1978

Relationships and treatment effects between field-dependence/field-independence and labeling pictures of facial affect

Fred Emery Stickle
Iowa State University

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pictures of facial affect

by

Fred Emery Stickle

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of
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Communication in a functional sense includes all methods of conveying any kind of thought or feeling between persons and is the process of sharing with another person or persons, one's knowledge, interests, activities, opinions, feelings, and ideas (Cherry, 1966). From infancy onward communication is necessary in order to utilize best one's potential for mental and social growth (Bernard & Huckins, 1974). The infant is helped to develop his brain cells by stimulating him with sounds, touch, and visual objects (Metcalf & Hunt, 1970). The child develops his concept of self by the messages he receives from his parents and teachers (Gordon, 1969). The adolescent's identity is established through recognition by peers, parents, and teachers in communication output and feedback (Friedenberg, 1969). Adults communicate from morning to night, particularly in today's society where most people interact with others in their work setting. When communication is not a part of the work setting, it is still a major part of America's "Mass communication" society, i.e., television, radio, and printed materials. In all human interaction there is communication.

Verbal communication is one of the most studied of human activities. At every level of schooling, from the first grade through college, students are required to learn
the structure of written and spoken language. Until they have mastered verbal language, students are not considered truly educated. Words are excellent means of imparting new information, but they alone are limited in their ability to sustain social interactions (Stanford & Roark, 1974). In social interaction there are always many messages, beyond words which enhance, modify, and at times replace words in communicating (Davis, 1972). Traditionally nonverbal communication is not considered important enough to be included in the basic curriculum of public schools (Flynn & Lafaso, 1974; and Krathwohl, Bloom, & Masia, 1964). However, nonverbal communication offers a rich source of data for inferences about another person (Baxter & Rozelle, 1975). Researchers state that as much as eighty percent of interpersonal communication is relayed nonverbally (Passons, 1975; Thompson, 1973).

Patterson (1973) stated that, "The emphasis of education in the future ... will be upon human relations" (p. 16). Curriculum should be designed to help the student deal in personal terms with the problems of human conduct (Weinstein & Fantini, 1970). Developing persons who can effectively communicate to others verbally and nonverbally, and who understand themselves and others is educating the affective
aspects of students (Patterson, 1973). Recent trends of humanism in the classroom (Bernard & Huckins, 1974; Aiken, 1973; Kelley, 1968; Patterson, 1973; Stanford & Roark, 1974) emphasize the teaching of nonverbal communication skills. The classroom is a living laboratory in human interaction and nonverbal communication (Thompson, 1973).

Nonverbal communication "encompasses so wide a range of activities that trying to gather all of them into one's thinking seems like equating communication with life itself" (Dittman, 1972, p. 2). Silverstein (1974) has attempted to identify several classes of nonverbal communication, which are listed below:

1. Bodily motion
2. Proxemics
3. Physical characteristics
4. Artifacts
5. Environmental setting

Within the category of bodily motion is the study of facial affect. Darwin (1904) made numerous observations on the importance of the communication cues of the face in emotional expression. The role of display behavior in social communication was extended by the work of Lorenz (1935) and Tinbergen (1952). The presence of facial expression during social communication among both animals and individuals has
been cited by almost every student of primate behavior (Altmann, 1967; Izard, 1971). The importance of one's ability to accurately label facial affect has long been emphasized in social psychology as an important component of interpersonal communication (Davis, 1975). Ekman (1975) stated that the skill of labeling facial affects is an interpersonal communication skill that is useful to all individuals in various aspects of life; and included such social roles as friend, spouse, parent, lover, relative, job applicant, and loan seeker.

In American culture, although people may cover certain parts of their bodies at times and are required by law to cover in public other parts at all times, the face has usually been free of regulation. Faces are usually uncovered. Unlike the so-called "inscrutibles" faces of Orientals or the covered faces of Arab women, American faces have been permitted by culture to express feelings openly. In daily interaction people search the faces of other people for clues to their attitudes, feelings, and emotions (Thompson, 1973).

First Question

The first task in this research was to examine the individual's ability to label correctly pictures of facial affect as assessed by Ekman's instrument, Pictures of Facial
Affect (see Appendix A). Although the importance of one's ability to label facial affect has long been emphasized; research does not state whether certain types of people are "better" at the skill than others (Davis, 1975). The first major purpose of this study was to find if a relationship exists between one's ability at labeling pictures of facial affect and a general overall personality dimension.

Witkin and his associates (1971) aptly described a personality dimension closely related to one's ability at using social cues. Witkin (1952, 1962) introduced the concept of field-dependence and field-independence to describe two modes of perceptual functioning that were consistent characteristics of individuals and had broad relationships with areas of psychological concern. Crutchfield and his colleagues (1958) described the field-independent individual as being generally original, demanding, individualistic, cold, distant, and strong. Similarly, Witkin and his associates (1962) have described field-independent individuals as socially more independent, less interested or needful of others, impersonal in their approach to problems, less attentive to the subtleties of others, less influenced by authority but guided by needs, values, and standards of their own. Goodenough (1976) has defined field-dependent individuals as people who tend to use external referents and rely on others for self-definition in social-interpersonal
settings. They are particularly attentive to social stimuli.

The most commonly used measure of field-dependence/field-independence in recent years is the Group Embedded Figures Tests (GEFT) (Witkin et al., 1976) (see Appendix C). Field-dependent individuals are those whose performance on the test reflects difficulty in locating a simple geometric design "hidden" within a larger more complex figure; an inability to keep one item separate from its surroundings (Witkin et al., 1971). Field-independent individuals are those whose performance on the test reflects an ability to locate the simple geometric figure "hidden" within the larger more complex figure; an ability to differentiate objects from their surroundings (Witkin et al., 1971).

Witkin and his associates (1971) stated in their test manual for the Group Embedded Figures Test that field-dependent individuals

... are particularly attentive to the faces of people around them ... they literally look more at the face and are better at remembering faces. To the extent that the face is the major source of cues as to what that person is feeling and thinking, it is reasonable to expect that people who tend to define their view of themselves by others' reaction to them should be attentive to faces (p. 9).

The research evidence cited (Crutchfield, Woodworth, & Albrecht, 1958; Konstandt & Forman, 1965; Messick & Damarin, 1964), demonstrated that field-dependent individuals are particularly attentive to the faces of people
around them in that they literally look more at faces and are better at remembering them than are field-independent people. In a more recent publication (1977) Witkin et al. stated that:

Impressive evidence from many studies indicates that field-dependent persons have what in effect amounts to a sensitive radar system, selectively attuned to social components of the environment (p. 10).

He then supports the above statement with the following:

It has been demonstrated that relatively field-dependent persons, more than field-independent ones, literally look more at the faces of others, the primary source of information about what others are feeling and thinking (p. 10).

Witkin et al. (1977) recently published another article in which he stated the same concept of differential attention to social cues and explained that the focus of all the studies in this area were the extent to which subjects directed their attention at the face - in some cases at the eye more specifically - of the person with whom they were interacting. He continued by stating:

Obviously, the face provides that main cue to what another person is thinking and feeling. To the extent that field-dependent people use others as guides for structuring their experiences, we may expect them to look particularly at others' faces as part of their information seeking strategy (p. 669).

Research evidence supports the statement that field-dependent individuals tend to look more at the face or eyes of others than do field-independent individuals. However, no
research has examined the question of whether both field-dependent and field-independent individuals possess similar or dissimilar skills of correctly labeling facial affect when the individual is forced to focus only on the face. No study has researched whether the ability to correctly label facial affect is significantly related to one's field-dependency/field-independency.

Second Question

The second major task of concern was the effect of teaching individuals to label pictures of facial affect. There has been no research reported to determine if there is a relationship between a person's field-dependency/field-independency and his ability to improve performance on labeling facial affect after attending a training program intended to teach labeling of facial affect.

Recent studies on the role of field-dependency/field-independency in learning and memory have been reported (Witkin et al., 1976). Many studies show that field-independent subjects are better at concept attainment (Arbuthnot, 1971; Davis & Klausmeier, 1970; Ruble & Nakamura, 1972; Shapson, 1973). Goodenough (1976) stated, however, that:

There may be some concepts that field-dependent people learn as well as, or even better than, field-independent people (p. 678).
He continued by stating that there are no data on this point and consequently "one of the most interesting implications of . . . field-dependency remains largely unexplained" (p. 678).

Witkin et al. (1977) stated that "field-dependent persons tend to be better at learning and remembering social material than persons who are relatively field-independent" (p. 18). However, the studies indicate that the field-dependent individuals are more "selective" with social material in that they learned more social material "peripheral" to the task at hand. If the extent to which the relative inferiority of field-independent persons with learning social material is a function of lack of attention, rather than a lack of ability, their performance could be improved equivalent to that of field-dependent individuals by bringing social material to be learned to focal attention as the intended task.

Research evidence supports the statement that field-dependent individuals learn more social material peripheral to the task at hand. However, no research has examined if a relationship exists between a person's field-dependence/field-independence and his/her ability to improve performance on recognizing pictures of facial affect after attending a training program to teach individuals to label pictures of facial affect.
Statement of the Problem

It has been suggested that one's ability to label accurately facial affect is an important component of interpersonal communication. This investigation was designed to investigate whether the field-dependence/field-independence of individuals has a possible effect on their performance on accurately labeling the facial affects of happiness, sadness, fear, anger, surprise, and disgust. The second major area of investigation was to examine the facial affect labeling skill of field-dependent/field-independent individuals after having undergone a training program, i.e., teaching individuals how to label pictures of facial affects of happiness, sadness, fear, anger, disgust, and surprise.

Research Question

In order to consider if a person's field-dependence/field-independence is significantly related to his/her performance on labeling of facial affect; and to consider the outcome of training field-dependent/field-independent individuals to label accurately pictures of facial affect, the following research questions were formulated:
1. Is there a significant relationship between field-dependence/field-independence with one's skill in labeling pictures of facial affect?

2. Is there a significant relationship between field-dependence/field-independence with one's skill in labeling pictures of facial affect after attending a training program to teach the labeling of pictures of facial affect?

Hypotheses

To examine the above research questions, seven null hypotheses were formulated. Hypothesis 1 through 3 examined the first major area of concern, whether a relationship exists between field-dependency/field-independency and one's skill in labeling pictures of facial affect. Hypotheses 4 through 7 examined the second major area of concern; whether a relationship exists between field-dependency/field-independency and one's ability to label pictures of facial affect following a training program to teach individuals to label pictures of facial affect.

Hypothesis 1: There is no significant relationship between the subject's field-dependence/field-independence as assessed by the Group Embedded Figure Test and labeling pictures of facial affect as assessed by the Pictures of Facial Affect Pretest.

Hypothesis 2: There is no significant relationship between the subject's field-dependence/field-independence as assessed by the Group Embedded Figure Test and labeling pictures of facial affect as assessed by the Pictures of Facial Affect pretest when controlling for sex.
Hypothesis 3: There is no significant relationship between the subject's field-dependence/field-independence as assessed by the Group Embedded Figure Test and labeling pictures of facial affect as assessed by Pictures of Facial Affect when controlling for I.Q.

Hypothesis 4: There is no significant relationship between the subject's labeling pictures of facial affect as assessed by the Pictures of Facial Affect following training, i.e. training individuals to label pictures of facial affect.

Hypothesis 5: There is no significant relationship between field-dependence/field-independence as assessed by the Group Embedded Figure Test and effect of training on labeling pictures of facial affect as assessed by Pictures of Facial Affect.

Hypothesis 6: There is no significant relationship between field-dependence/field-independence as assessed by the Group Embedded Figure Test and the effect of training on labeling pictures of facial affect as assessed by Pictures of Facial Affect when controlling for sex.

Hypothesis 7: There is no significant relationship between field-dependence/field-independence as assessed by the Group Embedded Figure Test and the effect of training on labeling pictures of facial affect as assessed by Pictures of Facial Affect when controlling for I.Q.

As a matter of statistical procedure, Pearson Product-Moment Correlations were calculated first to determine if there were relationships between the subject's skill in labeling pictures of facial affect and field-dependence/field-independence. Next, multiple regression was used for testing null hypotheses to determine if there were significant
differences among the subjects' field-dependence/field-independence and their skill in labeling pictures of facial affect following a training program to teach individuals labeling pictures of facial affect.

Overview

This chapter has provided an introduction to the importance of individuals being able to label facial affect accurately. The areas of major concern and a statement of the problem for this study with research questions were discussed. Chapter II will include a review of the literature related to the present study.
REVIEW OF LITERATURE

This review of literature is divided into two sections. The first section discusses the research on labeling facial emotions. The second section contains a review of the literature on field-dependence/field-independence and is divided into three subdivisions reviewing the individual's attention to social information obtained from other's behavior; the individual's favoring of interpersonal situations over impersonal ones; and the individual's reliance on external social referents in defining their own attention and judgments. The prominent features of these studies will be discussed in this chapter.

Labeling Facial Emotions

The amount of research regarding nonverbal communication is vast. Studies have investigated the use of personal and social distance from others in communication (Thompson, 1973; Baxter, 1975; Mehrabian, 1971; Fast, 1970; Stockwell, 1972; Sundstrom, 1977). Physical characteristics such as physique, personal odors, hair and skin color, and hair style have been studied in their relationship to communicating nonverbally (Lomranz & Shapira, 1974; Anderson, 1973; Schum, 1974; Sylvester, 1975). Several individuals have investigated the use of artifacts or objects such as clothing and emblems used
in interaction with others (Beckman, 1975; Fowles, 1974; Kazdin, 1975). Bodily motion such as gestures, limb movement, posture and touching behavior has been analyzed (Wundt, 1973; Crowne, 1964; Fugita, 1974; Baxter, 1973; Cranach, 1971; Kleck, 1970; Critchley, 1970). Within the category of bodily motion and nonverbal communication is the study of facial expression of affect.

