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AN EXPLORATORY STUDY OF THE RELATIONSHIP AMONG ANXIETY, SELF ESTEEM AND ACHIEVEMENT USING COGNITIVE STYLE MATCHING

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AN EXPLORATORY STUDY OF THE RELATIONSHIP AMONG ANXIETY, SELF ESTEEM AND ACHIEVEMENT USING COGNITIVE STYLE MATCHING

By

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ABSTRACT

AN EXPLORATORY STUDY OF THE RELATIONSHIP
AMONG ANXIETY, SELF ESTEEM AND
ACHIEVEMENT USING COGNITIVE
STYLE MATCHING

By

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Purpose of the Study

The purpose of this study was to determine the effect of Educational Cognitive Style on the level of anxiety, self esteem and achievement. The gifted child was the population from which a sample was drawn using the "Purposive" sampling technique. The "degree of match" between the cognitive styles of the subjects and of the instructional mode was calculated and subjects were assigned to one of two groups, namely: (1) matched (defined as group 1--highest degree of match) and (2) non-matched (defined as group 2--lowest degree of match).

The Cognitive Style Interest Inventory for Secondary Students was administered to determine the "cognitive style map" of each subject. Three instruments were administered as pretest-posttest dependent measures. The three instruments were: (1) the State Anxiety Inventory for Children (STAI-C State), (2) Self Esteem Inventory (SEI) and (3) achievement tests related to instructional content information.

Procedures

The Cognitive Style Interest Inventory for Secondary Students was administered to the subjects. One week later the three pretest-posttest measures were taken and intervened by a two hour instructional period.

The cognitive style of the instructional mode was determined by a panel of experts. This factor together with the cognitive style map of the student was used to calculate the degree of match.

Design of the Study

For this study, the Analysis of Covariance statistical technique was employed to test for no significant difference between group one and group two means on a posttest measure with the pretest measure used as a covariate on levels of A-State anxiety, self esteem and achievement. The Pearson Product Moment Correlation statistical technique was used to test for no significant relationship between A-state anxiety and self esteem for (1) pretest measures and (2) posttest measures for gorup one and group two.

Findings

The findings are listed serially and are presented in two parts. The first part is devoted to findings which address the results of the Analysis of Covariance statistical technique. In part two the findings are concerned with the results of data analysis using the Pearson Product Moment Correlation Coefficients.

Given, then, the analysis of data on the effects of cognitive style matching on A-State anxiety, self esteem and achievement, the findings are:

(1) There was no significant difference between posttest means of the matched and non-matched groups on A-State anxiety.

(2) There was no significant difference between posttest means of the matched and non-matched groups on self esteem

(3) There was no significant difference between the posttest means of the matched and non-matched groups on Instructional Sets I and II achievement measures.

Given, then, the analysis of data on the relationship between A-State anxiety and self esteem the findings in the second part are listed below.

(4) There is a significant inverse relationship for the matched group between A-State anxiety and self esteem on the pretest measure. Moreover, there is no significant relationship between pretest measure of the two emotionalities for the non-matched group.

(5) There is a significant inverse relationship for the matched group between A-State anxiety and self esteem on the posttest measure. Moreover, there is no significant relationship between posttest measure of the two emotionalities for the non-matched group.

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CHAPTER I

INTRODUCTION

The concern for growth in students by educators is two dimensional. The first of these dimensions is concern for the emotional health of learners and the second is concern that students reach their full achievement potential. There is general consensus that specific emotions influence the lives of individuals, and the emotional state of high anxiety debilitates achievement and lowers self esteem. When meeting the individual needs of students, the goal of educators, then, should be to enhance the intellectual growth of students by placing them in learning situations where optimum anxiety levels are experienced.

The Purpose

Educators involved in the delivery of instructional services should design a method with the expectation that gains in efficiency and effectiveness of learning will be realized. A proven method is to adapt instruction to the individual characteristics of each learner. Students who manage stressful situations successfully have learned coping skills that condition the individual to react emotionally to those situations at an optimum anxiety level.

The purpose of this study was to determine whether or not the matching[1] of a learner's cognitive style with the presentation

modality (hereinafter instructional mode) will affect the learner's level of anxiety and level of self esteem and level of achievement in a learning situation. The basic hypothesis is that by utilizing cognitive style matching, self esteem will be heightened and anxiety will be regulated to an optimum level for achievement.

Significance of the Study

There is a need for educators to achieve an understanding of the emotional phenomenon of anxiety and self esteem. The methods developed in this study, that distinguish differing feeling states and the intensity of such states investigated over a particular time frame, will add to such understanding. In addition, the long neglected phenomenological experiential properties of the emotions investigated in this study, together with individual responses associated with emotional arousal, will contribute to knowledge of the instructional side effects of anxiety and self esteem.

As a result of this investigation, contemporary research on individual differences in anxiety and self esteem within the context of habit theory may point the way toward systematic use of personality tests in research on human interaction. The combined use of cognitive style mapping as applied in the educational sciences as a measure of habituation and the use of the trait-treatment interaction methodological approach will add significantly to the knowledge base in cognitive psychology. Hence, this study may provide educators with improved techniques for meeting the individual learning needs of students.

Definition of Key Terms

A-State anxiety is a:

> transitory emotional state or condition of the human organism that varies in intensity and fluctuates over time. This condition is characterized by subjective, consciously perceived feelings of tension and apprehension, and activation of the autonomic nervous system. Level of A-State should be high in circumstances that are perceived by an individual to be threatening, irrespective of the objective danger; A-State intensity should be low in non-stressful situations, or in circumstances in which an existing danger is not perceived as threatening.[2]

A-Trait anxiety is a:

> relatively stable individual difference in anxiety proneness, that is, differences in the disposition to perceive a wide range of stimulus situations as dangerous or threatening, and in the tendency to respond to such threats with A-State reactions. A-Trait may also be regarded as reflecting individual differences in the frequency and the intensity with which A-States have been manifested in the past, and in the probability that such states will be experienced in the future. Persons who are high in A-Trait tend to perceive a larger number of situations as dangerous or threatening than persons who are low in A-Trait, and to respond to threatening situations with A-State elevations of greater intensity.[3]

Self esteem denotes a generalized evaluation of an individual involving standards and reflected in self-appraisal. It expresses an attitude of approval or disapproval. It is a subjective experience which the individual conveys to others by verbal reports and other overt, expressive behavior. There is a direct relationship between the individual's subjective judgements of his worthiness and subsequent overt behaviors.[4]

Educational cognitive style is a:

> concept for describing an individual's mode of behavior in searching for meaning. It is identified by an individual's disposition to use certain types of symbolic forms versus others; the derivation of meaning of symbols from roles the

> individual has found most satisfying; and the manner in which he reasons. An individual's cognitive style is determined by the way he takes notice of his total surroundings--how he seeks meaning--how he becomes informed.[5] (See Appendix D for related definition of terms.)

Conceptual Framework

This study is associated with the body of research classified as Trait-Treatment Interaction (TTI). This methodological approach, formally known as Aptitude-Treatment Interaction (ATI), concentrates on the effects of interaction between some characteristic(s) of the stimulus/task/treatment and of the subject/receiver/performer on responses/behavior.

The experimental variation employed in this study is the Trait Treatment Process Interaction (TTPI) which is essentially the cognitive process approach coupled with traits. The implication is that both traits and treatments, as suggested by a number of investigators,[6] interact in combination with the way information is processed to affect outcomes.

Since the information processing approach is used in this study, there are several events which must be considered. They are as follows: (1) the antecedent events to learning, which include expectations, learned strategies, dispositions, and other individual differences; (2) the events which take place simultaneously with the presentation of information (these include attending, perceiving, registering, selecting, coding and storing, which while functioning as individual differences, also interact with individual differences in noncognitive traits); and (3) events subsequent to the learning

tasks. Included in this class is the organization or reorganization of information as it is used, retrieved and/or transferred.[7]

Consideration of these events singularly or collectively is the source of theories about individual differences, i.e., achievement, anxiety, and self esteem, as well as methods for measuring individual differences, e.g., cognitive style mapping. While many of the antecedent events are viewed as individual difference variables, some, such as presentation modality, are manipulable. In support of this belief, DiVesta[8] suggests that materials, their organization and presentation, must be analyzed in terms of processes the learner uses, and that media can be employed to link what the learner knows to new information being received.

Hence, this study is consonant with the TTPI methodological approach, because it includes assessment of the comparability between learner and instructional mode through cognitive style matching, a treatment whereby content information is processed and in turn interacts with anxiety traits to affect the outcomes in anxiety states, self esteem and achievement. (See TTPI Flow Chart, page 64.)

Background of the Study

This study includes four concepts which are important to meet the individual needs of students. These concepts are: (1) anxiety, (2) self esteem, (3) achievement and (4) cognitive style. Anxiety and self esteem, functioning as emotional responses, are the individual characteristics to be regulated in this study. Achievement theory assumes that a person's belief about the likelihood of

attaining success in task performance lies between the perception of the task/stimulus and the final achievement-related response. Educational cognitive style is employed as a method to personalize instruction. This method was used in the study to reconcile characteristics by matching a learner's cognitive style to the cognitive style of the instructional mode.

Achievement

The relationship between student achievement and the emotions of anxiety and self esteem is an important aspect of this study. Terrell[9] suggests that the relationship is clarified by viewing emotions within the framework of McClelland's affect arousal model of achievement motivation. According to McClelland,[10] emotions are not motives, but are considered the basis for motives. Emotions, like motives, involve a present state and a future state which are viewed as two points on an affective continuum. In McClelland's model, motivation is described as a change in affect. The affects of concern in this study are anxiety and self esteem.

Further clarification may be gleaned in Atkinson's[11] conceptualization of achievement motivation as the resolution of conflict between a person's "hope of success" and his "fear of failure." The suggestion of Atkinson that a fear-of-failure motive is observed in the assessment of A-Trait and Sarason's[12] placement of emphasis on aroused self-deprecating tendencies for high A-Trait individuals in experimental situations, may have an effect on achievement. In both models incoming stimulation arouses an affect which is revealed in approach and avoidance behavior. The behavior is a response to

an affect which may have a motivating effect or a debilitating effect on student achievement when a person is involved in competition against a standard of excellence.

Anxiety and Self Esteem

While many studies in achievement motivation indicate that mild anxiety has a motivating effect on learning, high anxiety also may be maladaptive to psychological development.[13] Student anxiety is an important individual characteristic because the associated arousal function has the potential of being regulated. In support, Spielberger[14] suggests that experimental literature on anxiety is consistent with the hypothesis that situations which pose direct or implied threats to self esteem produce differential levels of A-State in persons who differ in A-Trait.

As a unitary emotional state, anxiety may be differentially influenced by psychological threats, because life experiences cause individuals to develop response modes to varied types of stressors. When individuals experience high anxiety, they meet temporal sequences of stressful events that can be interpreted as direct or implied threats to self esteem.

The effect of high levels of anxiety experienced by a student performing learning tasks may serve to activate cognitive processes that have effectively regulated A-State anxiety to a level which increases the probability of a student's success in performance. Stressful situations that are encountered frequently lead an individual to develop coping responses that quickly alleviate or minimize the threat and immediately reduce the level of A-State anxiety. An

individual also may respond to threatening situations with defensive processes that serve to reduce the intensity of A-State reactions.

Once a stimulus situation is appraised as threatening, the assumption is that an A-State reaction will be evoked and the intensity of this reaction will be proportional to the amount of threat the situation poses for the individual. The reaction is also affected by the duration of the evoking stimuli and the individual's previous experience in dealing with similar circumstances. High levels of A-State anxiety are experienced as unpleasant and may serve to initiate cognitive or motoric processes that have effectively reduced A-State anxiety in the past.

Cognitive Style

Cognitive style is conceived of as individual consistencies in the manner that persons have learned to adapt to their environments. Cognitive psychology which relates to theories of behavior concludes that in investigations of psychological coping skills and defense mechanisms, one must also study general cognitive functioning. Moreover, cognitive styles are linked with, but are not identical to, defense mechanisms. A cognitive style denotes a characteristic way of organizing incoming stimulation and producing the final response.

In this study, the utilization of cognitive style mapping as structured in the educational sciences[15] gives a picture of the way a student derives meaning from his environment(s) and personal experiences. It is viewed by Joseph Hill[16] as a Cartesian product (G),

which is a combination of all elements in (s), which denotes the set of elements defining symbolic orientation, (E), which indicates the set of cultural determinants of the meaning of symbols, and (H) which designates the set of modalities of inference. The individual's cognitive style is measured through the administration of a cognitive style interest inventory. The resultant cognitive map reflects an individual's cognitive style.

The individual learner's cognitive style map becomes a resource which can be used for prescribing alternative learning experiences for a student. A strategy employed is to fit specific characteristics into the instructional mode that incorporate as many as possible of the cognitive elements in sets S, F and H of the individual learner. The premise is that the greater the match, the greater the comparability in modes of understanding. By evaluating the instructional materials and learning activities to determine common cognitive elements, an instructor can provide an optimum learning experience geared to the learning style of a student.

Individual Differences

The experiences that a person receives in life form the cornerstone for development of unique sets of characteristics through which they derive meaning. Teachers are aware that these characteristics function as individual differences. They are also aware that these differences are continually amended and that they affect student performance. However, teachers have difficulty in making maximum use of individual differences which results in students' not reaching their optimum level of performance.

Educators should recognize that success for a student in the performance of learning tasks is directly related to his ability to process content information. However, there are other factors which affect student learning. One means of understanding individual differences is to analyze each student's cognitive style. Biggs, in his work on information processing in human learning, offers support for cognitive style when discussing problems related to intelligence testing. He states:

> In intelligence of IQ testing, the normal procedure is to administer a battery of highly differing tests of a cognitive kind and to extract from the scores, by a method of factor analysis, certain basic underlying factors of the intellect . . . these factors refer to content, not to process.
>
> Items that affect intellectual performance, but which are affective or emotional in nature, are not only not represented; they are considered to interfere with the purity of the intellectual measures themselves, and are therefore deliberately excluded as being irrelevant. . . non-intellectual measures are just as relevant as intellectual measures.[17]

The identification of process factors through a measure of individuals' cognitive style differences is important, because once the set of factors has been identified, learning prescriptions can be designed by employing instructional strategies to diversity presentation modalities to meet student needs, interests, and abilities.

Cronbach[18] suggests that the most adequate way of coping with individual differences might be to alter instructional methods to fit the aptitude patterns of the learner, e.g., student differences in IQ, verbal ability. This procedure would not be useful unless a trait-treatment interaction (TTI) exists.

Although individual differences usually refer to characteristics which are unique to each person, a review of investigations

which describe the "high ability-high IQ" learner sub-group characteristics may aid in the understanding of individual differences. This student sub-group generally demonstrates superior psychological adjustment. However, there are individuals within the group who encounter problems of anxiety, insecurity, difficulties due to differing interest, and a preference for self-direction to directions by others.[19]

The results of Terman's[20] longitudinal study showed that instruction for these students should provide necessary enrichment and challenge to keep up with their rapidly expanding abilities. The most important program objective for this sub-group, then, should be the stimulation of indiviudal interests, and standardized curriculum requirements are seen as unimportant. When comparing 55 bright and 55 dull sixth grade children, Lucito[21] suggested that a curriculum based on pupil interest should be designed, because these learners demonstrate independent and less conforming behavior. The group labeled as bright was found to be less conforming than their peers labeled as dull. In addition, 29 percent of the children labeled bright fell into the most independent category as opposed to none of the children labeled dull. In an earlier study, Smith[22] compared 42 superior and 42 average adolescents and found the superior to be significantly higher in the categories of independence and dominance. Gallagher[23] reports that the ability of the high IQ student generally measured by tests, is the ability to produce unique associative content information.

Martinson[24] recommends that differentiated educational programs be used with this group of students, and that the programs include a curriculum which denotes higher cognitive concepts and processes and instructional strategies which accommodate the individual's learning style. Eighty percent of the respondents to the advocacy survey reported by Martinson saw a need to adjust instruction to different learning styles among this sub-group.

Gallagher[25] reports that much of what has been called creativity and divergent thinking in cognitive ability of this group of students, represents a cognitive style or set of preferences in their performance. Further, there is evidence that this style can operate to influence the kind of perceptions that a person has, and thus selectively filter information received from the environment.

One of the problems in structuring learning experiences for high IQ students has been the lack of adequate instruments to measure their cognitive styles. Some of the reservations about measuring instruments stem from a literature which suggests that there are many transitory influences, other than intelligence tests, which are readily accepted by some, and considered invalid by others. In this study, cognitive style mapping will be used to diagnose student characteristics.

Research Questions

The research questions associated with this study are listed below.

Research Question 1: With the A-State anxiety pre-test measure as the covariate, is there a statistical signficant difference

between the mean on A-State anxiety post test measure (1) for student's with cognitive styles matched and (2) for student's with cognitive styles non-matched to the cognitive style of the instructional mode?

Research Question 2: With the self esteem pre-test measure as the covariate, is there a statistical significant difference between the mean on self esteem post test measures (1) for student's with cognitive styles matched and (2) for student's with cognitive styles non-matched to the cognitive style of the instructional mode?

Research Question 3: With the achievement pre-test measure as the covariate, is there a statistical significant difference between the mean on Instructional Sets I and II achievement post test measure (1) for a sub-sample of student's with cognitive styles matched and (2) for a sub-sample of student's with cognitive styles non-matched to the cognitive style of the instructional mode?

Research Question 4: Is there a statistical significant correlation between the pre-test scores on A-State anxiety and self esteem (1) for student's with cognitive styles matched and (2) for student's with cognitive styles non-matched to the cognitive style of the instructional mode?

Research Question 5: Is there a statistical significant correlation between the post test scores on A-State anxiety and self esteem (1) for student's with cognitive styles matched and (2) for student's with cognitive styles non-matched to the cognitive style of the instructional mode?

Hypotheses

In this study, Cognitive Style Matching is the independent variable. The dependent variables are A-State Anxiety, Self Esteem and Achievement. Given that X_1 is equal to the post A-State anxiety scores of the matched grou, and X_2 is equal to the post A-State anxiety score of the non-matched group; and that Y_1 is equal to the post self esteem score of the matched group and Y_2 is equal to the post self esteem score of the non-matched group, and since μ (mu) is equal to the mean and ρ (rho) is equal to the correlation, then H_{01}, H_{02}, H_{04} and H_{05} are presented in null form to facilitate examination of the variables.

Furthermore, given that Z_1 is equal to the post achievement score of the matched group, and Z_2 is equal to the post achievement score of the non-matched group for subjects involved in Instructional Sets I and II, and since μ (mu) is equal to the mean, then H_{03} is presented below in null form.

