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A STUDY OF THE RELATIONSHIP BETWEEN COGNITIVE STYLE AND
COMMUNICATION APPREHENSION IN AIR TRAFFIC CONTROL
TRAINEES

The University of Oklahoma

PH.D.

1980

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THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

A STUDY OF THE RELATIONSHIP BETWEEN
COGNITIVE STYLE AND COMMUNICATION APPREHENSION
IN AIR TRAFFIC CONTROL TRAINEES

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

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MONIQUE LAUGHLIN

NORMAN, OKLAHOMA

1980

A STUDY OF THE RELATIONSHIP BETWEEN
COGNITIVE STYLE AND COMMUNICATION APPREHENSION
IN AIR TRAFFIC CONTROL TRAINEES

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CHAPTER I

INTRODUCTION

The time span of major cultural change has always been greater than the life-span of an individual throughout history (Knowles, 1978). Education in the past has been defined as a process of imparting what is known to the youth of society--transmitting the culture. A cultural change began to emerge early in the 20th century (Mead, 1970) and for the first time in history, the cultural and social time span became considerably shorter than that of human life. This transformation has made it necessary to redefine education as a process of continuing inquiry (Knowles, 1978). The role of the educator is no longer to transmit known information to the youth of society but to be a facilitator and resource person for all ages in the process of lifelong learning. The reality is that knowledge gained at any point in time will become increasingly obsolete in the process of time.

Various forms of adult education have existed for a long time in virtually every contemporary society but it is only in recent years that it has emerged from the shadows and assumed a critical function (Lowe, 1975).

One role now assigned to adult education is to help society adjust to the effects of social change. The major problems of our changing world can only be solved as people, adults as well as youth, learn and change with the rapid pace, complexity and consequences of technological development (Lowe, 1975; Tough, 1979).

There is still very little known about the learning of adults. We do not understand why some people put forth tremendous effort, will try new things, extend themselves and take risks, while others are more resistant, more guarded, are slow to start and give up easily. This group are prodded, given advice and classified as apathetic or lazy. It has been easier to ignore the situation than to understand or help these people become competent learners (Kidd, 1973). It is only when adults have the intent to learn that they will seek new types of help and resources that are being developed (Tough, 1979).

Adult learning and change are therefore extremely important not only to the individual but to society. There are many areas of practice and research that are involved with understanding or producing changes in men and women

(Tough, 1979). Tough (1979) predicts major changes in adult learning and the various forms of adult education in the next 20 or 30 years. There will be changes in what they learn, why they learn it and the quantity that is learned. Helps available for the adult learner will probably be one of the significant areas of change (Tough, 1979).

The effect of adult education programs has often been to widen the margin between social groups that have existed when people left public school. Those who have profited from the educational experience in their youth are the ones who will most likely seek education as they enter adulthood. (Lowe, 1975). Providing more education in most communities tends to favor the already educated while the educationally underprivileged continue to withdraw (Lowe, 1975). What is happening or not happening that we fail to make contact with these people?

Many who pursue learning fail to get the help they need and often when they meet with obstacles will give up (Tough, 1979). It is clear that adult learners need improved help in various aspects of planning and carrying through their projects. The development of better help must be based on the needs and characteristics of individual adult learners if they are to benefit (Tough, 1979).

We live in a world with a complex system of technological communication; moving pictures, radio,

television, cassettes and combinations of media (Kidd, 1973). Mass communication has helped make a new type of society. All of these things are routine today for youth and adults alike (Educational Policies Commission, 1958). A system of communication whose content and form so deeply influence human life must have many implications for learning (Kidd, 1973). In spite of all these technological communications, we are a society with communication problems. We are affected tremendously on a daily basis by human interaction. We are members of organizations in varied situations ranging from social to major activities. There is an ongoing series of interpersonal relationships characterized by terms such as "work with", "go to school with", and "talk with". The "talk with" term is the most basic and crucial form of interaction we have with our fellow humans (Level & Galle, 1980).

The idea that language is the basis for what we think, how we think and whether we think at all is supported by a number of both psychiatrists and linguists (Level & Galle, 1980). Spiegel (1959) maintains that communication skills and abilities are directly associated with personality development and physical maturation. Deutsch (1952) contends that a person's personality and how that personality is held together is reflected in his manner of communication. It is the central idea of their hypothesis

that language functions not simply as a device for reporting experience but, more important, as a way of defining experience for its users. Language is more than simply a technique of communication, it directs the perceptions and behaviors of its users and provides a method of analyzing experience and placing that experience into significant categories. Through our own identification and categorization processes, what we notice in our environment, what we consider important, what we become aware of, and even what we ignore is determined through our language (Level & Galle, 1980).

The process of education is a process of communication. All participants in the educative system become alternately communicators and receivers of communication. There are many factors that influence this exchange and educators must be sensitive to them. Each year there are a large number of freshmen who drop from college because they fail to assume the responsibility as communicators (Brennan, 1963). The statistics are not so blatant in adult education but we know they are there also.

For over forty years scholars who have been concerned with oral communication have focused their attention concerning the person's anxiety or fear about communication on a person's communication behavior. Studies have consistently shown that some people are more apprehensive

orally than other people and this apprehension has a negative impact not only on their communication behavior but other important aspects of their life (McCroskey, 1977a). This has not been considered in adult education and is a factor that needs attention as we form programs for the adult learner.

Recent studies of cognitive changes in the adult years show that both programmed experiences such as adult education and unprogrammed experiences such as child rearing, produce deep-seated changes in the way adults handle risk, approach problems and organize their thinking. Therefore it is increasingly important that differences in cognitive style be taken into account (Knowles, 1978).

It is known that cognitive style is an influencing factor in the educational process from choice of major to academic success. Communication apprehension is also an important variable in the education field with strong indication that desensitization (McCroskey, 1977b; Olds, 1973) or adaptations in choosing or designing of instructional systems could aid in academic success for the individual with high communication apprehension (McCroskey & Anderson, 1976; McCroskey, Anderson, Richmond & Wheelless, 1979; and McCroskey, unpublished paper). This leads us to pose several questions: Is there a relationship between field-dependent-independent cognitive style and problems of

communication in the adult learner? Are adults who tend to avoid seeking help, or experience other problems and/or drop out along the way, high in communication apprehension? Is there a relationship between this verbal dimension and their cognitive style?

The goal of this study was to explore the relationship between the cognitive style of field-dependence-independence and the personality trait of communication apprehension.

Purpose of the Study

Research into individual communication variables in the adult learner and how this influences the learning process has barely been explored. The purpose of this study was to investigate the relationship between cognitive style and a specific personality trait. Specifically, the study looked at the possible relationship between the field-dependence-independence dimension of cognitive style and the personality trait of communication apprehension.

Cognitive style was measured with the Group Embedded Figures Test (Witkin, Oltman, Raskin & Karp, 1971) which assesses the field-dependence-independence continuum. Communication apprehension was measured by the Personal Figures Test (Witkin, Oltman, Raskin & Karp, 1971) which assesses the field-dependence-independence continuum. Communication apprehension was measured by the Personal

Report of Communication Apprehension--Long Form (McCroskey, 1978), which measures high to low communication apprehension. The sample selected for the study were two groups of Federal Aviation Administration (FAA) employees known for this study as Group A and Group B.

Statement of the Problem

The problem of this study was: To examine the relationship between field-dependent-independent cognitive style and communication apprehension with selected adult students.

The general area investigated was: The learner has a consistent cognitive style and consistent personality traits (McCroskey, 1978; Witkin, Lewis, Hertzman, Machover, Meissner & Wapner, 1954). Does the cognitive style correlate with the specific personality trait of communication apprehension?

Specific Hypotheses

The following were the hypotheses tested in this study:

H₁ There is a significant relationship between field-dependent-independent cognitive style and communication apprehension.

H₂ There is a significant positive relationship between Group A and Group B as described in this study.

Operational Definitions for the Study

The following operational definitions were used in the study:

Cognitive style: Self-consistent modes of functioning by which the sensory input is transformed, reduced, elaborated, stored, recovered and used in an individual's perceptual and intellectual activities.

Field-dependent: Subjects who score 0 to 9 for males and 0 to 8 for females on the Group Embedded Figures Test. This individual's perception is guided by the total environment outside of him/herself, referred to as global approach.

Field-independent: Subjects who score 16 to 18 for males and 15 to 18 for females in the Group Embedded Figures Test. This individual's perception is dependent more on his/her own internal sensations in relating to the world, referred to as analytical or articulate.

Communication apprehension: An individual's level of fear or anxiety associated with either real or anticipated communication with another person or persons.

High communication apprehension: Subjects scoring above 88 (one standard deviation above the typical mean) on the Personal Report of Communication Apprehension (PRCA).

Low communication apprehension: subjects scoring below 58 (one standard deviation below the typical mean) on

the Personal Report of Communication Apprehension (PRCA).

Adult learner: Persons over the age of 18.

Significance of the Study

The significance of the study is to test the relationship between a specific personality trait and cognitive style. Programs for the adult learner are shifting from general to individualized planning (Tough, 1979). It is important to those who design programs and aid in the educational process of the adult to understand the basic needs of the learner. There are certain attitudes and behaviors that are predictable, consistent, and similar in both the variables under consideration -- field-dependent-independent cognitive style and communication apprehension. It is not known if they correlate with one another in some way.

There are many general as well as specific programs that would benefit from this knowledge. The ability to predict communication problems from a specific individual characteristic would aid in the selection of programs as well as in the planning and facilitation process for the adult learner. If the educator knows there is a relationship between these two variables, it will be possible to develop systems that will be acceptable to them and aid in

keeping many in educational programs who both want and need assistance but are falling by the way side.

The Federal Aviation Administration selects applicants for training in specialized fields and are always searching for ways to improve their choices. The division of air traffic control desires personnel who are both high in visual spatial skills, as are field-independent persons, and high in their ease and ability to communicate, which means being low in communication apprehension.

There are many implications for adult education if the two variables were correlated: helps for the learner that will meet these needs, more accurate selection of students for specific programs, more efficient use of the educators' time and skills, appropriate projects, and ways to open new communication approaches. Information from this study will add to the body of knowledge.

CHAPTER II

SURVEY OF RELATED LITERATURE

This chapter contains a review of the literature relating to field-dependent-independent cognitive style, communication apprehension, and the adult learner.

Field-Dependent and Field-Independent Cognitive Styles

The study of cognitive functioning is an increasingly important area in the field of psychology in general and particularly in the psychology of personality (Pervin, 1970). Visual cognition deals with the processes by which a person perceives, remembers and thinks about the world as it is brought into being from retinal patterns. Auditory cognition refers to the transformation of the fluctuating pressure-pattern at the ear into what we hear as sounds, speech and music (Neisser, 1967).

Neisser (1967) defines cognition thus:

"Cognition refers to all the processes by which the sensory input transformed, reduced, elaborated, stored, recovered, and used. It is concerned with these processes even when they operate in the absence of relevant stimulation, as in images and hallucinations. Such terms as sensation, perception, imagery, retention, recall, problem-solving, and thinking among

many others, refer to hypothetical stages or aspects of cognition. (pp. 3-11)

Personality theorists are concerned with the total person, with individual differences, especially perceptual differences, and how these differences relate to their total functioning. The study of personality does not focus on only one particular psychological process but also on the interaction of different processes (Pervin, 1970). An important characteristic of cognitive styles is that they are stable over time. A person with a certain style one day will have the same style the next day, week or month, and possibly even years later (Witkin, Moore, Goodenough & Cox, 1977).