Darwin (1904) conducted the first empirical study of the recognition of facial expressions, using facial photographs. His book analyzed the facial and body expressions of emotions in man such as suffering, grief, joy, tender feelings, reflection, anger, and fear. His emphasis centered around the similarity between animals and their facial expressions and his theory of evolution. Darwin listed some thirty feeling expressions that he organized into eight general categories. The differences among the expressions within the categories were based on the intensity of emotion and on whether there was some distinctive aspect of facial expression for expressing the feeling.

The first systematic study of facial expression recognition after Darwin was that of Feleky (1914). She posed for several hundred photographs, attempting to portray a specific emotion in each one. After choosing eighty-six photographs, the pictures were presented to one hundred
people. The subjects were provided with a list of 100 "names of emotions". Most of the pictures were not judged to be in a single category by a majority of the subjects.

Langfield (1918) selected what he considered the 105 most expressive pictures from the 680 in a collection by Rudolph, 1903 as cited in Izard (1971). The pictures were an artist's sketches made from photographs that were posed by a bearded actor. Following two administrations of the instrument to six judges, he noted that the subjects were fairly consistent in their interpretation. Langfield reported that five of the six judges gave very similar answers on how they made their judgements. They proceeded by kinesthetic imitation of the expression in their own face, by association with known experiences, and by imagining situations which would give rise to such emotions.

Using photographs of faces from a previous experiment of subjects in emotional contexts or attempting to portray a given emotion, Landis (1929) had observers judge the emotion expressed and the situation that elicited it. He concluded from the results that observers could not predict either the emotion or the context better than by chance.

The communication of affect through spontaneous facial expressions was studied with ten pairs of female and nine
pairs of male undergraduates (Buck, Savin, Miller, & Caul, 1972). "Sender" subjects watched 25 slides designed to elicit affect, while observers watched the sender's face on television and made judgments about the nature and intensity of the affect. Results revealed significant communication of affect, particularly among the female pairs. A negative relationship was found between the sender's skin conductance responding and communication accuracy. The skillfulness of the individuals in judging facial expressions was evaluated in terms of their consistency with the dominant combined judgement of a selected panel of judges (Shor, 1976). Data were gathered from eight more male and female undergraduates on 100 newspaper facial snapshots. Pleasure was skillfully discriminated from displeasure. Misery, repulsion, and annoyance were statistically discriminated from the other two.

In 1966, two psychologists, Haggard and Issacs (1966), reported that while running psychotherapy films through in slow motion, they found expressions on the faces of their subjects that appeared and disappeared in a fraction of a second. When the film was run through at regular speed, the expressions were not discernible. When it was slowed to about one-sixth normal speed, they could be picked up by most people. Further study revealed what these high-speed
emotions were revealing. It seemed that they often occurred when a patient was in conflict. "I am not angry," he would say while momentarily looking very annoyed. They were often inconsistent with the facial expressions that bracketed them. As a patient talked about how much they really liked someone, his expression might flick from pleasure to anger and back to pleasure again.

Tomkin and McCarter (1964) developed a series of 69 photographs of various emotions and used a panel of 24 judges. The percentage of agreement among the judges was quite substantial, 42% to 96%, with most percentages above 50. They demonstrated that errors in judging expressions of emotions tended to be systematic in nature rather than random. As an example, fear was "commonly confused" with surprise but rarely or never with joy, disgust, or shame.

A female student with training in dramatics posed for 34 different expressions which Ruckmick (1921) considered the primary emotions and a number of subtle moods and feelings. He found that the emotions termed "primary" (love, hate, joy, and sorrow) were much more uniformly interpreted by the judgements of ten observers than those considered "secondary" (repulsiveness, surprise, distrust, and defiance).

Boucher (1969) performed two experiments to determine
if fear, sadness, and pain were separate and distinguishable facial expressions. The subjects showed a significant preference for either fear, sadness or pain in the labeling of 36 of the 39 total photographs.

Gates (1923) selected from the Ruckmick series six facial photographs, representing joy, pain, anger, fear, contempt, and surprise, and administered them to various ages ranging from children aged three to adults. She found that laughter was understood by more than half of the children whose age was three; pain was correctly interpreted by more than half of those from ages six and seven; anger was understood at seven; fear at ten; surprise at eleven; and scorn described by only 43% of the eleven year old children, though all the adults tested understood the pictures. Kellogg and Eagleson (1931) repeated Gates experiment on a black population and found similar results.

A paired comparison technique was used by Müller, 1954, as cited in Izard (1971) to determine children's ability to discriminate facial expressions. She found an increase in the number of correct responses from ages three to six. Ewert (1965) had children ages seven, eleven, and fourteen years of age match facial expressions and emotional terms. The author found an increase in correct matching 69% at age seven, to 91% at age eleven.

Odom and Lemond (1972) designed a study to determine if
a development lag existed between the perception and the production of facial expressions. Using kindergarten and fifth grade children, his results indicated that both age groups correctly discriminated more of the eight assessed expressions than they produced. The older children made more correct discriminations and productions than the younger children, but contrary to expectations, there was no reduction in the lag between discriminations and productions with increasing age.

The development of children's ability to recognize accurately and communicate posed facial expressions of emotion was studied by Moyer (1974). Forty-eight kindergarten and third graders studied demonstrated that older children were more accurate in their recognition and communication of posed facial expressions. Happiness was the easiest for the children to identify and communicate. Sad stimuli were the most difficult for them to pose facially. Third graders had the most trouble recognizing sad facial expressions and portraying poses of fear. Anger and surprise showed consistent improvement in recognition and communication skill as participant age increased. These findings, along with results showing that even adults have difficulty in producing requested expressions (Izard, 1971) may indicate that production of certain expressions does not attain the same level of accuracy as does discrimination of facial affect.
A problem which has plagued many attempts to measure facial movement has been how to describe most precisely each measurement unit (Ekman & Friesen, 1976). Blurton-Jones (1971) noted that facial activity could be described in three ways: the location of shadows and lines, the muscle responsible, or the main position of landmarks, such as the mouth corners or brow locations. Several descriptive systems have combined inference free descriptions with descriptions confounded with inferences: e.g., "aggressive frown" (Grant, 1969); "lower lip pout" (Blurton-Jones, 1971); "smile tight - loose O" (Birdwhistell, 1970). Measurement of facial movement by Ekman and Friesen (1976) was derived from an analysis of the anatomical dimension. Facial display of the basic emotions of happiness, sadness, fear, anger, surprise, and disgust were produced by the movement of the facial muscles resulting in temporary changes in facial appearance, shifts in the location and shape of the facial features, and temporary wrinkles.

Judgement of facial expression of emotions were obtained from pictures of the whole face, the eyes separately, and the mouth by Frois-Wittman (1930). Of the thirty-two specific emotions identified by the author, the judges aggregate agreement over all pictures was 37.5%. Frois-Wittman's series of pictures, which he posed by practicing before a mirror, made use of certain muscular involvement
or combinations of muscular involvement. He maintained that there are certain muscle groups or parts of the face that are typically involved in particular expressive patterns. However, no consistent dominance of either eyes or mouth in the determination of the judgement of the meaning of any facial expression was found.

Hanawalt (1944) found that when only the upper half of the face was shown that there was some confusion between happy expressions and pain-suffering expressions. To some extent, he concluded, the lower half of the face furnishes better cues for identifying happy expressions, while the upper half of the face was superior for surprise and fear. For other emotions there was no consistent difference. Coleman (1949) extended the research on the role of various parts of the face by using both posed expressions and candid movies sequences. His findings confirmed those of Hanawalt; in general, identifications of facial expressions of emotions were made about equally reliably from either the mouth region or the eye region of the face. He found, like Hanawalt, that certain specific facial expressions obtained somewhat higher percentages of agreement among judges on the basis of the mouth region. The acted or posed expressions tended to favor the mouth region more than did the candid movie sequences.
Boucher (1971) investigated the extent to which the untrained observer could obtain information about affect and intensity of affect from three facial areas. Thirty-two facial photographs of six males were cut into three areas: brows/forehead, eyes, and mouth/lower face. The results of the experiment stated that whole faces were always more accurately identified than partial faces. For partial face stimuli anger, disgust, and happiness were more accurately identified in the mouth than the eyes or brows; fear and sadness were more accurately identified in the eyes than in the mouth or brow; and surprise was more accurately identified in the brows than in the eyes and mouth.

In order to study the effect of context on judging facial expressions Munn (1940) developed two sets of slides, one showing the face in environmental context, the other showing the face alone. Percentages of agreement among subjects ranged from 57% to 97%. Generally, however, the agreement for the photos in the face-in-context series was not substantially better. Lewin, 1927, as cited in Izard (1971) argued the knowledge of ego-environment relations was essential for the integration and correct interpretation of expressions. Although the report was not based on a controlled experiment, Lewin gave examples to demonstrate how facial expressions in selected situations was interpreted
better with context.

Turham, 1960, as cited in Izard (1971) conducted an experiment somewhat similar in principle to that of Lewin’s study, and found that judgements of emotions based on the isolated face taken from movies were considerably different from judgements of the same face when the full context and full situation were shown. Thurham’s conclusion stands in direct contradiction to that of Thayer and Schiff (1969), whose controlled experiment showed facial expressions to be a more important determinant of judgements of the nature of an interpersonal interaction than body movement.

Past researchers who did not first ascertain the source clarity of facial or contextual cues before combining or comparing them found that contextual cues had a very marked effect on the judgement of facial expression and served to increase the recognition of emotional expression, for example, Cline (1956), Frijda (1958), Goldberg (1951), Munn (1940), and Vinacke (1949). Ekman and Friesen (1972), however, demonstrated that when the data of the aforementioned experimenters were reanalyzed to control for source clarity, facial cues dominated or were at least as important a source of information as situational cues. Across two experiments, Frijda (1969) reported that one-third to one-half of the combination ratings collected "just sticks to the expression given and about twenty percent are more
extreme than the expression rates alone" (p. 205). Good-enough (1932) also found that situational cues were not more influential than facial expressions. Their data revealed that when both facial and situational cues were of equal clarity, the facial expressions dominated. Watson (1972) had 172 college students rate 72 combinations of facial expressions and context lines on two measures of emotional expression. Results indicated that subjects heavily weighed the face in comparison to contextual cues.

Frijda (1958) showed four pictures of facial expression to two groups of subjects, each group receiving a different set of descriptions of the situation or context for the pictures. Although the groups differed in their interpretations of the specific emotions portrayed, there was agreement as to the pictured person's general attitude. Mordkoff (1971) replicated the study by Frijda and found similar conclusions.

Several studies have examined the effects of training and suggestion on emotion recognition. Jarden and Fernberger (1926) employed an experimental group with one of the investigators providing an imitation of the emotions under consideration and analyzed the facial expressions with regard to brow, eyes, nose, and mouth. Results indicated a significantly higher percentage of agreement on the intended
name for the emotion. Allport (1924) used a 15 minute training period, which consisted mainly of analyzing the various facial components of different expressions. He found only a slight average increase in ability to identify emotion after he had trained the subjects. Allport found that the superior subjects on the pretest tended to somewhat decrease in percentage of accuracy after training whereas the subjects who started at a very low level tended to increase their accuracy scores.

A follow-up to Allport's study conducted by Guilford (1929), used a more extensive training program. Subjects were asked to judge another set of faces while the experimenter gave the correct names to the expressions and called attention to the distinguishing marks of each expression. The subjects also studied the anatomy of the facial expressions as presented by Allport's 1924 textbook. Guilford found an average gain in ability of 51 percent over the original ability as compared with an average gain of only 5.9 percent by Allport. Jenness (1932) replicated Allport's original experiment, but used a training period of fifteen minutes for one group of subjects and a training session of 45 minutes for another group. There was no substantial difference in the results for the 15 and 45 minute training periods, and both groups showed significant average increases
in the scores. Jenness' results disagreed with Allport's and Guilford's conclusions that superior subjects tend to become less accurate while inferior subjects became more accurate following training.

Another test of the hypothesis that correct judgements of facial stimuli could be improved by learning was made by Mittenecker, 1960, as cited in Izard (1971). His training procedure consisted simply of informing subjects as to the correctness of their judgements. Subjects in the experimental group who were informed as to whether their judgements were right or wrong during training sessions showed significant improvement in accuracy scores, whereas the control group did not.

The effect of training on perceived facial expressions was researched by Hochberg (1969). Improvement in duplicating facial expressions resulted from the use of a mirror and there was a deterioration of performance without that aid. Anxiety was related to the use of the mirror in duplication such that high anxiety people performed more poorly with the use of the mirror than without it, while low anxiety subjects performed better with the use of a mirror than without it.

James (1972) researched the effects of exposure to and re-appraisal of facial expressions depicting affect.
It was concluded that training in the analysis of facial expressions did not significantly improve the ability to recognize emotions. Although the differences were not significant, training which combined expression analysis with cognitive reappraisal and imaginary motor activity seemed to effect greater positive change in evaluations of significant persons in the subject's environment.

Thompson and Meltzer (1964) conducted an experiment to determine the success of subjects in enacting or portraying specific emotions via facial expressions. They found that all of the individuals were able to portray some of the emotions effectively, and that happiness, love, fear, and determination were significantly easier to portray than suffering, disgust, and contempt. No significant relationship appeared between age, sex, scholastic aptitude and the fifteen trait scores on the California Psychological Inventory on the one hand, and ability to enact the ten emotions on the other. Drag and Shaw (1967) did a similar study of emotional enactment and found overall accuracy for emotion identification to be 52%.

Encoding and decoding of spontaneous and posed facial expressions was recently researched by Zuckerman, Hall, DeFrank, and Rosenthal (1976). Results indicated that females were significantly more accurate decoders than were males. There were low positive correlations between total
encoding and total decoding and low negative correlations between encoding and decoding of the same scene. Encoding and decoding six emotions first via facial expressions and second via tone of voice was studied by Zuckerman, Lipets, Koivumaki, and Rosenthal (1975). Results stated that the ability to encode and the ability to decode both visual and auditory cues were significantly related.

Emotional responsiveness to facial affect was studied by Zimmerman (1973). He hypothesized that the degree of awareness would be positively correlated with social adjustment. Thirty high school juniors and seniors viewed photographs and rated them on a continuum of pleasantness-unpleasantness and sleep-tension. Prior to the experimental condition and following each affect condition, the subjects completed the Mood Adjective Check List. The critical factors on the list were urgency, anxiety, and aggression. The hypothesis that the degree of awareness of emotion responsiveness was positively correlated with social adjustment was not supported.

