ABSTRACT

AN EXPLORATORY STUDY OF PROCEDURES
FOR MEASURING AND MAPPING
QUALITATIVE SYMBOLIC ORIENTATIONS

By

Ronald K. Bass

Purpose of the Study

The purpose of this study was to determine the relative effectiveness of two methods for mapping the qualitative symbolic orientation (an aspect of cognitive style) of a selected sample of community college students. These methods were: 1) a series of tests developed by Oakland Community College, Bloomfield Hills, Michigan (primarily a paper and pencil test battery) and 2) a series of tests developed for this study (video-taped performance tests). The effectiveness of the student orientation mappings, determined by each method, was assessed by means of a rated performance of a task which was deemed by a panel of experts as requiring a major orientation by the student in the element in question.

Procedures

The subjects utilized in this study were randomly selected from those students reporting for testing with the Oakland Community College test battery at Delta College,

University Center, Michigan on April 10, 1972. Twenty-one students were selected from the twenty-four accessible elements.

The Oakland Community College test battery designed to measure elements of cognitive style (approximately a four hour test battery) (see Appendix A) was administered to the students in the study on April 10, 1972. Later that same day two tests developed for this study and designed to measure selected qualitative symbolic orientations were administered to the same population. The two tests developed for this study (Bass tests) were performance tasks which were recorded on video tape. On May 18, 1972 the qualitative symbolic orientations exhibited by students on the video tapes were mapped by a panel of experts who viewed the video tapes.

The Bass tests were designed to measure the following:

Test 1: Qualitative Proprioceptive Kinematics Q(PK)
Qualitative Code Synnoetics Q(CS)
Qualitative Code Histrionics Q(CH)

Test 2: Qualitative Proprioceptive Temporal Q(PT)
Qualitative Audio Q(A)

The Qualitative Code Synnoetics and Qualitative Code Histrionics portions of the Oakland Community College Test Battery were administered on a re-test basis during the week of April 10, 1972, to see if there was a change in scores on this test after the subjects had been exposed to the procedures of the Bass tests.

The effectiveness of the test results (Oakland Community College Test Battery and the Bass Tests) was determined by comparing the results of the tests to performances in classroom situations requiring, according to a panel of experts, major orientations in the qualitative symbols under study.

Eighteen null hypotheses were generated and tested. Each null hypothesis was tested using the Komolgorov-Smirnov Statistical Test Model. All hypotheses were tested at the .05 Alpha level.

Conclusions

The findings of this study indicate that:

1. Either the O.C.C. test or the Bass test can be used effectively as a predictor of classroom performance in qualitative code synnoetics.
2. Either the O.C.C. test or the Bass test can be used effectively as a predictor of classroom performance in qualitative code histrionics.
3. Either the O.C.C. test for qualitative proprioceptiveness or the Bass test for qualitative proprioceptive kinematics can be used effectively as a predictor of classroom performance in qualitative proprioceptive kinematics.
4. Either the O.C.C. test for qualitative proprioceptiveness or the Bass test for qualitative proprioceptive

temporal, or incidental observation of qualitative proprioceptive temporal during the Bass test for qualitative proprioceptive kinematics can be used effectively as a predictor of classroom performance in qualitative proprioceptive temporal.

5. The Bass test is more effective than the O.C.C. test as a predictor of qualitative auditory ability.
6. Either the O.C.C. test or the Bass test can be used effectively for mapping qualitative symbolic orientation.

AN EXPLORATORY STUDY OF PROCEDURES FOR MEASURING AND MAPPING QUALITATIVE SYMBOLIC ORIENTATIONS

By

Ronald K. Bass

A THESIS

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DEDICATION

To my wife Jenny
and our children
David, Ronda and Mark

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I wish to express sincere appreciation to the Chairman of my committee, Dr. Paul W. F. Witt, whose advice, counsel, encouragement, and helpfulness have made success in my doctoral program possible and to Dr. Norman Bell, Dr. James Page, and Dr. Joseph E. Hill for their contributions and interest as members of my guidance committee.

I wish to express special thanks to Dr. Hill who took time from his many responsibilities at another institution to serve on my committee and who has served, quite often under the cover of darkness, as advisor, statistician, and friend during the course of my study.

Further gratitude and appreciation are expressed to Mrs. Crystal Lange of Delta College, Dr. Virginia Svagr of Oakland Community College, and Mr. James Hand, a fellow graduate student, who were always ready to go beyond the call of duty in helping me conduct this study.

Appreciation is also expressed to the Faculty and Staff of the Instructional Development and Technology Department and to my fellow graduate students, many of whom have provided counsel and all of whom have shown understanding.

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CHAPTER I

INTRODUCTION

Education for a technological age must not only be flexible in terms of educational opportunity and instructional programs, but in terms of personalization. At present there are a variety of efforts being made by educational institutions of the world to accommodate these demands. Although each aspect of flexibility in education, as listed above, is important to contemporary society, the aspect of personalization of education is a vitally important consideration for the realization of the flexibility goal. Therefore much more information about the individual, expressed in a variety of forms, is essential.

Most endeavors dealing with measurement of educational achievement, aptitudes, and other dimensions of a student's education have been limited to paper and pencil tests. Such measurement does not satisfy the demands of the non-traditional education[1] that is currently needed and most certainly will be required in the future. The current measurement situation can be greatly improved if the efforts of the field of instructional

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[1]Samuel B. Gould, "The Prospects for Non-Traditional Study," AGB Reports (Nov./Dec., 1971), pp. 22-31.

technology can be expanded to include many of the activities presently required of specialists in data collection and measurement. The video tape recorder (VTR) can be used for recording specimens of behavior involving qualitative symbolic mediation and/or utilization[2] as illustrative of these points. The VTR's capability of reproducing recorded situations which can be scored[3] by a panel of observers provides it with an attribute that cannot be found in paper and pencil measuring instruments.

Studies are needed to explore the possibilities and the limitations of selected technological devices for data collection and educational measurement. Specifically, a pilot study of how the video tape recorder might be used to collect data that can be translated into qualitative symbolic orientations, i.e., elements of the individual's cognitive style, is needed.

Several recent studies have been conducted in which a video tape recorder was utilized as a data collection device. These studies have been primarily in the areas of teacher education and counseling.

Studies in the counseling area have indicated that the video tape recorder is of considerable value as a data

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[2]See Chapter II for a discussion of these and other topics in the Educational Sciences.

[3]A score is a value assigned to an act or quality.

collection device. Donohue,[4] for example, found the VTR a very effective device in critiquing non-verbal behavior in prospective counselors. Lindberg[5] used the VTR effectively in investigation of students reactions to differing counseling styles. Hall[6] used the VTR successfully in the perceptual evaluation of empathic communication. Hum[7] found the VTR to be an excellent device for feedback in group counseling.

Teacher education applications have been primarily in the areas of student teacher evaluation. DeGenaro[8] found the VTR to be an excellent device for evaluation of student teacher performance in physical education. Harder[9] showed considerable

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[4]Stephen T. Donohue, "The Effects of Three Video Tape Critique In Practicum Upon Prospective Counselor's Nonverbal Behavior" (unpublished Doctoral Dissertation, New Mexico State University, 1969).

[5]Robert E. Lindberg, "An Investigation of College Student's Reaction to Two Different Styles of Counseling as Viewed on Video Tapes" (unpublished Doctoral Dissertation, Arizona State University, 1969).

[6]William O. Hall, Jr., "Analysis of Video Tape in the Perceptual Evaluation of Empathic Communication" (unpublished Doctoral Dissertation, The University of Kentucky, 1967).

[7]Sterling Pierce Creed Hum, "An Investigation of the Use of Focussed Video Tape Feedback in High School Group Counseling" (unpublished Doctoral Dissertation, The University of Southern California, 1969).

[8]Arthur Paul DeGenaro, "Experimental Use of the Video Tape Recorder as an Evaluative Instrument and Observational Tool in the Supervision of Student Teachers of Physical Education" (unpublished Doctoral Dissertation, The Ohio State University, 1969).

[9]Robert John Harder, "A Study in the Supervision of Social Studies, Student Teachers Utilizing Video-tape Techniques" (unpublished Doctoral Dissertation, The University of Nebraska, 1968).

success in the shaping of student teachers in social studies. Smith[10] used the VTR as a device through which teachers and supervisors could evaluate the same instructional activity, to see if there were differences in the evaluations. The video tape recorder has also been utilized successfully for student teacher evaluation at many institutions including the University of Georgia and Michigan State University.

The Michigan State University Medical School and the Michigan State University School of Ostheopathic Medicine have also used the video tape recorder effectively as a data collection device for evaluation and critique of student performance.

The concept of differences in the cognitive style of individuals, as supported by Chapter II of this study, has been of concern to educators for many years. Attempts at the development of a conceptual framework within which to deal with this problem are underway in many areas of the world. Prominent among them is the work of Donald Harry Britt[11] at the University of Cambridge, England. The framework he has developed is limited in that he classifies students into only three learner types. Another prominent activity in this area is being

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[10]Robert Howard Smith, "A Comparison of Instructional Evaluations by Teachers and Supervisors Using Video Tape" (unpublisted Doctoral Dissertation, University of Minnesota, 1969).

[11]Donald Harry Britt, "An Improved Method for Instructional Development," Audio-visual Instruction, Vol. 16, No. 4 (April, 1971), 14-15.

carried out by the Portsmouth, Rhode Island, Public Schools.[12] They too are developing a framework which could be classified as limited due to a small number of learner types identified. What appears to be a most promising work in this area is being conducted by Dr. Joseph E. Hill and his staff at Oakland Community College in Bloomfield Hills, Michigan. The framework developed by Hill takes into consideration many aspects of the individual and many learner types can be classified within the framework.

It is within the framework developed by Hill that the current study was conducted. A brief explanation of the educational sciences follows.

The Educational Sciences

Hill, currently President of Oakland Community College, has, for thirteen years been developing what he refers to as the Educational Sciences.

Efforts have been channeled in this direction due to an increasing awareness that existing educational systems are not adequately geared to meet the demands of a rapidly changing society and world. Attempts at effecting large-scale revision in curricula and activities which comprise the field of

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[12]Lawrence T. Melo, Paula Tannenbaum, and Edward R. Campbell, "Project CAM: Reaching Objectives Through Learning Modalities," Audio-visual Instruction, Vol. 16, No. 5 (May, 1971), 30-31.

education have been hampered because the field of education lacks a unifying, conceptual framework and language. Without a conceptual framework and language, the field of education does not lend itself to meaningful description and definition. Misinterpretation and misunderstanding are commonplace. The probability of precise discriminations and predictions is small.[13] If education is considered to be the process of searching for meaning, where this process can be defined as a system composed of the generic elements of persons, processes, and properties, then these bodies of information (sciences) considered to be fundamental to this process can form the needed conceptual framework.

If education is thought of as a social system involving the generic elements of persons, processes, and properties, and their interconnections, then analysis of this system shows that there are seven aspects of it that are fundamental to it's existence. Since each aspect includes factual descriptions, concepts, generalizations, and principles which can be employed to conduct rigorous, systematic observations and experimentations in the field (education) to which they pertain, then each can be considered a science in its own light.[14] These sciences may be designated as:

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[13]Joseph E. Hill, The Educational Sciences (Wayne State University, 1968), pp. 1-2.

[14]Ibid., pp. 5-6.

1. Symbols and their meanings (S).
2. Cultural determinants of the meanings of symbols (E).
3. Modalities of inference (H).
4. Biochemical and electrophysiological aspects of the memory function (recognition, retention, recall, association) (Y).
5. Cognitive style of individuals (G).
6. Teaching, administrative and counseling style (TAC).
7. Systemic analysis decision-making (SAD).[15]

These sciences and their interrelationships, can be depicted by the following cartesian products of sets. To illustrate this point, the science of cognitive style is a cartesian product of four sets of information; symbols and their meaning (S), cultural determinants (E), modalities of inference (H), and memory (Y).[16] The labeling used above is also utilized in this graphic representation.

$$\left\{ \overbrace{\left[\left\{ S_{(1)} \right\} \times \left\{ E_{(2)} \right\} \times \left\{ H_{(3)} \right\} \times \left\{ Y_{(4)} \right\} \right]}^{G_{(5)}} \times \left\{ TAC_{(6)} \right\} \right\}_{SAD_{(7)}}$$

Figure 1. A cartesian product of sets representation of the educational sciences.

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[15]Joseph E. Hill and Betty O. Setz, Educational Sciences at Oakland Community College (O.C.C. Press, 1970), p. 3.

[16]Vaughn Hoogasian, Cognitive Style: A Peek Behind the Classicurtain (O.C.C. Press, 1971), p. 2.

The particular elements of cognitive style of interest to this study are the qualitative symbols, i.e., those symbols which present and then represent to the awareness of the individual that which the symbols themselves are to the individual--feelings, colors, values, musical tones, commitments. Qualitative symbolic orientations are currently being mapped, primarily, from student responses to paper and pencil inventories. The present study is based on the contention that qualitative symbolic responses may be quite different in a real situation as compared to what one thinks one might do in such a situation (paper and pencil test responses).

Statement of Purpose

The purpose of this study was to determine the relative effectiveness of two methods for determining the qualitative symbolic orientation (an aspect of cognitive style) of a selected sample of community college students. The effectiveness of student orientation mappings, as determined by each method, was assessed by means of a rated performance of a task which was deemed by a panel of experts as requiring a major orientation by the student in the qualitative symbol under consideration.

Method

Specifically, the selected qualitative symbolic orientations of a given student were first mapped on the basis of

scores yielded by a paper and pencil instrumentality. These same qualitative symbolic orientations were then mapped on the basis of evaluations, by a panel of judges, of video taped performance behaviors requiring these symbolic orientations. The effectiveness of the mappings of selected qualitative symbolic orientations was determined on the basis of the degree to which they matched a performance criterion calling for a major capability in these dimensions.

It was anticiapted that the viewing of video tapes and empirical mapping by a panel of judges of the qualitative symbolic orientations of the individual recorded thereon would have a higher validity and reliability than the map resulting from paper and pencil responses. This notion is derived from the fact that the video taped map was compiled from responses actually exhibited in a real-life situation rather than through written responses to constructed validity situations as presented by paper and pencil tests.

Significance of the Study

The demands of contemporary society for diversifying and personalizing educational programs and approaches has caused increasing recognition, in educational circles, for the field of instructional technology. The field also has potential for contributing to data collection and, indirectly, measurement of educational achievement. This situation is emphasized with such developments in education as cognitive style mapping,

teaching style mapping, administrative style mapping, counseling style mapping, and systemic analysis decision making.

This study has significance for the increasing numbers of persons and educational institutions that are interested in and/or involved in the assessment of elements of cognitive style. This study should also provide new information which should lead to more accurate assessment of certain elements of cognitive style and more accurate matching of instructors, instructional settings, and instructional packages to students styles (needs), than is currently possible.

Questions to be Answered

In order to achieve the purpose of this study, answers to the following questions were sought:

1. Is the mapping of qualitative code synnoetics more effective by use of the Oakland Community College test battery or by use of the Bass test?
2. Is the mapping of qualitative code histrionic more effective by use of the Oakland Community College test battery or by use of the Bass test?
3. Is the mapping of qualitative proprioceptive kinematics more effective through use of the Oakland Community College test designed to yield measures of qualitative proprioceptiveness or by use of the Bass test for qualitative proprioceptive kinematic ability?

4. Is the mapping of qualitative proprioceptive temporal ability more effective through use of the Oakland Community College test designed to yield measures of qualitative proprioceptiveness or by use of the Bass test for qualitative proprioceptive temporal ability?
5. Is the mapping of qualitative auditory ability more effective through use of the Oakland Community College test battery or by use of the Bass test?
6. Is qualitative symbolic mapping by the Bass tests more effective than qualitative symbolic mapping by the Oakland Community College test battery?

Definition of Key Terms

The following definitions of terms are essential to the understanding of the current study.

CARTESIAN PRODUCT--A particular type of space or set whose elements may be combined into profiles defined over that space. The "x" sign does not denote any algebraic or numerical operation but indicates that elements from each of the sets depicted must be combined to determine the exact reference points of each multi-element profile in space (see Figure 1).

COGNITIVE STYLE--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. Is he a listener or a reader? Is he concerned only with his point of view or is he influenced in decision-making by his family or by his group of associates? How does he reason?

COGNITIVE STYLE MAP--A cognitive style map gives a picture of the way an individual derives meaning from his environment and personal experiences. Each map, like each individual, is different. A map of an individual's cognitive style provides a look at the way in which he derives meaning from his environment based upon his symbolic orientation, personal experiences, and ways of reasonings; i.e., drawing conclusions.

EDUCATIONAL SCIENCES--A common structure within which inquiry of significance for the fundamental aspects of the applied field of education can be conducted. The educational sciences provide a conceptual framework and scientific language for the field that approaches the level of precision found in such derivative fields as medicine, pharmacy, engineering, law, and nursing.

MAJOR ORIENTATION--When a student scores in the top 25% on a test for a particular element in cognitive style he is said to have exhibited a major orientation in that element.

MINOR ORIENTATION--When a student scores in the middle 50% on a test for a particular element in cognitive style he is said to have exhibited a minor orientation in that element.

NEGLIGIBLE ORIENTATION--When a student scores in the lower 25% on a test for a particular element in cognitive style he is said to have exhibited a negligible orientation in that element.

QUALITATIVE SYMBOLS--Symbols which present and then represent to the awareness of the individual that which the symbols are (feelings, commitments, and values are examples).

QUALITATIVE AUDITORY - Q(A)--The ability to perceive meaning through the sense of hearing.

QUALITATIVE PROPRIOCEPTIVE KINEMATIC - Q(PK)--Programmatic in nature, a combination of qualitative symbols, dealing with combinations involving motor-skill ability.

QUALITATIVE PROPRIOCEPTIVE TEMPORAL - Q(PT)--Programmatic in nature, dealing with combinations involving timing.

QUALITATIVE CODE SYNNOETICS - Q(CS)--Personal knowledge of oneself in all qualitative and theoretical symbolic forms in relation to ones environment.

QUALITATIVE CODE HISTRIONICS - Q(CH)--Staged behavior, or a deliberate exhibition of emotion or temperament to produce some particular effect on other persons.

SYMBOLIC ORIENTATION--Symbolic orientation refers to the ability of an individual to mediate either theoretical or qualitative symbols into meaning; four theoretical symbols, eighteen qualitative symbols.

Overview of Chapters

A frame of reference for this study is developed in Chapter I. Included are the introduction, the need for the study, statement of the purpose, significance of the study, and questions to be answered.

In Chapter II a review of related literature is presented. The main areas of the review are: cognitive style, the educational sciences, and cognitive style as defined in the educational sciences.

The design of the study and the procedures followed in the research are reported in Chapter III. Information in this chapter includes source of data, data collection procedures, and hypotheses to be tested.

The analysis of data is presented in Chapter IV.

In Chapter V, a summary of the study, conclusions, and implications for further research are presented.

CHAPTER II

REVIEW OF RELATED LITERATURE

Since the study deals with the collection of data pertaining to the individual characteristics of students, the pertinent related literature lies generally in the broad areas of: 1) cognitive style, 2) the educational sciences, and 3) studies of cognitive style as the concept is defined in the educational sciences.

Cognitive Style

From the late 1920's through the 1930's studies of consistency and predictability of personality were carried out by F. H. Allport,[1] Hartshorne,[2] Shuttleworth,[3] May,[4] and

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[1]F. H. Allport, "The Influence of the Group Upon Association and Thought," Journal of Experimental Psychology, 3 (1920), 159-182.

[2]H. Hartshorne, M. A. May, F. K. Shuttleworth, Studies in the Nature of Character, Vol. III: Studies in the Organization of Character (New York: Macmillan, 1930).

[3]Ibid.

[4]M. A. May and H. Hartshorne, "A Summary of the Work of the Character Education Inquiry," Religious Education, 25 (1930), 607-619 and 754-762.

Lewin.[5]

In the latter half of the 1930's, Gordon Allport[6] referred to "styles of life" and to "modes of adaptation" as a means of identifying distinctive personality types.

In the 1940's, studies were initiated concerning concept formation, that process which occurs between perception and response. These researchers were interested in what they called cognitive processing. They considered a response to a stimulus, as Gardner et al. stated, as:

> ... coerced not by stimulus alone, but also by the organizational dispositions of the responding system....[7]

Klein,[8] in 1951, termed the organizational process used by Gardner as "cognitive control principles" and Gardner,[9] in 1953, delimited the term "cognitive style" to only those control principles (disposition of the responding system) within an individual.

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[5]K. Lewin, R. Lippitt, and R. White, "Patterns of Aggressive Behavior in Experimentally Created "Social Climates," Journal of Social Psychology, 10 (1939), 271-299.

[6]Gordon W. Allport, Personality, A Psychological Interpretation (New York: Henry Holt and Co., 1937), p. 47.

[7]R. W. Gardner et al., "Cognitive Control: A Study of Individual Consistencies in Cognitive Behavior," Psychological Issues, Vol. 1, No. 4 (1959), 3.

[8]G. S. Klein, "The Personal World Through Perception," in Blake and Ramsey (Editors), Perception: An Approach to Personality (New York: Ronald Press, 1951), 328-355.