Witkins and associates' development of the field-dependent-independent cognitive style dimension emerged as a construct from laboratory experiments in the late 1940's and has led to many years of research and discoveries in the area of perception, intellectual functioning, individual and personality differences and social behavior (Witkin et al., 1954). Witkin's early works produced a battery of tests using conflicting visual and kinesthetic cues to determine how people locate the upright in space. Some individuals would use their visual reference to determine this and others depended on how the body felt to determine where "upright" existed (Witkin, Moore, Goodenough & Cox, 1977).

Witkin and associates (Witkin et al., 1954; Witkins, Moore, Goodenough & Cox, 1977) developed three tests to measure this difference in perception: The Rod and Frame Test (RFT), the Body-Adjustment Test (BAT) and the Embedded-Figures Test (EFT). In the RFT, the subject is seated in a totally dark room, presented a luminous square frame and a luminous rod arranged to pivot in either direction from the same center but independent of one another. The frame is adjusted to a tilt position and the task is to adjust the rod's position to upright. The object to place upright is the body rather than the external rod in the BAT. A chair, on which the subject is seated, is placed in a small room where both chair and room can be tilted either direction and independent of one another. After the subject is seated, both room and chair are tilted and it is the subject's task to adjust the chair to an upright position. The EFT presents the subject with a simple figure, it is then removed and a more complicated geometric design is presented. The latter has the same size and shape as the first presentation plus many lines that have been added so that the first figure seems to be there no longer. The task of the subject is to detect the simple form in the complex pattern (Witkin et al., 1954).

The number of degrees the body or rod is tilted decides the score in the RAF and the BAT. The score for the EFT is

determined by the time it takes to locate the embedded figure. The individual differences in ability to perform all three tasks is very marked (Witkin et al., 1954). There is evidence of subject consistency in the performance of all three of these tests as well as similar ones using an auditory and tactile embedded-figures task (Axelrod & Cohen, 1961; White, 1953; Witkin, 1964; Witkin et al., 1954).

All of the tests measure the extent to which the subject perceives part of a field as separate from the surrounding field as a whole. At one extreme of the range, perception is strongly dominated by the prevailing field, and they are therefore less accurate in the tests. These are called "field dependent". At the other extreme, the subject experiences items as somewhat separate from the surrounding field, and they are more accurate. These are called "field-independent". There is continuous distribution and participants display an indication toward one perception or the other (Witkin et al., 1954; Witkin, Moore, Goodenough & Cox, 1977).

Two more recent tests have been developed; the Group Embedded Figures Test (GEFT) and the Articulation--of Body Concept (ABC). The GEFT was developed from the EFT to administer to groups (Witkin, Moore, Goodenough & Cox). The ABC was developed to determine from figure drawings the articulation children had of their body concept (Witkin,

Dyk, Faterson, Goodenough & Karp, 1974). This 5-point scale originally developed for children's drawings was later modified for evaluation of adult's drawings (Faterson and Witkin, 1970). The body concept is considered to be articulated rather than global when the drawings indicate that the body has definite limits or boundaries, and the parts within the body are discrete, yet joined together into a definite structure (Witkin, Moore, Goodenough & Cox, 1977).

Research on Characteristics of Field-Dependence-Independence

Personality characteristics are transferred by two major methods: in one way they are classified according to their general ability to differentiate and to integrate information, the second way is to emphasize specific structural tendencies. Witkin's theory of field-dependent-independent falls in this second group which distinguishes field-and-body-orientation (Schroder & Suedfeld, 1971).

The factor that indicates individual differences in performance in the RFT, BAT, EFT and GEFT is the extent to which the subject perceives part of a field as separate from the surrounding field as a whole, rather than embedded in the field (Witkin, Moore, Goodenough & Cox, 1977). Field-independent persons depend more on their own internal sensations in evaluating and relating to these tasks and the world, and are sometimes referred to as analytical or

articulate. By contrast, field-dependent persons depend on the total environment outside of themselves to evaluate and relate and are referred to as perceiving globally (Witkin et al., 1954; Witkin, Moore, Goodenough & Cox, 1977). When field-dependent persons are presented with a problem in which the solution depends on taking some critical element out of context and reconstructing it to a new and different context, they find it much more difficult than do field-independent persons (Witkin, Moore, Goodenough & Cox, 1977). Field-independent persons use an internal frame of reference to deal with the world and have selfs which are experienced as being structured or an impersonal orientation. Field-dependent persons have little in the way of an internal frame of reference but rather experience themselves in relationship to all that is surrounding them outside of themselves or an interpersonal orientation (Witkin & Goodenough, 1977; Witkin, Moore, Goodenough & Cox, 1977).

The segregation of self from non-self is another way of interpreting the field-dependent-independent dimension. This segregation suggests there are boundaries existing between the inner and the outer self and the degree of differences in this segregation determines the extent to which the self or the outside field is likely to be used as a referent for behavior (Witkin & Goodenough, 1977). Witkin & Goodenough (1977) suggest that differentiation has

implications for interpersonal behavior. For example they posit that people who experience themselves as separate and distinct from others and who also rely on internal versus external referents are apt to be autonomous in their social relations. On the other hand, people with less defined selves, who also rely primarily on external rather than internal referents, are apt to turn toward other people. Both field-dependent and field-independent persons appear to perform at an equal level to achieve extrinsic rewards, whether that is social approval or material goods (Witkin & Goodenough, 1977). Witkin and Goodenough (1977) indicate that field-independent children and adults rate high on attributes such as autonomy, responsibility, showing initiative, self reliance and ability to think for oneself. They are in general, less dependent on others and separate themselves from pressures in their social environment (Witkin, 1967).

Research on Educational and Vocational Aspects of the Field-Dependent-Independent

There is no appreciable difference in the learning ability, memory, general intelligence or college grade point averages between the two cognitive styles (Pervin, 1970; Witkin, 1964; Witkin & Goodenough, 1977; Witkin, Moore, Goodenough & Cox, 1977). The field-independent person ranks superior on the analytic triad of the Wechsler I Q test

(Witkin et al., 1971) but there is no difference on the verbal-comprehension or attention-concentration triads (Witkin et al., 1971). Field-dependent people are better at learning and remembering any type of social material (Witkin, Moore, Goodenough & Cox, 1977).

Field-independent college and graduate students are likely to specialize in science, mathematics, engineering, architecture, experimental psychology, and surgical nursing as well as be teachers in these fields (Witkin, Moore, Goodenough & Cox, 1977). Field-dependent students choose fields such as elementary school teaching, clinical psychology, psychiatric nursing, social work, ministerial work, rehabilitation counseling, advertising, personnel and administration in which dealing with people is important (Witkin, Moore, Oltman, Goodenough Friedman, Owen & Raskin, 1977).

These selections carry over into their real-life activities and vocational choices. A higher percent of college athletes in team sports such as football, baseball and hockey are apt to be field-dependent while field-independent students are more likely to be associated with individual sports such as gymnastics, track, swimming and wrestling (Bard, 1972; Barnell & Trippe, 1975; Scheibner, 1970). If individuals start their careers in an area that is not in harmony with their cognitive style, longitudinal studies

show that they have a tendency to shift to more compatible vocations later (Witkin, Moore, Goodenough & Cox, 1977; Witkin, Moore, Oltman, Goodenough, Friedman & Owen, 1977).

Field-Dependent-Independent and Sex Differences

The topic of sex differences has been of interest in psychological research since 1900. Tyler (1956) reports the following: girls usually excell boys in school achievement, tend to be higher in verbal fluency, perceptual speed, rote memorizing of most materials and dexterity; boys average higher in science, mathematical reasoning and spatial judgment. Tested abilities show some sex differences in averages but a great deal of overlapping in distributions.

Consistent sex differences surface in studies to determine cognitive style (Witkin, 1949, 1950; Witkin et al., 1954; Witkin et al., 1971). Boys and men are more likely to be field independent than girls and women. This is a small but persistent difference and is observed in a number of Western European countries as well as in the United States.

Witkin et al. (1954) comment on this:

Where an item must be kept "separate" from the surrounding field, women generally prove more field dependent or less analytical than men, in the sense of being more affected by the context in which the item occurs. No sex differences are found in other kinds of

situations.

Men are more concerned than women with sensations from their bodies. Women, generally, give less attention to stimulation from their bodies, and are more likely to regard them in terms of their relation to the prevailing visual fields. Nevertheless, when the situation makes it easy or necessary to utilize bodily experiences in performing the required task, they are able to do so about as effectively as men. This difference between the sexes accounts further for women's greater variability in perceptual performance. (pp. 163-171)

Differences are greatest and most manifest at the adult level. The differences tend to become insignificant in geriatric groups beginning at age 60 (Witkin et al., 1954; Witkin et al., 1971).

Field-Dependent-Independent and Age

Intelligence tests administered to adult groups show that age brings a decline in the total score on the tests, but the extent of decrease depends to a large degree on the type of task involved. The scores on tests related to vocabulary and elementary-school subject matter stay up throughout middle age. The kind of items most highly related to measures of field dependence (i.e. spatial abilities) show the earliest and most rapid decline. Tests

requiring performance and rapid adaptation to new situations decline noticeably. Speed tests tend to decline more than power tests (Schwartz & Karp, 1967; Tyler, 1956).

Cross-sectional and longitudinal studies of children and young adults show that there is progression from more field-dependent perception and less developed levels of differentiation toward greater field independence and more differentiation with age (Schwartz & Karp, 1967; Tyler, 1956). The increase of field independence is noted between the ages of 8 and around 15 in girls and 17 in boys (Kogan, 1971; Witkin, Goodenough & Karp, 1967). The rate of change seems to slow down with increasing age. Individuals maintain their position in relationship to others, but there is a gradual increase in field-dependence through mid to late adolescence which is followed by a plateau in the young adult period (Comalli, 1970).

Schwartz and Karp (1967) found a persistent increase in field-dependence with age, particularly in the over 60 age group but an absence of sex differences in geriatric subjects. Comalli (1965) also found the older subjects to be more field dependent than a younger group. A study by Karp (1967) using a 60 to 90 age group, revealed that employed subjects were significantly more field independent than their retired peers.

The overall picture presented from these studies indicate a U-shaped pattern with the performance of children and aged subjects being similar and both differing on the various perceptual tasks from young adults (Kogan, 1973). Studies for ages 5 to 39 and 60 to 90 have been fairly extensive, however, there are few in the 40 to 60 age range. Comalli (1972) uses a chart to illustrate that field-dependence increases from age 40 to 60 but it was not possible to locate studies for that age range.

Field-Dependent-Independent and Communication

The relationship between verbal functioning and mode of field approach was not considered in the conceptual framework of the field-dependent-independent theory (Witkin, 1974). Research using the field-dependent-independent dimension and communication variables is somewhat limited. Brilhart (1970) found that the more field-dependent the listener, the more influenced they were by the experimentally induced evaluation of the speaker prior to the speech. Speeches that contained little documentation and false reasoning were given higher ratings by field-dependent subjects if the speaker was promoted as esteemed. Another study (Fleshler, Ilardo & Demoretcry, 1974) found field dependence to be only peripherally related to evaluations of speaker and message credibility.

