COGNITIVE STYLE AND ITS EFFECT

UPON HIGH SCHOOL GRADUATION

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CHAPTER I

INTRODUCTION

Background Information

Throughout the history of compulsory education in the United States, there have been problems in educating all of the population. Prior to 1920, hardly any results were attained in educating blacks and other minorities. Since that time, greater results have been made, but non-white students are not achieving as well as white. For that matter, white students are not making great strides in public school completion.[1] It seems that one great indicator of the need for a change in schools is the increase in dropout rates in spite of compulsory attendance laws.[2]

One way of coping with non-achievement is to provide for individual differences. However, in heterogeneous groups of thirty to forty or larger, the individual teacher has or takes little time to teach a particular student in a particular manner. To start with, a student's particular way of learning is not often known. Even in special education classes such as learning disabilities or gifted classes, which have relatively small teacher pupil ratios, the degree of accuracy in selecting modes of learning has not had great percentages of success. In fact, the "shotgun" approach is still often used. The truly individualized program needs to be prescriptive in nature. That is, the teacher must be able to recommend to the individual student the specific study

techniques which should be most effective for him.[3]

Statement of the Problem

In most present educational programs, the predominant teaching style or learning method is strongly verbal. This is in spite of a growing body of research indicating that a totally verbal style of teaching is possibly the poorest style of teaching any type of material.[4]

There is some evidence to indicate that although a student may learn from each of two methods, when these methods are presented together they will hinder learning. Therefore, not only must the teacher learn by what method a student learns, he must also learn the timing of each method in relation to other methods.[5]

This becomes a broader area when one considers the minority groups and their apparent inability to achieve and make satisfactory gains in our educational programs. The Mexican-American population may be an example of this phenomenon. The Mexican-American students learn less each year and complete fewer years of school than their Anglo-American counterparts. This can be attributed to nearly any cause one chooses. Yet one thread runs through all explanations. This is the unresponsiveness of educators to individual differences.[6] Still these differences must be determined before adequate attention may be paid them.

This lack of attention may be the prime reason for school failure with Mexican-American students and many other non-achieving students. The question arises, "What do all non-achievers and dropouts from school have in common?" It could be that their styles of learning are different from those of their peers who have success in formal schools.

If teachers could arrive at commonalities of cognitive style in learning, they could then teach directly to these styles in an effort to overcome the apparent inability to learn in a conventional or verbal manner.

Need for the Study

Determining these methods and timing of learning may be the most important factor related to academic achievement. However, there are relatively few instruments published which purport to diagnose those elements that determine how a student learns. In this time, when courts and pressure groups push for total accountability within the school, it is imperative for each professional to have sound reasoning behind each educational exercise. One means to this end is using any instruments which could show which students will require extra time and effort in order to complete a satisfactory educational program.[7]

There are several instruments which purport to measure cognitive style and in turn relate these results to success in our schools. It seems the most reliable test is the Group Embedded Figures Test (GEFT) which was developed by Herman Witkin. From his work with the GEFT test, Witkin has arrived at four educational implications of cognitive style.[8]

The first of these concerns the learning of socially oriented material by the two groups. Witkin reports that although relatively field independent and field dependent persons seem not to be appreciably different in sheer learning ability or memory, field dependent persons tend to be better at learning and remembering socially oriented material than persons who are relatively field independent. Therefore because of their social orientation relatively field dependent children are apt to

be adept at learning and remembering materials that have social context. However, since very little of the material taught and, more importantly, graded in school is social in nature they have very little advantage. Also field independents can easily learn the social material by bringing it to focal attention. Therefore field independents have no disadvantage in this area.

A second way in which student's cognitive style may influence their learning is found in the effects of various types of reinforcement. Teachers may expect field dependent students to be more likely in need of externally defined goals and reinforcements than field independent students who tend to have self-defined goals and reinforcements. The evidence suggests that field independent persons tend to learn more than field dependent persons under conditions of intrinsic motivation. Perhaps this is another way of saying that some students learn in spite of the teacher. Once again the field independent student has an advantage over the field dependent student in the present structure of our school as there are many cases when the only reinforcement in large classes may be students' internalized rewards system.[9]

The third general problem presented to field dependent students is the inability to transfer learning methods from one situation to another, whereas field independent students tend to behave as if governed by general principles which they have actively abstracted from their experiences. Witkin's evidence suggests that their lesser use of structuring or restructuring may handicap field dependent students in unstructured learning situations. There are many classroom situations in which, because the material to be learned is not clearly organized, the field dependent student may be at a disadvantage. Field dependent

students may need more explicit instruction in problem solving strategies than field independent students who may perform even better when allowed to develop their own strategies.[10]

The fourth area in which Witkin feels that field dependent students will be at a disadvantage is when they must deal with problems which have a dominant arrangement that may not contribute to the solution to the problem. In contrast, field independent students tend to sample more fully from the array of cues objectively available without regard for the structural arrangement. In view of this difference it might be expected that field independent people would learn concepts more rapidly than field dependent people if a portion of the cues were not pertinent to the definition of the concept.[11] One may therefore expect that, field dependent people would have particular learning difficulties under conditions in which cues useful for one concept definition become irrelevant in the context of a new learning problem.

In view of these four general situations in which field independent students appear to have distinct advantages over their field dependent counterparts in schools, it should not be surprising that field dependent students are not as successful. The next question appears to be, "How unsuccessful are they?" Could it be that the high percentage of dropouts could be identified as early as elementary school by using the GEFT? If this is the case, corrective measures could be taken to compensate at that time. However, the first step is to learn if the GEFT can identify public school dropouts and from that point, define corrective action.

Perhaps the use of GEFT scores in this regard is stated best by Davis in two of his recommendations for further research into the area

of cognitive style.

a. The precise process or processes could be identified which contribute to the global Ss' deficit and then training procedures and programs can be developed which will help overcome these deficiencies.

b. Attempts could be made to design instructional materials which are compatible with an individuals existing cognitive style.[12]

Therefore, the purpose of this paper is to determine if field dependent students are not learning as well as field independent students and whether or not they tend to finish high school less frequently than their possibly more advantaged counterparts.

Research Questions

Using the Group Embedded Figures Test developed by Herman Witkin and others, the study will seek to discover in this sample if dropouts from high school have a higher percentage of field dependent scores than field independent scores.

Another objective will be to see if a larger percentage of graduates score in the field independent range of the test rather than in the field dependent range.

The third method of studying the scores will be to compare the scores within each criteria for matching to determine if most graduates had more field independent scores than the dropouts. The hypotheses under consideration are as follows with Group A being high school graduates and Group B being high school dropouts:

H_1: Group A scores overall are equal to Group B scores overall on the GEFT.

H_2: Group A scores of Caucasians are equal to scores of Caucasians in Group B on the GEFT.

H_3: Group A scores of American-Indians are equal to scores of American-Indians in Group B on the GEFT.

H_4: Group A scores of Blacks are equal to scores of Blacks in Group B on the GEFT.

H_5: Group A scores of females are equal to scores of females in Group B on the GEFT.

H_6: Group A scores of males are equal to scores of males in Group B on the GEFT.

H_7: Group A scores of students from smaller schools are equal to scores of Group B from smaller schools on the GEFT.

H_8: Group A scores of students from larger schools are equal to scores of Group B from larger schools on the GEFT.

H_9: Group A scores in the 16-17 year age group are equal to Group B scores in the 16-17 year age group on the GEFT.

H_{10}: Group A scores of 18-19-20 year olds are equal to Group B scores of 18-19-20 years old subjects on the GEFT.

ENDNOTES

[1]U. S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 217, 1974.

[2]George Innacone, "Re-examining the Direction of American Education," NASSP Bulletin, October 1978, Vol. 62, p. 91.

[3]Harry Reinert, "One Picture is Worth a Thousand Words? Not Necessarily!" Modern Language Journal, 1976, Vol. 60, p. 160.

[4]Harry K. Wong, "How to be an Exciting, Successful, Happy and Liberated Educator," presentation to NAASP 62nd Annual Convention, Anahein, Calif., 1978.

[5]J. Kent Davis and Herbert J. Klausmeyer, "Cognitive Style and Concept Identification as a Function of Complexity and Training Procedures," Journ. of Educ. Psych., 1970, Vol. 61, p. 423-430.

[6]Spencer Kagan and G. Lawrence Zahn, "Field Dependence and the School Achievement Gap Between Anglo-American and Mexican-American Children," Journ. of Educ. Psych., 1975, Vol. 67, p. 643.

[7]Rita Dunn and Gary Price, "Diagnosing Learning Styles: A Prescription for Avoiding Malpractice Suits," Phi Delta Kappan, January 1977, p. 418.

