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A factor analytic study of conceptual systems theory and the genotypic and phenotypic characteristics of teacher trainees: Toward the development of a typology

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A FACTOR ANALYTIC STUDY OF CONCEPTUAL SYSTEMS THEORY AND THE GENOTYPIC AND PHENOTYPIC CHARACTERISTICS OF TEACHER TRAINEES: TOWARD THE DEVELOPMENT OF A TYPOLOGY

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SAF

ABSTRACT

INTRODUCTION

Conceptual Systems Theory is a developmental stage theory such as are the theories of Sullivan, Freud, Erikson, and Piaget, but differs from these theories in that it is rather more explicit about identifying the characteristics of the stages and the etiology behind progression to higher stages of development. This explicitness is what provides the utility of the theory for educational research and application. Within the theoretical framework, the goal of education is to produce abstract persons, i.e., those capable of providing their own structure in a rapidly changing world. This is accomplished by the successive correct matching of teacher behavior (the environment) to the stage of development of the student in order to induce a change to the next highest stage, i.e., a more abstract stage, until progression to the most abstract stage is attained.

RELATED RESEARCH

Originally, four stages of development were postulated by Harvey, Hunt, and Schroder in Conceptual Systems and Personality Organization. This was later extended to five by Hunt in working with lower class children. Research by France has indicated that the stages of development are related to the academic capacities and behavior of students. Hunt has noted the effects of classroom grouping by stage upon both students and teachers. Hunt and Joyce have also found that the higher the stage of development the teacher has attained, the more likely is that teacher to use reflective rather than authoritarian techniques in the classroom. Joyce has attempted to induce flexibility in the teacher trainee's ability to radiate different environments by training in behavioral discrimination through the use of a coding manual developed from the theory. Schroder has investigated Peace Corps volunteers in situations similar to curriculum development with respect to genotypic (taken to refer to cognitive structure) characteristics and their relationship to certain phenotypic (content) characteristics such as anxiety upon information processing skills. Few abstract teachers have been found in any of the reported studies.

RATIONALE

Since there are relatively few abstract teachers available, it becomes important to determine a way of training prospective teachers to produce behaviors (environments) for which they are not naturally suited, i.e., are not their initial teaching styles. This can be done since an explicit statement of desirable behaviors on the part of teacher can be made for each stage of (the student's) development and since teachers do differ in their abilities to produce these behaviors. A teacher training institution then should be able to recognize these differences as the result of specific, theory related genotypic and phenotypic characteristics of the teacher trainee. Once these differences are noted, it should further be capable of utilizing these differences in the specification of the training program which the teacher trainee experiences.

If the differences among trainees can be reduced to a few meaningful types, the task of the training institution can be reduced considerably. Thus the development of a typology using the variables of a unified theoretical point of view would be advantageous to the training institution.

PROBLEM

The problem with which this study was concerned was improving teacher training through the derivation of a typology of teacher trainees which could be used to specify the training programs of the training institution. There were two parts to the problem. The first concerned the derivation of meaningful types from the literature and research dealing with Conceptual Systems theory. The second part was the attempt to empirically validate the typology derived in the first part.

PROCEDURE

Subjects for the study were sixty-eight education students taking an educational psychology course at the University of the Pacific. All subjects were given a battery of tests which had been either theoretically or empirically related to the theory. Genotypic measures included a general measure of abstractness, an educational domain measure of abstractness, measures of discrimination, differentiation, and integration for three areas: behavior of students, students, and environments radiated by a teacher. Phenotypic variables were creativity, anxiety, flexibility, warmth, autonomy, and intrinsic acceptance.

Genotypic and phenotypic variables were first analyzed separately through factor analytic techniques to identify stable constructs. In addition to an analysis based on the total sample, the procedure was repeated for social class subsamples of the total sample in order to obtain some indication of the external validity of the results. The factor scores computed from the total sample solutions were then jointly factor analyzed to determine if hypothesized relationships among constructs existed. The results of this analysis were inputed to the OTYPE component of the BC TRY system to obtain the typology of teacher trainees.

RESULTS

The results of the attempts to define constructs were generally in line with hypothesized results with small differences for the subsamples and total sample from the expected. The relationship of the constructs was not as clearly in line with hypothesized factors as were the analyses used to obtain constructs. This made it necessary to reinterpret the definitions of the factors. The OTYPE component yielded five types of which three could be related to the theoretical types. No differences were found between the types for selected descriptive variables such as social class, year in school, and sex.

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CHAPTER I

THE PROBLEM, HYPOTHESES, AND DEFINITION OF TERMS

I. INTRODUCTION

Conceptual Systems theory is a developmental stage theory such as are the theories of Sullivan, Freud, Ericksen, and Piaget, but differs from these theories in that it is rather more explicit about identifying the characteristics of the stages and the etiology behind progression to higher stages of development.[1] This explicitness is what provides the potential utility of the theory for educational research and application.

Educational training programs have long operated on atheoretical grounds presenting a variety of psychological positions to teacher trainees and letting them sort out what they find useful.[2] The utilization of an explicit developmental stage theory which postulates desirable environments for teachers to radiate could allow for specific intervention and training on the part of the training institution. A typology of trainees which pointed out their strengths and weaknesses in ability to radiate or to potentially radiate the

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[1]O. J. Harvey, David E. Hunt, and Harold M. Schroder, Conceptual Systems and Personality Organization (New York: Wiley, 1961).

[2]A. Raymond Cellura, "The Application of Psychological Theory in Educational Settings: An Overview," American Educational Research Journal, 6:349-382, 1969.

desirable environments could allow for differential training programs tailored to the specific needs of the particular type of trainee. Thus, for example, a trainee who was good at discriminating among students, but poor at discriminating among environments could be given a specific training program aimed at acquainting him with the characteristics of the desired environments.

While some work, to be cited later, has been done in an educational setting with teacher training and Conceptual Systems theory, no attempt has been made to set up a training program making maximum use of theory related constructs. In order to attempt such a program, one approach is to note domain (educational) specific characteristics of teacher trainees and then to note the behavior manifested in relationship to these characteristics. This study was concerned with noting the domain specific characteristics and the patterns in which they appeared.

Characteristics of the Conceptual Systems Theory Stages of Development

It is necessary to review the basic characteristics of each of the four stages of development which were originally stated by Harvey, Hunt, and Schroder.[3] A fifth stage at the lower or concrete end of the developmental continuum was found by Hunt in working with lower class adolescents and was added to the theory.[4]

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[3]Harvey, et al., op. cit.

[4]David E. Hunt and John Dopyera, "Personality Variation in Lower-Class Children," Journal of Psychology, 62:47-54, 1962.

Development is viewed as occurring along a concrete-abstract continuum. Phenotypically, the Sub-I stage, the most concrete, is best characterized as an unorganized state where the individual has little awareness of anything other than his own feelings.[5] The Sub-I seeks immediate gratification for his needs and reacts negatively to any imposition which is placed upon him.

Progression to Stage I involves the learning of cultural standards with a view of the world in categorical chunks of good and bad. Adults whose development has been arrested at this level display many of the characteristics of the authoritarian personality described by Adorno, et al.[6] The Stage I is very upset when guidelines for his behavior are not available.

The focus of Stage II functioning is on the independent breakaway from the standards learned in Stage I development and the development of self-anchored or internalized standards. Cause-effect relationships are more readily seen, and more alternatives are available.

Stage III functioning is concerned with learning about others through empathic matching for which the internalized standards of Stage II serve as a basis. This stage is characterized by a concern for the feelings of others in making his decisions.

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[5]Persons operating at or progressing through a given stage will be called by the stage designation; hence, Sub-I.

[6]T. W. Adorno, Else Frenkel-Brunswik, D. J. Levinson, and R. N. Sanford, The Authoritarian Personality, (New York: Harper and Row, 1950).

Stage IV functioning involves the placing of self and others into an integrated relationship with the consideration of many factors and relationships and the ability to suspend judgement for long periods of time without increasing anxiety, i.e. ambiguity may be tolerated considerably better than at more concrete stages. The Stage IV should be capable of developing his own structure where none is provided.

Genotypically, there is an expected increase in the number of dimensions which a person can use to discriminate the stimuli entering from his environment with each increase in stage of development attained. More importantly, the inter-relationships of these dimensions becomes more complex with an increase in abstractness. Figure 1 illustrates this increase as well as summarizing the phenotypic characteristics of the stages. When development has become arrested at a given stage, particularly in adults, so that progression is not likely, the designation given is "system" rather than stage. Progression itself is defined as a function of particular environmental conditions interacting with the developmental stage at which the person is functioning.

Characteristics of the Environments

In addition to postulating the stages of development, Harvey, Hunt, and Schroder postulate the environments which lead to progression from one stage to the next.[7] Environments are said to vary along a major continuum from unilateral to interdependent. Unilateral training,

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[7] Harvey, et al., op. cit., pp. 113-157

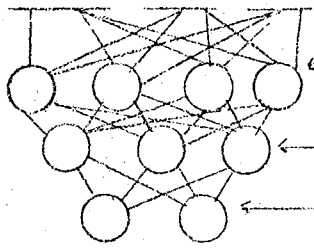
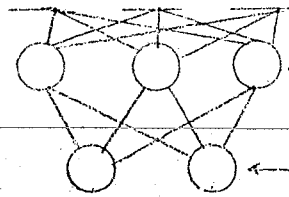
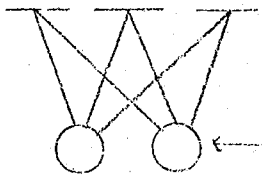
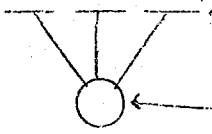
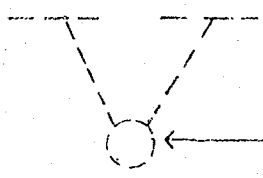
Stage	Genotypic	Phenotypic
IV	 ←Dimensions ←Different combinations of dim. scale values ←Comparison rules ←Structure for generating complex relationships	Tolerance for ambiguity; Many alternative views; Sees self in relation to others
III	 ←Dimensions ←Alternative combinations (perspectives) ←More complex rules for complex relationships	Less deterministic; Can weigh the effects of his own behavior from several other points of view; Concern with feelings of others; Use of internal processes
II	 ←Dimensions Emergence of alternate combinations of dimensional scale values	Movement away from absolutism; Emergence of primitive internal causation; Use of conditional rules; Rigid after a decision is made; Negativism against standards
I	 ←Dimensions ←Relatively fixed or hierarchial organization	Categorical, black-white thinking; Minimization of conflict; Anchoring of behavior in external conditions; Compartmentalization of ideas
Sub-I	 ←Dimensions not clearly anchored ←Organization unclear	Generalized negativism and hostility; No social awareness; Cultural norms and values are not internalized

FIGURE 1

GENOTYPIC AND PHENOTYPIC
STAGE CHARACTERISITCS

as specified, is characterized by the external source, such as a parent or teacher, determining absolute criteria for behavior, directing rewards and punishments towards these criteria, and by evaluating the child extrinsically, i.e. on the basis of how well the criteria are met. Interdependent training is characterized by relative determination of the criteria, directing rewards towards means and exploratory behavior, and by what is called intrinsic evaluation or valuing the child because he is a person rather than against some external criteria.

At the unilateral end of the continuum, an additional variable of the degree of reliability or unreliability of the imposition on the child was considered in the original formulation of the theory, while at the interdependent end a protective vs. informational dimension was considered. Reliable imposition was said to maximize the potential for developmental arrestation at Stage I while unreliable imposition was said to cause arrestation at Stage II. Protective imposition led to arrestation at Stage III and informational imposition maximized the potential for progression to Stage IV. With the modification of the theory by Hunt, the dimension of warmth-hostility, discussed briefly by Harvey, et al., in relation to Schaefer's circumplex became more central to the conditions leading to Stage I development.[8 and 9] Thus, the environment necessary for development to the next highest stage must be

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[8]Ibid., p. 154.

[9]Earl S. Schaefer, "A Circumplex Model for Maternal Behavior," Journal of Abnormal and Social Psychology, 59:226-236, 1959.

differentially specified, i.e. is not the same for all stages. Therefore, it is necessary to match the environment to the child in order to obtain the desired developmental progression or behavior. Within the confines of the family, it is not likely that major changes in environment radiated by parents takes place during the developmental span, although there is some evidence that parents become more restrictive with the increasing age of the children.[10] However, the educational setting may offer more choice with respect to potential environment than does the family.

Thus, if one accepts the basic value judgment of the theory, that developmental progression is a good thing, then the goal of education is the same as the goal of parental training, the production of abstract persons capable of adapting to an ever changing environment. On a priori grounds educational environments should, due to the increased flexibility in matching teaching environment to student, be capable of inducing development.

Having specified the parental training models which lead to either arrestation or development depending upon when they are utilized, and having assumed that the goal of education is basically the same as the goal of parental training with regard to the structural properties, then the definition of educational environments which maximize the

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[10] W. C. Becker, D. R. Peterson, L. A. Hellmer, D. J. Shoemaker, and H. C. Quay, "Factors in Parental Behavior and Personality as Related to Problem Behavior in Children," Journal of Consulting Psychology, 23:107-118, 1959.

potential for developmental progression should be specifiable in the same terms as the parental environments. Thus, progession to Stage I should be dependent upon an environment characterized by warmth and reliable unilateral imposition. Progression to Stage II should be contingent upon a slightly less reliable or unstructured environment with rewards directed towards means and exploratory behavior rather than towards external criteria, i.e. more intrinsic acceptance. Stage III development would require high intrinsic acceptance and a high degree of interdependence or autonomy while Stage IV development would be contingent upon an environment slightly more informational than the Stage III environment.

Characteristics of Teachers

Under ideal circumstances, teachers as well as parents could radiate all of the desirable environments. All current evidence with both parents and teachers indicates that such is not the case, both parents and teachers tend to favor radiating particular styles which appear to be related to the stage of development at which they themselves have become arrested.[11]

Research indicates a decrease in proportion of the population at given, increasing stages of abstractness. Since this includes samples of teacher trainees, therefore it would appear that there

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[11]David E. Hunt and Bruce R. Joyce, "Teacher Trainee Personality and Initial Teaching Style," American Educational Research Journal, 4:253-259, 1967.

should be problems in attempting to match students in need of an interdependent environment for progression on the basis of the small number of abstract teachers available. In adults, however, there is some reason to believe that abstractness is more domain specific or uneven with regard to different aspects of a person's life than it is in children. Thus, a person can be relatively abstract in one area, e.g. his work, and yet be concrete within other parts of his life such as intra-family relations.[12] When the possibility of abstractness being at least partially domain specific is considered and abstractness measured with stimuli associated with the educational domain, then somewhat of a more suitable distribution is found.[13] Even given this increase, there is still a decided lack of abstract teachers so that ways must be sought to train less abstract teachers to radiate abstract environments.

Ideally, of course, the most desirable teacher would be one who could radiate a wide variety of environments other than the particular environment which seemed natural. Hunt has specified a model for training training agents in which a hierarchy of the skills necessary for the radiation of just such a variety of environments is postulated.[14] Using

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[12]Harold M. Schroder, Michael J. Driver, and Siegfried Streufert, Human Information Processing, (New York: Holt, Rinehart and Winston, 1967), p. 9.

[13]Stanley France, "Selection of Candidates: Urban Teacher Preparation Program," (Syracuse University: Urban Teacher Preparation Program, 1965), (unpublished manuscript).

[14]David E. Hunt, "A Model for Analyzing the Training of Training Agents," Merrill-Palmer Quarterly, 12:135-155, 1966.

the basic Lewinian formula "B = f(P,E)" (behavior is a function of the person and the environment), Hunt notes that the training agent, in order to radiate a variety of environments, first must be able to discriminate among behaviors, must be able to discriminate among the persons to whom the environments are to be radiated, and must be able to discriminate among environments to be radiated. Once these discriminations are possible, the training agent must become proficient in radiating specified environments. Finally, the training agent must be able to shift from radiating one environment to radiating another or other environments, i.e. be capable of flexible modulation from one environment to another. While the discrimination problems can be viewed genotypically, the ability to radiate environment is likely to be related to phenotypic variables. Therefore, it seems necessary to examine the stage related characteristics of adults and teachers.

Genotypic characteristics

The structural concepts important to conceptual systems theory--discrimination, differentiation, and integration--have been illustrated in Figure 1. Data on the relationship of general abstractness, domain specific abstractness, and interpersonal discrimination and differentiation to teaching behavior has been collected by France, by Hunt and Joyce, and by Schroder, et al.[15 and 16] In general, these concepts

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[15]France, op. cit.; Hunt and Joyce, op. cit.

[16]Harold M. Schroder, O. J. Harvey, David E. Hunt, and B. D. Koslin, "Component Assessment in Peace Corps Trainees," (Princeton University: Peace Corps Assessment Program, 1965), (unpublished manuscript).

were found to relate to the sensitivity of the teacher to the student's frame of reference and, as previously mentioned, to the use of a reflective style. These results were in accord with theoretical expectations, thus lending support to further exploration of a more refined nature as suggested by Hunt's model.

Therefore, in addition to skills of discrimination relating to the domain of persons, a useful approach to teacher training might include a concern for the discrimination of behaviors relevant to both the curriculum and to the developmental progression of the students. In order for this information to be utilized, indices of genotypic characteristics with respect to the specific, desirable environments for radiation should be of value in directing the training of future teachers. Since discrimination may be viewed within the theoretical framework as taking place along specific dimensions derivable from the original theoretical postulations and from more recent research, it was possible for the author to tentatively identify some of these dimensions in each area.

Discrimination of students' behavior was considered as taking place along dimensions such as hostility-friendliness, attentiveness-inattentiveness, convergent-divergent, appropriate-inappropriate, relevant-irrelevant, and concrete-abstract. These dimensions were by no means all that might have been used, but were intended as key dimensions which could be used with all age ranges and curricular contexts.

Discrimination of persons, in this case students, was considered to be along dimensions which also reflected a theoretical concern about both development and curriculum. Hence, the following dimensions were considered to be important: interpersonally sensitive-interpersonally insensitive, independent-dependent, flexible-rigid, curious-withdrawn, memory oriented-concept oriented, and adjusted-maladjusted.

Discrimination of environments, like discrimination of behavior and persons, was considered to be relevant to both curriculum and development. Thus the following six dimensions were thought to be relevant: distant-involved, accepting-critical, controlling-nondirective, unstructured-informative, warm-hostile, and drill oriented-concept oriented.

Phenotypic characteristics

The more affective variables relevant to the theory's use in education and teacher training should be those which reflect a predisposition toward the radiation of specific environments and those which would reflect upon the ability to radiate a variety of environments. The dimensions mentioned above relevant to environmental discrimination should also then be important when viewed as predispositions. According to more original specifications of the theory, the unilateral-interdependent dimension and the warmth-hostility dimension should be of major importance.[17] France, drawing from the

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[17]Harvey, Hunt, and Schroder, op. cit., p. 113.

research, has briefly specified additional characteristics of teachers relevant to the environments to be radiated.[18] The most important additional variables noted by France include tolerance or patience and creativity for providing varied curriculum experiences.

More recent work by Schroder, Driver, and Streufert has suggested that information processing of the type necessary for making discriminations is affected by the noxiety of the situation.[19] This suggested that teacher trainees who are basically interpersonally anxious should view an interpersonal classroom as noxious and thus should discriminate more poorly than trainees who are less anxious. High anxiety would be likely to make training more difficult. This anxiety would also be likely to influence the ability to radiate a variety of environments since the person tends to become more stimulus bound and might have difficulty radiating other than the initial teaching style under conditions viewed as noxious. While a predisposition toward radiating a variety of environments might be present then, it would also be possible that despite competence in discrimination of situations where the trainee was not a participant, the situation might appear noxious enough to prevent functioning.

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[18]Stanley France, "Conceptual Systems Theory and Academic Capacities: Some Support for Developmental Stage Theories as Foci for Educational Unification," (paper read at the California Educational Research Association meeting, Berkeley, California, March, 1968).

[19]Schroder, Driver, and Streufert, op. cit., p. 89.

It appeared that a relatively few phenotypic variables, when combined with the genotypic variables described could allow for the derivation of expectations for a typology of trainees. While some of the research cited above was not carried out on teachers or teacher trainees, so that sampling could be a factor, there appears to be little evidence that such would be the case.

Derivation and Characteristics of Expected Types

The primary goal of the study was concerned with the validation of a typology which is both theoretically meaningful for matching teachers with students and useful for the training of potential teachers. Therefore, characteristics of the population with regard to important variables were used as a basis for deriving the types. Since general abstractness was known to be restricted, the majority of the types were expected to be at the lower end of the continuum, i.e. concrete.[20] The work cited by Schroder, et al., above indicated that noxious situations have more effect upon concrete than upon abstract persons. Therefore, and also in agreement with the original theoretical postulations, anxiety should also be more characteristic of concrete trainees.[21] This suggested that, conversely, abstract trainees should be characterized by low anxiety, high discrimination interpersonally, predisposition toward interdependent environments, and

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[20] Ibid., p. 195.

[21] Harvey, Hunt, and Schroder, op. cit., p. 108.

should be predisposed toward flexibility in radiating environments. Since abstract trainees are likely to be sensitive to others, they should also be expected to be rather warm in their interpersonal relations. Thus a type with all the desirable characteristics was anticipated. This type should require minimal training and could be given practice in learning the desired dimensions for discrimination and also practice teaching aimed at developing skills in dealing with each of the stages of development and various suitable curriculums.

In order to be theoretically meaningful, the types derived at the lower end of the general abstractness continuum should be identified to reflect the environments which must be radiated for the three lowest stages of development since these types are likely to be less flexible. Therefore, their training should be related to their initial teaching style. The training programs should attempt to induce flexibility, especially toward adjacent stage's environments.

In order to keep up with the students, the teacher working with the Stage II probably needs to be rather abstract. Since the other measures were expected to correlate as stated with abstractness, these should also be rather high. In addition, since the goal of the environment for the Stage II is to induce sensitivity toward the viewpoint of others, the teacher should be both sensitive towards her students and warm so that the negativeness of Stage II development is not an issue.

The teacher for Stage I students can be correspondingly less abstract. In keeping with the expectations, other variables should

also be correspondingly lower. However, the teacher might be predisposed towards being less warm or at least less reliable since progression to Stage II is dependent upon the student having to provide some of his own structure and determine where he stands in relation to his environment.

The critical issue for the Sub-I centers on the necessity for a warm, unilateral environment. Teacher trainees suitable for radiating such an environment should be so predisposed, but need not be very abstract. They should be rather more sensitive to behavior differences than to person and environment differences since they will be faced with reinforcing desirable behaviors for stimulus bound persons.

Four types seemed to meaningfully maximize the differences between trainees and also to be theoretically meaningful. Whether or not validation of these types could be derived empirically was the concern of the rest of this study. For the purpose of identification, these hypothetical types were labeled in the order in which they were presented. Type I was the most flexible of the theoretical types. Type II was the type associated with Stage II students. Type III was associated with the Stage I students. Type IV was associated with the Sub-I students. It should be obvious that the type designations are distinct from the designation of stages as many more variables are involved in deriving the types.

II. THE PROBLEM

Statement of the Problem

The problem of the study is the determination of the feasibility of using a typology to prescribe improvement of teacher training programs as to their direct relevance to the problems encountered in the educational setting. By defining types of trainees, it may be possible to more effectively use the time spent in the educational program by differentially specifying the training program according to the needs of the type. If the argument presented is correct, the use of a theoretical framework which aids in the defining of the types and the specification of the training program is of value to those attempting the improvement of training programs.

Significance of the Problem

Conceptual Systems theory is one of the few theories available which postulates the characteristics of stages and desirable environments for developmental progression. If teachers can be trained to provide these environments, then developmental progression can be enhanced. This is particularly important in lower class areas which typically contain a disproportionate number of students arrested at the lowest developmental level.[22] Current training programs are not specific enough to provide the type of training needed so that more

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[22]Hunt and Dopyera, op. cit.

task oriented programs need to be developed.[23]

III. PURPOSES OF THE STUDY

The purpose of the study was to attempt to derive and validate a typology of teacher trainees based on Conceptual Systems theory. In order to empirically validate the theoretically derived typology, three steps, each with a different purpose were needed. First, the constructs were operationally defined. Second, the interrelations of the constructs were established. Third, the types were determined as similar to theoretical expectations as possible. The first step was necessitated in more complex form than is usually done because of certain problems associated with the statistical procedures used. The reasons for this step will be more fully developed in the following two chapters.

IV. HYPOTHESES

The basic statistical procedures used in this study were factor analytic. Since these procedures are multivariate, it was necessary to specify the relationships of several variables at a time.[24]

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[23]Kevin A. Ryan, "A Plan for a New Type of Professional Training for a New Type of Teaching Staff," The Teacher and His Staff - Occasion Papers, No. 12 (Washington, D.C.: NCTEPS, National Education Association, February, 1968), p. 1.

[24]Fred N. Kerlinger, Foundations of Behavioral Research (New York: Holt, Rinehardt, and Winston, 1964).
Factor analytic techniques start out with a relatively large number of variables and selects those which are the most highly related

Step One Hypotheses

Step one was concerned with the operational definition of constructs. It was hypothesized that a factor matrix would emerge in which all variables considered on a priori grounds to be operational definitions of the same construct would load on the same factor and not on other factors. This was expected to be true of both the analysis defining genotypic constructs and the analysis defining phenotypic constructs.

Since an important consideration in the definition of constructs and the ability to generalize from a given study is the population to which the results are generalizable, the testing of step one hypotheses was made on upper, middle, and lower socioeconomic subgroups as well as on the total sample. It was thus hypothesized that operational definitions of the same construct would load on the same factor and not on other factors for each of the sample analyses.

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to make a new variable which is a composite of the variables selected. In most cases more than one new variable emerges from the analysis. The composite variables are called factors and the relationships of the old variables to the factors is expressed by what are called loadings on the factor. These loadings can roughly be interpreted as correlations of the variables with the factors. Loadings are usually expressed in terms of a factor matrix with the rows of the matrix being the old variables, the columns being the factors and the elements of the matrix being the loadings of the variables on the factors. The roots of the matrix, called eigenvalues, indicate how much of the variance in the original correlation matrix is accounted for by each of the factors. Each factor has an eigenvalue. The proportion of variance accounted for by each additional factor usually decreases with the number of factors.

Step Two Hypotheses

Step two dealt with the interrelationships of the constructs identified in step one. It was hypothesized that three factors would emerge. One factor, hypothesized to be called "abstractness" would have high loadings from the constructs of: general abstractness, integration of behavior, integration of persons, discrimination of environments, differentiation of environments, integration of environments, and autonomy.