Chapman (1967) found no relationship between field dependence and communication effectiveness in decoding a written message while Shows (1968) found subjects were able to match verbal descriptions to pictures significantly better when the descriptions were prepared as corresponding to their own cognitive style. Jeanne (1979) discovered the mutual affect and attraction between two people was a more powerful determinate in communication effectiveness than the similarity and/or dissimilarity in subject's cognitive style. Wright (1976) showed a preference for written communication with one's own cognitive style due to a better understanding both of what is being said and how it is said. Information about the physical sciences produced by field-dependent sources however, was preferred by both field-dependent and field-independent receivers.

Studies by Witkin et al. (1954) using the Rorschach, TAT and Figure Drawing, found field-dependent subjects to be more passive, displayed inability to function independently of environmental support, showed considerable anxiety, difficulty in accepting oneself and difficulty in articulation. Field-independent subjects were more self-assured, active and able to function with relatively little support from the environment, had the capacity to initiate and organize, power to struggle for mastery over social and other environmental sources, a low level of anxiety and more

competence in cognitive articulation. Culver, Cohen, Silverman and Shmovationian (1964), in a sensory deprivation experiment, found field-dependent people tend to be less relaxed when they do not know what is expected of them.

Gates (1971) studied verbal conditioning in conversation and found that the word output for field-dependent subjects was much lower with a silent interviewer than with a responsive interviewer. Field-independent subjects, by contrast, were little affected by the interviewer's behavior. In a therapy situation where both patient and therapist were field-dependent there was a higher frequency of interaction than the combination of field-independent patient and therapist (Witkin, Lewis & Weil, 1968). A study by Dingman (1971) indicates that global counselors are better communicators than analytical counselors.

Field-dependent individuals tend to become information seekers in situations that are unstructured or ambiguous if there are reliable sources available (Witkin, Moore, Goodenough, Friedman, Owen & Raskin, 1977). Greene (1976) found field-dependent subjects had less personal distancing during an interview, were more willing to comply with suggestions yet showed less success at following through.

Field-dependent subjects are particularly apt to be influenced by the opinion of others with whom they interact in a group as well as to change their attitude as the result

of a persuasive written communication (Witkin & Goodenough, 1977). Field-independent individuals tend to be unwilling or unable to aid in group conflict resolution by accommodating their views to those of others (Oltman, Goodenough, Witkin, Freedman & Freedman, 1975).

Communication Apprehension

Research relating to fear and anxiety about oral communication has been treated with several different labels (McCroskey, 1977a). Stage fright, reticence, shyness, audience sensitivity and communication apprehension are the main names used. "Communication apprehension", or more simply CA, has been chosen for the purpose of this study as it has been most widely used for the research in this area.

CA is defined as: "an individual's level of fear or anxiety associated with either real or anticipated communication with another person or persons" (McCroskey, 1977a). Phillips (1968) speaks of the person with high CA as "reticent" and describes such a person as one "for whom anxiety about participation in oral communication outweighs his/her projection of gain from the situation". CA refers only to apprehension about either oral or written communication and is not to be confused with a generally anxious personality (Hurt, Scott & Mc Croskey, 1978).

Speilberger (1966) describes two types of anxiety: State anxiety (A-State) is defined as a transitory condition triggered by a specific situation which produces conscious feelings of apprehension and tension and is associated with the arousal of the autonomic nervous system. Trait anxiety (A-Trait) is considered a personality trait and implies an acquired behavioral disposition that produces fairly consistent proneness to anxiety in stable individuals. Persons who are high in A-Trait anxiety will tend to display higher A-State levels more often and with more intensity than will persons with low A-Trait.

Research on Characteristics of Communication Apprehension

The CA construct is considered a personality-type trait which has many implications for an individual's every day life and it is conceived to be relatively permanent (McCroskey, 1977a). McCroskey (1978) developed the Personal Report of Communication Apprehension (PRCA) to help in the validation of the construct.

CA has the following theoretical propositions:

1. People vary in the degree to which they are apprehensive about oral communication with other people (McCroskey, 1978). Tests show an approximate normal distribution of scores and there is test-retest reliability unless there has been an intervening variable (McCroskey, 1978).

2. People with high oral communication apprehension seek to avoid communication (McCroskey, 1978). Individuals with high CA tend to be introverted and withdraw from social contact. Huntly (1969) found a significant $-.36$ correlation between extroversion and CA. High CA persons choose housing accommodations that require less interaction (McCroskey, 1976), occupations with little human contact (Hurt, Scott & McCroskey, 1978), avoid influential seats in a small group (McCroskey, 1976) as well as choosing classroom seats with less teacher interaction (Hurt, Scott & McCroskey, 1978) and they prefer lectures to small interaction classes (McCroskey & Anderson, 1976). McCroskey and Shehan (1978) found students with high CA were less likely to accept a blind date, interacted less with peer strangers and were more likely to engage in steady dating than were students who were low in CA.

3. People with high oral communication apprehension engage in less oral communication than do less orally apprehensive people (Sorensen & McCroskey, 1977) and they demonstrate less self disclosure than others (McCroskey & Richmond, 1977). Correlations between Lustigs verbal reticence scale and McCroskey's PRCA was $.74$ (McCroskey, 1978) and $.69$ (McCroskey, Daly, Richmond & Falcion, 1977).

4. When people with high oral communication apprehension do communicate their oral communication behaviors

differ from those of people who are less apprehensive. They use a higher number of rhetorical interrogatives such as, "you know", "you see", "ok?" (Powers, 1977) and they exhibit more tension in small group interaction (Sorensen & McCroskey, 1977).

5. As a result of their oral communication behavior, high oral communication apprehensives are perceived less positively by others than less apprehensive people. They frequently evidence lack of self esteem and self acceptance (McCroskey, Daly, Richmond & Falcione, 1977; McCroskey & Richmond, 1977; Phillips, 1968). Studies by McCroskey, Daly, Richmond and Falcione (1977) using five samples from three diverse populations over a two-year period found correlations between CA and self-esteem ranging from $-.54$ to $-.72$. Phillips (1968) describes the problem communicator as shy, quiet, reluctant to discuss ideas, or ask questions, uncomfortable socially and attempts to communicate are often associated with physical upsets. The high CA person is perceived by peers as less credible, less interpersonally attractive (McCroskey, Daly, Richmond & Cox, 1975; McCroskey & Richmond, 1976) and by teachers as less apt to succeed academically and they are expected to have more difficulty adjusting in their relationships with others (McCroskey, unpublished paper).

McCroskey, Daly & Sorensen (1976) found a relationship between CA and personality traits using the PRCA and Cattell's 16PF. CA was positively correlated with anxiety, dogmatism and external control and negatively correlated with emotional maturity, cyclothymia, dominance, surgency, character, adventurousness, confidence, self control, tolerance for ambiguity and need to achieve. Some of these were small and no one dimension could be measured as a communication apprehension dimension but rather it appears to be a variable that is associated with an individual's total personality rather than a specific dimension of that personality.

Research in Educational and Vocational Aspects of Communication

McCroskey (1977a; 1977b) estimates from recent research studies that at least 15 to 20 percent of all students suffer from CA and this has a major impact on their general achievement (McCroskey & Anderson, 1976). Intelligence and CA have not been found to be correlated (McCroskey, Daly & Sorensen, 1976) yet McCroskey and Anderson (1976) found students with high CA scored significantly lower on their ACT on both the composite score and the four individual subscores than students with low CA. They also found in a study of 1454 college students that the G.P.A.s of high CA students was significantly lower than for low CA students.

McCroskey, Anderson, Richmond and Wheelless (1979) discovered a substantially greater number of teachers with high CA in the lower elementary grades and an increase in the level of CA between kindergarten and grade 5. It is suggested this may be due to modeling and reinforcement effects.

Daly and McCroskey (1975) found subjects' choice of occupations was strongly related to the level of their communications apprehension. Jobs requiring low communication requirements were selected by persons high in CA, and positions with a high level of expected communication interaction were chosen by persons who were low in CA.

Communication Apprehension and Sex Differences

A study by Porter (1974) showed that females reported more fear in a communication situation than males and their autonomic arousal was higher and increased at a faster rate than males. Clevenger (1959) reports that most studies measuring stage fright show a sex difference in the degree of anxiety. These studies suggest that stage fright is observed more in men than in women, while women report experiencing more stage fright than men, but the differences in both cases are slight. Lohr, Rea, Porter and Hamberger (1980) found a significantly greater degree of speaking anxiety with females than with males but sex was not relevant when communication apprehension was considered. Talley

and Richmond (1980) found the gender orientation in interpersonal communication was removed by the CA and shyness factor.

Questions Regarding the Communication Apprehension Construct

Criticism has recently emerged regarding the behavioral consistency of the trait model of personality. Beatty, Behake and McCallum (1978) tested the assumption that CA was a stable trait by manipulating the situational factor of anticipation of making a speech or listening to a lecture and found the CA scores as indicated by the PRCA did vary significantly. They suggest that the PRCA appears to be sensitive to state characteristics. Pointer (1980) found that high CA persons did not experience heightened anxiety more frequently in a variety of communication situations than those with a median CA score and suggests that the communication apprehension construct may not best be conceptualized as a personality trait.

Hewes and Haight (1979; 1980) question the utility of a multiple-act approach for understanding the relationship between communication behavior and traits. Based upon data from their studies, they suggest that previous investigations have overestimated the benefits of the multiple-act approach. Jaccard and Daly (1980) challenge their conclusions by proposing that an analysis of their reports suggests that their findings are ambiguous and not conclusive.

They emphasize the need for different theoretical approaches for the different types of behavioral criteria studied.

Beatty and Behnke (1980) found that CA demonstrated both stable and dynamic characteristics and that there was empirical support for the assimilation theory of CA. Lohr, Rea, Porter and Hamberger (1980) were looking for the separate relationships between CA and state-trait anxiety. Their first study found a significant correlation between CA and trait anxiety when state anxiety was held constant. There was no relationship between CA and state anxiety when trait anxiety was held constant. The second study found the situation-specific fear of public-speaking anxiety significantly correlated with state anxiety when trait anxiety was held constant and was also significantly correlated with trait anxiety when state anxiety was held constant. These results lead them to question McCroskey's analysis of CA and public speaking fear based upon the analogy of trait and state anxiety and suggest that these two types of communication fear have distinct and noninteractive causes.

The Adult Learner

The previous sections have covered literature relevant to the two theoretical perspectives used in this study: Field-dependent-independent cognitive style and communication apprehension. This section will discuss studies and

theories specific to the adult.

Adult education was propagated in this country by the founders of the Plymouth Colony (Klevins & Knowles, 1972) where the Book of Psalms was used to teach one another to read. Benjamin Franklin was instrumental in forming discussion groups and then the Lyceum emerged. By 1835 there were 3000 town lyceums, 100 county lyceums and 16 state lyceums. The free town library was established in 1833 in New Hampshire and it became a model for the rest of the country. The free public library, supported by municipal taxes, was an integral part of the American culture and education by the beginning of the Civil War. Between the end of the Civil War and World War I, the form and substance in adult education was accelerated and the emphasis was primarily remedial due to the educational deficiencies engendered by the lack of sufficient schooling. In 1919 there was a report by the Adult Education Committee of the British Ministry of Reconstruction marking the beginning of a new era in both British and American adult education. The report said in essence ". . . adult education is a permanent national necessity, an inseparable aspect of citizenship, and therefore should be both universal and lifelong" (Klevins & Knowles, 1972, p. 7).