[8]H. A. Witkin, C. A. Moore, D. R. Goodenough, and P. W. Cox. "Field Dependent and Field Independent Cognitive Styles and Their Educational Implications," Review of Educational Research, 1977, Vol. 47, p. 18.

[9]Ibid.

[10]Ibid., p. 25.

[11]Ibid., p. 26.

[12]J. Kent Davis, Strategy Development and Hypothesis Testing as a Function of an Individual's Cognitive Style, U. S. Dept. of HEW Proj. No. 1-E-067, November 1972, p. 68.

CHAPTER II

REVIEW OF THE LITERATURE

Identification of the Need

The study of cognitive styles seems to have first begun with Victor Lowenfield in 1945. Lowenfield's theory was that people react to problems by one of two methods, or a combination of these. His two methods were called "visual" and "haptic."

The extremely haptic person was described as one who has normal sight but who uses his eyes only when he must do so. Ordinarily, he reacts to problems and situations much as a blind person, relying on touch and kinethesis.

The extremely visual person, on the other hand, is one who is completely lost in the dark and depends completely on his visual sense.

Lowenfield acknowledges that there are few cases of extreme types; however, in about 75 percent of the subjects he tested, there is an appreciable tendency toward one or the other. Of 1128 subjects, 47 percent reacted visually and 23 percent were haptic. The other 30 percent were not clearly identifiable.[1]

Although Lowenfield did not use cognitive style as a term, his tests, designed to determine visual and haptic individuals, were later used by clinicians to determine if these visual subjects might also be field independent. Ausburn found this to be the case. Also, according to her information, the ratios of field independent/dependent and

visual-haptic are very similar.

Although Ausburn only had 32 college subjects, her research did support Lowenfield's beliefs. Ausburn determined that the obtained distribution in her study would not differ significantly from Lowenfield's theoretical distribution.[2] A Chi-square test for goodness of fit was used and this indicated that the obtained distribution was not significantly different from the theoretical one.

It may be that visual-haptic is one of the different dimensions which are grouped into the general domain of cognitive style. The common characteristic which all descriptions and names of cognitive styles contain is that each is concerned primarily with the manner in which an individual perceives and analyzes a complex stimulus configuration. Kagan used the terms analytical and relational when writing in 1963. He also believed that his classification system was similar to that developed by Witkin.[3] Davis and Klausmeyer used the terms analytical-global and reported a good correlation with Witkin's Embedded Figures Test which yields the field independent/dependent classification. In light of the fact that most writers seem to compare their results with that of Witkin's group, this group seems to have the tests and terminology to use.

Davis and Klausmeyer's study was an attempt to further understand what dimensions are involved in cognitive style.[4] The one characteristic which they determined was common to all dimensions was field independence/dependence. Although many labels are applied to it, it is concerned primarily with the manner by which a person perceives and analyzes a complex figure. The two extreme points on the continuum of this dimension are characterized by individuals who can analyze and

differentiate the various components of a problem and by subjects who cannot differentiate components and can only respond to the problem as a whole. This same dimension was also reported by Gardner.[5]

Data from a number of other studies dealing with cognitive styles suggest that a person's cognitive style influences his ability to accomplish a variety of tasks related to formal schooling. Fitzgibbons, Goldberg, and Engle found that recall and recognition of social works incidentally presented were significantly co-related with field dependence.[6]

Further evidence of the importance of cognitive style in learning was presented by Satterly and Telfer in their study of the relationship of advance organizers and cognitive style. Their chief hypothesis was that the use of an advance organizer would interact in learning with field independent cognitive style. In particular the hypothesis referred to tests in learning and retention in problems of transfer and recall. The basic conclusion of this study was that,

> . . . a demonstration that field independence shares substantial variance with learning and retention after variance attributable to the claim of field independence to be an educationally relevant dimension of individual difference.

They further state in the same study that,

> It is clear that the cognitive style, as measured by the embedded figures test, is an educationally relevant measure of individual differences since differences in style are associated with differences in learning and retention.[7]

Letteri goes a step beyond this in his study to develop a cognitive profile for each student in an attempt to promote better learning. His conclusion was that it seemed evident that since the student cognitive profile can predict and account for the students' academic achievement, training in theory and practice of identifying cognitive style should be

incorporated into the training of educators.[8]

Through studies, it has been suggested that the American educational system may have a negatively biased selection factor which could cause a greater number of field dependent students not to succeed in our schools.[9]

A problem which exists in this assumption is that intelligence is also a prime factor in success in our school system. One must ascertain whether some aspect of intelligence or cognitive style is being measured. Studies by Wachtel reported a significant correlation between Witkin's measure of cognitive style and the subtests of the WISC which load on the factor of verbal comprehension.[10] However, Witkin concluded that field independent subjects are intellectually superior to field dependent subjects only in terms of the analytic subtests of the WISC.[11] Whichever is the case, it appears that some control of intelligence must be incorporated into a study which purports to measure cognitive style with any degree of significance.

Rate of learning could also be a function of both intelligence and cognitive style. This could be one of the factors which negatively biases education towards both less intelligent and more field dependent students. The longer a slower learner is in school the further behind the rest of his age group he becomes.[12]

On another aspect of the study of cognitive style, Brown has shown that low achievers exhibit a poor quality of achievement because they use inefficient cognitive processing systems.[13] It seems their system can be satisfactory during early years when concrete situations predominate, but their system fails when great transfer of knowledge and restructuring of problems is needed. Brown indicates that low achievement

is not necessarily a functon of low intellect but more probably a function of how well children can transfer their knowledge to new situations. Those students who do best in school are those whose cognitive style is more adept at structuring new problems into basic concepts to which solutions have been previously found.

Fletcher used the term transgeneration to describe the proces of encoding and decoding information and transfer of knowledge. He felt that since an individual can respond only to encoded information and not to actual stimuli, the transgeneration step in the cognitive process is of utmost importance. The generation of solutions to problems is based upon how input stimuli are transgenerated by the learner. Fletcher identified two principal styles or types of transgeneration: the analytic style, in which stimuli are broken down into individually meaningful elements; and the synthetic style, in which stimuli are grouped globally into wholes. The manner in which solutions are generated are necessarily dependent upon which type of transgeneration is used by an individual.[14] It therefore follows that a task which requires a specific type of transgeneration for its solution cannot be satisfactorily performed by a learner who is incapable of the necessary type of transgeneration.

Perhaps with the knowledge of these results and further results such as those sought in this study, (hypothesizing that high school drop outs are predominantly field dependent), teachers and administrators will become more aware of the individual difference called cognitive style and will structure their learning exercises with this and other individual differences in mind.

Selection of the Instrument

As all individual differences are unique so is cognitive style. In fact, it could be more troublesome, due to the possibility of an incongruence of cognitive style and teaching style. This could be a consistent factor in graduating. Measurement of cognitive style could be a distinct problem in any study. One instrument which purports to measure this is the Group Embedded Figures Test by Witkin. This test is designed to assess cognitive style into a continuum from field dependent to field independent classifications.[15]

For clarity, cognitive style and field independent/dependence should be defined. Kagan offers the following definition of cognitive style:

> Cognitive styles can be most directly defined as individual variation in modes of perceiving, remembering, and thinking or as distinctive ways of apprehending, storing, transforming and utilizing information.[16]

Field independence is defined as the ability to overcome embeddedness.[17] One measurement of this is the Group Embedded Figures Test[18] which is considered to be an adequate instrument in predicting success in creative thinking and organizational strategy which in turn can lead to success in formal education.[19]

The GEFT was designed as an adaptation of the individually administered Embedded Figures Test by Witkin which purports to measure the perceptually-based field dependence/field independence dimension. The test contains three sections: an unscored practice section with seven items, and two sections with nine items each which are both timed and scored. The items in each section are organized in order of increasing difficulty. It is intended to be a fairly flexible instrument which

may be used with many ages or groups but the only normative or reliability data shown for the instrument in the manual are for liberal arts college students. Moreoever, although the authors suggest adjusting the time limits for groups other than adults, no suggestions or guidelines are given.

For this study the GEFT was used in its exact published form and directions were the same as those published in the manual. However, subjects were asked to fill out a personal data sheet rather than only the name and age as requested on the test form.[20] (See Appendix A.)

Further support for the GEFT and Witkin's theory comes from Kagan and Zahn.[21] In their study of 1975, they chose to use Witkin's Man in a Frame Box to determine (a) the nature of the culture difference in field dependence, (b) the nature of the cultural achievement gaps in reading and math, and (c) the extent to which field dependence explains these gaps. The results indicated that Mexican-American children are more field dependent than Anglo-American children and that field dependence was significantly related to both reading and math achievement in this sample.

