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CONSTRUCT VALIDATION OF PORTIONS OF A COGNITIVE DEVELOPMENT THEORY WITH IMPLICATIONS FOR THE PREPARATION OF TEACHERS

by
Jeffrey Weil Eiseman

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
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Doctoral Committee:

Professor Ronald O. Lippitt, Co-Chairman
Professor Robert S. Fox, Co-Chairman
Assistant Professor Mark A. Chesler
Professor Allen Menlo
Professor Theodore M. Newcomb

ABSTRACT

CONSTRUCT VALIDATION OF PORTIONS OF A COGNITIVE DEVELOPMENT THEORY WITH IMPLICATIONS FOR THE PREPARATION OF TEACHERS

by
Jeffrey Weil Eiseman

Co-chairmen: Ronald O. Lippitt and Robert S. Fox

Theories of behavior which assume that some form of cognitive activity intervenes between stimuli and responses are compared and a synthesis is developed around the metaphor that behavior is influenced by an integrated network of structures. Various explanations of structural development are considered and the position is taken that the stimulation of structural development should be a major goal of education in general and of teacher preparation in particular.

Five conditions conducive to structural growth are discussed; although the labels used to identify them may be misinterpreted if the qualifications accompanying their description are not taken into account, a listing of these labels provides a rough idea of what this conceptualization seems to imply. The five conditions are optimal disparity, action, role taking, freedom, and reflection encouragement.

According to Harvey, Hunt, and Schroder in their book Conceptual Systems and Personality Organization, structural growth proceeds in such a way that the individual alternates between being dependent upon and then independent of objects and events. With each successive return to a dependent posture, the individual is more flexible and

less dogmatic. Similarly, with each successive return to an independent posture, the individual is more self-directed and less negative. Harvey et al. classify individuals along a unidimensional developmental continuum. While their theory is used as a foundation, the position is taken that an individual's developmental status can be more accurately described on a multidimensional continuum. The following dimensions are employed, again relying heavily on Harvey et al.: Absolutism, Negativism, Field Dependence, Self-Absorption, and Interdependence. Scales to measure the five dimensions were constructed and validated using data collected on 63 future teachers enrolled in a Foundations of Education course. The data provided support for a number of hypotheses which had one unifying theme, namely that the dimensions carry developmental significance.

An algorithm is presented for sorting an individual's dimensional profile into one of fifteen diagnostic patterns. An explication of each diagnostic pattern is provided including a description of the profile, a statement of the appropriate instructional task, and recommendations for designing the conditions conducive to accomplishing the specified task. Possible ways in which these recommendations could be used by teacher educators are then discussed. These include suggestions regarding independent study programs, grouping patterns, teacher-student matching, and direct feedback counseling.

Suggestions for future research are discussed including the need for cross-sectional and longitudinal data, the determination of the behavioral correlates of the various scales, and the securing of a data-based rationale for retaining or changing the tentative procedures for interpreting scores.

ACKNOWLEDGEMENTS

One of the major tenets of the theory advocated in the following pages is that an individual develops a cognitive structure which enables him to perform. It is possible for someone to show another person how to perform a particular operation without stimulating structural development. The important help that I have received from the members of my committee has been the long-term developmentally-oriented type of help--the kind of help which as I see it is both far rarer and far more meaningful.

Ronald Lippitt has influenced my growth and development since 1962. Many of the ideas contained in this study originated several years ago as a result of my interaction with him. More important, perhaps, and this comment holds true for Theodore Newcomb as well, his approach to coping with and solving problems has left a favorable and appreciated imprint.

I am grateful to Robert Fox for his help in forming a special Doctoral program committee which allowed me to pursue my interests in utilizing a social psychological approach to attempt to improve education.

The contributions of these men to my way of thinking and feeling are hard to describe but nonetheless important to me. Allen Menlo, for example, conducted a seminar when I taught Educational Psychology; I still reflect on much of what he did. I am thankful to Mark Chesler primarily for the discussions I have had with him focusing on value

issues; he has certainly expanded my perspective.

With regard to the writing task itself, I have found Professor Newcomb's detailed comments enormously helpful. Both Professors Lippitt and Fox helped with the organization and pinpointed some communication problems which needed further work. I believe the final product is far better because of it.

Throughout the entire effort, Judith Eiseman has been a needed source of support. As an uncompensated research assistant, she coded, key punched, and analyzed data. As an uncompensated executive secretary, she embarked on numerous journeys to the library and computer center, assembled the bibliographic references, served as the in-house consultant on format, and, in addition, typed, proofread, and edited. Most important, as my wife, she put up with several periods of minimal family life which, in their totality, were not only unreasonable, but also unfair. When my spirits waned, she spurred me on. Altogether, she sacrificed much on my behalf. I hope that the extent of my appreciation is clear to her.

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CHAPTER ONE

OVERVIEW

Background

The study reported here was motivated by a desire to improve the training which is provided for those who plan to be teachers. Tyler (1950) suggests that the first major task to complete in the design or re-design of a training program is the specification of objectives. He further suggests that the process of formulating objectives should begin with an analysis of society, of subject matter, and of the learner.

In an earlier paper (Eiseman, 1969), I attempted to develop implications for the design of the professional component of preservice teacher preparation programs from an analysis of both projections which had been made regarding what American society might be like in the 1980's and 1990's, and subject matter which focuses on processes of teaching and learning. To be comprehensive, it remained for me to study the developmental status of individuals aspiring to be teachers; perhaps from such a study, additional implications for the design of teacher preparation programs might emerge.

My earlier analysis of future society led me to stress what I described as intellectual habits. In the present venture, my con-

cern with intellectual habits prompted me to compare and contrast the assumptions underlying the approaches taken by various cognitive theorists, including Dewey, Lewin, Piaget, Kohlberg, Ausubel, Bruner, Hunt, J. Baldwin, A. Baldwin, Tolman, Bartlett, as well as the trios Harvey, Hunt, and Schroder and Miller, Galanter, and Pribram. In Chapters 2 and 3, some of the assumptions made by these and other men are reviewed.

Theoretical Perspective

According to each of the theorists mentioned above, between the stimuli which impinge upon an individual and the observable behavior in which he engages, it makes sense to take the position that some form of cognitive activity occurs. Rather than crediting all the functions thought to be performed by whatever intervenes between environmental stimuli and action to a single hypothetical construct, as do most of those listed above, I have advocated dividing up the functions into four major categories. For heuristic purposes, each set of functions is described as if it were performed by a different structure. Chapter 2 ends with a description of the following kinds of "structures": physiological, motivational, executive, and representational.

In Chapter 3, the manner in which the various "structures" are thought to develop is described. The stimulation of structural development is held to be a major goal for students in general and for future teachers in particular. After this goal is identified, the nature of the developmental process is examined to discover which conditions seem to be conducive to structural development. Five such conditions are described in detail at the end of the chapter. Although

the labels used to identify them may be misinterpreted if the qualifications accompanying their descriptions are not taken into account, they provide a rough idea of what this conceptualization seems to imply. The five conditions are optimal disparity, action, role taking, freedom, and reflection.

In Chapter 4, attention is focused on the representational structure. Usually, a construct akin to the representational structure is assumed to depict in a simplified way the objects which exist in the real world as well as some of the relationships among them. Harvey, Hunt, and Schroder's view is here seen as more fruitful. To them, the representational structure, which they call a conceptual system, actively evaluates incoming stimuli.

If the representational structure is adequately organized, it assigns an impinging object or event a position on one of its conceptual dimensions. This action enables the individual to generate an appropriate response. If the pattern of incoming stimuli is more complex than the processing system of the representational structure is prepared to handle, the individual may engage in maladaptive behavior; if, however, the proper blend of the five conditions mentioned above is present, structural growth may occur.

According to Harvey, Hunt, and Schroder, structural growth proceeds in such a way that the individual alternates between being dependent upon and then independent of objects and events. With each successive return to a dependent posture, the individual is more flexible and less dogmatic. Similarly, with each successive return to an independent posture, the individual is more self-directed and less negative.

Ultimately, the individual who continues to develop is thought to achieve an interdependent posture. On the one hand, he is self-initiating and capable of coping with highly complex abstractions. Thus, he has no need either to depend upon others to provode him to act or to depend upon concrete objects, examples, or representations in order to pursue a line of reasoning. He is free from the need to depend upon rules or status to achieve his goals. On the other hand, he has no qualms about building upon the ideas started by others, about collaborating with others, or about seeking help from others. He has no need to oppose whatever is supported by "The Establishment" or to withdraw from the demands and the requests of others. He is willing to treat others with mutual respect, not only accepting but actively exploring in a constructive way areas in which he and they differ.

As is evident above, Harvey, Hunt, and Schroder employ the concepts of dependence, independence, and interdependence to refer not only to relationships between the individual and other persons but also to relationships between the individual and both tangible and intangible objects. Technically speaking, these terms are used to describe the nature of subject-object linkages. This expanded and somewhat idiosyncratic usage will be followed here.

My attraction to the Harvey et al. approach is based, among other things, on its applicability to education. Whereas teachers who are fixated at one or another level of dependence tend to emphasize order, discipline, rewards, and right answers, teachers who are fixated at one or another level of independence tend to foster counter-dependence, isolationism, disregard for the accumulated wisdom

of others, and relationships with individuals and areas of interest which are only momentary. In contrast, the interdependent teacher as conceptualized here avoids either set of evils. Instead he encourages his students to think, feel, value, decide, and act. He puts a premium upon developing intrinsic motivation as well as upon building the skills and attitudes conducive to utilizing resources constructively, learning how to learn, and, in general, conducting disciplined inquiry.

My conception of structural development differs from that advanced by Harvey, Hunt, and Schroder in two important respects. First, they assume that when development is proceeding properly, the representational structural progresses along a single continuum. Thus, for example, in order for an individual to advance from a given level of independence to a more sophisticated level of independence, he must first move to and through a determinable level of dependence.

The alternative assumption proposed here is that when development is proceeding properly, the representational structure progresses simultaneously along two separate continua. Both continua start at the same place (when the representational structure is undifferentiated) and end up in the same place (when the individual is capable of forming interdependent relationships) but in the interim they travel different routes. One strand of development consists of a series of epigenetic stages of dependency; the other strand consists of a series of epigenetic stages of independence. Movement within one strand is assumed to be influenced by movement within the other strand but not in the lock step manner described by Harvey et al.

The other major difference has to do with a distinction that Lewin made regarding the Aristotelian and Galileian approaches. Harvey et al.'s theory is consistent with the Aristotelian approach of placing a set of representational structures into categories (Unilateral Dependence, Negative Independence, Conditional Dependence and Mutuality, and Interdependence). The categories describe the location of each individual's representational structure on the developmental continuum. Whereas Harvey et al. consider it possible for a representational structure to be in transition between two main categories, a representational structure which "spread out over" three or more categories would fall beyond the scope of their theory.

My modification of the Harvey, Hunt, and Schroder theory is consistent with the Galileian approach of placing a set of structures along dimensions (Absolutism, Negativism, Field Dependence, Self-Absorption, and Interdependence). With a dimensional approach, each individual receives a set of dimensional or pole scores. It becomes possible for someone to score very high on two poles which are far apart on the developmental continuum. In other words, the dimensional approach is capable of describing the representational structures of individuals with a wide variety of developmental histories, including both those which fall into the pattern predicted by Harvey, Hunt, and Schroder, and those which their approach can only handle by labeling them "admixtures."

Hypotheses and Results

In the latter portion of Chapter 4, three sets of hypotheses are proposed which are designed to determine the construct validity of my reformulation of Harvey et al.'s theory. The first set has to

do with the construct validity of each pole viewed as an isolated entity. Thirty-seven criterion variables are described and predictions are made regarding the direction in which each of the poles would correlate with a selected set of the criterion variables.