The first period from 1919 to 1929 had a surge of growth and was charged with idealism; however, promotion by

writers and lecturers on the values of adult education did not motivate men and women to involve themselves (Houle, 1976). The second period was from 1930 to 1946 and the ideals were modified to more realistic programs (Klevins & Knowles, 1972). The third period began in 1947 and brings us to the present--a period of professionalism and institutionalism.

Most of what is known about learning came from studies of learning in children and animals (Knowles, 1970). Through the years, the term pedagogy has been used to describe all education. The title implies a leading out, a guiding along the paths of knowledge and means specifically, the art and science of teaching children. This term has been associated with the conception that the purpose of education was to transmit knowledge. This defined education as long as the time-span of major cultural change was greater than the life-span of the individual. We are now living in the first period of human history when this is no longer the reality. In the twentieth century several cultural revolutions have already occurred and the pace is accelerating. Knowledge gained by the time persons are twenty-one is outdated by the time they are forty and skills used in the twenties are obsolete during the thirties with the present rate of change (Knowles, 1970). In the 20th century, the ordinary person, from the research scientist to

the garage mechanic to the housewife, must learn more new things after the age of 20 than ever before in human history (Havighurst & Orr, 1960). It is no longer appropriate to define education in terms of transmitting what is known but rather it is a lifelong process of discovering what is not known (Knowles, 1970).

Theorists in adult-education are rapidly developing a new theory of adult learning. This new technology for the education of adults is called androgogy and means the art and science of helping adults learn (Knowles, 1979).

Knowles (1970) lists four crucial assumptions about the characteristics of adult learners on which androgogy is based that are different from the assumptions about child learning which are based in traditional pedagogy. These assumptions are that as a person matures:

- (1) his self-concept moves from one of being a dependent personality toward one of being a self-directing human being;
- (2) he accumulates a growing reservoir of experience that becomes an increasing resource for learning.
- (3) his readiness to learn becomes oriented increasingly to the developmental tasks of his social roles; and
- (4) his time perspective changes from one of postponed application of knowledge to immediacy of applica-

tion, and accordingly his orientation toward learning shifts from one of subject-centeredness to one of problem-centeredness. (p. 39)

There are certain key assumptions about the adult learner (Knowles, 1978) that have been supported by research. These assumptions are foundation stones of modern adult learning theory:

1. Adults are motivated to learn as they experience needs and interests that learning will satisfy; therefore, these are the appropriate starting points for organizing adult learning activities.
2. Adults' orientation to learning is life-centered; therefore, the appropriate units for organizing adult learning are life situations, not subjects.
3. Experience is the richest resource for adults' learning; therefore, the core methodology of adult education is the analysis of experience.
4. Adults have a deep need to be self-directing; therefore, the role of the teacher is to engage in a process of mutual inquiry with them rather than to transmit his or her knowledge to them and then evaluate their conformity to it.
5. Individual differences among people increase with age; therefore, adult education must make optimal provision for differences in style, time, place,

and pace of learning. (p. 31)

There are a variety of motives that the adult learner gives for seeking knowledge. Lowe (1975) reports that studies have shown the following as being most important in the United States:

(a) to become better informed; (b) to prepare for a new job; (c) to obtain on-the-job training; (d) to spend leisure time in an enjoyable and rewarding way; (e) to meet new and interesting people; (f) to become more efficient in carrying out tasks and duties either in the home or elsewhere; (g) to escape from routine; (h) to improve and understand job, home or family life roles; (i) to improve skills; (j) to increase general knowledge; (k) to increase income; (l) to develop personality and to improve inter-personal relations; (m) to develop some physical attribute or attitudes.
(p. 53)

These motives can be grouped into three main categories: "Vocational, personal development; and social relationships (Lowe, 1975, p. 53).

Houle (1961) found three categories in his studies that describe the learners' purposes and values of continuing education for themselves:

1. The goal-oriented learners. These people often delay their continuing education until mid

twenties or later and have fairly clear-cut objectives for what they want.

2. The activity-oriented. They are seeking social contact and select activities on the basis of the amount and kind of human relationship it would yield.
3. The learning-oriented. These individuals seek knowledge for its own sake and have been involved in learning as long as they can remember.

Tough (1979) discovered that adults organize their learning efforts around "projects". These add up to at least seven hours and are defined as a series of related episodes. Adults' total motivation in each "episode" is to gain and retain a certain knowledge of skill or to produce some other lasting change in themselves. In a study by Penland (1977) only a number (23.6%) of self-initiating learners employed a group planner and the home was the preferred location for learning projects. The average man or woman spends 700 hours a year at learning projects (Tough, 1979), some less than 100 hours and others more than 2000 hours. Approximately 70% of these learning projects are planned by the learner himself and he needs and seeks help and subject matter from others. One of the ultimate goals in adult education is to design and provide more effective help for adult learners (Tough, 1979).

In determining what motivated adults to begin a learning project, Tough found his subjects expected several desired benefits and outcomes. Pleasure and self-esteem were critical elements; these and others are depicted in Figure 1.

There is a shift now towards the need of the individual as an appropriate place to start solving problems. The needs of the individual learner are as significant for adults as for children (Hesburgh, Miller & Warton, 1973; Tough, 1979).

Learning and Intellectual Abilities in the Adult

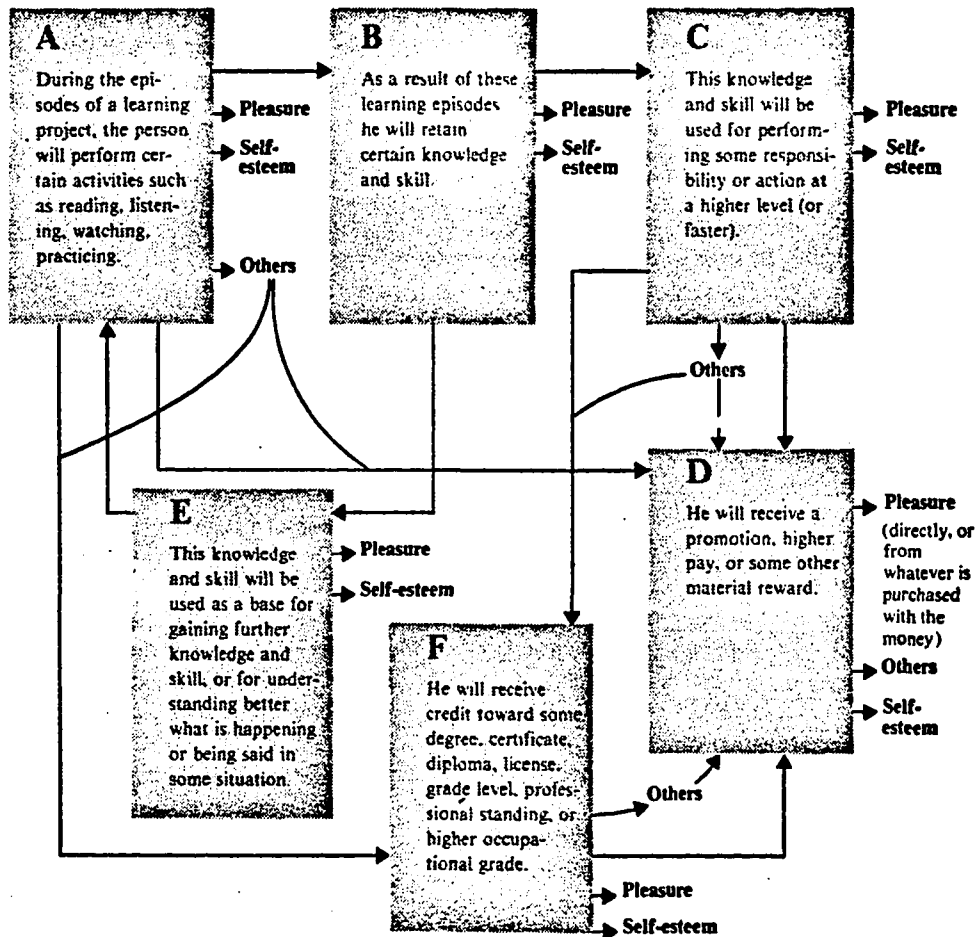
Learning and intellectual performance is influenced by various characteristics of the person and his or her context. Some of the main modifiers are: (Knox, 1977)

1. Condition. The physical health of an individual can affect learning and cognition in several ways. If there is sensory impairment, vision or hearing may be restricted. Attention given to external events is altered with ill health.

2. Adjustment. Personal or social maladjustment inhibits learning. Support and assistance is important for adults who have experienced few recent educational endeavors.

3. Relevance. It is important that the learning activity is meaningful and of interest to the learner.

Figure 1



The relationships among the benefits that a learner may expect from a learning project. [Tough, 1979 p. 48]

4. Speed. Time limits and pressures tend to inhibit the learning performance. It is usually most helpful if they can proceed at their own pace.

5. Status. Values, demands, constraints and resources are associated with the socioeconomic circumstance. Level of formal education is one of the status indexes most associated with adult learning.

6. Change. Social change between older and younger age cohorts can create substantial differences. This makes it impossible to compare two age groups regarding learning and conclude that difference in age is a factor.

7. Outlook. Personal outlook and characteristics of the individual's personality greatly affect the way in which an adult relates to specific types of learning situations.

Edward Thorndike reported in 1927 that the ability to learn declined only slightly and very slowly after age twenty (Knowles, 1970). Later studies revealed that what declined was the speed of learning and not the intellectual power. This decline is minimized by continual use of the intellect. The fact seems fully established that the human brain does not atrophy but enlarges throughout life (Kidd, 1973) and loss of both the neural connections and in the individual brain cells functioning occurs if it is not used. Many psychologists thus believe that senility is caused in about 85 percent of the cases by lack of intellectual effort

(Knowles, 1970). If there is no tissue damage, this decline can be interrupted by a change in motivation.

Longitudinal studies of learning ability (Knox, 1977) with individuals between twenty and fifty years of age indicate a high degree of stability. Knox (1977) states that, "Most adults in their forties and fifties have about the same ability to learn as they had in their twenties and thirties, when they can control the pace" (p. 422). A fairly large number of cross-sectional studies of intellectual functioning the past thirty-five years show a trend toward a rising age when peak performance occurred. Peak performance was about age twenty in the early thirties; during the fifties, peak performance was occurring in the late twenties and early thirties. Higher average levels of formal education and the impact of mass media is believed to be the influencing variable (Knox, 1977).

Neugarten (1974) reports an enormous difference between men and women as they approach middle age. Women are likely to communicate that they have new freedom and many feel they have a second life to live after age 40. More than half of them go to work for the first time outside the home and many of them go to school.

Personality Factors Related to Adult Learning

We know very little about adult personality and there are few theories considered useful as well as few empirical

studies available on which to build a developmental theory (Neugarten, 1973). The field of adult psychology and adult personality has not been pursued by psychologists. Personality theorists have not considered the impact of change and the questions of stability over the entire life cycle.

The oldest theories in the area of personality are global, which started with the work of Freud (Bischof, 1976). In the psychological literature on personality there is reference to a variety of terms. Life style, perceived self, ego development and involvement, traits and types, to mention a few. It is therefore difficult to answer a question concerning the stability of personality style throughout life because it depends upon the terms employed, the tests used and the methodology selected. Longitudinal personality studies that have been done indicate that personality is fairly similar throughout life.

In a study by Kelly (1955) between 1934 and 1954, there was evidence of considerable change in all the variables that were measured. The changes in personality scores that were absolute changes, tended to be small but similar in direction and magnitude for men and women. There was evidence of the "continuity of the self-percept". These 368 subjects maintained their internal consistency while living through a worldwide depression and war. There was not an overall tendency to change their personality even though

there were specific changes around them.