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

Broverman, in 1960, analyzed the work of Gardner and Klein and stated:

> ... cognitive styles seem promising parameters on which to order a perplexing array of individual differences in human behavior.[10]

Witkin,[11] in 1954, termed cognitive style as a type of personality construct shown in the interaction between the events in a person's life history and that person's perceptual (cognitive) response system.

The Educational Testing Service (ETS) has directed major attention to the concept of cognitive style. In November, 1951 ETS organized a conference to identify and select tests to measure established cognitive factors. As a result of these efforts, a kit containing tests to measure twenty-four different aptitude or achievement factors was developed and published in 1954. A second such conference was convened in November 1958, and resulted in the development and publishing of a second twenty-four element kit in 1963.[12]

While it is possible to assert with considerable confidence that people differ in their ability to learn, it is not

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[10]D. M. Broverman, "Dimensions of Cognitive Styles," Journal of Personality, Vol. 38 (1960), 183.

[11]H. A. Witkin et al., Personality Through Perception: An Experimental and Clinical Study (New York: Harper and Brothers, 1959), pp. 495-500.

[12]John W. French, Ruth B. Ekstrom, and L. A. Price, Manual of Reference Tests for Cognitive Factors (Princeton, New Jersey: Educational Testing Service, 1963), pp. 2-3.

easy to assess or accurately describe the ways in which they differ.

Gagné, in 1962, took the position that the least effective individual difference measure is the aptitude or general intelligence score. He sites as the most useful approach the concept of learning sets. He states:

> The major methodological implication of this paper is to the effect that investigation of productive learning must deal intensively with the kind of variable usually classified as individual differences. One cannot depend upon a measurement of general proficiency or aptitude to reveal much of the important variability in the capabilities people bring with them to a given task.... But, the measurement of their learning sets ... revealed a great deal about how they would behave.[13]

From Gagné's point of view, prior experience--the totality of an individual's being, must be the element of concern when dealing with individual differences.

The research cited above (Allport, Broverman, Gardner, Gagné, Witkin) and other research similar in nature (Ames,[14] Blake and Ramsey[15]) supports the contention that man in his dealing with the complexity of the world deals with problems in varying ways. Cognitive behavior is considered a basic component of the socio-personal matrix and this cognitive

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[13]Robert M. Gagné, "The Acquisition of Knowledge," Psychological Review, LXIX (July 1962), 365.

[14]A. Ames, "Sensations, Their Nature and Origin," Transformations, 1 (1950), 11-12.

[15]R. R. Blake and G. V. Ramsey, Perception: An Approach to Personality (New York: Ronald Press, 1951).

behavior is consistent enough in quality to be termed cognitive "style."

Educational Sciences

Hill, in his concept of educational sciences has defined cognitive style in a somewhat different way than it is defined above while relying heavily upon the work cited. It is within the framework developed by Hill that this study was conducted.

The concept of the educational sciences was developed in an attempt to create a conceptual framework and language for education and is composed of seven sciences, each of which is described below.

Science S, Symbols and Their Meanings, also known as symbologosics is mainly an outgrowth of the work of Ernst Cassirer and John Dewey.[16]

Man deals with two types of symbols:

> Theoretical--That symbol which presents to the "awareness" or nervous system of the individual something different from that which the symbol itself is--the word cat.[17]
>
> Qualitative--That symbol which presents and then represents to the "awareness" of the individual that which the symbol itself is to the individual--a cat.[18]

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[16]Laurence Wasser, The Educational Science of Cognitive Style (O.C.C. Press, 1971), p. 3.

[17]Ibid., p. 6.

[18]Ibid., p. 12.

The theoretical symbols can be both visual and auditory and deal with ideas both linguistic and quantitative. They therefore are subclassified as:

A. Theoretical visual linguistic T(VL)--written word

B. Theoretical audio linguistic T(AL)--sound of a word

C. Theoretical visual quantitative T(VQ)--written number

D. Theoretical audio quantitative T(AQ)--sound of a number[19]

The meaning of qualitative symbols is derived from three sources; sensory stimuli, cultural codes (games), and programmatic effects of objects.

There are eighteen (18) qualitative symbols. Five of them are associated with sensory stimuli.

1. Q(A)--auditory--the ability to perceive meaning through the sense of hearing.

2. Q(O)--olfactory--the ability to perceive meaning through the sense of smell.

3. Q(S)--savory--the ability to perceive meaning by the sense of taste.

4. Q(T)--tactile--the ability to perceive meaning by the sense of touch.

5. Q(V)--visual--the ability to perceive meaning by the sense of sight[20]

Three of the qualitative symbols are programmatic in nature, and as such, can be thought of as "sixth senses."

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[19]Joseph E. Hill and Derek Nunney, Personalizing Educational Programs Utilizing Cognitive Style Mapping (O.C.C. Press, 1971), p. 5.

[20]Ibid., p. 5.

6. Q(P)--proprioceptive--like the ability to type without consciously going through the steps.[21]

7. Q(PK)--proprioceptive kinematic--a subset of Q(P).

8. Q(PT)--proprioceptive temporal--a subset of Q(P).

The remaining ten qualitative symbols are associated with cultural codes and are termed:

9. Q(CEM)--code empathetic--the ability to identify with, or have a vicarious experience of, another persons feelings, ideas, volitions.

10. Q(CES)--code esthetic--the ability of the individual under consideration to view with enjoyment the "beauty" and "pureness" of a resulting product, situation, or idea.

11. Q(CET)--code ethic--a commitment to a set of values, a group of moral principles, obligations, and/or duties.

12. Q(CH)--code histrionic--staged behavior, or a deliberate exhibition of emotion or temperament to produce some particular effect on other persons.

13. Q(CK)--code kinesics--the ability to communicate by means of non-linguistic functions such as blushing and motions of the body; such as shrugs, smiles, gestures.

14. Q(CKH)--code kinesthetics--motor skill ability.

15. Q(CP)--code proxemics--the ability of an individual to judge the acceptable "critical" physical and social distance between himself and others as perceived by the other person.

16. Q(CS)--code synnoetics--personal knowledge of oneself in all qualitative and theoretical symbolic forms in relation to ones environment.

17. Q(CT)--code transactional--the ability to maintain a positive communicative interaction which significantly influences the goals of the persons involved in that interaction.[22]

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[21] Ibid., p. 5.

[22] Ibid., p. 6.

18. Q(CTM)--code temporal--proper social timing.

Theoretical symbols are used in ordinary language to communicate ideas in a connected, consecutive manner according to a principle of common logic. Qualitative symbols are used to convey feelings, commitments, values and to provide particular types of insights into the domain of self.[23]

The relationship between theoretical symbols and qualitative symbols can be explained in terms of a four part continuum. Each part of the continuum represents a symbolic condition. The four conditions are theoretical predominance (TP), reciprocity (REC), qualitative predominance (QP), and qualitative independence (QI).[24]

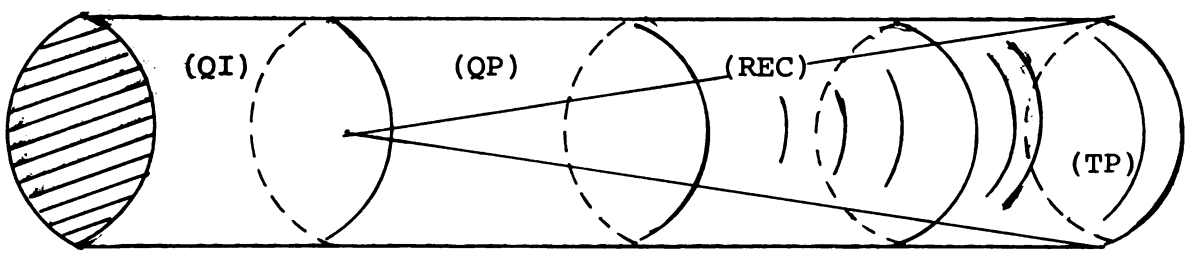

Figure 2. Continuum of symbolic conditions of educational tasks.[25]

The drawing "continuum of symbolic conditions" should be considered as a solid cylinder except for the hollow cone contained therein.

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[23]Hill and Setz, op. cit., p. 18.

[24]Ibid., p. 21.

[25]Wasser, op. cit., p. 21.

(QI)--qualitative independent--where symbolic utilization is entirely in the qualitative realm. An original music presentation by a person who can neither read nor write music.

(QP)--qualitative predominant--where symbolic utilization is in both the theoretical and qualitative realms, but predominantly qualitative. A music lesson in which theoretical symbols are used by the teacher, but the predominant activity (student performance) is qualitative.

(REC)--reciprocity--theoretical and qualitative symbolic utilization in approximately equal portions. A music lesson in which musical selections are played (qualitative) to explain (theoretical) certain aspects of appreciation.

(TP)--theoretical predominant--where symbolic utilization is in both the theoretical and qualitative realms, but predominantly theoretical. A music lesson--predominantly lecture mixed with occasional renditions.[26]

Science E, Cultural Determinants, also known as determantics, has been designed on the premise that education (for that matter all human behavior) cannot be completely analyzed and understood unless it is interpreted in the social context in which it exists.

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.

The main cultural influences at work on the individual throughout life are his family, his associates, and his individuality.[27]

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[26]Ibid., pp. 21-22.

[27]Joseph E. Hill, The Educational Sciences (Wayne State University, 1968), p. 7.

Individuals are predisposed to solve problems on their own (individuality), to seek aid from their family (family), to seek aid from friends (associates), or to deal with problems in combinations of these with one factor being predominant.

These influences are either positive or negative.[28]

Science H, Modalities of Inference, also known as inferensics. One quality distinguishing man from other animals is the uniqueness of the inference processes employed by him in his search for meaning. The educational science of modalities of inference deals with the diverse methods of mediating into meaning theoretical and qualitative symbols.[29]

The process of statistical inference is used as the model for establishing the modalities of inference attributed to man, and shows that man is limited to four inductive inference processes for drawing probability conclusions (magnitude, difference, relationship, appraisal).

The magnitude inference process is a form of categorical thinking and utilizes norms categorically classified, and attitudes accepted as true by the individual as a basis for acceptance or rejection of advanced hypotheses.[30]

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[28]Wasser, op. cit., p. 39.

[29]Ibid., p. 44.

[30]Hill and Nunney, op. cit., p. 5.

Difference deals with hypotheses of difference such as one to one contrasts or comparisons of selected characteristics of measurement.[31]

Relationship is a process of comparing relationships between two or more characteristics or measurements.[32]

The appraisal type of inference considers, with equal weight, hypotheses of all the previous three categories (magnitude, difference, relationship) in arriving at a probable conclusion.[33]

While an individual may at different times employ all of the types of inductive reasoning processes, preferential use of one type over the others emerges as an element of the individual's cognitive style.[34]

Science Y, Biochemical and Electrophysiological Aspects of Memory Function. This is an educational science which is not well developed. A great deal is not known in this area, and although research is being conducted in the area, this science is virtually not utilized in the Oakland Community College program.

Much additional research must be done before this educational science becomes a functional part of an on-going program.

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[31] Ibid., p. 5.

[32] Ibid., p. 5.

[33] Ibid., p. 5.

[34] Hill and Setz, op. cit., p. 6.

Science G, Cognitive Styles of individuals as can be seen in Figure 1 (Chapter I), is composed of the cartesian product of S, E, H, and Y.

The construct of cognitive style is a vehicle which can be used to diagnose individual styles and prescribe activities which provide the high probability of the student's accomplishing successfully the educational task confronting him.

The determination of an appropriate style for an individual demands that the diagnostician analyze the student and the substance of the educational task to be considered since the cognitive style provides a means of analyzing, interpreting, and evaluating educational endeavors in a manner relatively different from those usually employed.[35]

This procedure leads to the formulation of strategies for the matching and augmentation of styles to increase the probability of a student's successful performance in the myriad of educational tasks he faces daily. Cognitive style not only expresses the idiosyncratic nature of students as persons engaged in meaning-seeking behavior but allows teachers to communicate this uniqueness precisely and accurately within the realms of education.[36]

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[35]Hill, op. cit., p. 15.

[36]Wasser, op. cit., p. 59.

Science TAC, Teaching Style, Administrative Style, and Counseling Style. These three elements have been found to be significant as fundamental aspects of the educative process in addition to cognitive style. Teaching, administrative and counseling styles quite often are entirely different than cognitive styles.[37]

Teaching style may be used to analyze and develop generalizations about student-teacher relationships and are classified in three categories: authoritarian, adjustive, and flexible.[38]

Administrative styles are classified in major/minor two-element categories of the following: dominant, adjusting, cooperative, and passive-custodial.[39]

Counseling style takes into consideration, in addition to cognitive style, the counselor's attitude toward who should set goals and determine the approaches to the goals.

Counselors are classified as directive, situational, and non-directive (the situational style changing from directive to non-directive on the basis of the situation).[40]

Science SAD, Systemic Analysis Decision-Making. The ultimate aim of systemic analysis is that of deriving optimal decisions. An optimal decision is one that is best for all

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[37]Hill and Setz, op. cit., p. 9.

[38]Ibid., p. 10.

[39]Ibid., p. 10.

[40]Ibid., p. 10.

elements included in the system. The systemic approach accommodates both broad-scale and in-depth evaluative decision-making regarding changes and modifications in an arbitrarily defined set of elements and their interconnections considered over a specified period of time.[41]

These seven sciences have been proposed as a conceptual framework for the applied field of education. They provide bodies of information composed of descriptive facts, concepts, definitions, generalizations, laws, and theories that have significance to fundamental aspects of the applied field of education. Any element in education can be analyzed in terms of one of the sciences or by a combination of two or more of them.

The proposed educational sciences should also provide an articulation which is unique to those activities called education. This articulation should provide a vehicle to counteract, among others, misinterpretation, difficulties that now occur because of inadequate communication between scholars and professional persons, fragmentation, and lack of closure and completeness for the system. The educational sciences do not identify disconnected and isolated realms but are interrelated and complimentary aspects of the field of education.

Although the framework as presented above is extensive and well-defined, it is an evolving concept. Many studies are

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[41]Hill, op. cit., p. 20.

presently being conducted which will add to, delete from, or modify practice within the framework.

Effort is constantly being made toward more accurate assessment of elements of cognitive style, more accurate mapping of these elements, and more accurate matching of instructors, instructional packages, and instructional setting to students based upon their cognitive style maps.

Many educational institutions and organizations are becoming both interested and involved in cognitive style mapping and personalization of instruction based upon the framework developed by Hill (the University of Tennessee at Martin, a seven community college consortium in Florida, The East Lansing Public Schools, Tulane University, a six community college consortium in Georgia, the University of Wisconsin-Parkside, Delta College, and more).

Increased interest in and reliance on the framework of the educational sciences makes additional research in all areas of the framework not only desirable, but imperative.

Cognitive Style in the Educational Sciences

Recent findings by researchers working within the framework developed by Hill have added significantly to the evolution of the concept. Examples are:

Symbolic Orientation

Shuert,[42] in his study of the cognitive styles of successful mathematics students, found that the following elements of symbolic orientation were unique to the successful group.

1. Major theoretical visual quantitative (TVQ).
2. Major theoretical auditory quantitative (TAQ).
3. Minor theoretical auditory linguistic (TAL).

Dehnke's[43] findings indicated that there is a pattern of symbol mediation among successful English teachers.

Wasser[44] discovered that teachers of mathematics, language, health, social studies, science, reading and spelling tended to give higher grades to students who made use of auditory and visual theoretical symbols.

Robinson,[45] investigating the changes that occurred in the cognitive style of participants in a "Higher Opportunities

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[42] Keith L. Shuert, "A Study to Determine Whether A Selected Type of Cognitive Style Predisposes One to do Well in Mathematics" (unpublished Ph.D. dissertation, Wayne State University, 1970).

[43] Ronald E. Dehnke, "An Exploration of the Possible Isomorphism of Cognitive Style and Successful Teaching of Second School English" (unpublished Ph.D. dissertation, Wayne State University, 1966).

[44] Laurence Wasser, "An Investigation into Cognitive Style as a Facet of Teachers' Systems of Student Appraisal" (unpublished Ph.D. dissertation, University of Michigan, 1969).

[45] Richard L. Robinson, "A descriptive Study of Specific Achievements and Aptitudes of the High Risk Students in Oakland University's Higher Opportunities Program in Education" (unpublished Ph.D. dissertation, Wayne State University, 1969).

Programs in Education," found increases in theoretical visual and quantitative orientation can be related to certain qualitative codes.

Zussman[46] identified "collective" cognitive styles among groups of public-school and community-college administrators. Both groups of administrators exhibited theoretical visual and auditory orientations as well as qualitative code empathetic and kinesthetic orientations.

Cultural Determinants of the Meanings of Symbols

Shuert[47] observed the minor, positive associates determinants ($a_{(+)}$) to be characteristic of unsuccessful mathematics students in his study.

Zussman[48] found major individuality and minor positive associates determinants to be common elements among both public school and community college administrators.

Cotter's[49] study demonstrated a trend in which students who possessed a major individuality (I) most frequently

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[46]Steven P. Zussman, "A Pilot Study Exploration of Cognitive Style and Administrative Style as Defined in the Educational Sciences" (unpublished Ph.D. dissertation, Wayne State University, 1968).

[47]Shuert, op. cit.

[48]Zussman, op. cit.

[49]Jude T. Cotter, "The Affects of the Educational Science of Cultural Determinants of the Meanings of Symbols on Curricular Choice" (unpublished Ph.D. dissertation, Wayne State University, 1970).

selected community-college curricula which stress fundamental disciplines (i.e., Science and Liberal Arts curriculum) as opposed to Applied Sciences and Arts curriculum. Cotter notes, however, that while this trend and others were indicated, the hypothesis of a significant difference between the cultural determinants of students in the two groups could not be supported.

Modalities of Inference

Rankin[50] delineated the modalities of inference in terms of models, isomorphism, and hypotheses and added data to support the behavioral description of the symbols attached to this (modalities of inference) set.

The model theory to which Rankin refers is based upon the property of isomorphism associated with set theory in mathematics. In mathematics, a set is considered to be a carefully defined collection of elements. If two sets are examined, and if (a) there is found to be a one-to-one correspondence between the elements included in the sets, and (b) that certain structures are preserved, then the two sets are said to be "isomorphic." If two sets are isomorphic to each other, then either set can serve as a model for the other.

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[50]Stuart C. Rankin, "A Theory of an Isomorphism-Model-Hypothesis Method of Thought" (unpublished Ph.D. dissertation, Wayne State University, 1964).

Dehnke[51] observed isomorphism between modalities of inference and successful English teaching.

Shuert[52] found the major appraisal and major deductive inferential processes to be elements unique to successful math students.

Community college administrators in Zussman's[53] study possessed the modalities of appraisal, major difference and minor relationship. There were no common modalities of inference among the public school administrators.

Other investigations utilizing the educational science of cognitive style include the works' of DeLoach,[54] Fragale,[55] and Wyett.[56] DeLoach found that similarity of administrator and instructor cognitive style acts as a significant variable in the administrator's evaluation of the instructor. He also

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[51]Dehnke, op. cit.

[52]Shuert, op. cit.

[53]Zussman, op. cit.

[54]Joseph F. DeLoach, "An Analysis of Cognitive Style Disparity as an Antecedent of Cognitive Dissonance in Instructional Evaluation: An Exploratory Study in the "Educational Sciences" (unpublished Ph.D. dissertation, Wayne State University, 1969).

[55]Marvin Joseph Fragale, "A Pilot Study of Cognitive Styles of Selected Faculty Members and Students in a Community College Setting" (unpublished Ph.D. dissertation, Wayne State University, 1969).

[56]Jerry L. Wyett, "A Pilot Study to Analyze Cognitive Style and Teaching Style with Reference to Selected Strata of the Defined Educational Sciences" (unpublished Ph.D. dissertation, Wayne State University, 1969).

noted that similarities of teaching style between administrators and instructors were significant to the evaluation process.

Fragale identified "collective cognitive styles" among teachers and students included in his sample.

Wyett identified a general cognitive style orientation for each teacher who participated in the "Teacher Education Experimental Project" at Wayne State University. His study also implied that certain teaching tasks are related to certain cognitive styles.

Summary

Selected research related to cognitive style, the educational sciences, and cognitive style as defined in the educational sciences was reviewed.

The literature indicates that contemporary work toward definition and assessment of cognitive style has been conducted by many prominent psychologists during the past twenty-five years. Their work indicates that cognitive style is a complex concept which when adequately defined and assessed can lead to a far greater understanding of how individuals learn and how instruction should be carried out.

The educational sciences (symbols and their meanings, cultural determinants, modalities of inference, biochemical and electrophysiological aspects of memory function, cognitive style, teaching, administrative and counseling styles, and

systemic analysis decision making) were developed in an attempt to provide a conceptual framework and language for the field of education. The detailed descriptions of the educational sciences provided in this chapter indicate the current state of the concept.

The literature covering cognitive style as defined in the educational sciences indicates that much work of an exploratory nature has been conducted in this area. Each study adds significantly to what is known about the area, but no set parameters have been formed. Many other studies, not reported here, are currently underway. As work is completed, the findings are quickly utilized to modify the evolving concept.

CHAPTER III

DESIGN OF THE STUDY

The effectiveness of two series of tests, designed for mapping qualitative symbolic orientation, was assessed in this study by comparison of the mappings resulting from each of these series to performance by the students in the study in classroom situations. One series of tests was developed by Oakland Community College and for the most part, is of the paper and pencil variety. The other series was developed by this author and consists of the performance of selected tasks by students in the study and the recording of these performances on video tape. The video taped performances were viewed by a panel of experts and the orientations exhibited were mapped by them. The effectiveness of each of the series of tests was determined by use of the Komolgorov-Smirnov statistical test model.