The following predictions proved both accurate and statistically significant: Pole 1 (Absolutism) correlated positively with Teacher Deciding Alone, Preference for Evaluating Dependency, Institutionalism-Humanism, Fear of Negative Evaluation, Need Achievement, and Social Restraint and Self Control; it correlated negatively with Achievement via Independence, Assigning Independence, Evaluating Independence, Autonomy, Complexity, Non-Stereotypy, Rationality, Flexibility, and Cognitive Complexity. Pole 2 (Negativism) correlated positively with Autonomy, Social Avoidance and Distress, Complexity, Non-Stereotypy, Flexibility, Impulse Expression, and "Freedom From" (a collection of items from the Autonomy, Complexity, and Flexibility scales which tend to be more "freedom from" oriented than "freedom to" or positively oriented); it correlated negatively with Teacher Deciding Alone, Preference for Evaluating Dependency, Achievement via Conformity, Institutionalism-Humanism, Locus of Control, Need Achievement, and Social Restraint and Self-Control; it was not expected to correlate significantly with "Positive" (a collection of items from the Autonomy, Complexity, and Flexibility scales which tend to be positively oriented) and it did not. Pole 3 (Field Dependence) correlated positively with Institutionalism-Humanism, Fear of Negative Evaluation, Need Achievement, and Social Restraint and Self-Control; it correlated negatively with Achievement via Independence, Evaluating Independence, Autonomy, Complexity,

Flexibility, Cognitive Complexity, and Capacity for Status. Pole 4 (Self-Absorption) correlated positively with Withdrawal and Self-Sufficiency; it correlated negatively with Preference for Assigning Dependency, Preference for Evaluating Dependency, and Institutionalism-Humanism. Finally, Pole 5 (Interdependence) correlated positively with Achievement via Independence, Assigning Independence, Evaluating Independence, Alone, Mutual, Non-Stereotypy, Rationality, Cognitive Complexity, Threat (which has to do with the extent to which the individual considers various threatening situations to be worthwhile for him), Active, and Vigorous Action and the Overcoming of Obstacles.

The second set of hypotheses has to do with the difference between those individuals whose representational structures reflect certain differentiations (discriminations between various levels of dependence as well as between various levels of independence) and those whose representational structures do not show evidence of such differentiations. A substantial majority of the predictions made were confirmed, but they are too esoteric to be discussed in any more detail at this point.

The final set of hypotheses has to do with the developmental significance of the poles. Three different variables are described: Purepole, Alloypole, and Fusion. All three are alike in three respects: First, in order for a subject to receive a score on any one of them, his profile of pole scores must meet certain criteria. Second, the scores which a subject can receive on these derivative variables range from 1 to 5. Third, the scores more or less indicate that the individual who qualifies to receive them represents

an "ideal type" for the pole number which is equal to his derivative variable score. Thus, for example, if a subject receives a 4 on Purepole it means that he represents a Pole 4 ideal type.

The major way in which these derivative variables differ from one another has to do with the nature of the standards which are applied to the term "ideal type." Purepole has the most severe standards and is true to its name: Regardless of what score the individual receives on Purepole, it means that he represents a pure example of that number's pole type.

The lower the individual's score on Alloypole, the less severe are the standards applied to the term "ideal type." More specifically, the proportion of those receiving a given score on Alloypole who qualify to receive the same score on Purepole is 100 per cent when the given score is 5 but it diminishes steadily as the given score decreases to 1.

Finally, the term "Fusion" was also chosen to convey its meaning. Essentially, the three middle poles (Poles 2, 3, and 4) are fused into one. As a result, an individual can only receive a score of 1, 3, or 5 on this scale. And whereas only those individuals who receive scores of 1 and 5 on Purepole receive those scores respectively on Fusion, those who receive scores of 2, 3, or 4 on Purepole are not the only ones who receive a score of 3 on Fusion. The eradication of distinctions among Poles 2, 3, and 4 allows individuals to qualify for scores on Fusion who, while they would have qualified for scores on Alloypole would not have qualified for scores on Purepole.

Even though this chapter is only supposed to contain an overview, these derivative variables have been described in some detail. The reason for this departure from tradition is that the combined set of three variables can be used to answer the question: Do the pole scales merely represent unrelated dimensions or do they possess some of the developmental significance attributed to them? In other words, the hypotheses involving these three variables have central importance in the data collection and analysis effort.

Specifically, some of the criterion variables were thought to increase (or decrease) monotonically as structural development progressed. As a result, it was hypothesized not only that these variables would correlate positively (or negatively) with Purepole, but that in addition, the magnitude of these correlations would be higher than the respective correlations between these variables and either Alloypole or Fusion. The following hypotheses received empirical (statistically significant) support: Purepole correlated positively (and more so than did Alloypole or Fusion) with Assigning Independence, Alone, Mutual, Dominance, Capacity for Status, Threat (which, again, measures the extent to which the individual considers various threatening situations to be worthwhile for him), and Active; it correlated negatively (and more so than did Alloypole or Fusion) with Social Avoidance and Distress.

Other criterion variables were thought to vary less regularly with structural development. As development increased, these variables were thought to increase, then decrease (but not to their lowest points) and then increase to a new all-time high; others were expected to do the exact opposite (i.e., decrease, then increase,

and finally increase again). If the scores obtained on the criterion variables were grouped together for individuals who were Pole 2, 3, or 4 ideal types, the mean scores on some of these criterion variables for Pole 1 ideal types should be lower than the respective criterion variable mean scores for the composite group of Pole 2, 3, or 4 ideal types, and these in turn should be lower than the respective criterion variable mean scores for the Pole 5 ideal types. For other criterion variables the reverse should be true. The above line of reasoning led to the construction of the derivative variable Fusion. It was hypothesized not only that the above variables would correlate positively (or negatively) with Fusion, but that in addition, the magnitude of these correlations would be higher than the respective correlations between these variables and either Purepole or Alloypole. The following hypotheses received empirical (statistically significant) support: Fusion correlated positively (and more so than did Purepole or Alloypole) with Achievement via Independence, Evaluating Independence, Autonomy, Non-Stereotypy, and Impulse Expression; it correlated negatively (and more so than did Purepole or Alloypole) with Institutionalism-Humanism.

All in all, considerable support was found for the assertion that the Poles have construct validity both as isolated scales and as constructs with developmental significance.

Methodology and Additional Results

Sixty-three undergraduates enrolled in a Foundations of Education course served as subjects; a few others who had originally been selected for inclusion in the study did not complete one

or another phase, and as a result all data regarding them was disregarded. In all possible sequences, the subjects were individually assigned to four different learning conditions: Instructor Assigns-Instructor Evaluates, Instructor Assigns-Student Evaluates, Student Assigns-Instructor Evaluates, Student Assigns-Student Evaluates. The details of the subject selection and assignment processes as well as of the designs of the various treatments are given in Chapter 5.

The subjects ranked the four sets of learning conditions along eight dimensions. These rankings provided the data for ten experimental scales, the construction of which are described in Appendix A. Four having to do with dependency and independence proved useful but six having to do with cognitive complexity failed to fulfill the functions for which they were designed.

An additional scale was thereupon devised from a post hoc item analysis. Those items which seemed on the face of them to be related to my concept of cognitive complexity were pooled together and factor analyzed. Those which loaded on the first unrotated factor with a correlation of a least .40 were retained and re-factor analyzed. When all the items which remained loaded .40 or more on the first unrotated factor, a "factor score" was computed for each individual such that the higher the item loaded on the first unrotated factor, the more the individual's response to that item influenced his factor score.

The above process is discussed at the end of Chapter Five. It is exactly the process which was used to develop scores for the five poles. Sometimes some of the items selected overlapped

with one or more of the criterion variables. The extent to which this occurred and my view of its significance is discussed in Chapter 6.

One final series of data manipulations is worthy of mention. It will be recalled that if a subject qualified to receive a Purepole score, it meant that he was an ideal type on the pole bearing the same number as his Purepole score (i.e., if an individual received a Purepole score of 4, it meant that he was an ideal Pole 4 type). Further, the higher the subject's Purepole score, the more developmentally advanced he was thought to be. A "Purepole-equivalent score" was computed for most subjects whose pole profiles rendered them ineligible to receive a Purepole score (The basis for this computation is described in Chapter 6). Then, a group of items which, when keyed in the right direction, correlated positively with Purepole were combined into a "Developmental Maturity" scale.

Because the derivation of this scale involved only those subjects who received Purepole scores, it was possible to cross-validate the Developmental Maturity scale by correlating it with the Purepole-equivalent scale. The resulting correlation was barely significant, suggesting on the one hand that the notion of a Developmental Maturity scale has utility but on the other that the first approximation needed revision. Accordingly, those items contained in it which had the smallest correlations with the Purepole-equivalent scale were eliminated. Those that remained constitute a revised Developmental Maturity scale.

Implications for Use of the Pole Scores and for Further Research

In Chapter 7, an algorithm is presented for sorting an individual's pole score profile into one of fifteen diagnostic patterns. An explication of each diagnostic pattern is provided including a description of the pole profile, a statement of the appropriate instructional task, and recommendations for designing the conditions conducive to accomplishing the task. Possible ways in which these recommendations could be used by teacher educators are then discussed. These include suggestions regarding independent study programs, grouping patterns, teacher-student matching, and direct feedback counseling.

Hopefully, all of the above has conveyed the gist of this document. Now that we have jetted over the forest, let us meander through the trees.

CHAPTER TWO

STRUCTURES WITHIN THE ORGANISM WHICH INFLUENCE BEHAVIOR

Structures Posited by Others

Cognitive theorists infer that an internal structure exists which influences the individual's behavior in two opposing senses of the term: on the one hand, it permits him to engage in behavior that was beyong his capacity when his internal structure was not as fully developed; on the other hand, it prevents him from engaging in behavior in which, if the capacity of his internal structure continues to increase, he may become capable of engaging.

While all cognitive theorists hypothesize that the internal structure mediates between environmental stimuli and the individual's responses, they disagree with each other with regard to both its nature and its function. Some posit that the structure serves to represent the relationships among the important objects in the external environment. For Tolman, for example, the structure

> . . . is far more like a map control room than it is like an old-fashioned telephone exchange. The stimuli, which are allowed in, are not connected by just simple one-to-one switches to the outgoing responses. Rather, the incoming impulses are usually worked over and elaborated in the central control room into a tentative, cognitivelike map of the environment. And it is this tentative map, indicating routes and paths and environmental relationships, which finally determines what responses, if any, the animal will finally release (Tolman, 1948).

Baldwin argues that the term "cognitive map" implies the isomorphic representation of the external environment. He explains that Tolman "was directly concerned with rats in mazes and that Lewin . . . seriously attempted to describe all behavior as a locomotion in a geometrical space" (Baldwin, 1969, p. 333). Lewin seems, however, to have intended including far more in his concept of the psychological environment than just geometrical space. At one point he said that

> Objectivity in psychology demands representing the field correctly as it exists for the individual in question at that particular time. For this field the child's friendships, conscious and "unconscious" goals, dreams, ideals, and fears are at least as essential as any physical setting. Since this field is different for every age and for every individual, the situation as characterized by physics or sociology, which is the same for everybody, cannot be substituted for it (Lewin, 1951, p. 240).

While the above passage demonstrates that Lewin's concept of psychological environment contained not only a representation of the relationships among objects in the physical setting but also a representation of relationships among both physical and mental objects and events as well, it does not explicitly shed light on the extent to which Lewin postulated an isomorphism between the physical setting and its internal representation. Dewey, however, was quite explicit in arguing that the relationship between internal representations has different properties from the relationship between the referents of those representations, or, more simply, that an internal representation (which could have a relationship as its referent) has different properties from its referent.

> It is only by treating impressions as real facts in a real world, and only by carrying over into them, in some assumed and unexplained way, the capacity of representing the cosmic facts that cause them, that impressions or ideas come in any sense

> within the scope of thought. . . . but it is the matter, meaning or content of ideas that is associated, not the ideas as states or existences. Take such an idea as sun-revolving-about-earth. We may <u>say</u> it means the conjunction of various sense impressions, but it is connection, or mutual reference, of <u>attributes</u> that we have in mind in the assertion. It is absolutely certain that our psychical image of the sun is not psychically engaged in revolving about our psychical image of the earth. It would be amusing if such were the case; theaters and all dramatic representations would be at a discount. But in truth, sun-revolving-about-earth is a single meaning or intellectual object; it is a unified subject-matter within which certain distinctions of reference appear. It is concerned with what we intend when we think earth and sun, and think them in their relation to each other. It is a rule, specification, or direction of how to think when we have occasion to think a certain subject-matter. To treat this mutual reference as if it were simply a case of conjunction of mental events produced by psycho-physical irritation and association is a profound case of the psychological fallacy (Dewey, 1916, pp. 113, 116-117).