Woodruff and Birren (1972) examined ontogenetic and generational change in personality by making longitudinal and cross-sectional comparisons using the personality test scores of three cohort groups. Results indicated that personality test scores remained stable for both men and women over the 25-year period. Longitudinal comparisons indicated that both men and women described themselves in the present study almost exactly as they described themselves when in their teen years. This suggests consistency rather than change in personality over a 25-year span between ages 19.5 and 44.5 years. The older cohorts scored higher both times tested in self and social adjustment than did the two younger groups. This suggests questioning the influence of coming to age in a different era might have on producing a psychological "set" or imprint which may permanently characterize the attitudes of a cohort.

Neugarten (1973) suggests that individuals age in ways that are consistent with their earlier life histories and that personality is consistent if one knows enough about the individual. Youmans (1968) found in a study of 400 men and women that there was a continuity in life style from middle to old age if the subjects were in good health, were not mentally disturbed, and maintained an adequate socioeconomic status.

CHAPTER III

METHODOLOGY

Subjects for the Study

The sample consisted of two groups of Federal Aviation Administration (FAA) employees from seven of the twelve United States geographic regions, who were entering a selection screening process in a predevelopmental training program for the specialty of air traffic controllers. The trainees had been hired by their region and sent to the FAA facility in Norman, Oklahoma for a seventeen week training program. The first class, Group A, consisted of twenty-four students, thirteen females and eleven males; and the second class, Group B, had sixteen students, fourteen females and two males. The study was conducted during the first week of their training; all subjects were volunteers and ranged in age from 22 to 30.

Testing Instruments Used

The subjects were given the Group Embedded Figures Test (GEFT), the Personal Report of Communication Apprehension--Long Form (PRCA) (see Appendix A), and a personal data questionnaire and permission form (see Appendix A).

Group Embedded Figures Test.

The GEFT was designed as an adaptation of the Embedded Figures Test (EFT) (Witkin et al., 1971) which is administered to individuals. The GEFT was developed to assist in the screening of large groups and to aid in large-scale research in the field of personality. The test manual presents evidence of its being a reliable and valid test to measure the field-dependence continuum.

The administration time for the GEFT (Witkin et al., 1971) is twenty minutes. Eighteen complex figures, seventeen of which came from EFT, are used and a time limit is imposed. The complex figures are shaded to embed a simple figure. The subject is prevented from seeing the simple and complex form simultaneously as the simple forms are printed on the back of the booklet. It is permissible to look back at the simple forms as often as desired.

There are three sections to the GEFT (Witkin et al., 1971) booklet. The first section contains 7 very simple items for a two-minute timed period which is primarily for practice. The second and third sections each have 9 more complex figures and a five-minute timed period is given. The subject attempts to locate and trace the outline of the simple figure in the allotted time. The total number of figures traced correctly in sections 2 and 3 determines the score.

Sex differences in performance on the GEFT are small but consistent (Witkin et al., 1971). Females tend to have slightly lower scores, i.e., they are more apt to be field-dependent while males more often have field-independent scores. There are age-related changes that consistently emerge over the life span. There is a continuous increase in field independence between 8 and about 15. A plateau is usually observed in young adulthood and a return to field dependence begins gradually with changes showing often at about age 60. (Witkin et al., 1971).

The preliminary norms to date are limited to men and women college students from an Eastern liberal arts college. These norms are relevant for populations that are homogeneous with the norming group (Witkin et al., 1971), (see Table 1).

Reliability for the GEFT was established by determining the correlation between the parallel forms of Section 2 and Section 3 (Witkin et al., 1971). The correlation was computed and corrected by the Spearman-Brown prophecy formula. The reliability for both females and males was .82.

Validity for the test was evaluated by assessing the performance of subjects who were given the GEFT (Witkin et al., 1971), the EFT "parent" test, and the Rod-and-Frame-

Test (RFT) which was administered with the portable apparatus, Portable Rod-and-Frame-Test (PRFT). The Articulated Body Concept (ABC), a measure of psychological differentiation, was also given. Correlations between the GEFT and the EFT are quite high, especially for men. Correlations between GEFT and PRFT are at the lower end of the range of correlation. This is the typical finding between EFT and RFT. There are substantial correlations between GEFT and ABC, particularly for males. This is comparable with what is usually reported for the EFT. Validity coefficients are found in Table 2.

Personal Report of Communication Apprehension

The Personal Report of Communication Apprehension--Long Form (PRCA) used in this study (McCroskey, 1978) (see Appendix A) is a self-report, Likert-type questionnaire designed to measure communication anxiety. The present form is an improved version of the original PRCA-College form. A factor analysis of a 50-item instrument indicated the need for change in 1972 in order to increase face validity (McCroskey, 1978). The instrument has been used with thousands of subjects and scores have not deviated from the expected normal distribution (McCroskey, 1978). There is a possible score range between 25 and 125 with a hypothetical mid point of 75. Sample means have consistently ranged between 73 and 75. The standard deviation ranges between 13

TABLE 1
NORMS FOR THE GROUP EMBEDDED FIGURES TEST

Quartiles	Men	Women
1	0-9	0-8
2	10-12	9-11
3	13-15	12-14
4	16-18	15-18
N	155	242
Mean	12.0	10.8
S.D.	4.1	4.2

Source: Witkin, et al., 1971, p. 28.

TABLE 2
VALIDITY COEFFICIENTS FOR THE GROUP EMBEDDED FIGURES TEST

Population	N	Criterion Variable	r with GEFT Score*
Male undergraduates	73	Individual EFT, solution time	-.82
Female undergraduates	68	Individual EFT, solution time	-.63
Male undergraduates	55	PRFT, error	-.39
Female undergraduates	68	PRFT, error	-.34
Male undergraduates	55	ABC, degree of body articulation	.71
Female undergraduates	68	ABC, degree of body articulation	.55

*r's with the EFT or the PRFT should be negative because the tests are scored in reverse fashion

and 15. Based on interviews with subjects scoring at various levels, it has been found that subjects scoring above 88--or one standard deviation above the typical mean--to be "high" in communication apprehension. Those who score below 58--one standard deviation below the typical mean--are found to be "low" in communication apprehension (McCroskey, 1978).

The instrument contains twenty-five statements concerning the individual's communication with other people. Subjects are to indicate the degree to which each statement applies to them. The five choices and numerical value for each are: (1) Strongly Agree, (2) Agree, (3) Are Undecided, (4) Disagree or (5) Strongly Disagree with each statement (McCroskey, 1978). Participants are asked to work quickly, record their first impressions and are assured there are no right or wrong answers.

There are three steps to follow in computing the PRCA score (McCroskey, 1978):

1. Add the scores for items 1, 3, 5, 8, 9, 10, 12, 13, 15, 16, 19, 20, 22, and 24.
2. Add the scores for items 2, 4, 6, 7, 11, 14, 17, 18, 21, 23, and 25.
3. Complete the following formula:

$$\text{PRCA} = 84 - (\text{total from Step 1}) + (\text{total from Step 2}) \text{ (p. 202)}$$

Estimates for internal reliability for the scale have ranged from .92 to .96. Test-retest reliability (N = 762) was .82 over a seven-week period. (McCroskey, 1978).

PRCA instruments were designed to indicate communication apprehension reliably, quickly and inexpensively (McCroskey, 1970). These instruments have been used to screen students for research on the reduction of communication apprehension (McCroskey, 1970) as well as many other studies with many varied samples. There has been high reliability (McCroskey, 1978) consistently observed.

McCroskey (1978) presents information relating to the validity of the PRCA. Results of numerous studies using the PRCA suggest validity in several areas: (1) it is capable of predicting behavior that is consistent with the theoretical constructs of oral communication apprehension. (2) it has been correlated with other personality variables such as self-esteem, self-acceptance and portions of the 16 PF, at a level which is theoretically consistent with the communication apprehension construct, and (3) it provides a measure of a stable personality characteristic of a person that can be changed through specific intervention techniques.

Data Sheet and Permission Form

The data sheet is brief and includes information that might in some way affect the research design--section

number, sex, age, region of residence, nationality, years of formal education and a code number for identification. Participants were asked to choose any four numbers as a code to keep their tests together, and this was placed on the data sheet, both sheets of the PRCA and the GEFT booklet. (see Appendix A)

Subjects were asked to sign a short paragraph giving permission to use the information for research (see Appendix A).

Procedure

The students were given information about the study in their communications class on their first day at the center. Time was given for questions and discussion. It was made clear that participation was voluntary, had no influence on their work there and that results of the test would be given to those who requested it.

The tests were administered on the second day of class. The permission form and data sheet were distributed, filled in and collected. Subjects were asked to include their race with their nationality on the data sheet. The GEFT was dispersed and instructions read from the test manual. Opportunity was given to ask questions for clarity before taking the tests. The timed GEFT was given. These booklets were collected; the PRCA was presented and instructions were given. Subjects completed these questions and the tests.

were gathered. This is known in the study as Group A.

Three weeks later a new group of students arrived at the center and these subjects experienced the same procedures as the first group. This is known in the study as Group B.

Statistical Design

The analysis of the data was performed in four stages. In the first stage individual scores were computed from the Group Embedded Figures Test and from the Personal Report of Communication Apprehension.

Subjects were classified as follows on the GEFT:

Males: 0 - 9 field-dependent (FD)

10 - 12 moderately field-dependent (MFD)

13 - 15 moderately field-independent (MFI)

16 - 18 field-independent (FI)

Females: 0 - 8 field-dependent (FD)

9 - 11 moderately field-dependent (MFD)

12 - 14 moderately field-independent (MFI)

15 - 18 field-independent (FI)

Subjects were classified as follows on the PRCA:

25 - 28 low CA (LCA)

59 - 75 moderately low CA (MLCA)

76 - 87 moderately high CA (MHCA)

88 -125 high CA (HCA)

Each group was analyzed separately and tabulated in a contingency table with a summarization of scores on all the data.

In the second stage of analysis, four scattergrams were constructed. The first two show each group separately using all subjects and their test scores on both the GEFT and the PRCA. This gives a visual representation of the bivariate distribution of both test scores for each group. Means and standard deviations were calculated for both groups. Due to the unequal size, it was necessary to do a random sampling on Group A in order to have the desired 16 subjects to correlate with Group B. This was done by using a random numbers table and the scores from the 16 random sampling in Group A and the 16 subjects in Group B were then used in the between group analysis. The third scattergram illustrates the relationship between Group A and Group B on the GEFT and the fourth scattergram shows both groups' relationship on the PRCA. This graphically illustrates the bivariate distribution of both groups for each test. The Statistical Package for Social Sciences (SPSS) was utilized for this by using the Bivariate Correlation Analysis: Scatter Diagrams.

In the third stage of analysis the strength of relationship between field-dependent-independent cognitive style and communication apprehension was determined by

correlational analysis using the Pearson Product-Moment Correlation Coefficient. This test was performed on Group A and Group B separately. Significance was set at the 0.05 level.

In the fourth stage the strength of relationship between the two groups was tested with the use of the Pearson Product-Moment Correlation Coefficient. The sixteen randomly selected scores from Group A and all sixteen scores from Group B were used in this analysis. Significance was set at the 0.05 level.