Witkin's tests have been supported by several outside his group but one of the better analyses was made by Denson in 1976. Denson sought to describe and compare three measures of three postulated dimensions of cognitive style. The test chosen to measure field dependence/field independence was the Group Embedded Figure Test (GEFT). Specifically desired was the determination of (1) the shape and characteristics of the score distribution, (2) the reliability of the measure, and (3) the psychometric characteristics of each test item, using 272 subject samples of seventh grade students. The final summation of this exercise

was that "the GEFT appears to be a fairly usable instrument, although the speed and practice factors should be examined further, and the total score rather than part scores should definitely be used".[22] Although this seems a very cautious approval of the instrument, it is as much support as any of the instruments studied receive except from their own creators. Another benefit from Denson's work was the agreement that the GEFT may distribute scores on a relatively normal curve rather than a bi-modal distribution as Denson expected. Denson stated that there was a possibility that the variables considered were continuously distributed and should be dealt with using analysis procedures designed for a normal distribution.

Summary

However the results of this, or any other study are obtained, or what they show; each educator should be aware that increased efforts should be made to identify any individual differences which can be identified. Enough research has been accumulated to indicate the existence of a measurable cognitive style in each person's approach to learning. Whether this will have great effect on the outcome of formal education is yet to be seen; however, continued research must be done.

In choosing an instrument to measure any variable, one should use the most adequate instrument yet designed. The Group Embedded Figures Test appears to be such an instrument, as it is the instrument used by many other designers of instruments to compare more recent additions to the cognitive style measurement area and in particular the field independence/field dependence continuum.

ENDNOTES

[1]Victor Lowenfield, "Tests for Visual and Haptic Aptitudes," American Journal of Psychology, 1945, Vol. 58, pp. 100-112.

[2]Lynna J. Ausburn, "The Relationship of Perceptual Type to Perceptual Style and Tempo in College Students," paper presented at the Association for Educational Communications and Technology Annual Convention, Dallas, 1975.

[3]J. Kagan, H. A. Moss, and I. E. Sigel, "Psychological Significance of Styles of Conceptualization," Monographs of the Society for Research in Child Development, 1963, Vol. 28, pp. 73-112.

[4]J. Kent Davis and Herbert J. Klausmeyer, "Cognitive Style and Concept Identification as a Function of Complexity and Training Procedures," Journ. of Educ. Psych., 1970, Vol. 61, No. 6, pp. 423-430.

[5]R. W. Gardner, "Cognitive Styles in Categorizing Behavior," Journal of Personality, 1953, Vol. 22, pp. 214-233.

[6]D. Fitzgibbons, L. Goldberg, and M. Engle, "Field Dependence and Memory for Incidental Material," Perceptual and Motor Skills, 1965, Vol. 21, pp. 743-749.

[7]D. J. Satterly and I. G. Telfer, "Cognitive Style and Advance Organizers in Learning and Retention," British Journ. Educ. Psych., 1979, Vol. 49, pp. 169-178.

[8]Charles A. Letteri, "Cognitive Profile: Basic Determinant of Academic Achievement," The Journal of Educational Research, March/April 1980, Vol. 73, pp. 195-198.

[9]J. Kent Davis, Strategy Development and Hypothesis Testing as a Function of an Individuals Cognitive Style, U. S. Dept. of HEW, Prof. No. 1-E-067, November, 1972.

[10]P. L. Wachtel, "Style and Capacity in Analytical Functioning," Journal of Personality, 1968, Vol. 36, pp. 202-212.

[11]H. A. Witkin, R. B. Dyk, H. F. Fatherson, D. R. Goodenough, and S. A. Karp, Psychological Differentiation (New York, 1962).

[12]Spencer Kagan and G. Lawrence Zahn, "Field Dependence and the School Achievement Gap Between Anglo-American and Mexican-American Children," Journ. of Educ. Psych., 1975, Vol. 67, p. 643.

[13]Edward K. Brown, "Underachievement-A Case of Inefficient Cognitive Processing," an address prepared for the American Educational Research Association, New York, New York, February 1971.

[14]N. J. Fletcher, "Toward a General Model for Describing Cognitive Processing," Theoretical Paper No. 23, Wisconsin Research and Development Center for Cognitive Learning, Madison, Wisconsin, University of Wisconsin, December 1969.

[15]Witkin, Dyk, Faterson, Goodenough, and Karp.

[16]N. Kagan, "Psychological and Educational Practice," Educational Implications of Cognitive Styles (Chicago, 1971).

[17]Floyd B. Ausburn and Lynna J. Ausburn, "Learning Task Requirements, Cognitive Styles, and Media Attributes: An Interactive Research Model," presentation to Annual Meeting of the Association for Educational Communications and Technology, 1976.

[18]Philip K. Oltman, Evelyn Raskin, and Herman Witkin, The Group Embedded Figures Test (Palo Alto, California, 1971).

[19]Lloyd D. Noppe and Jeanette M. Gallagher, "A Cognitive Style Approach to Creative Thought," Journ. of Personality Assessment, 1977, Vol. 41, p. 85.

[20]H. A. Witkin, Philip K. Oltman, Evelyn Raskin, and Stephen Karp. A Manual for the Embedded Figures Tests (Palo Alto, California, 1971).

[21]Kagan and Zahn, pp. 643-650.

[22]Teri A. Denson, "Three Tests of Cognitive Style: Item Analyses and Characteristics," paper presented at the Annual Conference of the New England Educational Research Organization, 7th, Spring 1976.

CHAPTER III

METHODOLOGY

Definitions

The following definitions will be used for the purpose of this investigation.

Cognitive Style: "Cognitive styles can be most directly defined as individual variation in modes of perceiving, remembering, and thinking or as distinctive ways of apprehending, storing, transforming and utilizing information."[1]

Field Independent Cognitive Style: A style which involves a tendency to perceive items as discreet from their backgrounds and an ability to overcome an embedding context.[2]

Field Dependent Cognitive Style: A style which is heavily influenced by field factors and the complexity of the background.[3]

Embeddedness: A simple figure being hidden within a larger more complex figure which has been so organized as to obscure the sought after simple figure.[4]

Analytical Cognitive Style: Field Independent Cognitive Style.

Global Cognitive Style: Field Dependent Cognitive Style.

Sample Identifying Terms

High School Graduate: A subject who graduated from public or parochial high school in the normal academic program rather than a

special vocational, special education or alternate school program.

High School Dropout: A subject who has not graduated from public or parochial high school in the normal academic program rather than a special vocational, special education or alternate school program regardless if they have finished a GED program.

Caucasian: A subject who listed himself as a Caucasian on the personal data sheet accompanying the test instrument.

American Indian: A subject who listed himself as an American Indian on the personal data sheet accompanying the test instrument.

Black: A subject who listed himself as a Black on the personal data sheet accompanying the test instrument.

Students from Smaller Schools: Those subjects who last attended schools having fewer than one hundred students in each graduating class.

Students from Larger Schools: Those subjects who last attended schools having more than one hundred students in each graduating class.

Assumptions and Limitations

The researcher assumes the number of subjects who participate in this study will be representative of the corps population of the Guthrie Job Corps Center. The outcome of the study could be affected by those corp members who might refuse to participate but this is not a foreseen problem. The writer further assumes that the basic intelligence level of both samples is representative of the entire population of the center but is limited by not being allowed access to corps members files in accordance with Directive 684.94 of the Federal Register. This states that at no time will names, medical records or other information from a

corps member's file be used in outside research and all corps members and staff participation will be on a voluntary basis.

Also, attitudes of dropouts at the time of their leaving school will not be considered and the researcher has no knowledge of their reason for quitting school.

The writer assumes the GEFT is an appropriate instrument for testing and scoring of field independence or field dependence. He assumes these results may be generalized to the population of the Guthrie Job Corps Center in June, 1980, but caution must be used in attempting to generalize these results to any other population.

Selection of the Subjects and Test Site

During the planning of this research it was determined to have one half the sample be high school dropouts and one half to be high school graduates. However, a major problem developed which drastically changed the sample selection. That problem was the inaccessibility of names and addresses of high school dropouts. Although each high school is required to file a monthly list of school dropouts, these records are not available to one who is not directly involved with the storage of data at the Oklahoma Department of Vocational and Technical Education.

The next plan was to use only those dropouts in Kingfisher County, Oklahoma. Access to these records was obtained through the county school organization with the permission of each of the school boards in the county. This group would have been very adequate except for serious problems in reaching most of these dropouts.