A second factor hypothesized, to be called "sensitivity," would have high loadings from the constructs of educational domain abstractness, discrimination of behavior, differentiation of behavior, discrimination of persons, differentiation of persons, warmth, and intrinsic acceptance.

The third factor hypothesized, to be called "flexibility," would have high loadings from three constructs. These constructs were expected to be: flexibility, creativity, and interpersonal anxiety.

Step Three Hypotheses

Step three involved establishing the empirical validity of the types rather than of correlating variables. The profiles of the four hypothesized types are shown in Figure 2. These profiles were established by using one standard deviation of mean difference of a theoretical construct's factor score as being a meaningful difference.

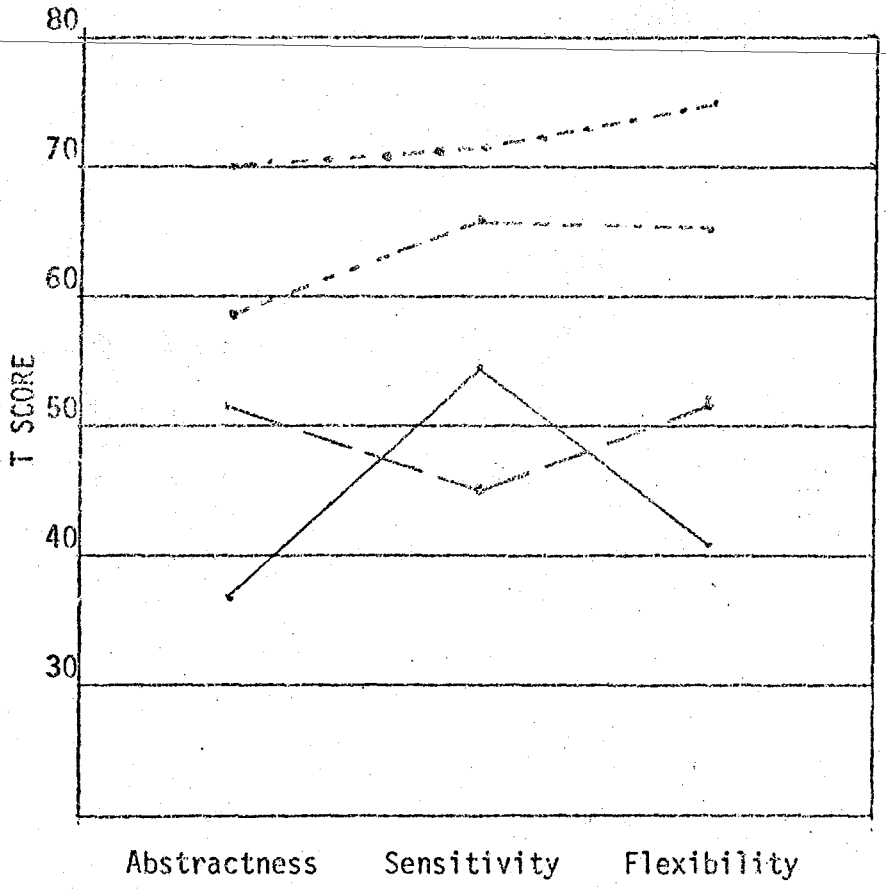

FIGURE 2

HYPOTHESIZED PROFILES OF
TEACHER TRAINEE TYPES

TYPE I-·-·-·- TYPE II------ TYPE III— — — —TYPE IV————————

V. ASSUMPTION AND LIMITATIONS

Assumptions

The assumptions upon which this study is based follow:

1. The goals set by Conceptual Systems theory are relevant to the goals of education.

2. The instruments constructed or used in the study were adequate definitions of the constructs within the theoretical framework.

3. The typology which resulted from the theoretical derivations will be useful for developing a teacher training program.

4. The procedures used in the analysis of data were adequate for the purpose for which they were chosen.

5. Sampling bias associated with variables could be controlled by the statistical procedures used for control.

6. Exposure to training had minimally influenced the responses given to test stimuli.

7. The constructs chosen were adequate and representative of the domains from which they were taken.

8. Conceptual Systems theory is an accurate description of the development of children.

Limitations

The limitations of the study follow:

1. The sample of subjects chosen was known not to be entirely representative of the national population of teacher trainees in that it had more lower class and more upper class representation than the national population.

2. Validation of the Classroom Rating Task, the Educational Views Questionnaire and the Teacher Attitude Research Inventory against classroom behavior had not been made at the time of the study.

3. Many important variables in the learning situation such as curriculum materials and mode of media presentation have not

been considered because the relationship of these variables to Conceptual System theory was not known.

4. To the extent that response sets were not created as desired in the testing situation, limitations or errors may have arisen.

5. To the extent that differences in the social climate for testing the two groups in the sample was different, undesirable variation may have been introduced.

VI. DEFINITIONS OF TERMS USED

The following definitions of terms have been used in this study:

1. Factor analysis: According to English and English, the term refers to "a statistical method for interpreting scores and correlations of scores from a number of tests. It consists of a search for the factors which, under stated restrictions, can be multiplied to give all the correlation coefficients of each test with every other. The most usual restriction is that the factors be as few as possible and still reproduce all the correlations."[25] It is further noted that a "factor when found represents the fact that for the persons tested there is an area or region of behavior within which individuals respond quantitatively in a consistent manner independently of the particular stimuli."[26]

2. Rotation: A procedure associated with the interpretation of factor analysis in which there is a movement of factors about the original axes when the factors are represented geometrically.[27]

3. Radiating environment: The term "radiating environment" is used by Hunt "to describe the training agent's behavior as it impinges upon the person with whom he interacts."[28]

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[25]Horace B. English and Ava C. English, A Comprehensive Dictionary of Psychological and Psychoanalytical Terms (New York: David McKay Company, Inc., 1958), p. 199.

[26]Ibid., p. 199.

[27]Ibid., p. 469.

[28]Hunt, op. cit., p. 137.

4. Environment: "The sum of the external conditions and factors potentially capable of influencing an organism."[29] In this study the term will be used to refer to the behavior of the teacher in the classroom.

5. Genotypic: In this study genotypic follows the usage of Schroder, et al., by referring to "'structural variables' which provide a metric for measuring the way a person combines [italics in original] information perceived from the outside world, as well as internally generated information, for adaptive purposes."[30]

6. Phenotypic: In this study phenotypic refers to the "'content variables'" which "provide information about the acquisition, direction, and magnitude of responses, attitudes, norms, needs, and so on." This is also in accord with Schroder, et al., usage of the term.[31]

7. Discrimination: According to Schroder, et al., "the capacity of the conceptual structure to distinguish among stimuli is called discrimination."[32]

8. Dimension: According to Schroder, et al., "a dimension is defined as a unique arrangement of stimuli."[33]

9. Differentiation: Differentiation, according to Schroder, et al., is "the number of dimensional units of information generated by a person when he 'perceives' an array of stimuli."[34]

10. Integration: According to Schroder, et al., "Integration in behavior measures the extent to which dimensional units of information can be interrelated in different ways in order to generate new and discrepant perspectives about stimuli."[35]

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[29]English and English, op. cit., p. 182.

[30]Schroder, Driver, and Streufert, op. cit., p. 4.

[31]Ibid. [32]Ibid., p. 24. [33]Ibid.

[34]Ibid. [35]Ibid., p. 25.

11. Concrete: According to Harvey, et al., "In more concrete functioning, the mediating link between input and output is more fixed."[36] Thus the organism is more stimulus bound than an organism functioning at a more abstract stage.

12. Stage: According to Harvey, et al., the term stage is used "to refer to a plateau or nodal point of conceptual development."[37]

13. Conceptual system: According to Harvey, et al., "A conceptual system . . . is a schema that provides the basis by which the individual relates to the environmental events he experiences."[38] Informally, a system is viewed as somewhat more fixed than a stage and is usually used to refer to adult development which is generally less open to progression than the conceptual structure of children.

14. Anxiety: As used in conceptual systems theory by Harvey, et al., "anxiety is generally defined as a fear which is ill-defined or not specific to a particular stimulus object."[39] In this study, anxiety will generally refer to the likelihood of less than optimal functioning in classroom situations. Schroder, et al., discuss the relationship of what they refer to as noxity in situations as it relates to abstract functioning.[40] While noxiety is more situation determined, anxiety is more likely to be dependent upon the individual. Both tend to lead to impared functioning at high levels so that the resulting performances under both conditions would likely be similar.

15. Unilateral training: According to Harvey, et al., "Unilateral training is characterized by the source's judging the subject's behavior in terms of how well responses match some external criterion."[41] Thus the source determines the absolute criterion and rewards and punishes on the basis of matching this criterion.

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[36]Harvey, Hunt, and Schroder, op. cit., p. 3.

[37]Ibid., p. 24. [38]Ibid., p. 244. [39]Ibid., p. 79.

[40]Schroder, Driver, and Streufert, op. cit., p. 69.

[41]Harvey, Hunt, and Schroder, op. cit., p. 121.

16. Extrinsic evaluation: This term refers to judging on the basis of performance as is the case in unilateral training.[42]

17. Intrinsic evaluation: In intrinsic evaluation, "the source places a value on the subject 'intrinsically', as a person, somewhat apart from the evaluation of his achievement measured against the source's criterion."[43]

18. Interdependent training: Interdependent training may be defined according to its operations as "(1) reality or relative determination of criterion, (2) rewards directed primarily toward means and exploratory acts, and (3) intrinsic evaluation."[44]

19. Warmth: Warmth is used in this study to correspond to Schaefer's use of the term "Love" which is defined by Schaefer in terms of affiliation, acceptance, and nuturance.[45]

20. Domain: All the data and/or concepts governed by, or included within, a given principle or law; all the situations or circumstances within which a given variable is to be found.[46]

21. Domain specific: Has two uses in this study. First, to refer to an individual's particular way of conceptualizing one part of an environment or life as distinct from the ways he conceptualizes other parts of his environment or life. Second, to refer to the area within which the model or theory is supposed to function.

VII. SUMMARY

The first chapter of this report has presented an introduction to the study. At the beginning, background information to acquaint the reader with the theoretical orientation has been presented. The

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[42] Ibid. [43] Ibid., p. 123. [44] Ibid.

[45] Schaefer, op. cit., p. 231.

[46] English and English, op. cit., p. 161.

problem has been stated, as has the purpose and significance of the study. Hypotheses, developed from research, have been proposed and the associated assumptions and limitations of the research noted. The important terms have been defined for clarification to the reader.

Four additional chapters complete this report. They are as follows: (1) Chapter II: Review of the Literature Related to the Study, (2) Chapter III: Method of the Study, (3) Chapter IV: Results and Discussion of the Study, and (4) Chapter V: Summary, Conclusions and Recommendations for Training Environments and Further Study.

CHAPTER II

REVIEW OF THE LITERATURE RELATED TO THE STUDY

I. INTRODUCTION

In this chapter a review of the literature supporting the study is made. The chapter is divided into seven sections. Section one presents background for the rationale of the study. Section two presents research on the student from the Conceptual Systems framework.[1] Section three describes theoretical research on adults' genotypic and phenotypic characteristics. Section four describes the instruments used for measuring the environments provided by parents and teachers. Section five presents research on the interaction of environments with development and learning. Section six covers teacher training research and models. Section seven discusses methodological issues concerning the study.

II. BACKGROUND

The major pragmatic argument for utilizing models in which individual differences are noted has been well stated by Cronbach.[2] In Cronbach's analysis, psychological theorizing is characterized as varying from the experimentalist's position which seeks to eliminate

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[1]O. J. Harvey, David E. Hunt, and Harold M. Schroder, Conceptual Systems and Personality Organization (New York: Wiley, 1961).

[2]Lee J. Cronbach, "The Two Disciplines of Scientific Psychology," American Psychologist, 12:671-684, 1957.

individual differences to the correlationist's position which concentrates on studying individual variations as found in natural settings.

Cronbach argues that the disciplines can make contributions to one another. The development of construct validation and its introduction into test theory suggests to Cronbach that both dependent and independent variables can be viewed as being drawn from a multivariate universe. Thus, individual variation on several constructs can be examined in relationship to multiple environmental constructs. This allows for the examination of treatment by subject interaction which, when applied in educational situations, suggests that a useful model has been identified only when regression lines for different treatments cross. It is argued that if a major portion of psychological theorizing is to survive, that there must be just such results in practical situations.[3]

A united discipline would consider past situations to which the organism has reacted, psychometric information about the organism at present, and the present situation. This would be used in order to predict the organism's response to the present situation.[4]

An attempt to characterize the multivariate environmental domain at a gross level is illustrated by the work of Stern in developing indices for examining the developmental and control "press" presented by schools and organizations.[5] Stern's indices have been tested in

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[3]Ibid. [4]Ibid.

[5]George G. Stern, People in Context, (New York: John Wiley & Sons, 1969), pp. 385-424.

educational settings.[6] Differences between elementary and secondary school personnel were found with regard to intellectual climate, achievement standards, practicalness, supportiveness, orderliness, and impulse control.[7] Elementary schools were found to be significantly higher than junior high schools in supportiveness while senior high schools were significantly below junior high schools in practicalness and orderliness. Elementary school teachers were more dependent and conforming while secondary teachers were more independent and achievement-oriented.

Multivariate characterization has been used in the field of delinquency. Warren has used a developmental theory for classifying delinquents, and has attempted to match type of treatment to type of delinquent in a parole setting.[8] Lower "recidivism" rates have been found for delinquents in the program as compared with matched control subjects. Jesness, using a cluster analysis approach, found empirical support for the typology used in Warren's study.[9]

Using Warren's theoretical structure, Jesness has attempted to match type of delinquent with type of treatment in an institutional

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[6]Ibid., p. 386. [7]Ibid.

[8]Rita Grant Warren, "Interpersonal Maturity Level Classification: Juvenile Diagnosis and Treatment of Low, Middle and High Maturity Delinquents," (California Youth Authority, 1966).

[9]Carl F. Jesness, "The Fricot Ranch Study: Outcomes with Small Versus Large Living Groups in the Rehabilitation of Delinquents," (State of California, Department of the Youth Authority, 1965), (unpublished manuscript).

setting.[10] Some attempt was made to obtain staff whose basic orientation was consistent with the desired treatment. While no parole success was found for experimental as opposed to control subject, complex change patterns were found for treatment by type of delinquent.

Palmer, also using a form of cluster analysis, has derived both a typology of delinquents and a typology of treatment agents which closely parallels the theory of Warren.[11] Palmer was able to specify which types of treatment agents could be matched with which types of delinquents.

III. RESEARCH ON THE STUDENT

In this section research dealing with the relationship between conceptual level of student and other characteristics will be examined. This section is included to demonstrate the utility of considering individual differences based on Conceptual Systems theory in dealing with students. The first study, by Hunt, represents the pioneering effort to identify characteristics of the stages in an educational setting.[12] The second study, by France, presents a cross-sectional

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[10]Carl F. Jesness, "The Preston Typology Study," (Institute for the Study of Crime and Delinquency, Sacramento, 1968).

[11]Ted Palmer, "Types of Probation Officers and Types of Youth on Probation: Their Views and Interactions," (Youth Studies Center, University of Southern California, 1963), (unpublished manuscript).

[12]David E. Hunt, "Final Report: Indicators of Developmental Change in Lower Class Children," (Syracuse University: Cooperative Research Project S - 166, 1965), (unpublished manuscript).

view of stage related behaviors as perceived by teachers.[13] The third study, by Wolfe, investigates the role of conceptual stages in cognitive functioning at varying levels of age and intelligence.[14]

The study by Hunt formed the basis for the article by Hunt and Dopyera cited earlier.[15] Since Hunt's study contains more detail than the published article, it was chosen as the basis for discussion. Hunt studied the development of lower class junior high students over a three year period while attempting to determine measures of change in stage. During the study, the opportunity arose to group students homogeneously by stage. The general findings with regard to grouping will be discussed later.

Overall, there was no change in stage over a one year period. This was in contrast to obtained increases in middle class samples over a comparative period of time. While this was true for the same grade level, middle class students were also significantly more abstract than lower class children. There was, however, more variation in the lower class sample with more Sub-I students and only five per cent fewer

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[13]Stanley France, "Conceptual Systems Theory and Academic Capacities: Some Support for Developmental Stage Theories as Foci for Educational Unification," (paper read at the California Educational Research Association meeting, Berkeley, California, March, 1968).

[14]Raymond Wolfe, "The Role of Conceptual Systems in Cognitive Functioning at Varying Levels of Age and Intelligence," Journal of Personality, 31:108-123, 1963.

[15]David E. Hunt and John Dopyera, "Personality Variation in Lower-Class Children," Journal of Psychology, 62:47-54, 1962.

Stage II students in the lower class sample than in the middle class sample. This higher variation was primarily attributed to many more of the middle class sample scoring as pure Stage I on the sentence completion measure used as the basis for assessing conceptual level (stage) attained. Some changes within the lower class group were noted as one homogeneous group of Sub-I students had a mean increase of .85 in conceptual level as determined by a sentence completion measure. However, the overall test retest reliability was rather low despite high inter-rater reliability so that this increase could be attributable to regression effects.

In addition to developing the sentence completion test, four other measures were given. The children's social desirability scale as developed by Crandall, Crandall, and Katkovsky; a negative attitude toward school scale from Cattell and Gruen; and a situational picture experiment which dealt with praise, criticism help, rejection, independence, and potential information were given.[16] The Cattell Anxiety Scale was given.[17] California Test of Mental Maturity scores available on most of the students were analyzed. The sentence completion measure, in addition to being scored for conceptual level, was also scored for negativism. The social desirability scale, negative attitude toward

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[16]Virginia Crandall, V. J. Crandall, and W. Katkovsky, "A Children's Social Desirability of Response Questionnaire," Journal of Consulting Psychology, 27:27-36, 1965.

[17]Raymond B. Cattell and W. Gruen, "Primary Personality Factors in the Questionnaire Medium for Children from Eleven to Fourteen Years Old," Educational and Psychological Measurement, 14:50-89, 1954.

school scale and the situational picture experiment were used to construct four additional scales: a Sub-I scale, a Stage I scale, a Stage II scale, and an Open I scale. These scales were found to discriminate among the stages. Anxiety and negativism were found to be characteristic of the Sub-I and Stage II students but not the Stage I subjects. Stage I subjects tended to give more socially desirable responses.

In the study by France, junior high students, heterogeneous with respect to race, were administered the sentence completion measure (as part of a larger test battery) used in the study described above by Hunt.[18] In addition, teachers who had the students for core subjects were asked to rate these students on a 66 item school behavior checklist devised especially to measure theory related behavioral expectations. Included among the questions were 10 items designed to measure stage related academic capacities. When the checklist was analyzed by the principal components method of factor analysis and varimax rotated, a separate factor composed of the academic capacity items emerged.

Three of the ten items loading above .50 on the factor discriminated among Sub-I, Stage I, and Stage II students. These items were: "Can manipulate symbols and think in abstract terms," "Can see connections and relationships between different academic subjects," and "Has difficulty memorizing material. (Beyond not liking to do it.)." The other seven items discriminated between two of the stages. Since teachers who made the ratings were not aware of the theory and obviously not aware of

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[18]France, op. cit.; Hunt, op. cit.

the stage designation of the students they were rating, independence of the measures was assured. Thus, the results could be interpreted as providing support for the relevance of the theory for education.

France suggested that the results indicated that the Sub-I student is not only academically unable, but probably lacking in the discrimination skills necessary to determine the important characteristics of his (educational) environment. Therefore, it was suggested that the curriculum for the Sub-I should first center on learning to make discriminations about what is important in a communication before dealing with subject matter of an academic nature.

Wolfe attempted to compare Conceptual Systems theory with two of Piaget's aspects of cognitive activity, decentering ability and the ability to utilize conceptual criteria in forming impressions of the environment.[19] A situational interpretation experiment (task) was used as a basis for determining stage since at the time of the study the sentence completion measure had not been developed.

Age and intelligence were both found to relate to conceptual level as they also do to Piaget's stages. However, when age and intelligence were partialled out of the experiment, conceptual level was found to relate to role taking ability with a distinct and theoretically expected advantage for System III subjects over System II subjects. Impression formation ability was also related to conceptual level with more abstract subject being better able to resolve conflicting environmental inputs

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[19]Wolfe, op. cit.

and go beyond describing behavior.

This suggests that more abstract students may be better able to discriminate the meaning of the teacher's communication than less abstract students. When the problems that the Sub-I student has are considered to be interpersonal as well as curricular, the relationship between these two types of variables in the classroom setting becomes more critical.

IV. RESEARCH ON ADULTS

There has been some variation in the instruments used on children to assess the stage of conceptual development attained. This has also been true for measures used to ascertain abstractness of adults. Schroder and Hunt have tended to develop measures which reflect the complexity of the structure used by the person.[20] Harvey has tended to rely upon attitudinal correlates of system functioning as major referents.[21] Further differences can be seen. Schroder and Hunt tend to minimize the exclusive aspects of systems (which are generally thought to be more fixed than stages) noting the shadings and situational determinants; Harvey regards development in adults as arrested at the

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[20]Harold M. Schroder, Michael J. Driver, and Siegfried Streufert, Human Information Processing (New York: Holt, Rinehart and Winston, 1967), pp. 185-198; Hunt, op. cit.

[21]O. J. Harvey (ed.), Experience Structure & Adaptability (New York: Springer Publishing Company, Inc., 1966), Chapter 4.

nodal points with fewer situational determinants of behavior. The validation of stages and systems is, of course, a bootstrap procedure with the ultimate criterion being the utility of the theory in application to various situations. Since Harvey's measures seem to conflict, in part at least, with the original rationale behind system identification, this writer tends to prefer the approach used by Schroder and Hunt. It should therefore be noted that the research to be reported in this section has used different means of identifying the system within which the adult is functioning.

This section on the adult is further subdivided into studies dealing mainly with genotypic variables and studies which place more emphasis on phenotypic characteristics. Studies which indicate the relationship of these characteristics to teaching behavior are included. No research has been reported in the literature concerning teachers ability to discriminate students' behavior, students' dynamics or environments in relation to conceptual level or the phenotypic variables under consideration.

Genotypic Studies

Carr administered paragraph completion measure used by Schroder, Driver, and Streufert to 63 undergraduate males along with a test designed to measure interpersonal discrimination.[22] The interpersonal

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[22]John E. Carr, "The Role of Conceptual Organization in Interpersonal Discrimination," Journal of Psychology, 59:159-176, 1965; Schroder, Driver, and Streufert, op. cit.

discrimination test asked subjects to compare themselves and to compare other persons having various relationships to them by first thinking up an adjective which described each person and the opposite of that adjective. Subjects were then asked to go back and compare themselves and the persons by placing the persons along a continuum formed by the adjective and its opposite. If a difference between persons existed, a line was to be drawn between the persons. Thus it was possible, with a total of seven persons, to discriminate among seven or fewer. The number of different distinctions minus one served as the index of discrimination. The number of dimensions which were not used identically served as the index of differentiation.

Carr's findings indicated that there was no evidence that abstract subjects used more dimensions than concrete persons. However, abstract subjects did make finer interpersonal discriminations than concrete subjects with System III subjects being superior to System II subjects. System II subjects perceived themselves as more distinct individuals than did System I subjects.

Schroder, et al., postulate a general "U" curve hypothesis with regard to the relationship of information processing to environmental complexity.[23] That is, information processing is said to be minimal when the environment is not complex enough, increase positively with the complexity of the environment and then decrease as the environmental

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[23]Schroder, et al., op. cit.

complexity goes beyond a certain point. Further, concrete individuals are thought to peak earlier and have a smaller range of environmental complexity over which they optimally function whereas abstract individuals peak later and have a broad range of environmental complexity over which they can function.

In order to test these hypotheses, a task was devised in which groups or teams homogeneous with regard to conceptual level played a game in which they had to determine characteristics of their opponents strength in order to win. In actuality, the opponents were the experimenters who could vary the complexity of their responses as desired. The task was carried out over several time periods with the complexity being varied randomly to avoid serial order effects. Several measures of integration were made at each time. Analysis of the data supported the hypotheses with regard to the shape of the curve and the differences between groups high and low in conceptual level.

Faletti attempted experimental validation of measures of cognitive complexity through a task in which subjects were trained to make judgments at varying levels of complexity.[24] Subjects varying in abstractness, as measured by paragraph completion responses, were trained to make ratings in a hypothetical business situation of applicants for a job. In one treatment, subjects were asked to consider strategic

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[24]Martin V. Faletti, "An Experimental Validation of Some Measures of Cognitive Complexity" (Princeton University, Senior Thesis, 1968).

thinking ability and social reciprocity in order to arrive at a judgment of an applicant. In a second treatment, subjects were given three dimensions: strategic thinking ability, social reciprocity, and orderliness, and asked to arrive at a judgment of an applicant. In a third treatment subjects were given the same three dimensions and asked to form two rules for judging applicants. They were then asked to form an overall opinion of each applicant. Four different measures of differentiation and integrative complexity were compared in the study. These were Multi-dimensional scaling, Bieri's Interpersonal Discrimination Test, number of categories and breadth and depth of category search for Free Response Adjectives, and a domain specific version of the paragraph completion test.[25] The Bieri instrument and the Free Response adjectives retrieved the number of dimensions inputed while multi-dimensional scaling would not retrieve the more complex structure. Subjects who were trained in the third task, the most complex, demonstrated higher levels of integrative complexity on the sentence completion measure than did the subjects trained under less complex conditions. Integrative complexity was more affected than differentiation by the dispositional level of the subject as determined by the paragraph completion measure.[26]

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[25]J. B. Kruskal, "MDS by Optimizing Goodness of Fit to a Non-Metric Hypothesis," Psychometrika, 29:1-27, 1964; J. Bieri, A. Atkins, S. Briar, R. L. Leaman, H. Miller, and T. Tripodi, Clinical and Social Judgment (New York: John Wiley & Sons, Inc., 1966); V. W. Torbert, III, "Toward a New National Character: Discovering the Dimensionality of International Perception" (Princeton University, Senior Thesis, 1968); Harold M. Schroder, et al., op. cit.

[26]Faletti, op. cit.

The relationship between general abstractness as well as educational domain abstractness to teaching behavior is summarized by Hunt.[27] Teaching behavior has been considered in terms of the teacher's ability to adapt to a given situation or student's frame of reference.[28] Five studies are considered, three involving Peace Corps volunteers. A study of National Teacher Corps trainees and a study of Urban Teacher trainees were the other sources of data.[29]

General abstractness was determined in all studies by the Paragraph Completion Test described by Schroder, Driver, and Streufert.[30] Educational domain abstractness was determined by an "Attitude to Teaching" measure first used by Hunt, Joyce, and Weinstein.[31] Only the study involving National Teacher Corps trainees showed a significant positive relationship of adaptability in a teaching setting to general

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[27]David E. Hunt, "Adaptability in Interpersonal Communication Among Training Agents" (Ontario Institute for Studies in Education, University of Toronto, 1969).