CHAPTER IV

ANALYSIS OF DATA

Stages of Analysis

The analysis of the data was accomplished in four stages: a contingency table analysis was developed to tabulate scores and classifications for both tests, age, race, sex and region of residence; scattergrams were constructed plotting the GEFT scores against the PRCA scores for each group and Group A against Group B for both tests; correlational analysis of scores for cognitive style and communication apprehension for each group; and correlational analysis of scores for Group A and Group B.

In the first stage of data analysis, individual scores were computed from the Group Embedded Figures Test and the Report of Communication Apprehension--Long Form. Test scores, classifications for each test, age, race, sex and region of residence was compiled in a contingency table (see Appendix B).

In the second stage of data analysis, the Statistical Package for Social Sciences (SPSS) was utilized by using the Bivariate Correlation Analysis: Scatter Diagrams to obtain

scattergrams for visual representation. Scattergram for Group A (see Appendix B) shows the GEFT (Cogstyle) scores against the PRCA (Comapp) scores. No relationship seemed to appear as well as no curvilinear relationship. Scattergram for Group B (see Appendix B) displays the GEFT (Cogstyle) scores against the PRCA (Comapp) scores. No relationship seemed to appear as well as no curvilinear relationship.

Due to the unequal subject size in Group A, it was necessary to do a random selection in order to do a subject to subject correlation between Group A and Group B. Sixteen (16) subjects from Group A were selected by using a random numbers table (Blalock, 1979) and these were used to represent Group A in the group analysis. Selected subject numbers were: 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 17, 19, 20, 21 and 23. In the scattergram for both groups (A and B) on the GEFT (see Appendix B), a slight negative linear relationship seemed to appear. In the scattergram for both groups (A and B) on the PRCA (see Appendix B) a slight negative linear relationship seemed to appear.

In the third stage of statistical analysis, strength of relationship between field-dependent-independent cognitive style and communication apprehension was determined. Correlational analysis of scores on the GEFT (cognitive style) and PRCA (communication apprehension) was conducted by employing the Pearson Product-Moment Correlation Coefficient.

The correlation coefficient for Group A ($r = 0.04068$, $r^2 = 0.00165$) was not significant at the 0.05 level indicating no significant relationship between cognitive style and communication apprehension for Group A. Therefore it appears that no relationship exists between cognitive style and communication apprehension for Group A. The correlation coefficient for Group B ($r = 0.10879$, $r^2 = 0.01184$) was not significant at the 0.05 level indicating no significant relationship between cognitive style and communication apprehension for Group B (see Table 3). Therefore it appears that no relationship exists between cognitive style and communication apprehension for Group B.

The mean and standard deviation on the GEFT (see Table 4), which was measuring field-dependent-independent cognitive style, were nearly the same for both groups. The 10.125 mean for Group A, with a near equal number of males and females, falls in the second quartile with a slight tendency toward the field-dependent end of the continuum. The mean for Group B is slightly higher, 10.75. Group A, with more males, was slightly more field dependent than the predominantly female Group B. This does not correspond to Witkin's prediction (Witkin, 1949; 1950; Witkin et al., 1954; Witkin et al., 1971) for males being more field-independent and females more field-dependent. This is near the normal mean for females (10.8) as stated in the test

manual (Witkin et al., 1971). Group A had more extremes, subjects at both ends of the field-dependent-independent continuum, while Group B had more moderate scoring subjects. Variance for both groups was in the normal range; skewness was slightly negative for Group B and kurtosis showed a normal distribution with a slight platycurtic curve in both groups (see Table 5).

Means on the PRCA for both groups in this study were from 5 to 9 points lower than the 73 to 75 that McCroskey (1978) states is the usual and consistent mean for groups. Group A with a mean of 66.083 was 1.73 points lower than Group B's mean of 67.812. The standard deviation for both groups was within McCroskey's predicted range of 13-15 (see Table 6). Variance on this instrument was high with Group A showing 222.949 and Group B, 185.896. This could have affected the results of the statistics. Skewness on the PRCA was normal and kurtosis showed a normal distribution (see Table 7).

In the fourth stage of statistical analysis, strength of relationship between Group A and Group B was determined. Correlational analysis of the sixteen randomly selected subjects in Group A and the sixteen subjects in Group B was conducted using the SPSS to obtain the Pearson Product-Moment Correlation Coefficient. The correlation coefficient for cognitive style using GEFT ($r = -0.37926$, $r^2 = 0.14384$)

was not significant at the 0.05 level indicating no significant statistical relationship existed between Group A and Group B in cognitive style. Correlational analysis of the PRCA scores for the sixteen randomly selected subjects in Group A and the sixteen subjects in Group B was conducted using the SPSS to obtain the Pearson Product-Moment Correlation Coefficient. The correlation coefficient for communication apprehension using the PRCA - Long Form ($r = -0.20766$, $r^2 = 0.04312$) was not significant at the 0.05 level indicating no significant statistical relationship existed between Group A and Group B in communication apprehension (see Table 8).

Based on the knowledge that the subjects for the study were all entering the same program, were near the same age and came from several regions of the country, it was expected they would be similar and that there would be a positive statistical relationship between the two groups. There was no positive statistical linear relationship but a slight negative relationship was indicated. This was slightly more evident on the GEFT along with a wider range in scores than was indicated on the PRCA. The two groups were similar in that there was no relationship in either group on cognitive style and communication apprehension but statistically, on these two attributes, Group A and Group B are not similar. Statistics were listed for the combined

groups but because of the absence of a statistical linear relationship it is important to consider the data for each group separately.

Test of Hypotheses

Statement of the hypotheses:

H₁ There is a significant relationship between field-dependent-independent cognitive style and communication apprehension.

The result of correlational analysis ($r = 0.0468$) for Group A and ($r = 0.10879$) for Group B was not statistically significant at the 0.05 level and therefore we fail to accept Hypothesis 1.

H₂ There is a significant positive relationship between Group A and Group B as described in this study.

The result of correlational analysis on both groups for the GEFT ($r = -0.37926$) and the PRCA ($r = -0.02076$) was not statistically significant at the 0.05 level and therefore we fail to accept Hypothesis 2.

Summary

The study postulated two hypotheses: both of them were rejected. Results of the analysis found that there was no significant relationship between cognitive style and communication apprehension. No significant relationship was found between Group A and Group B.

TABLE 3

PEARSON PRODUCT-MOMENT CORRELATION FOR GEFT AND PRCA

	Correlation (R)	R Squared	Probability
Group A	0.04068	0.00165	0.85030
Group B	0.10879	0.01184	0.68837
Both Groups	0.06911	0.00478	0.67175

TABLE 4

MEANS AND STANDARD DEVIATIONS FOR GEFT

	MEAN	SD	SE
Group A	10.125	5.136	1.048
Group B	10.750	5.000	1.250
Group C	10.375	5.027	0.795

TABLE 5

VARIANCE, KURTOSIS AND SKEWNESS FOR GEFT

	VARIANCE	KURTOSIS	SKEWNESS
Group A	26.375	-1.455	0.218
Group B	25.000	-0.504	-0.624
Both Groups	25.266	-1.236	-0.093

TABLE 6
MEANS AND STANDARD DEVIATIONS FOR PRCA

	MEAN	SD	SE
Group A	66.083	14.931	3.048
Group B	67.812	13.634	3.409
Both Groups	66.775	14.273	2.257

TABLE 7
VARIANCE, KURTOSIS AND SKEWNESS FOR PRCA

	VARIANCE	KURTOSIS	SKEWNESS
Group A	222.949	0.283	0.103
Group B	185.896	-0.201	0.289
Both Groups	204.717	0.028	0.138

TABLE 8
PEARSON PRODUCE-MOMENT CORRELATION FOR GROUP A AND GROUP B

	Correlation R	R Squared	Probability
GEFT	-0.37926	0.14384	0.14740
PRCA	-0.20766	0.04312	0.44028

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to investigate the relationship between cognitive style and the personality trait of communication apprehension. Cognitive style was investigated using the field-dependent-independent dimension of cognitive style as determined by the Group Embedded Figures Test. The personality trait of communication apprehension was evaluated with the Personal Report of Communication Apprehension--Long Form.

The study sample consisted of two groups (Group A and Group B) of Federal Aviation Administration (FAA) employees who were entering a selection screening process in a pre-developmental training program for the specialty of air traffic controllers at the FAA training center in Norman, Oklahoma. There were a total of forty subjects: twenty-four in Group A, and sixteen in Group B; and they ranged in age from twenty-two to thirty. Group A had thirteen females and eleven males while Group B had fourteen females and two males. Five regions of the country were represented in Group A: Eastern, Great Lakes, Central, Western, and South-

ern; and four regions were reported in Group B: Southwest, Northwest, Southern and Western.

The subjects completed permission and personal data forms (see Appendix A) and were administered the Group Embedded Figures Test (GEFT) and the Personal Report of Communication Apprehension - Long Form (PRCA) (see Appendix A).

Data were analyzed in four stages. In the first stage of analysis individual scores were computed from the GEFT and the PRCA and scores, categories, code number, group, age, race, sex, years of formal education and region of residence were compiled in a contingency table.

In the second stage of analysis, scattergrams were constructed to graphically show the relationship of cognitive style and communication apprehension for each group. No significant linear relationships were found. Sixteen subjects were randomly selected from Group A and scattergrams were developed to show the linear relationship of Group A and Group B on both the GEFT and the PRCA. A slight negative linear relationship between the two groups on both tests seemed to appear.

In the third stage of analysis, a correlational analysis was conducted on the scores of the GEFT and the PRCA for each group using the Pearson Product-Moment Correlation Coefficient. There was no significant

relationship between cognitive style and communication apprehension.

In the fourth stage of analysis, the Pearson-Product Moment Correlation was carried out between the sixteen randomly selected subjects from Group A and the sixteen subjects from Group B for the scores on both the GEFT and the PRCA. There was no significant relationship between the two groups.

Discussion and Conclusions

Based on the idea of a relationship between communication and personality as stated by McCroskey (1978), and Witkin and associates' theory that field-dependent-independent cognitive style indicates personality types (Witkin et al., 1954), it was postulated that there would be a relationship between these two variables. Results of the study showed no statistical relationship.

This study suggests:

1. It suggests that there is simply no relationship between one's cognitive style and whether or not people are apprehensive in their communication. From this study, one variable seems totally unrelated to the other.

2. Variance on the PRCA is very high while variance on the GEFT is within normal range. This indicates that the PRCA may be more sensitive to variance and it might also suggest the need for a reexamination of the validity and

reliability of the instrument as suggested by Beatty, Behake and McCallum (1978).

3. The complete absence of any relationship in two variables that are postulated as being associated with personality gives credence to Pointer's (1980) question of the CA construct.

4. The PRCA means for both groups was lower than those found in the normal population (McCroskey, 1978). Has there been something in the selection process that picked individuals who, as a group, were lower in CA than the normal population?

5. Witkin's prediction (Witkin, 1949; 1950; Witkin et al., 1954; Witkin et al., 1971) that males are more field-independent and females more field-dependent was not evidenced in this study and therefore sex does not appear to be the factor for an absence of correlation between Group A and B on the GEFT. The predominantly female Group B was slightly higher in CA than the mixed Group A; however, Lohr, Rea, Porter and Hamberger (1980) and Talley and Richmond (1980) found sex was not related to CA and its relationship was not determined here.