The idea that a concept need not have the properties which are attributed to its referent implies what Baldwin makes explicit; namely, that

> . . . . the cognitive representation may double code the environment, whenever there is genuine symbolic behavior. A person hearing a verbal description does not confuse the words with what they refer to. A visual image is not ordinarily confused with a visual perception. The cognitive representation, generally speaking, is internal but projected onto the environment so that the individual perceives the environment not his perception of it. His behavior is felt to be guided by the environment, not a cognitive map of it. But much cognitive activity involves verbal labels, logical thought, and arithmetic operations, where the labels represent the objects but are distinct from them (Baldwin, 1969, p. 333).

Regardless of the extent to which Lewin's psychological environment constitutes a one-to-one mapping of the physical setting, it seems to be a relatively passive structure. Tensions within the person (which was conceived to be a separate part of the life space from the psychological environment) or inputs from the physical environment could cause the amount of positive or negative valence in one or more of the regions within the psychological environment

to change. Once this happened, the increase or decrease in valence might result in the restructuring of the psychological environment and/or in the individual's engaging in overt behavior (Lewin, 1936). In the absence of input from either of the two sources described above, the psychological environment apparently would remain static.

Whereas Lewin's lifespace included not only the psychological environment but also the person, several theorists have attempted to posit a structure without any labeled subdivisions in the person-environment sense. With the exception of Tolman, whose cognitive map seemed to be passive in the same sense as Lewin's psychological environment, the others seem to feel the need to describe a structure that is more active.

Dewey, whose comments on one aspect of man's cognitive processes were quoted above, supports this generalization. He argued

> . . . . that the mind actually has a determining share in both the reception of stimuli and in their further associative combinations. The subject always enters into the presentation of any mental object, even the sensational, to say nothing of the perceptional and the imaged. The perception of a given state of things is possible only on the assumption that "the perceiving subject is at once enabled and compelled by its own nature to combine the excitations which reach it from objects into those forms which it is to perceive in the objects, and which it supposes itself simply to receive from them" (Dewey, 1916, pp. 114-115; the quote inside the quote is from Lotze, 1888, p. 235).

Bartlett also viewed his concept of internal structure as an active agent. In particular, he said that

> "Schema" refers to an active organization of past reactions, or of past experiences, which must always be supposed to be operating in any well-adapted organic response. That is, whenever there is any order or regularity of behavior, a particular response is possible only because it is related to other similar responses which have been serially organized, yet which operate, not simply as individual members coming one after another, but as a unitary mass. Determination by schemata is the most fundamental of all

> the ways in which we can be influenced by reactions and experiences which occurred some time in the past. All incoming impulses of a certain kind, or mode, go together to build up an active, organized setting: visual, auditory, various types of cutaneous impulses and the like, at a relatively low level; all the experiences are connected by a common interest: in sport, in literature, history, art, science, philosophy, and so on, on a higher level (Bartlett, 1932, p. 201).

At the end of the above passage, Bartlett makes a point which is also important to Piaget; viz., that the term "schema" should embrace both primary (sensorimotor) and secondary (cognitive) processes. The rationale for taking this position (as opposed to utilizing different labels for different processes) will be presented later when the discussion shifts to the nature of the development process. Now, however, Harvey, Hunt, and Schroder's term "concept" will be presented. As mentioned above, their approach--which will be elaborated more fully later--has had profound influence on the present work. For them

> A concept in the most general sense is a schema for evaluating impinging stimulus objects or events. Abstracted from the experience of objects in the environing world, it represents a category of varying definitiveness and breadth along some specifiable dimension . . . . Once a concept has evolved, it serves as a psychological yardstick in terms of which stimuli are compared and gauged, a kind of experiential filter through which objects are screened and evaluated on their way from sensory reception to ultimate response evocation.
>
> Concepts, in their matrix of interrelatedness, serve the critical cognitive function of providing a system of ordering by means of which the environment is broken down and organized, is differentiated and integrated, into its many psychologically relevant facets. In this capacity, they provide the medium through which the individual establishes and maintains ties with the surrounding world. It is on the basis of the web of these conceptual ties that one is able to place oneself stably and meaningfully in relation to time, space, and other objects and dimensions of his psychological universe. It is on this basis, hence, that one's self-identity and existence are articulated and maintained. Threat to such ties or severance of them leads to a psychological

> mobilization aimed at maintaining or restoring them, efforts, which if unsuccessful, may result in a major reorientation and organization of ties to the world, or more drastically, even to breakdown or destruction of the self (Harvey, Hunt, and Schroder, 1961, pp. 10-11).

Harvey, Hunt, and Schroder's representational structure contains several new elements in it. First, they indicate that the concept provides a means for evaluating objects. Of all the representational structures discussed above, Lewin's psychological environment seems to come the closest to having this attribute. In his psychological environment, a given region may acquire positive or negative valence if tension arises among regions which are directly related to it. When the tension in the corresponding region in the person is discharged, however, the strength of the valence may subside as well. Thus, for Lewin valence seems to be a variable property of a region, whereas for Harvey et al., the predisposition to evaluate objects in a particular way tends to be a fairly permanent property of the concept.

A second feature of their concept is the emphasis they put on its adaptation function. Of the theorists discussed to date, Dewey seems to be the one most concerned about man's adaptation to the world around him. Piaget, who so far has only been mentioned in passing, and Werner, whose concept of differentiation will be discussed below, also stress man's adaptive mechanism. Finally, adaptation is important to Kelly. According to him,

> Man looks at his world through transparent patterns or templets which he creates and then attempts to fit over the realities of which the world is composed. The fit is not always very good. Yet without such patterns the world appears to be such an undifferentiated homogeneity that man is unable to make any sense out of it. Even a poor fit is more helpful to him than nothing at all . . . .They are what enables man, and lower animals too, to

> chart a course of behavior, explicitly formulated or implicitly acted out, verbally expressed or utterly inarticulate, consistent with other courses of behavior or inconsistent with them, intellectually reasoned or vegetatively sensed (Kelly, 1955, pp. 8-9).

A third aspect of Harvey, Hunt, and Schroder's concept is its dimensional nature. Their characterization of the representational structure as consisting of a multidimensional space is reminiscent of the semantic space of Osgood and his colleagues (Osgood, Suci, and Tannenbaum, 1957).

Fourth, Harvey et al. hint at what they develop more fully in a later section of their book, namely, that the self can be defined as "the totality of one's concepts . . . in their intertwined interdependencies" (op. cit., p. 62); this also is a novel position. Finally, they mention that structural transformations occur by means of a differentiation-integration process. This notion is espoused by several others including David Ausubel whose special twist is of interest here.

Ausubel (1963) uses the term "'trace' . . . to account for the continuing representation of past experience in the nervous system and in present cognitive structure" (p. 24). He

> . . . assumes the existence of a cognitive structure that is hierarchically organized in terms of highly inclusive conceptual traces under which are subsumed traces of less inclusive subconcepts as well as traces of specific informational data. The major organizational principle . . . is that of progressive differentiation of trace systems of a given sphere of knowledge from regions of greater to lesser inclusiveness, each linked to the next step in the hierarchy through a process of subsumption (Ibid., pp. 24-25).

With the exception of Lewin, all the theorists discussed to date depend upon one fully developed construct to mediate between stimuli and responses. (They may use other intervening variables when it suits their convenience, but they have not devoted sufficient

attention to their manner of operation to suggest that they have intended them to be used as full-fledged constructs). Lewin's concept of life space includes four components: the psychological environment, the person, the sensorium, and the motorium. Lewin sometimes represented the person as an undifferentiated point "merely to deal with its position in the environment of the life space." Other times, he treated "the person as differentiated into parts" (Cartwright, 1959, p. 66). His concept of the person seems to be similar in function to a motivational structure. The other theorists discussed above only deal with motivation incidentally. The approach taken by Hunt (1963), however, is intriguing. He suggests that a motivational structure progresses through a sequence of stages as a result of the individual's interaction with the environment in a manner which parallels the development of the representational structure. His theory of the epigenesis of intrinsic motivation will be described in the chapter on the nature of development.

Lewin did not assume that the "locomotion" of the person from one region of the psychological environment to another necessarily implied that the individual was engaging in overt behavior. Presumably, the individual acted within and upon the external environment through the motorium. He referred to the " 'execution' of an action" (1951, p. 57), employing language strikingly similar to that of Miller, Galanter, and Pribram whose theory will be discussed below, following a brief mention of some of the concepts employed by Berlyne and Kohlberg.

As before, Lewin is practically alone among cognitive theorists in attempting to given special attention to the response phase of

behavior; most others collapse the guiding of this phase into their all-purpose representational structure (The identical point can be made about the perceptual phase of behavior: Lewin's sensorium performs key functions which are subsumed under the functions of the representational structure for other theorists). Most of the theorists who are exceptions to this generalization remove certain kinds of behavior from under the essentially exclusive control of the representational structure, but fail to focus major attention on how such behavior is guided. Berlyne (1965) seems to be attempting just this in his distinction between "situational thoughts" (internal responses which symbolize external stimulus conditions) and "transformational thoughts" (which intervene between situational thoughts and which symbolize the responses which must be performed to transform one situation into another).

Kohlberg is somewhat confusing on this issue. In the passage below, it would be possible for a reader to assume that the "cognitive structure" was the locus of "cognition."

> . . . Cognitive structure refers to rules for processing information for connecting experienced events. Cognition (as most clearly reflected in thinking) means putting things together or relating events, and this relating is an active connecting process, not a passive connecting of events through external association and repetition. In part this means that connections are formed by selective and active processes of attention, information-gathering strategies, motivated thinking, etc. More basically, it means that the process of relating particular events depends upon prior general modes of relating developed by the organism. The most general modes of relating are termed "categories of experience." These categories are modes of relating applicable to any experienced event, and include the relations of causality, substantiality, space, time, quantity and logic (the latter referring to relations of inclusion or implication between classes or propositions) (Kohlberg, 1969, pp. 349-350).

Furthermore, in this next passage one might assume that the

"cognitive structure" was responsible for fulfilling the executive function.

> Cognitive structures are always structures (schemata) of action. While cognitive activities move from the sensorimotor to the symbolic to verbal-propositional modes, the organization of these modes is always an organization of actions upon objects (Ibid., p. 348).

Yet in other places, Kohlberg differentiates between two aspects of personality development. One is the development of the cognitive structure (whose function is described above) and the other is the development of ego strength. In particular, he seems to view the ego as the agent which is capable of predicting consequences, maintaining attention, choosing a greater remote reward over a lesser immediate reward, and in general, controlling ideational flow and intelligent action (Kohlberg, 1964; 1969; Grim, Kohlberg, and White, 1968).

In contrast to the cognitive theorists who emphasize the representational structure, Miller, Galanter, and Pribram, seem to stand alone in emphasizing an executive structure.[1] Miller et al. are consistent with others in that they too employ a representational structure. They call it an "Image," and they define it as follows:

> The Image is all the accumulated, organized knowledge that the organism has about itself and its world. The Image consists of a great deal more than imagery, of course. What we have in mind when we use this term is essentially the same kind of private representation that other cognitive theorists have demanded. It includes everything the organism has learned--his values as well as his facts--organized by whatever concepts, images, or relations he has been able to master (Miller, Galanter, and Pribram, 1961, pp. 17-18).

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[1]Certainly the ego psychologists emphasize an executive structure and Redl and Wineman's (1951) description of 22 functions which the healthy ego must perform epitomizes the contribution such theorists can make. Ego psychologists, however, don't tend to be cognitive theorists in the sense used here; i.e., they don't postulate a representational structure.

Note that their Image is no more active than Lewin's psychological environment; both Lewin and Miller et al. have chosen to conceive of the locus of control as residing outside the representational structure. For Lewin, the locus of control seems to exist in the person rather than in the motorium. The latter concept seems to be postulated primarily to provide a means of implementing what the person directs. For Miller et al., the locus of control resides in what they call "Plans". Their description of a Plan (which contains elements of similarity to Berlyne's transformational thoughts) makes clear that they intend the term to convey multiple meanings::

> A Plan is any hierarchical process in the organism that can control the order in which a sequence of operations is to be performed.
>
> A Plan is, for an organism, essentially the same as a program for a computer, especially if the program has [some] sort of hierarchical character . . .
>
> . . .[W]e regard a computer program that simulates certain features of an organism's behavior as a theory about the organismic Plan that generated the behavior.
>
> Moreover, we shall also use the term "Plan" to designate a rough sketch of some course of action, just the major topic headings in the outline, as well as the completely detailed specification of every detailed operation (Ibid., pp. 16-17).