The Sample

The subjects for this study, in an attempt to avoid undue Oakland Community College influence, were selected from nursing students at Delta College, a comprehensive community college located in University Center, Michigan.

Seventeen nursing students at Delta College were tested in June of 1971 as to their cognitive styles, using the Oakland Community College (O.C.C.) test battery. These students were scheduled to be retested, and others to be tested for the first time, using the O.C.C. test battery on April 10, 1972 and the additional tests required by this study were added to the scheduled testing. The June, 1971 test data, although all aspects of the O.C.C. battery were not administered, provided valuable base-line data.

The sample used for this study consisted of students who reported for this testing on April 10, 1971. This sample then would be termed what Hill and Kerber refer to as a judgment or purposive sample and is defined as follows:

> When the selection of a sample is based upon human judgment, it is called "purposive" or "judgment" selection. Such selection is determined on the basis of what the research worker might consider from his past experience to be a typical or representative sampling unit. 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--persons who pass a particular corner in a certain city, for example. Frequently, "purposive" selection is considered "segmental" selection, to the extent that the selection is restricted to certain segments of the total statistical population.[1]

Specifically, twenty-one of the twenty-four students who reported for testing on April 10, 1972 were selected for this

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

study. The choice of these students was slightly more selective than taking an accessible population, as defined above. The sample was obtained through random selection[2] from the accessible population which reported for testing during the testing period.

Instrumentation

The tests used in this study were composed of a battery designed at Oakland Community College to determine cognitive style, a mini-battery (Bass tests) designed for this study to assess certain qualitative symbolic elements of cognitive style, and a set of classroom tasks, judged by a panel of experts as requiring major orientations in certain of the qualitative elements.

The Oakland Community College Battery

The Oakland battery is divided into two parts. The first part is a selection of 12 theoretical tests requiring 2-1/2 hours to complete, the first six of which represent aptitude testing. All of the tests have item validity.[3] The second six

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[2]Gene V. Glass and Julian C. Stanley, Statistical Methods in Education and Psychology (Englewood Cliffs, New Jersey, Prentice-Hall, Inc., 1970), Table of Random Digits, pp. 510-512.

[3]Item analysis was conducted and empirical validity established through the dissertations of Jerry L. Wyatt, Joseph DeLoach, Laurence Wasser, Arlin Schroeder, Glenn McAdams, and extensive work by personnel associated with the O.C.C. Diagnostic Test Center.

tests of the first part are inventories which give both qualitative and theoretical information about a student. The second section of the test is a qualitative non-written test requiring 90 minutes to complete. This section is composed of performance tests of sensory accuity. A complete test battery can be found in Appendix A. The characteristics described by particular instruments are:

Theoretical Test--

Test #1: Verbal Reasoning--TVL

Test #2: Listening--TAL (Recording)

Test #3: Numerical Reasoning--TVQ

Test #4: Reading--TVL (Gates)

Test #5: Numerical Listening--TAQ (Tape)

Test #6: Grammar--TVL

Qualitative Tests (written)--

Test #7: Q(CEM), Q(CES), Q(CET), Q(CH), Q(CK)

Test #8: Q(CKH), Q(CP), Q(CS), Q(CT)

Inventory #9 and #10: Cultural Determinants--IAF

Inventory #11: Modalities of Inference--MDRL

Inventory #12: Personal Code Inventory

Qualitative/Non-Written--

Test #1: Qualitative Auditory

Test #2: Qualitative Olfactory

The battery is descriptive in nature at the present time and, as such, provides information about the student being tested. Items are taken from a variety of instruments, such

as the Iowa Tests of Educational Development, the Gates Reading Tests, the Vineland Social Maturity Scale, and the Science Research Associates Batteries. Attitudes, interests, and values are measured by inventories and check-lists employed to provide information about specific vocational interests, social activities and such broad fields of interests as mechanical, electronic or computational devices.[4]

The Bass Tests

The second battery of tests (the Bass tests) was designed to assess selected qualitative elements of cognitive style. The tests were designed to have the student perform a task which was recorded on video tape. The tapes were later viewed by a panel of experts and the student's performance was evaluated with reference to the qualitative elements exhibited.

The tasks in the Bass series and the method of data collection and mapping were discussed at great length with Dr. Hill and Dr. Virginia Svagr, Director of the Oakland Community College Diagnostic Testing Center, as to their validity in providing measures of the desired qualitative symbolic orientations. These experts agreed that the tests, data collection methods, and mapping procedures of this series would provide measures of the desired elements.

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[4]For a more complete description of the test described in this section, see Appendix A.

Figure 3. Cup and ball used in the study.

BASS TEST 1: Qualitative Proprioceptive Kinematics Q(PK), Qualitative Code Synnoetics Q(CS), Qualitative Code Histrionics Q(CH).

Students were presented with a plastic cup-like object with an elastic string attached to it on the end of which was a light-weight plastic ball (see Figure 3). They were shown that a person in a standing position could hold the cup in his hand with the ball on the string hanging below the cup and could swing or flip the ball up (by use of only one hand) and catch it in the cup (see Appendix H). Each student was given one (1) attempt to perform this task. After that trial, the student was asked how many times he would catch the ball in

ten (10) attempts Q(CS). The student then took his ten (10) attempts, and this activity Q(PK) was recorded on video tape. The student's reaction, staged behavior (histrionics) to performing this task before the television camera provided a look at his Q(CH) orientation.

BASS TEST 2: Qualitative Proprioceptive Temporal Q(PT) and Qualitative Audio Q(A).

Students were asked to play a pinball machine. Their responses to the movement of the balls within the machine, with the flippers, was indicative of Q(PT). Since this flipper action was also a response to the pings, rings, pops, etc., of the pinball machine, it also provided a measure of Q(A). The students responses to this test were also recorded on video tape.

Classroom Tests

The third battery of test was deemed by a panel of experts as containing classroom activities requiring major orientation in Q(A), Q(PK), and Q(PT) respectively. The classroom activities are described below.[5]

Qualitative Auditory--Apical Pulse: The student and the instructor listened (at the same time), with a teaching stethoscope, to a patient's heart beat at the apex of the heart. Both student and instructor counted the number of heart beats and recorded the results.

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[5]The form on which this information was collected is included in Appendix B.

Proprioceptive Temporal--Blood Pressure: A blood pressure cuff was applied by the student to the upper left arm of a patient. The student listened for the first pulse sound, with a teaching stethoscope, and read the column of mercury on the Aneroid needle (blood pressure gauge) at the same time. The instructor and student listened and read the blood pressure simultaneously. The readings of both were recorded (one attempt).

Proprioceptive Kinematic--Binder Application: A binder was applied by a student to a body part. The student pulled the two edges of the binder together and secured the edges by pinning or hooking (coordinates pulling action and seeing--eye and muscle coordination).

Qualitative Code Synnoetics Q(CS) and Qualitative Code Histrionics Q(CH), as exhibited in a classroom situation were assessed through an evaluation form filled out by the instructor covering several classroom activities.[6]

Procedures

On April 10, 1972, twenty-one (21) students were randomly selected for this study from a group of students at Delta College, University Center, Michigan, who were scheduled to be tested by use of the Oakland Community College Cognitive Style Test Battery. These students had previously been tested

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[6]The form on which this information was collected is included in Appendix C.

by use of this battery in June of 1971. The Oakland test battery (a four hour long testing procedure) was administered to the twenty-one students and then later in the same day two short Bass tests (approximately five minutes in length), designed to measure elements of cognitive symbolic orientations as previously measured by the O.C.C. battery were administered to the same twenty-one students.

The Bass tests, as described previously in this chapter, were recorded on video tape and were later evaluated by a group of experts as to the orientations exhibited by each student.

A re-test of Qualitative Code Synnoetics Q(CS) and Qualitative Code Histrionics Q(CH), using questions taken from the Oakland Community College Test Battery, was administered to each of the students in the study during the remainder of the week of April 10, 1972. The re-test procedure was on a catch-as-catch-can basis throughout the week (no specific date). The re-test was conducted to see if there was a change in O.C.C. test scores after the students were exposed to the Bass tests.

There was approximately a two week delay between the administration of the tests designed for predictive mapping (O.C.C. tests, Bass tests) and the performance of the previously described classroom tasks. This delay was necessitated by 1) a term break at Delta College during which the students were not available, and 2) the need to wait for an appropriate time in the new term for the tests to be administered.

The video tape recordings of the Bass tests were evaluated on May 18, 1972 at the Oakland Community College Test Center on the Orchard Ridge Campus by a panel of experts with extensive experience in observing scoring and mapping of qualitative symbolic orientations. The panel was composed of:

1. Dr. Virginia Svagr, currently Director of the Oakland Community College Diagnostic Testing Center and Learning Systems and a certified consulting psychologist in Michigan. Dr. Svagr has a Ph.D. in clinical psychology and before joining the O.C.C. staff was a school psychologist and reading consultant for the Oakland County Intermediate School District. She is also a registered nurse (R.N.)
2. Dr. Arlin Schroeder, currently Associate Professor of Foundational Studies, Oakland Community College. Dr. Schoreder holds a doctorate in the educational sciences from Wayne State University and has done extensive work in test construction and assessment with many public school systems in Michigan. He spent six months in revision of the inventories and oral examinations designed to measure both cognitive styles and teaching styles which are currently utilized by O.C.C.
3. Mr. James Hand, currently a doctoral candidate in Instructional Development and Technology at Michigan State University. Mr. Hand has been working in the

educational sciences on an intern basis for the past year. He has been involved in cognitive style mapping of students at O.C.C., Spartan Village School in East Lansing, Michigan, and Marble School in East Lansing, Michigan. He was vitally involved in plans for implementation of cognitive style mapping programs with colleges in both Florida and Georgia.

4. Dr. Joseph E. Hill, currently President of Oakland Community College and the originator of the framework within which this study was conducted. Dr. Hill is author of a book on statistics and research design and for sixteen years taught evaluation and measurement courses at Wayne State University.

The video taped performance of each student was played back for the panel of experts and evaluated by them as to the orientation under scrutiny and any other orientations which were readily discernible from the video tape. The panels' evaluation, both individually and collectively, was recorded on paper and then the video taped recording of the next student was reviewed and evaluated, etc.

Analysis

The data gathered from the tests described above were analyzed by use of the Kolmogorov-Smirnov analysis technique. The Kolmogorov-Smirnov Statistical Test Model is described by Hill and Kerber as:

> ... The two-sample test is concerned with the degree of agreement between the two cumulative distributions of the relative frequencies observed in the respective samples. If the two samples have actually been drawn from the same population, or populations having the same distribution, the cumulative distribution of both samples should be reasonably close to each other over the range of values involved. If the two-sample cumulative distributions evidence too much divergence at any point, there is a given probability that the sample might come from different populations. If the deviation between the two cumulative distributions at any point is so great that it would occur, according to the appropriate Kolmogorov-Smirnov probability distribution, less than 5 percent, or 1 percent of the time, due to chance factors alone, the null hypothesis (no difference between the respective cumulative distributions) is rejected in favor of the statistical alternative hypothesis (H_1).[7]

The level of significance selected for rejecting the null hypotheses was at the .05 Alpha level.

An example of how this technique was employed in the study is shown in Figure 4.

GROUP RATED	DISTRIBUTION			
	MAJOR	MINOR	NEGLIGIBLE	TOTAL
GROUP A	11 $\frac{11}{21}$	8 $\frac{19}{21}$	2 $\frac{21}{21}$	21
GROUP B	21 $\frac{21}{21}$	0 $\frac{21}{21}$	0 $\frac{21}{21}$	21
ABSOLUTE DIFFERENCE BETWEEN GROUPS	$\frac{10}{21}$	$\frac{2}{21}$	$\frac{2}{21}$	

Figure 4. Hypothetical distribution.

[7]Hill and Kerber, op. cit., p. 311.

In this hypothetical distribution, the 11 in the upper left hand corner of the Group A - Major block indicates that eleven subjects in Group A were mapped as major, the 8 in the upper left hand corner of the Group A - Minor block indicates that eight subjects in group A were mapped as minor, and the 2 in the upper left hand corner of Group A - Negligible block indicates that two subjects in group A were mapped as negligible. The $\frac{11}{21}$ in the Group A - Major blocks indicates that eleven of the twenty-one subjects in Group A were rated major. The $\frac{19}{21}$ in the Group A - Minor block indicates a cumulative distribution (11 major and 8 minor) showing that nineteen out of the twenty-one subjects were rated as either major or minor. The $\frac{21}{21}$ in the Group A - Negligible block is also a cumulative distribution showing that twenty-one of the twenty-one subjects in Group A were rated as either major, minor, or negligible.

The distribution in Group B shows that all twenty-one of the subjects in the group were mapped as major.

The largest absolute difference in each Komolgorov-Smirnov table is tested. In Figure 4 the largest absolute difference of $\frac{10}{21}$ is shown in the major category (the absolute difference between $\frac{11}{21}$ and $\frac{21}{21}$). The testing amounts to comparing this difference to a table listing the critical values for the Komolgorov-Smirnov test.[8]

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[8]See Appendix E.

Comparison to the table shows that either the absolute difference between two distributions indicates that the distribution are significantly different or that they are not significantly different. A significant difference leads to rejection of the null hypothesis. A difference that is not significant leads to non-rejection of the null hypothesis.

The Komolgorov-Smirnov, a nonparametric statistic designed for analysis of variance, was chosen for this study because:

> ... it is sensitive to any kind of difference in the distribution....[9]

> When compared with the t test, the Komolgorov-Smirnov test has high power-efficiency (about 96 percent) for small samples ...$_2$seems to be more powerful in all cases than either the x^2 test or the median test ... for very small samples ... is slightly more efficient than the Mann-Whitney test....[10]

Research Hypothesis

Mapping by use of the Bass tests will be more effective as a predictor of classroom performance than mapping by use of the Oakland Community College battery when the elements to be mapped are in the qualitative symbolic mediation realm.

Operational Hypotheses

The operational hypotheses generated to effect the testing of the research hypothesis are as follows:

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[9]Sidney Siegel, Nonparametric Statistic for the Behavioral Sciences (New York: McGraw Hill Book Co., 1956), p. 127.

[10]Ibid., p. 136.

1. There will be a difference in mappings of qualitative code synnoetics between the Oakland Community College battery administered April 10, 1972 and a re-test, using the same questions, after the subjects have been through the Bass test for qualitative code synnoetics.
2. There will be a difference in mappings of qualitative code synnoetics between the Oakland Community College test battery and a classroom scale on which such activity is mapped.
3. There will be a difference in mappings of qualitative code synnoetics between the Bass test for qualitative code synnoetics and a classroom scale on which such activity is mapped.
4. The Bass test will be more accurate than the Oakland Community College test battery as a predictor of classroom performance in qualitative code synnoetics as mapped by classroom teachers.
5. There will be a difference in mappings of qualitative code histrionics between the Oakland Community College test battery administered April 10, 1972 and a re-test, using the same questions, after the subjects have been through the Bass test for qualitative code histrionics.
6. There will be a difference in mappings of qualitative code histrionics between the April 10, 1972 Oakland Community College test battery and a classroom scale on which such activity is mapped.

7. There will be a difference in mappings of qualitative code histrionics between the Bass test for qualitative code histrionics and a classroom scale on which such activity is mapped.
8. The Bass test will be more accurate than the Oakland Community College test battery as a predictor of classroom performance in qualitative code histrionics as rated by classroom teachers.
9. There will be a difference in mappings of qualitative proprioceptive kinematics between the Oakland Community College battery designed to measure qualitative proprioceptive ability and performance on a classroom task designed to yield a measure of qualitative proprioceptive kinematic ability.
10. There will be a difference in mappings of qualitative proprioceptive kinematics between the Bass test for qualitative proprioceptive kinematics and performance on a classroom task designed to yield a measure of qualitative proprioceptive kinematic ability.
11. The Bass test will be more accurate than the Oakland Community College test battery as a predictor of classroom performance on a task requiring a major orientation in qualitative proprioceptive kinematic ability.
12. There will be a difference in mappings of qualitative proprioceptive temporal between the Oakland Community College battery designed to measure qualitative

proprioceptive ability and performance on a classroom task designed to yield a measure of qualitative proprioceptive temporal ability.

13. There will be a difference in mappings of qualitative proprioceptive temporal between the Bass test for qualitative proprioceptive temporal and performance on a classroom task designed to yield a measure of qualitative proprioceptive temporal ability.
14. There will be a difference in mappings of qualitative proprioceptive temporal between incidental observation of qualitative proprioceptive temporal during the Bass test for qualitative proprioceptive kinematics and performance on a classroom task designed to yield a measure of qualitative proprioceptive temporal ability.
15. The Bass test will be more accurate than the Oakland Community College battery as a predictor of classroom performance on a task requiring a major orientation in qualitative proprioceptive temporal ability.
16. There will be a difference in mappings of qualitative auditory between the Oakland Community College test battery and performance on a classroom task designed to yield a measure of qualitative auditory ability.
17. There will be a difference in mappings of qualitative auditory between the Bass test and performance on a classroom task designed to yield a measure of qualitative auditory ability.

18. The Bass test will be more accurate than the Oakland Community College battery as a predictor of classroom performance of a task requiring a major orientation in qualitative auditory ability.

In order to employ statistical inference in the process of deciding to accept, or reject, an operational hypothesis, it is necessary to map the operational proposition into two related forms of a statistical hypothesis. The operational hypothesis (for example: number 16 above), stated in non-mathematical terms, is analyzed into a simple mathematical statement known as the statistical alternative hypothesis (H_1) which in the case of operational hypothesis 16 is:

H_1: $CRF_o \neq CRF_C$ (where CRF means cumulative relative frequency, the aspect of the distribution which is of concern in the Komolgorov-Smirnov statistical test model, the subscript o means the Oakland Community College test, and the subscript C means classroom performance)

After the statistical alternative has been stated the statistical null hypothesis (H_o) is formulated. The null hypothesis in this case would be the opposite of the statistical alternative hypothesis, or:

H_o: $CRF_o = CRF_C$ (same abbreviations utilized)

It is the null hypothesis which is submitted to test by the statistical inference process.

Appropriate statistical hypotheses were generated and tested (Chapter IV) for each of the operational hypotheses presented.

The steps in testing each hypothesis were as follows (example 16 used):

1. State Null Hypothesis H_o: $CRF_o = CRF_C$
   State Alternate Hypothesis H_1: $CRF_o \neq CRF_C$
2. State level and sample size $\alpha = .05$; $N_1 = N_2 = 21$
3. Employ Komolgorov-Smirnov Two-Tailed Test of Max D = $/S_1(X) - S_2(X)/$
4. Determine value of K_D (Appendix E)
5. Decision, Reject H_o and accept H_1 or Not Reject H_o

Summary

Twenty-one (21) students at Delta College, University Center, Michigan were randomly selected from a group of students scheduled for testing by use of the Oakland Community College Cognitive Style Test Battery on April 10, 1972. In addition to the O.C.C. test battery these twenty-one students were tested on two tests developed for this study and designed to assess qualitative symbolic orientation in the areas of qualitative code synnoetics, qualitative code histrionics, qualitative proprioceptive kinematics, qualitative proprioceptive temporal, and qualitative auditory. Students' performances in these tests were recorded on video tape and were evaluated by a panel of experts as to orientations exhibited.

The effectiveness of the test results was determined by comparing the mappings resulting from the Oakland Community battery and the Bass tests to rated performances by the

twenty-one students in classroom situations requiring, according to a panel of experts, major orientations in the qualitative symbols under study.

Eighteen operational hypotheses were generated to effect the evaluation and comparison of the tests utilized. The hypotheses were tested through use of the Komolgorov-Smirnov Statistical Test Model, and the level of significance selected for rejecting the null hypotheses was the .05 Alpha level.

CHAPTER IV

ANALYSIS OF DATA

An analysis of the data is reported in this chapter. The hypotheses are presented and subjected to statistical test in the order of their presentation in Chapter III, and appropriate test results are reported.

Test results for each qualitative symbolic orientation under consideration are presented preceding the hypotheses and statistical treatments dealing with each orientation.

The test results (Tables 4.1, 4.5, 4.9, 4.12, 4.16) are presented in the following manner:

1. The labels used within the table (see Table 4.1), O.C.C. test 6/71, O.C.C. test 4/72, Bass test, O.C.C. re-test, Classroom, indicate the various tests which were administered to the students.
2. The A, B, C mappings under each test indicate major, minor or negligible orientations for the student (numbers 1-21) based upon each test.

For example (Table 4.1), student number 1 was mapped as major (A) on the O.C.C. test of 6/71, major (A) on the O.C.C. test of 4/72, minor (B) on the Bass test, major (A) on the O.C.C. re-test, and major (A) on the classroom test.

Student number 10 was mapped as major (A) on the O.C.C. test of 6/71, major (A) on the O.C.C. test of 4/72, negligible (C) on the Bass test, major (A) on the O.C.C. re-test, and major (A) on the classroom test.

The Komolgorov-Smirnov tests of the hypotheses utilized the data from the test result tables and these data are presented as indicated in Chapter III of this study (see Figure 4, page 46). The abbreviations utilized in headings of the test result tables are utilized within the Komolgorov-Smirnov tables (see Table 4.2). In the sample SO_2 the O_2 indicates O.C.C. test 4/71 and in the sample SO_3 the O_3 indicates O.C.C. retest.