[28]Hunt, loc. cit. Description of the measuring instruments is considered in a later section.

[29]Hunt, loc. cit.

[30]Schroder, et al., op. cit., pp. 185-198.

[31]David E. Hunt, Bruce R. Joyce, and Gerald Weinstein, "Application of Communication Task in Assessment of Peace Corps Trainees," Report submitted to Peace Corps, 1965.

abstractness, the relationship in the other samples were positive but low.[32] Educational domain abstractness showed a significant positive relationship to adaptability in one of the three Peace Corps studies and in both of the other studies. The results were considered as supporting the necessity of considering the domain in which abstractness is to be considered and as indicating that one's attitude toward teaching affects one's classroom behavior.

Phenotypic Studies

In a set of studies done under the direction of Harvey, measurement of Conceptual Systems was done through response to the "This I Believe" test.[33] In this test, subjects are asked to respond to sentence stems beginning "This I believe about. . ." The blank is then filled with words like "sin," "friendship," "the American way of life," "myself," and "compromise." Classification is determined by "absolutism of his expressed beliefs, consideration of contingencies . . . dependency on external authorities, especially God and/or religion . . . degree of ethnocentrism, acceptance of socially approved modes of behavior, concern with interpersonal relationships . . . ." Responses are classified as part of an overall rating.

Harvey summarizes the results of studies dealing with the relationship of the systems to intelligence, authoritarianism, dogmatism,

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[32]Hunt, op. cit., p. 41.

[33]Harvey (ed.), op. cit., Chapter 4.

rigidity, Machiavellianism, and creativity among other variables of lesser importance to this study.[34] Systems II and IV scored higher on the WAIS Verbal Intelligence and Vocabulary scales than did the subjects representing Systems I and III. In several studies, individuals representing System I scored highest on the F-Scale followed by Systems III, II, and IV in that order. On the Rokeach Dogmatism Scale, System I subjects scored the highest followed by Systems II, III, and IV respectively. On the Gough and Sanford Scale of Rigidity, the order was from System I to System IV in sequence. System II subjects have been found to be significantly higher in Machiavellianism than subjects representing any of the other systems. Clear cut differences have been found between System I and System IV subjects with regard to creativity with System IV subjects being more creative. However, the relationships of creativity to the other two Systems was not clear.

A study by Harvey, White, Prather, Alter, and Hoffmeister related classification on the "This I Believe" test to ratings of Preschool Atmospheres of teachers in the areas of dictatorialness and task orientation.[35] System I teachers were more dictatorial than Systems III and System IV teachers as well as less task oriented. No differences were found between System III and System IV teachers. No System II

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[34]Ibid.

[35]O. J. Harvey, B. Jack White, Misha S. Prather, Richard D. Alter, and James K. Hoffmeister, "Teachers' Belief Systems and Preschool Atmospheres," Journal of Educational Psychology, 57:373-381, 1966.

teachers were found in the study sample.

A study by France, partly reported by Hunt, with Urban Teacher Preparation Program applicants as subjects, used correlational and factor analysis procedures to examine the relationship among creativity, the Paragraph Completion Test, the Attitude to Teaching measure, dogmatism, machivellism, submission-ascendence, the Miller Analogies Test, and ratings of sensitivity, feedback strength, and strategy from the Control Task described by Hunt were included as was the Adaptability Index from the Communication Task also described by Hunt.[36] The Kelly Rep test number of perceived similarities, a measure of interpersonal differentiation, and a measure of interpersonal discrimination were also used.[37] Findings were not in agreement with those reported by Harvey.[38] No significant relationship was found between scores on the Paragraph Completion Test and dogmatism or creativity. The only significant

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[36]Stanley France, "Selection of Candidates: Urban Teacher Preparation Program," (Syracuse University: Urban Teacher Preparation Program, 1965), (unpublished manuscript).
David E. Hunt, "Adaptability in Interpersonal Communication Among Training Agents" (Ontario Institute for Studies in Education, University of Toronto, 1969).
Schroder, et. al., op. cit.
M. Rokeach, The Open and Closed Mind, (New York: Basic Books, Inc., 1960).
Harvey (ed.), op. cit.
W. S. Miller, Psychological Corporation, Cited in Oscal Krisen Buros (ed.), The Sixth Mental Measurement Yearbook (New Jersey: The Gryphon Press, 1965), pp. 746-750

[37]George A. Kelly, Psychology of Personal Constructs, Volume 1, New York: Norton, 1955.
John E. Carr, op. cit.

[38]O. J. Harvey (ed.), op. cit., Chapter 4.

correlation for the Paragraph Completion Test was with the measure of interpersonal differentiation. The Attitude to Teaching measure was negatively correlated with strength from the Control Task and positively correlated with the Adaptability Index.

When factor analyzed by the principal components methods, the varimax rotated, four basic factors emerged. The behavioral task ratings from the Control Task made up one factor with a low contribution from the Adaptability Index. The Paragraph Completion Test, the Miller Analogy Test, and the measures of differentiation and discrimination made up a factor reflecting general abstractness. The multiple choice tests all loaded on a third factor. The creativity index and the Kelly Rep test also loaded on the same factor. The fourth factor was composed of the Attitude to Teaching measure and the Adaptability Index from the Communication Task. A negative loading from the Strength rating of the Control Task was also obtained.

V. ENVIRONMENTAL MEASUREMENT

In line with Cronbach's summary of characterizing the environment in a multivariate context, most studies derived from the Conceptual Systems framework have attempted to measure more than one characteristic of the environment. Measurement techniques have included rating scales by trained observers, a checklist coded by observers, and multiple choice instruments which allow either the subject or the parent to describe the environment. Variables measured have included warmth,

autonomy, intrinsic acceptance, reliability, and the protective-informational dimension.

The importance of having an objective, theoretically derived technique for measuring the behavior of a teacher as distinct from the genotypic and phenotypic characteristics seems crucial to the replication of studies in education. Given such an instrument, the researcher is much more apt to be able to control for the effects associated with individual teachers in his research design. Joyce has developed an instrument which is a major step in this direction.[39]

Joyce's instrument is a checklist in which the teacher's communication with students is noted every 15 seconds by a trained observer. Four areas or categories are used. They are: the application of sanctions, the development of procedures, the handling of information, and activity initiation and maintenance. Each of these categories is further divided into subcategories. The subcategories are used to generate ratings on the dimensions of unilaterality, reliability, and the protective-informational dimension. These are the major training dimensions of Conceptual Systems theory. Inter-rater reliability has been between .85 and .95.[40]

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[39] Bruce R. Joyce, "A Manual for Coding Teacher Communications Relevant to Conceptual Systems Theory," (unpublished manuscript, University of Chicago, Chicago, Illinois, 1964).

[40] David E. Hunt and Bruce R. Joyce, "Teacher Trainee Personality and Initial Teaching Style," American Educational Research Journal, 4:253-259, 1967.

Osofsky, in exploring the behavior of parents-as-teachers included rating scales by a trainer observer of the warmth of the parent as the teacher and the degree of unilateral training imposed by the parent.[41] Warmth correlated highly negatively with unilateral training in this study. Inter-rater reliabilities were above .85 for both scales.

Rating scales were also used extensively in a study by Harvey, White, Prather, Alter, and Hoffmeister.[42] Dimensions included warmth, flexibility in meeting needs, maintaining relaxed relationships, enlistment of child participation, encouragement of individual responsibility, consistency of rule enforcement, use of functional explanation of rules, use of unexplained rules, rule orientation, determination of classroom and playground procedure, and punitiveness. Other dimensions which reflected more on the teachers feelings than on the environment provided were included to make a total of 26 rating scales. The scales, when cluster analyzed, yielded two major clusters characterized as dictatorialness and task orientation. Dictatorialness had high loadings from need for structure, flexibility (Negative), rule orientation, encouragement of free expression of feelings (Negative), and other similar scales. Task orientation had high loadings from five scales. These were: warmth, perceptiveness, task effectiveness, utilization of physical

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[41] Joy Doniger Osofsky, "Relation of Conceptual level and Internal-External Control to Measures of Parental Teaching Behavior" (unpublished Master's thesis, Syracuse University, Syracuse, New York, 1967).

[42] O. J. Harvey, et. al., op. cit. pp 373-381.

resources, and ingenuity in improvising teaching and play materials. Interjudge reliability for the study was approximately .70.

In the two studies described above, scales which attempt to characterize the reactions of the teacher and scales which described the environment radiated by the teacher were combined in the same analysis. While a given behavior can no doubt serve as a referent for rating on several scales, the importance of maintaining a distinction between teacher characteristic and educational environment would seem worthwhile for the educational researcher interested in an experimental design.

A less independently arrived at method of characterizing the environment than used in the above study is found in a study by Cross.[43] In Cross's study, no direct measure of the environment was made. Parental training conditions relating to autonomy, authoritarianism, warmth, and intrinsic acceptance were obtained through the use of the Parental Attitude Research Inventory developed by Schaefer and Bell.[44] A set of interview questions dealing with discipline, standards for behavior, differing opinions, criticism of parent by child, and child's performance in relation to the parent's opinion of the child

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[43]Herbert J. Cross, "The Relation of Parental Training Conditions to Conceptual Level in Adolescent Boys" (unpublished Doctor's dissertation, Syracuse University, Syracuse, New York, 1965).

[44]Earl S. Schaefer and Richard O. Bell, "Development of a Parental Attitude Research Instrument, "Child Development, 21:339-361, 1958.

was developed and used.[45] A rating manual provided by Cross gives the general rationale for scoring at each point on the scale and gives illustrations as well.[46] Inter-rater reliability was .81 for autonomy and not given for intrinsic acceptance.

Hunt, Hardt, and Victor have used students perception of educational environment in a study of Upward Bound Project training institutions.[47] Eight scales were derived from a 72 item questionnaire. These scales were: group harmony, staff harmony, promotion of positive self concept, warmth-acceptance, sensitivity to individuation, autonomy, flexibility, and evaluation. A factor analysis of the scales yielded two factors identified as autonomy and warmth. Schroder and Lee have used this instrument in a study of Outward Bound training.[48]

A study by France used delinquent's perception of parental environment to compare training conditions for delinquents at different conceptual levels.[49] Items derived from the Parental Attitude Research

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[45]Cross, op. cit.

[46]Herbert J. Cross, "A Manual for Scoring Responses to Interview On Child Rearing" (unpublished manuscript, University of Connecticut, 1964).

[47]David E. Hunt, Robert H. Hardt, and James B. Victor, "Characterization of Upward Bound, 1967-68" (Syracuse University: Youth Development Center , 1968).

[48]"Outward Bound training aims to achieve an increase in motivation through the development of self." The program is aimed at disadvantaged inner-city youths. Harold M. Schroder and Robert E. Lee, "Effects of Outward Bound Training on Urban Youth" (Princeton University, 1967).

[49]Stanley Augustus France, Jr., "A Comparison of Integration Level Theory and Conceptual Systems Theory Using a Delinquent Population" (unpublished Master's thesis, Syracuse University, Syracuse, New York, 1968).

Inventory served as a partial basis for defining factors measuring warmth, autonomy, and intrinsic acceptance.

The similarities among various methods of measuring the environment radiated by a parent or teacher is an empirical question much in need of exploration. The effects of age and the conceptual level need to be examined. That studies using all the approaches given above have suggested similar interactions to those postulated by Conceptual Systems theory is a promising indication for such research. The use of a multi-trait, multi-method approach would seem appropriate.[50]

VI. INTERACTION

Interaction effects of different environments with students and children at different conceptual levels is of central importance to the approach chosen for the research presented in this study. This position suggests the necessity for having different environments in order to produce conceptual development for different stages as argued by Cronbach.[51]

Cross classified junior high school boys with regard to conceptual level and then assessed the autonomy, authoritarianism, warmth, and intrinsic acceptance of their parents through an interview and

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[50]Donald T. Campbell and Donald W. Fiske, "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix," Psychological Bulletin, 56:81-105, 1959.

[51]Cronbach, op. cit.

questionnaire techniques described earlier.[52] The results, using groups formed on the basis of conceptual level, suggested that parents of high conceptual level boys grant more autonomy than parents of low conceptual level boys and are also less authoritarian. Fathers of high conceptual level boys were more likely to intrinsically accept their sons than were fathers of low conceptual level boys.

A study by Hunt discussed earlier noted change in conceptual level for junior high school students as a result of homogeneous grouping by stage.[53] While results were not statistically tested, Sub-I students so grouped did better in terms of conceptual growth and decreased negativism than did Sub-I students not so grouped. Judging from the teachers' comments, Hunt suggested that the teachers also found the groupings useful in terms of knowing what techniques would "work" with each group after the teachers had been given some knowledge of the dynamics of the stage of the students they were teaching. Teachers found that keeping Sub-I students busy and doing a lot of drill seemed to be effective and that debates proved useful for Stage I students but were not effective with Stage II students who wanted their individual opinions heard.

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[52]Herbert J. Cross, "The Relation of Parental Training Conditions to Conceptual Level in Adolescent Boys," op. cit.

[53]David E. Hunt, "Final Report: Indicators of Developmental Change in Lower Class Children" op. cit.

France compared the perceived parental environments of delinquents at various conceptual levels.[54] Differences among Sub-I and Stage I delinquents were found for intrinsic acceptance. No differences were found for warmth or autonomy.

Hunt, Hardt, and Victor, in examining the effects of Upward Bound programs, found that the greatest changes occurred when program and student orientation were "matched" so that a structured approach in programs had predominantly low conceptual level students while more flexible programs had high conceptual level students.[55] More flexible programs showed greater student gains in internal control which was also considered theoretically consistent.

A doctorial dissertation by Heck, reported by Hunt, was concerned with improving adaptability among high and low conceptual level training agents.[56] Two forms of training were used, one highly structured and

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[54]Stanley Augustus France, Jr., "A Comparison of Integration Level Theory and Conceptual Systems Theory Using a Delinquent Population," op. cit.

[55]The purpose of Upward Bound is "to generate the skills and motivation necessary for college success among young people from low-income backgrounds and inadequate secondary school preparation. . . . It acts to remedy poor academic preparation and personal motivation in secondary school and thus to increase the youngster's promise for acceptance and success in a college environment." David E. Hunt, et.al., "Characterization of Upward Bound, 1967-1968," op. cit., p. 1

[56]E. J. Heck, "A Study Concerning the Differential Effectiveness of Two Approaches to Human Relationship Training in Facilitating Change in Interpersonal Communication Skill and Style of Interpersonal Perception," (unpublished doctoral dissertation, Syracuse University, 1968); David E. Hunt, "Adaptability in Interpersonal Communication Among Training Agents," (Ontario Institute for Studies in Education, University of Toronto, 1969).

one less highly structured. High and low subjects were assigned randomly to both treatments so that four groups were formed, two matched and two mismatched. It was found that subjects trained under matched conditions performed significantly better than did subjects trained under mismatched conditions on a post behavioral task.

Tomlinson and Hunt report a study in which eleventh grade students were taught the concept of cognitive dissonance by three methods differing in their degree of structure.[57] Sex and intelligence were used as control variables. In the highly structured treatment the definition of the concept was presented followed by material which illustrated the concept. In the less structured treatment the material was presented first, and in the least structured treatment the definition was not provided, subjects being told to look for similarities among the material. Retention of the definition and the illustrations were the independent variables at intervals of immediate, one day, and one week time. Low conceptual level subjects were more affected by the method of presentation than were high conceptual level subjects, scoring significantly higher under the more structured condition. Results were the same over all retention periods. The results were interpreted as supporting the differential treatment model.

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[57]Peter D. Tomlinson and David E. Hunt, "The Differential Effectiveness of Three Teaching Strategies for Students of High and Low Conceptual Levels" (Ontario Institute for Studies in Education, University of Toronto, paper read at 1970 AERA meeting, Minneapolis, Minnesota.)

VII. TEACHER TRAINING

In this section, teacher training models and research derived from the Conceptual Systems framework will be considered. Hunt suggests that considering the match between the method of training intervention and the type of trainee is as important for training teachers as in matching teachers presented environment with students.[58] While Hunt has developed a complex model for examining the differential training of training agents, research testing this model is lacking at the present time.

In a preliminary version of the model Hunt considers Lewin's classic formula "B=f(P,E)" (behavior is a function of the person and the environment).[59] This formula is used to specify a range of skills necessary for radiating a variety of environments. Thus the teacher trainee must learn to discriminate among the behaviors of his students, the interpersonal differences among his students, and among the environments which he can radiate towards those students. This is a first step in the training process. Once these skills have been acquired, the trainee should learn to radiate given environments. Lastly, the trainee

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[58] David E. Hunt, "Differential Training in Teacher Education and its Implications for Increasing Flexibility in Teaching," Prepared as a chapter in Bruce R. Joyce, et. al., New Perspectives in Teacher Training.

[59] David E. Hunt, "A Model for Analyzing the Training of Training Agents," Merrill-Palmer Quarterly, 12:135-155, 1966; Kurt Lewin, A Dynamic Theory of Personality (New York: McGraw-Hill Book Company, Inc., 1935).

should learn how and when to shift from radiating one environment to radiating another.

It should be noted that while Hunt specifies the areas in which discrimination training should take place, the dimensions along which discriminations are to be made are not specified. Joyce and Hodges, however, have developed what is called "Instructional Flexibility Training" which makes use of Joyce's coding instrument.[60] This instrument, described previously, serves as the basis for training in discriminating educational environments.[61] In the training process four phases are used.[62] In the first phase, trainees learn to discriminate teaching behavior by coding their own and classmates tape recorded lessons. A comparison of the coding system in use and other coding systems is also made in this phase. In the second phase, the instrument is used to learn discriminations in social climates, content, and teaching strategies provided by the trainee. The third phase concentrates on the student learning to produce teaching behaviors which are not part of his usual style. Trainers analyze lessons together. The fourth phase provides feedback from staff and supervising teachers as to progress.

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[60]Bruce R. Joyce and Richard E. Hodges, "Instructional Flexibility Training," The Journal of Teacher Education, 17:409-416, 1966.

[61]Bruce R. Joyce, "A Manual for Coding Teacher Communications Relevant to Conceptual Systems Theory," op. cit.

[62]Bruce R. Joyce and Richard E. Hodges, op. cit.

The training techniques described by Joyce and Hodges do not appear to make any systematic use of initial differences in the skill levels of accessibility characteristics of trainees. Hunt, in a more recent development of his model, considers these as the basis for developing training programs.[63] When the training objective and the trainee characteristics are known, the training intervention can be derived.[64]

Hunt considers four areas of trainee characteristics and their related intervention characteristics. The skill level of the trainee is viewed as related to the content of presentation. Ability to discriminate among behaviors, persons, and environments as specified in the above presentation of the model would be given primary consideration. Once the trainee has the capacity to make these discriminations, or if the trainee is capable of making these discriminations then the content could deal with promoting skill in radiating environments. Given this ability, the content would then focus on flexible modulation from one environment to another under appropriate circumstances.

The cognitive orientation of the trainee determines the structure of presentation. Hunt suggests that the more conceptually complex the trainee, the more complex can be the presentation, and the more likely is the trainee to be accessible through a reflective interdependent presentation.[65]

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[63]David E. Hunt, "Differential Training in Teacher Education and its Implications for Increasing Flexibility in Teaching," op. cit.

[64]Ibid.

[65]Ibid.

The value orientation of the trainee is viewed as determining the value context of the training intervention. Hunt cites a study by Harvey and Rutherford which found that an absolute approach worked more effectively than did a gradual approach with authoritarian persons.[66] The gradual approach was found to work better with non-authoritarian persons. As Hunt notes, little research has been done in this area.

Motivational orientation of the trainee is seen as related to the form of feedback and reward used in the training programs. The rewarding agent is important to consider. Harvey found that authoritarian persons were more accessible through authority based statements while those more interpersonally sensitive were more accessible through their peers.[67]

In training programs, micro teaching tasks, such as the Communication Task and the Thoreau Tasks described by Hunt, may prove useful for developing skill in radiating a given environment.[68] These tasks have been used in determining trainees ability to "flex" in order to communicate a complex idea to someone with a different frame of reference. Varying degrees of stress are presented in the tasks. In these tasks, trainees are given information about the behavior objective

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[66] O. J. Harvey and Jeanne Rutherford, "Gradual and Absolute Approaches to Attitude Change," Sociometry, 21:61-68, 1958.

[67] O. J. Harvey, "Some Cognitive Determinants of Influenceability," Sociometry, 27:208-221, 1964.

[68] David E. Hunt, "Adaptability in Interpersonal Communication Among Training Agents," op. cit.

they are to produce, usually the understanding on the part of the person or persons role playing the students of a complex idea. Trainees are also given information as to the person with whom they are to communicate in order to plan the approach to be used. The trainee's knowledge about the idea he is to communicate is generally partialled out of the situation by allowing study time with materials covering the concept. Some support has been found for an adaptability index based on these tasks and performances in field settings.[69]

VIII. METHODOLOGICAL ISSUES

Methodological problems in this study focus around three issues, the first of which is the establishment of constructs or construct validation. The second issue concerns the determination of the relationship of the constructs. A third related issue is concerned with the establishment of the relationship of individuals with respect to the constructs. The approach used in this study treats each of these problems as a special case of construct validation and proposes to utilize the same basic technique for each.

Construct validation is typically viewed as the measurement of the same trait by maximally different methods whereas reliability is normally viewed as the measurement of a trait by maximally similar methods.[70] According to the model proposed by Campbell and Fiske, the

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[69] Ibid.

[70] Donald T. Campbell and Donald W. Fiske, op. cit.

correlations between a trait measured by different methods should be higher than the correlation of different traits measured by the same method. This is known as discriminant validation.

A more sophisticated way, at least on the surface, to treat this problem is to factor analyze the multitrait-multimethod matrix. All variables thought on a priori grounds to be operational definitions of the same trait or construct should load on the same factor. This, unfortunately, is not always the case since a large amount of the variance associated with a test is likely to be method variance. When some of the correlations are not in desirable relation to each other, i.e. the intercorrelations of some of the traits within a method are higher than the correlations between methods, factors are likely to reflect methods as much or more than constructs. Thus Campbell and O'Connell propose that factor analysis may be an inappropriate technique for construct validation.[71]

Cliff, however, has proposed what may be a solution to the problem.[72] If factor matrices can be rotated to correspond to the experimenter's expectations, which in this case would represent trait factors, then the effects of method differences might be minimized. Cliff

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[71]Donald T. Campbell and Edward J. O'Connell, "Methods Factors in Multitrait-Multimethod Matrices: Multiplicative rather than Additive?" Multivariate Behavioral Research, 2:409-436, 1967.

[72]Norman Cliff, "Analytic Rotation to a Functional Relationship," Psychometrika, 27:283-295, 1962.

supplies a solution which maximizes the possibility of obtaining such a solution under the restriction of orthogonality.[73]

The problem of the number of variables to include in a factor analysis in order to arrive at a factor representing a construct may be seen to be a special case of the above problem. Until Cliff's procedure was developed, the researcher had to either make his variables very similar or have a large number of variables with similar characteristics for each factor desired. Since rotational procedures used criteria associated with making variables load on single factors or else criteria minimizing a majority of loadings on a factor, a few variables were sure to be lost as factors upon rotation if they didn't intercorrelate highly to begin within the analysis. If one method was involved, a large general factor associated with method or response set was often an unwanted result. Given Cliff's procedure, it seems feasible to examine the expected relationships among a set of constructs by factor analyzing the constructs and determining if a desired, preselected degree of match between the rotated factors and the hypothesized factors exists. Cliff suggests a correlation of .75 is needed for correspondence.[74]

If a procedure of factor analysis such as that described by Jöreskog is used, then a test for the number of factors can be made to

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[73]Norman Cliff, "Orthogonal Rotation to Congruence," Psychometrika, 31:33-42, 1966.

[74]Ibid.

determine if the predicted number of factors is adequate to describe the relationships among the constructs.[75] The combination of Jöreskog's technique and Cliff's rotation should prove effective to the researcher interested in theory construction. The use of the procedure is, of course, subject to the restriction that the postulated relationship among constructs is linear and that the distribution is multivariate normally distributed.

As Kaiser and Caffrey note, the distinction between statistical inference and psychometric inference takes on added significance with decreases in sample sizes.[76] Thus if only a relatively small sample is available for analysis, the canonical factor analysis test of significance may be inappropriate.

The problem of determining types is similar to the problem of determining factors. In determining factors, variables or constructs are correlated while in determining types, persons' profiles on variables, are correlated.[77] If the research desired independent types, the procedure described above could be used. In correlational procedures, the assumption of independence of source of variations is

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[75] K. G. Jöreskog, "Testing a Simple Structure Hypothesis in Facor Analysis," Psychometrika, 31:165-178, 1966

[76] Henry F. Kaiser and John Caffrey, "Alpha Factor Analysis," Psychometrika, 31:1-14, 1965.

[77] Robert C. Tryon and Daniel E. Bailey, "The BC TRY Computer System of Cluster and Factor Analysis," Multivariate Behavioral Research, 1:95-111, 1966.

generally made, i.e. no individual will be included twice in the same analysis. To meet this assumption when individuals' profiles are to be correlated, the variables used should be independent. This is the case if the variables which make up the profiles are the results of a factor analysis such as described above.

In this study, however, the types are not postulated as independent of one another so that a solution which is representative of the desired profiles is more important than one yielding independent types. There are two possible ways to handle the problem. First, a standard factor analysis could be run and then the results subjected to an oblique rotational procedure. Current oblique solutions do not allow for attempting to match an hypothesized structure, however, The second solution is to use the EUCO component of BC TRY system of cluster analysis which allows for an oblique solution and the introduction of marker individuals which serve as a basis for matching similar profiles from the remaining profiles. [78] This yields a solution in which the individuals with similar profiles form a cluster or group separate from the other individuals. The procedure allows for setting the expected number of clusters as well and also determining the degree of fit of the solution to the desired solution.

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[78] Ibid.

IX. SUMMARY

In Chapter II, a review of the Conceptual Systems and methodological literature has been presented. Seven areas were covered. These were: the rationale for the approach, research concerning the student from the Conceptual Systems viewpoint, research concerning adults' genotypic and phenotypic characteristics, instruments used for measuring the environment provided by parents and teachers, research on the interaction of environments with development, teacher training research and models, and methodological issues.