They assume that Plans exist for collecting or transforming information as well as for guiding action. They explicitly contrast their use of the term "hierarchical" with that of Hull's. Whereas Hull talks about an ordering of alternative responses based on their strengths (i.e., the strongest response habit has the highest probability of activation), Miller et al. are talking about both levels of abstraction and levels of control. In the first of the usages, but not their second, they resemble Ausubel.

According to their theory, the process of executing a Plan

requires the implementation of several sequences of Plans, each sequence including increasingly greater degrees of detail. For example, if a child decides to ride his bicycle to school, his most general plan might contain only three parts:

I. Go to the bike

II. Ride it to the school yard

III. Park and lock the bike

He can decide to implement this Plan without considering any of its details. As he begins to execute Part I, however, there are some decisions he must make and the sequence in which he makes them will be guided by a slightly more detailed Plan. Its parts might include:

I. Go to the bike

A. Recall where the bike is now

B. Decide which route to take to get there

C. Proceed along the chosen route

Note that Plan I calls for Plan A and its subroutines to be completed before Plan B is initiated. If he couldn't recall where he last left it, he might execute a Search Plan which might involve Plans B and C.

A complete description of the child's behavior would delineate the Plans at every level from the most molar (i.e., riding the bicycle to school) to the most molecular (which would include the "meticulous recording of every muscle twitch" (Ibid., p. 14)).

Miller, Galanter, and Pribram have drawn heavily on the work of Newell, Shaw, and Simon (1958). In the process of programming computers to solve logical problems, the latter group of authors has concluded that three major kinds of requirements must be fulfilled in

order to solve such problems: there must be memory units in which information can be stored, the capacity must exist to perform logical operations upon information stored in such units, and programs must exist in which information and operations are arranged hierarchically.

Miller et al. suggest that the Image is the basic memory unit in which in addition to other types of information Plans are stored. They also posit a processing unit which calls up Plans to guide its operation and which can store temporarily in a kind of working memory whatever information the controlling Plan requires. Finally, they stress the hierarchical nature of Plans. Altogether, then, they have included in their theory of behavior all the features that Newell, Shaw, and Simon have argued are needed in order for machines to solve problems.

For the sake of completion, one other source of influence on behavior should be mentioned: the individual's body per se. Both Piaget and Werner received extensive biological training, but while it influenced their theorizing to the extent that they focused on processes of adaptation and tended to view the phenomena they studied as organic wholes, neither they nor any of the theorists mentioned above, with the exception of Ausubel and Pribram, thoroughly examined physiological data.

Ausubel, whose educational background includes medical school, takes the position that

> . . . cognitive phenomena can only be explained in terms of processes operative at a psychological level of phenomenology. Neurophysiological processes accompany and make certain cognitive events possible but occur at a substrate level that has no explanatory value for these events (Ausubel, 1963, pp. 67-68).

Further, he suggests that

> . . . the combination of and interactions between images and precepts involved in problem-solving, concept formation and thinking probably have no corresponding neural concomitants. They are essentially extraneural psychological phenomena dependent only on sufficient substrate integrity of the brain to make perception, memory, and the interrelation of their products possible (Ibid., p. 67).

Pribram, on the other hand, cites neuroanatomical evidence from his earlier work (Pribram, 1958) and discusses the assumptions and findings of others to show that the Image-Plan explanation of behavior is physiologically feasible (Miller, Galanter, and Pribram, 1960, Chapter 14).

The intention in this chapter has been to describe some of the structures within the organism which influence behavior. Because the stimulation of cognitive growth is a primary focus, the theorists who have been discussed have been limited to those who have posited some form of representational structure; those who have concentrated on id or superego constructs or who have extensively studied specific instincts, drives, or motives have been omitted.

A Proposed Synthesis

Before presenting my own view of the structures which influence behavior, I want to indicate my position on the philosophy-of-theory-building question: How many structures should be posited, as few as possible or as many as can be identified? John Dewey, Jean Piaget, and Heinz Werner have frequently stressed the view that man should be viewed as an organic whole. For them, as well as for those theorists who experience a strong compulsion to extol the virtues of and be guided by the Principle of Parsimony, it seems to make sense to

utilize a single construct, endowing it with whatever capacities seem to be demanded by research data. Theorists at the other end of this how-many-constructs-are-enough continuum are interested in matching as closely as they can the complexity of the phenomena they are studying. Advocates of the as-many-constructs-as-necessary position are relatively rare in psychology, but the following passage states the fundamental principle succinctly:

> The broader one makes his nomological net, the better, in that the more nearly his resulting conceptions will approach those of the imaginary, all-seeing eye of Deity (Hunt, 1968, pp. 484-485).

My own position tends to be closer to the latter. I try to employ one term to refer to similar concepts when I can not justify distinguishing between or among them, but to use as many modifiers as the meaningful distinctions I can make require. I fail to see how the act of labeling various functions which a human being performs in any way implies that the individual is not an organic whole.

Thus, I shall employ one basic concept--structure--but utilize several modifiers. To say, however, that it is fruitful to conceive of a representational structure, an executive structure, etc., does not imply a belief in multiple, separate, physical entities; rather, it implies that it is fruitful to conceive of multiple functions being performed. The position here is no more than the architect's dictum that form follows function. The construction of multiple structures has heuristic value for comprehending, predicting, and modifying the manner in which a particular individual performs the functions which correspond to them. But the structures are intended to be no more than metaphors, despite the fact that their properties

will be described and procedures will be implemented to discriminate among individuals according to the extent to which one of their metaphorical structures possesses a given property.

With the above as a prelude, the concept of structure will be reintroduced. The quintessential function of a structure in its generic form is to provide a potentiality for activation in the double sense described in the beginning of the chapter; specifically, a structure permits certain behavior but sets upper bounds on the extent to which such behavior can vary; in other words, it predisposes the individual to behave in particular ways.

The basic elements of the framework advocated here are contained in the expression, to utilize Lewin's form, $B = f(P,M,R,E)$, where B stands for behavior and the letters in parentheses refer respectively to physiological, motivational, representational, and executive structures.

The functions which the physiological structure represents the potentiality to activate include not only those which can be performed by Lewin's sensorium and motorium but also any function which can be explained at physiological, anatomical, physical, or chemical levels of analysis. Its major molar functions are that it generates the energy which enables the individual to perceive, feel, think, and act and that it actually carries out the commandments issued by the executive structure; the latter include actively probing the environment, transmitting whatever information is retrieved back to the other three structures, and acting upon objects and within events in the external environment.

Obviously, distinctions can be made among the functions just

described. But since the bulk, if not all, of the variance than can be detected in the cognitive and social behavior of college students can be explained by referring to the variance in the remaining three structures, such distinctions are not of interest here. The physiological structure, then, has been included in this formulation because it is the sine qua non of behavior. It will not be discussed further, though, since whatever variance in cognitive and social behavior can be attributed to variance in physiological structure will have created variance in one or more of the other structures and can be explored while examing them.

The principal functions of the representational structure are to code and store information received from the other structures and to furnish it to them on demand. The information refers to objects; to object categories; to symbols which represent not only objects, object categories, and other symbols, but also relationships among any combination of them; and to relationships among any combination of these.

The motivational structure has two major tasks: to originate drives--which are here conceived to be unfocused, directional forces--and to convert drives into desires--which are thought of as focused, directional forces, focused in the sense of being aimed at approaching or avoiding one or more objects. The drives which it converts to desires are either physiological drives received from the physiological structure or "psychological" or "special" drives which the motivational structure itself has created.

The essential function of the executive structure is to implement Plans in Miller et al.'s sense of the term. The end product

of certain of these Plans is the selection of a Plan from among many competing others; i.e., the individual can implement Plans to select Plans. Reasoning, then, is a function which is subsumed under the notion of implementing Plans. It is the executive structure that is responsible for considering the future, for maintaining attention, and in general controlling the flow of ideas and action.

The motivational, representational, and executive structures have some important similarities. They are all perceived to be actively engaged in both cognitive and affective functions. The transformation of a drive to a desire, for example, involves identifying and coding an unfocused series of affective sensations and matching them with appropriate goal objects, clearly a cognitive activity.

Another similarity among the three structures is that all are assumed to be organized hierarchically in Ausubel's sense of the term, i.e., in terms of progressively higher levels of abstraction. The executive structure alone, however, is considered to be organized hierarchically in the sense unique to Miller, Galanter, and Pribram, i.e., in terms of progressively higher levels of control, while both the motivational and representational structures are considered to be organized as multidimensional space.

The assertion that each of the structures is organized in two perhaps incompatible ways becomes comprehensible when the "Pick one that does not belong" item which was employed by Guilford (1959) and discussed by Sigel (1963) is contemplated. The four items are: oven, rose, tree, and clam. Any one of the items can be chosen as a plausible answer. The oven, rose, and tree can be grouped together because they are always found on land whereas clams are frequently found in

water. The oven, rose, and clam can be grouped together because they all open whereas trees don't in the same sense. The rose, tree, and clam can all be grouped together because they represent organic matter whereas ovens are examples of inorganic matter. Finally, the oven, tree, and clam can be grouped together because they can all be utilized in food preparation whereas roses are not. The point is that we can simultaneously conceive of all four ways of organizing these elements, even though we might concentrate on one of them at a time as it suits our purposes.

Before turning to a consideration of how each of the structures develops, a few words should be said about the manner in which they are interrelated. To say that each structure needs the others in order to function might be misleading in that it might seem to imply that the structures have a reality that is not intended. It would be more accurate to say that each set of functions cannot be performed unless the other sets of functions are also being performed. From time to time throughout the text, however, variations of the former phraseology may be employed for semantic convenience.

Since the structures contain so many similarities and operate jointly, the reader may question the wisdom of exerting energy to tease them apart. The major reason for such differentiation is dealt with in detail in the next chapter, namely, that the development of each of the structures is believed to be influenced by a unique combination of factors.

CHAPTER THREE

THE NATURE OF STRUCTURAL DEVELOPMENT

General Considerations

Developmental theorists tend to be concerned with the genotypic properties that characterize a structure as a whole and which tend to remain relatively stable over time in contrast to the phenotypic properties which characterize only a portion of the structure and which tend to be somewhat transitory. In particular, they are interested in processes which result in irreversible transformations of the structure's genotypic properties.

The process by which adaptive structures are thought to develop consists of a series of differentiation-integration cycles. More specifically, adaptive structures are thought to progress from the first listed pole toward the second listed pole on the following dimensions: simple-complex (a universal assumption among theorists), concrete-abstract (Harvey, Hunt, and Schroder, 1961; Ausubel, 1963), diffuse-articulated (Werner, 1957; Harvey et al., 1961; Ausubel, 1963), random organization-hierarchical organization (Barker, Dembo, and Lewin, 1941; Werner, 1957; Ausubel, 1963) and rigid-flexible (Werner, 1957). Thus, at birth, rather than speak of a representational structure, an executive structure, and a motivational structure, it makes more sense to conceive of a single, undifferentiated primitive structure. The infant responds in a global way to whatever immediately

perceptible stimuli, either internal or external, impinge most saliently.

As the child develops, the nature of each of the three structures becomes increasingly independent of the others; for example, Baldwin (1969) states:

> With learning and maturity, the cognitive representation of the environment becomes relatively neutralized to the emotional and motivational state of the organism (p. 327).

A few theorists (Rousseau, 1762; Gesell, 1933) have asserted that both the sequence of developmental progression and its timing are genetically determined. According to them, if the child avoids encountering an unusually restrictive or noxious environment (which would inhibit his development), he will develop into a mature adult essentially automatically. The bulk of theorists, however, have felt the need to postulate alternative descriptive and explanatory concepts; they argue instead that development results from the interplay between certain internal structuring predispositions and the nature of those aspects of the environment with which the individual interacts (Dewey, 1891; Baldwin, 1895; Piaget, 1928; Tolman, 1932; Lewin, 1933; Mead, 1934; Kelly, 1955; Werner, 1957; Ausubel, 1958; Kohlberg, 1958; Miller et al., 1960; Harvey et al., 1961; Bruner, 1964; Baldwin, 1969). Some of these concepts will be mentioned below.