Qualitative Code Synnoetics

Table 4.1. Test Results Qualitative Code Synnoetics

STUDENTS	0_1 O.C.C. TEST 6/71	0_2 O.C.C. TEST 4/72	B BASS TEST	0_3 O.C.C. RETEST	C CLASSROOM
1.	A	A	B	A	A
2.	A	A	A	A	A
3.	A	A	A	A	A
4.	A	A	B	A	A
5.	A	A	A	A	B
6.	A	A	C	A	A
7.	A	A	B	A	B
8.	A	A	A	A	A
9.	A	A	A	A	A
10.	A	A	C	A	A
11.	A	A	A	A	A
12.		A	A	A	A
13.	A	A	A	A	A
14.		A	A	A	A
15.	A	A	B	A	A
16.		A	A	A	A
17.	A	A	B	A	A
18.	A	A	B	A	A
19.	A	A	A	A	A
20.		A	B	A	A
21.	A	A	B	A	A

A=MAJOR, B=MINOR, C=NEGLIGIBLE

Operational Hypothesis 1--There will be a difference in mappings of qualitative code synnoetics between the O.C.C. battery administered April 10, 1972 and a retest using the same questions after the subjects have been through the Bass test for qualitative code synnoetics.

Statistical Hypotheses 1

H_o: $CRF_{o2} = CRF_{o3}$ (Null)

H_1: $CRF_{o2} \neq CRF_{o3}$ (Statistical Alternative)

Table 4.2. Komolgorov-Smirnov Test Between April 10, 1972 O.C.C. Test Scores and O.C.C. Retest--Qualitative Code Synnoetics

SAMPLES	MAJOR		MINOR		NEGLIGIBLE		n
$SO_2(X)$	21	$\frac{21}{21}$	0	$\frac{21}{21}$	0	$\frac{21}{21}$	21
$SO_3(X)$	21	$\frac{21}{21}$	0	$\frac{21}{21}$	0	$\frac{21}{21}$	21
$\lvert SO_2(X)-SO_3(X)\rvert$=MAX D	0*		0		0		

The largest absolute difference in Table 4.2 is 0. According to the Komolgorov-Smirnov table of critical values this value indicates that no significant difference exist between the two distributions being compared. Therefore, the Null Hypothesis $CRF_{o2} = CRF_{o3}$ cannot be rejected, and the Alternative Hypothesis $CRF_{o2} \neq CRF_{o3}$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived

directly from Operational Hypothesis 1 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 2--There will be a difference in mappings of qualitative code synnoetics between the O.C.C. test battery and a classroom scale on which such activity is mapped.

Statistical Hypotheses 2

H_o: $CRF_{o2} = CRF_C$ (Null) H_1: $CRF_{o2} \neq CRF_C$ (Statistical Alternative)

Table 4.3. Komolgorov-Smirnov Test Between April 10, 1972 O.C.C. Test Scores and Classroom Performance--Qualitative Code Synnoetics

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$SO_2(X)$	21 $\frac{21}{21}$	0 $\frac{21}{21}$	0 $\frac{21}{21}$	21
$S_C(X)$	19 $\frac{19}{21}$	2 $\frac{21}{21}$	0 $\frac{21}{21}$	21
$\lvert SO_2(X)-S_C(X)\rvert$=MAX D	$\frac{2^*}{21}$	0	0	

The largest absolute difference in Table 4.3 is $\frac{2}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_{o2} = CRF_C$ cannot be rejected, and the Alternative Hypothesis $CRF_{o2} \neq CRF_C$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived

directly from Operational Hypothesis 2 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 3--There will be a difference in mappings of qualitative code synnoetics between the Bass test for qualitative code synnoetics and a classroom scale on which such activity is mapped.

Statistical Hypotheses 3

H_o: $CRF_B = CRF_C$ (Null) H_1: $CRF_B \neq CRF_C$ (Statistical Alternative)

Table 4.4. Komolgorov-Smirnov Test Between Bass Test Scores and Classroom Performance--Qualitative Code Synnoetics

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$S_B(X)$	11 $\frac{11}{21}$	8 $\frac{19}{21}$	2 $\frac{21}{21}$	21
$S_C(X)$	19 $\frac{19}{21}$	2 $\frac{21}{21}$	0 $\frac{21}{21}$	21
$\lvert S_B(X)-S_C(X)\rvert$ =MAX D	$\frac{8}{21}$*	$\frac{2}{21}$	0	

The largest absolute difference in Table 4.4 if $\frac{8}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_B = CRF_C$ cannot be rejected and the Alternative Hypothesis $CRF_B \neq CRF_C$ cannot be accepted. Since

the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 3 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 4--The Bass test will be more accurate than the O.C.C. test battery as a predictor of classroom performance in qualitative code synnoetics as rated by classroom teachers.

H_o: $|CRF_C - CRF_o| \leq |CRF_C - CRF_B|$ (Null)

H_1: $|CRF_C - CRF_o| > |CRF_C - CRF_B|$ (Statistical Alternative)

The analysis of the data in Table 4.3 showed that there was no significant difference in mappings of qualitative code synnoetics between the O.C.C. test and classroom performance. The data in Table 4.4 dealing with the Bass test as compared with classroom performance indicates that no significant difference exists between the two distributions. Therefore, the Null Hypothesis $|CRF_C - CRF_o| \leq |CRF_C - CRF_B|$ cannot be rejected and the Alternative Hypothesis $|CRF_C - CRF_o| > |CRF_C - CRF_B|$ cannot be accepted. Since the Statistical Alternative was derived directly from Operational Hypothesis 4 the Operational Hypothesis cannot be accepted.

The findings of this aspect of the study indicate that there is no significant difference between the predictive ability of the O.C.C. test for qualitative code synnoetics and the Bass test for qualitative code synnoetics.

Although there was no significant statistical difference, the test results (Table 4.1) indicate that the O.C.C. test is not as discriminating as it might be. There was consistency over the three administrations of the O.C.C. test, but in all three cases every student was mapped as having a major orientation in qualitative code synnoetics. This result is possible but not probable based upon population norms. Variance was exhibited in both Bass test mappings and classroom mappings.

Qualitative Code Histrionics

Table 4.5. Test Results Qualitative Code Histrionics

STUDENTS	0_1 O.C.C. TEST 6/71	0_2 O.C.C. TEST 4/72	B BASS TEST	0_3 O.C.C. RETEST	C CLASSROOM
1.	B	A	B	B	B
2.	B	B	B	B	B
3.	A	A	A	B	A
4.	B	B	A	B	A
5.	A	B	C	B	B
6.	B	B	C	B	B
7.	B	B	C	C	B
8.	C	C	B	C	A
9.	C	B	B	B	B
10.	B	B	B	C	B
11.	B	B	A	B	A
12.		B	C	B	B
13.	B	B	B	C	B
14.		B	A	B	A
15.	B	B	A	B	A
16.		A	A	B	A
17.	B	A	B	B	B
18.	A	B	B	B	B
19.	B	B	C	B	B
20.		B	B	B	B
21.	B	B	A	B	A

A=MAJOR, B=MINOR, C=NEGLIGIBLE

Operational Hypothesis 5--There will be a difference in mappings of qualitative code histrionics between the O.C.C. battery administered April 10, 1972 and a retest using the same questions after the subjects have been through the Bass test for qualitative code histrionics.

Statistical Hypotheses 5

H_o: $CRF_{o2} = CRF_{o3}$ (Null) H_1: $CRF_{o2} \neq CRF_{o3}$ (Statistical Alternative)

Table 4.6. Komolgorov-Smirnov Test Between April 10, 1972 O.C.C. Test Scores and O.C.C. Retest Scores--Qualitative Code Histrionics

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$SO_2(X)$	4 $\frac{4}{21}$	16 $\frac{20}{21}$	1 $\frac{21}{21}$	21
$SO_3(X)$	0 $\frac{0}{21}$	17 $\frac{17}{21}$	4 $\frac{21}{21}$	21
$\lvert SO_2(X)-SO_3(X)\rvert$=MAX D	$\frac{4}{21}$*	$\frac{3}{21}$	0	

The largest absolute difference in Table 4.6 is $\frac{4}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_{o2} = CRF_{o3}$ cannot be rejected and the Alternative Hypothesis $CRF_{o2} \neq CRF_{o3}$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived

directly from Operational Hypothesis 5 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 6--There will be a difference in mappings of qualitative code histrionics between the Bass test for qualitative code histrionics and a classroom scale on which such activity is mapped.

Statistical Hypotheses 6

H_o: $CRF_B = CRF_C$ (Null) H_1: $CRF_B \neq CRF_C$ (Statistical Alternative)

Table 4.7. Komolgorov-Smirnov Test Between Bass Test Scores and Classroom Performance--Qualitative Code Histrionics

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$S_B(X)$	7 $\frac{7}{21}$	9 $\frac{16}{21}$	5 $\frac{21}{21}$	21
$S_C(X)$	8 $\frac{8}{21}$	13 $\frac{21}{21}$	0 $\frac{21}{21}$	21
$\lvert S_B(X)-S_C(X)\rvert$ =MAX D	$\frac{1}{21}$	$\frac{5}{21}$*	0	

The largest absolute difference in Table 4.7 is $\frac{5}{21}$. According to the Komolgorov-Smirnov table of critical values this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_B = CRF_C$ cannot be rejected and the Alternative Hypothesis $CRF_B \neq CRF_C$ cannot be accepted. Since the

Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 6 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 7--There will be a difference in mappings of qualitative code histrionics between the April 10, 1972 O.C.C. test battery and a classroom scale on which such activity is mapped.

Statistical Hypotheses 7

H_o: $CRF_{o2} = CRF_C$ (Null) H_1: $CRF_{o2} \neq CRF_C$ (Statistical Alternative)

Table 4.8. Komolgorov-Smirnov Test Between April 10, 1972 O.C.C. Test Scores and Classroom Performance--Qualitative Code Histrionics

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$SO_2(X)$	4 $\frac{4}{21}$	16 $\frac{20}{21}$	1 $\frac{21}{21}$	21
$S_C(X)$	8 $\frac{8}{21}$	13 $\frac{21}{21}$	0 $\frac{21}{21}$	21
$\lvert SO_2(X)-S_C(X)\rvert$ =MAX D	$\frac{4}{21}$*	$\frac{1}{21}$	0	

The largest absolute difference in Table 4.8 is $\frac{4}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_{02} = CRF_C$ cannot be rejected and the

Alternative Hypothesis $CRF_{o2} \neq CRF_C$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 7 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 8--The Bass test will be more accurate than the O.C.C. test battery as a predictor of classroom performance in qualitative code histrionics as rated by classroom teachers.

Statistical Hypotheses 8

H_o: $|CRF_C - CRF_o| \leq |CRF_C - CRF_B|$ (Null)

H_1: $|CRF_C - CRF_o| > |CRF_C - CRF_B|$ (Statistical Alternative)

The analysis of the data in Table 4.8 showed that there was no significant difference in mappings of qualitative code histrionics between the O.C.C. test and classroom performance. The data in Table 4.7 dealing with the Bass test as compared with classroom performance indicates that no significant difference exists between the two distributions. Therefore, the Null Hypothesis $|CRF_C - CRF_o| \leq |CRF_C - CRF_B|$ cannot be rejected and the Alternative Hypothesis $|CRF_C - CRF_o| > |CRF_C - CRF_B|$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 8 the Operational Hypothesis cannot be accepted.

The findings of this study indicate that there is no significant difference between the predictive ability of the Oakland Community College test for qualitative code histrionics and the Bass test for qualitative code histrionics.

Findings also indicate an apparent lack of ability on the part of most of the students to respond accurately to the hypothetical situation concerning qualitative code histrionics. This study was designed to deal with only the three mapping categories (major, minor, and negligible) as the variables were evaluated. Using just these three categories, quite a considerable change in responses to the Oakland Community College (paper and pencil) questions was affected by having the students exposed to the Bass test (real life) for qualitative code histrionics. There were seven changes (Table 4.5), all downward, between the April 10, 1972 Oakland Community College ratings and Oakland Community College ratings (re-test) using the same questions during the week of April 10, 1972. This compared to the virtally no change between the June 1971 and April 10, 1972 Oakland Community College ratings (three up, two down) would indicate that the intervening Bass test (for Q(CH) between the April 10, 1972 O.C.C. test and the O.C.C. retest during the week of April 10, 1972 (exposure on a real-life situation) gave the students a more realistic view of themselves as they responded to the retest. Further support for this contention was gained from analysis of raw scores for students in this study (Appendix F) which showed that eighteen out of the twenty-one students had a change in raw score between the April 10, 1972 O.C.C. test and the O.C.C. retest during the week of April 10, 1972 (using the same questions), seventeen raw scores went down (away from major) and only one went up.

Qualitative Proprioceptive Kinematics

Table 4.9. Test Results Qualitative Proprioceptive Kinematics

STUDENTS	0 O.C.C. Test 4/72	B BASS TEST	C CLASSROOM
1.	C	B	A
2.	A	A	A
3.	A	A	A
4.	B	C	A
5.	A	A	A
6.	B	A	B
7.	A	C	B
8.	A	B	C
9.	A	B	A
10.	B	A	B
11.	B	A	B
12.	B	B	A
13.	A	A	A
14.	B	A	A
15.	B	C	A
16.	C	A	A
17.	A	A	A
18.	A	C	A
19.	B	B	A
20.	B	C	A
21	B	B	A

A=MAJOR, B=MINOR, C=NEGLIGIBLE

Operational Hypothesis 9--There will be a difference in mappings of qualitative proprioceptive kinematics between the O.C.C. battery designed to measure qualitative proprioceptive ability and performance on a classroom task designed to yield a measure of qualitative proprioceptive kinematic ability.

Statistical Hypotheses 9

H_o: $CRF_o = CRF_C$ (Null) H_1: $CRF_o \neq CRF_C$ (Statistical Alternative)

Table 4.10. Komolgorov-Smirnov Test Between the O.C.C. Test Scores and Classroom Performance--Qualitative Proprioceptive Kinematics

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$S_o(X)$	9 $\frac{9}{21}$	10 $\frac{19}{21}$	2 $\frac{21}{21}$	21
$S_C(X)$	16 $\frac{16}{21}$	4 $\frac{20}{21}$	1 $\frac{21}{21}$	21
$\lvert S_o(X)-S_C(X)\rvert$=MAX D	$\frac{7}{21}$*	$\frac{1}{21}$	0	

The largest absolute difference in Table 4.10 if $\frac{7}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_o = CRF_C$ cannot be rejected and the Alternative Hypothesis $CRF_o \neq CRF_C$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived directly from

Operational Hypothesis 9 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 10--There will be a difference in mapping of qualitative proprioceptive kinematics between the Bass test for qualitative proprioceptive kinematics and performance on a classroom task designed to yield a measure of qualitative proprioceptive kinematic ability.

Statistical Hypotheses 10

H_o: $CRF_B = CRF_C$ (Null) H_1: $CRF_B \neq CRF_C$ (Statistical Alternative)

Table 4.11. Komolgorov-Smirnov Test Between Bass Test Scores and Classroom Performance--Qualitative Proprioceptive Kinematics

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$S_B(X)$	$10\ \frac{10}{21}$	$6\ \frac{16}{21}$	$5\ \frac{21}{21}$	21
$S_C(X)$	$16\ \frac{16}{21}$	$4\ \frac{20}{21}$	$1\ \frac{21}{21}$	21
$\lvert S_B(X)-S_C(X)\rvert$ =MAX D	$\frac{6^*}{21}$	$\frac{4}{21}$	0	

The largest absolute difference in Table 4.11 is $\frac{6}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_B = CRF_C$ cannot be rejected and the

Alternative Hypothesis $CRF_B \neq CRF_C$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 10 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 11--The Bass test will be more accurate than the O.C.C. test battery as a predictor of classroom performance of a task requiring a major orientation in qualitative proprioceptive kinematic ability.

Statistical Hypotheses 11

H_o: $|CRF_C - CRF_o| \leq |CRF_C - CRF_B|$ (Null)

H_1: $|CRF_C - CRF_o| > |CRF_C - CRF_B|$ (Statistical Alternative)

Analysis of the data in Table 4.10 showed that there was no significant difference in mappings of qualitative proprioceptive kinematics between the O.C.C. test for qualitative proprioceptiveness and a classroom performance in qualitative proprioceptive kinematics. The data in Table 4.11 dealing with the Bass test for qualitative proprioceptive kinematics as compared with classroom performance in qualitative proprioceptive kinematics indicates that no significant difference exists between the distributions. Therefore, the Null Hypothesis $|CRF_C - CRF_o| \leq |CRF_C - CRF_B|$ cannot be rejected and the Alternative Hypothesis $|CRF_C - CRF_o| > |CRF_C - CRF_B|$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived from Operational Hypothesis 11 the Operational Hypothesis cannot be accepted.

The findings of this study indicate that there is no significance difference between the predictive ability of the Oakland Community College test designed to measure qualitative proprioceptive ability and the Bass test designed to measure qualitative proprioceptive kinematic ability, the ability required in the classroom activity for which the prediction is intended.

The Oakland Community College test battery currently has only a test for qualitative proprioceptiveness and no separate test for qualitative proprioceptive kinematics. The Bass test for qualitative proprioceptive kinematic ability according to Svagr, Hill, Schroeder and Hand provides a look at a much more practical aspect of proprioceptiveness, the coordination of musculature (motor-skill ability) with sight, than the Oakland Community College qualitative proprioceptiveness test, which deals with the coordination of motor-skill ability and touch.

Qualitative Proprioceptive Temporal

Table 4.12. Test Results Qualitative Proprioceptive Temporal

STUDENTS	0 O.C.C. TEST 4/72	B_1 BASS TEST Q(PT)	B_2 BASS TEST Q(PK)	C CLASSROOM
1.	C	A	B	A
2.	A	C	A	C
3.	A	A	A	C
4.	B	B	C	A
5.	A	A	A	A
6.	B	B	A	A
7.	A	B	C	A
8.	A	B	B	B
9.	A	A	B	A
10.	B	A	A	B
11.	B	B	A	A
12.	B	B	B	C
13.	A	A	A	A
14.	B	A	A	A
15.	B	B	C	C
16.	C	B	A	B
17.	A	A	A	B
18.	A	A	C	B
19.	B	B	B	A
20.	B	C	C	A
21.	B	B	B	A

A=MAJOR, B=MINOR, C=NEGLIGIBLE

Operational Hypothesis 12--There will be a difference in mappings of qualitative proprioceptive temporal between the O.C.C. battery designed to measure qualitative proprioceptive ability and performance on a classroom task designed to yield a measure of qualitative proprioceptive temporal ability.

Statistical Hypotheses 12

H_o: $CRF_o = CRF_C$ (Null) H_1: $CRF_o \neq CRF_C$ (Statistical Alternative)

Table 4.13. Komolgorov-Smirnov Test Between O.C.C. Test Scores and Classroom Performance--Qualitative Proprioceptive Temporal

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$S_O(X)$	9 $\frac{9}{21}$	10 $\frac{19}{21}$	2 $\frac{21}{21}$	21
$S_C(X)$	12 $\frac{12}{21}$	5 $\frac{17}{21}$	4 $\frac{21}{21}$	21
$\lvert S_O(X)-S_C(X)\rvert$=MAX D	$\frac{3}{21}$*	$\frac{2}{21}$	0	

The largest absolute difference in Table 4.13 is $\frac{3}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_o = CRF_C$ cannot be rejected and the Alternative Hypothesis $CRF_o \neq CRF_C$ cannot be accepted. Since the

Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 12 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 13--There will be a difference in mappings of qualitative proprioceptive temporal between the Bass test for qualitative proprioceptive temporal and performance on a classroom task designed to yield a measure of qualitative proprioceptive temporal ability.

Statistical Hypotheses 13

H_o: $CRF_{Bl} = CRF_C$ (Null) H_1: $CRF_{Bl} \neq CRF_C$ (Statistical Alternative)

Table 4.14. Komolgorov-Smirnov Test Between Bass Test Scores Q(PT) and Classroom Performance--Qualitative Proprioceptive Temporal

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$S_{Bl}(X)$	$9 \frac{9}{21}$	$10 \frac{19}{21}$	$2 \frac{21}{21}$	21
$S_C(X)$	$12 \frac{12}{21}$	$5 \frac{17}{21}$	$4 \frac{21}{21}$	21
$\lvert S_{Bl}(X)-S_C(X)\rvert$=MAX D	$\frac{3}{21}$*	$\frac{2}{21}$	0	

The largest absolute difference in Table 4.14 is $\frac{3}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that no significant difference exists between the two distributions being compared. Therefore, the

Null Hypothesis $CRF_{B1} = CRF_C$ cannot be rejected and the Alternative Hypothesis $CRF_{B1} \neq CRF_C$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 13 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 14--There will be a difference in mappings of qualitative proprioceptive temporal between incidental observation of qualitative proprioceptive temporal during the Bass test for qualitative proprioceptive kinematics and performance on a classroom task designed to yield a measure of qualitative proprioceptive temporal ability.