In this study the hypotheses tested were:

H_{01}: $\mu_{x1} = \mu_{x2}$ with the pre-test measure on A-State anxiety as a covariate.

H_{a1}: $\mu_{x1}^{1} \neq \mu_{x2}$ with the pre-test measure on A-State anxiety as a covariate.

H_{02}: $\mu_{y1} = \mu_{y2}$ with the pre-test measure on self esteem as a covariate.

H_{a2}: $\mu_{y1} \neq \mu_{y2}$ with the pre-test measure on self esteem as a covariate.

H_{03}: $\mu_{z1} = \mu_{z2}$ with the pre-test measure on achievement as a covariate (a composite hypothesis).

H_{a3}: $\mu_{z1} \neq \mu_{z2}$ with the pre-test measure on achievement as a covariate (a composite hypothesis).

H_{04}: $XY = 0$ for (1) matched and (2) non-matched groups using pre-test scores (a composite hy-othesis).

H_{a4}: $XY \neq 0$ for (1) matched and (2) non-matched groups using pre-test scores (a composite hypothesis).

H_{05}: $XY = 0$ for (1) matched and (2) non-matched groups using post test scores (a composite hypothesis).

H_{a5}: $XY \neq 0$ for (1) matched and (2) non-matched groups using post test scores (a composite hypothesis).

Summary

This chapter has introduced the use of cognitive style matching as one method for measuring individual differences. The method can be employed as an instructional strategy to adapt instruction to the individual characteristics of each learner. An illustration was made that concern for the emotional well being of students by educators can be gleaned through a measure of the individuals' self esteem levels and anxiety levels, with the goal in view to regulate the arousal function associated with these two emotionalities. An illustration was made that the concern of educators for students' reaching their full academic potential can be seen when measuring the achievement of students involved in an instructional event. In addition, a position was established for couching this study in the body of knowledge classified as Trait-Treatment Process Interaction (TTPI) and the statistical hypothesis were listed.

FOOTNOTES: CHAPTER I

[1]The use of the "matched and non-matched" terminology in this study should not be confused with statistical sampling language of matched experimental and control groups which reflects the equivalence of comparison groups.

[2]Charles D. Spielberger, "Anxiety as an Emotional State," Anxiety - Current Trends in Theory and Research, 1 (New York: Academic Press, Inc., 1972) p. 34.

[3]Ibid.

[4]Stanley Coopersmith, Antecedents of Self-Esteem (San Francisco: W.H. Freeman, 1967).

[5]William R. Terrell, "An Exploratory Study of the Modification of Student Anxiety Levels Utilizing Cognitive Style Matching," (Ph.D. Dissertation, Michigan State University, 1974), pp. 3-4.

[6]F.J. DiVesta, "Theory and Measures of Individual Differences in Studies of Trait by Treatment Interaction," Educational Psychologist, 13, No. 1 (1973), pp. 5-13; see also R. Glaser, "Individuals and Learning: The New Aptitudes," Educational Researcher, 1, No. 6 (1972), pp. 5-13; D.E. Hunt, "Person-Environment Interaction: A Challenge Found Wanting Before It Was Tried," invited address to the Division of Educational Psychology, American Psychological Association Meeting, Montreal, Quebec, August, 1972; M.L. Koran, "Identification of Relevant Aptitude Variables in TTI (ATI) Research," (paper presented at the Symposium on Trait-Treatment Interactions in Instructional Research, American Psychological Association Annual Meeting, Honolulu, 1972).

[7]F.J. DiVesta, "Trait-Treatment Interactions, Cognitive Processes, and Research on Communication Media," AV Communication Review, 23 (Summer, 1975), pp. 185-196.

[8]Ibid., p. 191.

[9]Terrell, op. cit., p. 18.

[10]D.C. McClelland, The Achievement Motive (New York: Appleton-Century-Crofts, Inc., 1953).

[11]J.W. Atkinson, An Introduction to Motivation (Princeton, New Jersey: Van Nostrand-Reinhold, 1964).

[12]S.B. Sarason et al., Anxiety in Elementary School Children (New York: Wiley, 1960), pp. 401-402.

[13]Terrell, loc. cit.

[14]Spielberger, op. cit., p. 44.

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[17]J.B. Biggs, Information and Human Learning (Glenview, Illinois: Scott, Foresman and Co., 1968), p. 22.

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[19]L. Hollingworth, Children Above 180 I.Q. (New York: Harcourt, Brace and World, Incorporated, 1942).

[20]L.M. Terman, Mental and Physical Traits of a Thousand Gifted Children, Vol. 1. Genetic Studies of Genius (Stanford, California: Stanford University Press, 1925); see also L.M. Terman and Melita Oden, The Gifted Group at Mid-Life, Vol. IV, Genetic Studies of Genius (Stanford, California: Stanford University Press, 1947); L.M. Terman and Melita Oden, The Gifted Group at Mid-Life, Vol. V, Genetic Studies of Genius (Stanford, California: Stanford University Press, 1959).

[21]L.J. Lucito, "Independence-Conformity Behavior as a Function of Intellect: Bright and Dull Children," Exceptional Children, 31 (1964), pp. 5-13.

[22]D.C. Smith, Personal and Social Adjustment of Gifted Adolescents, Research Monograph No. 4 (Washington, D.C.: Council for Exceptional Children, 1962).

[23]J.J. Gallagher, Teaching the Gifted Child (Boston: Allyn and Bacon, 1964).

[24]R. Martinson, "Research on the Gifted and Talented: Its Implications for Education," Education of the Gifted and Talented (Washington, D.C.: U.S. Printing Office, 1972).

[25]Gallagher, loc. cit.

CHAPTER II

REVIEW OF THE LITERATURE

This investigation addresses the variables of anxiety, self esteem, cognitive style matching and achievement. The theoretical foundation of these variables is included in the body of knowledge classified as cognitive psychology. This review of literature will examine anxiety and its relationship to self esteem, cognitive style matching and achievement. This chapter is divided into three major segments: (1) anxiety, (2) self esteem, and (3) cognitive style.

Anxiety

An important aspect of this study is to investigate a method of regulating student anxiety levels in an instructional event. The concerns expressed in this section of the review of literature are with the three divisions described as follows: (1) the view of anxiety as an emotional state, (2) the duality of State-Trait Anxiety, and (3) the relationship of anxiety to academic achievement. Previous attempts at regulating anxiety to affect student achievement will be discussed in the third division of this section of the review.

Anxiety as an Emotional State

Current research relating to emotional arousal has centered around either the phenomenological (experiential) or the physiological

(behavior) aspects of emotion. The present study approaches anxiety from the phenomenological frame of reference, which regards this emotion as human reactions that are characterized by an experiential or feeling quality. Spielberger reports that "the typical paradigm employed in current research on emotions involves the manipulation of experimental conditions. . ."[1] Hence, emotional reactions can be defined by stimulus-response operations together with individual differences related to previous experiences. The result is that the emotionality of anxiety will be viewed as a personality state which exists at a moment in time, with a level of intensity, recurring when evoked by a stimulus, which endures over time for as long as the evoking condition continues.

Investigators approaching anxiety from a physiological aspect have viewed this emotionality as a sympathetic autonomic nervous reaction which takes the form of unusual motor activity, increased pulse rate and blood pressure, glandular secretions, and restricted bowel activity. High anxiety is revealed in an excessive sympathetic autonomic reaction which functions as a response to stressor stimuli. Very low anxiety is seen as a parasympathetic autonomic reaction where the individual is in a state of rest.

Anxiety is seen as a generalized or specific reaction to ego threat. Environmental events which are incongruent with an individual's self esteem are ego threatening. In support, Kilpatrick et al.[2] found that high stress instruction involving ego and failure threat, produced an increased frequency on non-specific EDR's (Electro-dermal Responsiveness) in high and low anxious subjects.

The studies of Cattell and Scheier[3] offer clarification in their conclusion that anxiety is the result of the anxious person responding to his own environment. Jersild expresses concurrence with the explanation that anxiety exists when a person "is troubled by reminders of a gap between what he is and what he pretends to be."[4]

In a study with 112 female undergraduates, Bennett and Holmes[5] found that (a) the threat manipulation was effective in the increase of stress and (b) a redefinition of anxiety occurred after the onset of threat was ineffective in reducing stress.

Anxiety states are viewed as anticipatory goal reactions, which (1) are learned from previous cue effect association, (2) are energizers of behavior and (3) guide individuals toward predictable end states or goals. With dependence on the particular event and on the amount of stimulation, the states are viewed as a representation of two points on an affective continuum: a present state (either low, neutral or high) which redintegrates through past learning, and a second state involving an increase or decrease in anxiety.

The present-future states construct can be clarified by looking at Atkinson's[6] conceptualization for resolving the conflict between a person's hope of success and his fear of failure. The event is aroused by cues associated with competition against a standard of excellence.

Atkinson included among the determinants of action, the learning factor of habituation. Conflict resolution is realized by considering the strength of the approach tendency (hope of success) relative to the avoidance tendency (fear of failure) which

determines a person's movement toward or away from an achievement task.

Atkinson's determinant of fear of failure, or the tendency to avoid achievement tasks and/or avoid failure (T_{af}) is a multiplicative relationship of the motive to avoid failure (M_{af}), the probability of failure (P_f) and the incentive value of failure ($-I_f$): $T_{af} = M_{af} \times P_f \times (-I_f)$. The affective anticipation learned from prior failures and experienced shame is aroused. In the formula (P_f) refers to a cognitive goal expectancy or the anticipation that an action will not lead to the goal. Atkinson's use of the P_f determinant is of great interest in the present study. Its use is guided by Tolman's work in latent learning. Tolman[7] suggests that during non-rewarded and rewarded trials, the infrahumans (rats) developed "cognitive maps" of their environment and that response reward contingencies or expectations are formed.

Anxiety about failure is conceived of as a specific associative disposition, in contrast to the Spencian[8] view of anxiety as a nondirectional drive. McClelland[9] supports the former through the incorporation of the behavioral characteristic of pleasure, and primary and secondary drives are not differentiated and complex human needs are not derived from primary need deficits. Hence, behavior is not merely undertaken as a strategy for avoiding unpleasant states.

When investigating the interrelationship between measures of anxiety and academic achievement, Stutler[10] warns that drive theory as defined in his research failed to predict or interpret the academic achievement of college freshmen women students at any ability level.

Further warning was suggested by Cattell,[11] whereby inducing anxiety to utilize drive theory was viewed as inappropriate. Symonds[12] cautions that learning situations are frustrating enough; therefore, it is not necessary to create artificial situations.

Anxiety relates to both an arousal function which is general in nature and is characterized as diffuse intensity, and a content function which relates to specifics and is characterized as defining experiences.[13] The intensity is the feeling quality associated with arousal. When there is an increase in arousal, an increase in the intensity of feeling is experienced. When arousal is low an individual is in a state of rest. When arousal is moderate to high, an individual has the capability of predicting events. When arousal is excessive, an individual is unable effectively to predict and negotiate his environment.

Terrell[14] explained the relationship between degree of arousal and the individual's ability to perform (negotiate the environment) through the use of a bell-shaped curve. One tail of the curve represents low anxiety (arousal) and the other tail represents high anxiety (arousal). The apex of the curve indicates sufficient arousal for optimum performance.

Similarly, Malmo, when referring to arousal as a level of activation, indicated that the shape of the curve relating level of performance to level of activation is that of an inverted U:

> . . . from low activation up to a point that is optimal for a given performance or function, level of performance rises monotonically with increasing activation level: but past this optimal point the relation becomes nonmonotonic; further increase in activation beyond this point produces

> a fall in performance level, this fall being directly related to the amount of the increase in level of activation.[15]

Additional clarification of the emotional state of anxiety can be gleaned by looking at McClelland's[16] equilibrium construct. Accordingly, a state of equilibrium exists which does not require (only) a reduction in the level of stimulation (arousal).

In furtherance of this belief, and more important to the present study, an optimum level of stimulation is reflected which, at some point, is greater than zero. McClelland posits that is stimulation is below that level, instrumental action is undertaken to increase the amount of sensation. Similarly, if stimulation is above that level, action is undertaken to reduce the amount of sensation.

The optimum level also has been described as a threshold level. When describing the debilitating effects of high anxiety, Gaier reports that:

> First, if the anxiety is above individual threshold, it leads to an impairment in the ability to improvise in an unstructured and/or new situation. This results in stereotyped, habitual, and familiar approaches that may be maladaptive in the situation. Second, if anxiety is above individual threshold, the individual becomes self-engrossed and concerned with his personal adequacy.[17]

The individual's personal adequacy can be determined by measures of self esteem, which will be described in the next section of the review of literature.

Arrington,[18] seeking to clarify fully the condition under which optimal learning takes place, when such crucial variables as antecedent success and failure impinge upon subsequent performance, suggests that those subjects who experienced induced success had

significantly higher retention scores than those who experienced induced failure. Dixon[19] suggests that varying the methods of group reading therapy with 72 fifth graders placed in one of five experimental groups did not yield any advantage of a treatment group over the control group on the self concept variable and were not more effective in inducing optimal anxiety levels than the control group.

According to Friedman, "Man seeks an optimum level of predictability in his relationship with the environment."[20] When predictability is excessive, the individual is in a high arousal state. The individual confirms the same prediction over and over again, thus the monotony of the situation (event) generates excessive arousal and instability. For persons who are in an exhaustive state, sameness is quieting which is described by Terrell[21] as a static state or boredom which is viewed as absence of a change in affect arousal.

The affective variable of anxiety is of special interest because of its relationship to cognitive learning. In addition, a high level of anxiety is one of the most frequent psychological problems encountered in the school which serves to prevent the learner from realizing his intellectual potential. By developing an awareness of the types of events that serve to trigger this problem and the process by which it develops, it may become possible to arrange the learning situation in such a way as to reduce its occurrence.

State-Trait Anxiety

Anxiety is seen as a unitary mental state rather than a separate influence on behavior. The study of student anxiety levels

requires that measurement be taken during an instructional event rather than the general tendency of a student to react to events. This study makes a distinction between trait anxiety and state anxiety.

Trait anxiety refers to an individual's predisposition to respond anxiously in a variety of situations, and state anxiety is viewed as a transient individual response to varied types of stressors.[22] Cattell and Schier[23] in their studies referred to "trait" as permanent and "state" as momentary.

Spielberger envisioned as one of his tasks a description and specification of characteristics of stressor stimuli that evoke different levels of A-State in persons who differ in A-Trait. When reporting on Basowitz et al., Spielberger[24] suggests that the distinction between the two loci of anxiety is primarily a conceptual one. For a student there may be only the unitary state of emotional stress.

This interpretation is consistent with the hypothesis that psychological threats may differentially influence anxiety as the unitary emotional state (A-State), because life experiences cause people to develop different dispositions to respond to various stressors. The State-Trait Theory of Anxiety by Spielberger recognizes the centrality of cognitive appraisal when an anxiety state is evoked and the importance of cognitive and motoric responses (defense mechanisms) that serve to regulate anxiety states. The assumption which accompanies the theory is that the arousal of anxiety states involves a process or sequence of temporally ordered events initiated by either external or internal stimuli that are perceived

to be dangerous or threatening by an individual. An example of external stressors that are likely to evoke anxiety reaction is the threat to self esteem that is encountered when a student is called upon to respond to an instructional mode which is noncomparable to his own. Any internal stimulus which causes an individual to think about or anticipate a dangerour or frightening event may also evoke high levels of A-State. For example, a student who suddently remembers that he has experienced failure when relating to a particular instructional mode would probably experience a sudden increase in A-State. Moreover, the appraisal of a particular stimulus or event as threatening is also influenced by a person's aptitude, abilities, and past experience, as well as by his level of A-Trait and the objective danger that is inherent in the situation.

Relationship Between Anxiety and Academic Achievement

Previous investigations into the relationship of anxiety and academic achievement are consistent with the hypothesis that there is a negative correlation between these two variables. In support, Stutler[25] concludes that academic achievement appeared to be related to A-Trait anxiety measures.

Ohlenkamp[26] found correlations between test anxiety and academic achievement to be "generally negative." Waite et al.[27] support the existence of a relationship between anxiety and learning in children. Their study concluded that the low anxious children had greater success than the high anxious children on complex learning tasks.

Nadeau[28] found a significant difference between the threat and the nonthreat groups on any of the anxiety scales and the achievement-congruent (directly related to the objectives) variables. A significant difference was found on the achievement-incongruent (not related to the objectives) variables. Significant anxiety by information interactions were found on one of the anxiety scales and on the achievement congruent test.

Terrell,[29] in supporting the debilitating effects of high anxiety, describes the three studies of Spence, Knight and Sassenrath, and Spielberger. The conclusions reported relate to the fact that high anxious students performed poorer than low anxious students on complex and/or competitive tasks. Feldhusen and Klausmeier[30] found a negative correlation among achievement and IQ and scores on the Childrens' Manifest Anxiety Scale in both fifth grade boys and girls of average intelligence.

Combs[31] compared 25 boys (WISC IQ 115 and over) above the median in grade point average with a group of 25 boys of similar characteristics, but whose grade point average (GPA) fell below the first quartile. A comparison of themes written by the groups revealed that the achievers showed more freedom and more adequacy of emotional expression. Meyers and Dunham[32] found that high anxiety has a debilitating effect on the utilization of memory span in the solution of concept problems.

Regulating Anxiety Levels

A survey of related research, which revealed several studies attempting to regulate anxiety levels, yielded only one study which

attempted to regulate anxiety levels through the use of cognitive style matching.

The studies of O'Neil, Hanson and Spielberger[33] showed that high anxiety often interferes with performance in a computer-assisted learning situation. However, they did not support the belief that changing the instructional mode will significantly reduce test anxiety. Gustafson,[34] in a study involving the effects of simulation on student teachers, found that the instructional mode of simulation did not lower the anxiety of student teachers.

In the research related to the construct of anxiety and its influence on cognitive performance, two studies have attempted to mediate the effects of test anxiety and its interfering responses. Sieber[35] showed that after observing a model performing a serial learning task, test anxious subjects improved their performance at the same task. The improvement in their performance was greater for high than for low test-anxious subjects. In Richardson's[36] preliminary investigation of program effectiveness in the context of computer-managed instructional modules, a significant reduction was found in self-reported test anxiety.

Many and Many[37] tend to support the possibility of reducing anxiety in elementary and junior high school age pupils by enhancing the way in which they see themselves. In a study using a community college freshman population, Terrell,[38] in an attempt to modify student anxiety levels utilizing cognitive style matching, found that high A-Trait students with cognitive styles matched to the cognitive style of the instructional mode tend to have greater reduction of

A-State anxiety levels than non-matched students. Moreover, students with cognitive styles matched to the cognitive style of the instructional mode tend to achieve higher grades than students who are non-matched. In addition, low A-Trait students with cognitive styles non-matched to the cognitive style of the instructional mode tend to have less reduction of A-State anxiety levels than matched students.