Cupchik (1972) researched the effect that expressiveness of both the sender and the observer had on judgement accuracy in labeling facial emotions. Highly expressive observers were found to be more accurate than low expressive observers.

Aggressor's response to the victim's facial expression
of emotion was studied by Savitsky, Izard, Kotsch, and LoChristy (1974). College students were met by an experimental confederate who either agreed or disagreed with their opinion. The subjects were given the opportunity to deliver electric shock to the confederate (victim), who responded to the shock with a facial expression of anger, fear, joy, or neutral. The opinion condition had no effect but the victim's facial expressions were clearly perceived by the subjects. The expressions of enjoyment (smile) increased aggression, while that of anger decreased aggression. The effects of the fear and neutral expressions did not differ from each other, and neither had a consistent significant effect on the amount of shock administered by the subjects.

Fifty depressed and 50 normal women were each given a deck of facial expression photographs and were asked to choose one that best looked "like you feel right now" (Cohen & Rau, 1972). The finding indicated not only that different pictures were picked by the normal and depressed groups, but also that the technique discriminated appropriately within the depression group. The more depressed the patient's affect, the more depressive were the pictures chosen. Findings also suggested that the method was independent of education and social class.

Based on a belief that pain is an emotion, Boucher (1969) had subjects attempt to differentiate facial photo-
graphs of fear, sadness, and pain. The subjects were successful in sorting the fourteen photographs which had been selected. Boucher maintained that the study gave evidence to his contention.

Vinacke (1949) and Vinacke and Fong (1955) conducted systematic studies of the judgement of facial expressions by three national-racial groups in Hawaii. Results reported indicated that all three groups differed, but the differences between all the national-cultural groups were so small that the authors considered them to be of no practical significance. They concluded that the judgement of facial expression is not dependent, to any marked degree, upon racial differences in facial structure. Ekman (1973) researched the question of the existence of universal facial expressions. Results significantly demonstrated that in at least six types of emotions, there is a universal existence of facial emotion. Carroll Izard (1971) carried out essentially the same experiment with observers in eight different cultures and found the same evidence of universality of facial display of emotions.

Representative research regarding the labeling of facial emotions has been investigated. The findings of research cited indicated that there are discreet facial expressions of emotions. Research regarding identification of facial
expressions has demonstrated that subjects can label emotions with a degree of accurateness significantly better than chance, although such variables as culture and contextual cues had little effect on labeling; training had a positive influence on labeling facial effect.

Field-dependence/Field-independence

The amount of empirical research regarding field-dependence/field-independence is vast. The surveys of literature (Witkin, Oltman, Cox, Ehrlichman, Hamm, & Ringler, 1973; Witkin, Cox, Friedman, Hrishikesan, & Siegel, 1974; Witkin, Cox, & Friedman, 1976) reported over two thousand studies related to the topic. Recent studies have investigated such topics as: the effect of aging (Eisner, 1975; Tramer, 1974), alcoholism (Baekeland & Lundwall, 1975), blindness (Huckabee & Ferrell, 1971), cardiovascular processes (Brandsma, 1973), family characteristics (Buriel, 1975), language and psycholinguistics (Guyer & Friedman, 1975), mathematical ability (Constantinople, 1974), psychophysiological functions (Flemenbaum & Flemenbaum, 1975) homosexuality (Arbutnott, 1975), dancing ability (Barrell & Trippe, 1975), drug addiction (Arnon, Kleinman & Kissin, 1974), and artistic ability (Gaines, 1975) to mention only a few. In order to limit the review of literature and report on those areas of
field-dependence/field-independence related to the central purpose of this study, three general subtopics will be examined. These topics deal with the following: attention to social information; interpersonal orientation; and the use of external social referents.

Studies of attention to social information

Research concerning an individual's attention to social information indicated that field-dependent people tend to be selectively attentive to social information obtained from the behavior of others, whereas field-independent individuals tend to be relatively inattentive to such information. Consistent with such a view are the characterizations that have sometimes been given of field-independent people, based on self-ratings or ratings by others (Pemberton, 1952; Witkin & Goodenough, 1977). They have been characterized as people who are not sensitive to social undercurrents, and who are unaware of their own stimulus value.

More direct evidence of differential attention to social cues has come from a series of studies of looking at behavior during social interaction. The focus of these studies was the extent to which subjects directed their attention at the face of the person with whom they were interacting. To the extent that field-dependent people use others as guides for structuring their experience, one would expect them to look
particularly at others' face as part of their information-seeking strategy (Witkin & Goodenough, 1977; Witkin, Oltman, Raskin & Karp, 1971). This expectation has been substantially confirmed in the look-behavior studies reviewed.

Konstadt and Forman (1965) required children to perform a routine clerical task under approval and disapproval conditions. In the approval condition, in which the experimenter's behavior was in fact calculated to make the subject feel that their own task behaviors were proving adequate, field-dependent children did not look at the experimenter any more than did field-independent children. In the disapproval condition, in which the children were made to feel that they were not doing well, field-dependent children glanced at the experimenter significantly more often than field-independent children.

One study (Ruble & Nakamura, 1972) examined looking behavior of children during problem solving. The children were required to put together a puzzle while the experimenter, who was within view, put together a similar puzzle. In a control condition, such participation by the experimenter was omitted. In the experimental group, where the experimenter was clearly visible to the subject as a source of cues for solving the problem, field-dependent children glanced at the experimenter significantly more often than did children
who tended to be field-independent. It was further reported that field-dependent children tended to glance more often at the experimenter's face, and field-independent children at the experimenter's puzzle. Johnson (1973), working with adults, confirmed the earlier study that when a clearly designed external source of information is available during problem solving, field-dependent individuals are more likely than field-independent subjects to look at the experimenter as a source of cues for solving problems.

In contrast to problem solving, other kinds of interaction have been examined. Nevill (1974) found that during an interview about their experiences in the course of an immediately preceding problem solving session, field-dependent subjects looked at the interviewer significantly longer than did field-independent subjects, while both speaking and listening. He stated that the study offered strong experimental evidence for the relationship between social dependency, as measured by eye contact and field-dependency among college students.

Kendon and Cook (1969), however, did not find such a relationship for an interaction situation in which the two participants were asked to get to know each other. In fact, the percentage of time spent in looking while speaking, showed a negative relationship with field-dependency. Mones (1974) found more eye contact between partners in matched
dyades, (both field-dependent or both field-independent), although no overall difference in the amount of eye contact was found.

In contrast with the looking behavior allowed in the studies previously mentioned, Meskin and Singer (1974) instructed their subjects (college students) to look at the experimenter while carrying out a variety of mental operations. Field-dependent subjects showed significantly more breaking of eye contact with the experimenter than did field-independent subjects, when performing tasks that called for considerable cognitive processing or emotionally charged imagery. However, no significant difference was found with tasks requiring minimal processing. Although not studied under research conditions, the authors suggest that breaking eye contact with another may indicate an effort to clear channel space for internal processing. He further infers that field-dependent people tend to occupy themselves with processing information from other's faces.

Whereas the previous studies concentrated on looking behavior as an indicator of attention to faces, there are several complementary studies which measured the extent of memory for previously encountered faces. Crutchfield et al. (1958) demonstrated that field-dependent people performed significantly better than field-independent individuals in identifying photographs of people with whom they had spent
the weekend from pictures which also included strangers. A related finding (Oltman et al., 1975) showed a significant relationship between field-dependent individuals and their recognition of names of persons on a subject-pool list drawn from the college they attended. Alexander (1970) and Adcock and Webberley (1971) tested to see if these outcomes were a consequence of greater attention to people or a superior learning ability. Both studies failed to find field-dependent individuals among college students superior in recall of faces or names in experimental studies in which the subject was directed to learn faces or names.

Several studies have examined the level of performance in a learning situation in which social cues from another person were present. Ruble and Nakamura (1972) introduced a social cue in the form of the experimenter repeatedly looking and leaning slightly toward the card containing the correct figure while the subject was solving a concept-attainment task. Field-independent children tended to perform better under this condition; a reverse relationship was found for field-independent children. The study inferred that field-dependent children had paid more attention to the social cue.

Attention to social information, as a function of field-dependence/field-independence has also been examined in the
medium of verbal stimuli. In studies by Eagle, Goldberger, and Breitman (1969) and Fitzgibbon and Goldberger (1971) field-dependent college students showed better recall of social words than did field-independent individuals. Goldberger and Bendich (1972) found that field-dependent individuals incorporated significantly more social words in their free association from a previously heard incidental word list containing both social and neutral words. However, Fitz (1970) failed to find better recall of incidentally presented social words by field-dependent individuals. In Fitz's study the subjects were told that the purpose of the experiment was to see how well they could withstand the distracting effect of the word list played on a tape recorder while (he) was performing the assigned focal task. The test failed to prove significant.

Birnbaum (1975), also using an incidental learning paradigm, asked her subjects to recall anything they had heard, seen, felt, or noticed during and immediately preceding experimental sessions. Field-dependent subjects recalled more social aspects, defined by the researcher as reflecting attention to another person in the experimental situation. Field-independent persons recalled more task oriented aspects which the experimenter defined as reflecting attention to elements of the experimental task. Such a relation was not found in a very similar study by Trego
 Whereas Birnbaum allowed her subjects free recall, Trego used a multiple-choice recognition list, which, by limiting the subjects options to items selected by the experimenter, may have been less sensitive to individual differences in the importance assigned to social information.

Brilhart (1970) examined the difference between field-dependent/field-independent college students and attention to characteristics of the delivery of a message over the cognitive content of the message. He constructed a "good" and a "poor" speaker. Characteristics of the message that subjects afterward included in their list of features that they felt should be changed or not, were classified as speaker or message oriented. Field-dependent subjects rated the poor message delivered by the good speaker as significantly better than the good message delivered by the poor speaker. This indicated that the field-dependent subject tended to place more emphasis on the characteristics of the speaker over message characteristics.

McFall and Schenkein (1970) used a modified Rosenthal type photograph-rating task to experimenter expectancy. Half of the subjects in the study judged a series of photographs according to the apparent success or failure of the people pictured in them after listening to "positive pull" instructions, half after hearing "negative pull"
instructions. The instructions were identical in formal content while differing only in subtle elements of delivery or style. The photograph ratings of field-dependent subjects were not significantly different under the two instructional conditions, while those of field-independent were different.

Studies of interpersonal orientation

To the extent that field-dependent people tend to seek information from external sources, one would expect them to gravitate toward situations in which such information would be available. The favoring of interpersonal situations over impersonal ones may be seen as a helpful means in obtaining information from others. The following evidence to be examined clearly demonstrates that field-dependent persons show a strong interest in people, prefer to be physically close to others, favor real-life situations, and are emotionally open. Field-independent individuals, on the other hand, are less interested in people, favor impersonal situations, and show both psychological and physical distancing from others (Witkin et al., 1977).

Several experimental studies have examined the use of interpersonal space as a function of cognitive style. Justice (1969) required college students to prepare a presentation on a given topic, proceed to an adjacent room, and
deliver the presentation to the experimenter seated there. Halley (1972) in a similar study asked subjects to take up a position, relative to another person, that they considered optimal, maximal, or minimal for conducting a conversation. In both studies, more field-dependent subjects moved significantly closer than did field-independent subjects to the person with whom they interacted.

In another study Green (1973) had patients observed when they were seated two feet and five feet from the interviewer. In a factor analysis of patients' nonverbal behavior, Greene identified a "dependency factor" on which were loaded such behaviors as palms-up gesturing, lips and tongue activity, and mouth touching. Field-dependent individuals showed a significant increase in dependency behavior from the two feet to five feet condition. When physically more distant from the person with whom they were interacting, field-dependent persons gave greater evidence of increased feelings of dependency.

Trego (1971), in a related study, required his subjects (college students) to move along a corridor toward an object person until he reached the position he felt he usually maintained between himself and others in ordinary social interaction. Although the distance between the subject's starting position and the object person remained
fixed, four corridor lengths were used. Trego's hypotheses, which he confirmed, stated that subjects who took up more or less the same position in relation to the object person would be more field-dependent than subjects for whom changes in corridor length affected the position taken. The study suggested that field-dependent subjects used the other person as an anchor point for the position assumed; field-independent persons paid greater attention to physical aspects of the situation.

Several studies have failed to find a relationship between field-dependence/field-independence and physical distancing. Guardo, 1973, as cited in Witkin and Goodenough (1977) used silhouette figures described in particular personal and impersonal ways; subjects were required to position these silhouettes in relation to a self-silhouette. Another study (Wineman, 1973) made use of a paper and pencil procedure to identify the distance at which the subject preferred to have various individuals who had been described as to their relationship with the subject and the situational context in which they were encountered. Both studies failed to show a significant relationship.

Several studies of social characteristics of nursery school children have examined specific behaviors that also bear on the issue of physical distancing. In a study by
Crandall and Sinkeldam (1964), ratings were made of children seeking affection from adults. The study included such behavioral indicators as holding hands with, clinging to, or sitting on the lap of the staff member; asking an adult to sit near him, patting or touching the adult. Only for girls were the affection seeking ratings significantly higher in field-dependent than in field-independent children, but the relation was no longer significant when age and intelligence were statistically controlled. Pedersen and Wender (1968) found no relationship between field-dependence/field-independence and ratings of physical contact based on such indicators as seeking and responding to teacher's physical contact and being soothed by contact when upset.

A number of studies have focused on emotional rather than physical distancing. Ancona and Carli (1971) reported on a study in which after viewing a film on family life, college students filled out a questionnaire designed to reflect the degree of "emotional participation" in the events in the film. Field-dependent subjects scored significantly higher on this questionnaire than did field-independent ones. A similar study conducted by Westbrook (1974) involved asking the subjects to write out a description of what they had seen, after viewing each of a series of slides which showed people interacting. Field-dependent subjects made significantly more references to emotions than did field-independent
subjects. Also relevant is the observation of Greene (1972) that during the interview, field-independent clients showed significantly more nonverbal behaviors such as leg crossing, arm crossing, and absence of forward leaning described by Greene as an effort to "keep themselves at arm's length" from the interviewer.