Statistical Hypotheses 14

H_o: $CRF_{B2} = CRF_C$ (Null) H_1: $CRF_{B2} \neq CRF_C$ (Statistical Alternative)

Table 4.15. Komolgorov-Smirnov Test Between Bass Test Scores Q(PK) and Classroom Performance--Qualitative Proprioceptive Temporal

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$S_{B2}(X)$	$10\ \frac{10}{21}$	$6\ \frac{16}{21}$	$5\ \frac{21}{21}$	21
$S_C(X)$	$12\ \frac{12}{21}$	$5\ \frac{17}{21}$	$4\ \frac{21}{21}$	21
$\lvert S_{B2}(X)-S_C(X)\rvert$ =MAX D	$\frac{2^*}{21}$	$\frac{1}{21}$	0	

The largest absolute difference in Table 4.15 is $\frac{2}{21}$. According to the Komolgorov-Smirnov table of critical values,

this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_{B2} = CRF_C$ cannot be rejected and the Alternative Hypothesis $CRF_{B2} \neq CRF_C$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 14 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 15--The Bass test will be more accurate than the O.C.C. battery as a predictor of classroom performance of a task requiring a major orientation in qualitative proprioceptive temporal ability.

Statistical Hypotheses 15

H_o: $|CRF_C - CRF_o| \leq |CRF_C - CRF_B|$ (Null)

H_1: $|CRF_C - CRF_o| > |CRF_C - CRF_B|$ (Statistical Alternative)

Analysis of the data in Table 4.13 showed that there was no significant difference in mappings of qualitative proprioceptive temporal ability between the O.C.C. test for qualitative proprioceptiveness and a classroom performance requiring qualitative proprioceptive temporal ability. The data in Table 4.14 dealing with the Bass test for qualitative proprioceptive temporal ability as compared with a classroom performance requiring qualitative proprioceptive temporal ability indicates that no significant difference exists between the distributions. Therefore, the Null Hypothesis $|CRF_C - CRF_o| \leq |CRF_C - CRF_B|$ cannot be rejected and the Alternative Hypothesis

$|CRF_C - CRF_O| > |CRF_C - CRF_B|$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 15 the Operational Hypothesis cannot be accepted.

The findings of this study indicate that there is no significant difference between the predictive ability for qualitative proprioceptive temporal ability, between the Oakland Community College test designed to measure qualitative proprioceptive ability and the Bass test designed to measure qualitative proprioceptive temporal ability.

The Oakland Community College test battery currently has only a test for qualitative proprioceptiveness and no separate test for qualitative proprioceptive temporal ability. The Bass test for qualitative proprioceptive temporal ability was developed to fill this void. Hill in a discussion session in which the current Oakland Community College test was being discussed termed student performance on this test as theoretical tactile quantitative rather than qualitative proprioceptive.

A valuable finding in this area of study was that incidental observation of qualitative proprioceptive temporal ability by a panel of experts viewing the Bass test for qualitative proprioceptive kinematics proved just as effective as a predictive device for classroom performance in this area as did the Bass test which was designed to measure qualitative proprioceptive temporal ability.

Qualitative Auditory

Table 4.16. Test Results--Qualitative Auditory

Students	0 O.C.C. TEST 4/27	B BASS TEST	C CLASSROOM
1.	B	A	B
2.	B	C	A
3.	C	A	A
4.	B	B	A
5.	A	A	A
6.	C	B	A
7.	B	A	B
8.	C	B	A
9.	B	A	A
10.	C	B	A
11.	C	A	A
12.	B	C	C
13.	A	A	A
14.	C	A	A
15.	B	C	A
16.	A	B	A
17.	A	B	A
18.	B	B	A
19.	B	A	A
20.	C	A	A
21.	C	A	A

A=MAJOR, B=MINOR, C=NEGLIGIBLE

Operational Hypothesis 16--There will be a difference in mappings of qualitative auditory between the O.C.C. test battery and performance on a classroom task designed to yield a measure of qualitative auditory ability.

Statistical Hypotheses 16

H_o: $CRF_o = CRF_C$ (Null) H_1: $CRF_o \neq CRF_C$ (Statistical Alternative)

Table 4.17. Komolgorov-Smirnov Test Between O.C.C. Test Scores and Classroom Performance--Qualitative Auditory

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$S_0(X)$	4 $\frac{4}{21}$	9 $\frac{13}{21}$	8 $\frac{21}{21}$	21
$S_C(X)$	18 $\frac{18}{21}$	2 $\frac{20}{21}$	1 $\frac{21}{21}$	21
$\lvert S_0(X)-S_C(X)\rvert$ =MAX D	$\frac{14}{21}$*	$\frac{7}{21}$	0	

The largest absolute difference in Table 4.17 is $\frac{14}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that a significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_o = CRF_C$ can be rejected and the Alternative Hypothesis $CRF_0 \neq CRF_C$ can be accepted. Since the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 16 the Operational Hypothesis can be accepted.

Operational Hypothesis 17--There will be a difference in ratings of qualitative auditory between the Bass test and performance on a classroom task designed to yield a measure of qualitative auditory ability.

Statistical Hypotheses 17

H_o: $CRF_B = CRF_C$ (Null) H_1: $CRF_B \neq CRF_C$ (Statistical Alternative)

Table 4.18. Komolgorov-Smirnov Test Between Bass Test Scores and Classroom Performance--Qualitative Auditory

SAMPLES	MAJOR	MINOR	NEGLIGIBLE	n
$S_B(X)$	11 $\frac{11}{21}$	7 $\frac{18}{21}$	3 $\frac{21}{21}$	21
$S_C(X)$	18 $\frac{18}{21}$	2 $\frac{20}{21}$	1 $\frac{21}{21}$	21
$\lvert S_B(X)-S_C(X)\rvert$ = MAX D	$\frac{7^*}{21}$	$\frac{2}{21}$	0	

The largest absolute difference in Table 4.18 is $\frac{7}{21}$. According to the Komolgorov-Smirnov table of critical values, this value indicates that no significant difference exists between the two distributions being compared. Therefore, the Null Hypothesis $CRF_B = CRF_C$ cannot be rejected and the Alternative Hypothesis $CRF_B \neq CRF_C$ cannot be accepted. Since the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 17 the Operational Hypothesis cannot be accepted.

Operational Hypothesis 18--The Bass test will be more accurate than the O.C.C. battery as a predictor of classroom performance of a task requiring a major orientation in qualitative auditory ability.

Statistical Hypotheses 18

H_o: $|CRF_C - CRF_o| \leq |CRF_C - CRF_B|$ (Null)

H_1: $|CRF_C - CRF_o| > |CRF_C - CRF_B|$ (Statistical Alternative)

The analysis of data in Table 4.17 showed that there is a significant difference in mappings on qualitative auditory between the O.C.C. test and classroom performance. This result means that performance of the task in question was contrary to expectations that might have been placed on performance as a result of the O.C.C. test. The results of the test based upon data included in Table 4.18 dealing with the Bass test as compared to classroom performance shows an absolute difference that is not statistically significant.

The Bass test can therefore be considered a more accurate predictor of classroom performance than the O.C.C. test battery when dealing with performance demanding qualitative auditory symbolic mediation. Taking these results into account, collectively, the null hypothesis $|CRF_C - CRF_o| \leq |CRF_o - CRF_B|$ can be rejected and the Alternative Hypothesis $|CRF_C - CRF_o| > |CRF_C - CRF_B|$ can be accepted. Since the Statistical Alternative Hypothesis was derived directly from Operational Hypothesis 18 the Operational Hypothesis can be accepted.

As the result of this test the predictive ability of the Oakland Community College test for qualitative auditory ability is being questioned and a new qualitative auditory test (see Appendix G) has been developed which will be tried out in the testing of incoming students at Oakland Community College this fall. It is now suspected that the current Oakland Community College qualitative auditory test (see Appendix A) is one in which students succeed by use of a counting pattern rather than mediation into meaning of qualitative auditory signals. The new test seeks to more accurately measure this mediation ability.

Additional Findings

Each of the Bass tests which were five minutes or less in length were recorded on video tape.

During the evaluation period, by a panel of experts (Svagr, Schroeder, Hand, Hill), of the Bass test designed to measure qualitative proprioceptive kinematics, qualitative code synnoetics, and qualitative code histrionics, the members of the panel of experts were asked not only to provide ratings for each of the qualitative symbols that the test was designed to assess but to rate any other element of cognitive style which they saw exhibited by the students. The results of these ratings are provided in Table 4.19.

The information contained in Table 4.19 is presented in the following manner:

1. The first three columns, labeled Q(PK), Q(CS), Q(CH), are the elements which Bass test number 1 was designed to assess. The A, B, C mappings indicate major, minor, or negligible orientations by the students involved in each of the three areas.
2. The fourth column presents a listing of the additional cognitive style elements observed during the viewing of the video tape. Major orientation is indicated by symbols alone Q(CEM). Minor orientation is indicated by a symbol with a prime indicator--Q'(CEM). Negligible orientations are indicated by the symbol followed by (NEG)-Q(CEM)(NEG).

For example, student number 4 (Table 4.19) was mapped as negligible (C) in Q(PK), minor (B) in Q(CS) and major (A) in Q(CH). The additional elements mapped during the viewing of the video tape were a major in Q(CEM), a major in Q(CET), a major in Q(CK), a negligible in Q(CKH) a major in A, and a negligible in Q(PT).

The additional findings listed in Table 4.19 proved extremely accurate when compared to ratings, by classroom teachers, of classroom performance by the students. The fact that as many as thirteen elements of cognitive style were accurately assessed during a less than five minute video tape has tremendous implications for future testing programs.

Table 4.19. All Elements of Cognitive Style Observed By a Panel of Experts During Bass Test Number 1

	Q(PK)	Q(CS)	Q(CH)	ADDITIONAL COGNITIVE STYLE ELEMENTS NOTED--SAME VTR
1.	B	B	B	Q'(CEM), Q'(CET), Q'(PT)
2.	A	A	B	Q(CEM), Q(CET), Q'(CK), Q(CKH), Q'(CP), A, I, Q(PT)
3.	A	A	A	Q'(CEM), Q'(CET), Q(CKH), Q(CP)(NEG), A, I, D, Q(PT)
4.	C	B	A	Q(CEM), Q(CET), Q(CK), Q(CKH)(NEG), A, Q(PT)(NEG)
5.	A	A	A	Q(CEM), Q(CET), Q'(CK), Q(CKH), Q(PT)
6.	A	C	C	Q(CEM)(NEG), Q'(CET), Q'(CK), Q'(CKH), I, Q(PT)
7.	C	B	C	Q'(CET), Q(CK)(NEG), Q(PT)(NEG)
8.	B	A	B	Q(CEM), Q(CET), Q(CK), Q'(CKH), A, Q'(PT)
9.	B	A	B	Q(CET), Q'(CK), A, Q'(PT)
10.	A	C	B	Q(CEM), Q'(CET), Q(CK), Q(CKH), Q(PT)
11.	A	A	A	Q(CEM), Q(CET), Q(CK), Q(CKH), I, Q(PT)
12.	B	A	C	Q(T), Q'(CET), Q(CK), Q(CKH)(NEG), Q'(PT)
13.	A	A	B	Q(CEM), Q(CET), Q'(CK), Q(CKH), Q(CP), A, F, I, M. Q(PT)
14.	A	A	A	Q'(CEM), Q'(CET), Q(CK), Q'(CKH), A, M, Q(PT)
15.	C	B	A	Q(CEM), Q(CET), Q(CK), A, F, Q(PT)(NEG)
16.	A	A	A	Q(CEM), Q(CET), Q(CK), Q(CKH), I, M. Q(PT)
17.	A	B	B	Q(CEM), Q(CET), Q'(CK), Q(CKH), I, Q(PT)
18.	C	B	B	Q(CET), Q(PT)(NEG)
19.	B	A	C	Q(CEM), Q(CET), Q'(PT)
20.	C	B	B	Q'(CET), Q(CK)(NEG), Q(PT)(NEG)
21.	B	B	A	Q(CET), Q(CK), Q'(CKH), Q'(PT)

A=Major, B=Minor, C=Negligible

Summary

Eighteen null hypotheses were generated and tested. Each null hypothesis was tested using the Komolgorov-Smirnov Statistical Test Model. All hypotheses were tested at the .05 level of significance. Four hypotheses were formulated dealing with qualitative code synnoetics. Four hypotheses were formulated dealing with qualitative code histrionics. Three hypotheses were formulated dealing with qualitative proprioceptive kinematics. Four hypotheses were formulated dealing with qualitative proprioceptive temporal. Three hypotheses were formulated dealing with qualitative auditory. A summary of results of the statistical analysis is presented in Tables 4.20, 4.21, 4.22, 4.23, and 4.24.

Table 4.20. Summary of Results--Qualitative Code Synnoetics

Operational Hypotheses	Results of Statistical Test
1. There will be a difference in ratings on qualitative code synnoetics between the O.C.C. Test Battery administered April 10, 1972 and a retest using the same questions after the subjects have been through the Bass test for qualitative code synnoetics.	Null not rejected
2. There will be a difference in ratings on qualitative code synnoetics between the O.C.C. Test Battery and a classroom scale on which such activity is rated.	Null not rejected
3. There will be a difference in ratings on qualitative code synnoetics between the Bass test for qualitative code synnoetics and a classroom scale on which such activity is rated.	Null not rejected
4. The Bass test will be more accurate than the O.C.C. test as a predictor of classroom performance in qualitative code synnoetics as rated by classroom teachers.	Null not rejected

Table 4.21. Summary of Results--Qualitative Code Histrionics

Operational Hypotheses	Results of Statistical Tests
5. There will be a difference in ratings on qualitative code histrionics between the O.C.C. battery administered April 10, 1972 and a retest using the same questions after the subjects have been through the Bass test for qualitative code histrionics.	Null not rejected
6. There will be a difference in ratings on qualitative code histrionics between the Bass test for qualitative code histrionics and a classroom scale on which such activity is rated.	Null not rejected
7. There will be a difference in ratings on qualitative code histrionics between the April 10, 1972 O.C.C. test battery and a classroom scale on which such activity is rated.	Null not rejected
8. The Bass test will be more accurate than the O.C.C. test as a predictor of classroom performance in qualitative code histrionics as rated by classroom teachers.	Null not rejected

Table 4.22. Summary of Results--Qualitative Proprioceptive Kinematics

Operational Hypotheses	Results of Statistical Tests
9. There will be a difference in ratings on qualitative proprioceptive kinematics between the O.C.C. battery designed to measure qualitative proprioceptive ability and performance on a classroom task designed to yield a measure of qualitative proprioceptive kinematic ability.	Null not rejected
10. There will be a difference in ratings on qualitative proprioceptive kinematics between the Bass test and performance on a classroom task designed to yield a measure of qualitative proprioceptive kinematic ability.	Null not rejected
11. The Bass test will be more accurate than the O.C.C. test as a predictor of classroom performance of a task requiring a major orientation in qualitative proprioceptive kinematic ability.	Null not rejected

Table 4.23. Summary of Results--Qualitative Proprioceptive Temporal

Operational Hypotheses	Result of Statistical Tests
12. There will be a difference in ratings on qualitative proprioceptive temporal between the O.C.C. battery designed to measure qualitative proprioceptive ability and performance on a classroom task designed to yield a measure of qualitative proprioceptive temporal ability.	Null not rejected
13. There will be a difference in ratings on qualitative proprioceptive temporal between the Bass test for qualitative proprioceptive temporal and performance on a classroom task designed to yield a measure of qualitative proprioceptive temporal ability.	Null not rejected
14. There will be a difference in ratings on qualitative proprioceptive temporal between incidental observation of qualitative proprioceptive temporal during the Bass test for qualitative proprioceptive kinematics and performance on a classroom task designed to yield a measure of qualitative proprioceptive temporal ability.	Null not rejected
15. The Bass test will be more accurate than the O.C.C. test as a predictor of classroom performance of a task requiring a major orientation in qualitative proprioceptive temporal ability.	Null not rejected

Table 4.24. Summary of Results--Qualitative Auditory

Operational Hypotheses	Results of Statistical Tests
16. There will be a difference in ratings on qualitative auditory between the O.C.C. test battery and performance on a classroom task designed to yield a measure of qualitative auditory ability.	Null rejected Alternative (Operational) Accepted
17. There will be a difference in ratings of qualitative auditory between the Bass test and performance on a classroom task designed to yield a measure of qualitative auditory ability.	Null not rejected
18. The Bass test will be more accurate than the O.C.C. test as a predictor of classroom performance of a task requiring a major orientation in qualitative auditory ability.	Null rejected Alternative (Operational) Accepted

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this study was to determine the relative effectiveness of two methods for mapping the qualitative symbolic orientation (an aspect of cognitive style) of a selected sample of community college students. These methods were: 1) a series of tests developed by Oakland Community College, Bloomfield Hills, Michigan (primarily a paper and pencil test battery), and 2) a series of tests developed for this study (video-taped performance tests). The effectiveness of the student orientation mappings, determined by each method, was assessed by means of a rated performance of a task which was deemed by a panel of experts as requiring a major orientation by the student in the element in question.

Summary

Review of the literature indicates that psychologists have for many years been seeking to understand differing cognitive styles. These efforts have taken many directions, some of the most recent of which are efforts at the University of Cambridge, England, the Portsmouth Rhode Island Public

Schools, and Oakland Community College, Bloomfield Hills, Michigan. This study was conducted within the framework developed at Oakland Community College. The cognitive style mapping procedure developed by Oakland Community College has proven to be an excellent tool for use in personalization of education. Successful use of the video tape recorder as a data collection device is also supported by numerous studies.

The subjects utilized in this study were randomly selected from accessible elements of the population (those students reporting for testing with the Oakland Community College test battery at Delta College, University Center, Michigan on April 10, 1972). Twenty-one students were selected from the twenty-four accessible elements.

The Oakland Community College test battery designed to measure elements of cognitive style (approximately a four hour test battery) (see Appendix A) was administered to the students in the study on April 10, 1972. Later that same day two tests developed for this study and designed to measure certain qualitative symbolic orientations were administered to the same population. The two tests developed for this study (Bass tests) were performance tasks which were recorded on video tape. On May 18, 1972 the qualitative symbolic orientations exhibited by students on the video tapes were mapped by a panel of experts who viewed the video tapes.

The Bass tests were designed to measure the following:

Test 1: Qualitative Proprioceptive Kinematics Q(PK)
Qualitative Code Synnoetics Q(CS)
Qualitative Code Histrionics Q(CH)

Test 2: Qualitative Proprioceptive Temporal Q(PT)
Qualitative Audio Q(A)

The Qualitative Code Synnoetics and Qualitative Code Histrionics portions of the Oakland Community College Test Battery were administered on a re-test basis during the week of April 10, 1972, to see if there was a change in scores on this test after the subjects had been exposed to the procedures of the Bass tests.

The effectiveness of the test results (Oakland Community College Test Battery and the Bass Tests) was determined by comparing the results of the tests to performances in classroom situations requiring, according to a panel of experts, major orientations in the qualitative symbols under study.

Eighteen null hypotheses were generated and tested. Each null hypothesis was tested using the Komolgorov-Smirnov Statistical Test Model. All hypotheses were tested at the .05 Alpha level. A summary of the results of the statistical analysis was presented in Tables 4.20, 4.21, 4.22, 4.23, and 4.24.

Conclusions

The findings of this study indicate that:

1. Either the O.C.C. test or the Bass test can be used effectively as a predictor of classroom performance in qualitative code synnoetics.
2. Either the O.C.C. test or the Bass test can be used effectively as a predictor of classroom performance in qualitative code histrionics.
3. Either the O.C.C. test for qualitative proprioceptiveness or the Bass test for qualitative proprioceptive kinematics can be used effectively as a predictor of classroom performance in qualitative proprioceptive kinematics.
4. Either the O.C.C. test for qualitative proprioceptiveness or the Bass test for qualitative proprioceptive temporal ability or the incidental observation of qualitative proprioceptive temporal ability during the Bass test for qualitative proprioceptive kinematics can be used effectively as a predictor of classroom performance in qualitative proprioceptive temporal ability.
5. The Bass test is more effective than the O.C.C. test as a predictor of qualitative auditory ability.
6. Either the O.C.C. test or the Bass test can be used effectively for mapping qualitative symbolic orientations.

Implications

The scope of the present study is limited, however, it has several implications beyond its present scope. These implications are relevant to the cognitive style mapping program at Oakland Community College, cognitive style mapping wherever it is carried out, and the educational process in general. The following implications are suggested.

1. A need for students to be exposed to real situations for evaluation rather than just to hypothetical situations is indicated.

   The fact that most of the students in this study changed their own evaluation of their qualitative code histrionics ability after exposure to the Bass test for qualitative code histrionics indicates that paper-pencil responses to hypothetical situations as presented in writing may be quite different than responses to real life situations.

2. The fact that most of the students in this study changed their evaluation of their own qualitative code histrionics ability after exposure to the Bass test for qualitative code histrionics implies that the students either did not know themselves when presented with the qualitative code histrionics questions on April 10, 1972 (qualitative code synnoetics) or knowingly provided inaccurate information. Since students

were informed that their responses were not for grading purposes and that one response was not better than another the first contention is probably accurate. There is a lack of discrimination in the current Oakland Community College test for qualitative code synnoetics (all students tested were rated as having major orientations in qualitative code synnoetic on all of the three tests). These two points seem to imply that qualitative code synneotics is not accurately assessed by the Oakland Community College battery. These points also indicate that perhaps none of the paper-pencil responses by students as to how they think they might respond to a hypothetical situation (qualitative symbolic orientation) can be accurate if their knowledge of self (qualitative code synnoetics) is not major in scope. This further supports the need for students to be exposed to real situations for evaluation rather than just to hypothetical situation.