The research appears to support the relationship between Conceptual Systems theory and development. Characteristics of adults were used to form a basis for developing teacher training programs in the literature, but little research was reported which effectively tested the differential treatment model. Methodological issues were specified in terms of construct validation. Alternative statistical solutions, dependent upon characteristics of the sample were proposed.

CHAPTER III

METHOD OF THE STUDY

Chapter III presents the method and operational definitions used to define constructs, examine the relationship among constructs, and develop the empirical validation of the typology. Descriptions of the instruments and administration procedures are also discussed.

I. SOURCE OF DATA

The sample consisted of sixty-eight junior and senior education majors taking the course Learning and the Learner during the Spring 1969 semester at the University of the Pacific. Due to the request for volunteers for participation from the two classes enrolled in the course, it was not possible to obtain data on all members of the class. Eighty of the students in the classes did volunteer, but conflicts with other activities prevented twelve from completing the test battery in additional sessions. Subjects with incomplete test batteries were eliminated. Thus the sample used in this study could not be said to be random.

II. THE INSTRUMENTS

Guilford Uses for Things

The Guilford Uses for Things is a measure of creativity used in

a study described by France.[1] Several objects such as a paper clip and a brick are presented and the subject is given fifteen minutes to think up as many uses as he can for the objects.[2]

Paragraph Completion

The paragraph completion measure is a projective test in which the subject is asked to complete a sentence and write a short paragraph about the topic.[3] One hundred seconds are allowed for the completion of each one. The beginnings or stems are: "Rules...," "When I am criticized...," "When I am in doubt...," "The best way to learn is...," "When someone gives me instructions...," "Confusion...," "When others criticize me it usually means...," and "The most important thing in teaching is..." The fourth and the last stem are scored as a measure of domain specific abstractness while the others are used as measures of general abstractness.

Classroom Rating Task

The Classroom Rating Task served as the basis for the measure-

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[1]Stanley France, "Selection of Candidates: Urban Teacher Preparation Program,")Syracuse University, Urban Teacher Preparation Program, 1965), (unpublished manuscript).

[2]The entire set of instruments is included as Appendix A.

[3]Harold M. Schroder, Michael J. Driver, and Siegried Streufert, Human Information Processing (New York: Holt, Rinehart and Winston, 1967).

ment of discrimination, differentiation, and integration.[4] In this task, subjects were shown a video tape approximately fifteen minutes in length. This tape shows a teacher interacting with eight first grade students. Subjects were told in advance that they would be asked to compare the behavior of the students, the students themselves, and the behavior of the teacher towards each student. After the tape had been shown, subjects were asked to rate the students' behavior on the dimensions of: hostility-friendliness, attentiveness-inattentiveness, convergent responses-divergent responses, appropriate-inappropriate responses, and simple-complex responses.

The same procedure was followed to compare the students. In this case the dimensions were: interpersonal sensitivity-interpersonal insensitivity, independent-dependent, flexible-rigid, curious-withdrawn, memory oriented-concept oriented, and adjusted-maladjusted.

The rating of the behavior of the teacher toward each student was handled the same way as for student's behavior and student comparisons. This time the dimensions were: distant-involved, accepting-critical, controlling-nondirective, unstructured-informative, warm-hostile, and drill oriented-concept oriented.

After the subject had finished the above part of the task, he was asked to rate how he would behave toward each of the students. The same dimensions were used as in rating the behavior of the teacher towards the students.

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[4]See Appendix A for a copy of the instrument.

Educational Views Questionnaire

This instrument was a paragraph completion measure in which subjects were asked to state their views about discipline, revising standards, differing opinions of students with the teacher, criticism of the teacher by the student, criteria for determining if one was a good teacher, the important things for a child to learn while growing up, and the student who is not performing as well as he could in school. This instrument was a modified version of the questionnaire used by Cross to assess autonomy and intrinsic acceptance and was scored according to the manual Cross developed.[5]

Teacher Attitude Research Inventory

This inventory is a modification of the version of the Parental Attitude Research Inventory used in the Cross study described above.[6] It consisted of forty-five items with which the subject is asked to agree or disagree on a four point scale. Nine a priori scales are obtained and were combined to give indices of autonomy, warmth, and equalitarianism.

Personal Reaction Survey

The Personal Reaction Survey was designed by the writer to

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[5]Herbert J. Cross, "A Manual for Scoring Responses to Interview on Child Rearing," (University of Connecticut, 1964), (unpublished manuscript).

[6]Herbert J. Cross, "The Relation of Parental Training Conditions to Conceptual Level in Adolescent Boys," (Syracuse University, Syracuse, New York, 1965), (unpublished Doctoral dissertation).

measure flexibility of teachers within the Conceptual Systems framework.[7] Items were also included which were expected to measure anxiety as viewed from the theoretical network. Preliminary work correlating factors with ratings of potential flexibility in radiating a variety of educational environments had yielded significant correlations for two different groups.

III. ADMINISTRATION OF THE INSTRUMENTS

The instruments were given in the order in which they were discussed above during regular class time over a consecutive three day period. On the first day, the Guilford Uses for Things and the Sentence Completion measure were given. The second day was devoted to the Classroom Rating Task. On the third day, the Educational Views Questionnaire, The Teacher Attitude Research Inventory, and the Personal Reaction Survey were given.

In order to guarantee anonymity of response and still return the test booklets after the first day of testing only a number was used to identify each subject. This number was one which was regularly used by the class professor to return papers and was, therefore, not known by the writer.

Subjects were assured that their instructor would not see any of their responses nor would the results influence their grades in the

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[7]Stanley France, "Preliminary Analysis and Validation of the Personal Reaction Survey," (Stockton Unified School District, Stockton, California, 1970), (unpublished manuscript).

course. Considerable time was spent by the course instructor and by the writer in explaining the purpose and importance of the study as well as providing a general orientation to what the test battery was like.

Subjects were told that the general aim of the study was to find differences and similarities among potential teachers which could aid in developing new training programs more in line with the needs of new teachers. They were assured that none of the information would be shown to any person working with them or who might work with them in the future.

IV. OPERATIONAL DEFINITIONS

Descriptive Variables

In addition to the more theoretical variables used in the study, certain descriptive variables were collected to provide some indication of the population to which the results of this study might be generalized and to provide an indication of any biases associated with a particular type. To this end, data were collected relevant to: the year in school of the subject, teaching orientation, sex, intention to teach, whether or not they were in the Teacher Corps program and socio-economic class.[8] More explicit procedures for obtaining the operational definitions described in this chapter may be found in Appendix B.

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[8]The Teacher Corps program in which some of the subjects were participating is a teacher training program for minority and economically deprived undergraduates which leads to a B.A. in Education. While taking course work, participants also teach part of the day.

Genotypic Constructs

General abstractness. General abstractness was operationally defined by scoring the Sentence Completion measure according to the manual described in Schroder, Driver, and Streufert.[9]

Educational domain abstractness. Educational domain abstractness was operationally defined by scoring of the Sentence Completion measure teaching sentences according to a manual developed by Hunt.[10]

Behavioral discrimination. Behavioral discrimination was defined as the number of points used to rate the students on the dimensions pertaining to behavior from the Classroom Rating Task. Since there were five dimensions, there were five operational definitions.

Person discrimination. Person discrimination, in this case referring to the students in the Classroom Rating Task, was computed in the same way as behavioral discrimination except that the dimensions pertaining to comparing students from the task were used. Since there were six dimensions, there were six operational definitions.

Environmental discrimination. Environmental discrimination was also measured from the Classroom Rating Task. Scoring was the same as the other two measures of discrimination except that the ratings of the teacher on the six dimensions pertaining to the environment were used.

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[9]Schroder, et al, op. cit.

[10]David E. Hunt, "Draft of Scoring Manual - Teaching Sentences," (Syracuse University, Department of Psychology, undated), (unpublished manuscript).

Behavioral differentiation. Behavioral differentiation was operationally defined in two ways. The number of rating orders which were different on the dimensions used to rate students' behavior in the Classroom Rating Task were used. Second, the correlation matrices obtained by correlating the dimensions over stimulus objects for each subject were analyzed by principal components factor analysis and the resulting number of factors having eigenvalues greater than 1.0 served as an index of differentiation.

Person differentiation. Person differentiation had two operational definitions as did behavioral differentiation except that the dimensions pertaining to the comparison of students from the Classroom Rating Task were used.

Environmental differentiation. Environmental differentiation was computed as were the other operational definitions of differentiation except that the dimensions pertaining to comparing teacher behavior were used.

Behavioral integration. An operational definition of behavior integration was computed by using the relative proportion of the variance accounted for by the factors emerging from the second behavoral differentiation operational definition analysis. If the proportions were about equal, then the subject's structure was taken to be more highly integrated with regard to behavior than if there were large differences in the relative proportions of the variance accounted for.

Person integration. Person integration was computed in the same way as behavioral integration except that the results of the analysis

done to obtain the second operational definition of person differentiation were used.

Environmental integration. Environmental integration was computed in the same way as behavioral and person integration except that the analysis used for the second operational definition of environmental differentiation was the basis for the computations.

In order to obtain one score to represent each of the constructs, those constructs having more than one operational definition were factor analyzed according to the principal components method as described by Cooley and Lohnes then rotated by Cliff's technique to determine if the independent constructs existed.[11] This was the test of the step one hypothesis that all operational definitions of a construct should load on the same factor. The criterion chosen for determining if an adequate match was obtained was a Pearson product moment correlation of .75 or greater. This was the level suggested by Cliff.[12] Factor scores were computed by a formula (2) discussed by Horn.[13] These factor scores then served as the single operational definitions of the constructs with which they matched in the step two analysis of the relationship of variables.

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[11]W. W. Cooley and Paul R. Lohnes, Multivariate Procedures for the Behavioral Sciences (New York: John Wiley & Sons, 1962), p. 176; Norman Cliff, "Orthogonal Rotation to Congruence," Psychometrika, 31:33-42, 1966.

[12]Norman Cliff, "Orthogonal Rotation to Congruence," Psychometrika, 31:33-42, 1966.

[13]John L. Horn, "An Empirical Comparison of Methods for Estimating Factor Scores," Educational and Psychological Measurement, 25:313-322, 1965.

Phenotypic Constructs

Creativity. The Guilford Uses for Things served as a basis for operationally defining creativity.[14] A creativity index which consisted of the total number of responses plus an additional point for each answer not among the five most common responses given by the sample was computed.

Interpersonal anxiety. The operational definition of anxiety was taken from the scale by the same name from the Personal Reaction Survey. It should be noted that this score is reversed so that a low score on the construct indicates more interpersonal anxiety.

Flexibility. Flexibility was taken from the scale by the same name from the Personal Reaction Survey.

Interdependent predisposition. Interdependent predisposition had five operational definitions. They were the autonomy scale from the Teacher Attitude Research Inventory, the rating of autonomy from the Educational Views Questionnaire, the mean self rating on the controlling-nondirective dimension of the Classroom Rating Task, the mean self rating on the unstructured-informative dimension and the mean self rating on the drill-concept dimension.

Warmth. Warmth had three operational definitions. These were: the warmth scale from the Teacher Attitude Response Inventory, the mean self rating on the involved-distant dimension, and the mean self rating on the hostility-warmth dimension from the Classroom Rating Task.

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[14] France, op. cit.

Intrinsic acceptance. Intrinsic acceptance had three operational definitions. These were the equalitarian score from the Teacher Attitude Research Inventory, the mean self rating on the accepting-critical dimension, and the intrinsic acceptance rating from the Educational Views Questionnaire.

A single operational definition for the phenotypic constructs having more than one operational definition, interdependent predisposition, warmth, and intrinsic acceptance was obtained. These were obtained in the same manner as was a single measure for the genotypic constructs having more than one operational definition. The same criterion for an adequate match was also used. Factor scores were computed to serve as a basis for the step two analysis to determine the relationship among constructs.

V. METHOD OF ANALYSIS

Relationship of Constructs

The second step dealt with determining if the hypothesized relationships among the genotypic and phenotypic constructs could be demonstrated. There were three factors hypothesized to emerge. These were "abstractness," "sensitivity," and "flexibility." The operational definitions of: general abstractness, integration of behavior, integration of persons, discrimination of environments, differentiation of environments, integration of environments, and interpersonal predisposition were hypothesized to load on abstractness. The operational definitions of: educational domain abstractness, discrimination of

behavior, differentiation of behavior, discrimination of persons, differentiation of persons, warmth, and intrinsic acceptance were hypothesized to load on sensitivity. The operational definitions of: flexibility, creativity, and interpersonal anxiety were expected to load on flexibility.

The procedure used was the same used to arrive at the operational definitions of the constructs. The .75 correlation was again used to determine an adequate match. If the results of this analysis did not conform to theoretical expectations as described in the hypotheses, the resulting factors were to be reinterpreted. Factor scores were computed as previously described. These factor scores were standardized into T score form and used as input to the BC TRY system.

Identification of Types

The validation of the types was step three of the analysis. This validation was to be done using the individuals selected as representing the ideal type definers in an "O" analysis on the BC TRY system at the University of California at Berkeley.[15] If the results of step two were not in accord with theoretical expectations, the OTYPE component of the BC TRY system was to be substituted for the planned procedure. Under the possibility of having to use the OTYPE component, the degree of match between the theoretical types and the empirical types rests largely on interpretation of the findings. General guidelines used

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[15]Robert C. Tryon and Daniel E. Bailey, "The BC TRY Computer System of Cluster and Factor Analysis," Multivariate Behavioral Research 1:95-111, 1966.

suggested that the empirical profiles generally appear about the same as the theoretical profiles, but that the actual T score means for a given type be given considerable latitude of up to one standard deviation. It should be noted that these are the writer's guidelines since none were found in the literature.

VI. SUMMARY

Chapter III of the report has described the method of the study. Subjects for the study were students enrolled in an educational psychology course at the University of the Pacific. This group had to be considered nonrandom since members of the class participated on a voluntary basis.

A variety of instruments were used including: paragraph completion measures, rating scales, and multiple choice questionnaires. This variety was used to allow for multimethod definition of variables based on operational definitions of genotypic and phenotypic constructs selected as relevant to Conceptual Systems theory and teacher training programs.

Factor analytic techniques used in the method of analysis to obtain stable definitions of constructs were described as was the statistical procedure for arriving at an empirical typology of teacher trainees. This was a form of cluster analysis.

CHAPTER IV

RESULTS AND DISCUSSION OF THE STUDY

Chapter IV presents the results of the study. Four sections are employed. The first section deals with the results of procedures used to obtain operational definitions for phenotypic and genotypic constructs. The second section deals with the results of procedures used to relate the genotypic and phenotypic constructs. The third section presents the results of the attempt to find the expected typology. The fourth presents static characteristics of the types.

I. STEP ONE RESULTS AND DISCUSSION

This section presents the results of the attempt to obtain the hypothesized phenotypic and genotypic constructs. The empirical solutions are considered in terms of the similarity to the expected solutions.

In attempting to utilize the canonical factor analysis program of Jöreskog, difficulties arose in that, apparently due to an error in the program, a complete solution could not be obtained.[1] An exception was the total phenotypic group. Therefore, and in light of the effects of small sample sizes on significance tests as were used in Jöreskog's program, principal components factor analysis was substituted. The

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[1]K. G. Jöreskog, "Testing a Simple Structure Hypothesis in Factor Analysis," Psychometrika, 31:165-178, 1966.

program described in Cooley and Lohnes which had been thoroughly debuged on other data sets was used.[2] In order to obtain some indication of the number of factors which were likely to be meaningful with this method of analysis, Kaiser's criterion of the number of eigenvalues greater than one was chosen.[3] All factors having eigenvalues greater than one were retained for input to Cliff's rotational program to be matched with the theoretically expected solution.[4] Where fewer than the expected number of factors met the criterion, additional factors were retained to equal the number expected.

Phenotypic Solutions

There were a total of five separate factor analyses run on the operational definitions expected to define the phenotypic constructs. These were: the canonical solution on the total sample, the principal components solution on the total sample, the principal components solution on the lower class subsample, the principal components solution on the middle class subsample, and the principal components solution on the upper class subsample.

Results. In order to obtain the canonical solution, the range in the number of factors desired had to be limited to the expected number

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[2]W. W. Cooley and Paul R. Lohnes, Multivariate Procedures for the Behavioral Sciences (New York: John Wiley & Sons, 1962), pp. 176-178.

[3]Ibid., p. 160.

[4]Norman Cliff, "Orthogonal Rotation to Congruence," Psychometrika, 31:33-42, 1966.

of factors. The results indicated that the likelihood that three factors were descriptive of the correlation matrix was only 22/100, far short of the 85/100 arbitrarily chosen as defining a satisfactory fit to the data.

The total sample principal components analysis and the lower class and upper class subsample solutions all had four eigenvalues greater than one. The middle class subsample principal components solution had three eigenvalues greater than one.

The four factor solutions accounted for: 69 per cent of the trace of the total sample matrix, 74 per cent of the trace of the lower class subsample correlation matrix, and 76 per cent of the trace of the upper class subsample correlation matrix. The three factors of the middle class solution accounted for 68 per cent of the trace of the matrix.

In Table I the intercorrelations of the solutions after rotation to match the ideal solutions are presented. None of the matches intercorrelated to the criterion level of .75 which would indicate an acceptable match. In Table II the principal components total sample solution after rotation to ideal loadings is presented.

Discussion. The number of factors determined appeared to be relatively consistent considering the small size of the sample as all solutions accounted for large proportions of the trace of the matrix. There was, however, much less consistency in the solutions when rotated by Cliff's procedure to match the theoretically expected solution.[5]

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[5] Ibid.

TABLE I

INTERCORRELATIONS OF ROTATED FACTOR SOLUTIONS
WITH IDEAL SOLUTION - PHENOTYPIC FACTORS

Factor	Canonical Total Group	Prin. Comp. Tot. Group	Prin. Comp. Lower Class	Prin. Comp. Mid. Class	Prin. Comp. Upper Class
Interdependent Predisposition	612[a]	691	483	234	248
Warmth	520	551	624	487	495
Intrinsic Acceptance	345	514	277	356	721

[a] Leading zeros and decimal points have been omitted.

TABLE II

FACTOR LOADINGS OF PHENOTYPIC OPERATIONAL DEFINITIONS
AFTER ROTATION TO IDEAL LOADINGS
PRINCIPAL COMPONENTS SOLUTION - TOTAL GROUP

Source	Operational Definition	Interdependent Predisposition	Warmth	Intrinsic Acceptance	h^2
TARI	Autonomy	466[a]	-222	615	645
EVQ	Autonomy	476	071	581	569
CRT	Cont-Nondirective	792	-187	-260	730
CRT	Inform-Unstructured	467	-454	-446	623
CRT	Drill Concept	120	777	-162	644
TARI	Warmth	173	254	-149	117
CRT	Distant-Involved	-005	734	136	557
CRT	Hostility-Warmth	-183	702	374	666
TARI	Equalitarianism	452	-241	525	538
CRT	Critical-Accepting	-165	512	475	515
EVQ	Intrinsic Acceptance	039	090	554	316
Proportion of Variance		159	238	205	602

[a]Leading zeros and decimal points have been omitted.

The total group solution by the principal components method appeared to give the best overall fit with the three theoretical factors. From the standpoint of reliability due to sample size, this solution was also the best choice for use in Step Two of the study.

The results shown in Table II indicate that not all problems of method variance were eliminated by the procedure. Part of this problem may be a function of the effects of the ideal solution upon the transformation in as much as the ideal solution was not composed of orthogonal factors. Use of communalities as ideal loadings instead of unity might have alleviated the problem somewhat and improved the intercorrelations to the point where they might have reached the criterion of .75.

The Teacher Attitude Research Inventory (TARI) variables for autonomy and equalitarianism tended to load on the same factor. There was some tendency for the Educational Views Questionnaire (EVQ) variables to also load on the same factor. The Classroom Rating Task (CRT) measures showed less indication of being subject to method variance than the TARI measures.

One reason also for the low intercorrelations between theoretical and empirical solutions for interdependent predisposition and for warmth appeared to be the consistent loading of CRT drill-concept on warmth rather than on the expected factor, interdependent predisposition. This would suggest that teaching by drill was perceived as being associated with being hostile to students.

The reader wishing to generalize from the findings relating to the phenotypic constructs is cautioned that the external validity of the results is limited due to the small sample sizes effect on reliability. This is especially true with regard to the analyses performed on social class subsamples.

In examining the results of the principal components solution for the total group, it would appear that, although the desired level of significance was not achieved, the obtained solution is highly interpretable in terms of theoretical expectations. Most variables, with the exception of CRT drill-concept did have high loadings on the expected factors. Therefore, the factors were not renamed for the purpose of the remainder of the analysis, and factor scores for all subjects were computed using the loadings of the principal components solution for the total group.

Genotypic Solutions

There was a total of four separate factor analyses run on the genotypic operational definitions. All of these were principal components solutions. In addition to the total sample analysis, the lower, middle, and upper class subsamples were analyzed.

Results. The total sample had four factors with eigenvalues greater than one. These four eigenvalues accounted for 63 per cent of the trace of the correlation matrix. An additional 11 per cent of the trace was accounted for by the next two eigenvalues. The lower class solution had six eigenvalues meeting the criterion. These accounted for

77 per cent of the trace of the correlation matrix. The middle class solution had five eigenvalues meeting the criterion. These accounted for 79 per cent of the trace of the correlation matrix. An additional eigenvalue added 3 per cent to that total. The upper class solution had seven eigenvalues greater than one. These accounted for 87 per cent of the trace of the correlation matrix. The first six accounted for 82 per cent of the trace of the correlation matrix.

The intercorrelations of the empirical and theoretical solutions are shown in Table III. The criterion intercorrelation of .75 was not reached for any of the matches. Table IV presents the total sample solution after rotation to the ideal loadings.

Discussion. The variations in the number of eigenvalues greater than one reflected upon the lack of stability with small samples. That six factors for any solution accounted for similar amounts of trace suggests that for practical purposes of further analysis, the use of six factors from the total solution was not totally improper.

Variations in the intercorrelations for empirical and theoretical solutions were not as large as were variations for the phenotypic solutions. Deviations appeared to be due to the tendency for the three differentiation measures obtained by counting the number of different dimensions used to be more highly related to the measures of discrimination for the respective source. For example Behavioral Scales Number of Dimensions (B/Scales) loading on the behavioral discrimination factor was .708 while its loading on the behavioral differentiation factor was only .304. In retrospect, this relationship was not totally unanticipated,

TABLE III

INTERCORRELATIONS OF ROTATED FACTOR SOLUTIONS WITH IDEAL SOLUTION - GENOTYPIC FACTORS

Factor	Prin. Comp. Total Group	Prin. Comp. Lower Class	Prin. Comp. Middle Class	Prin. Comp. Upper Class
Behavioral Discrimination	607[a]	613	507	648
Person Discrimination	393	460	613	617
Environmental Discrimination	542	695	453	409
Behavioral Differentiation	635	450	597	543
Person Differentiation	708	582	451	620
Environmental Differentiation	722	473	473	556

[a] Leading zeros and decimal points have been omitted.

TABLE IV

FACTOR LOADINGS OF GENOTYPIC OPERATIONAL DEFINITIONS AFTER ROTATION TO IDEAL LOADINGS PRINCIPAL COMPONENTS SOLUTION - TOTAL SAMPLE

Source	Operational Definition	B Disc.	P Disc.	E Disc.	B Diff.	P Diff.	E Diff.	h^2
B/Students	Hostile-Friend	435[a]	492	189	379	-033	039	613
B/Students	Attent-Inattent	532	538	-041	167	037	-044	605
B/Students	Convergent-Diver.	420	386	441	126	235	012	591
B/Students	Approp-Inapprop	667	205	488	067	-002	071	734
B/Students	Simple-Complex	796	-050	319	092	202	139	806
Students	Intep Sensitivity	083	603	385	141	038	067	544
Students	Indep-Dependent	100	523	309	172	221	037	459
Students	Flexible-Rigid	369	497	389	072	119	217	601
Students	Curious-Withdrawn	183	750	229	-010	213	127	710
Students	Memory-Concept	273	325	527	239	397	-200	713
Students	Maladjusted-Adju	560	361	450	033	-156	079	678
Teacher	Distant-Involved	425	602	302	-205	153	170	728
Teacher	Critical-Accepting	329	442	581	032	-100	281	731
Teacher	Control-Nondirect	252	434	369	-039	127	277	482
Teacher	Inform-Unstruct	185	481	657	-104	113	-016	721
Teacher	Hostile-Warm	119	231	788	143	-108	158	746
Teacher	Drill-Concept	092	118	754	401	256	-106	828
B/Scales	No. diff. dim.	708	276	260	304	252	297	889
B/Scales	No. Eigen. gt. 1	136	406	-041	766	-085	090	787
P/Scales	No. diff. dim.	347	515	350	114	468	266	811
P/Scales	No. Eigen. gt. 1	100	337	085	055	799	126	788
E/Scales	No. diff. dim.	258	378	651	162	287	366	876
E/Scales	No. Eigen. gt. 1	-043	-053	098	189	086	911	887
Proportion of Variance		158	194	198	060	070	069	749

[a]Leading zeros and decimal points have been omitted.

but the degree was considerably higher than might be expected. All the measures of differentiation involving the use of the number of eigenvalues greater than one were highly definitive of the differentiation factors. These measures also tended to be more highly independent of each other than were the operational definitions of differentiation derived by counting the number of different dimensions used.

The lack of independence among the discrimination measures for different sources was also in evidence, although no consistent pattern was evident for the analyses done by social class subsamples. The tendency for most variables to load on the theoretically expected factor led to the decision to cautiously apply the same names to the factors and proceed with step two of the procedures. The results of the total group solution were used in the computation of factor scores by Horn's method one, since this group had the largest sample size and the overall relationship between empirical and theoretical loadings was the highest.[6]

II. STEP TWO RESULTS AND DISCUSSION

This section presents the result of the attempt to determine the interrelationships of the genotypic and phenotypic constructs. Factor scores resulting from step one of the analysis and for those constructs having only one operational definition were analyzed by the principal components method of factor analysis. Only the total sample was so analyzed.

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[6]Horn, op. cit.

Results. While three factors were hypothesized, seven eigenvalues accounted for 70 per cent of the trace of the correlation matrix. The first three eigenvalues accounted for 39 per cent of the trace.

The seven empirical factors were matched by Cliff's rotational procedure to the theoretically expected factors.[7] Intercorrelations of the theoretical and resulting empirical factor loadings are shown in Table V. None of the three matches reached the criterion intercorrelation of .75. Table VI presents the total sample solution after rotation to ideal loadings.

Discussion. Constructs proved to be far more independent than was anticipated. This was the result of using techniques to arrive at independent operational definitions of constructs which were to be correlated in Step Two.