Piaget portrays development as an assimilation-accommodation process. He suggest "that the living being assimilates to himself the whole universe, at the same time that he accommodates himself to it" (1952, p. 407). Although the two terms are descriptions of interrelated phases of a single process, assimilation essentially refers to the capacity of the individual to negotiate the environment with

his present composite structure while accomodation refers to the adjustments made by the structure to cope with challenges that, when first encountered, were beyond its current capacity.

For James Baldwin, accommodation is the process "by which an organism comes to adapt itself to more complex conditions of stimulation by performing more complex functions" (1895, pp. 478-479). In the language adopted here, then, accommodation results in the structure becoming more complex. To avoid being circular, it is necessary to specify the manner in which the structure becomes more complex.

Some theorists describe in fairly abstract language how the structure undergoes cycles in which some of the parts and relationships that comprise it become differentiated from one another or subdivide to form new clusters of interrelated parts and then formulate a new integration. For Lewin and his colleqgues, for example, the process of differentiation meant that the number of regions increased. Integration meant that the boundaries separating the regions from each other grew stronger (Barker, Dembo, and Lewin, 1941). Lewin had a notion of "simple interdependence" which had to do with the extent to which it was likely that tension would spread from one region to another. This was contrasted with a notion of "organizational interdependence" which had to do with the hierarchical organization of the life space. As differentiation proceeds, simple interdependence declines; as integration occurs, organizational interdependence increases.

According to the orthogenetic principle espoused by Werner (1957), functions which were formerly syncretic become discrete. As

the newly differentiated functions are performed, their articulation and coordination with other functions increases and becomes both more stable and more flexible. Garrett advanced the same notion as follows:

> Abstract or symbol intelligence changes its organization as age increases, from a fairly unified and general ability to a loosely organized group of abilities or factors (1946, p. 373).

Several theorists accept some equivalent of the above as given and describe in detail what they believe is an invariant epigenetic process. They argue that in each successive integration of the structure, the elements of the preceding stages are retained but organized into a new synthesis. Each such synthesis is believed to form a coherent "structured whole" (Piaget, 1960).

Sometimes the genotypic properties of the new synthesis seem to be so qualitatively different from the genotypic properties of the synthesis that preceded it that the theorists feel justified in asserting that each such synthesis forms a distinct and identifiable stage. Their analysis of the necessary conditions for the attainment of the stages they have identified prompt them to claim that they can only occur in one specific sequence, that the structure will not attain Stage N, in other words, unless it first has attained Stage N-1. Some of the sequences that have been posited will now be noted briefly, beginning with those which can be classified as relative to the executive structure and proceeding then to a consideration of those which can be classified as relating to the motivational and representational structures respectively.

The Concept of Invariant Stages

The executive structure

One of the earliest theorists to postulate an invariant sequence of stages was Baldwin (1895). His theory is considered to relate to the executive structure because his concepts provide a scheme for classifying the Plans implemented by the executive structure. His three "stages of adaptation" allow the individual to engage respectively in "organic imitation," "conscious imitation," and "volition," the latter referring to the process of consciously selecting and pursuing ends.

Despite the fact that the titles of Piaget's books sound as though he is primarily concerned with the representational structure, e.g., The Construction of Reality in the Child, his concept of schema seems to be equivalent to Miller et al.'s Plans. The names of his major stages--the sensorimotor, the pre-operational, the concrete operational, and the formal operational--refer to the kind of Plan the individual is capable of implementing. The representational structure must meet certain criteria before the individual can perform the operations (i.e., implement the Plans) that demonstrate that he has attained the next stage of executive structure development. This fact illustrates the intimate relationship between the two strands of development.

It is here hypothesized not only that the developmental status of the representational structure sets upper limits on the extent to which the executive structure can develop, but also vice versa; further, the same position is taken regarding the reciprocal influence of the developmental status of any one of the four structures

on that of any other.

To return to the case in point, a child can not assert without doubt that the weight of a clay ball is conserved despite transformations in its shape unless his representation of reality is so organized to permit him to make such a judgment. But the representational structure can not become so organized until the child's executive structure allows him not only to focus attention simultaneously on both his prior inadequate prediction that the weight of the clay would change during shape transformations and his current observation that it remained the same, but also to maintain interest in the discovered disparity long enough to develop an explanatory hypothesis which resolves the disparity. If the executive structure is developed to this extent and if the child implements the enabling Plans in a situation or sequence of situations in which other relevant factors which will be discussed more fully later are sufficiently favorable, the representational structure will be forced to undergo revision.

If the relationship between the executive and representational structures is all that intimate, why not fuse the two structures into one conceptually clear composite structure? After all, the reader might think, a satisfactory justification for treating them separately has still not been offered. An advantage of considering them as distinct structures could accrue if procedures existed for measuring the developmental status of each structure. It would then be possible to embark on a program of research to determine precisely how far each structure could develop while the development of the other structures was held constant. When the results of such a study were in, a student's developmental profile could be examined and the rel-

evant data would exist to guide decisions regarding which structure required the attention of the instructional staff.

The motivational structure

Moving now to stages classified as being related to the motivational structure, Hunt (1964) has identified three. He asserts that the infant is originally motivated only by homeostatic need and painful stimulation. Eventually, as the child's representational structure develops to the point that he can recognize a circumstance or situation which has been encountered repeatedly, he is motivated to re-experience the familiar. Finally, the representational structure develops to the point where the familiar is, by itself, no longer satisfying. At this point, the child seeks novel variations within the familiar.

Hunt's theory of the epigenesis of the drive to seek a certain extent of incongruence between what is currently coded in the representational structure and what exists in the actual environment provides an alternative to positing in a teleological manner the existence of an innate drive to seek novelty. Furthermore, and more important, it provides a basis for investigating whether or not the drive undergoes further development, and what, if anything, determines the degree of novelty which seems to be optimally motivating (if individuals turn out to differ with respect to the size of optimal disparity). The concept of optimal disparity is one to which we shall return.

Whereas Baldwin, Piaget, and Hunt have concentrated with very young children (Piaget claims that the stage of formal operations usually begins around twelve years old) much of the research of Kohlberg and his colleagues (e.g., Kramer, 1968) was conducted on boys ranging from ten to sixteen who were followed for twelve years.

Further, although he has indentified six stages, Stage 4 is the dominant stage of most adults (Kohlberg, 1969).

Because the main interest here is the developmental status of college students, Kohlberg's work, and that of Harvey, Hunt, and Schroder for the same reason, is of special interest; i.e., while an examination of the theories of those who have concentrated on children may yield generic principles of development, an examination of the theories of those who have studied adolescents and adults may yield, in addition to generic principles of development, specific content which carries implications for the design of teacher preparation programs.

Before discussing Kohlberg's developmental stages, some justification for classifying his theory as relating to motivational structure is warranted. The reasons are twofold: First, his studies concentrate on his subjects' rationales for believing that a fictional character should or should not engage in various specific actions; second, even though his theoretical work has concentrated on the developmental changes which occur in the representational structure, these changes are postulated to lead to transformations in what has here been called the motivational structure. In other words, Kohlberg has developed a theory which not only asserts that the representational structure must meet certain criteria before the individual is capable of comprehending, and therefore behaving in accordance with, developmentally advanced motives, but he also describes the nature of each structure at each stage.

To show the relationship between the two developmental strands graphically, the characteristics of the representational and motivational structures are displayed respectively in the left and right columns of Table 3.:

TABLE 3.1

TRANSFORMATIONS IN THE REPRESENTATIONAL AND MOTIVATIONAL STRUCTURES ACCORDING TO KOHLBERG'S THEORY OF MORAL DEVELOPMENT

Representational Structure	Motivational Structure
Stage 1	
Obedience and punishment orientation. Egocentric deference to superior power or prestige, or a trouble-avoiding set. Objective responsibility.	Action is motivated by avoidance of punishment and "conscience" is irrational fear of punishment.
Stage 2	
Naively egoistic orientation. Right action is that instrumentally satisfying the self's needs and occasionally others'. Awareness of relativism of value to each actor's needs and perspective. Naive egalitarianism and orientation to exchange and reciprocity.	Action motivated by desire for reward or benefit. Possible guilt reactions are ignored and punishment viewed in a pragmatic manner. (Differentiates own fear, pleasure, or pain from punishment-consequences.)
Stage 3	
Good-boy orientation. Orientation to approval and to pleasing and helping others. Conformity to stereotypical images of majority or natural role behavior, and judgment by intentions.	Action motivated by anticipation of disapproval of others, actual or imagined-hypothetical (e.g., guilt). (Differentiation of disapproval from punishment, fear, and pain).
Stage 4	
Authority and social-order maintaining orientation. Orientation to "doing duty" and to showing respect for aurhority and maintaining the given social order for its own sake. Regard for earned expectations of others.	Action motivated by anticipation of dishonor, i.e., institutionalized blame for failure of duty, and by guilt over concrete harm done to others. (Differentiates formal dishonor from informal disapproval. Differentiates guilt for bad consequences from disapproval.)

TABLE 3.1--Continued

Stage 5	
Contractual legalistic orientation. Recognition of an arbitrary element or starting point in rules or expectations for the sake of agreement. Duty defined in terms of contract, general avoidance of violation of the will or rights of others, and majority will and welfare.	Concern about maintaining respect of equals and of the community (assuming their respect is based on reason rather than emotions). Concern about own self-respect, i.e., to avoid judging self as irrational, inconsistent, nonpurposive. (Discriminates between institutionalized blame and community disrespect or self-disrespect.)
Stage 6	
Conscience or principle orientation. Orientation not only to actually ordained social rules but to principles of choice involving appeal to logical universality and consistency. Orientation to conscience as a directing agent and to mutual respect and trust.	Concern about self-condemnation for violating one's own principles. (Differentiates between community respect and self-respect. Differentiates between self-respect for general achieving rationality and self-respect for maintaining moral principles.)

Note:

The left hand column was taken verbatim from Kohlberg (1967, p. 171); the right hand column was taken verbatim from Kohlberg (1969, pp. 381-382) except that the examples that followed each stage in the original text have been deleted.

Kohlberg, in describing assumptions made by cognitive-developmental theorists in general (1969, p. 353), claims that individuals are predisposed to utilize the highest level of structure available to them. He argues that this tendency partially explains the consistency in behavior which has led others to make the assumption that was mentioned earlier that each new synthesis forms a coherent, structured whole.

This general principle of hierarchical preference seems to apply to Kohlberg's own findings. He indicates that:

> . . . on the average, 50 per cent of a child's moral judgments fit a single stage. The remainder are distributed around this mode in decreasing fashion as one moves successively farther on the ordinal scale from the modal stage . . . .
>
> . . .While S's have difficulty comprehending stages above their own, and do not have difficulty with stages below their own, they prefer higher stages to the lower stages. If they can comprehend a statement two stages above their own, they prefer it to a statement one above. If they comprehend statements one stage but not two above their own, they prefer them to statements either two above or one below their own. If hypothetical statements at their own stage are presented to S's, and they have not yet produced statements of their own, the S's tend to prefer the one above to their own level statement (1969, pp. 386-387).

One appealing feature of Kohlberg's theory, which is evident from an examination of the right'hand column in Table 3.1, is that he makes explicit what must be differentiated before the individual can progress to the next stage. The theories of Dewey and Harvey, Hunt, and Schroder also contain this feature although in Dewey's it is somewhat implicit. Furthermore, both theories contain an intriguing dynamic component which is also present in the work of Erikson. These will be described after brief mention of the stages postulated by Bruner.

The representational structure

Bruner (1964) has postulated that the representational structure progresses through three major stages. At first, in the "enactive" stage, the yound child can only represent ideas through action. In the "ikonic" stage, the representational structure is capable of producing visual images. In the "symbolic" stage, the representational structure can code and process arbitrary symbols.