In this portion of the review of literature the dependent variable of anxiety has been characterized as (1) an emotional state, and (2) a learned influence on an individual's behavior. Moreover, the State-Trait anxiety construct was explained, and the relationship between anxiety and academic achievement was described as having a negative correlation.

Self Esteem

Educators are attempting to determine which factors associated with the instructional process influence achievement. One of the important factors which investigators consider as an influence on achievement is self esteem.

In 1967, Coopersmith[39] defined self esteem as the attribution of positive or negative attitudes toward oneself. Among the social experiences antecedent to the development of positive self esteem, he included the individual's history of successes, relative to his own values and aspirations.

Self esteem is seen as a complex chain of beliefs and evaluations held by a person with reference to himself. This suggestion is based on self-consistency theory, which indicates that individuals

have a tendency to act in ways which defend and/or confirm their self esteem. In the literature, support for the self-consistency idea is found in the statement of Anastasi[40] who posits that self esteem operates as a self-fulfilling prophecy.

In the instructional process, students are confronted with two behavioral consequences, namely success and failure. As a strategy for identifying with self, a student maintains inner consistency by selective perceptions of experiences and by the manipulation of his environment.

For students with a high self esteem level, failure would be seen as threatening, and would require defensive behavior. Success for these same students would be seen as an enhancement of self esteem, and would invite confirmatory responses. In students whose self esteem levels are low, their expectancies would be reversed, that is, failure will confirm the expectancies and successful experiences would require defensive responses due to the incongruency with self esteem.

Self esteem is theorized to be a learned influence on behavior. Ruth Wylie[41] makes the assumption that an individual's self-regard is learned through the combining of rewards and punishments for one's behavior and self-characteristics. Certain things are learned through success and failure experiences when manipulating the environment and a student's level of self-regard is of great importance in predicting his actions.

Relationship Between Self Esteem and Academic Achievement

If, indeed, self esteem is a means of predicting behavior, then perhaps it can be applied to the behavior of academic achievement. Research efforts have been conducted to determine the relationship between self esteem and achievement and, if a relationship exists, to what degree.

Ohlenkamp[42] reports that correlations between self esteem and academic achievement are generally positive. Simon and Simon[43] studied the relationship among self esteem, achievement and intelligence. Their results affirm positively the relationship between self esteem and standardized academic achievement, and verbal IQ and self esteem for the total sample. Lang[44] concludes that higher achievers differ from their lower achieving peers in the area of self esteem.

The Primavera et al.[45] studies investigated the relationship between academic achievement and self esteem with reference to possible sex differences. The coefficients of correlation between self esteem and academic measures were significant for the total group of girls but only one was significant for the boys.

Katz[46] noted that academically unsuccessful boys engaged in significantly more self-criticism than successful boys, even when the experiment was so designed that both groups would succeed. He concludes that such self-criticism could be an effort to reduce anticipatory anxiety in achieving situations, due to a prior history of negative reinforcements from parents.

In a study involving 44 male college students, Goldberg[47] investigated the effects of fear of failure when it is related to self esteem. The results confirmed the expectation that students with fear of failure would have an approach-avoidance conflict about academic pursuits. The fear of failure group had a lower self esteem and a negative attitude toward college. Coleman[48] suggests that a sense of personal control or personal efficacy regarding the ability to influence others and confidence in one's own ability are the most important correlates of minority students' school achievement.

Academic programs offered to all students have been adjusted historically to the norm or average.[49] The result is that those viewed as different in potential encounter a program of limited significance. The intellectually superior student presents challenging educational problems because of his deviation from the norm. Hollingworth[50] showed that students in this target group typically performed far below their capacity, found their educational experiences frustrating, and often felt inferior, inadequate and insecure within their peer group.

High IQ students encounter difficulties in attempting to manage and direct activities. Since their ideas differ, they lose the participation of others and find themselves marginal and isolated. When conditions are changed and the students are given opportunities to satisfy their desires for knowledge and performance, their own sense of adequacy and well-being improves.

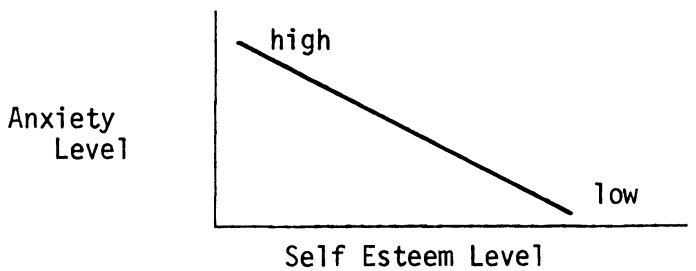
In general, high IQ students at the secondary level have been found to be better adjusted than the general population, although

there are definite relationships between educational opportunities and adjustment. According to Martinson,[51] standardized psychological tests used in various studies have shown that these students resemble college men and women more closely than they do the youth of their own age.

Gallagher[52] found among adolescent boys better attitudes than among girls, despite the fact that all were intellectually superior. Smith[53] administered the Thematic Apperception Test and Interpersonal Adjective Checklist that provided data on self and self-ideal concepts. No differences were found between the superior adolescent group and the average group in self-acceptance or accuracy of self-perception.

Relationship Between Anxiety and Self Esteem

Most investigators conducting research in the area of anxiety together with self esteem conclude that there is a negative to zero correlation between these two emotionalities. The interaction which exists is revealed in the graphic representation of a linear distribution; in other words, given a high anxiety level, there will be a low self esteem level.



The findings of Many[54] indicate a consistent pattern over grades four through eight of a negative, low, yet significant relationship between anxiety and self esteem. Horowitz[55] concluded that the more anxious children tend to have lower self esteem levels.

Many and Many[56] examined the relationship between a measure of self esteem and each of two measures of general anxiety and test anxiety. The results showed there were statistically significant negative correlations between the measures of self esteem and each of the measures of general anxiety and test anxiety when scores were analyzed by the total group, grade level, and sex. Sarason[57] found high anxious students more self-deprecatory, self-occupied, and generally less content with themselves than low anxious students.

In this segment of the review of literature the dependent variable of self esteem has been characterized as a learned influence on an individual's behavior. In addition, the relationship between self esteem and anxiety is reported to be a negative or near negative correlation. The correlations between self-esteem and academic achievement generally are reported to be positive.

Cognitive Style

The content and feeling function for both anxiety and self esteem are associative in nature. However, according to Friedman, an emotion can be identified only in terms of content. Moreover, Friedman posits that:

> Once a match for identification has been achieved and the individual becomes aware of the initiating event and the feelings he associates with it, his feelings are specific because he is aware of the conditions from which his feelings

> arise. Subsequently, when a match for prediction is achieved, his feelings about the event become even more specific because not only is he aware of the conditions which give rise to his feelings but, in addition, he may be aware of the specific goal that will reduce arousal and satisfy his feelings.[58]

These views are important to the present study because the matching of an individual's cognitive style with the cognitive style of the instructional mode is a strategy for reproducing the affective expectation in the manner that an individual derives meaning from his internal environment. When there is too little predictability (lack of a match) between the individual and the instructional cognitive style maps, the individual's arousal increases because there is a pronounced incongruity between an individual's "neuro-print and the event." In an instructional setting, the result is that the lack of predictability confuses the student, there is an overabundance of arousal, and mental processes become unstable.

When an individual's mind is unstable, his inability to relate effectively to the environment functions as a threat. Friedman suggests that:

> When there is too much predictability, he will search for variety and novelty. When there is too little predictability, he will search for familiarity. These compensatory reactions to either too much or too little predictability are directed toward stabilizing the mental process.[59]

Earlier in the review of literature, support was found for Friedman's suggestion in McClelland's equilibrium construct.

The lack of a match between the cognitive styles of the instructional mode and the student, functions as the stimulus which arouses affective expectations from prior experiences. The premise

is that emotions are learned and anxiety and self-esteem are reproduced by the stimulus similar to those present during the period of original learning.

The content is processed as incoming sensory stimulation and is "transformed, reduced, elaborated, recovered and/or used."[60] In support, Friedman posits that:

> The value an individual places on the selection and confirmation of predictions is positively correlated with the intensity of arousal or emotion that is generated at the time. The maintenance of predictability is valued above all else . . . . The importance of predicting a specific event is determined initially at the time a match for identification is achieved and the individual becomes aware of the intensity of feeling he associates with the event. The more intense his feelings are, the more he will value the reduction of the intensity or arousal. When a match for prediction is achieved, arousal may increase or decrease, depending upon whether or not the reduction of arousal is predicted.[61]

After evaluating the feelings and content of an instructional event, a neuro-print is formed by the student and the individual expresses a preference in making a selection of a master neuro-print when such matters as the probability of achieving a goal by means of a given program are under consideration. In this study, the contention is that an individual's cognitive style is a master neuro-print.

The matching of the cognitive style of the individual student and the cognitive style of the instructional mode is a relevant neuro-print. The content of the ideas embodied indicate that the achievement of the events and the instructional program (process) necessary for achieving them form an optimal neuro-print which relates to optimal predictability in a learning situation (event). The individual evaluates his feelings associated with neuro-prints as a

given program directs him toward McClelland's end states, and also evaluates how he feels when the goal has been achieved.

The identification of an individual's preference in the manner that he derives meaning from the environment is especially appropriate in the identification of cognitive style matching as a master neuro-print. The implication is that when the content of an idea of a match and the feelings associated with the match are solidified as the individual's choice for attaining stability, the result is that the individual seeks a pleasurable experience, and a preference for academic action which is predictable.

The arousal function is viewed as the agent having the responsibility of monitoring, ordering, and tracking the internal events. The source of arousal which flows from both the internal and external events is defined by the content function. Friedman[62] states that the relationship, in a master neuro-print, between internal and external events is gleaned when an external event is predicted to reduce the arousal attached to an internal event. Friedman's statement may be clarified by viewing the (1) cognitive styles of the student and the instructional mode and (2) cognitive style matching as positive factors, and using the arithmetic operation of addition to explain their non-arithmetic relationship. Hence, the relationship may be displayed as follows:

(+ Individual Cognitive Style Map-Internal Event) +

(+ Instructional Mode Cognitive Style Map-External Event) =

(+ Cognitive Style Matching-External Event).

Self esteem and anxiety are two cognitive characteristics found to be members of each individual's unique bank of behavior resources. Cognitive style is a description of the total cognitive characteristics of an individual. The use of educational cognitive style answers the call for further investigations which involve specific educational tasks, conditions, and analysis of student and environmental characteristics.

Cognitive Style Mapping-- A Cartesian Product

A method used for describing a broad pattern of individual learning behavior using symbolic language is cognitive style mapping. Hill defines cognitive style as:

> a cartesian product, G, composed of three sets, S, E and H, where S denotes the set of elements defining symbolic orientation, E indicates the set of cultural determinants of the meaning of symbols, and H designates the set of modalities of inference.[63]

The Cartesian product, a non-arithmetic display of elements contained in two or more sets, is represented by the equation, $G = S \cup E \cup H$. The product G is defined as the combination of all possible elements found in S, E and H.

In this study the cognitive style is determined by an analysis of a cognitive style interest inventory instrument administered to learners. The analysis describes the individual's set of cognitive characteristics which is referred to as the "cognitive map" of the learner. The "map" is descriptive of the way in which the student derives meaning and becomes informed in his environment based

upon his symbolic orientation, personal experiences, and methods of reasoning.

In the set S, the student's use of symbols to acquire knowledge and meaning is examined. The two types of symbols that are related to the set S are the theoretical (words and numbers) and the qualitative symbols which present and then represent the awareness of an individual to the sense of smell, feelings, commitments and values.

There are four theoretical symbols which are listed as follows:

1. T(VL)--Theoretical Visual Linguistic--ability to find meaning from words you see;
2. T(AL)--Theoretical Auditory Linguistic--ability to acquire meaning through hearing spoken words;
3. T(VQ)--Theoretical Visual Quantitatives--written numerical symbols, relationships and measurements;
4. T(AQ)--Theoretical Auditory Quantitative--numerical symbols, relationships and measurements.

Qualitative symbols associated with sensory stimuli are:

1. Q(A)--Qualitative Auditory--hearing;
2. Q(O)--Qualitative Olfactory--smell;
3. Q(S)--Qualitative Savory--taste;
4. Q(T)--Qualitative Tactile--touch;
5. Q(V)--Qualitative Visual--sight.

Qualitative programmatic symbols are classified under Q(P)--Qualitative Proprioceptive, primarily motor responses and skills. This takes into consideration such things as left and right-handedness and eyedness and physical timing. The qualitative symbols associated with cultural codes are:

1. Q(CEM)--Qualitative Code Empathetic--sensitivity to the feelings of others;
2. Q(CES)--Qualitative Code Esthetic--sensitivity to the beauty of an object or an idea;
3. Q(CET)--Qualitative Code Ethics--commitment to a set of values (not to imply morality);
4. Q(CH)--Qualitative Code Histrionics--acting or playing a role;
5. Q(CK)--Qualitative Code Kinesics--body language;
6. Q(KH)--Qualitative Code Kinesthetics--simulate any acceptable societal form;
7. Q(CP)--Qualitative Code Proxemics--knowledge of social distance;
8. Q(CS)--Qualitative Code Synnoetics--personal knowledge of oneself;
9. Q(CT)--Qualitative Code Transactional--salesmanship;
10. Q(CTM)--Qualitative Code Temporal--social timing.

In the second set of the cognitive style map, cultural influences which determine the meaning which the student will assign to symbols are examined. There are three cultural determinants of the meaning of symbols:

1. I--Individuality;
2. A--Associates (peers);
3. F--Family.

The third set of the cognitive map is "Modalities of Inference." Information associated with this category reveals the reasoning pattern(s) which an individual can use in deriving meaning. The forms of inference are:

1. M--Magnitude--need to use norms or categorical classifications; to define things in order to understand them;

2. D--Difference--one-to-one contrasts or comparisons of selected characteristics;

3. R--Relationship--ability to synthesize, through analysis of a situation to discover its component parts;

4. L--Appraisal--uses M, D, and R, giving equal weight to all three;

5. K--Deductive Reasoning.

The three sets collectively comprise the cognitive style of the student. A maximum of 3,200 different profiles of the elements are possible for an individual to show in his map at a given level of educational development. There are 20 levels of educational development.

A major orientation is noted by the capital letters indicating a particular characteristic and is accorded a given characteristic if it occurs in the 50th-99th percentile range. A distribution of that element at a given developmental level, e.g., T(VL), would indicate a major orientation in theoretical visual linguistic symbolis mediation. A minor orientation will indicate that the student realized a score for a given element in the range of the 26th-49th percentile of distribution of that element at a given developmental level, e.g., T'(VL), read "T prime VL," would indicate a minor orientation in theoretical visual linguistic symbolis mediation. An element will be included in the sets if it has a major and minor orientation based on percentile range.

In addition to the major orientation and minor orientation, there is a third classification referred to as a negligible orientation which indicates that a student realized a score at the 25th percentile or below of a distribution of scores for a given element

at a given developmental level. The symbol for this element is omitted from the indiviudal's cognitive style map.

Studies in Educational Cognitive Style

The utilization of cognitive style matching as an influence within the educational sciences has generated over 60 doctoral dissertations. This influence can be seen in the work of Denike.[64] He investigated one concern in educational cognitive style for the types of behaviors, or elements, employed by an individual to derive meaning from an educational task. To determine if a student's educational cognitive style is related to learning from a simulation game, Denike conducted an exploratory study with a sample of 24 fifth grade students. Knowledge gain was measured by identical pre- and post-tests. Results indicated that those students likely to derive maximum cognitive knowledge from a simulation game were those who gather information by listening, prefer peer group interaction, and tend to reason on the basis of rules. Students who tend to receive the least benefit from games derive information from both reading and listening and prefer independent activities.

The study of Terrell[65] indicates that (1) students with cognitive styles matched to the cognitive style of the instructional mode tend to achieve higher grades than students who are non-matched; (2) high and low A-Trait students with cognitive styles matched to the cognitive style of the instructional mode tend to have greater reduction of A-State anxiety levels than non-matched students; and (3) it is essential to control for cognitive processes, through

cognitive style matching or some other equally effective method, in the study of the effects of anxiety on achievement.

Berke[66] investigated the effects of educational cognitive style as an aid for teachers of educationally disadvantaged college students. He found that the mathematics program which employed cognitive style mapping as a teaching aid was judged more successful than the program which did not make use of educational cognitive style.

An investigation by Cotter[67] related student cognitive style with student curricular choice. He found that students who exhibit a "Major individuality"--I--selected curricula which stress fundamental disciplines (e.g., liberal arts and science curricula) as opposed to applied arts and sciences.

Lange[68] in a study involving nursing students concluded that the matching of students' educational cognitive style to the cognitive style of the instructor resulted in lower failure-withdrawal rates than nursing students who are non-matched and the matched students tended to receive higher grades. Wasser[69] reported that elementary teachers tended to give higher grades to students with cognitive styles than match their own.

In this segment of the review of literature cognitive style matching has been characterized as the interaction of characteristics of (1) the individuals cognitive style and (2) the cognitive of the instructional mode. Cognitive style mapping was described as a cartesian product, which identifies the individuals characteristics and depicts an individual's expectation in the manner that meaning

is derived from his environment. The strength of the characteristics was described as an orientation, either major, minor or negligible. The basis for classification by orientation is percentile range. In addition, previous studies in educational cognitive style were described which indicate that cognitive style matching has a positive influence on learning.

Summary

This chapter as attempted to illustrate the relationships among anxiety, self esteem, achievement and educational cognitive style. Trait-treatment interaction is a fruitful research area and this study can be classified as representing the area. A statement of educational cognitive style is reported which includes an explanation of cognitive style mapping.

FOOTNOTES: CHAPTER II

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CHAPTER III

DESIGN OF THE STUDY

In this study, the "Nonequivalent Control Group" research design suggested by Campbell and Stanley[1] was employed. The experimental group includes the students with cognitive styles matching the cognitive style of the instructional mode. The control group includes the students whose cognitive styles are non-matched to the cognitive style of the instructional mode. The two groups constitute naturally assembled collectives.

Sample

This study was conducted during the spring session, 1976, using two groups of students who met the following criteria:

a. The students were participants in the gifted child education program sponsored by the Leon County, Florida, School District;

b. The students completed the data gathering instruments which included:

   1. the Cognitive Style Interest Inventory for Secondary Students,
   2. the A-State Anxiety Inventory for Children, and
   3. the Self-Esteem Inventory.

c. The students completed the pre-test and/or post-test associated with achievement of instructional content.