Using the concept that reluctance to tell about oneself and disinterest in others reflect distancing in interpersonal relations, Sousa-Poza et al. (1973) examined the relationship between field-dependence/field-independence and responses to Jourard's self-disclosure questionnaire. They found more self-disclosure in more field-dependent subjects. Berry and Annis (1974) somewhat confirmed this finding in replicating the study using modification of the Jourard instrument.

The mediating role of field-dependence/field-independence in social facilitation was examined by Birnbaum (1975). Subjects carried out a chain-association task, either alone or in the presence of others, working independently of them, performing the task at the same time. Productivity, as measured by the number of words generated in the fixed time allowed, was significantly greater for field-dependent subjects than field-independent subjects in the coaching situation than in the alone condition. Birnbaum concluded that
field-independent people are relatively immune to the effect of a group context.

Several studies have demonstrated that relatively field-dependent people are likely to gravitate toward situations that will involve them with others and that relatively field-independent people tend to favor situations of a more solitary nature. In a study by Coats et al. (1975), teachers at the end of the school year made rankings for each child of the amount of time they had spent during the year in each of the free-play situations. The situations involved solitary tasks involved little communication with the other children. Field-independent children, both the boys and girls, were rated as having spent significantly more time in the solitary play, and field-dependent children in the social play. A similar study of boys and girls in a day camp setting by Crandall and Sinkeldam (1964) failed to show significance between field-dependence/field-independence and social interaction. Nadeau (1968), however, did find a tendency for field-independent nursery school boys to spend more time in solitary play than did field-dependent boys. Tramer and Schleidermann (1974) examined frequency of social contacts as a function of field-dependent/field-independence in elderly men hospitalized for acute illnesses. A significant relation was found between field-dependent individuals
and their greater amount of social involvement.

Another situation, sports, has been examined from the standpoint of preference for solitary versus group activities. Schreiber (1972) determined the extent of field-dependence in a group of varsity college athletes affiliated with team sports and individual sports. The first group which included baseball, football, and hockey proved to be significantly more field-dependent than the second group which included gymnastics, track, swimming, and wrestling. Similar studies done by Bard (1972) and Barrell and Trippe (1975) demonstrated a similar trend.

The evidence from recent research on career differentiation provides demonstration of the guiding role played by field-dependence/field-independence in directing people toward interpersonal or impersonal domains in real-life activities (Witkin et al., 1977). The process of making career choices was examined by Witkin et al. (1977) as a factor in academic evaluation; particularly in abandoning a chosen major in favor of a new major. After studying periods of high school, college, graduate/professional school, findings showed a tendency for students to shift their choice toward greater compatibility with their field-dependence/field-independence. Field-dependent students who identified mathematics or the natural sciences as their
preliminary majors at college entry tended to shift out of these majors by the time of graduation. Field-independent students who made these same preliminary choices were likely to remain with them. It has been observed by Osipow (1969) that a group of college women uncommitted to a course of study were significantly more field-dependent than other groups of women who were already enrolled in specific programs and reported experiencing greater ease in making career choices.

Witkin et al. (1977) reported that Tyler and Sundberg conducted a study of ninth grade Dutch children exploring the subjects classification occupational concepts. Among the classifications identified was one which included such characteristics as "concrete" and "using association rather than similarity as a basis for grouping." Almost all children who never use this kind of classification earned scores that were in a field-independent direction on tests of that dimension; the reverse was not true, however. Glatt (1970) in another study with children (eighth grade boys) assessed "readiness for occupational planning" as judged from interviews. Assessments of readiness made use of such criteria as: awareness of factors relevant to curriculum choice and to occupational choice; accuracy in self-appraisal of cognitive abilities, and ability to verbalize strengths
and weaknesses. According to ratings based on such criteria, relatively field-independent boys were found to show greater readiness for occupational planning. In another study by Clar (1971) the more field-dependent students attending a university counseling center showed some tendency, according to judgements of their counselors, to have more articulated vocational choices. In contrast, the relatively field-dependent counselees were more often undecided about vocations at the end of counseling. Scheibner (1970) found that relatively field-independent college men, compared to more field-dependent men, showed better agreement between vocational interests and vocational goals. However, this relationship was not found for college women.

A vast number of studies have examined the relation of educational-vocational interests and attitudes to field-dependence/field-independence (note Witkin et al., 1973, 1974, 1976). To the extent that the present research does not directly deal with this topic only a few studies have been reviewed. As a general principle, relatively field-independent persons, taken as a group, are likely to show interest in domains where their cognitive skills are called for and where relations with people are not particularly involved. In contrast, relatively field-dependent people are likely to favor domains with a "people" emphasis, which feature social contact and which involve interpersonal
relations in daily ongoing activities. Although there are a few exceptions, this pattern has emerged with a fair degree of regularity. The major studies dealing with the relation of educational-vocational interests and attitudes to field-dependence/field-independence on the following: Arbuthnot and Gruenfeld, 1969; Chung, 1966; Crutchfield et al., 1958; Keen, 1973; Levy, 1969; Pemberton, 1952; Pierson, 1965; and Witkin et al., 1977.

**Studies of the use of external social reference**

The expectation that relatively field-dependent people are likely to show greater reliance on external social referents in defining their external social referents attitudes and judgements has been examined with a variety of approaches in recent years. In general, the evidence suggests that field-dependent people make more use of information by another when the situation is ambiguous and the other is seen as a source of information that will help remove the ambiguity. However, when the situation is well-structured or when there is reason to believe that the other is not a useful source of information for reading the ambiguity, field-dependent and field-independent people are no different in their response to external social referents.

Linton (1955) conducted several of the earliest studies on the use of social referents by field-dependent and field-
independent people. He found that the extent of the subjects' field-dependence was significantly related to a groups effect on their judgements and movement in an autokinetic situation. He also found that a persuasive written communication had a greater affect on attitude change among field-dependent than field-independent individuals. Many studies have extended Linton's work to a variety of similar situations involving announced judgements by "stooges" (Antler, 1964; Birmingham, 1974; Paeth, 1973). These studies confirmed Linton's conclusion that field-dependent subjects are particularly apt to make use of the opinions of other people with whom they are involved in a group interaction.

Group decisions about hiring applicants for radio announcing jobs were examined by Shulman (1975). Bogus selection committees were requested to achieve unanimous decisions to accept or not accept each of several applicants on the basis of a taped audition and a brief description of the applicant. The groups were composed of one or two subjects and a set of stooges who outnumbered the subjects. One of the applicants was well-qualified for the job and at the audition elicited a favorable response from most of the subjects. He was said to have a facial deformity, however, and the stooges gave prearranged arguments to reject the applicant on this basis. It was
found that groups that could not reach a consensus opinion on the applicant tended to have field-independent subjects who refused to join the majority.

In another study, two groups composed of one field-dependent and one field-independent college student were asked to cooperate by taking the rod-and-frame test (Solar, Davenport, & Bruehl, 1969). In every group the consensus was closer to the initial judgement of the field-independent than the field-dependent group member. The authors suggested that field-dependent subjects were more responsive to their partners opinions than were field-independent subjects.

A more recent study (Oltman, Goodenough, Witkin, Freedman, & Friedman, 1975) examined conflict resolutions in groups that were homogeneous or heterogeneous with respect to the cognitive style of their members. The subjects were college women assigned to two-person groups in the following manner: both members were field-dependent; both were field-independent; and one member was field-dependent and one was field-independent. Each pair was assigned to the task of reaching a compromise agreement on a set of choice dilemma problems about which they had initially disagreed. Results significantly suggested that field-independent subjects tended to be unwilling or unable to contribute effectively to conflict resolution by accommodating their views to those
of others.

A limitation on the generality of the conclusions on the three previously mentioned studies is that the information made available to subjects for forming their judgements was not clear. Although field-dependent and field-independent people tend to be different in their response to social referents under ambiguous conditions, there is little evidence of any differences between them in unambiguous situations. For example, studies of voluntary behavior indicate that appeals for help are answered as often by field-independent as by field-dependent people (Webb, 1972; Soat, 1974). Little relationship has been found between field-dependence and the tendency to be cooperative (Swan, 1973; Tobias, 1968). And there appears to be no significant relationship between field-dependence and hypnotizability (Morgan, 1972; Palmer & Field, 1971). The information-seeking behavior of field-dependent people tended to occur only when the people available to them were seen as a likely source of information for resolving the ambiguity (Mausner & Graham, 1970).

Ambiguity in the role of definition was examined in a study of the consequences of different instructions to subjects entering a sensory deprivation experiment (Culver, Cohen, Silverman, & Shmavonian, 1964). Whereas some subjects were given relatively specific instructions about
what to expect during deprivation, other subjects were given ambiguous instructions and provided with little feedback from the experimenter throughout the experiment. Heart rates tended to be higher in the noninformed than in the informed condition among field-dependent subjects. However, the opposite tendency was observed among the field-independent subjects.

In a study by Gates (1971) young adults were asked to talk about a topic of interest to them, under a condition in which the interviewer kept silent throughout or under a condition where the interviewer provided the appropriate feedback. For field-dependent subjects, word output was found to be much lower with silent interviewer than with the responsive interviewer. Steingart, Freedman, Grand, and Buchwald (1975) found that field-dependent subjects talked significantly less during a five minute monologue than field-independent subjects under a cold (nonresponsive) interviewer condition.

An analysis of therapy transcripts (Witkin, Moore, Goodenough, & Cox, 1977) showed that therapists asked more questions of a specific nature of their field-dependent clients and asked more open-ended questions of their field-independent ones. The first kind of question limits the patient's options for response and so reduces the need for
structuring answers. Studies by Greene (1972) and Karp, Kissin, and Hustmyer (1970) suggest that therapists more often assign their field-dependent clients to supportive therapy, in which a well-defined structure is provided for them. Field-independent clients are more often assigned to modified therapy in which the patient's role is less highly structured.

In a study of nursery school boys and girls whose behavior in the school setting was rated for autonomous achievement striving and dependence (Coats et al., 1975), dependence scores did not significantly relate to field-dependence/field-independence. Beller, 1962, as cited in Witkin & Goodenough (1977) reported that field-dependence/field-independence bears little relation to what he designated as emotional dependence in children. The behaviors he chose as indicative of autonomous achievement striving were trying to initiate activities to overcome obstacles, to complete activities, and to obtain satisfaction from work. The contrast suggested by these two groups of behavior is between pursuit of activities on one's own, on the one hand, and seeking emotional sustenance and attention from others, on the other hand. Although Beller reported little relation between field-dependence/field-independence and emotional dependence, his study did demonstrate a relationship between field-dependence/field-
independence and autonomous achievement striving with field-independent children showing more striving.

In reviewing field-dependence/field-independence, representative research regarding interpersonal behavior has been investigated. The research findings cited indicate that field-dependent people are attentive to the views of others; they are sensitive to social cues; they have an interpersonal orientation, encompassing a strong interest in people, and a preference for being with others and even being physically close to them. These characteristics are less evident in field-independent people. On the other hand, field-independent people give evidence of greater skill in cognitive analysis and structuring than do field-dependent people.
METHODOLOGY

Purpose of the Study

The purpose of this study was to investigate whether the field-dependence/field-independence of an individual has a possible effect on the individual's performance of accurately labeling the facial affects of happiness, sadness, fear, anger, surprise, and disgust; and to investigate whether field-dependence/field-independence has an effect on the outcome of training, i.e., teaching subjects how to label facial affects of happiness, sadness, fear, anger, surprise, disgust and neutral. The Group Embedded Figure Test (Witkin, et al., 1971) was utilized for assessing the subject's field-dependence/field-independence. The ability to label pictures of facial affect was assessed by Pictures of Facial Affect. Training involved teaching Ekman and Friesen's guide to labeling pictures of facial affect (Unmasking the Face, 1975).

Subjects

The sample for this study consisted of 56 high school students (21 males and 35 females) enrolled at the Dows Community High School located at Dows, Iowa. The 56 students included 24 sophomores and 32 juniors; all of whom were enrolled in either 10th grade English or 11th grade
American History. Tenth grade English was taught 1st and 6th periods, and eleventh grade American History was also taught 1st and 6th periods. Students were assigned these periods according to their grade level and the period which best fit into their schedule.

High school students were employed for several reasons. First, both field-dependent and field-independent individuals exist within the high school setting (Clar, 1971; Pollack & Kiev, 1963; Witkin et al., 1976). Second, sophomores and juniors have reached, or are approaching, the formal operational stage of development. Individuals from the high school age are quite stable in their preferred mode of perceiving (Bauman, 1951; Paterson & Witkin, 1970; Witkin, Goodenough & Karp, 1967). Third, the student body of the Dows High School was accessible to the experimenter.

Dows, Iowa, is a small rural farming community situated in central Iowa. The social-economic status of the residents range from lower middle class to upper middle class. Witkin, Dyke, Paterson, Goodenough, and Karp (1962) studied the effect of social status on one's performance on the perceptual tests employed to measure field-dependency/field-independency and found no significant effect. Karp, Silberman, and Winters (1969) compared field-dependence/field-independence in two groups of adolescents (11 to 13 years of
age) coming from two racial groups and from two social classes and found no significant difference. Studies concerning the labeling of facial emotions indicate that the skill is not related to one's social-economic status (Ekman & Friesen, 1975; Izard, 1971).

Instrumentation

Instrumentation for this study consisted of the Group Embedded Figure Test (Witkin et al., 1971) and the Pictures of Facial Affect (Ekman & Friesen 1976). Results of the Otis-Lennon Mental Ability Test were used to partial out the effect that intelligence might have on the results.

A description of each instrument follows.

Pictures of Facial Affect

Pictures of Facial Affect is an instrument consisting of 110 35mm black and white slides of faces expressing the following emotions: happiness, sadness, fear, anger, surprise, disgust, and neutral. The pictures include both sexes and 14 individuals. The instrument which was developed by Paul Ekman and published by Consulting Psychologist Press, Inc., was first introduced to the public in 1976 (see Appendix A).