Bruner's current interests have shifted toward the very earliest years of life. Symbolic coding, his last stage, is the dominant mode of interacting with the environment for the majority of students by the middle of high school, if not by junior high school. Since the focus here is on college students, his stage hypotheses are listed primarily out of respect for his contributions both to cognitive theory and to the field of education. Much of Bruner's work in education bears a remarkable similarity to that of John Dewey, whose stages of cognitive activity will be taken up next.

I consider it extremely unfortunate that so few educators have comprehended or utilized Dewey's work; the theory discussed next seems to be practically unknown. Dewey (1900) envisioned four stages which span a doubt-inquiry dimension: At one end of the developmental continuum, the individual reduces uncertainty as rapidly as he can with a minimum of reflection and/or consideration of alternative modes of eliminating what is viewed as an unwelcome intrusion. At the other end of the continuum, the individual deliberately seeks problems and develops elaborate and systematized methods of investigating them.

A modification of Dewey's description of his stages is presented in Table 3.2. In the left hand column, the representational structure's orientation to perceiving beliefs at each of the stages is shown. Along with it is included, from the second stage on, the concepts between which the individual must differentiate if he is to achieve that stage. In the middle column, the representational structure's orientation to evaluating beliefs is shown. Finally,

TABLE 3.2

DEVELOPMENTAL CHANGES IN THE REPRESENTATIONAL STRUCTURE'S ORIENTATION TOWARD BELIEFS ACCORDING TO JOHN DEWEY

Orientation Toward Perceiving Beliefs	Orientation Toward Evaluating Beliefs	Dominant Forms of Cognitive Activity
Stage 1: Beliefs are treated as something fixed and static, as immutable facts, not open to doubt or revision.	Beliefs are not evaluated; they are merely accepted.	Cognitive activity is primarily passive homeostatic uncertainty reduction or contradiction resolution as in the cognitive balance models proposed by Heider (1946) and Newcomb (1953). Some discrimination among accumulated rules but inquiry is limited to determining which to use; i.e. it is not directed toward the fact or the idea, just toward the connection.
Stage 2: Not only are beliefs considered to be subject to change, they are viewed as being based on prejudice, interest, or arbitrary choice. They are seen as purely subject and therefore unstable in the sense that any one set of beliefs is perceived to be as good as any other. (Differentiates beliefs from facts; the latter are still viewed as stable while the former are believed to be unstable.)	Beliefs are compared and contrasted to each other along arbitrary ad hoc criteria.	Beliefs are compared and contrasted, and modified to locate and make relevant to a concrete problem whichever seems to have the most potential to be suitable; some systematization and reflection occurs.

TABLE 3.2--Continued

Orientation Toward Perceiving Beliefs	Orientation Toward Evaluating Beliefs	Dominant Forms of Cognitive Activity
Stage 3: Two kinds of beliefs are recognized: self-evident universal truths which are permanent and have no need to be questioned or demonstrated and ordinary beliefs which differ among themselves according to their proximity-remoteness from the universal truths. (Differentiates empirical truths from universal truths; the latter are unquestionable while the former are necessarily open to doubt.)	Beliefs are evaluated according to their relationships with universal truths.	The individual is concerned with demonstrating proof or validity. To that end logical and deductive processes are employed but cognitive activity ceases when it is believed that proof has been obtained, i.e., that a chain has been completed linking the issue at hand to universal proofs.
Stage 4: All beliefs are open to doubt; uncertainty compels investigation. The individual has a standing Plan to seek out ideas that might lead him to discover or wonder about new phenomena. The individual utilizes systematic frames of reference and tested procedures to guide him, but looks for ways to revise them. (Differentiates ad hoc ideas from those which fit in a carefully developed network of ideas,i.e., one which is	Beliefs are evaluated by their suggestiveness or their potential fruitfulness, i.e., according to the extent to which playing with or otherwise using them appears to show promise of encountering intriguing and unexpected consequences.	The individual searches for disparity. He hopes to advance knowledge, to discover new truths. He makes many inferences and employs the scientific method in attempting to isolate or discover the assumptions underlying his own thinking or that of others. He is continually on the lookout for "apparent exceptions, negative instances, extreme cases, anomalies . . . for new facts which may be incompatible with old theories, and which may

TABLE 3.2--Continued

Orientation Toward Perceiving Beliefs	Orientation Toward Evaluating Beliefs	Dominant Forms of Cognitive Activity
logically comprehensive and internally consistent; however, he is aware that either can provoke further productive thought and that is what counts.)		suggest new points of view." (Dewey, 1916, p. 212).

in the right hand column, the dominant form of cognitive activity is briefly sketched.

Note that each new stage develops as a reaction against the previous stage as in an Hegelian thesis-antithesis-synthesis process. For example, as an individual in the first stage accumulates more and more ideas

> . . . their application to specific questions becomes more difficult, prolonged, and roundabout. There has to be a definite hunting for the specific idea which is appropriate; there has to be comparison of it with other ideas. This comes to involve a certain amount of mutual compromise and modification before selection is possible. The idea thus gets somewhat shaken. It has to be made over so that it may harmonize with other ideas possessing equal worth . . . .
> . . . . . .
> . . .[T]he agitation of ideas, if judged from the standpoint of the older fixed ideas, is a destructive process. Ideas are not only shaken together and apart, they are so shaken in themselves that their whole validity becomes doubtful (Dewey, 1916, pp. 193 and 195).

Thus, the notion that ideas are arbitrary is a reaction against the predisposition to assume that they are fixed; the notion that some truths are universal can be viewed as a reaction against not having any props to count on. For those who have successfully integrated the elements of Stage 3, the rise in curiosity about all the ramifications of anything that moves can be interpreted as a vote of confidence for the fruitfulness of the elaborate procedures they have used and which they may have helped to revise. The experience of success and confidence could cause them to question the wisdom of protecting those assumptions they had previously accepted as inviolate.

Not only does every stage after the first start out as an Hegelian antithesis, but every antithesis after the first contains elements of the original thesis that the current thesis against

which the antithesis is reacting first opposed when it was an antithesis. Thus, those in Stage 2 progressed to it in reaction against the fixity which pervaded Stage 1, but when they opposed the arbitrariness of Stage 2, their representational structure reactivated the predisposition to perceive beliefs as fixed, but it did so in a more sophisticated manner.

Similarly, those who advanced to Stage 3 becase they opposed the arbitrariness of Stage 2, ultimately regain a sense of arbitrariness when they probe formerly sacred assumptions. Now, however, they are using procedures that have been built upon a rationale and integrated with other procedures. These procedures are not arbitrary in the sense of "capricious" but in the sense of "subject to individual will or judgment; discretionary" (American College Dictionary, 1964). The Stage 4 individual, then, is relying on an old component of his representational structure, but in a more controlled, precise, and cognitively complex way. We have here, then, a clear example of the principle of epigenetic stages: The more developmentally advanced structures contain the elements that were present in their earlier, more primitive versions; now they are more finely honed and better integrated; as a result, the individual can respond more flexibly, more competently.

The transition from Dewey to Harvey, Hunt, and Schroder through Erikson will be brief. Like that of Piaget, who has been undertreated here relative to the enormity of his contribution, the approach taken by Erikson (1950) is too well known to warrant as much space as a careful consideration of his work would require.

To recapitulate the essence, Erikson, like Hegel, postulates

that the individual encounters a series of thesis-antithesis crises which he is forced to resolve. Erikson believes that the individual will be forced to face the same set of issues again and again but that in each subsequent encounter, he will be increasingly more mature as a result of what he has done and undergone in the interim. Despite the assumption that each thesis-antithesis conflict re-emerges even after it has been successfully resolved during one period of development—mostly because the elements which formed the old thesis and antithesis continued to increase in complexity beyond the point where the old synthesis could remain adequate--the conflicts of particular theses against their corresponding antitheses are believed to occur in their most dominant form in an invariant sequence and at specific points in the life cycle.

Erikson's position qualifies as a stage theory because it fulfills the invariant sequence criterion as well as the "coherent whole" criterion; it fulfills the latter because each postulated crisis is believed to be such a central event during its tenure that it exerts a major influence on all other events with a high degree of centrality.

The stages of conflict are listed in Table 3.3. Only two comments will be made in passing. First, the dimensions upon which

TABLE 3.3

Erikson's Stages of Conflict

1. Trust vs. Autonomy and Mistrust
2. Autonomy vs. Shame or Doubt
3. Initiative vs. Guilt
4. Industry vs. Inferiority
5. Identity vs. Role Diffusion
6. Intimacy vs. Isolation
7. Generativity vs. Stagnation
8. Ego Integrity vs. Despair

Erikson focuses are usually overlooked by cognitive theorists, perhaps because they lack rigorous empirical validation. If they are taken into account, however, they cast a new light on the relationship between the representational structure and the executive structure. Earlier, in discussing the criteria the representational structure had to meet to allow the executive structure to develop, the implied emphasis was on cognitive power in the sense of possessing specific abilities. What Erikson introduces is the multi-faceted interpersonal sphere. For example, "the child who trusts is able to postpone immediate gratification for delayed, but larger, rewards" (McCandless, 1969, p. 797). This is one of the functions, it will be recalled, which Kohlberg indicated that the executive structure has to develop the capacity to perform.

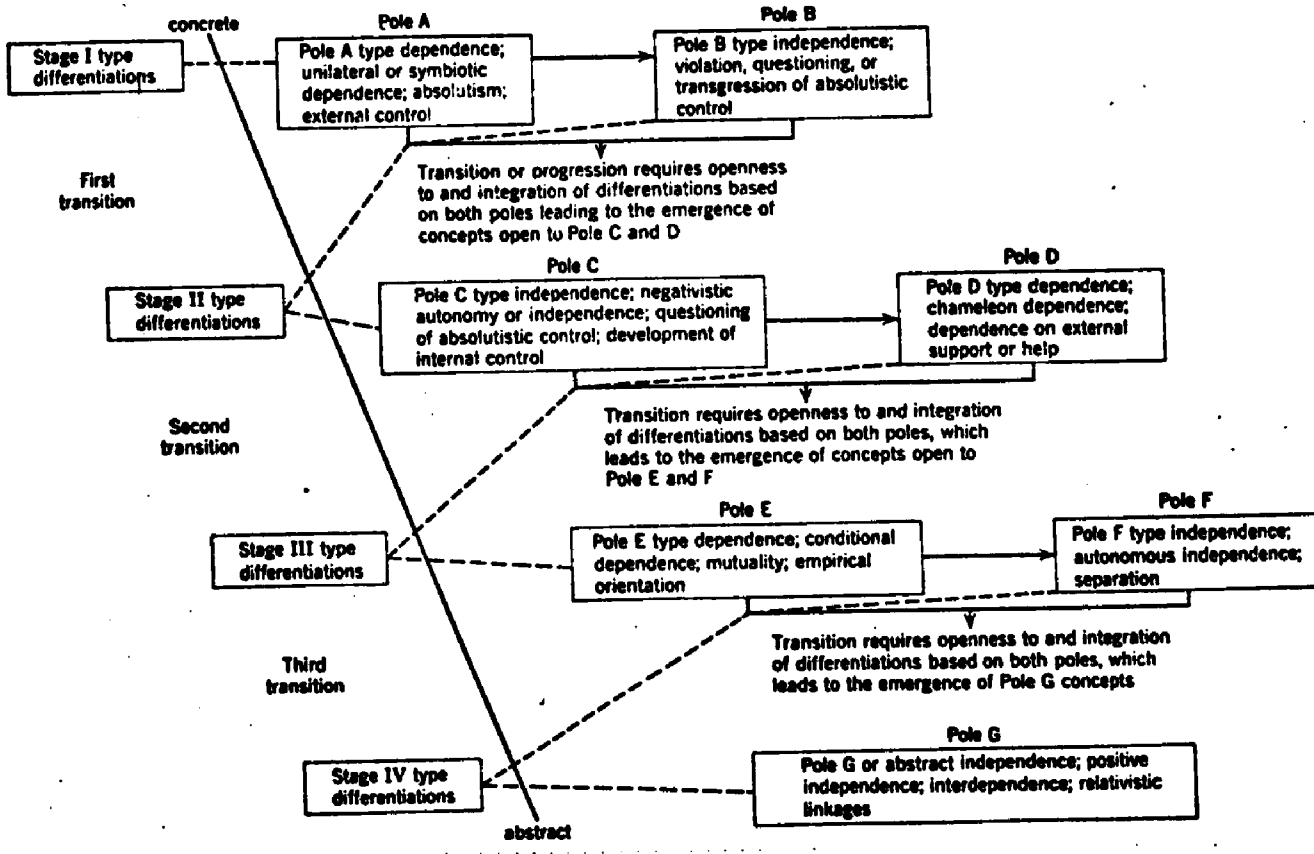
The second comment is that while Erikson's most famous stage, Identity vs. Role Diffusion, is predominantly resolved (for the first go-round anyway) for college students who have decided to be teachers, the crisis which succeeds it, Intimacy vs. Isolation, is still in its peak. This fact adds one more reason for Harvey, Hunt, and Schroder's theory, which will be taken up immediately, to have a special appeal, viz., that their fundamental concern is with issues which lay at the heart of the Intimacy-Isolation crisis: dependence, independence, and interdependence.