There appeared to be a definite divergence of the second factor from the theoretically expected. As shown in Table VI, this appeared to be due to the partial shift of a major defining construct, integration of persons, from abstractness to sensitivity, and the loading of both discrimination and differentiation of behavior more heavily on abstractness than on sensitivity. Both educational domain abstractness and warmth loaded more heavily on the flexibility factor than on sensitivity.

The flexibility factor received high loadings from all three

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[7]Cliff, op. cit.

TABLE V

INTERCORRELATIONS OF ROTATED STAGE II CONSTRUCTS WITH IDEAL SOLUTION

Construct	Correlation
Abstractness	716[a]
Sensitivity	290
Flexibility	611

[a] Leading zeros and decimal points have been omitted.

TABLE VI

FACTOR LOADINGS OF STEP II CONSTRUCTS AFTER ROTATION TO IDEAL LOADINGS - TOTAL SAMPLE

Construct	Loading			
	Abstractness	Sensitivity	Flexibility	h^2
General Abstractness	223[a]	243	351	232
Integration of Behavior	424	238	-018	237
Integration of Persons	473	664	-275	740
Discrimination of Environ	327	-363	-192	276
Differentiation of Environ	698	-276	-045	565
Integration of Environments	685	-381	-120	629
Interdependent Predisposit	331	245	596	525
Educational Domain Abstract	-144	025	351	144
Discrimination of Behavior	169	046	000	031
Differentiation of Behavior	252	068	-026	069
Discrimination of Persons	330	359	196	276
Differentiation of Persons	187	651	-512	721
Warmth	-358	281	378	350
Intrinsic Acceptance	-064	250	-075	072
Flexibility	030	-098	573	339
Creativity	159	280	435	293
Interpersonal Anxiety	108	131	735	569
Proportion of Variance	131	114	143	388

[a]Leading zeros and decimal points have been omitted.

of the anticipated constructs, flexibility, creativity, and interpersonal anxiety. In addition, both measures of abstractness had identical loadings on the factor. Interdependent predisposition and warmth also contributed to the definition of the factor.

In view of the relative changes in loadings between the theoretical and empirical solutions, and the disconfirmation of the Step Two hypotheses, a reinterpretation of the findings was made. The first factor, abstractness, was primarily defined by constructs related to the ability to conceptualize the behavior of students and the behavior of a teacher toward students. Thus a person obtaining a high factor score on this factor should be able to describe and examine the workings of the classroom. Somewhat secondarily, he should be able to conceptualize the student in order to arrive at hypotheses as to the causes of the student's behavior. There appeared to be some tendency to prefer an interdependent environment without warmth.

The second factor, sensitivity, reflected almost totally a concern with the student. The person obtaining a high factor score on this factor has many ways of viewing students and a well organized framework organizing these viewpoints. He would be likely to be accepting of students for what they were, and to have few skills for examining teacher behavior.

Factor three, flexibility, reflected most clearly the attitudinal predispositions as opposed to the skills involved in teaching. A person obtaining a high factor score on this factor, could be described as likely to be calm, flexible, creative, predisposed to use interdependent

environments, rather warm, and somewhat abstract.

Factor scores were computed for all three factors and used in the development of the typology in Step Three of the analysis. These factor scores had zero intercorrelations as required for input to Step Three.

III. STEP THREE RESULTS AND DISCUSSION

This section presents the results of the attempt to determine the types of teacher trainees present in the sample as described by the factor scores obtained from Step Two of this analysis. Since the results of Step Two were not totally in line with theoretical expectations, it was not possible to attempt the placing of marker individuals in the analysis. Instead, the data were run through a component of the BC TRY system known as OTYPE.[8] OTYPE arrives at essentially the same solution as the procedure as "O" analysis does without marker individuals.

Basically, OTYPE divides the score matrix into partitions based on the standard deviation as the unit of partition. Any empty partitions are eliminated and a clustering of the remaining partitions is begun on the basis of the similarities of their mean score profiles. Condensation proceeds hierarchially; that is, partitions are collapsed until only the total group is represented. The researcher is left to determine at what point the solution is most meaningful.

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[8]Robert C. Tryon and Daniel E. Bailey, Cluster Analysis (Boulder: Tryon-Bailey Associates, Inc., undated), Chapter 8.

Four criteria were used for arriving at the resulting types. First, all subjects had to belong to one of the chosen types. Second, the types should be as equal as possible in the number of members. Third, there should be about the same number of types as originally hypothesized. Fourth, there should be as much similarity as possible to the hypothesized types.

Ten clusters were identified by the procedure before condensation was begun. Of these ten, two seemed sufficiently independent of the remaining clusters and meaningful in terms of the comparison of mean profiles with the expected types to warrent identification as types. Two second order clusters and one third order cluster also appeared to be meaningful and were retained as types making a total of five identified types which included all of the subjects. A description of these types and a comparison with the theoretical types follows. Figure 3 presents the profiles of types which were similar to those hypothesized. The mean scores on defining factors for the remaining types may be found in Appendix F.

Empirical Type I-II

Otype ten was the last of the ten clusters to be condensed despite the fact that it was comprised of only three subjects. It appeared to be the nearest cluster to approach the theoretical types I and II, and was thus named Type I-II. The fact that this empirical type was composed of so few subjects and yet was so distinct from the remaining types was suggestive of findings by Hunt and Joyce that few

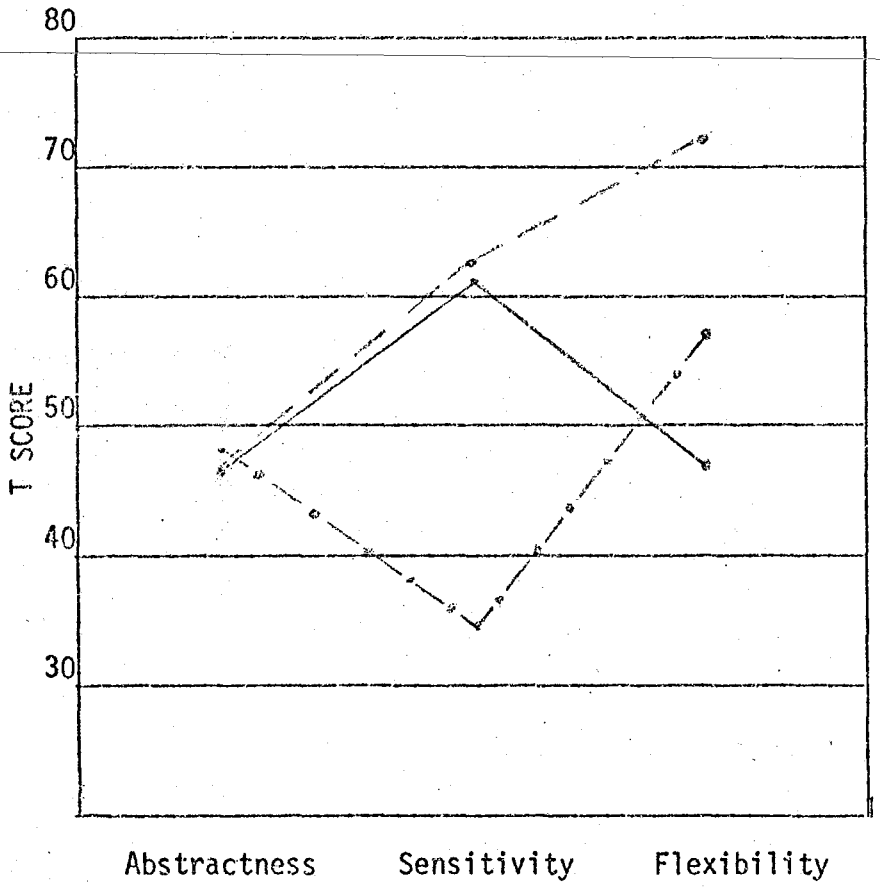

FIGURE 3

PROFILES OF EMPIRICAL TYPES SIMILAR
TO THEORETICAL TYPES

TYPE I-II — — — — TYPE III -·-·-·- TYPE IV ————

abstract teacher trainees are to be found in the general population.[9]

Description. An examination of the mean profile for Type I-II, shown in Figure 3, suggests that while this type was scarce it would be desirable to locate persons of this type to take into teacher training programs because of their potential trainability in radiating interdependent environments for abstract students. The extremely high score on flexibility suggested that they would be capable of radiating a variety of environments, but would tend to be predisposed toward an interdependent style. A person of this type would likely be interpersonally oriented and have good skills in this area as judged from the mean score on sensitivity. The relatively low score on abstractness would suggest that a training program for this type would concentrate on exposure to different types of students and different teacher behaviors in order to increase discrimination in these areas. Some time would probably have to be spent to convince trainees of this type that an interdependent environment was not the appropriate teaching milieu for concrete students.

Comparison with Theoretical Types. With the exception of the lower than expected score associated with conceptualization of behavior and classroom environments, the match with theoretical types I and II is probably close enough to make little difference in training. The profile suggested that this type was more interpersonally oriented than educationally oriented which, considering the orientation of the theory itself, is probably the desired perspective.

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[9]David E. Hunt and Bruce R. Joyce, "Teacher Trainee Personality and Initial Teaching Style," American Educational Research Journal, 4:253-259, 1967.

Empirical Type III

The mean profile of Otype thirteen called empirical Type III, a second order cluster, is shown in Figure 3. Ten subjects were included in this cluster which most closely represented the theoretical Type III and was thus named accordingly.

Description. Attitudinally, the teacher trainee of Type III is probably prepared for radiating a somewhat interdependent environment, but the skills for creating such an environment appear to be missing. Therefore, a training program for the Type III trainee should concentrate critically on helping a trainee develop perspectives for understanding students. The fairly high score on flexibility suggested that it should be possible to view the trainee as trainable.

Comparison with Theoretical Type. The major difference between the empirical Type III and the theoretical Type III was in the lower score on sensitivity and the higher score on flexibility for the empirical type. Since the composition of the factors was somewhat different from what was anticipated, the shift could in fact reflect a change which might have been anticipated. This would be true if the difference in the profiles was due to the warmth and educational domain abstractness variables. The low score on sensitivity is still of concern, however, since the Type III teacher would be expected to be providing an environment which would allow for progression from Stage I to Stage II. Sensitivity to individual differences in causes for behavior are of major concern for inducing developmental progression.

Empirical Type IV

Otype nine, empirical Type IV, which like Otype ten, was an original cluster not merged into the hierarchial clustering until near the end of the condensation. This Otype appeared to parallel the theoretical Type IV and was named accordingly. The mean profile for empirical Type IV is shown in Figure 3. Twelve subjects were members of this cluster.

Description. Empirical Type IV was denoted especially by its high score on the factor sensitivity. This score was almost identical to the mean score for the empirical Type I-II which suggested that the empirical Type IV was able to conceptualize the differences among children. The only difference between the empirical Type I and the empirical Type IV was in the flexibility factor score. This clearly suggested that training the empirical Type IV trainee is likely to be more difficult and will probably have to be restricted in terms of both the range of students to be worked with and the environments to attempt to radiate.

Comparison with Theoretical Type. The theoretical Type IV was intended to be trained to work with Sub-I students to bring about progression to Stage I and was anticipated to be warm and sensitive to behavioral differences more than person and environmental differences. The empirical Type IV appeared to be more capable of dealing with person differences than behavioral differences, although may be more capable than the theoretical Type IV in that regard. In terms of possible training environments, it might be necessary to get the trainee to concentrate more heavily on the behavior of the student than on his motivations. It

might also prove true that the empirical Type IV trainee could more easily be trained to work with Stage I students in order to induce progression to Stage II since the skill component of sensitivity appeared to be present here whereas it needed to be developed for the empirical Type III.

Residual Empirical Types

The two remaining empirical types did not fit the pattern of theoretical types anticipated. Since these types are purely empirical, the statistical label rather than a theoretical type designation was used. The profiles of these two types are shown in Figure 4. Otype sixteen contains nine subjects while Otype seventeen contains thirty-four subjects, exactly half the sample. As can be seen in Figure 4, the difference between the two types appeared to be almost entirely in their ability to conceptualize the classroom with regard to teacher and student behavior. The differences among the three empirical types similar to the theoretical types were due to differences on the factors of sensitivity and flexibility rather than abstractness. The score on flexibility for both residual types is similar to the score for empirical Type IV. This suggested that neither residual type would be easily trained. Otype seventeen with a fairly high score on abstractness appeared to be the best choice, while it might be necessary to discourage trainees of Otype sixteen from continuing in education. This remains an empirical question.

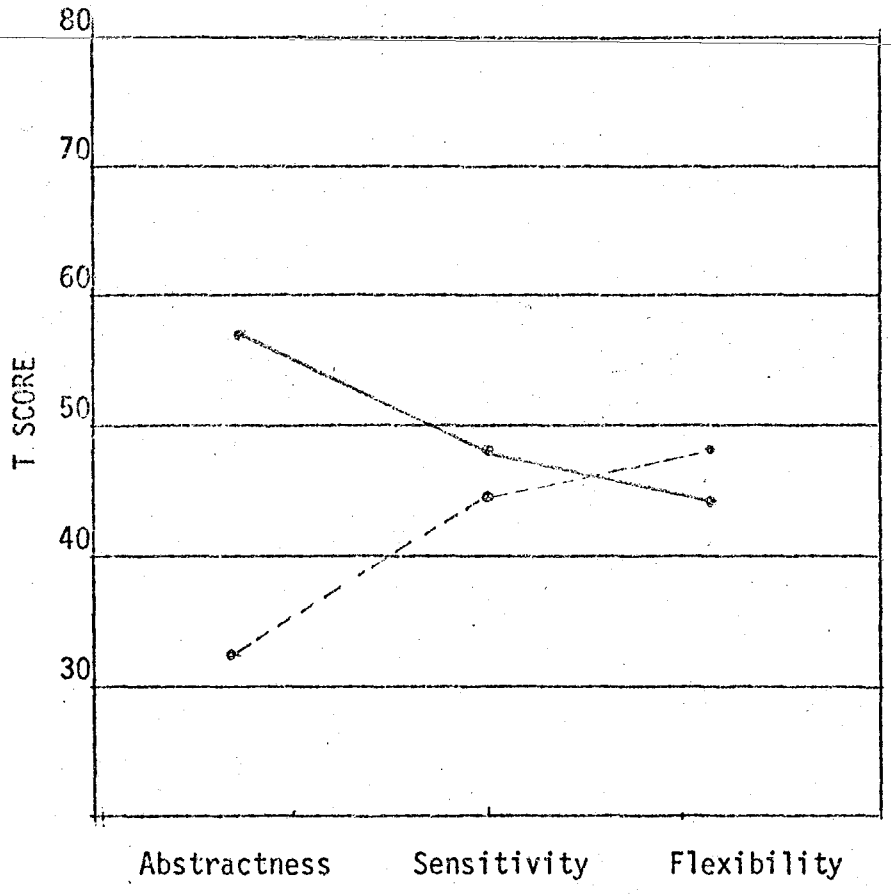

FIGURE 4

PROFILES OF RESIDUAL TYPES

Otype 16 – – – – – – – – – – Otype 17 ——————

IV. STATIC CHARACTERISTICS OF EMPIRICAL TYPES

At the time the data were collected, information pertaining to the socio-economic class, the year in school, sex, intentions towards teaching, teaching orientation, and Teacher Corps membership was also requested of the subjects.[10] This section presents the cross tabulation of the empirical types with that data. Chi square analysis was performed on all cross tabulations. No significant differences were found. Since there were no significant differences, no definitive statements could be made about the data. The Appendix G contains the cross tabulation tables.

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[10] Lloyd W. Warner, "Social Class in America," (Chicago: Science Research Associates, Inc. 1949), p, 140
J. Hensen, "The Creative Thinking Abilities of Elementary Students in Public and Parochial Schools," (unpublished doctorial dissertation, Indiana University, Bloomington, 1967.

Socio-economic class was obtained by classifying father's occupation according to the scheme developed by Warner, since support for using only father's occupation was presented by Hensen. In order to reduce the Warner scale to three classes, membership in the highest category was defined as upper class, membership in the next three categories defined as middle class, and membership in the three lowest categories defined as lower class.

V. SUMMARY

Chapter IV has presented the results of the study. Discussion at each step of these results was included in order to establish the rationale for analysis of future steps.

Operational definitions of constructs were established in Step I. While not meeting the predetermined criterion for a matching of theoretical and empirical solutions, the results were interpreted as consistent enough with expectations to continue the analysis. Subsample analyses by socio-economic class were in agreement with the total sample solutions.

In Step II, the constructs proved to be more independent than was anticipated. A reinterpretation of the factor solution as different from the theoretically expected was made. The same names for the first three factors were retained. The remaining factors were dropped.

Factor scores obtained from Step II were used in an analysis by the OTYPE component of the BC TRY system to obtain the empirical typology. All subjects could be included in one of five different types. Three of these types matched theoretical expectations while the other two types could not be matched. There were no differences among types on a variety of static characteristics.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. SUMMARY

It was the purpose of this study "to attempt to derive and validate a typology of teacher trainees based on Conceptual Systems theory."[1] Derivation of the typology was attempted by analysis of the research and literature concerning the theory while validation was attempted empirically.

Hypotheses were formulated in three steps. In Step I, hypotheses were tested relative to the existence of genotypic and phenotypic constructs with regard to the total sample and social class subsamples. Step II hypotheses were formulated relative to the relationship of genotypic and phenotypic constructs. Step III hypotheses were formulated regarding the profiles of expected types on the hypothesized factors of Step II.

Assumptions of the study were based on the utility of the model in an educational setting, and the adequacy of the data analysis procedures. Assumptions were also made concerning the relationship of the instruments to the constructs of which they were to be operational definitions.

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[1] See Chapter I, p. 17.

Limitations of the study were based on the size and representativeness of the sample, the validation of certain instruments, and important variables which may not have been considered.

Terms pertinent to the study were defined.

The literature was reviewed in seven areas. These were: (1) background information for the rationale of the study, (2) research on the student, (3) research on adults' genotypic and phenotypic characteristics, (4) research on measuring the environment provided by parents and teachers, (5) the interaction of environments with development, (6) teacher training research and models, and (7) methodological issues concerning the study.

The subjects for the study were sixty-eight education students taking an educational psychology course at the University of the Pacific. There were about equal numbers of lower (40%) and middle (38%) class subjects, with a smaller number (22%) of upper class students. Subjects voluntarily participated in the study so that the sample could not be said to be random. The subjects were given a test battery which took three of their class periods to administer.

In order to test hypotheses relevant to Step I and Step II, factor analysis was used with the resulting factor matrix being rotated to match the hypothesized loadings for the factors. The derivation of empirical types was accomplished through the OTYPE component of the BC TRY system.[2] Analysis and interpretation of the results were reported for each step.

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[2]Robert C. Tryon and Daniel E. Bailey, Cluster Analysis (Boulder: Tryon-Bailey Associated, Inc., undated), Chapter 8.

II. CONCLUSIONS

Conclusions relative to the study at each step were drawn. The limitations of the study partially restrict the degree of confidence which could be placed in the conclusions.

Step I Conclusions

The conclusions at this step relative to the hypotheses formulated are given with regard to genotypic and phenotypic constructs separately. Conclusions with regard to the similarities of the subsample analyses by social class are included.

Genotypic Conclusions. Six factors were hypothesized. It was concluded that results of the study did not fully support the hypotheses that: (1) a factor defined by five measures of behavioral discrimination would emerge, (2) a factor defined by six measures of person discrimination would emerge, (3) a factor defined by six measures of environmental discrimination would emerge, (4) a factor defined by two measures of behavioral differentiation would emerge, (5) a factor defined by two measures of person differentiation would emerge, and (6) a factor defined by two measures of environmental differentiation would emerge. However, the results for the total sample were close enough to the hypothesized results so that, with caution, they were used in Step II of the analysis. It was concluded that instrument refinement and the use of communalities in obtaining the hypothesized loadings might have resulted in obtaining the desired results. Variations for the social class subsamples from the theoretical solution were not very different

from that of the total sample from the theoretical loadings.

Phenotypic Conclusions. As was the case for genotypic variables, it was concluded that the results of the study did not fully support the hypotheses. However, results were more consistent, and somewhat closer to the expected or hypothesized results than for the genotypic analysis. The hypotheses were that: (1) a factor defined by five measures of interdependent predisposition would emerge, (2) a factor defined by three measures of warmth would emerge, and (3) a factor defined by three measures of intrinsic acceptance would emerge. Considerable variation was noted for the social class subsamples from the theoretical solution as compared to the total sample. While the total sample solution did not meet the expected degree of relationship, it was concluded that the solution was close enough to allow for the use of the findings in the second step of the analysis. The analyses generally suggested that the hypothesized number of factors, three, described the content of the measures adequately.

Step II Conclusions

The conclusions at this step relative to the hypotheses formulated with regard to the relationship of genotypic and phenotypic constructs is presented. It was hypothesized that three factors would emerge. One factor was to be called "Abstractness," and was to have high loadings from the constructs of: (1) general abstractness, (2) integration of behavior, (3) integration of persons, (4) discrimination of environments, (5) differentiation of environments, (6) integration

of environments, and (7) autonomy. A second factor was to be called "Sensitivity," and was to have high loadings from the constructs of: (1) educational domain abstractness, (2) discrimination of behavior, (3) differentiation of behavior, (4) discrimination of persons, (5) differentiation of persons, (6) warmth, and (7) intrinsic acceptance. A third factor was to be labeled "Flexibility," and was to have high loadings from the constructs of: (1) flexibility, (2) creativity, and (3) interpersonal anxiety.

The results indicated that seven factors were necessary to adequately describe the common characteristics of the constructs, four more than had been anticipated. Thus, the hypotheses were not supported. When rotated to meet hypothesized loadings, it was concluded that support was not found at the criterion level for the existence of the three hypothesized factors. Therefore, it was necessary to reinterpret these factors before derivation of the empirical types. The three factors retained after rotation were interpreted as reflecting: skill in conceptualizing teacher behavior and student behavior, skill in conceptualizing the dynamics of students, and an attitudinal set reflecting a calm, creative, abstract orientation. It was concluded that, while the factor structure was not as hypothesized, that a theoretical interpretation was possible and that the factors that resulted were meaningful for use in constructing a typology of teacher trainees which could be used in developing a training program.

Step III Conclusions

The conclusions formed at this step were concerned with the theoretical relevance and the potential for specifying differential training programs for the resultant types. Five types emerged from the OTYPE analysis. Of these, three types could be related to the theoretically derived types while two were labeled as residual.

Hypothesized types I and II were anticipated to be high on all factors hypothesized for Step II. An empirical type was found which, when the differences between the hypothesized and empirical factors from Step II were considered, was similar to the hypothesized types. The conclusion was drawn that the empirical type would be trainable to work with abstract students and could probably be trained relatively easily to work with more concrete students. Only three of the sixty-eight subjects were of this type.

Hypothesized Type III was anticipated to have scores on the hypothesized factors of abstractness and flexibility close to the mean of the total sample, and a somewhat lower score on the hypothesized factor of sensitivity. This type was anticipated to be trainable for inducing progression from Stage I to Stage II in students. An empirical type emerged which paralleled the hypothesized Type III except that the score on the empirical factor sensitivity was quite a bit lower while the flexibility score was somewhat higher. Since the theoretical and empirical factors were different, it was concluded that if the difference was due to the contribution of the constructs of warmth and educational domain abstractness, then the empirical type would be a good

match. It was also concluded that the empirical type could probably be trained to induce developmental progression from Stage I to Stage II, but that much work would have to be done to develop conceptual skills for understanding students. Ten subjects were representative of this type.

A theoretically hypothesized type, Type IV, was intended to be trainable to induce developmental progression from the Sub-I stage to Stage I. On the theoretically derived factors, this type was to be one and one-half standard deviations below the sample mean on abstractness, one-half standard deviation above the sample mean on sensitivity, and one standard deviation below the sample mean on flexibility. An empirical type was found (empirical Type IV) which was parallel to the hypothesized type, but approximately one standard deviation higher on all three factors. Thus, the empirical type was concluded to be somewhat more likely to be trainable than the hypothesized type. Twelve subjects were members of this type.

While the three empirical types resembling the theoretical types differed on the factors of sensitivity and flexibility, the two residual types differed on the factor of abstractness. The mean scores for both types on sensitivity and flexibility were within one-half of a standard deviation below the mean of the sample. Otype 17 contained thirty-four members, or exactly half the sample. This Otype had a mean score of abstractness about one-half standard deviation above the mean. Otype 16 contained nine members and had a mean score on abstractness almost two standard deviations below the mean. If this difference between the

two residual types was not a function of the interaction of unmeasured characteristics of the subjects with either testing or current environmental characteristics, the trainability of trainees falling in Otype 16 might yield such results that discouragement from the teaching profession might be necessary. However, it was concluded that subjects in Otype 16 might be trainable to induce progression from Sub-I to Stage I while trainees falling in Otype 17 might be capable of inducing progression from Sub-I to Stage I or from Stage I to Stage II.

Since no differences were found for the empirical types with regard to: socio-economic class, year in school, sex, intentions towards teaching, teaching orientation, and Teacher Corps membership, it was concluded that despite the small sample, the results should have some degree of similarity to replications in other settings. However, both socio-economic class and year in school of the subject approached significance, so that differences associated with these variables should be watched closely in future studies.

III. RECOMMENDATIONS

Recommendations are made with regard to two areas: providing training environments for the empirical types, and recommendations concerning future research. The research design for determining the effects of the training environments on the various types will be briefly developed. Recommendations with regard to methodology and other studies will be discussed.

Recommendations for Training Environments

Hunt, in discussing the use of the differential approach for training environments, notes the rigidity of the "lock step" approach.[3] The degree of training and the corresponding amount of time necessary for trainees to achieve criterion performance on potentially different goals is inherent in the differential approach. Hunt lists intervention characteristics in four areas: (1) content of presentation, (2) structure of presentation, (3) value context of presentation, and (4) the form of feedback and reward. This study has collected and summarized information relevant to the first three and could hypothesize as to the fourth.

The pacing of presentation as suggested earlier should be another crucial factor. The "U" curve hypotheses of Schroder, Driver, and Streufert with respect to the relationship between abstractness and environmental complexity could be considered in relation to the flexibility score.[4]

Before considering the types, the components of the proposed program are described. Since Hunt's earlier work had specified an anticipated hierarchy of skills necessary for the teacher, and since

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[3]David E. Hunt, "Differential Training in Teacher Education and its Implications for Increasing Flexibility in Teaching," prepared as a chapter in Bruce R. Joyce, et al., New Perspectives in Teacher Training

[4]Harold M. Schroder, Michael J. Driver, and Siegfried Streufert, Human Information Processing (New York: Holt, Rinehart and Winston, 1967), p. 29.

this study was explicitly constructed to include measures of those skills, the majority of the training programs discussed will focus on skill training.[5] Skills were divided into three areas: (1) skill in discrimination of students behavior, study dynamics, and teaching environments, (2) skill in radiating environments, and (3) skill in flexible modulation from one environment to another.

