tr>
<td>Error</td>
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<td>220</td>
<td>3.64</td>
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</table>

*p < .05   **p < .01
Table 8

Means for Each Emotion and Newman-Keuls Multiple Comparisons Procedure on Female Expressiveness Scores

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<tr>
<th>Emotion</th>
<th>Fear</th>
<th>Anger</th>
<th>Happiness</th>
<th>Surprise</th>
<th>Disgust</th>
<th>Sadness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9.33</td>
<td>9.46</td>
<td>9.50</td>
<td>9.58</td>
<td>10.29</td>
<td>11.00</td>
</tr>
</tbody>
</table>

Differences Between Pairs

<table>
<thead>
<tr>
<th></th>
<th>Fear</th>
<th>Anger</th>
<th>Happiness</th>
<th>Surprise</th>
<th>Disgust</th>
<th>Sadness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear</td>
<td>0.13</td>
<td>0.17</td>
<td>0.25</td>
<td>0.96</td>
<td>1.67*</td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.04</td>
<td>0.13</td>
<td>0.83</td>
<td>1.54*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happiness</td>
<td>0.08</td>
<td>0.79</td>
<td>1.50*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surprise</td>
<td>0.72</td>
<td>1.41*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disgust</td>
<td></td>
<td>0.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The difference between pairs of emotions are shown at the intersections of rows and columns. Asterisks indicate significant differences of $p < .05$. 
Table 9
Means for Each Emotion and Newman-Keuls Multiple Comparisons Procedure on Male Expressiveness Scores

<table>
<thead>
<tr>
<th></th>
<th>Fear</th>
<th>Happiness</th>
<th>Disgust</th>
<th>Sadness</th>
<th>Anger</th>
<th>Surprise</th>
</tr>
</thead>
<tbody>
<tr>
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<td>8.79</td>
<td>9.54</td>
<td>10.13</td>
<td>10.33</td>
<td>10.38</td>
<td>10.71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Differences Between Pairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear</td>
</tr>
<tr>
<td>Happiness</td>
</tr>
<tr>
<td>Disgust</td>
</tr>
<tr>
<td>Sadness</td>
</tr>
<tr>
<td>Anger</td>
</tr>
</tbody>
</table>

Note: The difference between pairs of emotions are shown at the intersections of rows and columns. Asterisks indicate significant differences of p < .05.
### Table 10

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anhedonic</td>
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</tr>
<tr>
<td>Males</td>
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<td>8.85</td>
<td>2.40</td>
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<tr>
<td>Females</td>
<td>12</td>
<td>10.61</td>
<td>2.26</td>
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<tr>
<td>Control</td>
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<td>Males</td>
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<td>8.75</td>
<td>3.03</td>
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<td>Females</td>
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<td>10.72</td>
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<td>All Males</td>
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<td>8.80</td>
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<tr>
<td>All Females</td>
<td>24</td>
<td>10.67</td>
<td>2.40</td>
</tr>
</tbody>
</table>

Note: Maximum possible score is 15, with higher scores indicating greater clarity.
Table 11

2 x 2 x 6 Between/Within ANOVA of Clarity Scores

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anhedonic/Control (A)</td>
<td>.03</td>
<td>1</td>
<td>.03</td>
<td>.00</td>
<td>.99</td>
</tr>
<tr>
<td>Male/Female (B)</td>
<td>251.25</td>
<td>1</td>
<td>251.25</td>
<td>6.20</td>
<td>.02*</td>
</tr>
<tr>
<td>A x B</td>
<td>.78</td>
<td>1</td>
<td>.78</td>
<td>.01</td>
<td>.89</td>
</tr>
<tr>
<td>Error</td>
<td>1782.54</td>
<td>44</td>
<td>40.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotions (C)</td>
<td>228.56</td>
<td>5</td>
<td>45.71</td>
<td>5.64</td>
<td>.00***</td>
</tr>
<tr>
<td>A x C</td>
<td>24.31</td>
<td>5</td>
<td>4.86</td>
<td>.60</td>
<td>.70</td>
</tr>
<tr>
<td>B x C</td>
<td>62.64</td>
<td>5</td>
<td>12.53</td>
<td>1.55</td>
<td>.18</td>
</tr>
<tr>
<td>A x B x C</td>
<td>67.95</td>
<td>5</td>
<td>13.59</td>
<td>1.68</td>
<td>.14</td>
</tr>
<tr>
<td>Error</td>
<td>1782.38</td>
<td>220</td>
<td>8.10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05     ***p < .0001
Table 12