The essential ingredients of Harvey et al.'s theory have already been discussed. Their notion of a conceptual system, which was presented in the first chapter, is sufficiently close to what is here referred to as the representational structure to ignore the distinctions for the present purposes. This system or structure

is believed to develop epigenetically as a result of spiraling conflicts between an independence pole and a dependence pole. As an individual works his way up the spiral, he makes progress on their major developmental dimension: concreteness-abstractness. The basic features of Harvey, Hunt, and Schroder's theory are summarized in Table 3.4 and a full description of each stage is given in Table 3.5.

TABLE 3.4

A SUMMARY OF HARVEY, HUNT, AND SCHRODER'S THEORY



Source: The above table is a reproduction of Table 1 from Harvey, Hunt, and Schroder, 1961, p. 88.

TABLE 3.5

HARVEY, HUNT, AND SCHRODER'S STAGES

Stage 1: Unilateral Dependence.

Conceptual systems in the first stage are characterized by external control, by the acceptance of externally derived concepts or schemata not built up through experience with the actual stimuli, and by the absolutistic nature of such concepts . . . . The term unilateral is intended to convey the fact that functioning in this stage is adjusted to match absolutistic, ready-made conceptual criteria. Unilateral dependence implies a lack of differentiation between a rule and its purpose; between authority and one's own experience; between one's thoughts about authority and oneself. First stage functioning is assumed to have the following characteristics: things are endowed with power as in magical thought; answers to questions are accepted more in the sense of absolutes (Werner, 1957); thinking is more concrete ("this is the way it is because it is"); behavior associated with this stage is characterized by a greater immediacy, by greater sensitivity to limits, to what is right and wrong, to what is tolerated and not tolerated, and by greater submissiveness to external control.

Stage 2: Negative Independence.

Negative Independence represents functioning that is negatively related to external constraints. Since such functioning represents a lessening of the importance of external control and the initial budding of internal control, we use the term, negative independence; the term does not imply any necessary hostility or aggression. Hostile reactions represent the extreme manifestations of closed second stage relatedness, which denotes the arrestation of development at this stage . . . .

. . . . . .

This stage has been referred to as "freedom from" authoritarian control and contrasted with positive freedom, independence, or "freedom to" (Fromm, 1941) . . . . Functioning at this stage is characterized by such cliches as "I'll do it myself; by the emergence of "self will".

Stage 3: Conditional Dependence and Mutuality.

This stage may be characterized by conditional or "as if" functioning, in that it involves learning about one's relationship to the environment in a more objective . . . more empirical approach . . .[O]ther people's intentions and wishes are taken into account . . . a more objective view of the social environment becomes possible. The person . . . views other people less subjectively (that is, less in terms of his own motives and less in terms of absolute standards) and more in terms of other's standards and past experience. His understanding of other points of view, rather than resisting or submitting to them, makes mutual relationships possible. Third stage functioning also involves holding alternative views of the self, of events, and of others simultaneously with a minimum of concern for ambiguity.

. . . . . .

TABLE 3.5--Continued

The person reacts in alternative ways toward others in order to experience their reactions. By observing the reactions of others to his own reactions and finding out more about their standards, he is better able to control the consequences of his own behavior and learn about his own characteristics and limitations. It is as if he were using the environment, or other people's standards, as a mirror to develop a more abstract criterion of his own behavior. Cooley (1912) refers to this procedure as the "looking glass self."

Stage 4: Interdependence.

In the fourth stage mutuality and autonomy are integrated so that neither interferes with the other and yet both are important. We refer to this integration as positive interdependence. The nature of subject-object linkages at this level is abstract, interdependent, and informational . . . .

. . . . . .

Such interdependence frees relationships from constrictions due to power, resistance to control, or fears of rejection, thus permitting a more abstract and objective form of understanding and participation with others. On the basis of the development of autonomous informational standards the individual can experience rewards, as a result of instrumental activity or work, in terms of his own past experience rather than being dependent on some external source . . . .

. . . . . .

The most general characteristic of such abstract functioning is resistance to stress. As more abstract forms of subject-object linkages develop there is greater self-awareness. It is this greater self-awareness of attribution of internal causation that is critical for stress tolerance . . . More abstract functioning is based on a conceptual system that has been open to a variety of conflicting forms of subject-object relatedness that have been progressively integrated during development. Consequently there is a greater reservoir of resources to overcome and withstand stress of various forms--failure, control, rejection, or isolation . . . .

. . . . . .

Fourth stage functioning is characterized by abstract standards developed through the exploration of alternative solutions against a variety of criteria. These standards are systematically related to the informational consequences of exploration and as such are "tools," not masters, since they are subject to change under changing conditions. Abstract functioning is characterized both by the availability of alternate conceptual schemata as a basis for relating and by the ability to hold a strong view or attitude that does not distort incoming information.

The above contains verbatim excerpts from Harvey, Hunt, and Schroder, 1961, pp. 94, 98, 101, 103, 106-109.

Harvey et al. include an interesting feature in their theory which fills a gap which has been ignored by others. Theorists such as Werner (1957) and Ausubel (1963) have stressed the importance of a clarity-ambiguity dimension which is associated with the nature of the differentiation the structure has achieved. In addition, Lewin (1936), in his discussion of centrality and the thickness of barriers, has alluded to a compartmentalization-interrelatedness dimension which is associated with the nature of the integration the structure has attained. None of these theorists, however, has been explicit aobut the relationship between where the structure lies on these dimensions and its potential to undergo the necessary extent of differentiation or integration for it to advance to the next stage. Harvey et al., however, introduce a concept of openness which addresses itself to this relatinship. It will be discussed more fully in future chapters, but essentially the more conceptual interrelatedness exists the more the structure is open to integration.

After considering Harvey, Hunt, and Schroder's theory in the light of the other theories which have been described, I became convinced that their basic position could be improved through reformulation. In the chapter which follows, I shall enumerate three modifications and cast them into testable hypotheses. Before concluding this chapter, however, two questions need to be resolved: 1) What does all the above have to do with formulating objectives for future teacher preparation programs? and 2) What implications emerge for the design of learning environments which will facilitate the achievement of whatever objectives are suggested in the answer

to the first question? Those implications for instructional-assessment methodology which flow from my proposed reformulation of Harvey et al.'s theory will be discussed in the final chapter, after the data which were collected to test the hypotheses have been presented and discussed.

A Major Objective of Education

Let us turn, then, to the first question: What does all the above have to do with formulating objectives for future teacher programs? My answer is that it helps us operationalize Dewey's continual urging that the purpose of education should be to promote growth (e.g., Dewey 1902, 1916, 1938). From Dewey's own writings, the ultimate criterion along which experiences should be judged conducive to or arresting of growth seems to be the extent to which they enable the individual to increase his influence on the quality of his future experiences including the nature of the environment in which they occur, the nature of the events which comprise them, and perhaps most important to Dewey, the individual's response to them.

Elsewhere, Dewey argued that the individual should "have the free use of all his personal powers" (1966, p. 287). When Dewey talked of having the free use of his powers, he was not describing conditions under which or means by which growth would be achieved. Instead, he was describing the ends of growth. When a person followed every whim that came along, Dewey considered him to be a prisoner of or slave to his impulses.

In the language adopted here, having the free use of one's powers means that the individual's motivational structure has sub-

sumed, in Ausubel's sense of the term, a wide variety of drives under a single dominant desire. This interpretation is supported by Dewey's statement that

> . . . there is not intellectual growth without some reconstruction, some remaking, of impulses and desires in the form in which they first show themselves. This remaking involves inhibition of impulse in its first estate (1938, p. 64).

In particular, Dewey is arguing that the drives should be subsumed under a desire to fulfill the needs and enhance the welfare of others. Dewey made this point explicit when he described the goal of the school. This is how he phrased it:

> The end of the institution must be such as to enable the child to translate his power over into terms of their social equivalencies; . . . This implies:
> 1. Such <u>interest</u> in others as will secure responsiveness to their real needs—consideration, delicacy, etc.
> 2. Such <u>knowledge</u> of social relationships as to enable one to form social ideas or ends.
> 3. Such <u>volitional command of one's own powers</u> as to enable one to be an economical social agent (Dewey, 1966, pp. 298-299).

The individual who possesses the above overarching desire has arrived at Kohlberg's principled level which comprises Stages 5 and 6 (The individual at Stage 5 is motivated "to maintain the respect of the impartial spectator judging in term[s] of community welfare" (Kohlberg, 1964, p. 400)).

To say that an individual has the free use of his personal powers also implies that his representational structure has developed to the point where he can combine his own resources with those whose help he needs to achieve his goals as in the fourth stage of Harvey et al. His representational structure must also permit him to search for cues which will enable him to make inferences about the adequacy of his attempts to make progress; this capacity would place him in

the fourth stages of both Dewey and Harvey et al.

Finally, saying that an individual has the free use of his personal powers implies that he can successfully exercise the following executive powers: maintaining attention, anticipating consequences, choosing a remote larger reward over an immediate smaller one, and in general implementing well articulated and integrated Plans which have the potential to achieve the social ends which Dewey embraced.

The fruitfulness of the approach taken here is that the above can be stated parsimoniously as follows: The overriding purpose of education is to promote the development of the motivational, representational, and executive structures. This position is congruent with those theorists whose work has been mentioned. All of those which postulate stages imply or explicitly state that socialization agencies such as the schools should create conditions which increase the likelihood that individuals can progress to the next stage.

Harvey, Hunt, and Schroder promulgate this view quite bluntly:

> The goal of education in a democratic society such as ours is (or should be) to provide the conditions to produce more abstract conceptual structure (Op. cit., p. 340).

Since writing the above statement, Harvey and some of his other colleagues have conducted research on college students and on teachers which suggests the urgency of adopting this goal. Here are some of their findings:

1. Out of 300 undergraduates, only 7 per cent can be classified as operating at System 4 (Harvey, Prather, White, and Hoffmeister, 1968).

2. Only 18 out of 292 teachers, "or six per cent, have been classified as System 4, not all of which were ideal cases" (Ibid., p. 132).
3. The behavior of System 4 teachers differs in the "educationally desirable direction" from System 1 teachers on every one of the 26 dimensions of classroom behavior on which they were rated. From studying the 14 dimensions on which the differences proved to be statistically significant, four stand out as being especially important to me. Compared to their System 1 colleagues, System 4 teachers showed greater perceptiveness of their students' wishes and needs, were more flexible in meeting student interests and needs, were more encouraging of individual responsibility, and they gave greater encouragement to creativity (Harvey, White, Prather, Alter, and Hoffmeister, 1966).
4. A cluster analysis of the 14 statistically significant dimensions revealed that compared to System 1 teachers, System 4 teachers were more resourceful, less dictatorial, and less punitive.
5. The classrooms of 66 teachers were observed and the students as a group were rated on 31 scales which loaded on 7 factors. The abstractness of the teachers correlated significantly with all 7 factors. Although all the correlations were very low--the mean of the absolute values was .20--it is of interest that the students of the more abstract teachers were judged to engage in

less nurturance seeking and were rated as being more abstract, more active, more involved, more cooperative and helpful, and last with the biggest correlation (.27), they were judged to be achieving more (Harvey. et al., 1968). The authors admit that correlation coefficients don's deonstrate causality but offer some compelling reaons for inferring that the behavior of the teachers was causally related to the behavior of the students.