In order to train skills in discrimination, short films or video tapes could be developed which present students or student behavior as stimulus object comparison. This could also be done to provide comparisons of teaching behavior. These films or tapes should be organized so as to allow for sorting into those which could be used for training on a single dimension, or on several dimensions, and should be graded as to the difficulty or distinctiveness of the stimulus objects contrasts. Ratings by trained experts should be available for each tape on all relevant dimensions. There should be enough tapes or films available to allow for considerable practice. Curriculum data banks could be developed to provide training in preparing materials for students at different stages of development.

In order to train skill in radiating environments or a given environment, a series of role playing scripts could be developed for each of desired environments which vary in terms of the degree of structure they provide the trainee. Provision should be made for recording the role playing session. Actual teaching situations should

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[5]David E. Hunt, "A Model for Analyzing the Training of Training Agents," Merrill-Palmer Quarterly, 12:135-155, 1966.

be available for trainees who have successfully completed work on the scripts. Staff or students could be trained to fill the roles of the students in the scripts.

Training in the skill of flexible modulation from one environment to another is theoretically contingent upon mastering skills in discrimination and skills in radiating environments. Role playing situations should be available in which flexible modulation must be made. These situations should be graded in terms of the complexity of analysis necessary to perform the proper modulation, and in the area or areas (i.e. behavior, student dynamics) which serve as the basis for modulation.

Materials should also be developed to be used either as lesson plans for the staff or as literature for the trainees concerning the theoretical framework of the training and the implications of the environments the trainees are being trained to radiate. These materials should be graded as to complexity.

Since the goal of training within the theoretical framework is to bring about certain skills in trainees, overall criterion performance could be set in terms of a post test on the empirical factors of abstractness and sensitivity. These factors relate to the content of the training factor.

Flexibility should be directly related to the structure and value context of the presentation of the training environment. If the assumptions of the study are correct, high scoring trainees on the flexibility factor should be more abstract and more predisposed towards interdependent

environments than trainees with lower scores on this factor. Thus, the score on this factor largely should determine the way the program's use of the components will be carried out. Types with high scores on this factor theoretically need to be given a less structured training environment than types with lower scores. Thus, choices of starting points could be made by trainees and flexibility left in the sequence of presentation for more flexible trainees.

Recommendations for Training Empirical Type I-II. This type, similar to theoretical types I and II, was by far the most flexible of the empirical types with a mean score over two standard deviations above the mean. This type would likely be capable of making its own selections with regard to materials about Conceptual Systems theory, and would probably start working on the skill of discrimination among students first since the type appears to be the most competent in this area. However, the training agents should not allow for skill development in this area alone. Training in behavioral discrimination, particularly with regard to those dimensions which aid in determining the student's frame of reference should be started soon after skill training in discrimination among students is begun since these skills would appear to compliment each other. Learning to discriminate environments should follow criterion learning in behavioral and dynamic skills with particular emphasis on interdependent environments for abstract students. It is likely that this type of learning should be accomplished in a relatively short period of time.

Learning to radiate an interdependent environment should be an

easy task for subjects of this type. Once trainees are satisfied that they can accomplish this, they could be presented with situations in which an interdependent environment yields negative feedback about the technique in order to force them to attempt flexible modulation. Once the value of different environments is perceived, the flexible modulation tasks should be utilized by the training agent.

Recommendations for Training Empirical Type III. If the conclusions of the study are correct, the major problem in training empirical Type III, which was similar to theoretical Type III, is in raising the score on the factor of sensitivity. The descrepancy between this score and the mean factor score on flexibility is large enough to suggest that while empirical Type III trainees perceive an interdependent environment as necessary, they do not have the skill to effectively utilize such an environment.

It is recommended that the training program could effectively make use of the films or video tapes which deal with skill in discriminating among students. The reasonably high score on flexibility suggests that a discussion presentation of the theory might be useful as a preliminary to actual training since the theory points out the different causes for similar behavior associated with the stages of development. In the use of the films, particular emphasis should be given to those dimensions which indicate developmental progression from Stage I to Stage II. Concurrent with this training, skill in making behavioral discriminations should be begun. Only when criterion performance in these two skills has been achieved should training in environmental discrimination be started.

After training in this skill has been achieved, training in radiating an environment which will induce the desired developmental progression from Stage I to Stage II should be started. Relatively simple scripts will probably be necessary at the beginning. Whether or not flexible modulation can be achieved with empirical Type III trainees is a questionable matter which will require more research. If an attempt is made to train trainees to work with other stages, the Sub-I stage environment would probably be the easiest environment for this type to learn.

Recommendations for Training Empirical Type IV. This type, which parallels theoretical Type IV, represents an interesting problem for the training institution. The lower than average score on flexibility suggests that a rather structured and authoritarianly presented environment could be used. The high score on sensitivity suggests an integrated structure for understanding students. Since this type was anticipated to be trained to work with Sub-I students to induce progression to Stage I, the high ability to discriminate among students is not really needed, although not detrimental in training. Whether this teaching assignment would be the best place for this type of trainee is an empirical question.

A straight forward program emphasizing training in discriminative skills with particular emphasis on behavior and teaching environments and little emphasis on theory should be appropriate. Training to radiate a given environment may have to proceed slowly with emphasis on the more concrete, behavior oriented approaches. Learning to induce

progression from Stage I to Stage II might be a goal for flexible modulation.

Recommendations for Training Empirical Otype 16. The optimal training environment for training Otype 16 subjects should be expected to be similar to that for empirical Type IV except that a great deal of slow, dimension by dimension, training in behavioral discrimination, followed by the same approach for student dynamic discrimination, followed by environmental discrimination would be necessary. Almost no emphasis should be given to learning the theory behind the discriminations until the end of the training period. Skills should be learned beyond criterion to insure their inclusion in the trainee's frame of reference before an attempt is made to train in environmental radiation. Differences among students at the concrete end of the developmental continuum should be emphasized.

Recommendations for Training Empirical Otype 17. The similarity between Otype 17 and Otype 16 with regard to the mean scores on the factor of sensitivity suggests that about equivalent amounts of training in this area are needed for trainees of both types. The higher score on abstractness suggests that less intensive training is needed with regard to behavior and environmental discrimination. Thus, the training programs for the types would be quite similar except for the amount of time to be spent on skill training in these two areas. Again, flexible modulation should deal with the concrete environments.

Recommendations for Future Research

To the writer's knowledge, this is the first attempt to systematically develop and empirically validate a typology of teacher trainees. Questions divide into two areas: the validity of the typology and the utility of the typology. If the developed typology is to be useful for teacher training institutions, the validity of constructing different training programs for each type should be tested empirically. Mismatched as well as matched treatments could be tested by randomly assigning trainees of each type to each training program developed. A matched treatment with type should show significant gains as compared with the same type given unmatched treatments.

Another area for investigation is the order of presentation of materials. Once matched versus unmatched effects have been compared to determine if interaction does exist, training programs components can be presented in different orders. Guttman scaling procedures could be used to determine the necessity of presenting components in a given sequence.

Issues surrounding the appropriate method of feedback for each type should be examined. Praise versus criticism, the use of video tape, group discussion versus individual conferences should be considered.

Methodological Considerations. In the light of the evidence found with regard to this study and problems arising therein, several recommendations are made.

First, sample size should be considerably larger than it was in

this study. This allows for subsample analyses to test for similar solutions and allows for better generalization.

Second, with regard to the administration of instruments, those in which a video tape or film is to be used should be presented in small groups to eliminate distractions and audio and video difficulties on the part of the subjects.

Third, where rating scales are to be used, subjects should be given some training information on the meaning of the anchoring points before being asked to rate stimulus objects.

Fourth, in attempting replication where some information as to the resulting types is known, multidimensional scaling procedures which allow for the establishment of similarity of perspective for subjects should be used. The procedure described by Tucker and Messick is recommended.[6] This allows for better indications of the subject's frame of reference with regard to the area under investigation, and should give a better indication of differentiation and integration. It provides results which can be correlated with the scale ratings and other constructs. This data would be collected prior to the presentation of rating scales to avoid learning effects from the testing.

Fifth, differentiation measures for rating scales could be taken in terms of the number of eigenvalues greater than one for each area since this appeared to be the more realistic of the two measures.

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[6]Ledyard R. Tucker and Samuel Messick, "An Individual Differences Model for Multidimensional Scaling," Psychometrika, 28:333-367, 1963.

Sixth, the Teacher Attitude Research Inventory needs to be factor analyzed to establish the independence of the constructs it is measuring.

Seventh, more stable indicators of intrinsic acceptance need to be developed.

Eighth, the Personal Reaction Survey needs construct validation in a classroom behavior context. The Teacher Attitude Research Inventory could also profit from this type of validation to a lesser extent.

Ninth, the introduction of measures of teaching behavior could be used to supplement the test battery and add construct validation in the derivation of future typologies.

Tenth, future typologies should also be based on measures of response to various forms of feedback, and on ability to develop curriculum materials given the characteristics of different students.

Eleventh, special care should be taken in establishing the identification of constructs through factor analysis of multi-trait, multi-method matrices. Difficulties arise if solutions are used which yield independent solutions and uncorrelated factor scores when in a later step relationships among the identified constructs are postulated.

Twelve, strong support would be provided for a typology which was arrived at from several different techniques. The method of factor (or cluster) analysis, the method of arriving at communality estimates, the method of computing factor scores, the method of determing the number of factors, the method of rotation, and the procedure for finding the typology could be varied.

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APPENDIX A

THE TEST BATTERY

TEACHER TRAINEE STUDY

NAME _____
(Last) (First)

IDENTIFICATION

AGE:_____

SEX: Male_____ Female_____

CLASS: Junior_____Senior_____Grad_____

TEACHER CORPS: Yes_____ No_____

FUTURE TEACHER: Yes_____No_____

(IF YES): Elementary_____Secondary_____

MAJOR: _____

USES FOR THINGS

There are five objects listed on this and the following page. Your task is to write down as many different uses as you can for each object. Several examples are given in each case. Be sure to write down some uses for each object. Write down anything that comes to mind, no matter how strange it may be. You will have 15 minutes for this task. Try to distribute your time equally among the five items.

1. BRICKS: Build houses, doorstep

2. PENCILS: Write, bookmark

You may also work ahead on the following page.

3. PAPER CLIPS: Clip paper together, make a necklace

4. 4. TOOTHPICKS: Clean teeth, test cake

5. SHEET OF PAPER: Write on, make an airplane

You may also go back and work on the previous page.

SENTENCE COMPLETION

On the following pages you will be asked to complete certain sentences and write a short paragraph.

On each page you will find the beginning of a sentence. Your task is to complete it. For example:

I like....

When you are given the signal, turn to Page 4. Complete the sentence given and write at least two additional sentences. You will be given 100 seconds. After 80 seconds, we will say: "Finish your sentence," and at 100 seconds we will ask you to turn to Page 5. Make sure you complete your last sentence. There are eight pages in all.

Write your sentences as quickly but as clearly as possible.

Do not turn this page or the other pages until you are given the signal!

Rules.....

When I am criticized.....

When I am in doubt.....

The best way to learn is.....

When someone gives me instructions.....

Confusion.....

When others criticize me it usually means.....

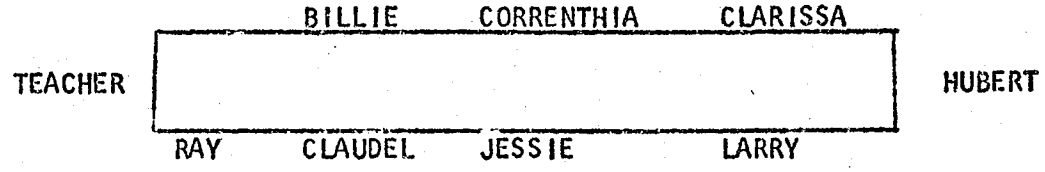
The most important thing in teaching is.....

CLASSROOM RATING TASK

In this part of the study you will first be shown a vidio tape of a teacher interacting with eight students. After you have seen the tape, you will be asked to: (1) compare the behavior of the students; (2) compare the students and (3) compare the behavior of the teacher towards each student. These comparisons will be made by rating on scales which will be provided after you have seen the tape. In addition, you will be asked to rate how you would act towards each student were you to have each student in your own class.

In order to aid you in remembering the students and what you consider to be important, the next page contains a diagram of the seating arrangement of the students and space for you to write down any notes you may wish to make. Since this tape represents an actual situation and was not especially prepared for the purpose of this study, the conditions closely represent the situation, you as a teacher, will face in the classroom.

The tape runs about 12 minutes. Please turn to the next page and familiarize yourself with the names of the students. When the tape begins, Ray, the student closest to the teacher's right will not be in view.



NOTES:

RAY

CLAUDEL

JESSIE

LARRY

HUBERT

CLARISSA

CORRENTHIA

BILLIE

DO NOT TURN THIS PAGE UNTIL TOLD TO DO SO.

For the following five dimensions, you are to compare the BEHAVIOR of the STUDENTS by placing an "X" in the space on the scale which best describes the BEHAVIOR of the STUDENT you are rating. Please work carefully. Make sure your marks are not between spaces.

RAY

HOSTILE _____ _____ _____ _____ _____ _____ _____ _____ _____ FRIENDLY

CLAUDEL

HOSTILE _____ _____ _____ _____ _____ _____ _____ _____ _____ FRIENDLY

JESSIE

HOSTILE _____ _____ _____ _____ _____ _____ _____ _____ _____ FRIENDLY

LARRY

HOSTILE _____ _____ _____ _____ _____ _____ _____ _____ _____ FRIENDLY

HUBERT

HOSTILE _____ _____ _____ _____ _____ _____ _____ _____ _____ FRIENDLY

CLARISSA

HOSTILE _____ _____ _____ _____ _____ _____ _____ _____ _____ FRIENDLY

CORRENTHIA

HOSTILE _____ _____ _____ _____ _____ _____ _____ _____ _____ FRIENDLY

BILLIE

HOSTILE _____ _____ _____ _____ _____ _____ _____ _____ _____ FRIENDLY

GO ON TO THE NEXT PAGE.

-15-

RAY

ATTENTIVE _____ _____ _____ _____ _____ _____ _____ _____ _____ INATTENTIVE

CLAUDEL

ATTENTIVE _____ _____ _____ _____ _____ _____ _____ _____ _____ INATTENTIVE

JESSIE

ATTENTIVE _____ _____ _____ _____ _____ _____ _____ _____ _____ INATTENTIVE

LARRY

ATTENTIVE _____ _____ _____ _____ _____ _____ _____ _____ _____ INATTENTIVE

HUBERT

ATTENTIVE _____ _____ _____ _____ _____ _____ _____ _____ _____ INATTENTIVE

CLARISSA

ATTENTIVE _____ _____ _____ _____ _____ _____ _____ _____ _____ INATTENTIVE

CORRENTHIA

ATTENTIVE _____ _____ _____ _____ _____ _____ _____ _____ _____ INATTENTIVE

BILLIE

ATTENTIVE _____ _____ _____ _____ _____ _____ _____ _____ _____ INATTENTIVE

GO ON TO NEXT PAGE.

-16-

RAY

CONVERGENT RESPONSES _____ DIVERGENT RESPONSES

CLAUDEL

CONVERGENT RESPONSES _____ DIVERGENT RESPONSES

JESSIE

CONVERGENT RESPONSES _____ DIVERGENT RESPONSES

LARRY

CONVERGENT RESPONSES _____ DIVERGENT RESPONSES

HUBERT

CONVERGENT RESPONSES _____ DIVERGENT RESPONSES

CLARISSA

CONVERGENT RESPONSES _____ DIVERGENT RESPONSES

CORRENTHIA

CONVERGENT RESPONSES _____ DIVERGENT RESPONSES

BILLIE

CONVERGENT RESPONSES _____ DIVERGENT RESPONSES

GO ON TO NEXT PAGE.

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RAY

APPROPRIATE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ INAPPROPRIATE RESPONSES

APPROPRIATE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ INAPPROPRIATE RESPONSES

CLAUDEL

APPROPRIATE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ INAPPROPRIATE RESPONSES

JESSIE

APPROPRIATE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ INAPPROPRIATE RESPONSES

LARRY

APPROPRIATE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ INAPPROPRIATE RESPONSES

HUBERT

APPROPRIATE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ INAPPROPRIATE RESPONSES

CLARISSA

APPROPRIATE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ INAPPROPRIATE RESPONSES

CORRENTHIA

APPROPRIATE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ INAPPROPRIATE RESPONSES

BILLIE

APPROPRIATE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ INAPPROPRIATE RESPONSES

GO ON TO NEXT PAGE.

RAY

IMPLE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ COMPLEX RESPONSES

CLAUDEL

IMPLE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ COMPLEX RESPONSES

JESSIE

IMPLE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ COMPLEX RESPONSES

LARRY

IMPLE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ COMPLEX RESPONSES

HUBERT

IMPLE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ COMPLEX RESPONSES

CLARISSA

IMPLE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ COMPLEX RESPONSES

CORRENTHIA

IMPLE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ COMPLEX RESPONSES

BILLIE

IMPLE RESPONSES _____ _____ _____ _____ _____ _____ _____ _____ _____ COMPLEX RESPONSES

For the following six dimensions you are to compare the STUDENTS by placing an "X" in the space on the scale which best describes the STUDENT you are rating. Please work carefully. Make sure your marks are not between spaces.

RAY

INTERPERSONAL SENSITIVITY _____ _____ _____ _____ _____ _____ _____ _____ _____ INTERPERSONAL INSENSITIVITY

CLAUDEL

INTERPERSONAL SENSITIVITY _____ _____ _____ _____ _____ _____ _____ _____ _____ INTERPERSONAL INSENSITIVITY

JESSIE

INTERPERSONAL SENSITIVITY _____ _____ _____ _____ _____ _____ _____ _____ _____ INTERPERSONAL INSENSITIVITY

LARRY

INTERPERSONAL SENSITIVITY _____ _____ _____ _____ _____ _____ _____ _____ _____ INTERPERSONAL INSENSITIVITY

HUBERT

INTERPERSONAL SENSITIVITY _____ _____ _____ _____ _____ _____ _____ _____ _____ INTERPERSONAL INSENSITIVITY

CLARISSA

INTERPERSONAL SENSITIVITY _____ _____ _____ _____ _____ _____ _____ _____ _____ INTERPERSONAL INSENSITIVITY

CORRENTHIA

INTERPERSONAL SENSITIVITY _____ _____ _____ _____ _____ _____ _____ _____ _____ INTERPERSONAL INSENSITIVITY

BILLIE

INTERPERSONAL SENSITIVITY _____ _____ _____ _____ _____ _____ _____ _____ _____ INTERPERSONAL INSENSITIVITY

GO ON TO NEXT PAGE.

RAY

INDEPENDENT _____ _____ _____ _____ _____ _____ _____ _____ _____ DEPENDENT

CLAUDEL

INDEPENDENT _____ _____ _____ _____ _____ _____ _____ _____ _____ DEPENDENT

JESSIE

INDEPENDENT _____ _____ _____ _____ _____ _____ _____ _____ _____ DEPENDENT

LARRY

INDEPENDENT _____ _____ _____ _____ _____ _____ _____ _____ _____ DEPENDENT

HUBERT

INDEPENDENT _____ _____ _____ _____ _____ _____ _____ _____ _____ DEPENDENT

CLARISSA

INDEPENDENT _____ _____ _____ _____ _____ _____ _____ _____ _____ DEPENDENT

CORRENTHIA

INDEPENDENT _____ _____ _____ _____ _____ _____ _____ _____ _____ DEPENDENT

BILLIE

INDEPENDENT _____ _____ _____ _____ _____ _____ _____ _____ _____ DEPENDENT

GO ON TO NEXT PAGE.

RAY

FLEXIBLE _____ _____ _____ _____ _____ _____ _____ _____ _____ RIGID

CLAUDEL

FLEXIBLE _____ _____ _____ _____ _____ _____ _____ _____ _____ RIGID

JESSIE

FLEXIBLE _____ _____ _____ _____ _____ _____ _____ _____ _____ RIGID

LARRY

FLEXIBLE _____ _____ _____ _____ _____ _____ _____ _____ _____ RIGID

HUBERT

FLEXIBLE _____ _____ _____ _____ _____ _____ _____ _____ _____ RIGID

CLARISSA

FLEXIBLE _____ _____ _____ _____ _____ _____ _____ _____ _____ RIGID

CORRENTHIA

FLEXIBLE _____ _____ _____ _____ _____ _____ _____ _____ _____ RIGID

BILLIE

FLEXIBLE _____ _____ _____ _____ _____ _____ _____ _____ _____ RIGID

GO ON TO NEXT PAGE.

RAY

CURIOUS _____ _____ _____ _____ _____ _____ _____ _____ _____ WITHDRAWN

CLAUDEL

CURIOUS _____ _____ _____ _____ _____ _____ _____ _____ _____ WITHDRAWN

JESSIE

CURIOUS _____ _____ _____ _____ _____ _____ _____ _____ _____ WITHDRAWN

LARRY

CURIOUS _____ _____ _____ _____ _____ _____ _____ _____ _____ WITHDRAWN

HUBERT

CURIOUS _____ _____ _____ _____ _____ _____ _____ _____ _____ WITHDRAWN

CLARISSA

CURIOUS _____ _____ _____ _____ _____ _____ _____ _____ _____ WITHDRAWN

CORRENTHIA

CURIOUS _____ _____ _____ _____ _____ _____ _____ _____ _____ WITHDRAWN

BILLIE

CURIOUS _____ _____ _____ _____ _____ _____ _____ _____ _____ WITHDRAWN

GO ON TO NEXT PAGE.

RAY

MEMORY ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

CLAUDEL

MEMORY ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

JESSIE

MEMORY ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

LARRY

MEMORY ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

HUBERT

MEMORY ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

CLARISSA

MEMORY ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

CORRENTHIA

MEMORY ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

BILLIE

MEMORY ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

GO ON TO NEXT PAGE.

RAY

MALADJUSTED _____ _____ _____ _____ _____ _____ _____ _____ _____ ADJUSTED

CLAUDEL

MALADJUSTED _____ _____ _____ _____ _____ _____ _____ _____ _____ ADJUSTED

JESSIE

MALADJUSTED _____ _____ _____ _____ _____ _____ _____ _____ _____ ADJUSTED

LARRY

MALADJUSTED _____ _____ _____ _____ _____ _____ _____ _____ _____ ADJUSTED

HUBERT

MALADJUSTED _____ _____ _____ _____ _____ _____ _____ _____ _____ ADJUSTED

CLARISSA

MALADJUSTED _____ _____ _____ _____ _____ _____ _____ _____ _____ ADJUSTED

CORRENTHIA

MALADJUSTED _____ _____ _____ _____ _____ _____ _____ _____ _____ ADJUSTED

BILLIE

MALADJUSTED _____ _____ _____ _____ _____ _____ _____ _____ _____ ADJUSTED

GO ON TO NEXT PAGE.

For the following six dimensions, you are to rate the BEHAVIOR of the TEACHER towards each of the students by placing an "X" in the space on the scale which best describes the way the teacher behaved towards the student. Please work carefully. Make sure your marks are not between spaces.

RAY

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

CLAUDEL

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

JESSIE

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

LARRY

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

HUBERT

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

CLARISSA

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

CORRENTHIA

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

BILLIE

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

GO ON TO NEXT PAGE.

RAY

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

CLAUDEL

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

JESSIE

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

LARRY

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

HUBERT

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

CLARISSA

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

CORRENTHIA

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

BILLIE

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

GO ON TO NEXT PAGE.

RAY

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

CLAUDEL

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

JESSIE

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

LARRY

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

HUBERT

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

CLARISSA

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

CORRENTHIA

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

BILLIE

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

GO ON TO NEXT PAGE.

RAY

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

CLAUDEL

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

JESSIE

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

LARRY

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

HUBERT

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

CLARISSA

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

CORRENTHIA

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

BILLIE

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

GO ON TO NEXT PAGE.

RAY

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

CLAUDEL

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

JESSIE

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

LARRY

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

HUBERT

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

CLARISSA

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

CORRENTHIA

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

BILLIE

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

GO ON TO NEXT PAGE.

-30-

RAY

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT OREIENTED

CLAUDEL

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

JESSIE

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

LARRY

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

HUBERT

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

CLARISSA

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

CORRENTHIA

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

BILLIE

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT C IENTED

GO ON TO NEXT PAGE.

For the final part of the task, you are to rate how YOU would act towards each of the students, were YOU go be their teacher for the remainder of the school year. Place an "X" in the space on the scale which best describes how YOU would act towards the student you are rating. Make sure your marks are not between spaces.

RAY

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

CLAUDEL

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

JESSIE

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

LARRY

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

HUBERT

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

CLARISSA

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

CORRENTHIA

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

BILLIE

DISTANT _____ _____ _____ _____ _____ _____ _____ _____ _____ INVOLVED

GO ON TO NEXT PAGE.

RAY

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

CLAUDEL

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

JESSIE

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

LARRY

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

HUBERT

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

CLARISSA

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

CORRENTHIA

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRITICAL

BILLIE

ACCEPTING _____ _____ _____ _____ _____ _____ _____ _____ _____ CRIT 'AL

GO ON TO NEXT PAGE.

RAY

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

CLAUDEL

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

JESSIE

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

LARRY

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

HUBERT

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

CLARISSA

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

CORRENTHIA

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

BILLIE

CONTROLLING _____ _____ _____ _____ _____ _____ _____ _____ _____ NON-DIRECTIVE

GO ON TO NEXT PAGE.

RAY

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

CLAUDEL

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

JESSIE

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

LARRY

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

HUBERT

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

CLARISSA

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

CORRENTHIA

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

BILLIE

UNSTRUCTURED _____ _____ _____ _____ _____ _____ _____ _____ _____ INFORMATIVE

GO ON TO NEXT PAGE.

RAY

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

CLAUDEL

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

JESSIE

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

LARRY

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

HUBERT

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

CLARISSA

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

CORRENTHIA

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

BILLIE

WARM _____ _____ _____ _____ _____ _____ _____ _____ _____ HOSTILE

GO ON TO NEXT PAGE.