6. One other variable that needs mentioning is the region from which the subjects came. Both groups had some subjects from the Western and Southern regions; but

predominantly, Group A came from the Eastern, Great Lakes, and Central regions, while Group B was predominantly from the Northwest, Southwest, Western, and Southern regions. The Eastern, Northern and Central group were more field dependent and had less communication apprehension than the Northwest, Southwest, Southern and Western group. The relationship in this variable was not determined.

Limitations of the Study

The study is limited by the characteristics of the population examined. There were several different cultures represented with a high percent of black subjects, particularly in Group A. It is not known if the GEFT and PRCA scores are apt to differ with different cultures. The geographic regions which the subjects represented may in some way have influenced the scores. The specific occupational selection may have been influential in the results of the study. It is necessary to consider these variables in generalizing to other populations.

Recommendations

There is a need for more normative data on both the GEFT and the PRCA for race, culture and geographic differences. Further research is needed on the CA construct and the validity and reliability of the PRCA.

The first recommendation for further research would be to replicate the study and use a different population with a larger number of subjects.

The second recommendation for further research is to correlate the field-dependent-independent cognitive style with the A-State and A-Trait (Spielberger, 1966) anxiety scales.

The third recommendation for further research would be to do a follow up on several classes of air traffic control trainees in the predevelopmental program to determine if a particular combination of cognitive style and the personality trait of communication apprehension would predict success in the field.

The fourth recommendation for further research would be a study of current air traffic control personnel to discover if there is a particular predominate combination of cognitive style and communication apprehension among employees.

A great deal has been done using field-dependent-independent cognitive style and its relationship to education but little has been done to associate it with oral communication variables. This study contributes to that research base and reveals the lack of relationship between the personality type of field-dependent-independent cognitive style and the personality trait of communication

apprehension. It adds to the growing research projects that indicate a need to reexamine the instrument most widely used for measuring CA as well as the CA construct itself.

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APPENDIX A

PERMISSION FORM

Participation in answering these questions is voluntary.
Completing the forms constitutes permission. These
responses will be used for research purposes. No
names will be used and your anonymity is guaranteed.

Signed

Date

AIR TRAFFIC CONTROL TRAINEES

COGNITIVE STYLE AND COMMUNICATION APPREHENSION

Section Number _____

Code Number _____

Age _____

Male _____

Female _____

Nationality _____

Years of Formal Education _____

Region of Residence _____

Desire test score results--Yes _____ No _____

GROUP EMBEDDED FIGURES TEST

The Group Embedded Figures Test by Philip Oltman, Evelyn Raskin,
Herman Witkin, is a copyrighted publication available from:

Consulting Psychologists Press

577 College Avenue

Palo Alto, California 94306

Code Number _____

PRCA -- LONG FORM

DIRECTIONS: This instrument is composed of 25 statements concerning your communication with other people. Please indicate the degree to which each statement applies to you by circling whether you Strongly Agree (SA), Agree (A), are Undecided (U), Disagree (D), or Strongly Disagree (SD) with each statement. There are no right or wrong answers. Work quickly, just record your first impression.

- | | | | | | |
|---|----|---|---|---|----|
| 1. While participating in a conversation with a new acquaintance I feel very nervous. | SA | A | U | D | SD |
| 2. I have no fear of facing an audience. | SA | A | U | D | SD |
| 3. I talk less because I'm shy. | SA | A | U | D | SD |
| 4. I look forward to expressing my opinions at meetings. | SA | A | U | D | SD |
| 5. I am afraid to express myself in a group. | SA | A | U | D | SD |
| 6. I look forward to an opportunity to speak in public. | SA | A | U | D | SD |
| 7. I find the prospect of speaking mildly pleasant. | SA | A | U | D | SD |
| 8. When communicating, my posture feels strained and unnatural. | SA | A | U | D | SD |
| 9. I am tense and nervous while participating in group discussions. | SA | A | U | D | SD |
| 10. Although I talk fluently with friends, I am at a loss for words on the platform. | SA | A | U | D | SD |
| 11. I have no fear about expressing myself in a group. | SA | A | U | D | SD |
| 12. My hands tremble when I try to handle objects on the platform. | SA | A | U | D | SD |
| 13. I always avoid speaking in public if possible. | SA | A | U | D | SD |
| 14. I feel that I am more fluent when talking to people than most people are. | SA | A | U | D | SD |

- | | | | | | |
|---|----|---|---|---|----|
| 15. I am fearful and tense all the while I am speaking before a group of people. | SA | A | U | D | SD |
| 16. My thoughts become confused and jumbled when I speak before an audience. | SA | A | U | D | SD |
| 17. I like to get involved in group discussions. | SA | A | U | D | SD |
| 18. Although I am nervous just before getting up, I soon forget my fear and enjoy the experience. | SA | A | U | D | SD |
| 19. Conversing with people who hold positions of authority causes me to be fearful and tense. | SA | A | U | D | SD |
| 20. I dislike to use my body and voice expressively. | SA | A | U | D | SD |
| 21. I feel relaxed and comfortable while speaking. | SA | A | U | D | SD |
| 22. I feel self-conscious when I am called upon to answer a question or give an opinion in class. | SA | A | U | D | SD |
| 23. I face the prospect of making a speech with complete confidence. | SA | A | U | D | SD |
| 24. I'm afraid to speak up in conversations. | SA | A | U | D | SD |
| 25. I would enjoy presenting a speech on a local television show. | SA | A | U | D | SD |

APPENDIX B

RAW DATA

SUBJ	GROUP	CODE NO.	SEX	AGE	RACE	NATION- ALITY	REGION	YRS. OF SCHOOL	GEFT SCORE	CAT.	PRCA SCORE	CAT.
1	A	0709	F	28	White	American	Western	14	17	FI	61	MLCA
2	A	7493	M	29	Black		Eastern	12	6	FD	80	MHCA
3	A	3338	F	24	Black		Great Lakes	13	8	FD	61	MLCA
4	A	6112	F	23	White		Southern	13	8	FD	72	MLCA
5	A	2616	M	28	Black	American	Western	15	5	FD	54	LCA
6	A	1687	F	28	White	Slaverian	Great Lakes	14	6	FD	63	MLCA
7	A	0000	M	27	Black		Western	12	8	FD	84	MHCA
8	A	7124	F	29	White		Eastern	13	5	FD	77	MHCA
9	A	3852	M	28	Black		Great Lakes	14	6	FD	55	LCA
10	A	1512	F	22	Black		Eastern	12	9	MFD	72	MLCA
11	A	5085	F	27	White		Central	11	3	FD	49	LCA
12	A	0441	F	23	White	Swed/Ger	Central	13	11	MFD	58	LCA
13	A	9028	M	28	Black	American	Eastern	12	6	FD	51	LCA
14	A	1551	F	28	Black	American	Great Lakes	13½	6	FD	52	LCA
15	A	2016	F	25	Black	American	Central	14	2	FD	101	HCA
16	A	0431	M	30	Black		Eastern	15	9	FD	33	LCA
17	A	1110	F	26	Black	American	Eastern	15	15	FI	81	MHCA
18	A	4444	M	25	Black	American	Great Lakes	14	15	MFI	62	MLCA
19	A	4711	M	24	Black	American	Southern	14	15	MFI	79	MHCA
20	A	4739	M	29	Black	American	Central	14	18	FI	50	LCA
21	A	4416	F	26	White		Eastern	14½	16	FI	82	MHCA
22	A	3277	F	29	White		Great Lakes	12	16	FI	65	MLCA
23	A	7069	M	22	White	Italian	Eastern	14	15	MFI	70	MLCA
24	A	7113	M	26	Spanish	Cuban	Eastern	14	18	FI	74	MLCA
1	B	3605	F	23	White	American	Southwest	14	13	MFI	60	MLCA
2	B	2744	F	29	Indian	American	Southwest	12	13	MFI	76	MHCA
3	B	6535	F	26	White	German	Northwest	12	6	FD	57	LCA
4	B	2694	F	26	White	German	Southern	12	14	MFI	58	LCA
5	B	3920	F	25	White	American	Northwest	13	18	FI	92	HCA
6	B	6040	F	28	Black	American	Southern	15	15	FI	61	MLCA
7	B	3582	F	24	White		Northwest	13	9	MFD	80	MHCA
8	B	6707	F	27	White	American	Southern	12	9	MFD	92	HCA

SUBJ.												
NO.	GROUP	CODE NO.	SEX	AGE	RACE	NATION- ALITY	REGION	YRS. OF SCHOOL	GEFT SCORE	CAT.	PRCA SCORE	CAT.
9	B	1414	F	23	White	American	Western	14	17	FI	77	MHCA
10	B	0215	F	26	White		Southern	16	13	MFI	58	LCA
11	B	0482	F	29	Black	American	Western	13	4	FD	65	MLCA
12	B	1004	M	28	Black	American	Northwest	16½	13	MFI	58	LCA
13	B	0956	F	24	White		Southwest	12	3	FD	61	MLCA
14	B	6944	M	22	White	American	Southwest	13	1	FD	76	MHCA
15	B	1076	F	28	White	American	Southwest	13	11	MFD	42	LCA
16	B	0024	F	29	White	American	Southern	16	13	MFD	72	MLCA

GROUP A

CROSSSTARS

GEFT (COGSTYLE) DOWN

PRCA (COMAPP) ACROSS

10/27/80

PAGE 3

FILE NONAME
SCATTERGRAM OF

(CREATION DATE = 10/27/80)