3. The fact that as many as thirteen elements of cognitive style were accurately assessed, during a less than five minute video tape, by a panel of experts who had not previously been exposed to such a video taped situation, has tremendous implications for future testing programs. The current Oakland Community College Test Battery is one which takes about four hours

for completion by the student. A need to develop a shorter testing procedure is indicated and in the light of findings from this study seems quite practical. Successful development of such a shortened procedure should significantly enhance the possibility of other institutions adopting this procedure which has been key to successful development of a personalized educational program at Oakland Community College.

4. The fact that the Oakland Community College test for qualitative auditory ability proved extremely inaccurate as a predictor of classroom performance in the qualitative auditory realm indicates that the development of a more accurate assessment instrument is needed. The Bass test for qualitative auditory as administered in this study was a more accurate predictor of classroom performance but was limited in that other elements of cognitive style could not be observed and rated from the same video tape.

5. The finding of no significant difference between the Bass test for qualitative proprioceptive temporal ability and incidental observation of qualitative proprioceptive temporal ability during the Bass test for qualitative proprioceptive kinematics indicates that two test may not be needed to deal with these two orientations. Skilled observers, as were the members of the panel of experts utilized in this

study, showed outstanding ability in rating both elements in the video tape in which both were observable.

Recommendations

The following recommendations are based on the analysis of the findings in this study and the insights gained during the course of this study. The recommendations for future research follow:

1. Future research in this area should include larger samples which may provide more definitive results than the present study provides.
2. The population of this study consisted of students enrolled in the nursing program at Delta College, only. It may prove beneficial for future research to examine populations in other programs and students across programs (nursing and business and liberal arts and/or others). Research across programs as indicated should provide a broader basis for formulating more comprehensive conclusions regarding the effectiveness of varying methods of mapping qualitative symbolic orientation.
3. Further research should examine the effectiveness of varying methods of mapping qualitative symbolic orientation with a primarily male population as opposed to the primarily female population utilized in this study. Some difference may exist between mapping

effectiveness for the two groups.

4. Further research should examine the effectiveness of varying methods of mapping qualitative symbolic orientation with a primarily black population as opposed to the primarily white population utilized in this study. Some difference may exist between mapping effectiveness for the two groups.
5. It may prove beneficial for future research to examine the use of the techniques utilized in this study with populations at other educational levels such as elementary, junior high, senior high and upper division college. Research at these levels should provide a broader basis for formulating more comprehensive conclusions regarding the effectiveness of varying methods of rating qualitative symbolic orientation.
6. The findings of this study show that a single video taped activity by a student (five minutes in length) can serve as a source of information leading to the rating of many cognitive style elements. Future research should seek to develop and evaluate the effectiveness of one video taped activity (perhaps ten to fifteen minutes in length) for assessment of most elements of cognitive style.
7. A more comprehensive study should be undertaken in the future that would include replication of this study across comparable groups.

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APPENDICES

APPENDIX A

MANUAL OF DIRECTIONS

COGNITIVE STYLE

DIAGNOSTIC TEST BATTERY

COGNITIVE STYLE

DIAGNOSTIC TEST BATTERY

MANUAL OF DIRECTIONS

OAKLAND COMMUNITY COLLEGE

TEST ADMINISTRATION

T(VL) ALGORITHM

1. Score tests 1, 4, and 6. Go to Step 2.

2. Establish majors and minors for test 1 and 6 at the same grade level. Go to Step 3.

3. Is test 1 or test 6 negligible?

   NO: Go to Step 4
   YES: Go to Step 8

4. Establish entry level equal to grade level of test 1 and 6. Go to Step 5.

5. Are there two majors?

   NO: Go to Step 7
   YES: Go to Step 6

6. Record T(VL) as major. Go to Step 11.

7. Record T(VL) as minor. Go to Step 11.

8. Set entry level equal to reading level + .5. Go to Step 9.

9. Substitute test 4 for the negligible test. Go to Step 10.

10. If test 4 is negligible, lower entry level by 1 and set test 4 equal to major. Go to Step 11.

11. End of procedure.

TEST I

TEST I

ANSWER KEY

1.	B
2.	D
3.	B
4.	C
5.	C
6.	A
7.	E
8.	B
9.	B
10.	A
11.	A
12.	C
13.	A
14.	A
15.	E
16.	E
17.	D
18.	D
19.	A
20.	D
21.	A
22.	D
23.	E
24.	A
25.	B

Double Raw Score

12th Grade Level

30 - 50 Major
20 - 29 Minor
0 - 19 N/S

11th Grade Level

29 - 50 Major
19 - 28 Minor
0 - 18 N/S

10th Grade Level

25 - 50 Major
16 - 24 Minor
0 - 15 N/S

9th Grade Level

20 - 50 Major
13 - 19 Minor
0 - 12 N/S

8th Grade Level

16 - 50 Major
11 - 15 Minor
0 - 10 N/S

TEST II TEST II

MAY I HAVE YOUR ATTENTION. LISTEN CAREFULLY. I'M GOING TO READ YOU A BRIEF SHORT STORY. IMMEDIATELY AFTER I AM FINISHED, YOU WILL BE GIVEN TEST SHEETS ON WHICH YOU ARE TO WRITE YOUR ANSWERS TO A FEW QUESTIONS ABOUT THE STORY. YOU ARE NOT TO WRITE OR PICK UP YOUR PENCILS WHILE THE STORY IS BEING READ. PAY CLOSE ATTENTION.

"COKE AND CHIPS IN THE CARIBBEAN"

ON A WARM DAY WHEN THEY'RE THIRSTY, CARIBBEAN KIDS SHINNY UP TO THE COCONUTS AT THE TOP OF A COCONUT PALM TREE. THEY FIND THE RIPEST OF THE BUNCH, CUT IT LOOSE, AND LET IT FALL TO THE GROUND.

THEN THEY FIND AN OPENER (MOST OFTEN JUST A BIG ROCK) AND SMASH, SMASH, SMASH AT THE OUTER SKIN UNTIL THEY GET TO THE INNER SKIN. (THE ONE WITH THE MONKEY FACE.)

THEN THEY SMASH, SMASH, SMASH SOME MORE. UNTIL THEY REACH THE FRUITS OF THEIR LABOR. DELICIOUS COCONUT MILK. CRISP COCONUT MEAT.

IT'S "COKE AND CHIPS" IN THE CARIBBEAN.

ANSWER KEY TEST II

1. Warm
2. Caribbean
3. Coconut
4. Shinny up the tree, climb the tree
5. Drop it, let it fall to the ground
6. Monkey
7. Smash with a rock
8. Coek and chips

Boys and girls	7 - 8 Major
	2 - 6 Minor
	0 - 1 N/S

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TEST III

TEST III

ANSWER KEY

1. B
2. A
3. E
4. C
5. B
6. D
7. D
8. D
9. A
10. B
11. C
12. E
13. C
14. D
15. D
16. D
17. E
18. A
19. E
20. B

Double Raw Score	24 - 40 Major
	18 - 23 Minor
	0 - 17 N/S

TEST IV

TEST IV

ANSWER KEY

1.	C	13.	B	25.	B
2.	B	14.	C	26.	C
3.	A	15.	D	27.	D
4.	C	16.	D	28.	A
5.	B	17.	A	29.	B
6.	C	18.	D	30.	C
7.	A	19.	B	31.	B
8.	D	20.	D	32.	C
9.	A	21.	A	33.	D
10.	B	22.	C	34.	A
11.	A	23.	D	35.	A
12.	D	24.	B	36.	C

GRADE NORMS

Raw Score	Reading Grade	Raw Score	Reading Grade	Raw Score	Reading Grade
0	2.0	13	6.1	25	11.0
1	2.2	14	6.3	26	11.3
2	2.4	15	6.5	27	11.4
3	2.5	16	6.8	28	11.5
4	2.7	17	7.1	29	11.6
5	3.0	18	7.4	30	11.7
6	3.4	19	7.8	31	11.8
7	3.9	20	8.2	32	11.9
8	4.2	21	8.6	33	12.0
9	4.5	22	9.1	34	12.1
10	4.8	23	9.9	35	12.2
11	5.3	24	10.6	36	12.3
12	5.8				

TEST V TEST V

MAY I HAVE YOUR ATTENTION. LISTEN CAREFULLY. I'M GOING TO READ YOU SOME BRIEF ARITHMETIC PROBLEMS. YOU ARE TO WRITE YOUR ANSWER TO THE PROBLEM IMMEDIATELY AFTER IT IS READ. THERE WILL BE A PAUSE OF 15 TO 20 SECONDS FOR YOU TO DO YOUR CALCULATIONS, THEN THE NEXT PROBLEM WILL BE READ. PAY CLOSE ATTENTION FOR THE PROBLEMS WILL BE READ ONLY ONCE. LISTEN CAREFULLY.

1. A newsboy collected 90¢ from each of 3 customers. The total amount he collected was...
2. How many inches are in 3 1/2 feet?
3. How many "cokes" can you buy for 88¢ if cokes cost 11¢ each?
4. How many hours will it take to drive 300 miles at 60 miles per hour?
5. How much change will the clerk give you from $1.00 if you purchase 15 cards at 5¢ each?
6. A chick with $8.00 spends $3.50. How much does she have left?
7. Ball point pens are two for 49¢. How much will one dozen cost?
8. A cat bought a second-hand motor bike for $400.00 which was 2/3 of what it cost new. How much did it cost new?
9. A teacher's salary is $200.00 per week. 5% of it is withheld for retirement. How much does he have left?
10. Four women can knit a blanket in two days. How many will be needed to finish it in 1/2 day?

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TEST V

TEST V

ANSWER KEY

1. $2.70
2. 42"
3. 8
4. 5
5. 25¢
6. $4.50
7. $2.94
8. $600
9. $190
10. 16

Boys & Girls

8 - 10 Major

7 - 5 Minor

4 - 0 N/S

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TEST VI

TEST VI

ANSWER KEY

1.	D	21.	D	41.	A
2.	C	22.	E	42.	C
3.	B	23.	D	43.	A
4.	D	24.	C	44.	D
5.	A	25.	C	45.	B
6.	B	26.	C	46.	E
7.	C	27.	D	47.	A
8.	D	28.	C	38.	D
9.	E	29.	B	49.	D
10.	C	30.	D	50.	C
11.	B	31.	A		
12.	C	32.	A		
13.	C	33.	B		
14.	D	34.	B		
15.	E	35.	C		
16.	B	36.	C		
17.	E	37.	B		
18.	E	38.	C		
19.	C	39.	C		
20.	B	40.	B		

Boys & Girls

35 - 50 Major
23 - 34 Minor
0 - 22 N/S

SCORE	PERCENT	COURSE
0-22	0-44	ENG 052
23-34	46-68	ENG 131
35-43	70-86	ENG 151
44-50	88-100	ENG 152

NORMS FOR GRADES 8 - 12 FOR TEST VI

GRADE	M	M'	N/S
12	35-50	23-34	0-22
11	30-34	18-29	0-17
10	25-29	13-24	0-12
9	20-25	8-19	0-7
8	15-19	3-14	0-2

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TEST VII

TEST VII

A = 3
B = 2
C - 1
D = Ø

24 - 15 Major
14 - 8 Minor
7 - 0 N/S

1.	Qcem	21.	Qch
2.	Qces	22.	Qces
3.	Qcet	23.	Qck
4.	Qch	24.	Qcem
5.	Qck	25.	Qch
6.	Qcem	26.	Qck
7.	Qces	27.	Qcet
8.	Qcet	28.	Qcet
9.	Qcem	29.	Qck
10.	Qck	30.	Qces
11.	Qch	31.	Qck
12.	Qcem	32.	Qcem
13.	Qcem	33.	Qch
14.	Qcet	34.	Qces
15.	Qces	35.	Qck
16.	Qch	36.	Qces
17.	Qcet	37.	Qch
18.	Qch	38.	Qces
19.	Qcet	39.	Qck
20.	Qcem	40.	Qcet

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TEST VIII

TEST VIII

A = 3
B = 2
C = 1
D = Ø

24 - 15 Major
14 - 8 Minor
7 - 0 N/S

1. Ockh
2. Qcp
3. Ocs
4. Qct
5. Qcs
6. Ockh
7. Qcs
8. Qct
9. Ockh
10. Qckh
11. Qcs
12. Qckh
13. Qct
14. Qckh
15. Qcp
16. Qcp
17. Qct
18. Qckh
19. Qcs
20. Qckh
21. Qcs
22. Qcp
23. Qct
24. Qcp
25. Qcp
26. Ocs
27. Qct
28. Qcs
29. Qcp
30. Qct
31. Qcp
32. Qct

TEST IX

TEST IX

SCORING KEY

F = Family
A = Associates
I = Individual

A.		F.	
1.	F	16.	I
2.	A	17.	F
3.	I	18.	A
B.		G.	
4.	A	19.	F
5.	I	20.	I
6.	F	21.	A
C.		H.	
7.	I	22.	A
8.	F	23.	F
9.	A	24.	I
D.		I.	
10.	F	25.	F
11.	I	26.	I
12.	A	27.	A
E.		J.	
13.	F	28.	I
14.	A	29.	A
15.	I	30.	F

WEIGHTED SCORING METHOD

1. Score Most as 3
2. Score Least as 1
3. Score Blank as 2

KEY

30 - 21 Major
20 - 14 Minor
13 - 0 N/S

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TEXT X TEST X

SCORING KEY

M = Magnitude
D = Difference
R = Relationship
L = Appraisal

KEY
70 - 37 Major
36 - 22 Minor
21 - 0 N/S

I		IV		VIII	
1.	R	13.	L	29.	M
2.	M	14.	M	30.	L
3.	D	15.	D	31.	R
4.	L	16.	R	32.	D
II		**V**		**IX**	
5.	M	17.	L	33.	M
6.	L	18.	R	34.	L
7.	R	19.	M	35.	R
8.	D	20.	D	36.	D
III		**VI**		**X**	
9.	R	21.	M	37.	R
10.	M	22.	R	38.	D
11.	D	23.	D	39.	M
12.	L	24.	L	40.	L
		VII			
		25.	R	41.	C
		26.	M	42.	C
		27.	D	43.	C
		28.	L	44.	C
				45.	C

WEIGHTED SCORING METHOD

1. Score A as 7
2. Score B as 3
3. Score C as 2
4. Score D as 1

Questions 41 - 45

If the student has 3 out of 5 answers correct and at least a minor in T(VQ); Print (K).

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Instructions for Raven Matrices Survey

1. Turn on the tape recorder.
2. Wait for instructions to be completed:

   (On tape) PLEASE LOOK AT THE FIRST PICTURE IN FRONT OF YOU. YOU SEE IT IS A PATTERN WITH A PIECE CUT OUT OF IT. EACH OF THE PIECES AT THE BOTTOM OF THE PICTURE IS THE RIGHT SHAPE TO FIT THE SPACE, BUT ONLY ONE OF THEM IS THE RIGHT PATTERN. #2 IS NOT A PATTERN AT ALL. #3 IS QUITE WRONG. #6 IS REALLY RIGHT BUT IT IS WRONG WITH THE WHITE PIECE IN IT. ONLY #4 IS QUITE RIGHT.
3. Turn off the recorder.
4. The testor says: I WOULD LIKE YOU TO DETERMINE THE CORRECT ANSWER FOR EACH OF THE PUZZLES AND WRITE THE CORRECT ANSWER IN THE SPACE PROVIDED. YOU WILL HAVE FROM 15 TO 20 SECONDS FOR EACH PUZZLE. GO AHEAD.

Q(V)--Qualitative Visual

Recording of Results for Raven Matrices Survey

The students record their answers on the self-scoring checklist

VISUAL

A.	_____	E.	_____
B.	_____	F.	_____
C.	_____	G.	_____
D.	_____	H.	_____

Scoring for Raven Matrices

Use the weights as indicated. Score WRONG answers only.

Answers				Weights			
A	4	E	4	A	5	E	3
B	5	F	3	B	7	F	1
C	5	G	4	C	2	G	4
D	2	H	5	D	6	H	8

Add the total score and compare to the following chart.

0 - 11 Major
12 - 18 Minor
19 - 36 N/S

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Mueller Auditory Survey

THIS IS AN AUDITORY REASONING TEST. YOU ARE ABOUT TO HEAR A SERIES OF SOUNDS WITH A DEFINITE PATTERN. YOU ARE TO WRITE THE NEXT SOUND OF THE PATTERN WHEN REQUESTED. FOR EXAMPLE, IF YOU HEAR "BA BA BA, BE BE BE, BA BA BA" YOU NOTICE AN ALTERNATING PATTERN AND PREDICT THE NEXT SOUND AS "BE BE BE". SIMILARLY, IF YOU "BA BE, BA BE BE, BA BE BE BE", YOU SHOULD NOTICE THAT IN EACH GROUP THERE IS ONE MORE "BE" THAN IN THE PREVIOUS GROUP, AND YOU SHOULD PREDICT "BA BE BE BE BE" OR ONE "BA" AND FOUR "BE'S". (pause) NOW LISTEN TO THE SOUNDS, FIGURE OUT THE PATTERN, AND WRITE THE NEXT SOUND IN THE SERIES ON YOUR ANSWER SHEET.

1. BE BE BE BE, BE BE BE, BE BE
2. BA BE BE BA, BE BA BA BE, BA BE BE BA, BE BA BA BE
3. BE BE BA BE BE BE, BE BE BA BA BE BE, BE BE BA BA BA BE
4. BE BA BE BE, BE BE BA BE, BE BE BE BA, BA BE BE BE
5. BA BA BA, BA BE BA, BE BE BE, BE BA BE

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Scoring for Mueller Auditory Survey

The following weights have been assigned to the answers in the Mueller Auditory Survey as follows:

1. 3
2. 4
3. 5
4. 6
5. 7

Answers to the Mueller Auditory

1. BE
2. BA BE BE BA
3. BE BE BA BA BA BA
4. BE BA BE BE
5. BA BA BA

Score the weighted right answers as follows:

IF SCORE IS:	CHECK
0 - 3	N/S
4 - 7	Minor
8 +	Major

Q(O)--Qualitative Olfactory

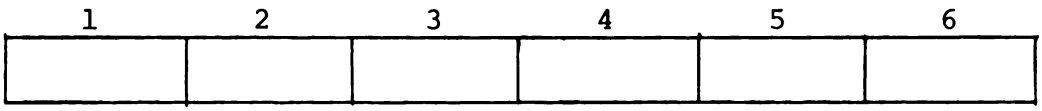
Instructions for the Olfactory Cards

The testor shows the students a packet of six olfactory cards. THESE ARE OLFACTORY CARDS. YOU ARE TO SCRATCH THE TAPE LIKE THIS. (Here the testor demonstrates the proper way to scratch the cards.) THEN SNIFF THE TAPE. ON THE BACK OF THE CARD YOU WILL FIND FIVE CHOICES LABELED A THROUGH E. YOU WILL ALSO NOTICE THAT EACH CARD IS NUMBERED. THESE NUMBERS CORRESPOND TO THE NUMBERED BOXES ON YOUR SELF-SCORING CHECKLIST. PLEASE WRITE YOUR ANSWERS IN THESE BOXES. GO AHEAD.

The students do this test at their own pace.

Recording of Results for Olfactory Survey

OLFACTORY



Correct Answers

1. C
2. C
3. B
4. C
5. B
6. D

KEY

4 - 6 Major
2 - 3 Minor
0 - 1 N/S

KEY SHEET

(1) ONION	(2) CHOCOLATE	(3) COCONUT
Parsley Seed	Coke	Burnt Sugar
Pepper	Cinnamon	Coconut
Onion	Chocolate	Chocolate
Celery	Banana	Toasted Almond
Chocolate	Strawberry	Vanilla

(4) CHERRY	(5) SMOKE	(6) CINNAMON
Root Beer	Wood	Peppermint
Coke	Smoke	Nutmeg
Cherry	Bread	Cloves
Grape	Pizza	Cinnamon
Coffee	Charcoal	Coke

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Q(T)--Qualitative Tactile
Q(P)--Qualitative Proprioceptive

Seat the student at the table in front of the curtain. PLEASE PULL YOUR CHAIR UP AS CLOSE AS POSSIBLE. THANK YOU. BEHIND THIS CURTAIN YOU WILL FIND TWO PEG BOARDS: ONE FOR YOUR RIGHT HAND AND ONE FOR YOUR LEFT. IN THE CENTER OF EACH OF THESE BOARDS IS A MASTER PEG. PLEASE PUT YOUR HANDS THROUGH THE CURTAIN AND FIND THE TWO MASTER PEGS. (Pause while the student does this.) FEEL HOW THOSE PEGS ARE DIFFERENT FROM THESE PEGS (Testor is to show student regular pegs) IN THAT THEY HAVE RAISED RIDGES OR GROOVES IN THEM. I AM GOING TO MAKE A PATTERN ON THE LEFT BOARD USING THE MASTER PEGS AND ADDITIONAL PEGS LIKE THESE. THEN I WILL GIVE YOU SOME PEGS AND ASK YOU TO DUPLICATE THAT PATTERN ON THE RIGHT BOARD WITHOUT LOOKING. PLEASE REMOVE YOUR HANDS. THIS FIRST ONE IS A SAMPLE AND CONSISTS OF THE MASTER PEG AND ONE ADDITIONAL PEG AND YOU WILL HAVE THIRTY SECONDS TO DUPLICATE IT. GO AHEAD. THANK YOU. NOW, I AM GOING TO MAKE A PATTERN USING TWO PEGS AND THE MASTER PEG AND YOU WILL HAVE ONE MINUTE TO DUPLICATE THE PATTERN. GO AHEAD. THANK YOU. THIS LAST PATTERN WILL CONSIST OF THE MASTER PEG AND THREE ADDITIONAL PEGS AND YOU WILL HAVE TWO MINUTES TO DUPLICATE THE PATTERN. GO AHEAD. THANK YOU, THAT IS ALL.