After it became apparent that the study could not be completed using the Kingfisher County dropouts as half the sample, contact was

made with the Guthrie Job Corps Center to see if the testing could be done at the institution. A proposal of the study was sent to the regional head quarters of Job Corps in Austin, Texas. Approval was granted with several contingencies involved. These included using only volunteers, having no access to student files, and not using any names with the study.

The Guthrie Job Corps Center is a training center for financially handicapped students ranging in age from 16 to 22. The center is owned by Teledyne Economic Development Company and is operated under a contract with the United States Government. The corps members are recruited primarily from Oklahoma, Arkansas, Texas, Kansas, Missouri and Louisiana; however, some members come from other parts of the United States.

The testing staff of the center randomly selected the 99 subjects of the study from the June, 1980, population of approximately 600 members. The testing was done on a normal school day and subjects were dismissed in groups of 20 from their regular classes in order to take the GEFT at the Job Corps test center. The Job Corp provided one staff member to assist in the arrangement and movement of subjects and to help with test administration.

Collection of the Data

The group Embedded Figures Test was designed as an adaptation of an individually-administered test of the perceptually-based field dependence/field independence dimension. This instrument, developed by Oltman, Taskin, and Witkin (1971), contains three sections: an unscored practice section with 7 items and two sections with 9 items each which

are both timed and scored. Items in each section are arranged in order of difficulty. Although intended to be a flexible instrument for use with groups widely diversified in age and background, the only normative and reliability data available for the instrument in the manual are for liberal arts college students. Moreover, although the authors recommend adjusting the five-minute time limit allotted to complete each nine-item section for groups other than adults, no exact guidelines are given since this instrument is admittedly in the research stage of development. The consistency of the two scored sections using the Spearman Brown Prophecy formula is .82 and this is the only reliability datum offered in the manual.[5]

For this study, the Group Embedded Figures Test was used in its exact published form and directions were the same as those offered in the manual.

According to Denson, practice and speed effects mitigate against the comparability of sections one and two of the GEFT despite the test authors' claim that these sections are actually alternate forms of a nine-item task.[6] A comparison total score distribution with those of each section considered separately indicates that use of the total score would result in a very different picture than consideration of either of the sections separately. While not symetrical, the total score distribution does seem more usable than the half-test distributions, indicating that part scores for the GEFT should be viewed with extreme caution and that, for research purposes, the total score would be more useful. Again selection of the upper quarters would be suggested for formation of extreme groups since there appears to be a satisfactory separation between these portions of the distribution. However, because of the

speed and practice factors pointed out earlier, it is probable that more is being measured by this instrument than field independence/field dependence.[7]

Yet, although there are doubts concerning this instrument, it is apparently the best and most accepted instrument of its kind and is accepted as the benchmark by which other tests of field independence/dependence are measured.

Analysis of the Data

The data have been analyzed at the Oklahoma State University Computer Center using the SPSS program for Gosset's Test. The subjects' scores on the GEFT have been compared using only the school graduate/school dropout variable. Following this the subjects were compared using the dependent variables race, sex, age, and size of school to sort the data. These variables were selected in an effort to determine if these specific factors had a significant impact on the scores made on the test. A breakdown of the scores by classification is shown in Table I. The SPSS program shows a two-tailed probability with both pooled variance and separate variance. It also shows the mean, standard deviation, and standard error with each hypothesis.

Personal data was compiled from subject response on the data sheet shown in Appendix A. This information was punched onto computer cards along with the subject's score on the GEFT which could range from 0 to 19 following prescribed directions for the GEFT.

TABLE I

ANALYSIS OF DATA BY CLASSIFICATION

	No.	Grad.	Mean	Non Grad.	Mean
Total	99	22	3.318	77	3.168
Males	63	17	4.00	46	3.6
Females	36	5	1.0	31	2.45
16 - 17 year olds	34	2	7.0	32	3.7
18 - 19 - 20 year olds	65	20	2.95	45	2.77
American Indian	7	1	.0	6	3.83
Black	72	18	3.44	54	2.87
Caucasian	11	1	8.0	10	4.2
Small School	37	5	3.4	32	3.09
Large School	62	17	3.29	45	3.22

ENDNOTES

[1]N. Kogan, "Psychological and Educational Practice," Educational Implications of Cognitive Styles (Chicago, 1971), p. 244.

[2]Floyd B. Ausburn and Lynna J. Ausburn, "Learning Task Requirements, Cognitive Styles and Media Attributes: An Interactive Research Model," presentation to Annual Meeting of the Association for Educational Communications and Technology, 1976, p. 3.

[3]Ibid.

[4]H. A. Witkin, Philip K. Oltman, Evelyn Raskin, and Stephen Karp, A Manual for the Embedded Figures Tests (Palo Alto, California, 1971).

[5]Ibid., p. 28.

[6]Ibid., p. 27.

[7]Teri A. Denson, "Three Tests of Cognitive Style Item Analyses and Characteristics," paper presented at the Annual Conference of the New England Educational Research Organization, 7th, Spring 1976, p. 15.

CHAPTER IV

TESTING PROCEDURE

One will recall from Chapter III that the researcher administered the Group Embedded Figures Test to 99 randomly selected members of the approximately 600 members at the Guthrie Job Corps Center. All of these 99 tests appeared to be valid efforts by the subjects, although there were several zero scores made on the test. One must assume that the students simply could not find the hidden figures of the GEFT within the complex figures. This is especially so since the testing personnel showed each subject how to find the figures in the two sample figures and the seven figures of section one exactly as the test instructions indicated.

It was hoped that an equal number of dropouts and graduates would be administered the test. However, as the selection process was totally random without regard for any variable, the researcher used those members selected by the Job Corp staff. Furthermore, using the test, the number in the two major categories really made no statistical difference.

Another unexpected outcome with this group was the extremely truncated range of the GEFT scores. A high score of eight and a low score of zero does make a skewed distribution. Especially because the norms given by the test publishers shows means of 9 for females and 12 for males. It certainly points out the difference in this group and the

group of college freshmen from which the norms were developed. It would be expected that scores obtained from a group in public school would be more field independent as more of these students would be college bound.

In the remainder of this chapter, the presentation and analysis of the data will be reported as they relate to each of the hypotheses examined. Adhering to common practice, the researcher would only accept those hypotheses which were supported at the .05 level of significance.

In each of the hypotheses, Group A will be used to delineate those subjects who listed themselves as high school graduates and Group B will include only those who reported themselves to be high school dropouts. Further discussion of this self description was included earlier in Chapter III.

Data

Hypothesis One

H_1: Group A scores overall are equal to Group B scores overall on the GEFT.

The calculated *t* value for the analysis was .18. Using the pooled variance estimate the two-tailed probability was .856. This would have to have been less than .05 in order for the null hypothesis to be rejected. Therefore, the null hypothesis is not rejected, and there was no significant difference between scores made by Group A and Group B in this sample. Data relevant to this hypothesis are summarized in Table II.

TABLE II

TOTAL GROUP ONE COMPARED TO TOTAL GROUP TWO ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	22	3.3182	2.852	0.608
Group B	77	3.1688	3.541	0.404

Pooled Variance Estimate

T Value	Degrees of Freedom	Two-Tail Prob.
0.18	97	0.856

Hypothesis Two

H_2: Group A scores of Caucasians are equal to scores of Caucasians in Group B on the GEFT.

A *t* test was used to determine if there was a significant difference at the .05 level between Group A Caucasians and Group B Caucasians. The value of the calculated *t* was .67 with only 9 degrees of freedom and the two-tailed probability was .52. There was no significant difference. The data related to this test are summarized in Table III.

Hypothesis Three

H_3: Group A scores of American Indians are equal to scores of American Indians in Group B on the GEFT.

A *t* test was used to determine if there was a significant difference between American Indians in Group A and American Indians in Group B. The value of the calculated *t* was -0.78 with 5 degrees of freedom and a two-tailed probability of .469. The data related to this test are summarized in Table IV.

Hypothesis Four

H_4: Group A scores of Blacks are equal to scores of Blacks in Group B on the GEFT.

A *t* test was used to ascertain if there was a significant difference between scores made by Blacks in Group A and Blacks in Group B. The value of the calculated *t* was .70 with 70 degrees of freedom, resulting in a two-tailed probability of .487. There was no significant difference. The data related to this test are summarized in Table V.