Few instruments exist which measure one's ability to recognize facial emotions. Frois-Wittman (1930), who
pioneered a set of photographs; and a more recent Light-food series, developed by Schlosberg (1954), both have serious defects. The pictures in each series are all posed by one person and lack quality which modern photographic equipment can provide. Both series have many photographs that failed to produce satisfactory consensus among subjects in many studies (Ekman & Friesen, 1972).

With the aid of more modern technology in lighting and photography, Ekman and Friesen repeatedly photographed more than a dozen persons. Six frequently experienced emotions were chosen for this study. These six were happiness, sadness, fear, anger, surprise, and disgust. Posers were trained to contract or relax different facial muscles associated with the various facial expressions. Generally, models were instructed to activate certain muscles rather than to pose a particular emotion.

From hundreds of photographs, a set of 110 was finally chosen on the basis of empirical studies which measured the consistency of judgments of the various pictures. Photographs which yielded highly consistent judgments of facial expression of affect were finally selected for inclusion. Table 1 summarizes the results of reliability studies conducted by Ekman. All photographs in the present set were judged to show the intended emotion by at least 70 percent of the observers. All but eleven were correctly rated more
Table 1. Number of photographs achieving various levels of correct judgement

<table>
<thead>
<tr>
<th>Percent of Correct Judgement</th>
<th>Happy M-F</th>
<th>Sad M-F</th>
<th>Fear M-F</th>
<th>Anger M-F</th>
<th>Disgust M-F</th>
<th>Surprise M-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>71-80%</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>81-90%</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>91-100%</td>
<td>9</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>TOTALS</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>7</td>
<td>10</td>
</tr>
</tbody>
</table>


than 80 percent of the time; 59 were correctly judged by more than 90 percent of the raters.

**Group Embedded Figure Test**

The Group Embedded Figure Test (GEFT) was designed to provide an adaptation of the originally administered Embedded Figure Test from which the concept of cognitive style was first developed. Whereas the individually administered Embedded Figure Test is "impractical where large numbers of subjects must be tested on the field-dependence/field-independence dimension" (Witkin et al., 1971, p. 26), with the Group Embedded Figure Test, scores for many individuals may be obtained in a single testing session. The Group Embedded Figure test has been modeled as closely as possible to the individually administered Embedded Figure Test with respect to mode of presentation and format. The instrument contains eighteen complex figures, seventeen of which were taken from the Embedded Figure Test (see Appendix C). The instrument contains three sections: The First Section, contains seven very simple items and is primarily for practice; the Second Section and Third Sections, each contain nine more difficult items. An example from the Second Section follows:
The subject was prevented from seeing simultaneously the simple form and the complex figure containing it. The simple figure was presented on the backside of the booklet and the complex figure on the booklet pages. The directions requested the subject to try and find the simple form in the complex figure and trace it in pencil directly over the lines of the complex figure. The simple figure was the same size, in the same proportion, and faced in the same direction within the complex figure as when it appeared alone. Subjects were given a time limit of two minutes for section one and five minutes each for sections two and three. The score was the total number of simple forms correctly traced in sections two and three in the time allowed.

Correlations between the First Section scores and the Second Section scores have been computed and corrected by the Spearman-Brown Prophecy Formula, producing a reliability estimate of .82 (Witkin et al., 1971). The validity of the GEFT has been tested against the "Parent" form, namely the EFT. The correlations reported (Witkin et al., 1971) were
.82 for males and .63 for females. A similar research study conducted by Dumsha, Minaro, McWilliams (1973) revealed a correlation of .749 between the two instruments.

**Otis-Lennon Mental Ability Test**

The advanced level of the Otis-Lennon Mental Ability Test was intended for grades 10.0-12.9. The test was constructed to measure verbal, numerical, and abstract reasoning abilities. The single score derived from the instrument can be thought of as an index of the verbal-educational component of Vernon's (1961) hierarchical structure-of-intellect-model (Mehrens and Lehmann, 1973). The testing time was 40 minutes, which appeared to be ample. A special study showed that mean I.Q.'s were only about 1.8 points higher for students who took as long as they wished on the test. Correlations between timed and untimed administrations were above .98 (Mehrens & Lehmann, 1973).

The standardization sample for the instrument was selected to be representative of the entire United States educational system. The reliability of the Otis-Lennon compares favorably with other well-constructed aptitude tests (Otis-Lennon, 1969). Alternative-form reliability ranged from .81 to .94. The standard error of measurement averaged about 4.3 I.Q. units. The median split-half reliability was .95. Correlations between scores on the
Otis-Lennon administered one year apart ranged from .80 to .94. Criterion-related validity studies place the bulk of the coefficients in the .70's. Construct validity evidence correlates the Otis-Lennon with many different aptitude tests in the range of .70 to .90.

Data Collection

In place of their scheduled class, tenth grade English and eleventh grade American History students were asked to view 110 Pictures of Facial Affect slides and take the Group Embedded Figure Test. Prior to taking these instruments, the students received a complete explanation of the study. There was no aspect of the research project that the subjects were not aware of beforehand other than the statistical treatment of the data and what each instrument (The Group Embedded Figure Test, and The Pictures of Facial Affect) contained.

Instructions for the Pictures of Facial Affect instrument were given orally. Subjects were instructed that a series of 110 slide pictures would be presented. After viewing each slide for four seconds, the subjects than had six seconds to write down the feeling or emotion that best described the person pictured. An answer sheet which was provided, was numbered from one to 110; following each
number was a blank for the subject's response. Subjects were informed that they need not be concerned with spelling and that they could use any word as many times as they desired.

After completion of the 110 pictures, the forms were collected and scored by determining the total number of right for each of the following categories: 1 - happiness, 2 - sadness, 3 - fear, 4 - anger, 5 - surprise, 6 - disgust, 7 - neutral, and 8 - the grand total of all pictures viewed. For words written down by the subjects but not identified in the answer manual, Webster's New Collegiate Dictionary (1977) and Roget's Thesaurus (1964) were used to determine if the subject's word corresponded in meaning to the correct word listed in the test manual (see Appendix B).

Following the administration of the Pictures of Facial Affect instrument each student was given a copy of the Group Embedded Figure Test. Students were instructed as follows:

On each page you will see a complex figure, and under it will be a letter corresponding to the simple figure which is hidden in it. For each problem look at the back cover of the test booklet to see which simple form to find. Then try to trace it in pencil over the lines of the complex figure. Note these points:

1. Look back at the simple figure as often as necessary.
2. Erase all mistakes.
3. Do the problems in order. Don't skip a problem unless you are absolutely "stuck" on it.

4. Trace only one simple form in each problem. You may see more than one, but just trace one of them.

5. The simple form is always in the complex figure in the same size, the same proportions as on the back cover of the booklet.

Students were given two minutes to complete section one, and two five-minute limits for sections two and three. Following the administration, the test was scored by counting the correct number of simple figures correctly traced on the complex figure for sections two and three.

Two students failed to take one or more of the instruments due to their absence and were not included in the findings.

Treatment

From the sample of 56 subjects, control and experimental groups were formed through systematic randomization of males and females. The treatment period extended over three one-hour group presentations undertaken during the first part of the second semester. The treatment was based on Ekman and Friesen's book *Unmasking the Face* (1975). The purpose of the text was to improve one's ability to label emotions from facial expressions, and is based on over twenty years of research and study (Davis, 1975). Each one hour session was spent on two emotions, with a total of six emotions being studied
on three days. Emotions studied included happiness, sadness, fear, anger, surprise, and disgust.

The procedure for presenting each of the six emotions was similar and followed a prescribed outline. An introduction to the emotion was presented by way of lecture and explained how the term was defined and used. Second, the appearance of the emotion was outlined describing the muscle tension and appearance of the three facial areas of the brow, the eyes, and the lower face. The subjects were shown examples of the emotions and asked to experience the facial affect by both observing and then practicing the emotion in dyads. Each subject received a two page handout presenting the aforementioned material (see Appendix D). The handouts were collected at the end of each class period.

Organization of Data

Four sets of data from the individuals were collected in this study: I.Q., Labeling Pictures of Facial Affect (Pretest), Labeling Pictures of Facial Affect (Posttest), and the Group Embedded Figure Test.

Before proceeding to the statistical analysis, it was necessary to transform the data in a manner appropriate for computer analysis. This process varied with the type of data collected. Thus, the following deals separately with each of the four types of data and explains this transfor-
The single I.Q. score obtained from each individual by taking the Otis-Lennon Mental Ability Test was used as an independent variable in stepwise multiple regression. The single score obtained from the instrument was used in the analysis.

The answer sheets for both the pre- and posttests on the Pictures of Facial Affect instrument were scored in the similar manner. Each of the words used in the answer key (happiness, sadness, fear, anger, disgust, surprise, and neutral) were looked up in Webster's New Collegiate Dictionary (1977) and Roget's Thesaurus (1964). Words found in these two volumes were written down and used as an expanded answer key (see Appendix B). If additional words were used by subjects which were unclear or uncertain they were looked up in the previously mentioned volumes and their meaning was compared to the answer key. Only words which corresponded in meaning according to Webster's New Collegiate Dictionary (1977) and Roget's Thesaurus (1964) were considered correct. The total number of answers correctly given was recorded. On both the pretest and posttest the number correct for each category (happiness, sadness, fear, anger, surprise, disgust, and neutral) was recorded in addition to the grand total.

The Group Embedded Figure Test was scored by counting the
number of correct simple geometric shapes traced over the complex geometric figures in sections two and three. The total number correct was recorded.

Analysis of Data

Pearson-Product moment correlations were initially calculated between all subjects' scores on the Group Embedded Figure Test and the Pictures of Facial Affect (pre-test) to determine if there was a significant relationship between field-dependence/field-independence and labeling pictures of facial affect. The formula used for calculating the correlation coefficients was

$$r = \frac{\Sigma XY}{(n-1)} \sqrt{\frac{\Sigma X^2 \Sigma Y^2}{(n-1)(n-1)}}$$

Two dependent variables were defined to have a positive relationship when either the large values of one variable was associated with the large values of the second; or when the small values of the first dependent variable was associated with the small values of the second. On the other hand, a negative relationship was defined when the large values of one variable were associated with a small value of the first; or when the small values of the first variable
were associated with the large values of the second (Edwards, 1964). For clarification, the dependent variable in the study for which correlation coefficients were initially calculated was the pretest scores on the Pictures of Facial Affect.

The purpose of the hypotheses 2 through 7 tested relationships between various independent variables and Pictures of Facial Affect when controlling for other variables. These tests were made using Stepwise multiple regression. In the regression procedure, the control variable(s) were forced to enter on the first step i.e., took out the predictive value of the control variable(s) (sex, I.Q., pretest, or treatment), before examining the independent variables which were forced to enter on step 2. If the partial F-value was significant, then the relationship between the variable being examined and Pictures of Facial Affect was significant after the controlled variables were held constant.

The statistical model (Snedecor and Cochran, 1967) on which multiple regression was based is as follows:

\[ Y = \alpha + \beta_c X_c + \beta X + \epsilon \]
\[ Y = \text{Pictures of Facial Affect} \]
\[ \alpha = \text{constant} \]
\[ \beta_C = \text{regression coefficient for } X_C \text{ (or control variable(s))} \]
\[ X_C = \text{control variable(s)} \]
\[ \beta = \text{regression coefficient for predictor variable} \]
\[ X = \text{independent variable} \]
\[ \epsilon = \text{error term} \]

The regression model was utilized to test hypotheses 2 through 7. The stepwise multiple regression analysis was derived from the SPSS computer program procedure.

The findings of this study are presented in the following chapter, and will appear in the order in which the null hypotheses were presented.
FINDINGS

The research undertaken in this study was designed to investigate whether being field-dependent or field-independent had a possible effect on their performance of accurately labeling pictures of facial affect. The second major area of investigation was to examine the facial affect labeling skill of field-dependent/field-independent individuals who had undergone a training program, i.e., teaching them how to label pictures of facial affect. Both the experimental and control populations were sophomores and juniors at Dows Community High School during the second semester, 1978. All of the participants in the study were administered three instruments: the Otis-Lennon Intelligence Test, the Group Embedded Figure Test, and Pictures of Facial Affect.

The findings reported in this chapter will be divided into two sections. The first section will include descriptive data of the subjects. In the second section, the null hypotheses analysis results will be reported.