The testor is to record the student answers on the guide checklist.

Recording of Results for the Nottus Pattern

The number of pegs placed correctly in each of the tests should be recorded. The sample is recorded only as a yes or no to indicate whether the students did the sample pattern correctly. The testor is to indicate, by circling the matrix on the score sheet, the dots that indicate the actual design of the test. The testor is to indicate the student's response by placing an "X" over the dot where the student actually placed each peg.

NOTTUS PATTERN

x = Subject Response	0 = Example
1. _____ Correct	2. _____ Correct
. . . . .	. . . . .
. . . . .	. . . . .
. . . . .	. . . . .
. . . . .	. . . . .
. . . . .	. . . . .
. . . . .	. . . . .

Scoring for the Nottus Pattern

Score the third pattern as follows (Number 2):

Correct Pegs

2 - 3 Major
1 Minor
0 N/S

TEXT X DIRECTIONS TEST X

In this test there are ten (10) situations in which you are asked to imagine yourself. Each situation has four (4) alternative responses. You are to decide which response you would "most likely" make as the first or best solution, then the second best, the third best, and the fourth best.

Remember YOU MUST RANK ALL FOUR RESPONSES for each situation.

READ ALL FOUR (4) RESPONSES BEFORE YOU MAKE YOUR SELECTIONS.

EXAMPLE

If you had to organize a baseball team, you would:

1. Pick from previously established teams.
   A. first choice
   B. second choice
   C. third choice
   D. fourth choice
2. Get all new untried players.
   A. first choice
   B. second choice
   C. third choice
   D. fourth choice
3. Bring older experienced players from retirement.
   A. first choice
   B. second choice
   C. third choice
   D. fourth choice
4. Compare each choice to an established star.
   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

SAMPLE ANSWER CARD

	T	F						
1.	A	●	B	O	C	O	D	O
2.	A	O	B	O	C	●	D	O
3.	A	O	B	●	C	O	D	O
4.	A	O	B	O	C	O	D	●

In this example #1 would be your first choice, #2 would be your third choice, #3 would be your second choice, and #4 would be your fourth choice.

I. If you were a member of the O.C.C. debate team and had to prepare a speech "in favor of public school education," which approach would you most likely take?

1. Compare American education with other American, European, and Far Eastern educational systems and point out the similarities among all of them.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

2. Tell your audience that despite what appear to be "fads" and "frills" in the public school, it still contains the three R's and holds to standards to excellence and purpose.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

3. Make a survey of all contemporary education pointing up differences between other educational systems and our own.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

4. Compare the similarities and differences in the ideas of professional educators and show to what extent they meet the standards of the past.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

 Turn to next page

II. If you were asked to recommend a "very good" restaurant to your best friend's family, what would you most likely do?

5. Determine if the restaurant has the high standards of very good restaurants you have visited in the past.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

6. Find out if its standards are in keeping with older traditions as well as modern ones, and the extent to which it is like or different from other good restaurants and eating places.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

7. Discover in what ways the restaurant resembles and duplicates other fine eating places.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

8. Determine in what ways the restaurant's reputation is different from currently accepted standards of excellence.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

III. In considering your own ideas about what helps to make a "good" education, how would you rate the following as methods of good classroom management?

9. Arrange a classroom that is as much as possible like the kind of situations the students will encounter in the "real" world (business, military, professional, etc.).

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

10. Place the teacher in position of authority. He should be one who leads, instructs, and controls the activities.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

11. Use the latest theories of education to show how today's classroom differs from the past.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

12. Recognize how our standards and values are changing and provide a classroom that will aid learning and, at the same time, help in the acceptance of society's standards.

   A. first choice
   B. second choice
   C. third choice
   D. fourth choice

IV. If you were asked to rate the performance of a group of workers or students, which method of rating would you most likely choose?

13. Check the past record of the student/worker, compare his performance to that of his fellow workers, and consider his performance in terms of the work of others in the past.

A. first choice
B. second choice
C. third choice
D. fourth choice

14. Rate the worker/student in terms of standards and requirements established for the whole group at the beginning of the year.

A. first choice
B. second choice
C. third choice
D. fourth choice

15. Rate this year's group in terms of its difference from the best group which performed in the past.

A. first choice
B. second choice
C. third choice
D. fourth choice

16. Grade the student in comparison with the performance of his present classmates.

A. first choice
B. second choice
C. third choice
D. fourth choice

V. If you believe that a good home is necessary and desirable for a child to make the greatest success in school, which of the following would you most likely choose as the best home environment?

17. One where the "old time" parent and child roles are somewhat followed. Difference and individuality is respected, but attempts are made by the family to fit into the neighborhood by being like other families on the block in most ways.

A. first choice
B. second choice
C. third choice
D. fourth choice

18. One where the child is sure that his home is pretty much like the home of his friends and classmates.

A. first choice
B. second choice
C. third choice
D. fourth choice

19. One where the members of the family follow the ideas put forward by social workers, family counsellors and family doctors.

A. first choice
B. second choice
C. third choice
D. fourth choice

20. One where the best home is considered independent of the rest of the society and is judged by its difference from other families.

A. first choice
B. second choice
C. third choice
D. fourth choice

VI. If you feel that a course in psychology is helpful to a better understanding of normal behavior, which would you choose as the most effective way to teach such a course?

21. A method where the teacher lectures and uses a standard textbook which has been highly rated by psychology teachers.

A. first choice
B. second choice
C. third choice
D. fourth choice

22. Have students read various paperback novels and books which illustrate different psychological problems (such as, "I Never Promised You a Rose Garden") and compare the abnormal behavior brought out in the books with that discussed in class.

A. first choice
B. second choice
C. third choice
D. fourth choice

23. Have students engage in a discussion of which symptoms are typical of a particular illness and how it is different from another illness.

A. first choice
B. second choice
C. third choice
D. fourth choice

24. Use standard textbooks, tour a state mental hospital, read psychological research, and determine how accurate is the current method of classification of mental illness.

A. first choice
B. second choice
C. third choice
D. fourth choice

VII. If you wanted to find out more about O.C.C.'s basketball team, with hopes of making the varsity, which would you choose as most helpful?

25. Watch movies of games played in the past, note the strategy used by the O.C.C. winning team as compared with that used by the other team.

A. first choice
B. second choice
C. third choice
D. fourth choice

26. Attend a series of lectures by the coach in which he describes the usual kind of player who contributes to a successful team, and the traditional demands on the player.

A. first choice
B. second choice
C. third choice
D. fourth choice

27. Pay close attention to the players who are on the varsity team, and note the difference between their skills and those of players on the reserve team.

A. first choice
B. second choice
C. third choice
D. fourth choice

28. Listen to talks by coaches on the subject of what makes for success in basketball, compare your skills with those of other players but also realize your shortcomings.

A. first choice
B. second choice
C. third choice
D. fourth choice

 Turn to next page.

VIII. In making plans for getting a job after high school graduation, which procedure would you follow?

29. Go to the state employment agency for an interview with the guidance counselor.

A. first choice
B. second choice
C. third choice
D. fourth choice

30. Ask your high school counselor about job possibilities, look at the want ads in the daily papers, and then make up your mind based on all of the information gathered.

A. first choice
B. second choice
C. third choice
D. fourth choice

31. Compare the advantages of the job listed in the want ads with those suggested by the state employment agency.

A. first choice
B. second choice
C. third choice
D. fourth choice

32. Check on the differences in pay, fringe benefits, and tasks required for the same kind of job at different places.

A. first choice
B. second choice
C. third choice
D. fourth choice

 Turn to next page.

IX. If you were demonstrating to a group of youngsters a method for learning to draw pictures, which would be the most effective way?

33. To teach it as it is taught in school art classes where the methods are demonstrated by the instructor.

A. first choice
B. second choice
C. third choice
D. fourth choice

34. To show different approaches and methods in teaching art. Analyze the very early methods of African art, the later methods of European and modern artists.

A. first choice
B. second choice
C. third choice
D. fourth choice

35. To compare the methods of teaching some art skills to sketching, sculpture and the drawing of portraits.

A. first choice
B. second choice
C. third choice
D. fourth choice

36. To note the differences between new and past methods of teaching art.

A. first choice
B. second choice
C. third choice
D. fourth choice

X. The issues centering around student rights and censorship of school reading material is of concern to most students. Which of the following do you most agree with?

37. School systems should copy the censoring practices of other institutions of society (i.e., the courts, publishers, churches, and libraries).

A. first choice
B. second choice
C. third choice
D. fourth choice

38. School policy should recognize the policies of other arms of society, and show how the policies at O.C.C. differ from the usual ones.

A. first choice
B. second choice
C. third choice
D. fourth choice

39. The school system should honor its traditions and recognize the wisdom of the past controlling decisions of great leaders in education.

A. first choice
B. second choice
C. third choice
D. fourth choice

40. The school administration should secure recommended positions on this issue from as many official offices and unofficial organizations as possible, as well as student's opinions, and shape a policy from this research.

A. first choice
B. second choice
C. third choice
D. fourth choice

TEST X TEST X

The following statements are untimed.

Work quickly and give the first answer that comes to you.

Your first impression is important.

Fill in the space on the IBM card under the proper letter.

A - Rarely
B - Sometimes
C - Usually

41. When I am in an argument I avoid probability statements.

42. I enjoy the type of reasoning used in solving arithmetic problems.

43. I enjoy puzzles in which the solution is deduced from the rules.

44. When I am defending a position, I attempt to develop a logical proof.

45. I resent being placed in situations in which I cannot predict what the outcome will be.

TEST IX

TEST IX

DIRECTIONS

Following are some stories or incidents that might happen to people. Three possible responses are given. You are required to choose which of these is "most like you" and which is "least like you". You will leave one choice blank. Read the example.

EXAMPLE

A. Sue Bryant is planning to buy a new set of clothes for a long vacation trip. She should:

1. Consult her parents and sisters on what to buy.
   A. MOST B. LEAST

2. Make her own decision.
   A. MOST B. LEAST

3. Ask the advice of her girlfriends.
   A. MOST B. LEAST

1. A O B O C O D O E O

2. A O B ● C O D O E O

3. A ● B O C O D O E O

In the above example it would be "most like you" to ask the advice of your friends and "least like you" to make a decision alone on what to buy, and you left one choice (1) blank.

TEST IX

TEST IX

A. Mrs. Jones, a widow with three children at home, is about to be evicted from the flat that she has rented for the past ten years. In order to help her solve her problem, she should:

1. Ask her married children (or sisters or brothers) for help.
   A. MOST B. LEAST

2. Ask the ladies in her church group to give her some advice and help.
   A. MOST B. LEAST

3. Realize that no one can really help her and decide to solve it on her own.
   A. MOST B. LEAST

B. Bill Bowen, a 17 year old at Center High School, is having more and more frequent arguments and encounters with another fellow in school. It is beginning to seem as though a fight cannot be avoided. Bill should:

4. Talk to his best buddies about what he should do.
   A. MOST B. LEAST

5. Decide for himself what to do and even fight if necessary.
   A. MOST B. LEAST

6. Talk to folks at home and take their advice.
   A. MOST B. LEAST

TEST IX

C. Mary is a sophomore student at Colorado University. A number of students are planning to go out on strike to protest "an inadequate educational system." Other students are not supporting the strike. Mary should:

7. Weigh the positive and negative arguments for the strike and make up her mind.
A. MOST B. LEAST

8. Call her parents (or brother or sister) and ask their advice.
A. MOST B. LEAST

9. Discuss the proposed strike with her friends and follow their suggestions.
A. MOST B. LEAST

D. Don Roberts needs a car to get to his new job. He goes to the used car agency with some of his buddies and his Dad. His father wants him to buy one car, his buddies are urging him to buy a different one and he has been thinking about another one. He should:

10. Buy what his father suggests.
A. MOST B. LEAST

11. Buy what he has been thinking about.
A. MOST B. LEAST

12. Buy what his buddies are telling him to get.
A. MOST B. LEAST

TEST IX

E. The pastor of the B.C.E. Bible Church has been urging his congregation to boycott some merchants along Tenth Street for unfair sales and hiring practices. Mr. and Mrs. Pitts have shopped at the stores for years and some of the merchants have been fairly nice to them. Mrs. Pitts does not want her family to go without the things they get at the store. However, their fellow church members all side with the pastor. If you were Mr. Pitts:

13. The family's feelings should determine the decision.
A. MOST B. LEAST

14. The goals of the members of the church should heavily influence your actions.
A. MOST B. LEAST

15. You should weigh the situation and make a decision based on your individual experiences.
A. MOST B. LEAST

AMONG THE FOLLOWING STATEMENTS CHOOSE THE ONE THAT IS "MOST LIKE YOU" (MOST) AND THE ONE THAT IS "LEAST LIKE YOU" (LEAST).

F. 16. To be free to do as I choose.
A. MOST B. LEAST

17. To follow the advice given to me by close relatives.
A. MOST B. LEAST

18. To have others support and agree with me.
A. MOST B. LEAST

TEST IX

TEST IX

G. 19. To stick close to the standards developed in our family.
A. MOST B. LEAST

20. To stick firmly to my own opinions and beliefs.
A. MOST B. LEAST

21. To stick to the beliefs of my associates and fellow students.
A. MOST B. LEAST

H. 22. To make things for other people.
A. MOST B. LEAST

23. To spend time working on a family project.
A. MOST B. LEAST

24. To work on my own hobbies without assistance.
A. MOST B. LEAST

I. 25. To live my life as taught by my parents.
A. MOST B. LEAST

26. To be able to live my life exactly as I wish.
A. MOST B. LEAST

27. To have a way of life much like my friends.
A. MOST B. LEAST

J. 28. To be relatively unbound by social conventions.
A. MOST B. LEAST

29. To be praised and approved of by other people.
A. MOST B. LEAST

30. To gain the approval of my family.
A. MOST B. LEAST

TEST VIII

TEST VIII

DIRECTIONS

The following test is untimed.

Work quickly and give the first answer that comes to you.

Your first impression is important.

Do not spend a lot of time on any one question.

There are 32 items.

Fill in the space on the IBM card under the proper letter.

A = usually
B = sometimes
C = seldom
D = never

EXAMPLE:

I would make a good football player.
A. usually B. sometimes C. seldom D. never

1. A ● B O C O D O E O

In this case you believe you would "usually" be good as a football player.

DO NOT MARK IN TEST BOOKLET

TEST VIII

TEST VIII

1. I compete effectively in amateur sports.
   A. usually B. sometimes C. seldom D. never

2. I wait for an invitation to be seated in making a call on a supervisor in his office.
   A. usually B. sometimes C. seldom D. never

3. I am able to keep at a task which I set for myself.
   A. usually B. sometimes C. seldom D. never

4. I can be effective in settling a dispute between two parties.
   A. usually B. sometimes C. seldom D. never

5. I accept criticism without being deeply hurt.
   A. usually B. sometimes C. seldom D. never

6. I can maintain balance well enough to participate in water or snow skiing.
   A. usually B. sometimes C. seldom D. never

7. I set goals consistent with my own needs and abilities.
   A. usually B. sometimes C. seldom D. never

8. I can bring a group to some agreement.
   A. usually B. sometimes C. seldom D. never

9. I play the piano or other musical instrument.
   A. usually B. sometimes C. seldom D. never

10. I can jump rope for three minutes with less than three restarts.
    A. usually B. sometimes C. seldom D. never

11. I seldom fail to complete an assignment because of misjudging my ability to complete the task.
    A. usually B. sometimes C. seldom D. never

12. I compete effectively with other amateurs in such games as billiards, ping-pong, or dart-throwing.
    A. usually B. sometimes C. seldom D. never

TEST VIII

TEST VIII

13. I influence others to join me in a cause.
A. usually B. sometimes C. seldom D. never

14. I can repair or work on an object with small parts.
A. usually B. sometimes C. seldom D. never

15. I would wait to be addressed by a supervisor rather than take the initiative in greeting.
A. usually B. sometimes C. seldom D. never

16. I reserve discussion of "personal" matters to either those who usually discuss such things or friends and relatives.
A. usually B. sometimes C. seldom D. never

17. I get people in disagreement to reach agreement.
A. usually B. sometimes C. seldom D. never

18. I am an adequate typist.
A. usually B. sometimes C. seldom D. never

19. I accurately predict my own prospects for success in most situations.
A. usually B. sometimes C. seldom D. never

20. I make minor household repairs.
A. usually B. sometimes C. seldom D. never

21. I am self-confident in assuming a new responsibility.
A. usually B. sometimes C. seldom D. never

22. I request permission before taking a seat by a stranger.
A. usually B. sometimes C. seldom D. never

23. I usually convince others that my opinions are right.
A. usually B. sometimes C. seldom D. never

24. I reserve use of first name greeting to friends and associates of similar status.
A. usually B. sometimes C. seldom D. never

Turn to next page.

TEST VIII

TEST VIII

25. I can give a good description of someone's personality after a short acquaintance.
A. usually B. sometimes C. seldom D. never

26. I am able to assess my own performance in a situation which I had not experienced before.
A. usually B. sometimes C. seldom D. never

27. I give directions in such a way that others would want to accept them.
A. usually B. sometimes C. seldom D. never

28. I can anticipate how well I will do in an activity.
A. usually B. sometimes C. seldom D. never

29. I wait to be introduced to a famous celebrity rather than introduce myself.
A. usually B. sometimes C. seldom D. never

30. I get others to do the things I think they should do.
A. usually B. sometimes C. seldom D. never

31. I do not borrow money from strangers.
A. usually B. sometimes C. seldom D. never

32. I can make a good salesman.
A. usually B. sometimes C. seldom D. never

TEST VII

TEST VII

DIRECTIONS

The following test is untimed.

Work quickly and give the first answer that comes to you.

Your first impression is important.

Do not spend a lot of time on any one question

There are 40 items.

Fill in the space on the IBM card under the proper letter.

A = usually
B = sometimes
C = seldom
D = never

EXAMPLE:

I would make a good football player.
A. usually B. sometimes C. seldom D. never

1. A ● B O C O D O E O

In this case you believe you would "usually" be good as a football player.

DO NOT MARK IN TEST BOOKLET

TEST VII

1. I try to avoid saying things which hurt other's feelings.
   A. usually B. sometimes C. seldom D. never

2. I enjoy attending a good theatrical performance.
   A. usually B. sometimes C. seldom D. never

3. I am more likely to sacrifice an immediate gain than a principle.
   A. usually B. sometimes C. seldom D. never

4. I can effectively participate in a role-playing situation.
   A. usually B. sometimes C. seldom D. never

5. I "talk with my hands" as one means of communicating.
   A. usually B. sometimes C. seldom D. never

6. I consider the feelings of others.
   A. usually B. sometimes C. seldom D. never

7. I enjoy listening to a good concert.
   A. usually B. sometimes C. seldom D. never

8. I guide my conduct according to personal moral values.
   A. usually B. sometimes C. seldom D. never

9. I am the type of person who can understand how others feel.
   A. usually B. sometimes C. seldom D. never

10. I use "non-verbal" communication to make a point in a speech.
    A. usually B. sometimes C. seldom D. never

11. I am able to act in a stage play.
    A. usually B. sometimes C. seldom D. never

12. I ask personal favors from close friends and associates rather than from strangers or work supervisors.
    A. usually B. sometimes C. seldom D. never

13. I can understand how others feel.
    A. usually B. sometimes C. seldom D. never

Turn to next page.

TEST VII

14. I complete assignments when promised rather than delay them to achieve a personal goal.
A. usually B. sometimes C. seldom D. never

15. I enjoy eating exotic foods and foreign dishes.
A. usually B. sometimes C. seldom D. never

16. I enjoy telling jokes and stories at a party.
A. usually B. sometimes C. seldom D. never

17. I do not consider "cheating" even if it is for a good reason.
A. usually B. sometimes C. seldom D. never

18. I tell amusing stories at parties.
A. usually B. sometimes C. seldom D. never

19. I give up an immediate goal rather than give in on a principle.
A. usually B. sometimes C. seldom D. never

20. I understand how a person being punished would feel.
A. usually B. sometimes C. seldom D. never

21. I take part in amateur theatricals.
A. usually B. sometimes C. seldom D. never

22. I enjoy reading great works in literature.
A. usually B. sometimes C. seldom D. never

23. I can imitate a friend using only bodily movements and facial expressions.
A. usually B. sometimes C. seldom D. never

24. I understand my friends better than they understand me.
A. usually B. sometimes C. seldom D. never

25. I do "play a role" if asked to at a party.
A. usually B. sometimes C. seldom D. never

Turn to next page.