TABLE III

CAUCASIAN GROUP A COMPARED TO CAUCASIAN GROUP B ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	1	8.0000	0.0	0.0
Group B	10	4.2000	5.412	1.711

Pooled Variance Estimate

t Value	Degrees of Freedom	Two-Tail Prob.
0.67	9	0.520

TABLE IV

AMERICAN INDIAN GROUP A COMPARED TO AMERICAN INDIAN GROUP B ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	1	0.0	0.0	0.0
Group B	6	3.8333	4.535	1.851

Pooled Variance Estimate

t Value	Degrees of Freedom	Two-Tail Prob.
-0.78	5	0.469

TABLE V

BLACKS IN GROUP A COMPARED TO BLACKS
IN GROUP B ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	18	3.4444	2.770	0.653
Group B	54	2.8704	3.096	0.421

Pooled Variance Estimate

t Value	Degrees of Freedom	Two-Tail Prob.
0.70	70	0.487

Hypothesis Five

H_5: Group A scores of females are equal to scores of females in Group B on the GEFT.

A *t* test was used to determine if there was a significant difference at the .05 level between scores made by females in Group A and scores made by females in Group B. The value of the calculated *t* was -1.07 with 34 degrees of freedom and a two-tailed probability of .291 and is shown in Table VI.

Hypothesis Six

H_6: Group A scores of males are equal to scores of males in Group B on the GEFT.

A *t* test was used to determine if there was a significant difference at the .05 level of probability between scores made by males in Group A and scores made by males in Group B. The value for the calculated *t* was .34 with 61 degrees of freedom resulting in a two-tail probability of .735. There was no significant difference. The data relating to this test are summarized in Table VII.

Hypothesis Seven

H_7: Group A scores of students from small schools are equal to scores of Group B from small schools on the GEFT.

A *t* test was used to determine if there was a significant difference at the .05 level between scores made by Group A subjects who had attended small schools and Group B subjects who had attended small schools. The *t* value on this hypothesis is .17 with thirty-five degrees of freedom and a two-tail probability of .869. The means were not

TABLE VI

FEMALES IN GROUP A COMPARED WITH
FEMALES IN GROUP B ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	5	1.0000	2.236	1.000
Group B	31	2.4516	2.873	0.516

Pooled Variance Estimate

t Value	Degrees of Freedom	Two-Tail Prob.
-1.07	34	0.291

TABLE VII

MALES IN GROUP A COMPARED WITH
MALES IN GROUP B ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	17	4.0000	2.693	0.653
Group B	46	3.6522	3.883	0.572

Pooled Variance Estimate

t Value	Degrees of Freedom	Two-Tail Prob.
0.34	61	0.735

significantly different. Data germane to this test are presented in Table VIII.

Hypothesis Eight

H_8: Group A scores of students from larger schools are equal to scores of Group B from larger schools on the GEFT.

To determine if there was significant difference in the scores of Group A from larger schools and Group B from larger schools a *t* test was calculated using only those scores. The value of the calculated *t* was .08 with sixty degrees of freedom, and two-tail probability of .937. There was no significant difference. The data related to this test are summarized in Table IX.

Hypothesis Nine

H_9: Group A scores in the 16-17 year age group are equal to Group B in the 16-17 year age group on the GEFT.

A *t* test was calculated to determine if there was a statistically significant difference in the means of the scores of those subjects in Group A who were 16 and 17 years old and those mean scores of 16 and 17 years old who were members of Group B. The value of the calculated *t* was 1.16 with 32 degrees of freedom and a two-tail probability of .254. There was no significant difference. Data dealing with this hypothesis are summarized in Table X.

Hypothesis Ten

H_{10}: Group A scores of 18-19-20 year olds are equal to Group B scores of the 18-19-20 year old subjects on the GEFT.

TABLE VIII

GROUP A FROM SMALL SCHOOLS COMPARED TO GROUP B FROM SMALL SCHOOLS ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	5	3.4000	3.435	1.536
Group B	32	3.0938	3.880	0.686

Pooled Variance Estimate

t Value	Degrees of Freedom	Two-Tail Prob.
0.17	35	0.869

TABLE IX

GROUP A FROM LARGE SCHOOLS COMPARED TO GROUP B FROM LARGE SCHOOLS ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	17	3.2941	2.779	0.674
Group B	45	3.2222	3.323	0.495

Pooled Variance Estimate

t Value	Degrees of Freedom	Two-Tail Prob.
0.08	60	0.937

TABLE X

GROUP A OF 16-17 YEAR OLDS COMPARED TO GROUP B
OF 16-17 YEAR OLDS ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	2	7.0000	1.414	1.000
Group B	32	3.7188	3.929	0.694

Pooled Variance Estimate

t Value	Degrees of Freedom	Two-Tail Prob.
1.16	32	0.254

To ascertain if there was a significant difference between scores of Group A 18-19 and 20 year old subjects and Group B 18-19 and 20 year old subjects a *t* test was calculated. The value of the *t* was .21 with 63 degrees of freedom. The two-tail probability was .836 resulting in no significant difference. Data related to this test are summarized in Table XI.

TABLE XI

GROUP A 18-20 YEAR OLD SCORES COMPARED TO GROUP B
18-20 YEAR OLD SCORES ON THE GEFT

	Number of Cases	Mean	Standard Deviation	Standard Error
Group A	20	2.9500	2.704	0.605
Group B	45	2.7778	3.226	0.481

Pooled Variance Estimate

t Value	Degrees of Freedom	Two-Tail Prob.
0.21	63	0.836

CHAPTER V

SUMMARY

The Group Embedded Figures Test was administered to 99 members of the Guthrie Job Corps Center. The general intent was to determine if school graduation is related to field independence as measured by the GEFT. The GEFT is a perceptual test designed to measure a subject's ability to overcome embeddedness by finding a simple figure obscured within a more complex figure. A greater number of correct responses obtained indicates relatively more field independent cognitive style.

The testing was done with the assistance of Job Corp personnel at the testing center of the Guthrie Job Corps. The subjects were 99 randomly selected corps members of the approximately 600 population of the center. The sample was then divided into Group A, high school graduates and Group B, high school dropouts.

Findings

Hypothesis One

H_1: Group A scores overall are equal to Group B scores overall on the GEFT.

The null hypothesis was accepted as there was no significant difference in the scores of Group A, which consisted of high school graduates, and Group B, high school dropouts.

Hypothesis Two

H_2: Group A scores of Caucasians are equal to scores of Caucasians in Group B on the GEFT.

Hypothesis 2 was also accepted as there was no significant difference in the scores of graduates and dropouts who listed themselves as Caucasians.

Hypothesis Three

H_3: Group A scores of American-Indians are equal to scores of American-Indians in Group B on the GEFT.

Hypothesis 3 was accepted since there was no significant difference in the scores of American Indians who had graduated from high school and those who had not. However, there were only seven American Indians in the sample and only one of these had graduated from high school.

Hypothesis Four

H_4: Group A scores of Blacks are equal to scores of Blacks in Group B on the GEFT.

Hypothesis 4 was accepted as there was no significant difference in the scores of those who listed themselves as Blacks and had graduated and those who had not graduated.

Hypothesis Five

H_5: Group A scores of females are equal to scores of females in Group B on the GEFT.

Hypothesis 5 was accepted since there was no significant difference at the .05 level in the scores of female graduates and female dropouts.

Hypothesis Six

H_6: Group A scores of students from smaller schools are equal to scores of Group B from smaller schools on the GEFT.

Hypothesis 6 was accepted because there was no significant difference at the .05 confidence level in the scores of male graduates and male dropouts.

Hypothesis Seven

H_7: Group A scores of students from smaller schools are equal to scores of Group B from smaller schools on the GEFT.

Hypothesis 7 was accepted as there was no significant difference in the scores made by small school graduates and small school nongraduates.

Hypothesis Eight

H_8: Group A scores of students from larger schools are equal to scores of Group B from larger schools on the GEFT

Hypothesis 8 was accepted as there was no significant difference in the scores made by larger school graduates and larger school nongraduates.

Hypothesis Nine

H_9: Group A scores in the 16-17 year age group are equal to Group B scores in the 16-17 year age group on the GEFT.

Hypothesis 9 was accepted since there was no significant difference in the scores of Group A and Group B in the 16-17 year old group.

Hypothesis Ten

H_{10}: Group A scores of 18-19-20 year olds are equal to Group B scores of 18-19-20 year old subjects on the GEFT.

Hypothesis 10 was accepted since there was no significant difference in the scores of Group A and Group B of the 18-19-20 year old subjects.

Basically the acceptance of these ten null hypotheses has rejected the original rationale of the study, at least with this population. This rationale was based on the following premise: Since cognitive style has been shown to be related to various types of learning and creativity it should also be related to high school graduation.