Overall Means for Each Emotion and Newman-Keuls Multiple Comparisons Procedure on Clarity Scores

<table>
<thead>
<tr>
<th></th>
<th>Fear</th>
<th>Surprise</th>
<th>Happiness</th>
<th>Disgust</th>
<th>Anger</th>
<th>Sadness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means</td>
<td>8.98</td>
<td>9.06</td>
<td>9.21</td>
<td>9.42</td>
<td>10.23</td>
<td>11.50</td>
</tr>
</tbody>
</table>

Differences Between Pairs

<table>
<thead>
<tr>
<th></th>
<th>Fear</th>
<th>Surprise</th>
<th>Happiness</th>
<th>Disgust</th>
<th>Anger</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.08</td>
<td>.23</td>
<td>.44</td>
<td>1.25</td>
<td>2.52*</td>
<td></td>
</tr>
<tr>
<td>Fear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surprise</td>
<td>.14</td>
<td></td>
<td>.35</td>
<td>1.17</td>
<td>2.44*</td>
<td></td>
</tr>
<tr>
<td>Happiness</td>
<td></td>
<td>.21</td>
<td>.02</td>
<td>2.29*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disgust</td>
<td></td>
<td></td>
<td></td>
<td>.81</td>
<td>2.08*</td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.27*</td>
<td></td>
</tr>
</tbody>
</table>

Note: The difference between pairs of emotions are shown at the intersections of rows and columns. Asterisks indicate significant differences of $p < .05$. 
### Table 13

**Means and Standard Deviations for Affective Communication Test Scores**

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anhedonic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>12</td>
<td>54.92</td>
<td>16.04</td>
</tr>
<tr>
<td>Females</td>
<td>12</td>
<td>69.25</td>
<td>15.97</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>12</td>
<td>71.75</td>
<td>16.53</td>
</tr>
<tr>
<td>Females</td>
<td>12</td>
<td>80.33</td>
<td>22.50</td>
</tr>
<tr>
<td><strong>All Anhedonic</strong></td>
<td>24</td>
<td>62.08</td>
<td>17.28</td>
</tr>
<tr>
<td><strong>All Control</strong></td>
<td>24</td>
<td>76.04</td>
<td>19.80</td>
</tr>
<tr>
<td><strong>All Males</strong></td>
<td>24</td>
<td>63.33</td>
<td>18.10</td>
</tr>
<tr>
<td><strong>All Females</strong></td>
<td>24</td>
<td>74.79</td>
<td>19.90</td>
</tr>
</tbody>
</table>

*Note: Maximum possible score is 135, with higher scores indicating greater nonverbal emotional expressiveness.*

### Table 14

**2 x 2 Between-groups ANOVA of Affective Communication Test Scores**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anhedonic/Control (A)</td>
<td>2338</td>
<td>1</td>
<td>2338</td>
<td>7.24</td>
<td>&lt; .01**</td>
</tr>
<tr>
<td>Male/Female (B)</td>
<td>1576</td>
<td>1</td>
<td>1576</td>
<td>4.88</td>
<td>&lt; .05*</td>
</tr>
<tr>
<td>A x B</td>
<td>99</td>
<td>1</td>
<td>99</td>
<td>.30</td>
<td>NS</td>
</tr>
<tr>
<td>Error</td>
<td>14208</td>
<td>44</td>
<td>323</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 15
Means and Standard Deviations for Snyder Self-Monitoring Scale Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anhedonic Males</td>
<td>12</td>
<td>10.67</td>
<td>5.40</td>
</tr>
<tr>
<td>Anhedonic Females</td>
<td>12</td>
<td>13.33</td>
<td>4.79</td>
</tr>
<tr>
<td>Control Males</td>
<td>12</td>
<td>11.33</td>
<td>4.14</td>
</tr>
<tr>
<td>Control Females</td>
<td>12</td>
<td>13.83</td>
<td>4.37</td>
</tr>
<tr>
<td>All Anhedonic</td>
<td>24</td>
<td>12.00</td>
<td>5.18</td>
</tr>
<tr>
<td>All Control</td>
<td>24</td>
<td>12.58</td>
<td>4.35</td>
</tr>
<tr>
<td>All Males</td>
<td>24</td>
<td>11.00</td>
<td>4.72</td>
</tr>
<tr>
<td>All Females</td>
<td>24</td>
<td>13.58</td>
<td>4.49</td>
</tr>
</tbody>
</table>