Descriptive Data

Fifty-six students, consisting of twenty-one males and thirty-five females, took part in the study. The experimental group included twelve males and twenty females with a total of thirty-two individuals. The control group involved
twenty-four persons, nine males and fifteen females. The data in Table 2 show the absolute frequency and relative frequency for all subjects in the investigation categorized by sex and treatment groups. Pictures of Facial Affect pretest and posttest had a possible score range from 0-110. On the pretest, subjects' scores ranged from 38 to 89 correct. The pretest had a mean of 69.77, median of 71.5, and a standard deviation of 10.53. Scores were normally distributed. Posttest scores ranged from 43 to 109 correct and had a mean of 83.91, a median of 86.83, and a standard deviation of 14.63. Posttest scores were normally distributed. The Group Embedded Figure Test had a possible score range of 0 to 18. The subjects' scores ranged from one to 18, with a mean of 9.91 and a median of 10.94, and a standard deviation of 4.73. These results were similar to results reported in the test manual (Witkin, Oltman, Raskin & Karp, 1971) with a mean of 11.4 and a standard deviation of 4.15. The Otis-Lennon Intelligence Test scores ranged from 77 to 131 with a mean of 105.02, a median of 104.17, and a standard deviation of 12.94. These results were slightly higher than the mean of 101.92 and the standard deviation of 12.27 reported in the test manual (Otis-Lennon, 1969). The data in Table 3 show the total number of subjects, the mean, median, minimum and maximum scores, and the standard deviation for each of the variables in the
Table 2. Total sample dichotomized by sex and treatment group

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th></th>
<th>Percentage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>Control group</td>
<td>9</td>
<td>15</td>
<td>24</td>
<td>16%</td>
</tr>
<tr>
<td>Experimental group</td>
<td>12</td>
<td>20</td>
<td>32</td>
<td>21.5%</td>
</tr>
<tr>
<td>TOTALS</td>
<td>21</td>
<td>35</td>
<td>56</td>
<td>35.5%</td>
</tr>
</tbody>
</table>

Table 3. Assessment data for the subjects sampled in the investigation

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Range</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pictures of Facial Affect (Pretest)</td>
<td>56</td>
<td>69.768</td>
<td>71.500</td>
<td>38</td>
<td>10.533</td>
</tr>
<tr>
<td>Pictures of Facial Affect (Posttest)</td>
<td>56</td>
<td>83.911</td>
<td>86.833</td>
<td>43</td>
<td>14.628</td>
</tr>
<tr>
<td>Field-dependence/Field-independence</td>
<td>56</td>
<td>9.911</td>
<td>10.944</td>
<td>1</td>
<td>4.730</td>
</tr>
<tr>
<td>I.Q.</td>
<td>56</td>
<td>105.018</td>
<td>104.167</td>
<td>77</td>
<td>12.941</td>
</tr>
</tbody>
</table>
The treatment and control groups were not significantly different on the Otis-Lennon Intelligence Test, Group Embedded Figure Test, or pretest scores on Pictures of Facial Affect. Table 4 reports the comparison of treatment and control groups for the three variables. The comparison of the treatment and control groups was examined through the use of the t-test. The calculated t-value of 0.66 for I.Q., 0.56 for the Group Embedded Figure Test, and 0.52 for the pretest on the Pictures of Facial Affect were not significant at the .01 or .05 levels. In other terms, both the control groups and the experimental groups were similar in intelligence, field-dependence/field-independence, and labeling pictures of facial affect on the pretest.

Table 4. Mean comparisons of treatment and control groups

<table>
<thead>
<tr>
<th></th>
<th>Treatment Mean</th>
<th>Standard deviation</th>
<th>Control Mean</th>
<th>Standard deviation</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.Q.</td>
<td>104.08</td>
<td>10.44</td>
<td>106.33</td>
<td>15.82</td>
<td>0.66</td>
</tr>
<tr>
<td>Group Embedded Figure Test</td>
<td>10.21</td>
<td>5.01</td>
<td>9.50</td>
<td>4.40</td>
<td>0.56</td>
</tr>
<tr>
<td>Pretest</td>
<td>70.41</td>
<td>9.81</td>
<td>68.92</td>
<td>11.38</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Table t-value: 2.70 with 54 degrees of freedom at the .01 level

2.01 with 54 degrees of freedom at the .05 level
Analysis of Hypotheses

In order to consider if field-dependence/field-independence is significantly related to the performance of labeling facial affect; and to consider the outcome of training field-dependent/field-independent individuals to accurately label pictures of facial affect, two research questions were formulated.

1. Is there a significant relationship between individuals' field-dependence/field-independence with their skill in labeling pictures of facial affect?

2. Is there a significant relationship between individuals' field-dependence/field-independence with their skill in labeling pictures of facial affect after attending a training program to teach individuals how to label pictures of facial affect?

To examine the above research problem, seven null hypotheses were formulated. Hypotheses 1 through 3 examined the first major area of concern - whether a relationship exists between field-dependency/field independency and one's skill in labeling pictures of facial affect. Hypotheses 4 through 7 examined the second major area of concern; whether a relationship exists between field-dependence/field-independency and one's ability to label pictures of facial affect following a training program to teach individuals how to label pictures of facial affect.

Analysis of the data related to the hypotheses presented
in Chapter I will be discussed as follows. First, each hypothesis will be stated, and descriptive data for the variables involved in the hypotheses will be presented. Second, the statistical technique and data used to test the relationship of the variables for each hypothesis will be presented in the table form. Third, a summary of the findings for each hypothesis will be presented.

The effect of the various interactions of independent variables was analyzed with each hypothesis, however, they were not found to be significant and will not be reported. Only relevant findings relating to the hypotheses will be reported.

Hypothesis 1: There is no significant relationship between the subject's field-dependence/field-independence as assessed by the Group Embedded Figure Test and labeling pictures of facial affect as assessed by the Pictures of Facial Affect pretest.

Hypothesis 1 was tested by comparing the derived Pearson Product-moment Correlation Coefficient with values necessary for statistical significance. The correlations were reported for the following variables: treatment, sex, I.Q., field-dependence/field-independence, and pretest total on Pictures of Facial Affect. Table 5 data present the correlation of subjects. The level of significance reported is .01. Only the findings which refer to Hypothesis 1 will be discussed. In addition to the total pretest score on
Table 5. Correlation matrix for all subjects

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Sex</th>
<th>I.Q.</th>
<th>Field-dependence</th>
<th>Field-independence</th>
<th>Pretest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>1.00</td>
<td>0.0</td>
<td>-0.0883</td>
<td>0.0759</td>
<td>0.706</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>1.00</td>
<td>0.1075</td>
<td>-0.2193</td>
<td>-0.1056</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I.Q.</td>
<td>1.00</td>
<td></td>
<td></td>
<td>0.6309**</td>
<td>0.0902</td>
<td></td>
</tr>
<tr>
<td>Field-dependence/Field-independence</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td>0.0240</td>
<td></td>
</tr>
<tr>
<td>Pretest Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

** Significant at .01 level.

Pictures of Facial Affect, the individual emotions of happiness, sadness, fear, anger, surprise, disgust, and neutral were analyzed. No significance was found to alter the findings of the total score; therefore, only the results from analyzing the total score will be presented.

The correlations of .0240 between field-dependence/field-independence and labeling pictures of facial affect (pretest) suggests that no significant relationship exists between the two variables. Since the correlations were not significant, Hypothesis 1 failed to be rejected. There is no significant relationship between the subject's field-dependence/field-independence and labeling pictures of facial affect. Subjects scores on Labeling Pictures of Facial Affect (pretest) were not related to their field-dependence/field-independence.
Hypothesis 2. There is no significant relationship between the subject's field-dependence/field-independence as assessed by the Group Embedded Figure Test and labeling pictures of facial affect as assessed by the Pictures of Facial Affect pretest when controlling for sex.

The independent variables of sex and field-dependence/field-independence were selected to determine if they were "predictors" of labeling pictures of facial affect, the dependent variable. The stepwise multiple regression procedure was utilized. The overall tabulated F-value of 4.98 (with 2 and 53 degrees of freedom) is not significant at the .01 level indicating that a relationship did not exist between the dependent variable, labeling pictures of facial affect, pretest, and the linear combination of independent variables selected. Results of the analysis are presented in Table 6.

The multiple correlation coefficient, $R$, is .106 and the coefficient of determination, $R^2$, is .0111. This can be interpreted to mean the 1.11 percent of the variability in labeling pictures of facial affect is accounted for or "explained" by the linear combination of independent variables. The partial F-values for the two independent variables, sex and field-dependence/field-independence, were not significant (.566 and .00 respectively).

Since the partial F-value was not significant, Hypotheses 2 failed to be rejected. There was no significant relationship
Table 6. Labeling Pictures of Facial Affect (pretest) predicted by means of stepwise regression when controlling for sex

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R^2</th>
<th>R^2 change</th>
<th>Regression Coefficient</th>
<th>Standardized Regression Coefficient</th>
<th>Partial F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field-dependent/</td>
<td>0.02403</td>
<td>0.0058</td>
<td>0.0058</td>
<td>0.240783</td>
<td>0.00092</td>
<td>0.00</td>
</tr>
<tr>
<td>Field-independent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>0.10557</td>
<td>0.0114</td>
<td>0.01057</td>
<td>2.271856</td>
<td>-0.10536</td>
<td>0.566</td>
</tr>
<tr>
<td>Final prediction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>equation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pictures of Facial Affect = 73.44 + 0.024 field-dependence/field-independence + (-2.272) sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Partial F-value: 7.08 with 1 and 53 degrees of freedom at .01 level
between the subject's field-dependence/field-independence and labeling pictures of facial affect when controlling for sex. The subject's score on Labeling Pictures of Facial Affect pretest was not related to the subject's sex and field-dependence/field-independence.

Hypothesis 3: There is no significant relationship between the subject's field-dependence/field-independence as assessed by the Group Embedded Figure Test and labeling pictures of facial affect as assessed by Pictures of Facial Affect when controlling for I.Q.

The independent variables of I.Q. and field-dependence/field-independence were selected to determine if they were "predictors" of labeling pictures of facial affect, the dependent variable. The stepwise multiple regression procedure was utilized. The overall tabulated F-value of 4.98 (with 2 and 53 degrees of freedom) was not significant at the .01 level, indicating that a relationship did not exist between the dependent variable, labeling pictures of facial affect pretest, and the linear combination of independent variables selected. The results are presented in Table 7.

The multiple correlations coefficient of determination, \( R \), is .09966 and the coefficient of determination of \( R^2 \), is .00993. This can be interpreted to mean the .993 percent of the variability in labeling pictures of facial affect is accounted for or "explained" by the linear combination of
Table 7. Labeling Pictures of Facial Affect (pretest) predicted by means of stepwise regression when controlling for I.Q.

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>$R^2$</th>
<th>$R^2$ change</th>
<th>Regression Coefficient</th>
<th>Standard Regression Coefficient</th>
<th>Partial F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.Q.</td>
<td>0.09020</td>
<td>0.00314</td>
<td>0.00814</td>
<td>0.1014666</td>
<td>0.12466</td>
<td>0.501</td>
</tr>
<tr>
<td>Field-dependent/Field-independent</td>
<td>0.09966</td>
<td>0.00939</td>
<td>0.00180</td>
<td>-0.1216402</td>
<td>-0.05463</td>
<td>0.096</td>
</tr>
</tbody>
</table>

Final prediction equation: Pictures of Facial Affect (pretest) = 60.31760 + 0.101 I.Q. + (-0.122) field-dependence/field-independence

Partial F-value: 7.08 with 1 and 53 degrees of freedom
independent variables. The partial F-values for the two independent variables, I.Q. and field-dependence/field-independence, were not significant (.501 and .096 respectively).

Since the partial F-value was not significant, Hypothesis 3 failed to be rejected. There was no significant relationship between the subject's field-dependence/field-independence and labeling pictures of facial affect when controlling for I.Q. The subject's score on Labeling Pictures of Facial Affect pretest was not effected by the subject's I.Q. and field-dependence/field-independence.

Hypotheses 1 through 3 examined the first major research problem which was formulated to determine if there was a significant relationship between individuals' field-dependence/field-independence and their skill in labeling pictures of facial affect. Results indicated that both field-dependent and field-independent individuals from the sample population possessed similar skills in correctly labeling pictures of facial affect when they were instructed to focus their attention on the face. A person's score on Labeling Pictures of Facial Affect pretest was not predicted by or related to the person's field-dependence/field-independence.
Hypothesis 4: There is no significant relationship between the subject's labeling pictures of facial affect as assessed by the Pictures of Facial Affect following training, i.e., training individuals to label pictures of facial affect.

The independent variable of treatment, i.e., training individuals to label pictures of facial affect, was selected to determine if the training program had a possible effect on the posttest score of Labeling Pictures of Facial Affect, the dependent variable. The independent variable of the pretest was selected to partial out any effect the pretest may have contributed to the posttest scores. The stepwise multiple regression procedure was utilized. The overall tabulated F-value of 4.98 (with 2 and 53 degrees of freedom) was highly significant beyond the .01 level, indicating that a relationship did exist between labeling pictures of facial affect (posttest), and the linear combination of independent variables selected. The results are presented in Table 8.

The multiple correlations coefficient, $R$, is .525, and the coefficient of determination, $R^2$, is .279. This can be interpreted to mean that 27.9 percent of the variability in the posttest score was accounted for or "explained" by the linear combination of independent variables.

The partial F-value for the two independent variables, treatment and pretest scores, are highly significant (10.337 and 8.683 respectively). Since the partial F-value is
Table 8. The effect of training on Labeling Pictures of Facial Affect predicted by means of stepwise regression

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R²</th>
<th>R² change</th>
<th>Regression Coefficient</th>
<th>Standard Regression Coefficient</th>
<th>Partial F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>0.37123</td>
<td>0.12781</td>
<td>0.13781</td>
<td>0.4786633</td>
<td>0.34467</td>
<td>8.683**</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.52775</td>
<td>0.27852</td>
<td>0.14071</td>
<td>11.01616</td>
<td>0.37606</td>
<td>10.337**</td>
</tr>
</tbody>
</table>

Final prediction equation: Pictures of Facial Affect (posttest) = 33.20430 + 0.479 + 11.016

Partial F-value: 7.08 with 1 and 53 degrees of freedom at the .01 level

**

Significant at the .01 level.
highly significant, Hypothesis 4 is rejected. There is a significant relationship between subjects' posttest scores on Pictures of Facial Affect and the treatment group. The training program (Appendix D) was highly effective; students who took the training scored much higher on Labeling Pictures of Facial Affect posttest than students who did not attend the training program.

Hypothesis 5. There is no significant relationship between field-dependence/field-independence assessed by the Group Embedded Figure Test and effect of training on labeling pictures of facial affect as assessed by Labeling Pictures of Facial Affect.