This is simply not the case at the Guthrie Job Corp Center. With the graduates achieveing a mean score of 3.3 on the GEFT and the non-graduates achieving a 3.16, even on the surface one would expect the difference to not be significant. What appears to be significant is the relatively low score of all subjects who participated in this study. Also, the words "appear significant" and "relatively low score" are used advisedly because of a problem with this instrument involving the lack of norms for the GEFT test for a group such as this. The norms for college students are hardly applicable for this group, but yet a mean of 3.3 must be regarded at the lower end of the field independent/field dependent continuum. In the norms given by the test developers, the lower quartile began at 9 for men and 8 for women with a mean of 12 and 10.8, respectively.[1]

Recommendations

The researcher feels it would behoove the test developers to obtain

scores made on the test by all groups taking it and make an effort to broaden their norms while continuing to use precise test instructions. Although the subjects of this study are not at all indicative of average students in the United States these norms could be useful to others who might wish to test a similar sample at another location. It could be worthwhile to replicate this study using other groups in an effort to determine if there is no relationship between high school graduation and cognitive style in all students or only with this group. It could be that there is a distinct difference between the two groups in a more normal high school group. The selection process for the job corps could account for the extreme field dependent scores. Although these possibilities are apparent now, only continued research in the cognitive style area will lead to a further understanding of ways to meet these and other individual differences.

A specific variable which was not accounted for in this study is the intelligence level of the subjects. However, it was beyond the scope of the researcher to give individual IQ tests to the subjects, and permission could not be obtained to view intelligence scores which may be in their files at the Job Corps. Perhaps this test may be incorporated into the normal processing of each corps member by a staff member and better use of the GEFT reached by correlating its results with their intelligence scores. This would be an excellent pilot program for the Job Corps. If in fact, it should develop that the Wechsler Intelligence Test and the GEFT are not measuring the same things in other Job Corps populations, the Job Corps would do well to incorporate the GEFT into their initial testing program for new members. Following this step, they might either hire teachers with specific skills to teach field dependent

students or train existing teachers in the necessary skills to do this.

On a more general level, it is apparent that further study of the GEFT and other cognitive style measurement devices is needed if this individual difference is to gain further respectability. However, the profession cannot expect this approach to be a panacea to solve all the ills of American education. Rather, educators must ask if the implications from cognitive style research could be important for educational research or practice. It seems that cognitive style research has undeniable potential for use in educational practice. There are simply too many studies linking styles to important intellectual processes and educational outcomes for this area of research to be dismissed as "faddish."

Perhaps part of the problem in developing firm and significant hypotheses concerning cognitive style is the vagueness of many theoretical constructs. Difficulties result from incomplete theoretical development of many cognitive style constructs, as well as from substantial measurement and related technical problems with all of the constructs. These problems include non-structured individually administered tests and lack of norms.

Despite these difficulties research needs to continue in an effort to develop further cognitive theories linking intellectual processes with the attributes of instructional treatment. The studies concerning teacher-student matching may be the area researchers should attempt to replicate rather than try to compensate for either extreme of the field independent/dependent continuum. Of course, the research can do no good unless its results are put into use in the classroom.

If the matching cannot be done, educators must develop supplantion

techniques that enable those with various learning styles to compensate for their problems with specific learning tasks. One research program that should prove profitable would be one which would result in a group of instructional design principles that would emphasize the supplantation capabilities of various media and techniques and would provide specific guidelines for their selection when confronted with situations characterized by learners with specific cognitive styles and by learning tasks with specific stimulus processing requirements. Instructional-design principles of this type would be based on generalization of treatment effects under specific interaction conditions with learners and tasks rather than on across-the-board over-simplified generalization. This appears to be the problem with this research and much of the research done concerning cognitive style. Rather than doing general research, scholars may need to get very narrow and specific with the studies in order to move toward individual instruction. It may become necessary to write an individual educational plan for each student for each of the various task types.

What the increased knowledge of cognitive style should do is make learning more equitable between students with varying modes of perception. Failing this optimum outcome, educators should still strive to have the research make teachers aware of the cognitive styles of their students and the implications for learning. To facilitate this objective, inservice programs to help teachers understand what cognitive style means and how it might affect students' performance in the classroom should be implemented. The more instructors know about conditions that encourage or discourage learning, the more effective they can be in planning appropriate learning experiences for all students.

ENDNOTES

[1]H. A. Witkin, Philip K. Oltman, Evelyn Raskin, and Stephen Karp, A Manual for the Embedded Figures Test (Palo Alto, California, 1971).

SELECTED BIBLIOGRAPHY

Journal Articles

Ausburn, Lynna J. and Floyd Ausburn. "Cognitive Styles: Some Information and Implication for Instructional Design." Educational Communication and Technology Journal, 1978, Vol. 26, No. 4, pp. 337-354.

Bengston, John K. "Cognitive Style: The Individual Difference Variable That Doesn't Make a Difference." Viewpoints in Teaching and Learning, Summer 1979, Vol. 55, pp. 91-97.

Bloomberg, Morton. "An Inquiry Into the Relationship Between Field Independence/Dependence and Creativity." The Journal of Psychology, 1967, Vol. 67, pp. 127-140.

Cohen, Rosalie A. "Conceptual Styles; Culture Conflict and Nonverbal Tests of Intelligence." American Anthropologist, 1969, Vol. 71, pp. 828-856.

Davis, Kent J. and Herbert J. Klausmeyer. "Cognitive Style and Concept Identification as a Function of Complexity and Training Procedures." Journ. of Educ. Psych., 1970, Vol. 61, pp. 423-430.

Dunn, Rita and Gary Price. "Diagnosing Learning Styles: A Prescription for Avoiding Malpractice Suits." Phi Delta Kappan, January 1977, p. 418.

Feij, Jan A. "Field Dependence, Impulsiveness, High School Training and Academic Achievement." Journ. of Educ. Psych., 1976, Vol. 68, No. 6, 793-799.

Gredrick, Wayne C. and Herbert J. Klausmeyer. "Cognitive Styles a Description." Educational Leadership, 1970, Vol. 27, pp. 668-672.

Goodenough, Donald R. and Stephen A. Karp. "Field Dependent and Intellectual Functioning." Journal of Abnormal Psychology, 1961, Vol. 63, No. 2, pp. 241-243.

Innacone, George. "Re-examining the Directions of American Education." NASSP Bulletin, October 1978, Vol. 62, p. 91.

Kagan, Spencer and G. Lawrence Zahn. "Field Dependence and the School Achievement Gap Between Anglo-American and Mexican-American Children." Journal of Educational Psychology, 1975, Vol. 67, No. 5, pp. 643-650.

Kagan, J., H. A. Moss, and I. E. Sigel. "Psychological Significance of Styles of Conceptualization." Monographs of the Society for Research in Child Development, 1963, Vol. 28, pp. 73-112.

Kagan, Spencer and G. Lawrence Zahn. "Field Dependence and the School Achievement Gap Between Anglo-American and Mexican-American Children." Journ. of Educ. Psych., 1975, Vol. 67, p. 643.

Karp, Stephen A. "Field Dependence and Overcoming Embeddedness." Journ. of Consulting Psychologists, 1963, Vol. 27, No. 4, pp. 294-302.

Lowenfield, Victor. "Tests for Visual and Haptic Aptitudes." American Journal of Psychology, 1945, Vol. 58, pp. 100-112.

Letterei, Charles A. "Cognitive Profile: Basic Determinant of Academic Achievement." Journ. of Educ. Research, 1980, Vol. 73, pp. 195-198.

Noppe, Lloyd D. and Jeanette M. Gallagher. "A Cognitive Style Approach to Creative Thought." Journ. of Personality Assessment, 1977, Vol. 41, p. 85.

Reinert, Harry. "One Picture Is Worth a Thousand Words? Not Necessarily!" Modern Lang. Journ., 1976, Vol. 60, p. 160.

Sanders, Mary, James P. Scholz, and Spencer Kagan. "Three Social Motives and Field Independence Dependence in Anglo-American and Mexican American Children." Journal of Cross Cultural Psych., 1976, Vol. 7, No. 4, pp. 451-461.

Satterly, D. J. and I. G. Telfer. "Cognitive Style and Advance Organizers in Learning and Retention." British Journal of Educ. Psych., 1979, Vol. 49, pp. 169-178.

Schwen, Thomas M., Anne K. Bednar, and Kay Hodson. "Cognitive Styles: Boon or Bane?" Viewpoints in Teaching and Learning, Summer 1979, Vol. 54, pp. 49-61.

Wachtel, P. L. "Style and Capacity in Analytical Functioning." Journal of Personality, 1968, Vol. 36, pp. 202-212.

Witkin, H. A., C. A. Moore, D. R. Goodenough, and P. W. Cox. "Field Dependent and Field Independent Cognitive Stules and Their Educational Implications." Review of Educational Research, 1977, pp. 1-64.