Fifty three (53) students met the above criteria for inclusion in the sample for this study. The sampling procedure used is based upon human judgment and is determined on the basis of what the researcher considers from his past experiences to be a typical or representative sampling unit. Hill and Kerber refer to this type of sampling procedure as "judgment" or "purposive." They also indicate that:

> It may also be based upon the findings of an analysis of the statistical population relative to physical, psychological, sociological, or economic characteristics. Sometimes it is a haphazard selection of accessible population elements . . . Frequently, "purposive" selection is considered "segmental" selection, to the extent that the selection is restricted to certain segments of the total statistical population.[2]

The use of this technique is based on the assumption that if the sample is representative with respect to known population characteristics, it will also be representative with respect to unknown characteristics. The difficulty which arises when this assumption is made is that individuals who are providing the data usually include only those persons within each category who are most readily available.

Representativeness of the Population

The population of interest in this study consisted of all sixth, seventh and eighth grade students enrolled in the Leon County School District's gifted child education program who completed the cognitive style mapping instrument. There were 77 students who completed the task. Four (4) of the participants were eliminated

due to errors in completing the instrument and 20 students were not in attendance when the instructional activities and the A-State anxiety and self esteem instruments were delivered to the students.

An explanation for the high absentee rate is that toward the end of the school year children became tired. In this situation they were asked to participate in a series of activities, e.g. testing-achievement, research, etc., in the regular classroom and the gifted program activities. Recognizing the voluntary nature of participation in the program, the 31 percent absentee rate is understandable.

The remaining 53 students formed the defined population. Since there is no reason to believe that students involved at the time when the investigation was conducted demonstrated abnormal participation, all students who met the criteria were included in the sample. The defined population was considered representative of the population from which it was drawn.

Instruments

State-Trait Anxiety Inventory for Children

The State-Trait Anxiety Inventory for Children (STAI-C), developed by C.D. Spielberger, C.D. Edwards, J. Montuori and R. Lushene, copyright 1968, is based on the State-Trait conceptualization of anxiety originating in the work of Cattell and Scheier.[3] The inventory is divided into two parts labeled Form C-1 measuring state anxiety, which fluctuates over time, and Form C-2 measuring trait anxiety, which is much less sensitive to short-term

environmental change input and hence remains relatively constant. Numerous reliability and validity studies, many of which are summarized by Spielberger et al.,[4] have been reported in the literature (see Appendix A). The STAI-C is appropriate for use with elementary school children. Norms are available for large samples of fourth, fifth and sixth grade children. Validity and reliability data are presented in Appendix A.

Self Esteem Inventory

The Self Esteem Inventory (SEI) is an adaptation of the self report scale developed by Coopersmith, copyright 1967. The instrument utilized in this study consists of 25 items selected from the original instrument. Total scores including the lie scale range from 0 to 66 points. The higher the score, the higher the self esteem. This form was administered to one class of fifth graders of both boys and girls. One hour later the inventory was readministered to the same fifth grade students with a test-retest reliability of .88.

Cognitive Style Interest Inventory for Secondary Students

The Cognitive Style Interest Inventory for Secondary Students measures the theoretical characteristics, qualitative written characteristics and qualitative non-written characteristics. The characteristics are listed below.

Theoretical	Qualitative (Written)
•Verbal Reasoning--TVL	•Q(CEM), Q(CES), Q(CET), Q(CH), Q(CK), Q(CKH), Q(CP), Q(CS), Q(CT).

Theoretical

- Listening--TAL Recording
- Reading--TVL (Gates)
- Numerical Listening--TAQ Tape
- Grammar--TVL

Qualitative (Written)

- Cultural Determinants--I, A, F.
- Modalities of Inference--M, D, R, L.
- Personal Code.

Qualitative (non-written)

- Qualitative Auditory
- Qualitative Olfactory

The Cognitive Style Inventory is available in the Testing Center at the Orchard Ridge Campus at Oakland Community College.

Data Collection Procedures

The study was conducted during the months of May and June, 1976. Prior to the collection of data, administrators of the Gifted Child Education Program of Leon County gave their approval for the investigation to include students enrolled. The Leon County Research Advisory Board then followed with their approval of the research proposal. A list of students was obtained and a schedule of events prepared. In a series of meetings, the instructors were given instructions regarding how they and their students would be involved.

After consultation with the instructors and program leaders, a decision was reached to involve students in a manner that was viewed as normal program operation. Prior to the start of data collection, students were informed that they would be involved in data gathering activities.

The following procedures were utilized in gather data for the study:

a. During the week of May 9 through May 15, 1976, the Cognitive Style Interest Inventory was administered. The criteria for inclusion were previously cited under the section labeled "Sample."

b. During the two weeks which followed, May 16 through May 29, 1976, students in a test-retest instructional setting, were given:

1. A-State Anxiety Inventory for Children (STAI-C),
2. Self Esteem Inventory, and
3. content information tests for achievement.

The students involved in the investigation were transported to the Leon County Academic Resource Center for one half day per week. All activities involving the sample used in this study were conducted at this location (see Appendix B--Criteria for Eligibility).

Assignment of Student Sample to Groups

In this study, students in the sample were assigned to groups by determining the degree of match between the cognitive style of the student and the cognitive style of the instructional mode. To determine the student's cognitive style, the Cognitive Style Interest Inventory was administered to the sample. The Oakland Community College Data Processing Center, then, interpreted the results and identified the cognitive style map of each student in the sample.

The cognitive style of the instructional mode associated with the instructional program(s) was determined by a panel of experts.[5] The panel consisted of Dr. Ronald Bass, Instructional Development Specialist, College of Denistry, University of Florida;

Dr. William Terrell, Instructional Development Specialist, Virginia Polytechnic Institute; Mr. William Breese, Coordinator of Media Production and Technical Training, Duval County School District in Florida; Mr. Lester Rosenbloom, Assistant Professor, University of Florida; and this investigator. The panel viewed the package for each of the instructional set's and noted in writing the cognitive style embodied. The notes were tallied, and the characteristic traits listed. Figures 3.1 through 3.4 indicate the cognitive style traits included in the mode of understanding required by Instructional Set's I, II, III and IV, respectively.

The degree of match between the student's cognitive style and the cognitive style of the instructional mode required by the instructional set for the purpose of identifying those students matched to the instructional mode and those students non-matched were calculated.[6] Students in the sample with a degree of match at the 69 percentile and above were assigned to the matched group. Students in the sample with a degree of match below the 69 percentile were assigned to the non-matched group.

Hypothetical Description of Degree of Match

Degree of match can be calculated by taking the arithmetic cognitive style score of the instructional mode (the referent) and equate the arithmetic cognitive style score of the individual. The measure of the degree of agreement is described in the arithmetic sentence which follows.

Mode of Understanding	Number of Panel Members Listing the Trait
T(AL)	5 of 5
T(VL)	5 of 5
Q(V)	5 of 5
Q(T)	5 of 5
Q(P)	5 of 5
Q(CKH)	4 of 5
Q'(A)	3 of 5
F, I', A'	4 of 5
D, M', R'	5 of 5

Figure 3.1--Mode of Understanding for Instructional Set I.

Mode of Understanding	Number of Panel Members Listing the Trait
T(AL)	5 of 5
T(VL)	5 of 5
Q(V)	5 of 5
Q(A)	3 of 5
Q'(T)	3 of 5
Q'(P)	3 of 5
Q(CEM)	5 of 5
Q(CES)	5 of 5
F, I, A'	5 of 5
F, D', M'	5 of 5

Figure 3.2--Mode of Understanding for Instructional Set II.

Mode of Understanding	Number of Panel Members Listing the Trait
T(AL)	5 of 5
T(VL)	5 of 5
Q'(A)	5 of 5
Q(V)	5 of 5
Q(CT)	4 of 5
Q(CET)	4 of 5
A, F', I'	5 of 5
M, R', D'	5 of 5

Figure 3.3--Mode of Understanding for Instructional Set III.

Mode of Understanding	Number of Panel Members Listing the Trait
T(AL)	5 of 5
T(VL)	5 of 5
Q(V)	5 of 5
Q(CH)	5 of 5
Q(CK)	4 of 5
Q(CT)	5 of 5
Q(CEM)	5 of 5
Q(CET)	4 of 5
A, I	5 of 5
R, M', D'	5 of 5

Figure 3.4--Mode of Understanding for Instructional Set IV.

> Let X, represent the cognitive style score of the referent, and, also let Y, represent the cognitive style score of the individual, then, take a measurement to determine if Y is equal to X, or
>
> $$Y = X, \text{ and } \frac{Y}{X} = 1$$

The elements in the referent are given a numerical value of 3 (see Figure 3.5, p. 60). If the elements of the individual's map are the same as the cognitive style elements of the referent, they are given a value of 3. However, when the individual's element differs from the referents, based on whether an element is described as having a major orientation e.g. T(VL), Q(A), etc., or described as having a minor orientation e.g. T'(VL), Q'(A) (described as a prime), the elements of the individual is given a value of 1 (see Figure 3.6).

The values of the theoretical and qualitative symbols are placed in binomial combinations as revealed in the addition figures 3.5 and 3.6, page 60. The values of the cultural determinants and the modalities of inference is determined by assigning elements which have a major orientation a value of 3. However, the value of the elements with minor orientation are included in the total as a binomial combination with elements which have a major orientation.

Using the totals displayed in Figure 3.6, if an individual's map showed the same cognitive style elements as the referents, this sameness represents a perfect match, which is explained in the equation which follows.

$$\frac{\frac{60}{60} + \frac{15}{15} + \frac{15}{15}}{3} = \frac{1 + 1 + 1}{3} = 3/3 = 1$$

Qualitative Symbols +	Theoretical Symbols T(AL)-3	T(VL)-3	Cultural Determinants F=3; I'=3; A'=3	Modalities of Inference D=3; M'=3; R'=3
Q(V)-3	3	3	F = 3	D = 3
Q(S)-3	6	6	I'+ F 3 + 3 = 6	M'+ D 3 + 3 = 6
Q'(A)-3	6	6		
Q(O)-3	6	6	A'+F 3 + 3 = 6	R'+ D 3 + 3 = 6
Q(T)-3	6	6		
Subtotal	30	30	15	15
TOTAL	60		15	15

Figure 3.5--The Hypothetical Cognitive Style of the Instructional Mode--The Referent.

Qualitative Symbols +	Theoretical Symbols T'(AL)-1	T(VL)-3	Cultural Determinants F=3; I'=3; A'=3	Modalities of Inference D=3; M'=3
Q(V)-3	4	6	F = 3	D = 3
Q'(T)-1	2	4	I'+ F 3 + 3 = 6	M'+ D 3 + 3 = 6
Q'(S)-1	2	4		
Q'(A)-3	4	6	A'+ F 3 + 3 = 6	
Subtotal	12	20	15	9
TOTAL	32		15	9

Figure 3.6--The Hypothetical Cognitive Style Map of an Individual's Mode of Understanding.

If the totals displayed in Figure 3.5 and Figure 3.6 are compared, an imperfect score would result and the degree of match is revealed in the equation which follows.

$$\frac{\text{Individual Cognitive Style Map}}{\text{Referent Cognitive Style}} = \text{DEGREE OF MATCH}$$

$$\frac{\frac{32}{60} + \frac{15}{15} + \frac{9}{15}}{3} + \frac{.5333 + 1 + .600}{3} =$$

$$\frac{2.1333}{3} = .7111 \text{ or 71st percentile}$$

In this study, the sample total was 53. There were 25 members above the 69th percentile, three members at the 69th percentile and 25 members below the 69th percentile. The 28 member total at the 69th percentile and above were assigned to the matched group. The 25 members below the 69th percentile were assigned to the non-matched group.

Statistical Approach

In this study, two statistical techniques were used to analyze the data. Firstly, the Analysis of Covariance was used to test H_{01}, H_{02} and H_{03}. This test was a measure of the effect of cognitive style matching on A-State and anxiety levels, self esteem levels and achievement levels using an F-test for statistical significant difference between nonequivalent group means at $\alpha = 0.05$.

The second test, the Pearson Product Moment Correlation Coefficient, was used to test H_{04} and H_{05}. The linear relationship

was determined between A-State anxiety and self esteem (1) for the matched group and (2) for the non-matched group on pre-test and post-test measure at $\alpha = 0.05$.

Summary

This chapter describes the sample, representativeness of the population, instrumentation employed in the study and the data collection procedures. In addition, the method for assignment of student sample to groups and a hypothetical description of degree of match was explained. Moreover, the statistical approach was identified.

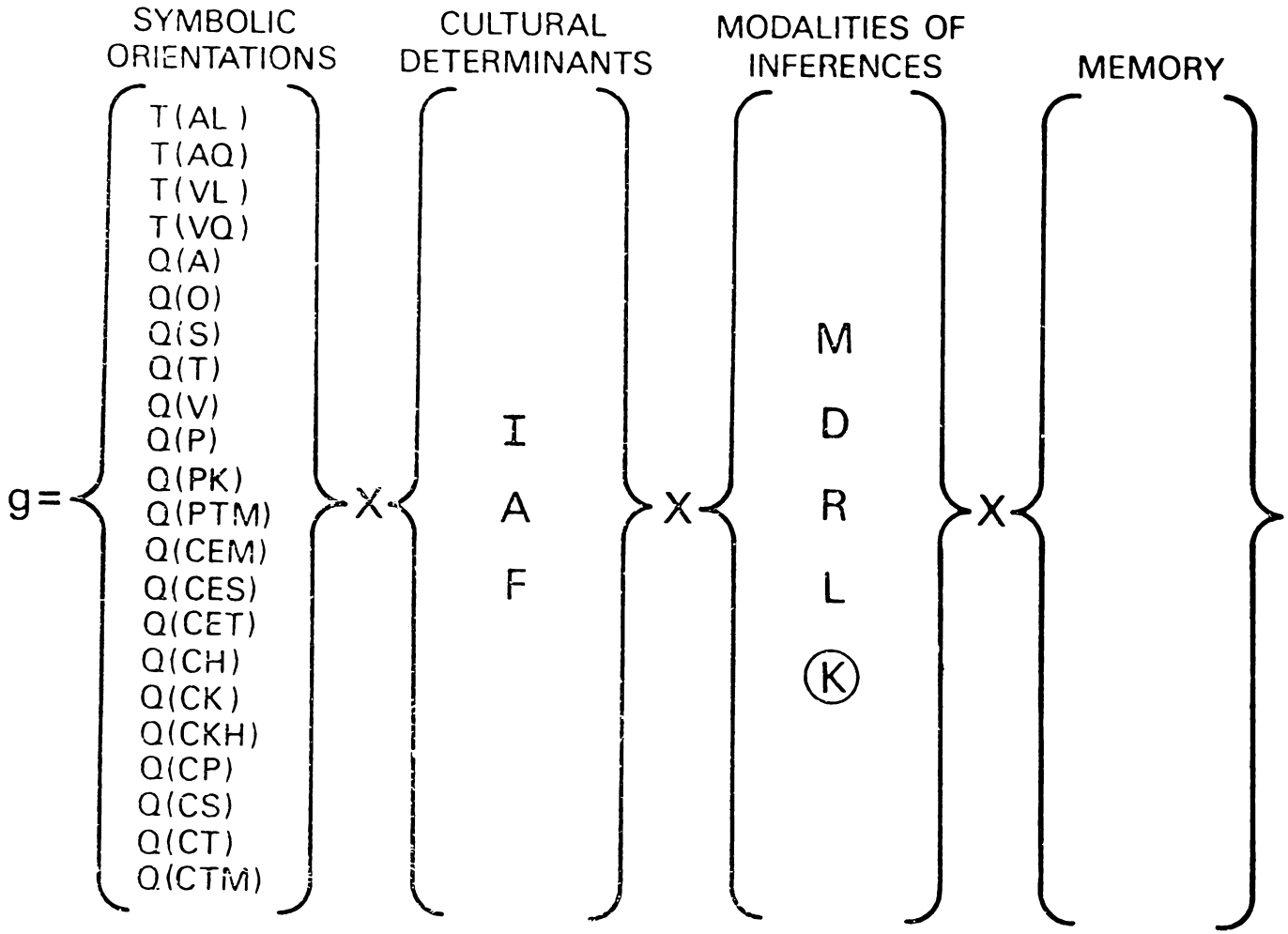

Figure 3.7.--Cognitive Style Map.

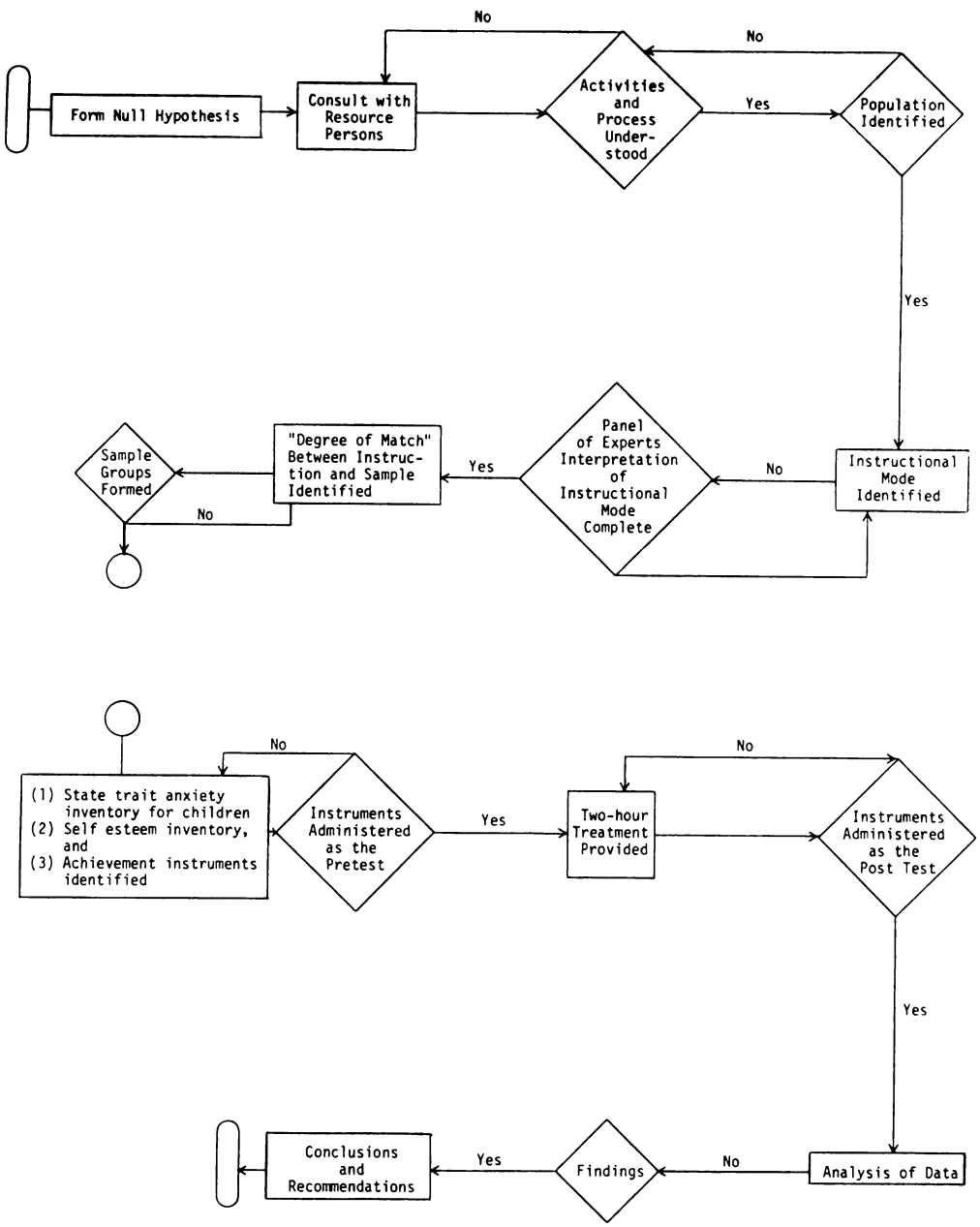

Figure 3.8.--Trait Treatment Process Interaction.