Note: Maximum possible score is 25, with higher scores indicating greater self-monitoring.

Table 16
2 x 2 Between-groups ANOVA of Snyder Self-Monitoring Scale

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anhedonic/Control (A)</td>
<td>4.1</td>
<td>1</td>
<td>4.1</td>
<td>.19</td>
<td>NS</td>
</tr>
<tr>
<td>Male/Female (B)</td>
<td>80.1</td>
<td>1</td>
<td>80.1</td>
<td>3.62</td>
<td>NS</td>
</tr>
<tr>
<td>A x B</td>
<td>.1</td>
<td>1</td>
<td>.1</td>
<td>.00</td>
<td>NS</td>
</tr>
<tr>
<td>Error</td>
<td>971.7</td>
<td>44</td>
<td>22.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 17
Means for First Four Questions on Post-Task Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Group</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1: &quot;Uncomfortable&quot;</td>
<td>Male</td>
<td>4.25</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>4.92</td>
</tr>
<tr>
<td></td>
<td>Anhedonic</td>
<td>4.71</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>4.46</td>
</tr>
<tr>
<td>#2: &quot;Enjoy&quot;</td>
<td>Male</td>
<td>3.54</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.57</td>
</tr>
<tr>
<td></td>
<td>Anhedonic</td>
<td>3.42</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.80</td>
</tr>
<tr>
<td>#3: &quot;Tape Experience&quot;</td>
<td>Male</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.08</td>
</tr>
<tr>
<td></td>
<td>Anhedonic</td>
<td>2.88</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>2.58</td>
</tr>
<tr>
<td>#4: &quot;Acting Experience&quot;</td>
<td>Male</td>
<td>2.04</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2.79</td>
</tr>
<tr>
<td></td>
<td>Anhedonic</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>2.83</td>
</tr>
</tbody>
</table>

Note: Subjects responded to each question on a 7-point Likert scale. A "1" indicated "not at all" or "none", and a "7" indicated "very much" or "a lot."
Table 18

Tallies for Last Three Questions on Post-Task Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Group</th>
<th>Emotion*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>H  Sa  A  D  S  F  Dt</td>
</tr>
<tr>
<td>#5: &quot;Easiest&quot;</td>
<td>Male</td>
<td>11 1  6  2  3  0  1</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>9 2  7  5  0  0  1</td>
</tr>
<tr>
<td></td>
<td>Anhedonic</td>
<td>9 2  7  4  1  0  1</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>11 1  6  3  2  0  1</td>
</tr>
<tr>
<td>#6: &quot;Most</td>
<td>Male</td>
<td>3 2  4  4  4  5  2</td>
</tr>
<tr>
<td>Difficult&quot;</td>
<td>Female</td>
<td>0 2  3  4  7  5  3</td>
</tr>
<tr>
<td></td>
<td>Anhedonic</td>
<td>1 3  6  4  3  5  2</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>2 1  1  4  8  5  3</td>
</tr>
<tr>
<td>#7: &quot;Feeling</td>
<td>Male</td>
<td>17 0  3  1  2  1  0</td>
</tr>
<tr>
<td>Today&quot;</td>
<td>Female</td>
<td>17 1  3  1  0  1  1</td>
</tr>
<tr>
<td></td>
<td>Anhedonic</td>
<td>16 0  3  1  1  2  1</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>18 1  3  1  1  0  0</td>
</tr>
</tbody>
</table>

* H=Happiness  Sa=Sadness  A=Anger  D=Disgust  S=Suprise  F=Fear  Dt=Doubtfulness