U. S. Government Publications

Davis, J. Kent. Strategy Development and Hypothesis Testing as a Function of an Individuals Cognitive Style. U. S. Dept. of HEW, Proj. No. 1-E-067, November 1972.

U. S. Dept. of Commerce, Bureau of the Census. Current Population Reports. Series P-20, No. 217, 1974.

Unpublished Dissertations

Colvin, Willis Dwayne. "A Comparison of Attitudes Towards Education of Persons in the Anglo-American and the Mexican-American Power Structures Within Four Selected Oklahoma Communities." (Unpub. Ed.D. dissertation, Oklahoma State University, 1975.)

Myers, Lillian. "Cognitive Style Compatibility and Job Satisfaction of University Personnel: An Exploratory Study." (Unpub. Ed.D. dissertation, Oklahoma State University, 1980.)

Williams, Donald. "A Comparative Study of the Effects of Vocational Education on Culturally Disadvantaged Youth." (Unpub. Ed.D. dissertation, Oklahoma State University, 1976.)

Presentations

Ausburn, Floyd B. and Lynna J. Ausburn. "Learning Task Requirements, Cognitive Styles, and Media Attributes: An Interactive Research Model." Presentation to Annual Meeting of the Association for Educational Communications and Technology, Anaheim, California, 1976.

Ausburn, Lynna J. "The Relationship of Perceptual Type to Perceptual Style and Tempo in College Students." Paper presented at the Association for Educational Communications and Technology Annual Convention, Dallas, Texas, 1975.

Brown, Edward K. "Underachievement-A Case of Inefficient Cognitive Processing." An address prepared for the American Educational Research Association, New York, February, 1971.

Denson, Teri A. "Three Tests of Cognitive Style: Item Analyses and Characteristics." Paper presented at the Annual Conference of the New England Educational Research Organization, 7th, Spring 1976.

Wong, Harry K. "How to be an Exciting, Successful, Happy and Liberated Educator." Presentation to NASSP 62nd Annual Convention, Anaheim, California, 1978.

Books

Hornbostel, Victor O., John C. Egermeier, J. Paschal Twyman, and Gaylen R. Wallace. The Rehabilitation of School Dropouts in Oklahoma City, An Experimental Appraisal. Funded by the Ford Foundation. Stillwater, Oklahoma: Oklahoma State University Research Foundation, 1979.

Kogan, N. "Psychological and Educational Practice," Educational Implications of Cognitive Styles. Chicago: Scott Foresman and Company, 1971.

Oltman, Phillip K., Evelyn Raskin, and Herman A. Witkin. The Group Embedded Figures Test. Palo Alto, California: Consulting Psychologists Press, 1971.

Witkin, H. A., R. B. Dyk, H. F. Faterson, D. R. Goodenough, and S. A. Karp. Psychological Differentiation. New York: John Wiley and Sons, 1962.

Witkin, H. A., Philip K. Oltman, Evelyn Raskin, and Stephen Karp. A Manual for the Embedded Figures Tests. Palo Alto, California: Consulting Psychologists Press, 1971.

APPENDIX A

PERSONAL DATA SHEET

Personal Data Sheet

No._____

Directions: In each area below, please check (✓) the box which most correctly describes yourself.

Sex:

1. ☐	1. Male
2. ☐	2. Female

Age:

1. ☐	1. 16 years
2. ☐	2. 17 years
3. ☐	3. 18 years
4. ☐	4. 19 years
5. ☐	5. 20 or over

Race:

1. ☐	1. American Indian
2. ☐	2. Black
3. ☐	3. Caucasian
4. ☐	4. Other
5. ☐	

Size High School Last Attended:

1. ☐	1. 0-100
2. ☐	2. 100 or more

Public School Graduation

1. ☐	1. Graduated from regular classes
2. ☐	2. Did not graduate from regular classes

APPENDIX B

INSTRUMENT

GROUP EMBEDDED FIGURES TEST*

By Philip K. Oltman, Evelyn Raskin, & Herman A. Witkin

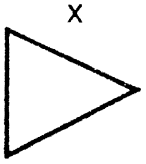
Name _____ Sex _____

Today's date _____ Birth date _____

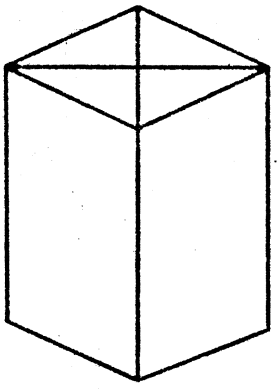
INSTRUCTIONS: This is a test of your ability to find a simple form when it is hidden within a complex pattern.

Here is a simple form which we have labeled "X":

X



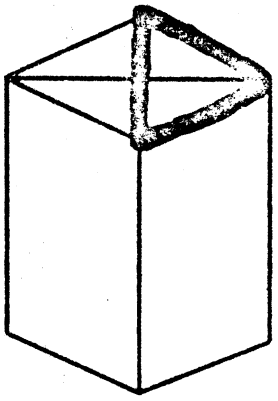
This simple form, named "X", is hidden within the more complex figure below:



Try to find the simple form in the complex figure and trace it *in pencil* directly over the lines of the complex figure. It is the SAME SIZE, in the SAME PROPORTIONS, and FACES IN THE SAME DIRECTION within the complex figure as when it appeared alone.

When you finish, turn the page to check your solution.

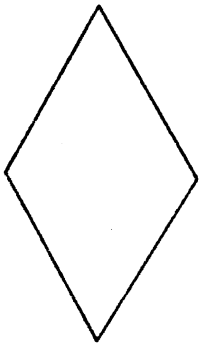
This is the correct solution, with the simple form traced over the lines of the complex figure:

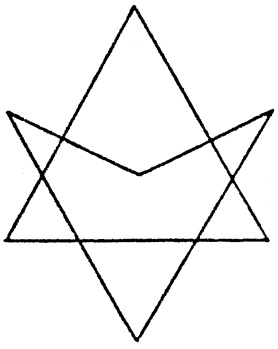


Note that the top right-hand triangle is the correct one; the top left-hand triangle is similar, but faces in the opposite direction and is therefore *not* correct.

Now try another practice problem. Find and trace the simple form named "Y" in the complex figure below it:

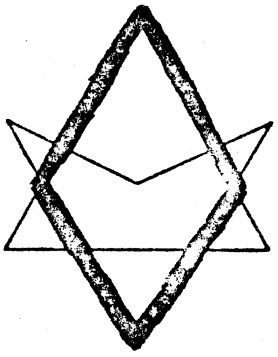
Y





Look at the next page to check your solution.

Solution:



In the following pages, problems like the ones above will appear. On each page you will see a complex figure, and under it will be a letter corresponding to the simple form which is hidden in it. For each problem, look at the BACK COVER of this booklet to see which simple form to find. Then try to trace it in pencil over the lines of the complex figure. Note these points:

1. Look back at the simple forms as often as necessary.

2. ERASE ALL MISTAKES.

3. Do the problems in order. Don't skip a problem unless you are absolutely "stuck" on it.

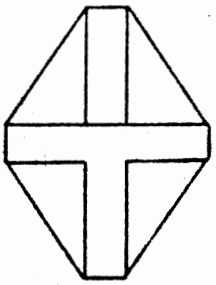
4. Trace ONLY ONE SIMPLE FORM IN EACH PROBLEM. You may see more than one, but just trace *one* of them.

5. The simple form is always present in the complex figure in the SAME SIZE, the SAME PROPORTIONS, and FACING IN THE SAME DIRECTION as it appears on the back cover of this booklet.