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RAY

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

CLAUDEL

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

JESSIE

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

LARRY

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

HUBERT

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

CLARISSA

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

CORRENTHIA

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

BILLIE

DRILL ORIENTED _____ _____ _____ _____ _____ _____ _____ _____ _____ CONCEPT ORIENTED

EDUCATIONAL VIEWS QUESTIONNAIRE

On the following pages are some questions designed to allow you to express your views on important educational issues. Three minutes will be allowed for each page. At the end of the three minutes, the person giving you the test will tell you to go on to the next question. If you should happen to finish a question earlier than the alloted time, you may begin working on the next question. Please try to make each response that you give as complete and accurate a statement of your views as possible. There are seven pages in all.

1. What are your general ideas about disciplining students? Do you have any general guidelines or underlying philosophy?

2. How would you go about deciding when it is time to revise your expectations and change your standards for students you were teaching?

3. What might you say when a student states an opinion, say on politics or world affairs, or about the subject you were teaching, that was the opposite of your own?

4. How would you feel and what might you do when a student criticizes you or something you have done?

5. How could you tell when you were doing a good job of being a teacher?

6. What do you think are the most important things for a child to learn while growing up? How would you go about helping your students to learn these things?

7. What would you think about a child who is performing well below the level he is capable of in some important subject?

TEACHER ATTITUDE RESEARCH INVENTORY

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

PERSONAL REACTION SURVEY

	VF	SF	ST	VT					
1.	( )	( )	( )	( )	21.	( )	( )	( )	( )
2.	( )	( )	( )	( )	22.	( )	( )	( )	( )
3.	( )	( )	( )	( )	23.	( )	( )	( )	( )
4.	( )	( )	( )	( )	24.	( )	( )	( )	( )
5.	( )	( )	( )	( )	25.	( )	( )	( )	( )
6.	( )	( )	( )	( )	26.	( )	( )	( )	( )
7.	( )	( )	( )	( )	27.	( )	( )	( )	( )
8.	( )	( )	( )	( )	28.	( )	( )	( )	( )
9.	( )	( )	( )	( )	29.	( )	( )	( )	( )
10.	( )	( )	( )	( )	30.	( )	( )	( )	( )
11.	( )	( )	( )	( )	31.	( )	( )	( )	( )
12.	( )	( )	( )	( )	32.	( )	( )	( )	( )
13.	( )	( )	( )	( )	33.	( )	( )	( )	( )
14.	( )	( )	( )	( )	34.	( )	( )	( )	( )
15.	( )	( )	( )	( )	35.	( )	( )	( )	( )
16.	( )	( )	( )	( )	36.	( )	( )	( )	( )
17.	( )	( )	( )	( )	37.	( )	( )	( )	( )
18.	( )	( )	( )	( )	38.	( )	( )	( )	( )
19.	( )	( )	( )	( )	39.	( )	( )	( )	( )
20.	( )	( )	( )	( )	40.	( )	( )	( )	( )

TEACHER ATTITUDE RESEARCH INVENTORY

TEACHER ATTITUDE RESEARCH INVENTORY

On the following three pages are 45 statements about your attitudes as a teacher, which can be rated as follows:

A	a	d	D
( )	( )	( )	( )

Indicate your opinion by placing an "X" in the parentheses under the "A" if you strongly agree. In the parenthesis under "a" if you mildly agree. In the parenthesis under "d" if you mildly disagree, and in the parenthesis under "D" if you strongly disagree.

Be frank and give your own personal views. There are no right or wrong answers. Even child guidence experts tend to disagree about many of these.

It is important for you to work alone and not to discuss your reactions with anyone. It is best to work rapidly. Try to give your first reaction to the statement. Going back over the items sometimes tends to be confusing and to take too much time. Please answer all the items.

1. Children should be allowed to disagree with their teacher if they feel their own ideas are better.

2. When a teacher asks a child to do something, the child should always be told why.

3. A child should be taught that there are many other people he will love and respect as much or more than his teacher.

4. Children should never learn things outside the school which make them doubt their teacher's ideas.

5. Teachers very often feel that they can't stand their class a moment longer.

6. There's no excuse wasting a lot of time explaining when you can get kids doing what you want by being a little clever.

7. Children have every right to question their teacher's views.

8. A child should grow up convinced his teachers always know what is the right thing to do.

9. Most teachers can spend all day with the children and remain calm and even-tempered.

10. Children should be encouraged to tell teachers about it whenever they feel school rules are unreasonable.

11. Teachers should adjust to the children some rather than always expecting the children to adjust to the parents. Teachers

12. Most children soon learn that their teachers were mistaken in many of their ideas.

13. There is no excusing someone who upsets the confidence a child has in his teacher's ways of doing things.

14. The things children ask of a teacher at the end of a hard day are enough to make anyone lose his temper at times.

15. Often you have to fool children to get them to do what they should without a big fuss.

16. If a teacher is wrong he should admit it to the students.

17. A child soon learns that there is no greater wisdom than that of his teachers.

18. A teacher should keep control of his temper even when children are demanding.

19. A child's ideas should be seriously considered in making school decisions.

20. In a well run class, children should have things their own way as often as the teacher does.

21. Loyalty on the part of children to their teacher is something that the teacher should earn.

22. A teacher should never be made to look wrong in a child's eyes.

23. It's natural for a teacher to "blow his top" when children are selfish and demanding.

24. It's best to trick a child into doing something he doesn't want to do instead of having to argue with him.

25. A good teacher can tolerate criticism of himself even when the children are around.

26. Loyalty to teachers comes before loyalty to fellow students.

27. Teaching children is an easy job.

28. When a child is in trouble he ought to know he won't be punished for talking about it with his teachers.

29. As much as is reasonable, a teacher should try to treat a child as an equal.

30. A teacher should not expect to be more highly esteemed than other worthy adults in their children's eyes.

31. It's best for the child if he never gets started wondering whether his teacher's views are right.

32. It's a rare teacher who can be even-tempered with children all day.

33. You have to fool children into doing many things because they wouldn't understand any way.

34. When a child thinks his teacher is wrong he should say so.

35. More teachers should teach their children to have unquestioning loyalty to them.

36. Most teachers never get to the point where they can't stand their class.

37. A child has a right to his own point of view and ought to be allowed to express it.

38. Children are too often asked to do all the compromising and adjusting and that is not fair.

39. Loyalty to teachers is an over-emphasized virtue.

40. The child should not question the thinking of his teachers.

41. Teaching children is a nerve-wracking job.

42. When a child is doing something he shouldn't, one of the best ways of handling it is to just get him interested in something else.

43. A child should be encouraged to look for answers to his questions from other people even if the answers contradict his teachers.

44. A child should always love his teachers.

45. There is no reason why a day at school with the children should be upsetting.

PERSONAL REACTION SURVEY

PERSONAL REACTION SURVEY

DIRECTIONS: On the next two pages are questions designed to allow you to indicate how you usually react to and feel about some situations encountered in everyday life. The best answer to each statement is your usual reaction to the situation. It is best not to spend too much time on each question.

The ANSWER SHEET is set up in the following manner

VF ( ) SF ( ) ST ( ) VT ( )

If the statement is Very False about you or you disagree strongly mark VF.
If the statement is Somewhat False about you or you disagree somewhat mark SF.
If the statement is Somewhat True about you or your agree somewhat mark ST.
If the statement is Very True about you or you agree strongly mark VT.

In order to prevent mismatching the numeral of the statement with the numeral on the answer sheet, the answer sheet is designed so that if it is placed behind the question booklet with the first column of answers visible, the choice of answers is directly to the left of the corresponding question.

If you have any comments you would like to make about particular questions or about the test in general, please feel free to write them on the answer sheet.

1

1. Compared with most people, I catch on to new ideas in a hurry.
2. Making new friends is difficult for me.
3. If I don't understand something, it bothers me to have to ask questions.
4. I am bothered very little by mistakes I have made.
5. I enjoy thinking up new ways to do things.
6. Once I have made up my mind, I hardly ever change it.
7. Most people grow up knowing what is right even if they don't act that way.
8. Even if nobody agrees with me, I usually do things the way I want to do them.
9. It upsets me when people act differently from day to day.
10. When I discuss something, I spend more time thinking about what I am going to say than what the other person is talking about.
11. I don't find it nerve-wracking to try doing several things at once.
12. Regardless of what they do, people, as human beings, should be given equal respect.
13. My feelings don't get hurt easily.
14. I can't stand to see kids do sloppy work.
15. If someone doesn't understand my explanation, I usually repeat verbatim what I have said.
16. I spend my free time in much the same way as I always have in the past.
17. Arguments with someone about my beliefs upset me not at all.
18. You can tell whether a person is good or bad by the kinds of mistakes he makes.
19. I like to have a place for everything and keep it there.
20. Most people can be handled in much the same way.

OVER

21. Even if I don't let it show, I usually get mad if someone won't let me do things my own way.

22. There are two ways to teach, the right way and the wrong way.

23. I blush a lot.

24. I have almost nothing in common with the kids in school.

25. In a new group, I make absolutely sure of who is important before I voice an opinion.

26. The answers to most questions are really quite simple.

27. I often like to try something new.

28. When I am playing a game, I usually stick to one system of playing.

29. Children shouldn't be allowed to argue with teachers because they might make the teacher look bad.

30. Very few things make me nervous.

31. Whenever I get anxious, I usually do something to take my mind off the problem rather than trying to resolve it.

32. When I make a mistake, I usually don't tell anyone about it.

33. It bothers me when people express ideas very different from my own.

34. It doesn't bother me if I don't have any particular schedule to follow.

35. When someone criticizes me, I get angry.

36. There should be very few exceptions allowed to rules.

37. I don't understand how some people believe what they do.

38. I don't like people who try to get me to change my way of doing things.

39. All kids should be handled in the same way.

40. There are few similarities of importance among various peoples of the world.

STOP

APPENDIX B

SCORING OF INSTRUMENTS

```
C       SCORING OF TEACHER ATTITUDE RESEARCH INVENTORY
        DIMENSION ISCALE(15), X(45)
        DATA DECK/2H13/
        INTEGER X
      1 FORMAT(A2,2X,45I1)
      2 FORMAT(2A2,5X,15I4)
      3 FORMAT(1H ,2A2,5X,15I4)
    100 READ(1,1)D,X
C       IRRITABILITY
        ISCALE(1)=21-(X(5)+X(14)+X(23)+X(32)+X(41))
C       REVERSE IRRITABILITY
        ISCALE(2)= X(9)+X(18)+X(27)+X(36)+X(45)
C       REVERSE DEIFICATION
        ISCALE(3)= X(3)+X(12)+X(21)+X(30)+X(39)
C       DEIFICATION
        ISCALE(4)= 21 -(X(8)+X(17)+X(26)+X(35)+X(44))
C       EXCLUDING OUTSIDE INFLUENCES
        ISCALE(5)= 21 - (X(4)+X(13)+X(22)+X(31)+X(40))
C       REVERSE EXCLUDING OUTSIDE INFLUENCES
        ISCALE(6)+ X(7)+X(16)+X(25)+X(34)+X(43)
C       DECEPTION
        ISCALE(7)=  21 - (X(6)+X(15)+X(24)+X(33)+X(42))
C       EQUALITARIANISM
        ISCALE(8)= 21 - (X(2)+X(11)+X(20)+X(29)+X(38))
C       ENCOURAGING VERBALISM
        ISCALE(9)= 21 - (X(1)+X(10)+X(19)+X(28)+X(37))
C       COMBINE REVERSED SCALES
C       IRRITABILITY
        ISCALE(10)=ISCALE(1)+ISCALE(2)
C       DEIFICATION
        ISCALE(11)=ISCALE(3)+ISCALE(4)
C       EXCLUDING OUTSIDE INFLUENCES
        ISCALE(12)=ISCALE(5)+ISCALE(6)
C       CONTROL - AUTONOMY FROM DEIFICATION AND EXCLUDING OUTSIDE
C       INFLUENCES
        ISCALE(13)= 43 - (ISCALE(11)+ISCALE(12))
C       WARMTH IS REVERSE OF IRRITABILITY
        ISCALE(14)= 22 - ISCALE(10)
C       EQUALITARINAISM
        ISCALE(15)=ISCALE(8)+ISCALE(9)
        WRITE(2,2)D, DECK,ISCALE
        WRITE(3,3)D, DECK,ISCALE
        GO TO 100
        STOP
        END
```

APPENDIX C

RELIABILITY DATA

TABLE VII

INTERCORRELATIONS OF SCORES ON THE GUILFORD USES FOR THINGS

Score	Bricks	Pencils	Paper Clips	Toothpicks	Paper	Total
Bricks	1.000	543	443	466	345	741
Pencils	543	1.000	481	306	521	760
Paper Clips	443	481	1.000	375	497	756
Toothpicks	466	306	375	1.000	402	654
Paper	345	521	497	402	1.000	777
Total	741	760	756	654	777	1.000

TABLE VIII

INTERCORRELATIONS OF PARAGRAPH COMPLETION STEMS CONTRIBUTING TO GENERAL ABSTRACTNESS

Stem	Rules	Criticize	Doubt	Tells	Confusion	Means	$\bar{X}$ top 2
Rules	1.000	190	021	429	173	227	540
Critize	190	1.000	120	-020	420	160	526
Doubt	021	120	1.000	-118	252	-021	445
Tells	429	-020	-118	1.000	219	317	450
Confusion	173	420	252	219	1.000	-038	562
Means	227	160	-021	317	-038	1.000	506
$\bar{X}$ top 2	540	526	445	450	562	506	1.000

TABLE IX

INTERCORRELATIONS OF PARAGRAPH COMPLETION STEMS CONTRIBUTING TO EDUCATIONAL DOMAIN ABSTRACTNESS

Stem	Learn	Teach	$\bar{X}$
Learn	1.000	188	755
Teach	188	1.000	786
$\bar{X}$	755	786	1.000

TABLE X

INTERCORRELATIONS OF SCORES FROM EDUCATIONAL VIEWS QUESTIONNAIRE

	AUTONOMY							
Topic	Discipline	Standards	Opinions	Criticism	Criteria	Important	$\bar{X}$	INTRINSIC ACCEPTANCE Performance
Discipline	1.000	027	153	287	119	311	564	207
Standards	027	1.000	186	-045	173	083	399	155
Opinions	153	186	1.000	064	182	203	596	404
Criticism	287	-045	064	1.000	253	007	481	-068
Criteria	119	173	182	253	1.000	075	602	034
Important	311	083	203	007	075	1.000	529	152
$\bar{X}$	564	399	596	481	602	529	1.000	288
Performance	207	155	404	-068	034	152	288	1.000

APPENDIX D

CORRELATION MATRICES

TABLE XI

INTERCORRELATIONS OF PHENOTYPIC OPERATIONAL DEFINITIONS - TOTAL SAMPLE

Variable	Source	1	2	3	4	5	6	7	8	9	10	11
1	TARI Autonomy	1.000	405	137	-087	-059	-196	003	066	592	104	126
2	EVQ Autonomy	405	1.000	207	-078	-013	-014	043	102	276	164	296
3	CRT Cont-Nond	137	207	1.000	542	-142	209	-334	-369	094	-396	096
4	CRT Inf-Unst	-087	-078	542	1.000	-369	088	-337	-555	036	-406	-052
5	CRT Drill-Con	-059	-013	-142	-369	1.000	-013	483	427	-135	272	-112
6	TARI Warmth	-196	-014	209	088	-013	1.000	-102	-161	-102	-171	245
7	CRT Dist-Invol	003	043	-334	-337	483	-102	1.000	662	071	563	-089
8	CRT Host-Warm	066	102	-369	-555	427	-161	662	1.000	014	627	072
9	TARI Equal	592	276	094	036	-135	-102	071	014	1.000	178	055
10	CRT Crit-Acc	104	164	-396	-406	272	-171	563	627	178	1.000	055
11	EVQ Intr Acc	126	296	096	-052	-112	245	-089	072	055	055	1.000

TABLE XII

INTERCORRELATIONS OF PHENOTYPIC OPERATIONAL DEFINITIONS - LOWER CLASS SUBSAMPLE

Variable	Source	1	2	3	4	5	6	7	8	9	10	11
1	TARI Autonomy	1.000	364	297	077	-122	-183	-164	-118	645	-126	093
2	EVQ Autonomy	364	1.000	344	137	136	-003	-035	-159	047	-037	331
3	CRT Cont-Nond	297	344	1.000	689	-163	360	-375	-371	382	-398	126
4	CRT Inf-Unst	077	137	689	1.000	-349	322	-369	-624	311	-403	082
5	CRT Drill-Con	-122	136	-163	-349	1.000	-210	450	430	-180	466	-180
6	TARI Warmth	-183	-003	360	322	-210	1.000	-026	-233	-128	-196	096
7	CRT Dist-Invol	-164	-035	-375	-369	450	-026	1.000	663	032	856	-126
8	CRT Host-Warm	-118	-159	-371	-624	430	-233	663	1.000	-046	674	002
9	TARI Equal	645	047	382	311	-180	-128	032	-046	1.000	-046	110
10	CRT Crit-Acc	-126	-037	-398	-403	466	-196	856	674	-046	1.000	-029
11	EVQ Intr Acc	093	331	126	082	-180	096	-126	002	110	-029	1.000

TABLE XIII

INTERCORRELATIONS OF PHENOTYPIC OPERATIONAL DEFINITIONS - MIDDLE CLASS SUBSAMPLE

Variable	Source	1	2	3	4	5	6	7	8	9	10	11
1	TARI Autonomy	1.000	510	-078	-159	-134	-306	088	342	667	373	221
2	EVQ Autonomy	510	1.000	-011	-096	-366	-116	-024	230	418	210	331
3	CRT Cont-Nond	-078	-011	1.000	521	-223	148	-436	-439	-102	-361	124
4	CRT Inf-Unst	-159	-096	521	1.000	-487	-077	-317	-667	-013	-668	-140
5	CRT Drill-Con	-134	-386	-233	-487	1.000	145	328	327	-371	367	-094
6	TARI Warmth	-306	-116	148	-077	145	1.000	-145	-106	-270	-221	275
7	CRT Dist-Invol	088	-024	-436	-317	328	-145	1.000	619	056	521	-031
8	CRT Host-Warm	342	230	-439	-667	327	-106	619	1.000	104	862	667
9	TARI Equal	667	418	-102	-013	-371	-270	056	104	1.000	262	021
10	CRT Crit-Acc	373	210	-361	-668	367	-221	521	862	262	1.000	060
11	EVQ Intr Acc	221	331	124	-140	-094	275	-031	667	021	060	1.000

TABLE XIV

INTERCORRELATIONS OF PHENOTYPIC OPERATIONAL DEFINITIONS - UPPER CLASS SUBSAMPLE

Variable	Source	1	2	3	4	5	6	7	8	9	10	11
1	TARI Autonomy	1.000	274	235	-342	203	007	246	-056	395	096	-116
2	EVQ Autonomy	274	1.000	254	-476	326	069	435	436	536	517	158
3	CRT Cont-Nond	235	254	1.000	-195	514	270	296	027	248	-282	126
4	CRT Inf-Unst	-342	-476	-195	1.000	-320	031	-319	-113	-356	-012	-129
5	CRT Drill-Con	203	326	514	-320	1.000	017	801	614	001	-242	-053
6	TARI Warmth	007	069	270	031	017	1.000	-189	-198	249	-153	437
7	CRT Dist-Invol	246	435	296	-319	801	-189	1.000	804	053	013	-188
8	CRT Host-Warm	-056	436	027	-113	614	-198	804	1.000	-143	144	-093
9	TARI Equal	395	536	248	-356	001	249	053	-143	1.000	274	054
10	CRT Crit-Acc	096	517	-282	-012	-242	-153	013	144	274	1.000	182
11	EVQ Intr Acc	-116	158	126	-129	-053	437	-188	-093	054	182	1.000

TABLE XV

INTERCORRELATIONS OF GENOTYPIC OPERATIONAL DEFINITIONS - TOTAL SAMPLE

Variable	Source	1	2	3	4	5	6	7	8	9	10	11	12
1	B/Students Hostile-Friend	1.000	496	538	474	384	489	382	449	417	375	489	413
2	B/Students Attent-Inattent	496	1.000	412	448	324	279	310	468	445	345	374	444
3	B/Students Convergent-Diverg	538	412	1.000	610	420	394	473	574	484	579	419	610
4	B/Students Approp-Inapprop	474	448	610	1.000	586	507	330	468	408	481	621	571
5	B/Students Simple-Complex	384	324	420	586	1.000	270	292	516	313	456	567	394
6	Students Intep Sensitivity	489	279	394	507	270	1.000	465	400	540	455	445	433
7	Students Indep-Dependent	382	310	473	330	292	465	1.000	467	465	514	398	370
8	Students Flexible-Rigid	449	468	574	468	516	400	467	1.000	589	529	528	590
9	Students Curious-Withdrawn	417	445	484	408	313	540	465	589	1.000	495	486	591
10	Students Memory-Concept	375	345	579	481	456	455	514	529	495	1.000	496	466
11	Students Maladjusted-Adju	489	374	419	621	567	445	398	528	486	496	1.000	553
12	Teacher Distant-Involved	413	444	610	571	394	433	370	590	591	466	553	1.000
13	Teacher Critical-Accepting	491	362	538	610	461	491	453	500	543	401	576	556
14	Teacher Control-Nondirect	387	277	421	425	390	394	331	500	440	420	440	542
15	Teacher Inform-Unstruct	418	399	589	490	294	496	359	541	473	526	529	620
16	Teacher Hostile-Warm	395	283	478	446	371	347	408	547	398	432	469	413
17	Teacher Drill-Concept	378	256	467	513	344	426	332	436	370	592	399	301
18	B/Scales No. diff. dim.	609	533	635	695	719	408	426	544	471	480	566	569
19	B/Scales No. Eigen. gt. 1	388	305	270	196	163	266	230	318	296	311	270	242
20	B/Scales No. diff. dim.	463	482	512	537	504	564	585	590	667	626	561	588
21	B/Scales No. Eigen. gt. 1	311	263	377	191	254	273	308	352	437	360	117	410
22	B/Scales No. diff. dim.	539	330	619	592	484	558	467	576	560	602	561	619
23	B/Scales No. Eigen. gt. 1	072	021	121	128	125	114	106	218	099	015	082	104

TABLE XV (continued)

Variable	Source	13	14	15	16	17	18	19	20	21	22	23
1	B/Students Hostile-Friend	491	387	418	395	378	609	388	463	311	539	072
2	B/Students Attent-Inattent	362	277	399	283	256	533	305	482	263	330	021
3	B/Students Convergent-Diverg	538	421	589	478	467	635	270	512	377	619	121
4	B/Students Approp-Inapprop	610	425	490	446	513	695	196	537	191	592	128
5	B/Students Simple-Complex	461	390	294	371	344	719	163	504	254	484	125
6	Students Intep Sensitivity	491	394	496	347	426	408	266	564	273	558	114
7	Students Indep-Dependent	453	331	359	408	332	426	230	585	308	467	106
8	Students Flexible-Rigid	500	500	541	547	436	544	318	590	352	576	218
9	Students Curious-Withdrawn	543	440	473	398	370	471	296	667	437	560	099
10	Students Memory-Concept	401	420	526	432	592	480	311	626	360	602	015
11	Students Maladjusted-Adju	576	440	529	469	399	566	270	561	117	561	082
12	Teacher Distant-Involved	556	592	620	413	301	569	242	588	410	619	104
13	Teacher Critical-Accepting	1.000	498	583	703	446	603	267	562	293	686	186
14	Teacher Control-Nondirect	498	1.000	494	378	363	468	267	516	319	618	162
15	Teacher Inform-Unstruct	583	494	1.000	573	558	471	152	586	324	701	040
16	Teacher Hostile-Warm	703	378	573	1.000	614	430	196	407	188	647	191
17	Teacher Drill-Concept	446	363	558	614	1.000	436	314	496	352	656	096
18	B/Scales No. diff. dim.	603	468	471	430	436	1.000	438	726	440	711	285
19	B/Scales No. Eigen. gt. 1	267	267	152	196	314	438	1.000	291	196	314	438
20	B/Scales No. diff. dim.	562	516	586	407	496	726	291	1.000	570	798	278
21	B/Scales No. Eigen. gt. 1	293	319	324	188	352	440	196	570	1.000	471	125
22	B/Scales No. diff. dim.	686	618	701	647	656	711	314	798	471	1.000	385
23	B/Scales No. Eigen. gt. 1	186	162	040	191	096	285	438	278	125	385	1.000

TABLE XVI

INTERCORRELATIONS OF GENOTYPIC OPERATIONAL DEFINITIONS - LOWER CLASS SUBSAMPLE

Variable	Source	1	2	3	4	5	6	7	8	9	10	11	12
1	B/Students Hostile-Friend	1.000	648	567	594	411	431	575	492	366	442	563	355
2	B/Students Attent-Inattent	648	1.000	553	576	359	191	223	624	379	294	406	431
3	B/Students Convergent-Diverg	567	553	1.000	514	291	359	387	653	399	598	308	580
4	B/Students Approp-Inapprop	594	576	514	1.000	375	496	286	345	223	417	602	464
5	B/Students Simple-Complex	411	359	291	375	1.000	124	337	437	083	382	618	158
6	Students Intep Sensitivity	431	191	359	496	124	1.000	517	225	426	386	400	265
7	Students Indep-Dependent	575	223	387	286	337	517	1.000	402	419	274	320	420
8	Students Flexible-Rigid	492	624	653	345	437	225	402	1.000	586	406	311	562
9	Students Curious-Withdrawn	366	379	399	223	083	426	419	586	1.000	369	145	423
10	Students Memory-Concept	442	294	598	417	382	386	274	406	369	1.000	413	378
11	Students Maladjusted-Adju	563	406	308	602	618	400	320	311	145	413	1.000	316
12	Teacher Distant-Involved	355	431	580	464	158	265	420	562	423	378	316	1.000
13	Teacher Critical-Accepting	478	305	473	547	293	392	482	511	380	217	435	350
14	Teacher Control-Nondirect	277	149	440	179	081	251	217	552	227	311	129	475
15	Teacher Inform-Unstruct	557	422	732	464	210	558	515	674	440	583	416	600
16	Teacher Hostile-Warm	516	273	597	467	213	299	436	556	267	460	551	436
17	Teacher Drill-Concept	580	467	676	514	129	464	300	459	396	627	468	362
18	B/Scales No. diff. dim.	652	698	656	671	679	331	536	630	360	504	553	490
19	B/Scales No. Eigen. gt. 1	455	459	498	417	087	306	362	388	422	409	362	475
20	B/Scales No. diff. dim.	468	453	542	321	471	422	555	592	569	648	362	480
21	B/Scales No. Eigen. gt. 1	289	462	547	121	432	251	404	680	494	413	014	542
22	B/Scales No. diff. dim.	637	389	721	520	191	472	514	592	468	656	553	541
23	B/Scales No. Eigen. gt. 1	672	218	253	094	359	-077	189	200	156	125	092	202