(NON) COGSTYLE

(ACROSS) COMAPP

30,00 40,00 50,00 60,00 70,00 80,00 90,00 100,00 110,00 120,00

18,00

18,00

16,20

16,20

14,40

14,40

12,60

12,60

10,80

10,80

9,00

9,00

7,20

7,20

5,40

5,40

3,60

3,60

1,80

1,80

0,0

0,0

25,00 35,00 45,00 55,00 65,00 75,00 85,00 95,00 105,00 115,00 125,00

06

GROUP B

GEFT (COGSTYLE) DOWN

PRCA (COMAPP) ACROSS

CROSS TABS

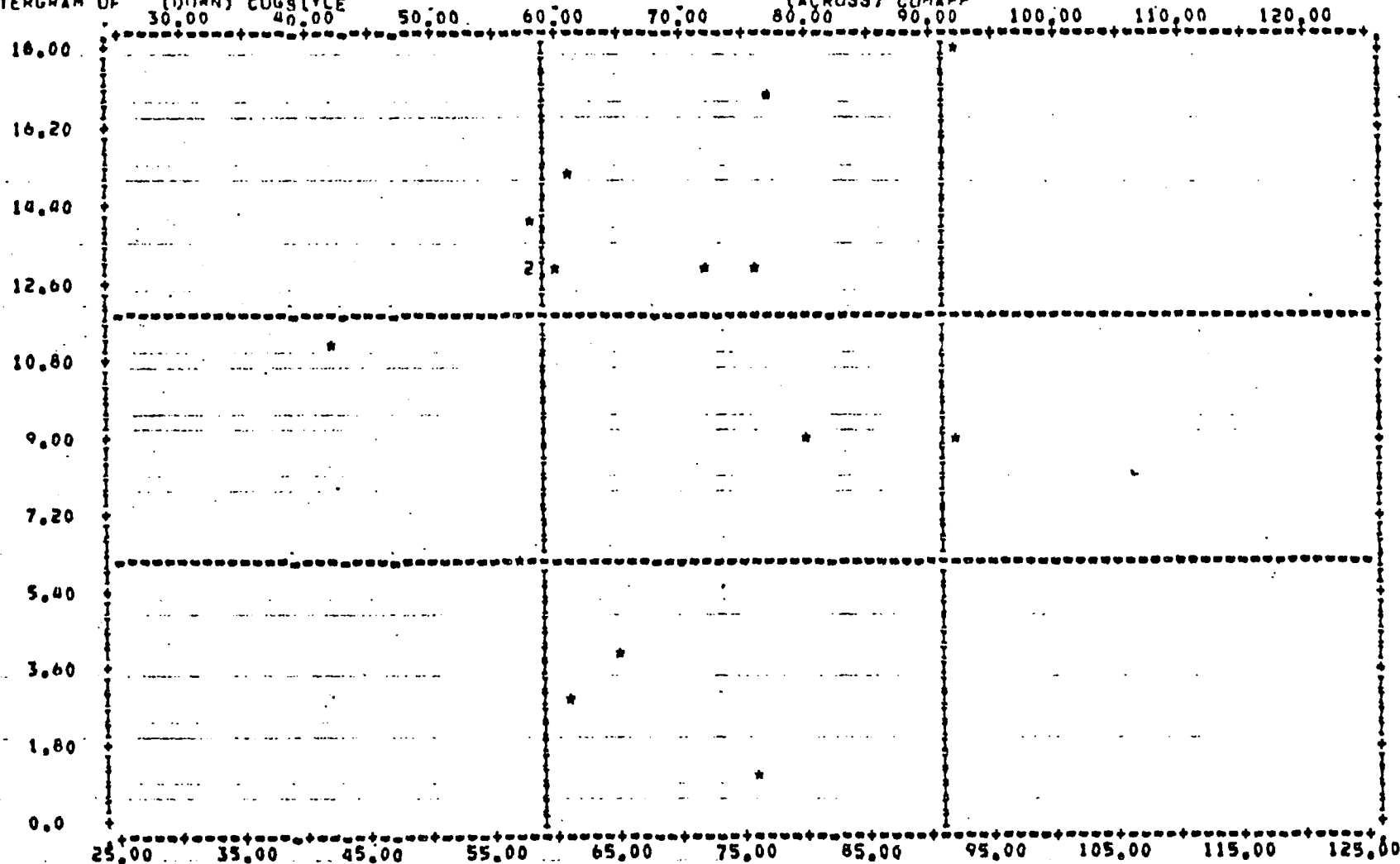
10/27/80

PAGE 3

FILE NO NAME (CREATION DATE = 10/27/80)

SCATTERGRAM OF (DOWN) COGSTYLE

(ACROSS) COMAPP



GROUP A--- DOWN

GROUP B --- ACROSS

SSTARS

GEFT - GROUP A AND GROUP B

11/12/80

PAGE 3

E NONAME
TTERGRAN OF

(CREATION DATE = 11/12/80)

(DOWN) A

(ACROSS) B

0.90

2.70

4.50

6.30

8.10

9.90

11.70

13.50

15.30

17.10

18.90

16.20

14.40

12.60

10.80

9.00

7.20

5.40

3.60

1.80

0.0

18.00

16.20

14.40

12.60

10.80

9.00

7.20

5.40

3.60

1.80

0.0

92

0.0 1.80 3.60 5.40 7.20 9.00 10.80 12.60 14.40 16.20 18.00

GROUP A --- DOWN

GROUP B--- ACROSS

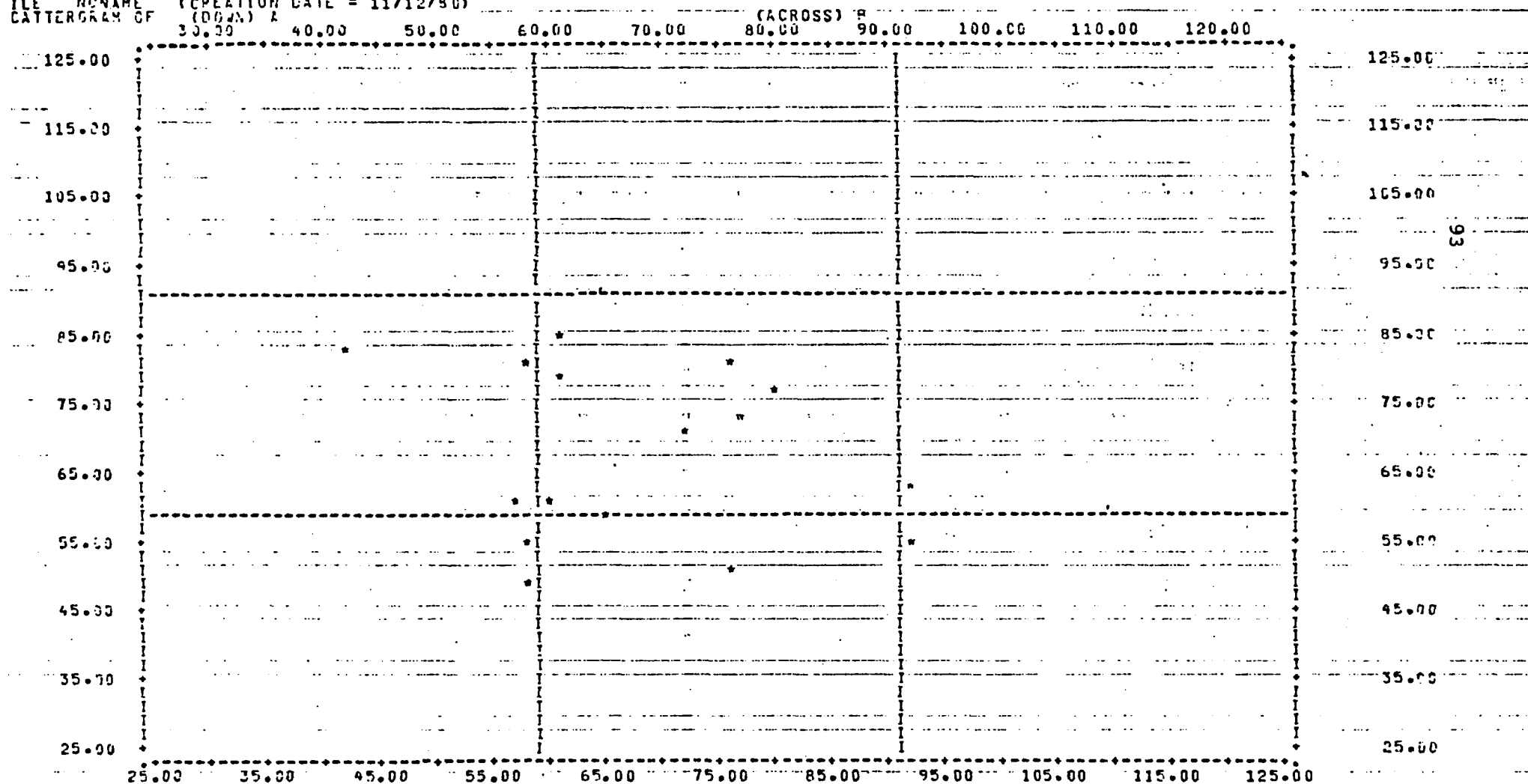
ROSSTABS

PRCA - GROUP A AND GROUP B

11/12/80

PAGE 3

FILE NAME (CREATION DATE = 11/12/80)
CATTERGRAM OF (0000) A



CROSSTABS

GROUP A

10/28/80

PAGE 4

FILE NONAME (CREATION DATE = 10/28/80)

VARIABLE COGSTYLE

MEAN 10.125
 VARIANCE 26.375
 RANGE 16.000
 SUM 243.000

STD ERROR 1.048
 KURTOSIS -1.455
 MINIMUM 2.000

STD DEV 5.136
 SKEWNESS 0.218
 MAXIMUM 18.000

VALID OBSERVATIONS - 24

MISSING OBSERVATIONS - 0

VARIABLE COMAPP

MEAN 66.083
 VARIANCE 222.949
 RANGE 38.000
 SUM 1586.000

STD ERROR 3.048
 KURTOSIS 0.283
 MINIMUM 33.000

STD DEV 14.931
 SKEWNESS 0.103
 MAXIMUM 101.000

VALID OBSERVATIONS - 24

MISSING OBSERVATIONS - 0

94

CROSSTABS

GROUP B

10/28/80

PAGE 4

FILE NONAME (CREATION DATE = 10/28/80)

VARIABLE COGSTYLE

MEAN 10.750
 VARIANCE 25.000
 RANGE 17.000
 SUM 172.000

STD ERROR 1.250
 KURTOSIS -0.504
 MINIMUM 1.000

STD DEV 5.000
 SKEWNESS -0.624
 MAXIMUM 18.000

VALID OBSERVATIONS - 16

MISSING OBSERVATIONS - 0

VARIABLE COMAPP

MEAN 67.812
 VARIANCE 185.856
 RANGE 50.000
 SUM 1085.000

STD ERROR 3.409
 KURTOSIS -0.201
 MINIMUM 42.000

STD DEV 13.634
 SKEWNESS 0.289
 MAXIMUM 92.000

VALID OBSERVATIONS - 16

MISSING OBSERVATIONS - 0

CROSSTABS

CORRELATION OF GEFT AND PRCA FOR GROUP A

10/27/80

PAGE 4

STATISTICS..

CORRELATION (R) -	0.04068	R SQUARED -	0.00165	SIGNIFICANCE -	0.85030
STD ERR OF EST -	5.24674	INTERCEPT (A) -	9.20034	SLOPE (B) -	0.01399
PLOTTED VALUES -	24	EXCLUDED VALUES -	0	MISSING VALUES -	0

***** IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

CROSSTABS

CORRELATION OF GEFT AND PRCA FOR GROUP B

10/27/80

PAGE 4

STATISTICS..

CORRELATION (R) -	0.10679	R SQUARED -	0.01184	SIGNIFICANCE -	0.68837
STD ERR OF EST -	5.14477	INTERCEPT (A) -	6.04449	SLOPE (B) -	0.03990
PLOTTED VALUES -	16	EXCLUDED VALUES -	0	MISSING VALUES -	0

***** IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

CROSSTABS

CORRELATION OF GEFT AND PRCA FOR BOTH GROUPS

10/27/80

PAGE 4

STATISTICS..

CORRELATION (R) -	0.06911	R SQUARED -	0.00478	SIGNIFICANCE -	0.67175
STD ERR OF EST -	5.08007	INTERCEPT (A) -	6.74974	SLOPE (B) -	0.02434
PLOTTED VALUES -	40	EXCLUDED VALUES -	0	MISSING VALUES -	0

***** IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

CROSSTABS

CORRELATION OF GROUP A and GROUP B ON PRCA

11/12/80

PAGE

4

STATISTICS..

CORRELATION (R) -	-0.20766	R SQUARED -	0.04312	SIGNIFICANCE -	0.44928
STD ERR OF EST -	12.40373	INTERCEPT (A) -	79.90205	SLOPE (B) -	-0.15657
PLOTTED VALUES -	16	EXCLUDED VALUES -	0	MISSING VALUES -	0

***** IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

CROSSTABS

CORRELATION OF GROUP A AND GROUP B ON GEFT

11/12/80

PAGE

4

STATISTICS..

CORRELATION (R) -	-0.37926	R SQUARED -	0.14384	SIGNIFICANCE -	0.14740
STD ERR OF EST -	4.82342	INTERCEPT (A) -	14.29400	SLOPE (B) -	-0.38200
PLOTTED VALUES -	16	EXCLUDED VALUES -	0	MISSING VALUES -	0

***** IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.