Do not turn the page until the signal is given

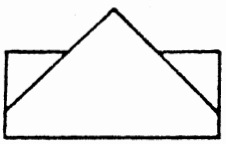
FIRST SECTION

1



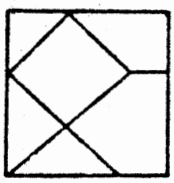
Find Simple Form "B"

2



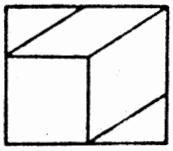
Find Simple Form "G"

Go on to the next page

3 

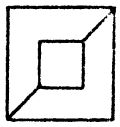
Find Simple Form "D"

---

4 

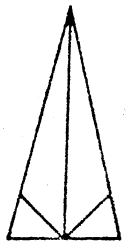
Find Simple Form "E"

Go on to the next page

5 

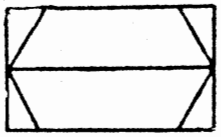
Find Simple Form "C"

---

6 

Find Simple Form "F"

Go on to the next page

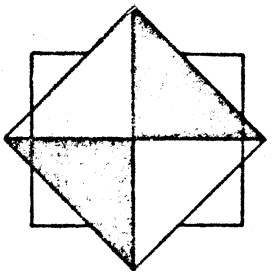
7 

Find Simple Form "A"

PLEASE STOP. *Wait for further instructions.*

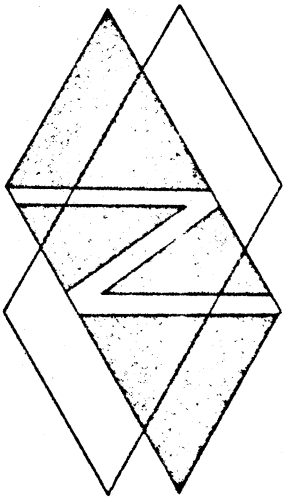
SECOND SECTION

1



Find Simple Form "G"

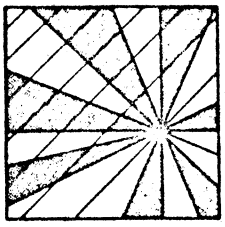
2



Find Simple Form "A"

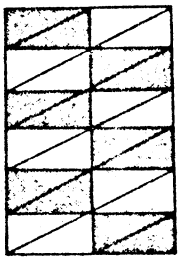
Go on to the next page

3



Find Simple Form "G"

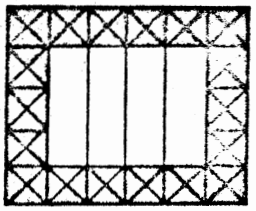
4



Find Simple Form "E"

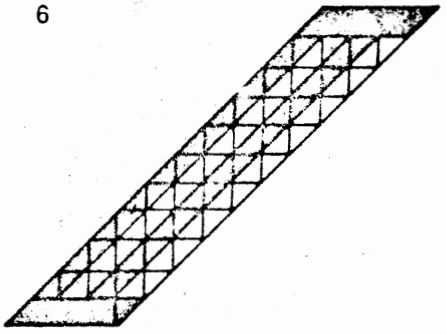
Go on to the next page

5



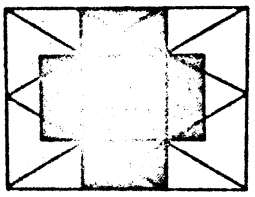
Find Simple Form "B"

6



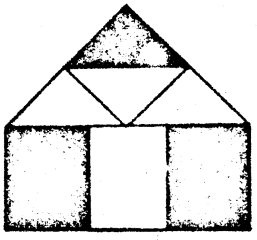
Find Simple Form "C"

Go on to the next page

7 

Find Simple Form "E"

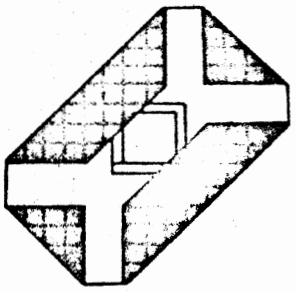
---

8 

Find Simple Form "D"

Go on to the next page

9

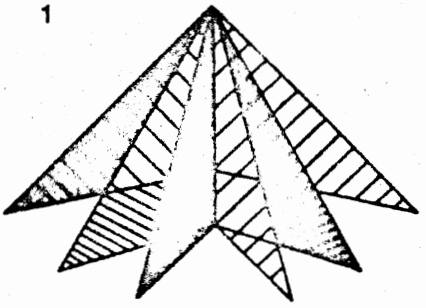


Find Simple Form "H"

PLEASE STOP. *Wait for further instructions.*

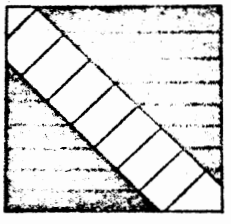
THIRD SECTION

1



Find Simple Form "F"

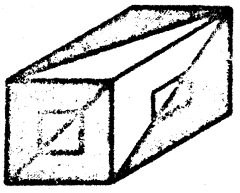
2



Find Simple Form "G"

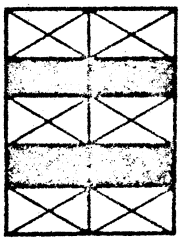
Go on to the next page

3



Find Simple Form "C"

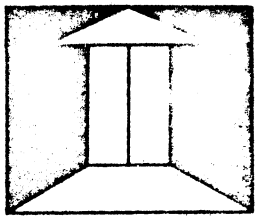
4



Find Simple Form "E"

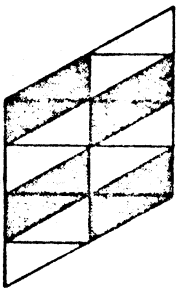
Go on to the next page

5



Find Simple Form "B"

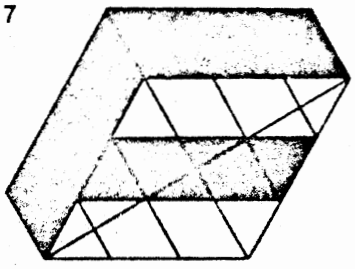
6



Find Simple Form "E"

Go on to the next page

7

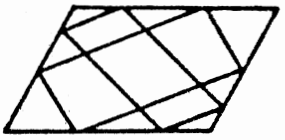


Find Simple Form "A"

8

Find Simple Form "C"

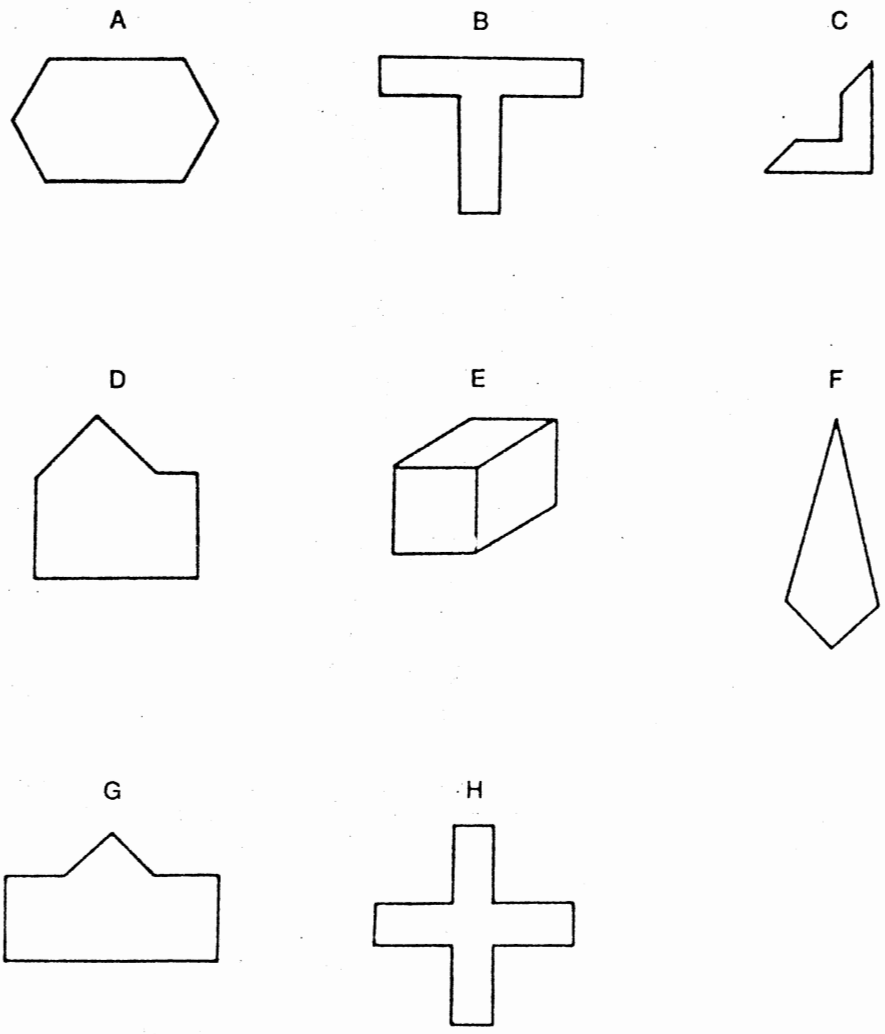
Go on to the next page

9 

Find Simple Form "A"

PLEASE STOP. *Wait for further instructions.*

SIMPLE FORMS



VITA

Earl J. Myers

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Doctor of Education

Thesis: COGNITIVE STYLE AND ITS EFFECT UPON HIGH SCHOOL GRADUATION

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Professional Experience: Junior High English Instructor, Ponca Military Academy, Ponca City, Oklahoma, 1968-1970; Junior High Counselor, Memorial Junior High, Edmond, Oklahoma, 1971-1973; Counselor-Principal, Cashion High School, Cashion, Oklahoma, 1974-1980.