TABLE XVI (Continued)

Variable	Source	13	14	15	16	17	18	19	20	21	22	23
1	B/Students Hostile-Friend	478	277	557	516	580	652	455	468	289	637	672
2	B/Students Attent-Inattent	305	149	422	273	467	698	459	453	462	389	218
3	B/Students Convergent-Diverg	473	440	732	597	676	656	498	542	547	721	253
4	B/Students Approp-Inapprop	547	179	464	467	514	671	417	321	121	520	094
5	B/Students Simple-Complex	293	081	210	213	129	679	087	471	432	191	359
6	Students Intep Sensitivity	392	251	558	299	464	331	306	422	251	472	-077
7	Students Indep-Dependent	482	217	515	436	300	536	362	555	404	514	189
8	Students Flexible-Rigid	511	552	674	556	459	630	388	592	680	592	200
9	Students Curious-Withdrawn	380	227	440	267	396	360	422	569	494	468	156
10	Students Memory-Concept	217	311	583	460	627	504	409	648	413	656	125
11	Students Maladjusted-Adju	435	129	416	551	468	553	362	362	014	553	092
12	Teacher Distant-Involved	350	475	600	436	362	490	475	480	542	541	202
13	Teacher Critical-Accepting	1.000	174	533	685	472	555	397	387	342	608	258
14	Teacher Control-Nondirect	174	1.000	509	339	209	204	000	243	342	462	022
15	Teacher Inform-Unstruct	533	509	1.000	768	790	481	360	535	512	753	011
16	Teacher Hostile-Warm	685	339	768	1.000	725	375	345	254	194	639	045
17	Teacher Drill-Concept	472	209	790	725	1.000	364	450	390	310	644	-007
18	B/Scales No. diff. dim.	555	204	481	375	364	1.000	563	737	573	658	375
19	B/Scales No. Eigen. gt. 1	397	000	360	345	450	563	1.000	548	388	534	009
20	B/Scales No. diff. dim.	387	243	535	254	390	737	548	1.000	780	708	336
21	B/Scales No. Eigen. gt. 1	342	342	512	194	310	573	388	780	1.000	450	280
22	B/Scales No. diff. dim.	608	462	753	639	644	658	534	708	450	1.000	352
23	B/Scales No. Eigen. gt. 1	258	022	011	045	-007	375	009	336	280	352	1.000

TABLE XVII

INTERCORRELATIONS OF GENOTYPIC OPERATIONAL DEFINITIONS - MIDDLE CLASS SUBSAMPLE

Variable	Source	1	2	3	4	5	6	7	8	9	10	11	12
1	B/Students Hostile-Friend	1.000	396	459	435	391	704	271	450	655	335	480	480
2	B/Students Attent-Inattent	396	1.000	272	231	315	371	233	344	390	355	236	304
3	B/Students Convergent-Diverg	459	272	1.000	755	643	570	578	629	708	727	542	645
4	B/Students Approp-Inapprop	435	231	755	1.000	737	602	347	603	542	609	629	634
5	B/Students Simple-Complex	391	315	643	737	1.000	424	314	652	532	608	534	651
6	Students Intep Sensitivity	704	371	570	602	424	1.000	351	566	765	500	499	613
7	Students Indep-Dependent	271	233	578	347	314	351	1.000	589	442	573	362	296
8	Students Flexible-Rigid	450	344	629	603	652	566	589	1.000	643	718	721	623
9	Students Curious-Withdrawn	655	390	708	542	532	765	442	643	1.000	509	776	756
10	Students Memory-Concept	335	355	727	609	608	500	573	718	509	1.000	418	502
11	Students Maladjusted-Adju	480	236	542	629	534	499	362	721	776	418	1.000	739
12	Teacher Distant-Involved	480	304	645	634	651	613	296	623	756	502	739	1.000
13	Teacher Critical-Accepting	606	394	683	624	603	637	442	662	761	504	747	823
14	Teacher Control-Nondirect	526	268	584	607	705	581	392	706	680	572	717	722
15	Teacher Inform-Unstruct	414	375	586	605	492	504	208	476	549	398	530	673
16	Teacher Hostile-Warm	452	299	444	367	500	456	469	520	524	475	428	379
17	Teacher Drill-Concept	244	027	348	542	444	423	328	427	288	405	284	180
18	B/Scales No. diff. dim.	621	428	702	697	706	687	446	580	674	522	554	690
19	B/Scales No. Eigen. gt. 1	256	102	206	067	245	343	190	254	324	194	106	-010
20	B/Scales No. diff. dim.	599	511	631	706	519	768	574	629	705	597	638	690
21	B/Scales No. Eigen. gt. 1	564	180	554	497	372	701	593	487	580	676	378	549
22	B/Scales No. diff. dim.	549	266	664	685	585	698	474	577	635	568	529	680
23	B/Scales No. Eigen. gt. 1	256	-024	300	383	245	411	297	254	270	313	202	093

TABLE XVII (continued)

Variable	Source	13	14	15	16	17	18	19	20	21	22	23
1	B/Students Hostile-Friend	606	526	414	452	244	621	256	599	564	549	256
2	B/Students Attent-Inattent	394	268	375	299	027	428	102	511	180	266	-024
3	B/Students Convergent-Diverg	683	584	586	444	348	702	206	631	554	664	300
4	B/Students Approp-Inapprop	624	607	605	367	542	697	067	706	497	685	383
5	B/Students Simple-Complex	603	705	492	500	444	706	245	519	372	585	244
6	Students Intep Sensitivity	637	581	504	456	423	687	343	768	701	698	411
7	Students Indep-Dependent	442	392	208	469	328	446	190	574	593	474	297
8	Students Flexible-Rigid	662	706	476	520	427	580	254	629	487	577	254
9	Students Curious-Withdrawn	761	680	549	524	288	674	324	705	580	635	270
10	Students Memory-Concept	504	572	398	475	408	522	194	597	676	568	313
11	Students Maladjusted-Adju	747	717	530	428	284	554	106	638	378	529	202
12	Teacher Distant-Involved	823	722	673	379	180	690	-010	690	549	680	093
13	Teacher Critical-Accepting	1.000	764	765	688	310	725	071	763	634	805	336
14	Teacher Control-Nondirect	764	1.000	564	512	453	732	242	689	512	756	441
15	Teacher Inform-Unstruct	765	564	1.000	553	384	559	-221	652	494	731	129
16	Teacher Hostile-Warm	688	512	553	1.000	607	565	140	578	592	743	577
17	Teacher Drill-Concept	310	453	384	607	1.000	478	181	532	470	676	626
18	B/Scales No. diff. dim.	725	732	559	565	478	1.000	383	803	546	801	447
19	B/Scales No. Eigen. gt. 1	071	242	-221	140	181	383	1.000	123	041	084	370
20	B/Scales No. diff. dim.	763	689	652	578	532	803	123	1.000	706	850	410
21	B/Scales No. Eigen. gt. 1	634	512	494	592	470	546	041	706	1.000	717	349
22	B/Scales No. diff. dim.	805	756	731	743	676	801	084	850	717	1.000	586
23	B/Scales No. Eigen. gt. 1	336	441	129	577	626	447	370	410	349	586	1.000

TABLE XVIII

INTERCORRELATIONS OF GENOTYPIC OPERATIOAL DEFINITIONS -- UPPER CLASS SUBSAMPLE

Variable	Source	1	2	3	4	5	6	7	8	9	10	11	12
1	B/Students Hostile-Friend	1.000	382	664	184	134	140	289	452	000	196	173	205
2	B/Students Attent-Inattent	382	1.000	294	483	272	378	557	471	635	372	544	664
3	B/Students Convergent-Diverg	664	294	1.000	461	303	245	414	483	186	351	373	534
4	B/Students Approp-Inapprop	184	483	461	1.000	838	417	341	562	520	366	614	663
5	B/Students Simple-Complex	134	272	303	838	1.000	237	143	455	452	308	420	450
6	Students Intep Sensitivity	140	378	245	417	237	1.000	662	504	528	472	398	547
7	Students Indep-Dependent	289	557	414	341	143	662	1.000	378	599	737	620	440
8	Students Flexible-Rigid	452	471	483	562	455	504	378	1.000	555	496	634	717
9	Students Curious-Withdrawn	000	635	186	520	452	528	599	555	1.000	690	647	739
10	Students Memory-Concept	196	372	351	366	308	472	737	496	690	1.000	741	513
11	Students Maladjusted-Adju	173	544	373	614	420	398	620	634	647	741	1.000	733
12	Teacher Distant-Involved	203	664	534	663	450	547	440	717	739	513	733	1.000
13	Teacher Critical-Accepting	190	384	334	690	649	559	445	636	534	563	562	583
14	Teacher Control-Nondirect	081	415	-116	394	352	384	316	178	358	273	344	230
15	Teacher Inform-Unstruct	010	390	167	274	010	308	415	431	386	626	802	547
16	Teacher Hostile-Warm	017	304	240	579	614	329	302	612	513	368	357	433
17	Teacher Drill-Concept	204	208	248	428	584	340	361	431	454	780	458	325
18	B/Scales No. diff. dim.	266	344	335	734	851	-068	135	397	320	276	517	358
19	B/Scales No Eigen. gt. 1	468	351	016	030	039	-039	121	258	078	251	335	108
20	B/Scales No. diff. dim.	-015	555	172	562	537	521	652	538	818	690	746	640
21	B/Scales No. Eigen. gt. 1	-021	110	-174	-179	137	-058	-194	-060	207	028	-158	091
22	B/Scales No. diff. dim.	028	361	215	516	577	440	347	641	674	566	578	628
23	B/Scales No. Eigen. gt. 1	-290	-218	-422	-132	-227	050	-319	120	-235	-527	-201	-139

TABLE XVIII(continued)

Variable	Source	13	14	15	16	17	18	19	20	21	22	23
1	B/Students Hostile-Friend	190	081	010	017	204	266	468	-015	-021	028	-290
2	B/Students Attent-Inattent	384	415	390	304	208	344	351	555	110	361	-218
3	B/Students Convergent-Diverg	334	-116	167	240	248	335	016	172	-174	215	-422
4	B/Students Approp-Inapprop	690	394	274	579	428	734	030	562	-179	516	-132
5	B/Students Simple-Complex	649	352	010	614	584	851	039	537	137	577	-227
6	Students Intep Sensitivity	559	384	308	329	340	-068	-039	521	-058	440	050
7	Students Indep-Dependent	445	316	415	302	361	135	121	652	-194	347	-319
8	Students Flexible-Rigid	636	178	431	612	431	397	258	538	-060	641	120
9	Students Curious-Withdrawn	534	358	386	513	454	320	078	818	207	674	-235
10	Students Memory-Concept	563	273	626	368	780	276	251	690	028	566	-527
11	Students Maladjusted-Adju	562	344	802	357	458	517	335	746	-158	578	-201
12	Teacher Distant-Involved	583	230	547	433	325	358	108	640	091	628	-139
13	Teacher Critical-Accepting	1.000	613	325	824	615	406	328	544	-224	680	-142
14	Teacher Control-Nondirect	613	1.000	300	284	382	306	655	526	017	526	043
15	Teacher Inform-Unstruct	325	300	1.000	076	406	140	351	544	-145	494	-062
16	Teacher Hostile-Warm	824	284	076	1.000	424	365	-005	438	-282	599	-005
17	Teacher Drill-Concept	615	382	406	424	1.000	477	289	577	266	659	-493
18	B/Scales No. diff. dim.	406	306	140	365	477	1.000	266	537	165	464	-234
19	B/Scales No. Eigen. gt. 1	328	655	351	-005	289	266	1.000	200	122	231	-103
20	B/Scales No. diff. dim.	544	526	544	438	577	537	200	1.000	222	838	-074
21	B/Scales No. Eigen. gt. 1	-224	017	-145	-282	266	165	122	222	1.000	194	-203
22	B/Scales No. diff. dim.	680	526	494	599	659	464	231	838	194	1.000	055
23	B/Scales No. Eigen. gt. 1	-142	043	-062	-005	-493	-234	-103	-074	-203	055	1.000

APPENDIX E

FACTOR MATRICES

TABLE XIX

FACTOR LOADINGS OF PHENOTYPIC OPERATIONAL DEFINITIONS AFTER ROTATION TO IDEAL LOADINGS CANONICAL SOLUTION - TOTAL GROUP

Source	Operational Definition	Interdependent Predisposition	Warmth	Intrinsic Acceptance	h^2
TARI	Autonomy	431[a]	-203	717	741
EVQ	Autonomy	384	035	347	269
CRT	Cont-Nondirective	909	-137	-394	1.000
CRT	Inform-Unstructured	359	-405	-406	458
CRT	Drill-Concept	-050	550	054	308
TARI	Warmth	100	-016	-295	097
CRT	Distant-Involved	-138	683	292	571
CRT	Hostility-Warmth	-121	788	383	782
TARI	Equalitarianism	324	-179	570	462
CRT	Critical-Accepting	-158	547	449	611
EVQ	Intrinsic Acceptance	153	011	105	034
Proportion of Variance[b]		283	371	346	

[a] Leading zeros and decimal points have been omitted.

[b] Based on these three factors only.

TABLE XX

FACTOR LOADINGS OF PHENOTYPIC OPERATIONAL DEFINITIONS
AFTER ROTATION TO IDEAL LOADINGS
PRINCIPAL COMPONENTS SOLUTION - LOWER CLASS GROUP

Source	Operational Definition	Interdependent Predisposition	Warmth	Intrinsic Acceptance	h^2
TARI	Autonomy	449[a]	-447	588	747
EVQ	Autonomy	617	-073	297	474
CRT	Cont-Nondirective	835	-043	-188	734
CRT	Inform-Unstructured	685	-080	-426	657
CRT	Drill-Concept	-180	468	382	397
TARI	Warmth	422	424	-603	721
CRT	Distant-Involved	-207	791	465	885
CRT	Hostility-Warmth	-390	513	547	714
TARI	Equalitarianism	478	-185	487	500
CRT	Critical-Accepting	-257	692	537	833
EVQ	Intrinsic Acceptance	433	-098	122	212
Proportion of Variance		243	187	205	635

[a]Leading zeros and decimal points have been omitted.

TABLE XXI

FACTOR LOADINGS OF PHENOTYPIC OPERATIONAL DEFINITIONS
AFTER ROTATION TO IDEAL LOADINGS
PRINCIPAL COMPONENTS SOLUTION - MIDDLE CLASS GROUP

Source	Operational Definition	Interdependent Predisposition	Warmth	Intrinsic Acceptance	h^2
TARI	Autonomy	256[a]	-112	799	716
EVQ	Autonomy	526	004	631	675
CRT	Cont-Nondirective	534	-224	-374	475
CRT	Inform-Unstructured	298	-688	-399	721
CRT	Drill-Concept	-536	593	-133	657
TARI	Warmth	370	552	-466	659
CRT	Distant-Involved	-529	318	392	535
CRT	Hostility-Warmth	-268	594	659	859
TARI	Equalitarianism	202	-378	717	698
CRT	Critical-Accepting	-351	453	692	807
EVQ	Intrinsic Acceptance	671	511	156	736
Proportion of Variance		191	205	289	685

[a]Leading zeros and decimal points have been omitted.

TABLE XXII

FACTOR LOADINGS OF PHENOTYPIC OPERATIONAL DEFINITIONS
AFTER ROTATION TO IDEAL LOADINGS
PRINCIPAL COMPONENTS SOLUTION - UPPER CLASS GROUP

Source	Operational Definition	Interdependent Predisposition	Warmth	Intrinsic Acceptance	h^2
TARI	Autonomy	682[a]	-323	130	586
EVQ	Autonomy	445	375	650	761
CRT	Cont-Nondirective	695	163	-062	513
CRT	Inform-Unstructured	-604	-052	-270	440
CRT	Drill-Concept	629	650	-270	891
TARI	Warmth	159	029	331	136
CRT	Distant-Involved	525	683	-171	771
CRT	Hostility-Warmth	127	855	-081	754
TARI	Equalitarianism	540	-282	596	726
CRT	Critical-Accepting	-236	097	738	610
EVQ	Intrinsic Acceptance	-126	265	581	424
Proportion of Variance		253	201	193	646

[a]Leading zeros and decimal points have been omitted.

TABLE XXIII

FACTOR LOADINGS OF GENOTYPIC OPERATIONAL DEFINITIONS AFTER ROTATION TO IDEAL LOADINGS PRINCIPAL COMPONENTS SOLUTION - LOWER CLASS SUBSAMPLE

Source	Operational Definition	B Disc.	P Disc.	E Disc.	B Diff.	P Diff.	E Diff.	h^2
B/Students	Hostile-Friend	534[a]	460	327	240	-041	053	666
B/Students	Attent-Inattent	679	006	233	467	265	039	805
B/Students	Convergent-Diver	420	230	634	199	302	060	766
B/Students	Approp-Inapprop	625	309	311	287	-227	034	718
B/Students	Simple-Complex	738	377	-188	-254	120	275	877
Students	Intep Sensitivity	-014	802	238	131	-068	-128	738
Students	Indep-Dependent	009	725	197	127	080	391	740
Students	Flexible-Rigid	376	128	569	088	463	271	794
Students	Curious-Withdrawn	-078	435	308	417	403	083	633
Students	Memory-Concept	417	506	308	-026	313	-236	679
Students	Maladjusted-Adju	669	469	151	-010	310	094	795
Teacher	Distant-Involved	233	177	542	190	367	138	569
Teacher	Critical-Accepting	189	357	500	279	-204	530	814
Teacher	Control-Nondirect	088	129	623	-453	369	019	754
Teacher	Inform-Unstruct	221	467	772	026	149	-034	887
Teacher	Hostile-Warm	272	292	781	024	-255	151	858
Teacher	Drill-Concept	317	355	663	265	-073	-232	795
B/Scales	No. diff. dim.	688	403	121	278	275	347	924
B/Scales	No. Eigen. gt. 1	255	328	213	699	151	-093	738
P/Scales	No. diff. dim.	298	614	099	224	587	188	906
P/Scales	No. Eigen. gt. 1	128	273	261	203	769	204	833
E/Scales	No. diff. dim.	332	528	554	124	158	217	783
E/Scales	No. Eigen. gt. 1	125	-058	011	127	230	742	639
Proportion of Variance		162	173	189	076	101	069	770

[a]Leading zeros and decimal points have been omitted.

TABLE XXIV

FACTOR LOADINGS OF GENOTYPIC OPERATIONAL DEFINITIONS AFTER ROTATION TO IDEAL LOADINGS PRINCIPAL COMPONENTS SOLUTION - MIDDLE CLASS SUBSAMPLE

Source	Operational Definition	B Disc.	P Disc.	E Disc.	B Diff.	P Diff.	E Diff.	h^2
B/Students	Hostile-Friend	228[a]	299	398	459	468	-104	740
B/Students	Attent-Inattent	853	-018	-016	112	408	-175	938
B/Students	Convergent-Diverg	399	665	364	-011	033	120	750
B/Students	Approp-Inapprop	406	426	594	-006	-136	213	763
B/Students	Simple-Complex	609	386	444	096	-295	182	846
Students	Intep Sensitivity	217	436	452	412	428	063	798
Students	Indep-Dependent	195	737	-069	-141	333	313	815
Students	Flexible-Rigid	426	695	300	053	-022	110	770
Students	Curious-Withdrawn	256	604	480	349	242	-147	863
Students	Memory-Concept	474	681	116	-142	100	299	821
Students	Maladjusted-Adju	192	562	602	150	-078	-182	777
Teacher	Distant-Involved	303	502	683	025	041	-269	885
Teacher	Critical-Accepting	331	441	696	082	260	-045	865
Teacher	Control-Nondirect	317	480	610	237	-047	125	777
Teacher	Inform-Unstruct	401	118	761	-213	231	-034	854
Teacher	Hostile-Warm	284	210	456	062	377	481	710
Teacher	Drill-Concept	151	126	433	062	052	763	815
B/Scales	No. diff. dim.	500	371	508	353	137	194	827
B/Scales	No. Eigen. gt. 1	154	306	-256	805	-114	244	903
P/Scales	No. diff. dim.	419	426	534	102	411	164	824
P/Scales	No. Eigen. gt. 1	056	569	377	-076	568	247	858
E/Scales	No. diff. dim.	275	328	714	064	305	382	936
E/Scales	No. Eigen. gt. 1	-039	133	309	370	109	745	818
Proportion of Variance		138	210	235	071	076	095	825

[a]Leading zeros and decimal points have been omitted.

TABLE XXV

FACTOR LOADINGS OF GENOTYPIC OPERATIONAL DEFINITIONS AFTER ROTATION TO IDEAL LOADINGS PRINCIPAL COMPONENTS SOLUTION - UPPER CLASS SUBSAMPLE

Source	Operational Definition	B Disc.	P Disc.	E Disc.	B Diff.	P Diff.	E Diff.	h^2
B/Students	Hostile-Friend	629[a]	187	-121	500	-285	-264	846
B/Students	Attent-Inattent	384	578	071	335	175	212	674
B/Students	Convergent-Diver	771	365	-026	-038	-204	-293	857
B/Students	Approp-Inapprop	656	204	545	-087	083	209	827
B/Students	Simple-Complex	620	-104	658	-076	342	055	954
Students	Intep Sensitivity	055	648	327	-169	-088	191	603
Students	Indep-Dependent	100	801	273	-015	-098	-185	770
Students	Flexible-Rigid	546	487	322	080	-044	322	751
Students	Curious-Withdrawn	188	647	383	-096	439	154	826
Students	Memory-Concept	066	717	495	041	175	-385	944
Students	Maladjusted-Adjus	281	698	388	167	104	093	764
Teacher	Distant-Involved	506	663	185	-023	231	293	870
Teacher	Critical-Accepting	316	296	831	048	-152	105	914
Teacher	Control-Nondirect	-120	143	652	553	018	249	828
Teacher	Inform-Unstruct	-101	709	225	261	037	099	643
Teacher	Hostile-Warm	360	122	721	-272	-119	202	793
Teacher	Drill-Concept	155	257	693	138	325	-397	853
B/Scales	No. diff. dim.	650	-102	444	230	378	015	826
B/Scales	No. Eigen. gt. 1	-001	108	252	934	-075	-005	953
P/Scales	No. diff. dim.	130	586	522	073	468	214	903
P/Scales	No. Eigen. gt. 1	-022	-088	-173	234	855	-081	830
E/Scales	No. diff. dim.	176	377	642	076	353	288	799
E/Scales	No. Eigen. gt. 1	-247	-188	-100	-055	-227	851	885
Proportion of Variance		150	215	207	083	087	079	822

[a]Leading zeros and decimal points have been omitted.

APPENDIX F

MEANS OF OTYPES

TABLE XXVI

MEANS OF OTYPES ON STEP II FACTORS

Otype	Types Merged	N	Abstractness	Sensitivity	Flexibility
1		5	29.000	38.800	49.800
2		4	35.750	51.500	47.250
4		7	47.571	37.143	55.571
5		3	50.333	33.333	64.667
6		5	45.800	50.600	33.400
7		10	53.100	48.100	49.200
9		12	45.083	63.250	48.250
(Empirical Type IV)					
10		13	47.000	62.667	72.667
(Empirical Type I-II)					
11		7	57.571	43.857	35.714
12		12	62.333	51.500	53.000
13	4&5	10	48.400	36.000	58.300
(Empirical Type III)					
14	7&12	22	58.136	49.954	51.273
15	6&11	12	52.667	46.667	34.750
16	1&2	9	32.000	44.444	48.667
17	14&15	34	56.206	48.794	45.441
18	9&17	46	53.304	52.567	46.174
19	13&16	19	40.632	40.000	53.737
20	18&19	65	49.600	48.892	48.385
21	10&20	68	49.485	49.500	49.456

APPENDIX G

STATIC CHARACTERISTICS

TABLE XXVII

CROSS TABULATION OF EMPIRICAL TYPES WITH SOCIO-ECONOMIC CLASS

	EMPIRICAL TYPE					
Class*	Type I-II	Type III	Type IV	Otype 16	Otype 17	Total
Lower	3	4	3	3	14	27
Middle	0	1	6	6	13	26
Upper	0	5	3	0	7	15
Total	3	10	12	9	34	68

Chi Square = 15.347

Degrees of Freedom = 8

$p > .10$ ns

*Lloyd W. Warner, Social Class in America, (Chicago: Science Research Associates, Inc. 1949), p. 140

TABLE XXVIII

CROSS TABULATION OF EMPIRICAL TYPES
WITH YEAR IN SCHOOL OF SUBJECT

	EMPIRICAL TYPE					
Class	Type I-II	Type III	Type IV	Otype 16	Otype 17	Total
Junior	2	4	8	5	24	43
Senior	1	5	3	1	7	17
Graduate	0	1	1	3	3	8
Total	3	10	12	9	34	68

Chi Square = 9.107

Degrees of Freedom = 8

$p > .10$ ns

TABLE XXIX

CROSS TABULATION OF EMPIRICAL TYPES WITH TEACHER CORPS MEMBERSHIP

	EMPIRICAL TYPE					
Teacher Corp Member	Type I-II	Type III	Type IV	Otype 16	Otype 17	Total
Yes	1	3	2	3	9	18
No	2	7	10	6	25	50
Total	3	10	12	9	34	68

Chi Square = .947

Degrees of Freedom = 4

$p > .10$ ns

TABLE XXX

CROSS TABULATION OF EMPIRICAL TYPES WITH TEACHING ORIENTATION

Teaching Orientation	EMPIRICAL TYPES					
	Type I-II	Type III	Type IV	Otype 16	Otype 17	Total
Elementary	2	8	9	5	22	46
Secondary	1	1	2	2	8	14
Total	3	9	11	7	30	60

Chi Square = 5.423

Degrees of Freedom = 4

$p > .10$ ns

TABLE XXXI

CROSS TABULATION OF EMPIRICAL TYPES WITH SEX OF SUBJECTS

	EMPIRICAL TYPE					
Sex	Type I-II	Type III	Type IV	Otype 16	Otype 17	Total
Male	0	1	1	4	6	12
Female	3	9	11	5	28	56
Total	3	10	12	9	34	68

Chi Square = 6.209

Degrees of Freedom = 4

$p > .10$ ns

TABLE XXXII

CROSS TABULATION OF EMPIRICAL TYPES WITH INTENTION TO TEACH

Intention to Teach	EMPIRICAL TYPE					
	Type I-II	Type III	Type IV	Otype 16	Otype 17	Total
Yes	3	10	10	7	31	61
No	0	0	1	2	3	6
Total	3	10	11	9	34	67

Chi Square = 3.223

Degrees of Freedom = 4

$p > .10$ ns