FOOTNOTES: CHAPTER III

[1]D.T. Campbell and J.C. Stanley, Experimental and Quasi-Experimental Designs for Research (Chicago: Rand McNally College Publishing Company, 1963), pp. 47-50.

[2]Joseph E. Hill and August Kerber, Models, Methods and Analytical Procedures in Educational Research (Detroit: Wayne State University Press, 1967), pp. 43-44.

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[5]Joseph E. Hill, "A Suggested Technique for Determining Degree of Match Between 'Styles' and Between 'Styles and Modes of Understanding,'" (Bloomfield Hills, Michigan: Oakland Community College, Manuscript, 1973).

[6]The degree of match for sub-samples Group 1 and Group 2 are displayed in the tables found on pages 68 thru 73 in Chapter IV.

CHAPTER IV

ANALYSIS OF DATA AND FINDINGS

This chapter includes a restatement of the five null hypotheses governing this study. An analysis of the data and a summary of the findings are included. Also, an overview of data collected and related statistical results are presented in tabloid form. In addition, a discussion of each hypothesis is included.

The operational hypotheses tested in this study were the following:

Operational Hypothesis 1: With the A-State Anxiety pre-test measure as the covariate, there is no statistical significant difference between the mean on A-State anxiety post test measure (1) for student's with cognitive styles matched and (2) for student's with cognitive styles non-matched to the cognitive style of the instructional mode.

Operational Hypothesis 2: With the self esteem pre-test measure as the covariate, there is no statistical significant difference between the mean on self esteem post test measure (1) for student's with cognitive styles matched and (2) for student's with cognitive styles non-matched to the cognitive style of the instructional mode.

Operational Hypothesis 3: With the achievement pre-test measure as the covariate, there is no statistical significant difference between the mean on Instructional Sets I and II achievement post test measure (1) for a sub-sample of student's with cognitive styles matched and (2) for a sub-sample of student's with

cognitive styles non-matched to the cognitive style of the instructional mode.

Operational Hypothesis 4: There is no statistical significant correlation between the pre-test scores on A-State anxiety and self esteem (1) for student's with cognitive styles matched and (2) for student's with cognitive styles non-matched to the cognitive style of the instructional mode.

Operational Hypothesis 5: There is no statistical significant correlation between the post test scores on A-State anxiety and self esteem (1) for student's with cognitive styles matched and (2) for student's with cognitive styles non-matched to the cognitive style of the instructional mode.

Findings of the Study

This study was designed to find out whether the matching of a student's cognitive style with the cognitive style of the instructional mode had a significant effect on the level of A-State anxiety, level of self esteem and level of achievement. Within the design, student's were assigned to one of two groups; namely, matched (hereinafter group 1) and non-matched (hereinafter group 2). The assignment of students to groups was based on a measure of the degree of match between the student's cognitive style map, which is determined by scores received by students on a Cognitive Style Interest Inventory, and the cognitive style of the instructional mode which is determined by a panel of experts. The cognitive style matching process is described in Chapter III.

The results of the data collected are presented in Tables 4.1 thru 4.6. In Table 4.1, page 68, the degree of match, pre- and post A-State anxiety scores and the change in A-State anxiety for

Table 4.1--Degree of Match, Pre- and Post Test Scores and Change in Anxiety for Matched Group (Group 1).

Student	Degree of Match	Pre-Test Scores	Post Test Scores	Change in Anxiety
1	100	30	20	-10
2	96	24	20	- 4
3	95	29	31	+ 2
4	95	33	31	- 2
5	95	31	31	0
6	92	29	28	- 1
7	86	31	29	- 2
8	85	33	27	- 6
9	84	35	30	- 5
10	83	37	32	- 5
11	83	31	26	- 5
12	82	28	31	+ 3
13	82	30	30	0
14	82	29	29	0
15	81	36	29	- 7
16	80	30	34	+ 4
17	80	34	36	+ 2
18	80	41	30	-11
19	79	36	42	+ 6
20	78	44	39	- 5
21	72	31	25	- 5
22	72	30	30	0
23	71	27	22	- 5
24	71	20	20	0
25	70	34	22	-12
26	69	30	34	+ 4
27	69	33	23	-10
28	69	40	39	- 1

group 1 are presented. In Table 4.2, page 69, the same data is presented for group 2. In addition, Tables 4.3, page 70, and 4.4, page 71, lists the degree of match, pre- and post self esteem scores and change in self esteem for groups 1 and 2, respectively. Similarly, Tables 4.5, page 72, and 4.6, page 73, presents the degree of match, pre- and post achievement scores and gain scores for a sub-sample

Table 4.2--Degree of Match, Pre- and Post Test Scores and Change in Anxiety for Non-Matched Group (Group 2).

Student	Degree of Match	Pre-Test Scores	Post Test Scores	Change in Anxiety
1	68	29	31	+ 2
2	68	22	21	- 1
3	68	30	30	0
4	68	31	31	0
5	68	30	30	0
6	68	33	41	+ 8
7	67	41	30	-11
8	67	41	30	-11
9	66	29	30	+ 1
10	66	29	30	+ 1
11	65	27	23	- 4
12	65	35	34	- 1
13	64	29	29	0
14	63	33	27	- 6
15	61	21	23	+ 2
16	60	23	24	+ 1
17	58	29	29	0
18	56	31	30	- 1
19	56	31	37	+ 6
20	56	30	30	0
21	56	31	37	+ 6
22	56	35	30	- 5
23	54	31	26	- 5
24	53	30	30	0
25	48	30	40	+10

of group 1 and 2 participating in Instructional Set I and II, respectively.

The analysis of covariance statistical technique was used to test for H_{01} for no significant difference between group 1 and group 2 means on a post test A-State anxiety measure with the A-State pre-test measure used as the covariate.

Null Hypothesis: H_0: $\mu_{x1} = \mu_{x2}$ with the pre-test measure on A-State anxiety as a covariate.

Table 4.3--Degree of Match, Pre- and Post Test Scores and Change in Self Esteem for Group 1.

Student	Degree of Match	Pre-Test Scores	Post Test Scores	Change in Self Esteem
1	100	49	51	+ 2
2	96	67	73	+ 6
3	95	55	55	0
4	95	53	67	+14
5	95	65	67	+ 2
6	92	65	71	+ 6
7	86	65	65	0
8	85	53	53	0
9	84	65	71	+ 6
10	83	45	43	- 2
11	83	45	51	+ 6
12	82	65	61	- 4
13	82	63	61	- 2
14	82	41	49	+ 8
15	81	67	71	+ 4
16	80	57	53	- 4
17	80	65	69	+ 4
18	80	63	63	0
19	79	59	57	- 2
20	78	45	45	0
21	72	69	69	0
22	72	73	71	- 2
23	71	69	69	0
24	71	57	57	0
25	70	71	71	0
26	69	55	57	+ 2
27	69	57	59	+ 2
28	69	40	30	-10

For this between group test of no significant difference between means, the means and standard deviations for group 1 and group 2 A-State anxiety were calculated and are displayed in Table 4.7, page 74. The covariate F, main effect F value, mean square value and the probability criteria (significance of F) were calculated and are presented in Table 4.8, page 74. The F values were determined by dividing the mean square value by the residual value.

Table 4.4--Degree of Match, Pre- and Post Test Scores and Change in Self Esteem for Group 2.

Student	Degree of Match	Pre-Test Scores	Post Test Scores	Change in Self Esteem
1	68	69	67	- 2
2	68	67	63	- 4
3	68	59	63	+ 4
4	68	55	57	+ 2
5	68	57	53	- 4
6	68	43	45	+ 2
7	67	69	71	+ 2
8	67	53	63	+10
9	66	41	49	+ 8
10	66	41	49	+ 8
11	65	59	61	+ 2
12	65	57	63	+ 6
13	64	70	73	+ 3
14	63	61	67	+ 6
15	61	53	59	+ 6
16	60	55	57	+ 2
17	58	69	69	0
18	56	75	75	0
19	56	49	43	- 6
20	56	61	69	+ 8
21	56	73	75	+ 2
22	56	63	71	+ 8
23	54	55	61	+ 6
24	53	67	71	+ 4
25	48	57	59	+ 2

Table 4.5--Degree of Match, Pre- and Post Test Scores and Change in Achievement for Group 1 and Group 2 Involved in Instructional Set I.

Student	Degree of Match	Pre-Test Scores	Post Test Scores	Change in Achievement
		Group 1		
1	100	17	100	+83
2	95	42	83	+41
3	95	25	92	+67
4	95	8	33	+25
5	92	42	100	+58
6	86	17	83	+66
7	84	25	92	+67
8	83	25	92	+67
9	82	17	100	+83
10	72	0	83	+83
11	69	17	100	+83
		Group 2		
12	68	17	92	+75
13	67	17	92	+75
14	63	42	100	+58
15	58	58	92	+34
16	56	8	42	+34
17	56	33	75	+42

Table 4.6--Degree of Match, Pre- and Post Test, and Change in Achievement for Group 1 and For Group 2 Involved in Instructional Set II.

Student	Degree of Match	Pre-Test Scores	Post Test Scores	Change in Achievement
		Group 1		
1	96	50	100	+50
2	85	40	100	+60
3	82	20	100	+80
4	81	10	80	+70
5	80	40	100	+60
6	72	30	90	+60
7	71	30	80	+50
8	69	0	40	+40
		Group 2		
9	68	50	100	+50
10	65	30	90	+60
11	64	50	90	+50
12	56	10	80	+70
13	54	0	100	+100

Table 4.7--The Means and Standard Deviation Pre- and Post Test Measure of A-State Anxiety for Groups 1 and 2.

Source of Data	N	X	SD
Group 1			
Pre-test	28	32.0	4.98
Post test	28	29.29	5.78
Group 2			
Pre-test	25	30.64	4.78
Post test	25	30.12	5.27

With an F value of 15.405, the test for significant difference between means on post test A-State anxiety measures shows a significant difference between group 1 and group 2 on pre-test A-State anxiety measures. However, when pre-test A-State anxiety is the covariate, and when the F value is 1.408, there is no significant difference between the post test means of the two groups. Therefore, H_{01} failed to reject.

Table 4.8--Degrees of Freedom, Mean Square, F Value and Significance of F for the Analysis of Covariance on A-State Anxiety.

Source of Data	Degrees of Freedom	Mean Square	F Value	Significance of F
Covariate (Pre-anxiety)	1	363.729	15.405	0.001
Main Effect (Gp. 1 - Gp. 2)	1	33.270	1.409	0.239
Residual		23.611		

$\alpha = 0.05$

The analysis of covariance statistical technique was also used to test H_{02} for no significant difference between group 1 and group 2 means on a post test self esteem measure with the pre-test measure employed as a covariate.

Null Hypothesis: H_0: $\mu_{y1} = \mu_{y2}$ with the pre-test measure on self esteem as a covariate.

For this between group test of no significant difference between post test means, the means and standard deviations for groups 1 and 2 self esteem were calculated and are displayed in Figure 4.1.

Source of Data	N	X	SD
Group 1			
Pre-test	28	58.68	9.43
Post test	28	59.97	10.54
Group 2			
Pre-test	25	59.44	8.97
Post test	25	62.44	8.77

Figure 4.1--The Means and Standard Deviation Pre- and Post Test Measure of Self Esteem for Groups 1 and 2.

The Covariate F value, main effect F value and the probability criteria (significance of F) related to H_{02} were calculated and are presented in Table 4.9, page 76. With an F value of 205.024, the test for significant difference between means on post test self esteem measures shows a significant difference between group 1 and group 2 on pre-test self esteem measures. However, when pre-test self esteem is used as the covariate, and when the F value is 2.120, there is no

Table 4.9--Degrees of Freedom, Mean Square, F Value and Significance of F for the Analysis of Covariance on Self Esteem.

Source of Data	Degrees of Freedom	Mean Square	F Value	Significance of F
Covariate (Pre-Self Esteem)	1	3926.013	205.024	0.001
Main Effect (Gp. 1 - Gp. 2)	1	40.597	2.120	0.148
Residual		19.149		

$\alpha = 0.05$

significant difference between the means of the two groups. Therefore, H_{02} failed to reject.

Null Hypothesis: H_0: $\mu_{z1} = \mu_{z2}$ with pre-test measure on achievement as a covariate (a composite hypothesis).

The analysis of covariance was also used to test H_{03} for no significant difference between group 1 and group 2 means, on Instructional Sets I and II post test achievement measures, with the pre-test measure used as the covariate. For this within group test, the covariate F value, main effect F value and the significance of F related to Instructional Set I were calculated and are presented in Table 4.10, page 77. When the F value is 2.889, the test for significant difference between Instructional Set I means at $\alpha = 0.05$ indicates no significant difference between the groups on pre-test achievement scores. When the pre-test is used as a covariate, and when the F value is 1.095, there is no significant difference on post test achievement scores. Therefore, the null hypothesis failed to reject.

Table 4.10--Instructional Set I Degrees of Freedom, F Values and Significance of F for Post Test Achievement for a Group 1 and Group 2 Sub-Sample Analysis of Covariance.

Source of Data	Degrees of Freedom	Mean Square	F Value	Significance of F
Covariate (Pre-Achievement)	1	14.059	2.889	0.111
Main Effect (Gp. 1 - Gp. 2)	1	5.328	1.095	0.313
Residual		4.867		

$\alpha = 0.05$

For the within group test related to student performance associated with Instructional Set II, the covariate F value, main effect F value and the significance of F were calculated and are presented in Table 4.11, page 78. The results of a test for significant difference between means at $\alpha = 0.05$ indicates no significant difference between the two groups on pre-test achievement scores. The F value was 4.693. With the pre-test used as the covariate, and with the F value of 0.417, there is no significant difference between post test achievement means. Therefore, the null hypothesis failed to reject.

Correlation Data on Specific Variables

As a measure of the relationship between variables, two statistical correlation tests on H_{04}, one for group 1 and the other for group 2, were conducted on pre-test measures. Similarly, two

Table 4.11--Instructional Set II Degrees of Freedom, F Values and Significance of F for Post Test Achievement for Analysis of Covariance Group 1 and 2 Sub-Sample.

Source of Data	Degrees of Freedom	Mean Square	F Value	Significance of F
Covariate (Pre-Achievement)	1	10.465	4.693	0.056
Main Effect (Gp. 1 - Gp. 2)	1	0.929	0.417	0.533
Residual		2.230		

$\alpha = 0.05$

statistical correlation tests on H_{05}, one for group 1 and the other for group 2, were conducted on post test measures.

A Pearson Product Moment Correlation statistical technique was used to test for no significant relationship between A-State anxiety and self esteem pre-test measures for group 1 under H_{04}. The same statistical technique was also used to test H_{04} for no significant relationship between A-State anxiety and self esteem pre-test measures for group 2.

Null Hypothesis: H_0: $\rho_{xy} = 0$ for (1) matched and (2) non-matched groups using pre-test scores (a composite hypothesis).

The results of the correlation as defined in a two tail statistical test r at $\alpha = 0.05$ is presented in Table 4.12, page 79. The correlation of the two variables associated with group 1 was significant with an r value of -0.3364. The H_{04} related to group 1 was rejected. The result is that there exists a weak to moderate[1] inverse relationship which is significant at $\alpha = 0.05$. Revealed

Table 4.12--Correlation Between Pre- and Post Test Scores for Groups 1 and 2 on A-State Anxiety and Self Esteem.

Source of Data	N	r	Significance of r
Group 1			
a. Pre-test: anxiety and self esteem	28	-0.3364	0.040
b. Post test: anxiety and self esteem	28	-0.3647	0.028
Group 2			
a. Pre-test: anxiety and self esteem	25	+0.0674	0.374
b. Post test: anxiety and self esteem	25	-0.1601	0.222

$\alpha = 0.05$

in the results is that there is some tendency among group 1 that the higher the pre-self esteem the lower the pre-anxiety.

The correlation between the two variables under H_{04} associated with group 2 was not significant with an r value of 0.0674. The H_{04} stating that there was no significant relationship between A-State anxiety and self esteem on pre-test measures for group 2 failed to reject. These results indicate there is virtually no relationship between pre-self esteem and pre- A-State anxiety for group 2 students and the correlation is not significant at $\alpha = 0.05$.

The Pearson Product Moment Correlation statistical technique was also used to test for no significant relationship between A-State anxiety and self esteem post test measures for group 1 under H_{05} for no significant relationship between A-State anxiety and self esteem measures for group 2.

Null Hypothesis: H_0: $\rho_{xy} = 0$ for (1) matched and (2) non-matched groups using post test scores (a composite hypothesis).

The results of the correlation as defined in a two tail statistical test r at $\alpha = 0.05$ is presented in Table 4.12, page 79. The correlation of the two variables related to group 1 was significant with an r value of -0.3647. The results of the test is that there exists a weak to moderate inverse relationship which is significant at the $\alpha = 0.05$. The results is explained as some tendency among group 1 students that the higher the post test self esteem the lower the post test anxiety when the two variables are correlated.