The independent variable of field-dependence/field-independence was selected to determine if it is a "predictor" of an individual's posttest score on Labeling Pictures of Facial Affect, the dependent variable. The independent variable of pretest score and treatment was selected to partial out any effect possibly contributed to the posttest score. The stepwise multiple regression procedure was utilized. The overall tabulated F-value of 4.13 (with 3 and 52 degrees of freedom) was highly significant beyond the .01 level, indicating that a relationship did exist between labeling pictures of facial affect (posttest), and linear combination of independent variables selected. The results are presented in Table 9.
Table 9. Labeling Pictures of Facial Affect (posttest) predicted by means of stepwise regression

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>R</th>
<th>R²</th>
<th>R² change</th>
<th>Regression Coefficient</th>
<th>Standard Regression Coefficient</th>
<th>Partial F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>0.37123</td>
<td>0.13782</td>
<td>0.13781</td>
<td>0.4704278</td>
<td>0.33874</td>
<td>9.539**</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.52775</td>
<td>0.27852</td>
<td>0.14071</td>
<td>10.32589</td>
<td>0.35249</td>
<td>10.276**</td>
</tr>
<tr>
<td>Field-dependent/Field-independent</td>
<td>0.61466</td>
<td>0.37781</td>
<td>0.09929</td>
<td>0.977444</td>
<td>0.31607</td>
<td>8.298**</td>
</tr>
</tbody>
</table>

Final prediction equation: Labeling Pictures of Facial Affect (posttest) = 25.176 + 0.479 pretest + 10.326 Treatment + 0.977 field-dependence/field-independence

Partial F-value: 703 with 1 and 52 degrees of freedom at .01 level

** Significant at level .01.
Table 10. Mean comparisons of treatment and control groups (posttest)

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td>Mean deviation</td>
<td>deviation</td>
</tr>
<tr>
<td>Pictures of Facial Affect</td>
<td>88.94</td>
<td>13.67</td>
</tr>
<tr>
<td>(posttest)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The multiple correlations coefficient, $R$, is .615, and the coefficient of determination, $R^2$, is .376. This can be interpreted to mean that 37.8 percent of the variability in the posttest score is accounted for or "explained" by the linear combination of independent variables.

The partial F-values for the independent variables, pretest, treatment, and field-dependence/field-independence were highly significant (9.539, 10.276, and 8.298 respectively). Since the partial F-value was highly significant, Hypotheses 5 was rejected. There was a significant relationship between subjects' posttest scores on Pictures of Facial Affect and field-dependence/field-independence after controlling for the effect of treatment and pretest. The training program had a greater effect on field-independent individuals than on field-dependent individuals. Students who significantly improved their scores on Labeling Pictures of Facial Affect posttest after attending the training program were individuals who scored high on the Group Embedded Figure Test and were identified as field-independent individuals.

Hypothesis 6: There is no significant relationship between field-dependence/field-independence as assessed by the Group Embedded Figure Test and the effect of training on labeling pictures of facial affect as assessed by Pictures of Facial Affect when controlling for sex.
The independent variables of sex and field-dependence/field-independence were selected to determine if they were predictors of Labeling Pictures of Facial Affect (posttest), the dependent variable. The independent variables of pretest scores and treatment were selected to partial out any effect that they may have contributed to the posttest scores. The stepwise multiple regression procedure was utilized. The overall tabulated F-value of 3.65 (with 4 and 51 degrees of freedom) was highly significant beyond the .01 level, indicating that the relationship exists between labeling pictures of facial affect (posttest), and the linear combination of independent variables selected. The results are presented in Table 10.

The multiple correlation coefficient, R, was .667, and the coefficient of determination, $R^2$, was .444. This could be interpreted to mean that 44.4 percent of the variability in the posttest score is accounted for or "explained" by the linear combination of independent variables.

The partial F-value for the independent variables, pretest, treatment, and field-dependence/field-independence, and sex, were highly significant (12.090, 10.878, 12.165, and 6.117 respectively). Since the partial F-value is highly significant, Hypothesis 6 is rejected. There is a significant relationship between subjects' posttest scores on
Table 11. Labeling Pictures of Facial Affect (posttest) predicted by means of stepwise regression when controlling for sex

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R^2</th>
<th>R^2 change</th>
<th>Regression Coefficient</th>
<th>Standard Regression Coefficient</th>
<th>Partial F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>0.37123</td>
<td>0.13781</td>
<td>0.13781</td>
<td>0.5081133</td>
<td>0.36588</td>
<td>12.090**</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.52775</td>
<td>0.27852</td>
<td>0.14071</td>
<td>10.17042</td>
<td>0.34516</td>
<td>10.878**</td>
</tr>
<tr>
<td>Field-dependence/F</td>
<td>0.61466</td>
<td>0.37781</td>
<td>0.09929</td>
<td>1.157385</td>
<td>0.37425</td>
<td>12.165**</td>
</tr>
<tr>
<td>Field-independence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>0.66667</td>
<td>0.44444</td>
<td>0.6663</td>
<td>7.967009</td>
<td>0.26606</td>
<td>6.117*</td>
</tr>
<tr>
<td>Final prediction</td>
<td>Labeling Pictures of Facial Affect (posttest) = 8.109 + 0.508 pretest + 10.140 treatment + 1.157 field-dependence/field-independence + 7.967 sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial F-value:</td>
<td>7.08 with 1 and 51 degrees of freedom at the .01 level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.00 with 1 and 51 degrees of freedom at the .05 level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the .05 level.
**Significant at the .01 level.
Pictures of Facial Affect and the field-dependence/field-independence after controlling for treatment, pretest scores, and sex. The training program had a greater effect on field-independent individuals and less of an effect on field-dependent persons. Both male and female students who improved their scores on Labeling Pictures of Facial Affect posttest after attending the training program were individuals who scored high on the Group Embedded Figure Test, identified as field-independent individuals.

Hypothesis 7. There is no significant relationship between field-dependence/field-independence as assessed by the Group Embedded Figure Test and the effect of training on labeling pictures of facial affect as assessed by Pictures of Facial Affect when controlling for I.Q.

The independent variables of I.Q. and field-dependence/field-independence were selected to determine if they were predictors of labeling pictures of facial affect (posttest), the dependent variable. The independent variables of pretest scores and treatment were selected to partial out any effect they may have contributed to the posttest scores. The stepwise multiple regression procedure was utilized. The overall tabulated F-value of 3.65 (with 4 and 51 degrees of freedom) was highly significant beyond the .01 level, indicating that a relationship did exist between labeling pictures of facial affect (posttests), and the linear
combination of independent variables selected. The results are presented in Table 11.

The multiple correlation coefficient $R$, is .649, and the coefficient of determination $R^2$, is .421. This can be interpreted to mean that 42.1 percent of the variability in the posttest scores is accounted for or "explained" by the linear combination of the independent variables.

The partial F-value for the independent variables pre-test and treatment, were highly significant (8.612 and 12.917 respectively). However, the independent variables, I.Q. and field-dependence/field-independence, were not significant (3.798 and 1.020 respectively). Hypothesis 7 failed to be rejected. There is no significant relationship between subjects' posttest scores on Pictures of Facial Affect and field-dependence/field-independence after controlling for I.Q. When taking into account a person's I.Q., a subject's score on Labeling Pictures of Facial Affect Posttest was not predicted by or related to a person's field-dependence/field-independence.

Hypotheses 4 through 7 examined the second major research problem which was formulated to determine if there was a significant relationship between individual's field-dependence/field-independence and their skill in labeling pictures of facial affect after attending a training program.
Table 12. Labeling Pictures of Facial Affect (posttest) predicted by means of stepwise regression when controlling for I.Q.

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R²</th>
<th>R² change</th>
<th>Regression Coefficient</th>
<th>Standard Regression Coefficient</th>
<th>Partial F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>0.37123</td>
<td>0.13781</td>
<td>0.13781</td>
<td>0.438147</td>
<td>0.31550</td>
<td>8.612**</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.52775</td>
<td>0.27852</td>
<td>0.14071</td>
<td>11.47503</td>
<td>0.39172</td>
<td>12.917**</td>
</tr>
<tr>
<td>I.Q.</td>
<td>0.63980</td>
<td>0.40935</td>
<td>0.13082</td>
<td>0.309275</td>
<td>0.27361</td>
<td>.798</td>
</tr>
<tr>
<td>Field-dependence/</td>
<td>0.64879</td>
<td>0.42093</td>
<td>0.1158</td>
<td>0.4361184</td>
<td>0.14102</td>
<td>1.020</td>
</tr>
<tr>
<td>Field-independence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final prediction</td>
<td>Labeling Pictures of Facial Affect (posttest) = 56.357 + 0.438 pretest + 11.475 treatment + 0.309 I.Q. + .436 field-dependence/field-independence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial F-value:</td>
<td>7.08 with 1 and 51 degrees of freedom at .01 level.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Significant at the .01 level.
to teach individuals to label pictures of facial affect. Students who took the training program scored much higher on the Facial Affect posttest than students who did not attend the training. Students who significantly improved their scores on Labeling Pictures of Facial Affect posttest after attending the training program were individuals who scored high on the Group Embedded Figure Test and were identified as field-independent individuals. Similar results were found for both male and female students. However, when controlling for or taking into account a person's I.Q., one's improvement or gain on Labeling Pictures of Facial Affect Posttest after attending the training program was not predicted by or related to a person's score on the Group Embedded Figure Test.
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to investigate whether the field-dependence/field-independence of an individual had a possible effect on the individual's performance of accurately labeling the facial affects of happiness, sadness, fear, anger, surprise, disgust, and neutral. The Group Embedded Figure Test (Witkin et al., 1971) was utilized for assessing the subjects' field-dependence/field-independence. Ability to label facial affect was assessed by Pictures of Facial Affect. Treatment involved teaching Ekman and Friesen's guide to labeling facial affect (Unmasking the Face, 1975).

The sample for this study consisted of 21 males and 34 females enrolled as sophomores and juniors at Dows Community High School in Dows, Iowa. Data from the I.Q. instrument, pretest and posttest scores on the Pictures of Facial Affect, and the Group Embedded Figure Test were examined to test the seven hypotheses. Two types of statistical analyses were conducted to analyze the data. Pearson-Product Moment Correlations were initially calculated between each of the dependent variables to determine if a viable association existed between the subject's ability in labeling pictures of facial affect and field-dependence/field-independence. The second analysis was stepwise multiple regression analysis.
of variance for each of the dependent variables.

Summary

Seven null hypotheses were formulated to examine the major areas of concern. There was significant evidence to reject three of the hypotheses, and sufficient evidence to fail to reject four of the hypotheses. In abbreviated form the findings were as follows:

**Null Hypotheses**

1. There is no significant relationship between the subject's field-dependence/field-independence as assessed by the Group Embedded Figure Test and labeling pictures of facial affect as assessed by the Pictures of Facial Affect Pretest, Failed to Reject

2. There is no significant relationship between the subject's field-dependence/field-independence as assessed by the Group Embedded Figure Test and labeling pictures of facial affect as assessed by the Pictures of Facial Affect Pretest when controlling for sex. Failed to Reject

3. There is no significant relationship between the subject's field-dependence/field-independence as assessed by the Group Embedded Figure Test and labeling pictures of facial affect as assessed by the Pictures of Facial Affect Pretest when controlling for I.Q. Failed to Reject
4. There is no significant relationship between the subject's labeling pictures of facial affect as assessed by the Pictures of Facial Affect following training, i.e., training individuals to label pictures of facial affect.  

5. There is no significant relationship between field-dependence/field-independence as assessed by the Group Embedded Figure Test and the effect of training on labeling pictures of facial affect as assessed by the Pictures of Facial Affect.  

6. There is no significant relationship between field-dependence/field-independence as assessed by the Group Embedded Figure Test and the effect of training on labeling pictures of facial affect as assessed by Pictures of Facial Affect when controlling for sex.  

7. There is no significant relationship between field-dependence/field-independence as assessed by the Group Embedded Figure Test and the effect of training on labeling pictures of facial affect as assessed by Pictures of Facial Affect when controlling for I.Q.  

Discussion  

Based on the findings in the fourth chapter, several conclusions can be related to the questions posed in this study. To answer the question if there was a significant relationship between individuals' field-dependence/field-independence with their skill in labeling pictures of facial affect, three hypotheses were generated. The three
hypotheses did not yield a difference that was statistically significant at the .01 level of significance. It was found that no significant relationship existed between field-dependence/field-independence and labeling pictures of facial affect. The correlation of .024 suggested that no significant relationship existed. There was no significant difference between field-dependence and field-independence and their ability at labeling pictures of facial affect on the pretest. The findings were the same when controlling or taking into account the sex or I.Q. of the person. This indicated that a person's skill in labeling pictures of facial affect was not effected or predicted by their sex, I.Q. or field-dependence/field-independence. These findings appeared to be contradictory to many of the implications made by writers in the field (Crutchfield, Woodworth & Albrecht, 1958; Konstandt & Forman, 1965; Messick & Damarin, 1964; Witkin et al., 1971; and Witkin et al., 1977). Previous research demonstrated that field-dependent individuals were particularly attentive to the faces of people around them in that they were better at remembering faces, and looked more at faces, than were field-independent people. Witkin et al. (1971) stated that:

Impressive evidence . . . indicates that field-dependent persons have what in effect amounts to a sensitive radar system, selectively attuned to social components. . . . It has been demonstrated that relatively field-dependent
persons . . . literally look more at the faces of others, the primary source of information about what others are thinking and feeling (p. 10).

The results of the study appeared to be in contradiction to the basic definition of field-dependence/field-independence presented by Witkin et al. in his test manual (1971). In support of his contention that field-dependent individuals are more attentive to social cues and use the face as a guide for structuring their own experiences (Witkin et al., 1977), it is inferred that field-dependent individuals are more skillful at labeling facial emotions (1971). Witkin does not cite research evidence to support his implication that field-dependent individuals are better at labeling facial emotions than field-independent individuals. This study, however, indicated that field-dependent and field-independent individuals were not significantly different in their skill at labeling pictures of facial affect. It may be true that field-dependent people look more at the face, but this most recent study demonstrated that when a person is directed to look at the face, field-dependent and field-independent individuals were not significantly different in their skill of labeling pictures of facial affect. Both field-dependent and field-independent individuals had similar ability in labeling pictures of facial affect.

The second major question in this study was designed to
determine if there was a significant relationship between individuals' field-dependence/field-independence and their skill in labeling pictures of facial affect after attending a training program to teach individuals to label pictures of facial affect. Four major null hypotheses were generated to answer this question.

The effect of training, i.e., teaching individuals to accurately label pictures of facial affect of happiness, sadness, fear, disgust, surprise, and neutral was tested in Hypothesis 4. Although this hypothesis essentially tested what was being taught, it was deemed important for several reasons. First of all, no research has been reported that determined if the training program outlined by Ekman and Friesen (1975) achieved its basic purpose which was to train individuals to label pictures of facial affect accurately. Second, the major concern of the present study was not which method of teaching labeling of facial affect was more productive, but if a person's field-dependence/field-independence was a predictor of one's ability to learn or improve the skill of labeling pictures of facial affect after training.