TEST VII

26. I show signs of blushing in an embarrassing situation.
A. usually B. sometimes C. seldom D. never

27. I am willing to give up a monetary gain to avoid a compromise of principles.
A. usually B. sometimes C. seldom D. never

28. I do not usually compromise a principle for personal gain.
A. usually B. sometimes C. seldom D. never

29. I can effectively illustrate the behavior of a deaf-mute using various movements and actions.
A. usually B. sometimes C. seldom D. never

30. I enjoy reading poetry.
A. usually B. sometimes C. seldom D. never

31. I communicate well in a "charades" game.
A. usually B. sometimes C. seldom D. never

32. I am able to offer criticism without offending another person.
A. usually B. sometimes C. seldom D. never

33. I pretend to be someone other than myself.
A. usually B. sometimes C. seldom D. never

34. I enjoy viewing a display of modern art.
A. usually B. sometimes C. seldom D. never

35. I use facial expressions in showing various emotions.
A. usually B. sometimes C. seldom D. never

36. I discuss art and painting with friends.
A. usually B. sometimes C. seldom D. never

37. I can imitate a famous movie star before a group.
A. usually B. sometimes C. seldom D. never

Turn to next page.

TEST VII

38. I enjoy going to a symphony or opera.
A. usually B. sometimes C. seldom D. never

39. I shrug my shoulders when saying "I don't know."
A. usually B. sometimes C. seldom D. never

40. I fulfill an obligation even if assumed under unfair circumstances.
A. usually B. sometimes C. seldom D. never

APPENDIX B

RATING SCALE QUALITATIVE AUDITORY, QUALITATIVE PROPRIOCEPTIVE TEMPORAL, QUALITATIVE PROPRIOCEPTIVE KINEMATICS

#051572
CML

Student_____

Instructor_____

1. Qualitative Auditory: Apical Pulse

The student listens and the instructor listens with a teaching stethescope of the patient's heart beat at the apex of the heart. The student and instructor listen and count the number of beats and record below.

Student Count _____

Instructor Count_____

+ - 2 major_____
+ - 6 minor_____
+ - 8 negligible___
or more

2. Proprioceptive Temporal: Blood Pressure

The blood pressure cuff is applied to the upper left arm of the patient. The student listens for the first pulse sound and reads the column of mercury or the Aneroid needle at the same time (with the teaching stethescope). The instructor listens and reads simultaneously the reading is recorded below (One attempt).

Student B/P_____ + - 2 Major_____

Instructor B/P_____ + - 6 Minor_____

Note if more than one attempt: + - 8 or more_____ Negligible

3. Proprioceptive Kinematic: Binder Application

A binder is applied to a body part. The student pulls the two edges of the binder to approximate the edges and secures the edges by pinning or hooking (coordinates pulling action and seeing--eye and muscle coordination).

One attempt: Satisfactory completion_____(Major)

Two attempts: Satisfactory completion_____(Minor)

More than two attempts for satisfactory completion_____(Negligible)

APPENDIX C

TEACHER'S RATING SCALE

TEACHER'S RATING SCALE

Students of Nursing

Crystal M. Lang

- RATING KEY -

to be used with IBM cards

A = Always
B = Usually
C = Sometimes
D = Rarely
E = Never

Teacher's Rating Scale

Nursing Students

CARD A

Cognitive Style Element

T (AL) - Obtaining meaning from spoken words
Theoretical Auditory Linguistic

1. The student remembers information discussed in pre-conference and post-conference as evidenced by being able to re-tell the information or answer questions about it.
2. The student can describe an incident that occurred in patient care.
3. The student is able to follow directions.
4. The student participates in conferences with other students and/or the teacher.
5. Uses medical terminology in discussing patient care.

T (VL) Theoretical Verbal Linguistic - Obtaining meaning from written words

6. The student can summarize or answer questions about information he has read (text book, doctor's orders, patient record, kardex).
7. The student reads more than the assigned readings.
8. Shows evidence of having read about clinical assignments.
9. Reviews prior readings such as basic science, prior course readings as it related to present activities.
10. Written work is usually complete.

T (AQ) Theoretical Auditory Quantitative - Obtaining meaning from spoken numbers

11. The student can calculate drug dosages correctly from information presented orally.

12. The student can remember the patient's room number.

13. The student can remember his student number.

14. The student can follow verbal directions that contain numbers.

15. The student can compute the rate of flow for an I.V. from oral information.

T (VQ) Theoretical Visual Quantitative - Obtaining Meaning from written numbers.

16. The student solves drug dosage problems most easily when he writes them on paper.

17. The student can identify the amount of drug in a given quantity (i.e., 50 mg per ml.) from the written label.

18. The student can convert from apothecary to metric system with a conversion chart.

19. The student can calculate the rate of I.V. from written information.

20. The student can accurately copy the amount of drug ordered from the chart or kardex.

Q (A) Qualitative Auditory - Obtaining meaning from non-verbal sounds

21. The student can identify differences in breathing patterns by listening to the patient's breathe.

22. The student can identify hospital noises by their sounds.

23. The student can identify the heart beat when he listens with the stethescope.

24. The student can identify patient distress sounds, i.e., moan, groan, crying.

25. The student can identify breathe sounds when he listens with a stethescope.

Q (O) Qualitative Olfactory - Obtaining meaning from odors, smells or aromas

---

26. The student can identify deviations from usual odors in a patient's room, charts and reports these (i.e., vomities, fowl sputum, fecal material, wound discharges etc.).

27. The student takes action to improve or alter unpleasant odors in the patient's room (i.e., removes fowl materials where possible, provides air circulation, deodorants).

28. The student will comment on the patient's perfume or after-shave lotion.

29. The student comments on the odors in the patient's room or in the clinical setting.

30. The student will smell particular items to determine status; i.e., the patient's breath, the cast, wounds, etc.

Q (S) Qualitative Savory. Obtaining meaning by the sense of taste.

---

31. The student can tell the difference between sweet and sour milk by tasting.

32. Given a patient who complains that a food tastes bad (too salty, too flat, too spicy, etc.) the student will appropriately taste the food to assess the situation.

33. The student comments on the taste of particular foods.

34. The student refers to and/or shares recipes for particular foods.

35. The student can taste when foods are too salty.

Q (T) Qualitative Tactile - The ability to obtain meaning by the sense of touch.

---

36. The student is able to feel the radial pulse within a reasonable period of time, i.e., five to fifteen seconds.

37. The student is able to feel the rise and fall of the chest during respirations.

38. Given a patient who appears flushed or pale, the student will feel the skin to determine skin temperature.

39. Given a patient with a casted extremity, the student will feel the extended parts (i.e., toes, fingers) to determine temperature.

40. Given a patient with a distended body part, the student will feel the part to assess the status (i.e., distended abdomen, edematous legs and feet).

Q (V) Qualitative Visual - The ability to obtain meaning by the sense of sight.

---

41. The student can see the differences in patient skin color due to circulatory status; i.e., flushed, pale, cyanotic as evidenced by reporting or recording.

42. The student can see that the patient is in correct body alignment or incorrect alignment. As evidenced by reporting and/or actions to change the position.

43. The student can see changes in skin color in a particular area as a result of pressure on the part as evidenced by reports and/or nursing actions.

44. Given a patient with jaundice the student will see the skin coloring as evidenced by reporting or recording.

45. The student is able to accurately count the respiratory rate by seeing the chest rise and fall.

Q (P) Qualitative Proprioceptive - The ability to obtain meaning through coordinated inputs: sometimes referred to as the "sixth sense."

46. The student can coordinate two or more senses such as seeing and hearing to take a blood pressure.

47. The student can coordinate muscle activity with seeing i.e., putting on an ace bandage or a breast binder.

48. The student can "size up" the patient situation and realize that all is not well with the patient.

49. The student can perceive the patient's muscle response to a nursing care activity, i.e., cleansing a wound.

50. The student can "size up a load" and move things smoothly.

CARD B

Q (CEM) Qualitative Code Empathetic - The ability to put yourself in another person's situation.

1. The student listens to the patient's problems.
2. The student expresses concern about the patient's problems.
3. The student takes action to assist the patient with a particular problem if possible; i.e., takes action to relieve pain.
4. The student acts as the patient's advisory when and where possible.
5. The student says kind things about the patient.

Q (CES) Qualitative Code Esthetic - The ability to enjoy the "beauty" and "pureness" of an object, situation, or idea; a sense of orderliness and beauty.

6. The student comments on the environment as pleasant, unpleasant regarding color, space, lighting.
7. The student presents a neat and orderly personal appearance with clean, pressed uniform, neat hair style, etc.
8. The student leaves the patient's environment in an orderly state.
9. The student comments on how pretty things are.
10. The student expresses enjoyment of music, art and/or ideas.

Q (CET) Qualitative Code Ethic - A commitment to a set of values, a group of moral principles, obligations, duties.

11. The student sets high standards of nursing care for self and others.
12. The student reports situations as they occur to maintain safe patient care; i.e., records exact time a medication is given, reports errors, etc.

13. The student gives correct information to patients and families, when in doubt secures correct information.

14. The student carries out the plan of patient care.

15. The student gives evidence of high integrity in carrying out written assignments and quizzes.

Q (CH) Qualitative Code Histrionic - Staged behavior or the deliberate use of a set of behaviors to produce some particular effect on other persons; role-playing.

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16. The student is able to play an assigned role in a class room situation particularly if he views the role as the "good" person.

17. The student is able to play an assigned role in a classroom situation even when the role is the "bad" person.

18. The student is able to act out the role of "nurse" in the patient's presence.

19. The student likes to take the role of patient or doctor in a play acting situation.

20. The student is able to behave in different ways to achieve changes in patient behavior.

Q (CK) Qualitative Code Kinesics -- The use of non-verbal functions such as shrugs, smiles, gestures, body motions, blushing to communicate.

---

21. The student uses gestures in response to questions.

22. The student uses gestures to communicate with a non-hearing patient.

23. The student blushes.

24. The student shows pleasure and/or displeasure through body motions.

25. The student uses gestures and body motions in describing patient care activities.

Q (CKH) Qualitative Code Kinesthetics - Motor skill ability.

---

26. The student carries out procedures smoothly, without awkwardness or shakiness.

27. The student is able to get things done in a reasonable period of time.

28. The student enjoys doing things with the hands, i.e., back-rub, injections.

29. The student has a good sense of balance.

30. The student has good muscle control.

Q (CP) Qualitative Code Proxemics - Ability to determine critical physical and social distances between one self and another as defined by the other person.

---

31. The student knows about how far he should stand from the patient who is talking to him.

32. The student is able to determine that it would be acceptable to hold the patient's hand.

33. The student waits to be invited before joining a group at coffee break.

34. The student introduces himself to other members of the health team at appropriate times.

35. The student determines when the patient would prefer to be alone and/or silent.

Q (CS) Qualitative Code Synnoetics - Personal knowledge of oneself in relation to one's environment.

---

36. The student makes realistic work plans for his time in the clinical laboratory.

37. The student is able to determine what he needs in moving or lifting a patient.

38. The student is able to identify correctly when he needs the instructor's assistance.

39. The student is aware of (or accepts from others) his weakness and attempts to improve these.

40. The student is aware of his strengths and builds on these.

Q (CT) Qualitative Code - Transactional - the ability to influence others.

---

41. The student tries to convince the group to do things his way.

42. The student will be selected by other class members for responsible roles.

43. The student is able to convince the patient to engage in a particular activity; i.e., ambulate, deep breathe and cough.

44. The student is able to do effective patient teaching.

45. The student is able to secure positive action from other members of the health team to the patient's benefit.

CARD C

A - Associates - Represented by the various groups with whom the student has the greatest contact (fellow students in nursing).

---

1. The student will share materials and information with others.

2. The student prefers to work with another student.

3. The student follows the example set by other students in nursing.

4. The student is influenced by the decision of other students.

5. The student tries to find out what the group thinks is best in a given situation.

F - Family - either immediate or extended or surrogate changing throughout life.

---

6. The student makes references to his family members and their activities.

7. The student compares a patient care situation to a family member, i.e., mother, father, husband, wife, etc.

8. Family commitments have high priority for the student's time.

9. The student is concerned about how the family will respond to what he does.

10. The student consults with a family member before he decides to do particular things.

I - Individuality - the knowledge that his way is best along with the ability and willingness to direct his behavior accordingly.

---

11. The student will not let other students change his position or decision.

12. The student prefers to carry out patient care activities by himself (i.e., does not like to be on a multiple assignment).

13. The student makes independent nursing care decisions.

14. The student prefers to study by himself.

15. The student accepts the fact that he is frequently a leader in the clinical group.

D - Difference - Contrasts selected characteristics on a one-to-one comparison of difference.

---

16. The student can identify shades of difference in a patient's skin color, i.e., shades of paleness, shades of cyanosis--as evidenced by reporting and recording.

17. The student can see small differences in a healing or non-healing wound as evidenced by reporting or recording.

18. The student contrasts present vital signs with the vital signs measured previously to determine differences.

19. The student contrasts the responses of a patient with a particular disease with another patient having the same disease.

20. The student compares one health worker with another to identify differences, i.e., the doctor's orders written by two doctors for similar situations.

M - Magnitude inference; a form of "categorical thinking," using categories, definitions, authority sources.

---

21. The student frequently quotes the teacher or the text book or the rules to others.

22. The student prefers to have specific step-by-step directions for each task.

23. The student arranges his written work in neat columns or outline because "that is the way to do it."

24. The student carries out nursing care activities because the "head nurse said to do it" or that is "what the doctor ordered."

25. The student wants new terms defined as they are introduced; he uses a dictionary frequently.

R - Relationships - comparison of two or more selected characteristics to determine similarities.

---

26. The student will make statements such as, "this patient's wound looks like another patient...."

27. The student relates new information to similar information he has had previously.

28. The student compares several pieces of similar information, i.e., all the similar laboratory reports.

29. The student frequently says, "that's just like...."

30. The student enjoys relating information or experiences with patients or family that are similar to the situation being presented.

L - Appraisal - The application of Magnitudes, Differences, and Relationships in reaching a probability conclusion.

---

31. When asked to make a decision, the student says he needs time to think about it.

32. The student often criticizes multiple choice or true false test items.

33. The student gives many details before he gets to the point in describing a nursing care situation.

34. The student reaches different conclusions in similar situations and may be perceived as "inconsistent."

35. The student has difficulty making "snap" decisions, and dealing with emergency type nursing care situations.

K - Deductive inferential process.

---

36. The student enjoys the type of reasoning used in solving mathematical problems, i.e., a = b, a = c, therefore b = c; infection produces elevated temperatures (a = b),

infections produce elevated white blood count (a = c), therefore elevated temperature produces elevated white blood count (b = c).

37. The student enjoys problems in which the solution is deduced from the rules.

38. The student defends his actions in "logical" progression.

39. The student does not like to be in a situation where he cannot predict the outcome.

40. The student expects patients to react to his nursing care in similar ways.

APPENDIX D

OAKLAND COMMUNITY COLLEGE

RETEST QUESTIONS

TEST XX TEST XX

DIRECTIONS

The following test is untimed. Work quickly and give the first answer that comes to you. Your first impression is important. Do not spend a lot of time on any one question. There are 16 items.

Fill in the space on the IBM card under the proper letter:

A = usually
B = sometimes
C = seldom
D = never

Example:

I would make a good football player.

A. usually B. sometimes C. seldom D. never

1. A  B.  C.  D. 

In this case you believe that you would "usually" be good as a football player. Therefore you fill in "A" on the IBM card.

TEST XX TEST XX

1. I am able to keep at a task which I set for myself.
   A. usually B. sometimes C. seldom D. never

2. I am able to act in a stage play.
   A. usually B. sometimes C. seldom D. never

3. I enjoy telling jokes and stories at a party.
   A. usually B. sometimes C. seldom D. never

4. I set goals consistent with my own needs and abilities.
   A. usually B. sometimes C. seldom D. never

5. I pretend to be someone other than myself.
   A. usually B. sometimes C. seldom D. never

6. I am self-confident in assuming a new responsibility.
   A. usually B. sometimes C. seldom D. never

7. I take part in amateur theatricals.
   A. usually B. sometimes C. seldom D. never

8. I seldom fail to complete an assignment because of misjudging my ability to complete the task.
   A. usually B. sometimes C. seldom D. never

9. I can imitate a famous movie star before a group.
   A. usually B. sometimes C. seldom D. never

10. I accept criticism without being deeply hurt.
    A. usually B. sometimes C. seldom D. never

11. I tell amusing stories at parties.
    A. usually B. sometimes C. seldom D. never

12. I accurately predict my own prospects for success in most situations.
    A. usually B. sometimes C. seldom D. never

13. I do "play a role" if asked to at a party.
    A. usually B. sometimes C. seldom D. never

14. I am able to assess my own performance in a situation which I had not experienced before.
    A. usually B. sometimes C. seldom D. never

15. I can effectively participate in a role-playing situation.
    A. usually B. sometimes C. seldom D. never

16. I can anticipate how well I will do in an activity.
    A. usually B. sometimes C. seldom D. never

APPENDIX E

TABLES OF CRITICAL VALUES

TABLE L. Table of Critical Values of K_D in the Kolmogorov-Smirnov Two-Sample Test (Small samples)

N	One-tailed test*		Two-tailed test†	
	$\alpha = .05$	$\alpha = .01$	$\alpha = .05$	$\alpha = .01$
3	3	--	--	--
4	4	--	4	--
5	4	5	5	5
6	5	6	5	6
7	5	6	6	6
8	5	6	6	7
9	6	7	6	7
10	6	7	7	8
11	6	8	7	8
12	6	8	7	8
13	7	8	7	9
14	7	8	8	9
15	7	9	8	9
16	7	9	8	10
17	8	9	8	10
18	8	10	9	10
19	8	10	9	10
20	8	10	9	11
21	8	10	9	11
22	9	11	9	11
23	9	11	10	11
24	9	11	10	12
25	9	11	10	12
26	9	11	10	12
27	9	12	10	12
28	10	12	11	13
29	10	12	11	13
30	10	12	11	13
35	11	13	12	
40	11	14	13	

*Abridged from Goodman, L. A. 1954. Kolmogorov-Smirnov tests for psychological research. Psychol Bull., 51, 167, with the kind permission of the author and the American Psychological Association.

†Derived from Table 1 of Massey, F. J., Jr. 1951. The distribution of the maximum deviation between two sample cumulative step functions. Ann. Math. Statist., 22, 126-127, with the kind permission of the author and the publisher.

TABLE M. Table of Critical Values of D in the Kolmogorov-Smirnov Two-sample Test (Large samples: two-tailed test)*

Level of significance	Value of D so large as to call for rejection of H_o at the indicated level of significance, where D = maximum $\lvert S_{o1}(X) - S_{o2}(X) \rvert$
.10	$1.22\sqrt{\frac{n_1 + n_2}{n_1 n_2}}$
.05	$1.36\sqrt{\frac{n_1 + n_2}{n_1 n_2}}$
.025	$1.48\sqrt{\frac{n_1 + n_2}{n_1 n_2}}$
.01	$1.63\sqrt{\frac{n_1 + n_2}{n_1 n_2}}$
.005	$1.73\sqrt{\frac{n_1 + n_2}{n_1 n_2}}$
.001	$1.95\sqrt{\frac{n_1 + n_2}{n_1 n_2}}$

*Adapted from Smirnov, N. 1948. Tables for estimating the goodness of fit of empirical distributions. Ann. Math. Statist., 18, 280-281, with the kind permission of the publisher.

APPENDIX F

RAW SCORES QUALITATIVE CODE HISTRIONICS

A-1. Raw Scores Qualitative Code Histrionics April 10, 1972 and April 11-14, 1972 (Bass Test Administered Between the Two Tests Reported)

STUDENT	APRIL 10, 1972 SCORE	APRIL 11-14, 1972 RE-TEST SCORE
1	15	10
2	11	9
3	20	14
4	11	10
5	14	13
6	14	14
7	10	7
8	7	3
9	13	8
10	9	3
11	10	8
12	14	11
13	9	7
14	10	10
15	10	13
16	16	14
17	15	14
18	13	12
19	12	11
20	11	11
21	13	12

APPENDIX G

NEW QUALITATIVE AUDITORY TEST

Qualitative Auditory--Audio Tape

This exercise is designed to explore your auditory ability. The test will consist of three sounds presented in differing sequences. One sound stands for (represents) objects with names beginning with A (apple), one sound stands for (represents) objects with names beginning with B (ball), and one sound stands for (represents) objects with names beginning with C (car).

Your task is as follows:

Upon hearing a sequence of sounds, you are to select items from those pictured on the screen in front of you which have names beginning with letters as indicated to you by the audio tape presentation and mark the number beside that item on your IBM card.

(tone) stands for items with names beginning with A

(tone) stands for items with names beginning with B

(tone) stands for items with names beginning with C

Example:

Upon hearing (tone A), (tone B), (tone C), you would respond by selecting an item from the screen in front of you with a name beginning with A and recording its number on line 1 of your IBM card, selecting an item from the screen in front of you with a name beginning with B and recording its number on line 2 of your IBM card, selecting an item from the screen in front of you with a name beginning with C and recording it on line 3 of your IBM card.

Hear new series of tones and follow above procedure.

SEQUENCES IN QUALITATIVE AUDITORY TEST

1. A C B
2. C B A
3. A B A
4. C A B
5. A C B A
6. C A B B C

APPENDIX H

SEQUENCE PHOTO--BASS TEST 1