The correlation between the two variables when considering group 2 under H_{05} was not significant at $\alpha = 0.05$. However, the H_{05} stating that there was no significant relationship between A-State anxiety and self esteem on post test measures for group 2 failed to reject.

Summary

The findings resulting from the analysis of data indicated that when using the Analysis of Covariance statistical technique, H_{01}, H_{02} and H_{03} failed to reject at $\alpha = 0.05$. Utilizing the Pearson Product Moment Correlation statistical technique, the analysis of data did indicate a significance in the relationship between A-State anxiety and self esteem on group 1 pre-test scores and post test scores, whereby, H_{04} and H_{05} were rejected at $\alpha = 0.05$. However, when group 2 pre-test scores and post test scores were considered, H_{04} and H_{05} failed to reject at $\alpha = 0.05$. Discussion and implications of these findings are considered in the following chapter.

FOOTNOTES: CHAPTER IV

[1]John W. Best, Research in Education (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1970), p. 247.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to examine (1) the effects of cognitive style matching of students with instruction on A-State anxiety levels, self esteem levels, and achievement levels and (2) the relationship between A-State anxiety and self esteem.

Overview

The subjects were Leon County School District gifted sixty, seventh and eighth grade students. The sample was those students who completed data gathering instruments on specific variables. The degree of match was calculated and subjects were assigned to one of two groups; namely, Group 1 (matched) and Group 2 (non-matched). Fifty three subjects participated in the investigation (see Appendix B--Gifted Program Description and Criteria for Eligibility).

Conclusions

In this section, the conclusions are listed serially and are presented in two parts. The first part is devoted to conclusions which address the results of the Analysis of Covariance statistical technique employed in this study. In part two the conclusions are concerned with the result of data analysis using the Correlation Coefficient statistical technique.

Given, then, the analysis of data on the effects of cognitive matching on A-State anxiety, self esteem and achievement, the conclusions in the first part are as follows:

1. No significant difference was found between the post test means of the matched and non-matched groups on A-State anxiety.
2. No significant difference was found between the post test means of the matched and non-matched groups on self esteem.
3. No significant difference was found between the post test means of the matched and non-matched groups on Instructional Set I and II achievement measures.

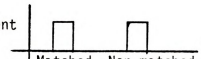
Given, the analysis of data on the relationship between A-State anxiety and self esteem the conclusions in the second part are listed below.

4. A significant inverse relationship was found for the matched group between pre- A-State anxiety and pre-self esteem. No significant relationship was found between the pre-test measures of the two variables for the non-matched group.
5. A significant inverse relationship for the matched group was found between post A-State anxiety and post self esteem. No significant relationship was found between post test measures of the two variables for the non-matched group.

Discussion

In this study, no significant difference on post test measures was found as revealed in conclusions 1 through 3. These conclusions are presented in the composite display which follows.

A-State Anxiety/Self Esteem/Achievement



There could be several reasons for these results. The first reason is, that, the technique used to test the statistic (difference between means) could have contributed to the results. The Analysis of Covariance statistical technique used pre-test measures as the covariate. The analysis of data associated with conclusions 1 and 2 showed that the difference between group means on the pre-test measure were significant at $\alpha = .001$.

The interpretation of the results is that the sample groups started at different levels. However, when the covariate is taken into account and/or when consideration is given to the fact that the groups started at different levels, no significant difference was found between means on post test measures. This fact justifies the rationale for using the Analysis of Covariance technique to test the statistic. Accounting for the initial differences between means of the two groups through the use of the Analysis of Covariance technique is important, because if this activity were not included in the study the possibility exists that the results could have been different.

A reason for no significant difference found in the results which relate to conclusion 3 may be explained in the population

characteristics from which the sample was drawn. The figted child population is viewed as a homogeneous group of high achievers (see Appendix--Criteria for Eligibility). The total sample demonstrated high levels of achievement when measured against a standard of excellence' this fact may tend to support the construct that because the population is a high ability group, a high percentage will demonstrate high achievement levels. Given, high achievement by this population, then, a major goal should be to assist these learners to reach their full potential.

Another reason for no significant difference associated with the first three conclusions is related to the fact that a sample of the population was used rather than the total population. In this study, the "purposive" sampling technique was employed. The use of this technique is based on the assumption that if the sample is representative with respect to known population characteristics, it will also be representative with respect to unknown characteristics. The difficulty which arises when this assumption is made is that indivudals who are providing the data usually include only those persons within each category who are most readily available.

A larger N might have produced different results. Participation in the educational delivery system which accompanies the gifted child program is voluntary. This fact justified the use of the purposive sampling technique and also accounts for the small N investigated in this study. Student participation in the educational delivery system is not mandated by the school district, therefore this intervening variable was uncontrolled.

The inability of this investigator to control student participation resulted in a statistical test between sample group means and correlations. If the total population would have been investigated, then, the true mean and correlations could have been determined, and the possibility exists that different results could have been revealed.

There are a set of reasons which relate to the degree of match construct employed in this study which may account for the results. These reasons which will be discussed in order are: (1) the method employed to calculate the degree of match and (2) the percentile range of the degree of match recorded for the total sample.

First, there are two alternate combinations for calculating the degree of match. The first is to match the cognitive style of the learners to the cognitive style of the instructor. The second is to match the cognitive style of the learner to the cognitive style of the instructional mode. In this study, the latter combination was employed, because its relationship to the purpose for the investigation.

In the first combination an investigator can use percentile ranges to refine calculations of degree of match. In the second combination, a panel of experts is employed to interpret the cognitive style of the instructional mode, and percentile ranges related to cognitive style characteristics are not utilized. It appears, then, if the size of the panel of experts were increased and the interpretations were different due to refinement of the referent

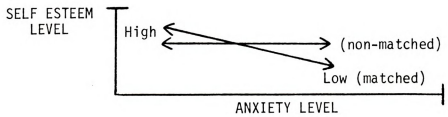
(cognitive style of the instructional mode), then, the calculations of the degree of match could have been different.

The second reason associated with the degree of match is that the percentile range for the total sample from 48 percent to 100 percent is a "major" orientation. The subjects with the highest degree of match (matched group) had a percentile range from 69 percent to 100 percent. Subjects with the lowest degree of match (non-matched) group had a percentile range from the 48th percentile to below the 69th percentile. The findings of no significant difference between means tends to support Hill's principle that subjects at the 50th to 99th percentiles with educational levels for a set of cognitive style characteristics is a "major" orientation. There was one subject with a perfect degree of match of 100 percent and one subject at the 48th percentile. The analysis of data supports the conclusion that there is no significant difference between subjects with a degree of match that is a major orientation. An unknown factor related to the present discussion and related to earlier discussion on control is that individuals in the population who were not in the sample could have been those students who had a "minor" or "negligible" orientation. If this factor was true, the study could have yielded statistical results which were significantly different.

Another reason for the results in this study is the two hour time frame of the treatment between the pre-test and the post test. The time frame for the treatment is viewed as a short time frame. Its selection for use was due to a consideration governing the conduct of this study to minimize the effect of intervening variables

affecting a change in the emotionalities of anxiety and self esteem scores. The scores on A-State anxiety, self esteem and achievement, associated with conclusions 1, 2, and 3, respectively, were pre-post measures taken in relationship to an instructional session. However, other intervening variables may have been maximized by suing the short time frame. A variable which could have affected the results is interference due to recall of item responses in a test-retest situation. A longer period between pre-test and post test, e.g. an academic quarter, semester, might have yielded significantly different results.

In this study, a weak to moderate significant relationship was found for the matched group and no significant relationship was found for the non-matched group for pre-test measures and also for the post test measures between self esteem and anxiety. These findings relate to conclusions 4 and 5. The interaction which exists is revealed in the linear distribution represented below; in other words, given, a high self esteem level, there is a low anxiety level.



The findings associated with the matched group revealed that a significant relationship was found when pre-test and post test

measures were investigated. The strength of the relationship falls within the category classified by Best as a "weak to moderate" inverse relationship.

The pre-test measure associated with the non-matched group revealed a low positive correlation between the two variables. However, the post test measure showed a calculated r value which fall within the category classified by Best as a "very weak" inverse relationship which is not significant.

The statistical significance associated with the matched group and the lack of significance associated with the non-matched group tends to support the use of cognitive style matching as an appropriate instructional strategy.

Implications and Recommendations

The following suggestions for future research are based on the findings of this study and the insights gained during the investigation.

1. This study used a sample which yields an estimate of the statistic to be analyzed. Future studies should look at the population statistic which would yield true values of the statistic.

2. Replication should include a larger N. The increased N would increase the sample size and group size and would yield more precise statistical results. A strategy to be employed to increase the size of N may be to consider students in all grade levels.

3. In this study the relationship between anxiety and self esteem were measured. Future studies should measure the relationship between achievement and the two emotionalities measured in this study.

4. This study used the degree of match between the subject and the instructional mode. Replication should also consider the degree of match of the instructor, because percentile ranges relating to cognitive style characteristics could also be employed.

In conclusion, previous investigations utilizing cognitive style matching has concentrated on cognitive style as it relates to achievement. However, achievement is one dimension of concern for growth in students by educators. Another concern that should receive "equal treatment" is concern for the emotional health of the learner. It appears to this investigator that when a student receives content in the manner that he derives meaning it becomes a form of pleasure. Further, to consider one dimension and not the other is a consistent error made throughout the educational enterprise and made at all levels.

APPENDICES

APPENDIX A

STATE-TRAIT ANXIETY INVENTORY:

RELIABILITY AND VALIDITY

Reliability

Test-retest reliability (stability) coefficients for the STAIC are presented in Table 1 for 246 elementary school children after a six week time interval. Since a valid measure of A-State should reflect the influence of unique situational factors existing at the time of testing, low test-retest correlation for the STAIC A-State scale were anticipated.

Table 1.--Test-Retest Reliability Coefficients for Fourth, Fifth and Sixth Grade School Children Over a Six-Week Interval.[1]

	N	A-Trait	A-State
Males	132	.65	.31
Females	114	.71	.47

Given the transitory nature of anxiety states, measures of internal consistency such as the alpha coefficient would seem to provide a more meaningful index of reliability than test-retest correlations. The alpha reliability of the STAIC A-State scale, computed by Kuder-Richardson formula 20 as modified by Cronback (1950),[2] was .82 for males and .87 for females.

Further evidence of the internal consistency of the STAIC scales is provided by item reminder correlations, which are presented

[1] Spielberger, op. cit., p. 6, 1973.

[2] L.J. Cronback, "Coefficient Alpha and the Internal Structure of Tests," Psychometrika, 1951, 16: 297-335.

in Table 2. The internal consistency of the STAIC scales is reasonably good. The test-retest correlations for the STAIC A-State scale are quite low, as would be expected for a measure designed to be sensitive to the influence of situational factors.

Validity

Evidence bearing on the construct validity of the A-State scale is available for a sample of more than 900 fourth, fifth and sixth grade students. The mean scores in the NORM and TEST conditions for each indivudal A-State item are reported in Table 3. Critical ratios (CR) for the differences between these means, and point-biserial correlations for scores on each item with the two experimental conditions are also reported in Table 3.

Table 4 presents correlations between the STAIC A-State and A-Trait scales with the California Test of Mental Maturity and the California Achievement Test for groups of 80 to 140 fourth, fifth and sixth grade elementary school children. Most of the correlations are negative as might be expected with these measures of aptitude and achievement.

Table 2.--Item Remainder Correlation Coefficients for Individual STAIC A-State and A-Trait Items.

Item	A-STATE		A-TRAIT	
	Males	Females	Males	Females
1	.41	.41	.35	.34
2	.33	.55	.34	.42
3	.45	.44	.35	.37
4	.36	.51	.28	.27
5	.24	.23	.36	.43
6	.35	.33	.44	.44
7	.28	.45	.34	.38
8	.50	.43	.24	.16
9	.42	.55	.40	.46
10	.38	.46	.38	.45
11	.26	.52	.37	.36
12	.43	.54	.41	.49
13	.37	.42	.29	.37
14	.50	.61	.42	.44
15	.55	.56	.33	.42
16	.44	.51	.20	.31
17	.33	.46	.49	.51
18	.26	.43	.24	.27
19	.39	.53	.35	.40
20	.50	.54	.38	.41

Table 3.--Mean Scores on Individual STAIC A-State Items Under Norm and Test Conditions.

	MALES (N=456)				FEMALES (N=457)			
Item	Norm	Test	CR	r(pb)	Norm	Test	CR	r(pb)
1	1.90	2.51	15.97	.44	1.94	2.64	20.14	.51
2	1.14	1.60	12.60	.36	1.18	1.72	15.00	.40
3	1.83	2.43	16.43	.44	1.86	2.46	17.46	.45
4	1.33	2.03	18.06	.47	1.37	2.16	20.32	.53
5	1.31	1.83	13.39	.39	1.30	1.94	16.85	.46
6	1.99	2.41	10.04	.29	2.05	2.55	13.56	.37
7	1.15	1.76	16.02	.45	1.17	1.94	20.98	.55
8	1.99	2.51	13.34	.37	2.00	2.66	18.27	.49
9	1.23	1.96	17.97	.50	1.26	2.06	20.91	.54
10	1.97	2.43	11.74	.34	1.93	2.55	16.29	.45
11	1.13	1.60	13.56	.38	1.13	1.77	18.25	.48
12	1.82	2.47	17.37	.45	1.77	2.52	19.98	.50
13	1.89	2.52	16.53	.44	2.01	2.65	17.45	.47
14	1.74	2.33	15.34	.40	1.66	2.42	20.88	.51
15	1.22	1.68	12.28	.36	1.22	1.78	15.17	.42
16	1.31	1.71	9.78	.30	1.25	1.75	12.42	.37
17	1.82	2.28	12.98	.34	1.72	2.32	16.86	.43
18	1.16	1.53	10.21	.30	1.15	1.60	12.64	.35
19	1.29	1.75	11.72	.32	1.29	1.83	14.15	.38
20	1.88	2.42	14.36	.37	1.77	2.47	18.17	.47

Table 4.--Correlations of the STAIC A-Trait Scale with Measures of Aptitude and Achievement Among Elementary School Children.

	MALES			FEMALES		
Grades:	4th	5th	6th	4th	5th	6th
California Test of Mental Maturity I.Q. Score	18	-12	-37	-36	-12	-36
California Achievement Test						
Reading	-14	-21	-28	-34	-14	-33
Language	-12	-21	-28	-32	-08	-24
Arithmetic	-10	-17	-24	-34	-13	-32
Composite Score	-13	-17	-29	-37	-13	-31
Study Skills	-13	-16	-32	-33	-09	-30

APPENDIX B

GIFTED CHILD PROGRAM DESCRIPTION AND CRITERIA FOR ELIGIBILITY/ PARTICIPATION

B. CRITERIA FOR ELIGIBILITY

1. The child must meet the following:

   a. Obtain an IQ score of 130 or above on the WISC, WISC-R, or the Stanford Binet. This score can be verbal, performance, or full scale score, or

   b. An IQ score of 130 or above on the Slosson administered by psychologists, psychometrists, or specially trained teachers of the gifted.

2. Must fulfill all of the following:

   a. Recommendation of classroom teacher confirming the student's intellectual functioning as evidenced by preponderance of 5's on a majority of the characteristics and objectives on the screening and referral form.

   b. Social and emotional maturity.

   c. Parent approval.

C. PROVISION FOR SCREENING, REFERRAL, IDENTIFICATION, PLACEMENT AND DISMISSAL

1. Screening

   The following evaluations are done each year in the fall under the supervision of the guidance department:

   a. Kindergarten

      (1) Kindergarten Inventory of Teaching Essentials (KITE), preliminary Edition

   b. Grade 1

      (1) Comprehensive Tests of Basic Skills, Expanded Edition, Form S, Level B

   c. Grade 2

      (1) Comprehensive Tests of Basic Skills, Expanded Edition, Form S, Level C

   d. Grade 3

      (1) Comprehensive Tests of Basic Skills, Level 1, Form Q
      (2) Short Form Test of Academic Aptitude, Level 2

e. Grade 4

(1) Comprehensive Tests of Basic Skills, Level 1, Form R
(2) Short Form Test of Academic Aptitude, Level 2

f. Grade 5

(1) Comprehensive Tests of Basic Skills, Level 2, Form Q
(2) Short Form Test of Academic Aptitude, Level 4

g. Grade 7

(1) Comprehensive Tests of Basic Skills, Level 3, Form Q
(2) Short Form Test of Academic Aptitude, Level 4

h. Grade 8

(1) Florida Statewide Eighth-Grade Tests

2. Referral

Referral may be made to school principals by parents, teachers, guidance counselors, students, school psychologists, and self-referrals.

3. Identification

Any student meeting Criteria 1 and all of 2 will be considered for placement in the gifted program.

4. Placement

a. The placement of an individual in the program for the gifted will be the responsibility of a special staffing committee. The staffing committee will include the referring teacher, the school principal or his representative, and any other school personnel deemed necessary to insure proper placement. The final decision for placement will be made by the Coordinator of Exceptional Child Education.

b. Parents will be notified by letter of the placement decision.

c. Prior to placement, the Coordinator will obtain written permission from the parent or guardian for placement in the Gifted Program on an acceptance form provided by the Exceptional Child Education Department.

5. Dismissal

a. Dismissal may be recommended by the classroom teacher, principal, and resource teacher due to lack of ability to profit from the program. Dismissal must be approved by the placement committee.

b. Dismissal through advancement to a grade level not being served by the Gifted Program.

c. Dismissal by parent request.

D. INSTRUCTIONAL PROGRAM

The Leon District's program for the gifted is growing. In February, 1975, sixty-seven third graders were added to the program, bringing the total number of students to approximately 500. Students in grades three through eight are being served 135 minutes per week of instructional time.

The program is housed in a resource center of four rooms at Bond Elementary, and has a staff of four teachers and a coordinator. This center has unique advantages, as each student is offered a program of highly individualized enrichment to add dimension and depth to learning. The students are offered the opportunity of learning at levels and rates commensurate with ability to achieve. The utilization of home and community resources, along with an unusual variety of activities and materials allows students to study in areas not included in the basic curriculum.

A computer terminal has been acquired for instructional purposes which provides the gifted students with new learning expeirences.

Classes are small and informal, and students are free to move about the room in pursuit of their studies. Participation in two types of activities is required in the resource room. Imperatives are chosen by group interest, and each student is required to choose an imperative. These imperatives include courses in logic, computer science, photography, oceanography. Students individually pursue subjects and activities as electives.