The findings indicated that the training program had a highly significant relationship to an individual's posttest scores when adjusting for the pretest. The partial F-value after controlling for the pretest was 10.337 which is highly
significant at the .01 level. Therefore, based on this finding, it can be concluded that the training program (Appendix D) which was adapted from Ekman and Friesen's guide to recognizing emotions from facial expressions, Unmasking the Face (1975), had a positive relationship with individuals' improving their scores on Labeling Pictures of Facial Affect. This finding is consistent with Ekman and Friesen's (1972, 1975) and Izard's (1971) contentions that a training program does have a positive relationship to one's ability to improve performance on labeling pictures of facial emotions.

Several past studies have examined the effects of training on labeling emotions. Allport (1924) used a 15 minute training period, which consisted mainly of analyzing the various facial components of different expressions. He found only a slight average increase in ability to identify emotions after he had trained subjects. A follow-up to Allport's study conducted by Guilford (1929) used a more extensive training program. Subjects were asked to judge another set of faces while the experimenter gave the correct names to the expressions and called attention to the distinguishing marks of each expression. Guilford found a significant gain in scores by the treatment group on the posttest (1929).
Mittenecker, 1960, as cited in Izard (1971) demonstrated that correct judgement of facial stimuli could be improved by learning. His training program consisted simply of informing subjects as to the correctness of their judgements.

The effect of training on perceived facial expressions was researched by Hochberg (1969). Improvement in duplicating facial expressions resulted from the use of a mirror and there was a deterioration of performance without that aid.

Except for Allport's (1924) conclusions, this study confirmed previous research which indicated that training did have a positive relationship on one's increased accuracy on labeling facial affect.

The relationship between individuals' field-dependence/field-independence with their skill in labeling pictures of facial affect after attending a training program to teach individuals to label pictures of facial affect was tested in Hypothesis 5. The partial F-value for field-dependence/field-independence was significant (8.298) at the .01 level when controlling for the treatment effect and the effect of the pretest. In other terms, this indicated that when comparing the treatment group against the nontreatment group or the control group, the field-independent individuals exhibited
a greater increase in ability to correctly label facial affect after attending the training program than did field-dependent persons. The partial F-value for field-dependence/field-independence was likewise highly significant (12.165) at the .01 level after controlling for sex. However, when controlling for the effect of I.Q., field-dependence/field-independence was no longer significant (1.020) at the .01 level. In other terms, this indicated that when comparing the treatment group against the nontreatment group, or the control group, and taking into account the I.Q. of each subject; field-independent individuals did not exhibit a greater increase in ability to correctly label facial affect than did field-dependent persons. Both field-dependent and field-independent individuals were similar in their improvement of labeling pictures of facial affect. A person's field-dependence/field-independence was not a determining factor in his/her learning the material presented in the training program.

Although recent studies on the role of field-dependence/field-independence in learning and memory have been reported (Witkin et al., 1976), there has been no study to determine if field-dependence/field-independence effects learning to label pictures of facial affect. Many studies show that field-independent subjects are better at concept attainment (Arbuthnot, 1971; Davis and Klausmeier, 1970; Ruble and
Nakamura, 1972; and Shapson, 1973). Goodenough (1976) stated, however, that

There may be some concepts that field-dependent people learn as well as, or even better than, field-independent people (p. 678).

Witkin et al. (1977) recently stated that "the field-dependent persons tend to be better at learning and remembering social material than persons who are relatively field-dependent" (p. 18). In contradiction to Witkin's statement, this study demonstrated that field-dependent individuals were not better at learning a socially oriented task of labeling pictures of facial affect. When controlling for, or taking into account, the I.Q. of the individual, the field-dependence/field-independence of an individual did not have a significant relationship to learning to label pictures of facial affect.

Conclusion

With the emphasis of future education on human relations (Patterson, 1973), guidance counselors will be asked to help design curriculum and teach students the interpersonal social skills of verbal and nonverbal communication (Weinstein and Fantini, 1970; Bernard and Huckins, 1974; Aiken, 1973; Kelley, 1968; Stanford and Roark, 1974). The classroom is a living laboratory in human interaction and
nonverbal communication (Thompson, 1973) and is the appropriate location for guidance counselors to teach the skills of interpersonal communication.

Within the several categories of nonverbal communication which guidance counselors may teach, is the study of labeling facial affect. The presence of facial expressions during social communication among individuals have been cited by many students of interpersonal behavior (Altmann, 1976; Izard, 1971).

This research indicated that the adaptation (see Appendix D) of Paul Ekman and Wallace Frieson's guide to recognizing emotions from facial expression, Unmasking the Face (1975), was an extremely successful teaching model for a guidance counselor to use to increase the sample population's score on Labeling Pictures of Facial Affect. The study also gave evidence that the high school students sampled were able to improve their scores regardless of their field-dependence/field-independence.

Recommendations for Further Study

Based on the findings from this investigation and the researchers insights, the following recommendations for further research are made.

Replication of this study, involving students from
similar and dissimilar social-economic and geographical locations might substantiate the findings here and provide a broader base for generalizations.

A longitudinal study could be conducted to determine if the training of individuals to label pictures of facial affect has an optimal age level. Would, for example, junior high or upper elementary students benefit more from the training program than high school sophomores and juniors?

Further research could employ several standardized personality scales to determine if a relationship exists between one's score on the Pictures of Facial Affect instrument and various scales of personality.

It is also suggested that further researchers using the Group Embedded Figure Test or other measures of field-dependence/field-independence, partial out the effect of I.Q. Many past studies have not accounted for I.Q. which could have attributed to the results presented. Several conclusions of the present study would be drastically altered if the effect of I.Q. had not been accounted for in the statistical analysis.
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APPENDIX A: PICTURES OF FACIAL AFFECT INSTRUMENT
The following are seven examples of the pictures in Ekman's Pictures of Facial Affect Instrument:

HAPPINESS

SADNESS

FEAR

ANGER
SURPRISE

DISGUST

NEUTRAL
APPENDIX B: EXPANDED ANSWER KEY FOR PICTURES
OF FACIAL AFFECT INSTRUMENT
ANGER - irritated, resentment, rage, fury, annoyance, irritated, annoy, provoke, infuriate, enraged, wrath, indignation, fierce, despise, steaming, ticked-off, hot tempered, pissed-off

DISGUST - sicken, revolting, repel, nauseate, loathing, sneer, yick, distaste, dislike, dissapprove, yucky, unpleasant, scorn, pew

HAPPY - lucky, gay, contented, joyous, ecstatic, glad, agreement, cheerfulness, pleasure, pleased, successful, jubilient, merry, laughing

SAD - sorrow, downcast, dejected, unhappy, woeful, depressed, gloomy, melancholy, somber, dismal, shameful, heavy-hearted, dejected, pain, grief, disappointed, hurt, blue, mourning, forlorn

SURPRISE - nonexpectant, unexpected, unforseen, astonished, wonder, surprise, bolt, blow, shock, amaze, astound, dumfound, startle, dazzle, awe, stun, unaware, flabbergast, bewilderment

NEUTRAL - middling, nondecided, null, serene, clam, normal, indifferent, tranquil, expressionless, careless, plain, at ease, peaceful, common, casual

FEAR - horrified, petrified, horror, terrified, worry, apprehension, mistrust, doubt, fright, alarm, panic, suspicion, qualm, dread, dismay, scare
APPENDIX C: THE GROUP EMBEDDED FIGURES TEST
The following are the first five geometric figures taken from the practice section of the Group Embedded Figure Test:

**Complex figures**

- ![Complex figure 1](image1)
- ![Complex figure 2](image2)
- ![Complex figure 3](image3)
- ![Complex figure 4](image4)
- ![Complex figure 5](image5)

**Simple figures**

- ![Simple figure 1](image6)
- ![Simple figure 2](image7)
- ![Simple figure 3](image8)
- ![Simple figure 4](image9)
- ![Simple figure 5](image10)
1. Through a group discussion, participants will be asked to verbally describe the muscular appearance of a person's face when happy.

2. Mini-lecture presentation on the four types of happiness will include examples and definitions of the following:
   a. excitement happiness
   b. pleasure happiness
   c. self-concept happiness
   d. relief happiness

3. Mini-lecture presentation on the muscular appearance of happiness.
   a. Corners of the lips are drawn up and back
   b. The mouth may or may not be parted, with the teeth exposed or not
   c. A wrinkle runs down from the nose to the outer edge beyond the lip corners
   d. The lower eyelid shows wrinkles below it, and may be raised but not tense
   e. Crow's-feet wrinkles go outward from the outer corners of the eyes

4. Show pictures of the facial emotion of happiness emphasizing the muscular appearance.

5. In dyads practice the muscular facial emotion of happiness. Each participant will be given an opportunity to demonstrate while the others will provide feedback.
Labeling Facial Affect Training Program (Continued):

II. Sad

1. Through a group discussion, participants will be asked to verbally describe the muscular appearance of a person's face when sad.

2. Mini-lecture presenting some of the general experiences of sadness:
   a. Loss through death
   b. Rejection by a loved one
   c. Loss of an opportunity of reward
   d. Loss of health

3. Mini-lecture presenting the muscular appearance of sadness:
   a. The inner corners of the eyebrows are drawn up
   b. The skin below the eyebrow is trangulated, with the inner corner up
   c. The upper eyelid inner corner is raised
   d. The corners of the lips are down, or the lip is trembling

4. Show pictures of the facial emotion of sadness emphasizing the muscular appearance.

5. In dyads practice the muscular facial emotion of sadness. Each participant will be given an opportunity to demonstrate while the others will provide feedback.
Labeling Facial Affect Training Program (Continued):

III. Fear

1. Through a group discussion, participants will be asked to verbally describe the muscular appearance of a person when experiencing fear.

2. Mini-lecture presentation on some of the experiences of fear. Fear is often experienced in advance of harm.
   a. Physical form:
      1. vaccination
      2. life-endangering injuries
   b. Psychological harm:
      1. minor insults
      2. rejection of one's love
      3. attacks on one's worth

3. Mini-lecture presenting the muscular appearance of fear:
   a. The brows are raised and drawn together
   b. The wrinkles in the forehead are in the center, not across the entire forehead
   c. The upper eyelid is raised, exposing sclera, and the lower eyelid is tensed and drawn up
   d. The mouth is open and the lips are either tensed slightly and drawn back or stretched and drawn back

4. Show pictures of the facial emotion of fear emphasizing the muscular appearance.

5. In dyads, practice the muscular facial emotion of fear. Each participant will be given an opportunity to demonstrate while the others will provide feedback.
Labeling Facial Affect Training Program (Continued):

IV. Anger

1. Through a group discussion, participants will be asked to verbally describe the muscular appearance of a person when experiencing anger.

2. Mini-lecture presentation on some of the experiences of anger. Anger can be aroused in a number of different ways.
   a. Frustration resulting from interference with one's activity or the pursuit of one's goals.
   b. Someone's action or statement which causes one to feel psychologically hurt.
   c. Physical threat.
   d. Observing someone do something which violates one's values.
   e. A person's failure to meet one's expectations.

3. Mini-lecture presenting the muscular appearance of anger.
   a. The brows are lowered and drawn together.
   b. Vertical lines appear between the brows.
   c. The lower lid is tensed and may not be raised.
   d. The upper lid is tense and may or may not be lowered by the action of the brow.
   e. The eyes have a hard stare and may have a bulging appearance.
   f. The lips are either pressed firmly together, with the corners straight; or they are open, tensed in a squarish shape as if shouting.
   g. The nostrils may be dilated, but this is not essential to the anger facial expression and may also occur in sadness.
4. Show pictures of the facial emotion of anger emphasizing the muscular appearance.

5. In dyads, practice the muscular facial emotion of anger. Each participant will be given an opportunity to demonstrate while the others will provide feedback.
ANGER
Labeling Facial Affect Training Program (Continued):

V. Surprise

1. Through group discussion, participants will be asked to verbally describe the muscular appearance of a person when experiencing surprise.

2. Mini-lecture on some of the experiences of surprise. Surprise is triggered by:
   a. Unexpected events
   b. Misexpected events

3. Mini-lecture presenting the muscular appearance of surprise.
   a. The brows are raised so that they are curved and high.
   b. The skin below the brow is stretched.
   c. Horizontal wrinkles go across the forehead.
   d. The eyelids are opened; the upper lid is raised and the lower lid drawn down; the whites of the eyes - the sclera - shows above the iris, and often below as well.
   e. The jaw drops open so that the lips and teeth are parted, but there is no tension or stretching of the mouth.

4. Show pictures of the facial emotion of surprise emphasizing the muscular appearance.

5. In dyads, practice the muscular facial emotion of surprise. Each participant will be given an opportunity to demonstrate while the others will provide feedback.
SURPRISE

[Images of people with surprised expressions]
Labeling Facial Affect Training Program (Continued):

VI. Disgust

1. Through a group discussion, participants will be asked to verbally describe the muscular appearance of a person when experiencing disgust.

2. Mini-lecture presentation on some of the experiences of disgust. Disgust often involves getting-rid-of and getting away from responses that are repulsive.
   a. taste - certain foods
   b. seeing - an ugly person or blood
   c. smelling
   d. sounds
   e. touch - a slimy object

   Individuals may very greatly. What may be disgusting to one person may not be disgusting to another.

3. Mini-lecture presenting the muscular appearance of disgust.
   a. The upper lip is raised.
   b. The lower lip is also raised and pushed up to the upper lip, or is lower and slightly protruding.
   c. The nose is wrinkled.
   d. The cheeks are raised.
   e. Lines show below the lower lid, and the lid is pushed up but not tense.
   f. The brow is lowered, lowering the upper lid.

4. Show pictures of the facial emotion of disgust emphasizing the muscular appearance.
5. In dyads, practice the muscular facial emotion of disgust. Each participant will have the opportunity to demonstrate while the others provide feedback.
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