E. FACILITIES

1. Present facilities are four resource rooms located at Bond Elementary School.

2. Facilities for the gifted program are inadequate due to:

a. Lack of floor space for students' individual pursuits.

b. Lack of storage space for materials, supplies, equipment, and students' unfinished projects.

c. There are no black-out curtains for the viewing of audio-visual materials.

d. No quiet area is available for student-teacher conferences, or for consultants working with individual students.

e. The cooling and ventilation system is inadequate for the provision of the optimum learning environment.

F. TRANSPORTATION

The Leon School District provides bus transportation to and from the home school to the resource center. Travel monies are paid to the resource room teachers for the purpose of providing inservice training to sending teachers.

G. PROGRAM PERSONNEL

Four teachers staff the resource center, who are certified at elementary and secondary levels in various subject areas. A full-time coordinator is responsible to the district's program.

H. SUPPORTIVE SERVICES

1. The full range of school support services is available to all students in the gifted program.

2. Community resources have been utilized continuously in the program. Resource persons from FSU, FAMU, Florida Department of Education, Leon County District Schools, and the community at large have provided enrichment in many subject areas.

I. PERSONNEL DEVELOPMENT ACTIVITIES

There were two one-hour inservice workhops for all sending teachers, principals, curriculum assistants, and interested district staff during the 1974-75 school year. Inservice is provided to all schools sending students to the gifted program,and teachers of the gifted spend one day per week in the home schools working with sending teachers. An active parent group is striving to improve the quality of education for bright students.

J. PROGRAM EVALUATION

Certain aspects of the program may be objectively evaluated, while other aspects may only be estimated subjectively. However, some objective evidence can be assembled on which judgments may be based.

1. An increased interest in school is indicated by the statements of pupils, parents and home school teachers, in addition to observations of increased student reading, use of community resources and home activities stimulated by school experiences.

2. Improved classroom procedures are evidenced by ratings and checklists which record pupil participation in discussion, improvement in research skills, and ability to follow through on individual projects.

3. There is improved personal and social adjustment within the resource room and home school, which is evidenced by checklists, pupil interviews, and parent and teacher observation.

4. An evaluation of the instructional system will be conducted by an evaluator as proposed in the Title III Gifted Project Grant.

APPENDIX C

.AUTHORIZATION TO CONDUCT RESEARCH

.INSTRUCTIONAL PROGRAM DESCRIPTION

INST. 62

SCHOOL BOARD of Leon County

NED B. LOVELL
SUPERINTENDENT

P. O. BOX 2825 2757 WEST PENSACOLA ST. TALLAHASSEE, FL. 32304

BOARD MEMBERS

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BROWARD P. DAVIS, Vice Chairman
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PETER W. EVERETT
O. D. ROBERTS
C. GRAHAM CAROTHERS,
School Board Attorney

May 11, 1976

Mr. Adelbert Jones
Rt. 13 Box 210-C
Tallahassee, Florida 32304

Dear Mr. Jones:

The Leon County Research Advisory Board has approved your request for research. We are looking forward to reviewing your results. Your input may benefit our educational programs and will be made available to interested persons within our educational system.

Contact the principal of the schools in which you wish to conduct your study as soon as possible. The principal is responsible for making the decision relative to his or her school. I suggest that you make an appointment to meet with the appropriate principals about your research proposal. When you meet with each principal, show them this letter.

It is your responsibility to return the enclosed "Principal's Consent for Research Participation", signed by the principals of those schools to be involved, prior to the start of any research. Send this form to the Chairman of the Research Advisory Board. Receipt of this consent form by this office will complete the approval process.

In the interest of continued research benefits and the coordination of research interests, send this office one (1) copy of your results and discussion. This information, and any other relevant information you may think to include, will be filed in our research library and added to our annotated listing of research projects. The research library is open to any persons interested in school based research. We encourage your contributions.

To facilitate records control each research request is assigned a number. The number for your project appears at the top right of this page. When you contact the principals of those schools where you would like to conduct research, please inform them of your assigned number.

We need input as you plan future research activities. I am available for consultation concerning identified areas of research needs within the school system. We appreciate your research interests and encourage consultation in planning for research that may be compatible with our school system's needs. Most important, we look forward to your results and any suggestions they may offer toward improving the educational process.

Please feel free to call if we may be of further assistance. I can be reached at 487-2870.

Sincerely,

William D. Piotrowski

William D. Piotrowski, Chairman
Research Advisory Board

WDP/la

REQUEST FOR RESEARCH

DATE: January 7 1976

PRINCIPLE INVESTIGATOR: Adelbert Jones

ADDRESS: Route 13, Box 210C

Tallahassee, Florida 32304

TELEPHONE #: 222-8030, Ext. 221

UNIVERSITY or DEPARTMENT/AREA SPONSOR (include sponsor's name) or

Affiliation: Florida A. & M University

ADDRESS: College of Education

Tallahassee, Florida 32307

c/o Adelbert Jones

TELEPHONE #: 222-8030, Ext. 221

STUDY DESCRIPTION: Analysis of the modification of anxiety levels and self-esteem levels and their relationships

TITLE OF STUDY: Analysis of the modification of anxiety levels and self-esteem levels and their relationships via cognitive style matching.

SHORT TOPIC OF STUDY (5 words or less): Assessment of instructional 'side effects'.

STATEMENT OF PROBLEM ADDRESSED OR HYPOTHESIS: Need exists for educators to use individual differences to promote efficiency and effectiveness in the learning process.

STUDY DESIGN:

BRIEFLY DESCRIBE INTERVENTION: (Independent variables), if any:

An investigation of the cognitive style mapping-matching process - the independent variable as a strategy for modifying the self-esteem levels and anxiety levels of 'gifted learners'.

BRIEFLY DESCRIBE MEASURES (Dependent variables) & INSTRUMENTS TO BE USED: (Include copies of instruments):

1. Measure I: Reduction of "anxiety levels" using the State-Trait Anxiety
2. Inventory for Children (STAI-C).
3. Measure II: Gain in "self-esteem" using the Self-Esteem Inventory (SEI).
4.
5.
6.

SUBJECT POPULATION; BRIEFLY DESCRIBE GROUPS TO BE CONTRASTED OR STUDIED; if any:

GROUP(S)	n	GRADE LEVEL(S)	RELEVANT CHARACTERISTICS
1. Gifted students in		6th and/or	Related to the 'College for
2. Leon County		5th	Kids' selection criteria.
3.		4th	
4.			
5.			
6.			
N=			

IF INDIVIDUAL SUBJECT DESIGN, BRIEFLY DESCRIBE:

HOW ARE THE SUBJECTS TO BE SELECTED (randomly, blocked & random, probability sampled, matched, etc.)

The population will include two groups - those students that are matched to the cognitive style of the instructional mode and those that are non-matched.

INSTRUCTIONAL SET I

DEVELOPING A SLIDE ESSAY

PURPOSE

The instructional purpose of the Instructional Set I was: to familiarize the student with the terminology used in media production, to introduce to students the use of audio-visual aids in instruction, and to understand what type of material resources are included in the preparation of a slide essay.

OBJECTIVE

Given a lecture and demonstration by the instructor, the student will identify the terminology and demonstrate the proper use of the equipment and materials required for making a slide essay with 75% accuracy.

INSTRUCTIONAL STRATEGIES

1. Introduce the vocabulary by presenting a chart of terminology by showing examples, models, and diagrams.
2. Demonstrate the equipment and explain its use.
3. Provide the student an opportunity to manipulate and work with the equipment.

INSTRUCTIONAL MATERIALS AND EQUIPMENT

1. Chart of the following terms:

   STORYBOARD PROGRAMMING SUPER

EDITING	SYNC	PROGRAMMER
MULTI-IMAGE	DISSOLVE	MULTI-SCREEN PRESENTATION
UMBILICAL CABLE	GENERATIONS	SET-UP
CUED-UP		

2. Equipment and/or materials
   a. Storyboard
   b. Slide projector
   c. tape recorder
   d. dissolve unit

PRE-POST MEASURE

FOR

INSTRUCTIONAL SET I

DIRECTIONS

Indicate that you understand these audio-visual terms by writing a brief definition of each.

SLIDE ESSAY TERMINOLOGY

1. STORYBOARD
2. SUPER
3. EDITING
4. SYNC
5. PROGRAMMER
6. MULTI-IMAGE
7. MULTI-SCREEN PRESENTATION
8. DISSOLVE
9. UMBILICAL CABLE
10. GENERATIONS
11. SET-UP
12. CUED-UP

INSTRUCTIONAL SET II

Purpose

The instructional purpose of the Instructional Set II was: to create an atmosphere conducive to the free exchange of ideas and inquiry by learning to listen to other individuals' points of view, to understand what meaning is conveyed, and to give other individuals' ideas careful thought. Additionally, the instruction was designed to encourage open-mindedness and to bring biases out in the open where they can be dealt with.

Objectives

Affective Domain

As a result of the lesson, the students will demonstrate:

1. an awareness of the feelings of others;
2. a willingness to defend empathy as a value to be held;
3. an interest in examining a variety of viewpoints on a controversial issue for forming a personal decision on a just resolution; and
4. a willingness to consider a change in attitude towards an opposing viewpoint when faced with new and verified information.

Cognitive Domain

As a result of this lesson, the student will:

1. distinguish between empathy and the following: agreement, ethnocentrism, self-interest, and sympathy; and
2. identify the presence of the concept of empathy in a particular instance of human interaction.

Skills

As a result of participation, students will:

1. cite examples of empathy;
2. apply empathy in a problem situation;
3. recognize value connotations in the meaning of a concept, and
4. examine personal value judgments relative to a concept.

PRE-POST MEASURE

FOR

INSTRUCTIONAL SET II

Instructions

Answer all of the following questions by:

1. forming a circle around the letter next to the correct response, or
2. writing a statement when indicated.

TEST SET II

Pre & Post

1. Understanding the feelings of others defines

   (a) firmness (b) sympathy (c) agreement (d) empathy.

2. An ethnocentric person is empathetic.

   (a) True (b) False

3. When you empathize with someone, do you

   (a) agree with them (c) neither one

   (b) disagree with them (d) either one

4. Laws of our society are expressed in

   (a) sympathy (b) empathy.

5. According to transactional analysis, from which ego state does empathy arise?

   (a) Adult (b) Parent (c) Child

6. According to transactional analysis, from which ego state does sympathy arise?

   (a) Adult (b) Parent (c) Child

Answer the following questions by writing a statement:

7. Define ethnocentrism. _____

   _____

   _____

8. Distinguish between empathy and sympathy.

   Empathy is _____

   _____

   Sympathy is _____

   _____

9. What is the difference between a positive and a negative stroke?

   Positive Stroke is _____

   _____

   Negative Stroke is _____

   _____

10. What is the difference between a conditional stroke and an unconditional stroke?

    Conditional stroke is _____

    _____

    Unconditional stroke is _____

    _____

INSTRUCTIONAL SET II

Answer Key

1. Empathy
2. False
3. Either one
4. Empathy
5. Adult
6. Child
7. Judging another's society by our own values.
8. Sympathy - feeling the same as another person.
   Empathy - understanding the feelings of another.
9. Positive - feels good.
   Negative - doesn't feel good.
10. Conditional - because you have done something.
    Unconditional - because you are you.

INSTRUCTIONAL SET III

Discovery is a commerically prepared interaction simulation unit of instruction which introduces students to some of the realities of exploration and colonization. A brief study of maps, geography, and natural resources leads to the question-why do people explore and establish colonies? The class was divided into groups which represented future colonies, and after examining the reasons for exploration and settlement, each group decided why a colony should be established. Students faced conditions simulating the voyage and the settlement of Early Colonial America. They made numerous individual and groups decisions which ultimately affected the success or failure of their colony. The entire experience included the playing of five rounds of the simulation in each of four class periods. During the class period in which the research associated with this study was conducted, students were engaged in actual gaming identified as Lesson Plan Day 12 and Day 13-21 which reads as follows:

> The students were introduced to the content information in a series of class sessions; conducted prior to the class session in which the collection of the data for this study occured. Therefore a pre-post measure of achievement was not conducted. The instructor's plans were to use a future class session to evaluate and allow students to verbalize the learning that occured.

Day 12

Purpose : begin daily round play and established initial colonies.

Materials: Colony Record Books, all activity cards, Indian Interaction Chart, and Teacher's Map.

Prodecure:

1. For groups still at sea draw two SAILING cards per round until they have landed (following prodcedure 2, Day 11).

2. Once groups have landed, they begin the following schedule of events each round:

   a. A brief meeting of the colony to decide on its strategy for the round. Here the colony decided what jobs need to be done and what defenses are needed for the round.

   b. REVOLT Cards are drawn if any colony wants to change its government.

   c. SAILING cards are drawn for all colonies with ships on the high seas.

   d. Each colony fills out its CHART OF DAILY LABOR and discusses which areas it wishes to defend and attack on its STUDENT MAP. The colony must then write down on its STUDENT MAP how many defenders or attackers it wishes assigned to certain squares.

   e. WEATHER card is drawn, read, and explained - one card applying to all colonies as detailed on the card.

   f. Five minutes for a limited trading session, weather permitting.

   g. OLD WORLD TRADE cards are drawn for trading by any group which landed a ship in the Old World.

   h. OCCUPATION cards are drawn, read, and recorded for occupations permitted by weather (Hunting, Fishing, Ship Building, Attacking, and Farming).

   i. GENERAL WELFARE cards are drawn, one per group.

j. The POPULATION CHART is completed by the recorder of each group and the teacher collects all of the food that was consumed during that round.

Days 13-21

Purpose: to play two rounds of the simulation per day and keep a record of the results.

Materials: Colony Record Book, all activity cards, Indian Interaction Chart, and Teacher Map.

Procedure: Follow the schedule outlined above, playing two rounds per day until twenty rounds have been completed.

Days 22-23

Purpose: evaluation

Materials: General Attitude Survey

Procedure: Time should be spent discusssing questions that have arisen, asking the students to verbalize what they have learned and to analyze their attitude changes.

1. Add up all of the various points that each group has earned during the game and declare a winner. (see number 8 under Genral RULES.)

2. Evaluation of the Map skills and geography

   a. Discuss what they have learned about maps, how to read them, what they are for, and why they are important.

   b. Discuss the importance of basic physical features and natural resources and why they had special importance to colonizes of early North America.

3. Evaluation of colonial life

   a. Give the GENERAL ATTITUDE SURVEY for the second time.

   b. Compare answers with GENERAL ATTITUDE SURVEY taken before the simulation. Discuss why many answers are different.

   c. List and discuss those things that a colonial group must have in order to survive.

   d. What kind of work was most beneficial to your colony and why?

   e. How did the climate and weather affect colonial life?

   f. What were the most serious problems facing colonist? (Limit it to the three most serious.)

   g. List all of the oustside factors that controlled the colonists' lives.

4. Evaluation of the group

a. How was the group selected and how did this affect the simulation?

b. How well did your group work together? Why?

c. What were the most important problems that your group had working together and what did you do to solve them?

5. Evaluation of DISCOVERY

a. Do you believe that the simulation helped you learn anything really significant about life in North America.

b. What features of DISCOVERY did you like. List and discuss.

c. What features of the simulation did you dislike. List and discuss.

d. What would you do to improve DISCOVERY?

e. How would you compare learning in a simulation game with learning from reading a book?

For details of the entire sequence of events involving the total simulation see attached guide sheets (pg.).

INSTRUCTIONAL SET IV

JURIS is a commercially prepared interaction simulation unit which introduces the four sections of contracts, torts, juvenile and criminal law. Each section covers a different legal area of emphasis which is complete in itself and may be taught independently of the others or in combination with other materials from other sources. The Student Handbook contains a history of the common law legal system, a detailed background for each type of law, and a Glossary of Legal Terms common to all types of law. In the Teacher Guide are directions for three teaching strategies and master copies for all student expendable forms, including case studies and questions for each section, for small group instruction, and for individual response assignments.

The teaching strategy developed for use was a participatory classroom approach. In this strategy, the object was for students to learn as much as possible from one another's study of related materials and to assist one another meet instructional requirements. In using this method , the teacher organized the group into the five elements that form an adversary system of justice. The five elements are the plaintiff (or prosecution), the defense, the judge, the jury, and the appellate court. Each subgroup representing one of the five elements used a different frame of reference in evaluating a set of facts and circumstances making up a legal controversy brought to trial. Directions for developing each frame of reference was given as assignments to the subgroups. After members of each subgroup developed its frame of reference all

groups met together and a spokesperson from each group gave a report on the groups view of the controversy. The instructional sequence which included a number of meetings was climaxed by a similated trial. The instructor provided trial procedures for the participants.

The post achievement test given to students was a measure of the knowledge gleaned as a result of participation in the entire sequence of learning activities. Therefore, a pre-test associated with the simulation trial was not administered to the participants.

LESSON ACTIVITIES

Students were given case studien as mock trial materials. The witnesses developed their stories, lawyers developed their case, the judge presided, and the jurors deliberated and made a final decision.

	STUDENT ROLES	OUTCOME
# 004	DEFENSE ATTORNEY	LOST CASE
008	WITNESS	ALSO CRIMINAL
002	PROSECUTING ATTORNEY	WON CASE
024	ASSISTANT DEFENSE ATTORNEY	LOST CASE
005	DEFENSE ATTORNEY	WON CASE
003	JUDGE	---------

POST-TEST RESULTS RELATED TO ACHIEVEMENT

There were eight questions on the content information post-test. Five of the six participants answered all eight questions correctly. The sixth participant answered seven of the eight questions correctly.

POST-TEST QUESTIONS

1. What are "Mala in Se" Crimes?

   1. Answer: Malice aforethought

2. What is the difference between a misdeamenor and a felony?

   2. Answer: Felony is a more serious crime punishible by a year or more in prison.

3. What does Corpus Delecti mean?

   3. Answer: The substantial and fundamental fact necessary to prove the commission of a crime. In the case of murder, the body of the victim must be produced.

4. What does Mala Prohibila mean?

   4. Answer: Crimes that are not evil in themselves but are crimes because the law prohibits certain behavior.

5. What are the rules set up by the Miranda case?

   5. Answer: An arresting officer must advise a defendant of his rights before a statement is taken. These rights are (1) to remain silent, (2) to an attorney, and (3) to ask for an appointed attorney.

6. What is an objection and what is a valid reason to object?

   6. Answer: When a lawyer feels kike a question is not worded correctly or leads a witness to a response he may challenge the question. The term used many times is "badgering the witmess".

7. In your role as Judge, juror, counselor, witness what did you learn?

   7. Answer: varied responses.

8. Write a statement about your feelings of the module.

   8. Answer: Evaluation of the participant question required.

APPENDIX D

.THE EDUCATIONAL SCIENCE OF SYMBOLS AND THEIR MEANING

.THE EDUCATIONAL SCIENCE OF CULTURAL DETERMINANTS
(Determinantics)

THE EDUCATIONAL SCIENCE OF SYMBOLS AND THEIR MEANING (Symbologosics)

The examination of the elements included in the three "sets" in this and the next two chapters has two basic purposes:

1. To enable the teacher to understand the nature of each element thoroughly enough to know its ramifications and scope, and thus be able to identify its presence or absence in a student's "style."

2. To anable the teacher, as a result of such understanding, to relate the element to the persons, processes and properties available to the pupil in the classroom, with a view to selecting a mix appropriate for the cognitive style of the student.

Man is a symboling creature (in fact, the only symboling creature) that searches for knowledge and meaning. He does this by mediating symbols. The root of the word "mediate" is "to be in the middle." Whatever comes to man through his senses is acted upon or mediated before it acquires meaning and, subsequently, generates thought or action.

Man mediates two kinds of symbols:

1. Theoretical symbols--words, numbers and onomatopoeia;

2. Qualtiative symbols--sensory, programmatic and "cultural codes."

Since it is impossible to educate an individual without using both of these symbols, an understanding of the material presented in this chapter is basic to all the other Educational Sciences.

To further define these two kinds of symbols:

1. A theoretical symbol presents to the awareness of the individual something different from that which the symbol itself is. If we see the word "cat," this sighting of print is mediated to a memory or image of some specific "cat" or just a general class of "cat." The printed word "cat" is different from the actual or image of a "cat" which is brought to the awareness by the printed symbol.

2. A qualitative symbol presents, and then represents to the awareness of the individual, that which the symbol itself is to the individual. If we see a cat, we are seeing what that symbol itself is, and we think "cat."

From birth, and for a time thereafter, a child derives his impressions and meanings of the world around him in terms of qualitative symbols. What he touches, hears and sees determine his feelings of safety, satisfaction or irritation. When the child begins to use words, he has initiated the development of his theoretical symbolic capability, an enterprise that he will continue for the remainder of his life.

The Theoretical Symbols

There are four theoretical symbols that we use in the Educational Sciences. They are written words and numbers, plus the sounds of words and numbers.

1. The Theoretical Auditory Linguistic symbol T(AL) is the sound of a word. When we hear words, we form a set of images different from the sounds of the words that are involved. Children that have developed an oral language have some capacity for T(AL).

2. The Theoretical Auditory Quantitative symbol T(AQ) is the sound of a number. If we say two times two is four, the individual is aware of images that are different from the sounds of the numbers heard (2 x 2 = 4).

3. The Theoretical Visual Linguistic symbol T(VL) is the written word. A written word brings to the individual an awareness of an image different from the printed arrangement of letters. The goal of reading instruction is primarily that of making associations between the written word T(VL) and the pupil's speaking vocabulary which has already been established T(AL).

The meanings of linguistic symbols are often quite diverse, as is evidenced by the size of an unabridged dictionary. This stands in opposition to the precise nature of quantitative symbols which have only one connotation.

4. The Theoretical Visual Quantitative symbol is the written number T(VQ). As with the others, it presents an image different from that which itself is. It is important in math education that a student not be allowed to infer that the symbol is actually the concept. Otherwise, an answer to the question: What is half of "11 will be 1."

The teacher of reading and math is, of course, concerned with these four theoreticals. The presence of each in some degree sets the requirement for prescription. A common experience for a teacher is to determine that a child will exhibit a capacity in either the auditory or visual mode, but not in both. In this case, the teacher makes use of the capacity that is present since this represents the student's current mode of acquiring meaning. Concurrently, the teacher should begin to develop those theoreticals that are minor or negligible.

Dependent upon his grade level, a child that has an appropriate oral language would show a T(AL) on his map. The child that cannot read words or numbers would not have a T(VL) or T(VQ) on his map. This, of course, is what most teachers will discover in mapping the average preschooler or kindergartner.

The Qualitative Symbols

Meanings for qualitative symbols are derived from three sources: (1) sensory stimuli; (2) cultural codes (games); and (3) programmatic effects of objects which convey an almost automatic impression of a definite series of images, scenes, events or operations.

1. Sensory Stimuli. The symbols associated with the five senses are evidence of the presence of individualized meanings. None of us derive exactly the same meaning from what we see, hear or smell. However, the teacher needs to know how well the sensory apparatus of the student is functioning because such a flood of stimuli is constantly impacting upon him. How well the student sees and hears, how accurate or distorted his direct impressions of the outside world are, is important to the teacher. When a stimulus is presented to one of the senses, the meaning is derived immediately, since there is no need for interpretation or generalization.

The five sensorily related qualitative symbols are defined and signified as follows:

a. Qualitative Auditory Q(A)--is the ability to perceive meaning through the sense of hearing. This implies the ability to recognize such sounds as music, the clang of a bell, a train whistle, or the ticking of a watch. No mediation is needed for the perception of such stimuli. They present to the sense of hearing what they actually are.

b. Qualitative Olfactory Q(O)--the ability to perceive meaning through the sense of smell. Recognizing the smell of flowers, frying bacon, or perfume would be examples.

c. Qualitative Savory Q(S)--the ability to perceive meaning through the sense of taste, recognizing the tart taste of lemon or the sweet taste of candy.

d. Qualitative Tactile Q(T)--the ability to perceive meaning by the sense of touch, recognizing the smooth feel of silk or the coarse feel of corduroy.

e. Qualitative Visual Q(V)--the ability to perceive meaning by the sense of sight, recognizing the color of the setting sun or a drawing of a floor plan.

2. The qualitative symbols that are programmatic in nature are:

a. Qualitative Proprioceptive Q(P)--ability to synthesize a number of symbolic mediations into a performance demanding monitoring of a complex task (e.g., playing a musical instrument, typewriting); or into an immediate awareness of a possible set of interrelationships between symbolic mediations, i.e., dealing with "signs." While wualitative proprioceptive symbolic intelligence is most readily observable in seemingly automatic motor responses such as reading and playing music, certain types of theoretical mediation also require qualitative proprioceptive codes. For example, the synthesis of a number of symbolic mediations is evident when an individual upon seeing a sign of smoke immediately interprets it as evidence of fire and experiences an interplay of many sensations including smell of smoke, taste of smoke, and sensation of heat. In this instance, a network of previous experiences and related associations produces the theoretical mediation of fire along with the other qualitative aspects.

b. Qualitative Proprioceptive Dextral Q(PD)--a predominance of right-eyed, right-handed and right-footed tendencies (a typically right-handed person) while synthesizing a number of symbolic mediations into a performance demanding monitoring of a complex task (e.g., playing a musical instrument, typewriting).

c. Qualitative Proprioceptive Kinematics Q(PK)--ability to synthesize a number of symbolic mediations into a performance demanding the monitoring of a complex physical activity involving motion.

d. Qualitative Proprioceptive Sinistral Q(PS)--a predominance of left-eyed, left-handed and left-footed tendencies (a typically left-handed person) while synthesizing a number of symbolic mediations into a performance demanding monitoring of a complex task (e.g., playing a musical instrument, typewriting).

e. Qualitative Proprioceptive Temporal Q(PTM)--ability to synthesize a number of symbolic mediations into a performance demanding the monitoring of a complex physical activity involving timing.

3. The remaining ten qualitative symbols associated with cultural codes are defined as:

a. Qualitative Code Empathetic Q(CEM)--sensitivity to the feelings of others; ability to put yourself in another person's place and see things from his point of view.

b. Qualitative Code Esthetic Q(CES)--ability to enjoy the beauty of an object or an idea. Beauty in surroundings or a well-turned phrase are appreciated by a person possessing a major strength in this area.

c. Qualitative Code Ethic Q(CET)--commitment to a set of values, a group of principles, obligations and/or duties. This commitment need not imply morality. Both a priest and a criminal may be committed to a set of values although the "values" may be decidedly different.

d. Qualitative Code Histrionic Q(CH)--ability to exhibit a deliberate behavior, or play a role to produce some particular effect on other persons. This type of person knows how to fulfill role expectations.

e. Qualitative Code Kinesics Q(CK)--ability to understand and to communicate by, non-linguistic functions such as facial expressions and motions of the body (e.g., smiles and gestures).

f. Qualitative Code Kinesthetic Q(CKH)--ability to perform motor skills, or effect muscular coordination according to a recommended, or acceptable, form (e.g., bowling according to form, or golfing).

g. Qualitative Code Proxemics Q(CP)--ability to judge the physical and social distance that the other person would permit between oneself and that other person.

h. Qualitative Code Synnoetics Q(CS)--personal knowledge of oneself.

i. Qualitative Code Transactional Q(CT)--ability to maintain a positive communicative interaction which significantly influences the goals of the persons involved in that interaction (e.g., salesmanship).

j. Qualitative Code Temporal Q(CTM)--ability to respond or behave according to time expectations imposed on an activity by members in the role-set associated with that activity.

THE EDUCATIONAL SCIENCE OF CULTURAL DETERMINANTS (Determantics)

Culture influences the way in which we perceive things. Man's perceptions influence and are influenced by his culture. Relatively stable social relationships are, therefore, significant factors in the development of the perceptions which an individual has of his "world." In this context, the formation and transformation of the meaning of symbols, in both the theoretical and the qualitative domain, are influenced by culturally created rules of expression and communication.

We "interpret" our sensations, and this interpretation provides us with an impression of "our world." Heavy traffic on a highway is viewed by a policeman as a traffic control problem; by an ecologist as increased carbon monoxide pollution; and by a gasoline retailer as an opportunity for increased sales.

The symbols we have examined in the previous chapter are both formed and transformed by cultural influences. The main cultural influence on the meaning of symbols is exercised by a person's family, associates, or individuality. These three "determinants" define the social role or roles that we play, together with the expectations that others have about these roles based on rules and norms of society.

We have chosen family, associates and individuality for analysis because they constitute the stable, social relationships that significantly influence our perceptions. Each of these determinants influences the indivudal's interpretation of the theoretical or qualitative symbolic information pertaining to an educational task. The relative strength of each determinant varies with the age of the individual and the symbolic condition of the task. As we shall see, the family determinant is dominant in the young child.

THE EDUCATIONAL SCIENCE OF MODALITIES

OF INFERENCE AND THEIR MEANING

In the previous chapter, we discussed the influence of cultural determinants on the meaning of symbols. The modes (or patterns) of inference (or reasoning) also influence meaning. The kind of inference we apply to problems or perceptions has a great deal to do with the conclusions or meaning we arrive at. The individual who is receiving messages of words, pictures, sounds, stories, numbers and the like, engages in a process of sorting, testing, validating or synthesizing before accepting and internalizing such messages as conclusions or realities.

We say that an individual is hypothesizing when he filters symbolic content through such a process. It is important for us to know the kinds of hypotheses students use, because any particular form of hypothesis provides direction for and imposes limits not only on the process but upon the product, end result, conclusion or meaning.

Inference not only means the process used but the conclusion itself. Phrased another way--a conclusion is an inference of some type.

Teachers often use such expressions as, "What is your reason for doing that?" "Why did you jump to that conclusion?" "How did you figure that out?" In each case, they were probing for the mode of inference that was employed.

As we shall see, different patterns of inference not only tell us how people think, but show us how people approach educational problems. In fact, teachers will quickly observe student behaviors based on inferential patterns, as opposed to the thought processes that generate such patterns, which are more difficult to ascertain. There are two processes that can be used to derive conclusions:

1. The inductive logical process yields a probability conclusion. This is the process most frequently used by man since there are so few things in his daily life to which the deductive pattern of reasoning can be applied. The weather forecast; whether the steak will be tough or tender; and how you will feel tomorrow are all probabilities. There are four ways of reaching a probability conclusion. We shall analyze each, along with their symbols for cognitive style mapping.

   a. Magnitude [shown as major (M) or minor (M') on the map].

> Is a form of 'categorical reasoning' that utilizes norms or categorical classifications as the basis for accepting or rejecting an advanced hypothesis. Persons who need to define things in order to understand them reflect this modality. (Hill, 1972)

It involves comparison to fixed standards or categories, or an appeal to rules, regulations and traditions (items found rather frequently in armies and schools).

Examples: (1) Teachers who grade solely on test scores and dutifully fail those who fail to meet their standards; (2) corporation presidents who demand that their employees follow the chain of command; (3) persons who live by the letter of the law; and (4) administrators who do everything "according to the book."

The norms, rules, standards and codes people live by are evidence of (M), as are those persons who sort things into neat classes and categories as the result of a precise definition of function or quality.

Educational tasks involving specific outlines; definite, sequentially arranged problems; and unmistakeable detailed directions are a natural for the (M) student. Such students work best in an organized and highly structured situation.

b. Differences [shown as major (D) or minor (D') on the map].

> This pattern suggests a tendency to reason in terms of one-to-one contrasts or comparisons of selected characteristics or measurements. Artists often possess this modality as do creative writers and musicians. (Hill, 1972)

The (D) student is also alert to contrast traits, qualities or measurements. He would be quick to pick up the contrasts or differences in the shape, color, or size of objects. The tendency toward contrasting might be called the "generation of opposites." This causes the (D) student to listen to a statement, generate a different or opposite point of view, and preface his remarks with "yes, but..."

Another tendency of the (D) student is to divide items into groups or parts. He is a divider, not a lumper. He will grasp an idea or concept quicker if he sees how it differs from similar ideas.

Behaviorally, the (D) uses contrasting colors in drawing or clothing. He will use humor to generate contrasts or switch the focus of conversation. He frequently offers "another point of view." His desires for certain activities (play) are often motivated to contrast with his mood (disgust or boredom). He is often characterized by an "arugmentative posture." His kinesics say "I am different."

c. Relationship [shown as a major (R) or a minor (R') on the map].

> This modality indicates the ability to synthesize a number of dimensions or incidents into a unified meaning, or through analysis of a situation to discover its component parts. Psychiatrists frequently employ the modality of relationship in the process of psychoanalyzing a client. (Hill, 1972)

The (R) student likes a variety of examples to illustrate a point out of which he will synthesize the concept or idea being presented. He would be interested in seeing how the parts of a toy or the pieces of a puzzle fit together (relate), as well as how the elements of a process--such as making ceramics--results in a useful product. He looks for the reasons behind behavior: "Why do you suppose he did that?" He seeks for the interconnections of properties or ideas in order to create closure or relevance. He associates things he hears and sees with similar items perceived in the past and makes a connection. He engages in problem solving by consideration of a number of alternatives before deciding on a solution. The teacher who says, "Bill is a hard worker, speaks well and is a class leader' that's why he gets high marks and scholarship awards," is using a relationship inference.

d. Appraisal [shown as a major (L) or minor (L') on the map].

> Is the modality of inference employed by an individual who uses all three of the modalities noted above (M, D and R), giving equal qeight to each in his reasoning process. Individuals who employ this modality tend to analyze, question or, in effect, appraise that which is under consideration in the process of drawing a probability conclusion. (Hill, 1972)

A child with (L) might find himself unable to make a quick decision. He possible thinks too much, analyzing, comparing and contrasting before reaching a conclusion. An extreme manifestation of this would be that of procrastination.

An (L) student frequently wants more information or new ways of looking at a problem before deciding. He sees all these varieties of information and points of view as necessary, not superfluous. He typifies the thinker who leaves "no stone unturned" in gathering, organizing and appraising information needed for problem solution or concept building.

He is uncomfortable with situations where courses of action are limited, or choices must be made on an either/or basis. In speech, he may wander through a variety of explanations without coming to the point.

Thus, the (L) student may appear slow and contemplative and resists being pinned down to an exact or specific answer since his mental processes point to probabilities with unresolved aspects.

2. The deductive process produces a conclusion which is a logically necessary consequence from that particular chain of reasoning. In math, the addition of "two plus two" logically and necessarily results in "four."

The deductive inferential process is shown as (K) on the map.

> Indicates deductive reasoning, or the form of logical proof used in geometry or that employed in syllogistic reasoning. (Hill, 1972)

Although this inference process is necessary in such educational tasks as geometry, it is generally accepted that these processes are required and/or employed infrequently in daily living. Less emphasis is thus placed on the presence or absence of this symbol in younger children.

The (K) student looks for predictability. He enjoys arithmetic since the answer to problems is an exact quantity. He may like to argue by claiming to have "logic" or "truth" on his side.

1. The Family determinant [shown as a major (F), or minor (F') on the map] stems from the influence of the group of persons an individual considers to be his family. In the four to seven year age bracket, children form a set of code systems and also show signs of emerging individuality. However, the main influence on the meaning of symbols being acquired at this time is the family. Whatever the family, as a group, tends to support and propagate in terms of roles and expectations will compose the family determinant.

2. The Associates determinant [shown as a major (A), or minor (A') on the map] shows the influence on the meaning of symbols derived from the peer group or those with whom the student associates.

Children learn from other children with great rapidity, and this indicates that the associates determinant is at work. Another indication is seen in the desire of some children to work or sit with others.

3. The Individuality determinant [shown as a major (I), or minor (I') on the map] manifests itself in the form of willingness of the person, based upon his individuality, to bring his own influence or definition to his symbolic mediations. It is also the student's awareness of the differences which distinguish him from others, and his acceptance or treatment of these differences.

When a child, as a family member, begins to influence the norms and roles that his father and mother expect him to accept, his individuality begins to take form.

In looking at determinants in students, the teacher needs to be aware of the fact that she is looking at the student both as a unique individual and as a group member who is responding to influences that the group brings to bear on him.

Teachers are well aware of the kinds of behavior that family life fosters in the child. The rules, guidelines, and codes imposed by parents manifest themselves in actions and utterances in the classroom. Teachers are also aware of the behaviors engendered by peer group relationships. By listening and observing, a teacher may quickly detect the presence of family and associates determinants and their relative strength in the child's behavioral pattern.

The individuality determinant is manifest in a child's ability to move freely in a variety of roles and normative situations with particular emphasis on self-directed or self-confident "isolation" behavior.

Educational tasks not only "call forth" determinants but can be utilized to develop or augment a minor or negligible element.

A small group discussion or project may require the associate determinant and assists the student in deriving "new" meaning from other participants.

Studying programmed texts or media involves the individuality determinant since the child must accomplish this task while working independently.

A student with a family orientation may work more effectively if the person conducting the task (teacher, parent, student-aide) becomes a "parental" figure to the pupil.

Of the three elements of a classroom as a social system, the cultural determinants point significantly to "persons." The various activities that can be prescribed involving youth-tutors-youth, cross-age tutoring, parent-volunteer, teacher's-aide, small group, or whole class, are partly selected because of the strengths and weaknesses of the cultural determinants of the students involved. The determinants are thus an effective tool for both diagnosis and prescription.

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