Before responding to the second-raised question, I should point out that though my analysis of the structures influencing behavior was originally stimulated by the prospect of developing implications for the design of teacher preparation curricula, the main focus in this chapter is to provide background information on and a context for the study which is reported in the remaining chapters. Since this is the case, a more detailed answer to the first-raised question would be inappropriate.

Conditions Promoting Developmental Progression

Turning then, to the second question: What implications does the theory set forth here have for the design of learning environments which will promote developmental progression? Five principles will be discussed: optimal disparity, action, role taking, freedom, and reflection encouragement.

Optimal disparity

The notion of optimal disparity is derived from the hierarchical preference assumption. Under favorable circumstances, according

to this assumption, a bias operates in the individual to employ the schema, concepts, or modes of thinking that are possible at his current stage rather than the more primitive structures which served him when he was operating at earlier stages. This bias is less likely to achieve ultimate influence on the individual's behavior either if the vestiges of the ancestor states of the structure appear to the individual to be totally adequate to cope with whatever environmental challenge is confronting him or if impinging stimuli are bombarding him too rapidly or in too complex a form for his current structure to respond optimally. This implies that for the individual to be able to cope with an input pattern in a manner consistent with the most advanced stage of the structure yet achieved, the input pattern must fall within a critical range of complexity that is neither too far below the complexity of his structure nor too far above.

However, the assumption that structural transformation only occurs as a result of an interplay between innate structuring predispositions and the aspects of the environment with which he interacts implies that the structure could not grow unless the environmental input pattern was more complex than the current stage of the structure. For if the structure could develop without the confrontation caused by a disparity between the complexity of the input pattern and the capacity of the current state of the structure, one could hardly argue that the environment was a necessary ingredient in the process of growth.

The notion of optimal disparity appears in a number of guises in the work of the above theorists. Dewey, for example, argues that

the lack of disparity results in predictable stagnation.

> If ideas were called into play only when doubtful cases actually arise, they could not help retaining a certain amount of vitality and flexibility; but the community always instructs its new members as to its way of disposing of these cases before they present themselves. Ideas are proffered . . . separated from present doubt and remote from application, in order to escape future difficulties . . . When the community uses its resources to fix certain ideas in the mind--that is, certain ways of interpreting and regarding experience--ideas are necessarily formulated so as to assume a rigid and independent form (Dewey, 1916, pp. 189-190).

Hunt (1964) cites several studies which can be interpreted to suggest that "contolling intrinsic motivation is a matter of providing an organism with circumstances that provide a proper level of incongruity." It does not follow, however, that the degree of disparity that is optimally motivating is also optimal for structural development. It might be that the degree of disparity required to coerce accommodation is greater than that which is maximally motivating. On the other hand, one could argue that the high level of structural activation that is associated with maximal motivation is the critical ingredient of the growth process.

Some additional complications are pointed out by Harvey, Hunt, and Schroder (1961, p. 53):

> The fact that an event objectively is discrepant from a concept on some dimension and in some direction does not mean that such a discrepancy will be taken by the subject as representing either confirmation or refutation of a particular concept. Such lack of correspondance between variations in the stimulus and accompanying effects, overt and covert, may be due to a host of conditions. For example, the discrepancy might be so great between the subject's concept and the impinging stimulus that the event (another's evaluation, say) would be interpreted as irrelevant to the issue at hand. Such conceptual discontinuities have been noted in several studies, where the discrepant events have been both the evaluations of another person (Asch, 1952) and inanimate psychophysical anchors (Rogers, 1941).
>
> An individual, instead of noting the discrepancy and interpreting it as irrelevant to his own concept, may actually fail to note the concept-event incongruity and, at least so far as

> measured effects reveal, to act as if no discrepancy existed. Such ways of behaving were found to occur in prejudiced subjects who failed to get the point of the Mr. Biggot cartoons (Cooper and Jahoda, 1947), as well as more authoritarian individuals who failed to "receive" the negativity of information to which they were exposed (Harvey and Beverly, 1959).

If optimal disparity is indeed a condition of structural development, the familiar platitude "Start where the learner is" takes on enriched meaning. Kohlberg and his colleagues have demonstrated the importance, as well as the practicability, of assessing the current state of the motivational structure.

> . . . Turiel (1966) divided sixth-grade children (themselves equally divided by pretests among Stages 2, 3, and 4) randomly to one of three treatment groups. The treatments consisted of exposure to advice by an adult E on two hypothetical moral conflict situations. The first treatment group received advice one stage above their own, the second two stages above their own and the third one stage below their own. The children were post-tested one month later on both the pretest and the treatment situations. Turiel found a significant increase in usage of thinking one stage above in the plus-one treatment group. He found no significant increase in usage of thinking two stages above in the plus-two treatment group. He found an increase in usage of thinking one stage below in the minus-one group, but this increase was significantly less than the increase of plus-one treatment group.
>
> Turiel's laboratory study has received naturalistic validation from Blatt's (1969) program of classroom discussion of moral dilemmas held once a week for three months at the sixth-grade level. Blatt's procedure was to elucidate the arguments of the Stage 3 children as against the Stage 2 children on hypothetical moral conflicts, then to pit the Stage 3's against the Stage 4's, and finally to himself present Stage 5 arguments. The effect of this procedure was to raise 45 per cent of the children up one stage (as compared to 8 per cent in a control group), and 10 per cent up two stages. A majority of the Stage 2 subjects moved to Stage 3, a majority of the Stage 3 subjects to Stage 4. There was very little movement from Stage 4 to the Stage 5 level presented by the teacher.
>
> One reason the Blatt study induced more change than the Turiel study was because the discussions were carried on over a greater time period. The Blatt procedure also differed in inducing greater conflict through disagreement. Presumably a sense of contradiction and discrepancy at one's own stage is necessary for reorganization at the next stage (1969, pp. 402-403).

Not only is optimal disparity important for the motivational

structure, it also seems to be important for the executive structure.

> Ego functions improve as they are performed with success in increasingly difficult situations. A major requirement is that tasks calling for a wide variety of ego performances be assigned the individual, but in situations that are not so difficult or anxiety-provoking that he is forced to make use of primitive defensive devices (Sanford, 1962, p. 278).

A task analysis needs to be done to executive structure functioning to determine what generic abilities still need to be fostered or refined at the college level and which ones of these proceed through developmental stages. Such a task analysis could then form the foundation of an assessment program.

The problem of assessing the state of the representational structure is what prompted the study reported here. Harvey has already made some attempts which will be discussed in the next Chapter.

Action

Next to be discussed is the principle of action. The implication of the theoretical position described above is that the learning-by-doing aphorism needs qualification. It is frequently interpreted to emphasize motor activity. For example, Hunt said that "Dewey (1902) gave emphasis to the motor side. . . in his belief that the child learns chiefly by doing" (1968, p. 491). In the same article, Hunt cites several studies which suggest that the sensory system is more important than the motor system for the development of both animals and infants, points out that Piaget really emphasized the sensory over the motor, and finally, he cites Montessori as one who put great stress on the training of sensory processes. Hunt even suggests that

> [t]he fact that [Montessori] placed strong emphasis on the training of sensory processes may well be one of the major reasons why her work dropped out of the main stream of educational thought and practice in America before World War I. This emphasis was too dissonant with the dominant American emphasis in learning upon the motor response, rather than upon the sensory input or informational processes (1968, p. 506).

If the hierarchical preference principle is applied, it would lead to the prediction that, to use Bruner's terms, the child uses enactive processes as the primary means to interact with the environment, but that he will embrace ikonic processes as his primary mode of interaction to the extent that it is appropriate as soon as he develops the capacity to do so. Similarly, he will adopt symbolic processes as his dominant mode of interaction with the environment to the extent that it is appropriate as soon as he is capable of making the transistion.

Ausubel's passage vindicating Dewey is instructive:

> John Dewey had correctly recognized that meaningful understanding of abstract concepts and principles in childhood must be built on a foundation of direct, empirical experience, and for this reason advocated the use of project and activity methods in the elementary school. But he also appreciated that once a firmly grounded first-story of abstract understandings was established, it was possible to organize secondary and higher education along more abstract and verbal lines. Unfortuneately, however, although Dewey himself never elaborated or implemented this latter conception, some of his disciples blindly generalized childhood limiting conditions, with respect to meaningful verbal reception learning, broadly enough to encompass learning over the entire life span. And this unwarranted extrapolation, frequently but erroneously attributed to Dewey himself, provided a pseudonaturalistic rationale for, and thus helped perpetuate, the seemingly indestructable myth that, under any and all circumstances, abstractions cannot possibly be meaningful unless preceded by direct, empirical experience (1963, p. 20).

Role taking

Our third principle, the encouragement of role taking, has been stated by several. Its most general statement is that by Moore

and Anderson:

> One environment is more conducive to learning than another if it both permits and facilitates the taking of more perspectives toward whatever is to be learned (1969, p. 585).

These two authors have identified four perspectives that a comprehensive theory of development should take into account. The four perspectives are the "agent," the "patient," the "reciprocator" and the "referee" (the latter two are similar to the significant and generalized others of Mead (1934)).

Erikson (1950) feels that achieving identity in a new role helps the individual prepare to handle others. Kohlberg views role taking as the primary mechanism by which the individual differentiates and advances his structure (see especially 1969, pp. 397 ff.).

Sanford states the implication of the above for the college curriculum rather aggressively:

> So great are the benefits of confronting the student with new role-requirements--according to the present theory--that one is led to hope that each college will invent special devices for forcing the student to vary his habitual way of doing things. If the first few weeks of college constitute a kind of developmental crisis which can result in a spurt in development, then the college would be well advised to arrange for their students an educational program embracing a series of such crises. At the least students could be offered radically different kinds of social situations, during their four years of college. Even temporary shifts in the student's situation and role requirements might be highly beneficial (1962, p. 280).

Freedom

The fourth principle to be discussed is freedom. Rousseau's belief that the child is innately good in contrast to society which is the source of evil has exerted considerable influence in educational philosophy. It influenced him to argue that a maximally permissive environment would allow the innately good potential in the child to unfold naturally according to the stages which had been predetermined.

His conclusion was that students should have "freedom from": freedom from goals, criteria, rules, and other constraints. Two of the major proponents of this approach currently are A.S. Neill (1960) and Carl Rogers (1969). Rogers has cited a study done by Clara M. Davis to support the major premise. Because the issue of freedom continues to be so controversial, and because the Davis study is so perennially intertwined with it, some of the reactions it has provoked and some aspects of the study itself will be examined in detail. Here is what Rogers said about the Davis study:

> I would remind you of the experiment in which young infants had spread in front of them a score or more of dishes of natural (that is, unflavored) foods. Over a period of time they clearly tended to value the foods which enhanced their own survival, growth, and development. If for a time a child gorged himself on starches, this would soon be balanced by a protein "binge." If at times he chose a diet deficient in some vitamin, he would later seek out foods rich in this very vitamin. He was utilizing the wisdom of the body in this value choices, or perhaps more accurately, the physiological wisdom of his body guided his behavioral movements, resulting in what we might think of as objectively sound value choices (Rogers, 1969, p. 241).

A thorough reading of the Davis study reveals that Rogers is inaccurate in some of his assertions. The report never mentions a starch or protein binge. What it does say about protein is that authorities differ among themselves with respect to the proportion of total calories consumed by children under five years old that should be furnished by protein, but that generally somewhere between 10 and 17 per cent is advocated. The statistic was provided without comment that "the individual range for the protein in the group was from 9 per cent to 20 per cent." No distribution is shown. The reader has no way of knowing how many children fell right outside of the recommended range.

Rogers also referred to the innate wisdom of the children

with regard to vitamin needs. Here is what Davis says:

> As yet no statistical analysis of the diets has been made for their vitamin and mineral contents, but with all vegetables fresh, all cereals whole grains, grounded by the old stone process, eggs, liver and kidney eaten freely, fresh fruits eaten in amazingly large quantities, and the salt used, an unpurified sea salt containing all the minerals found in the body, the probability of any deficiency in vitamins or minerals is slight indeed. In fact, the quantities of fresh fruit, carrots and potatoes and of eggs, liver and kidneys in practically all the diets preclude, on the basis of their known vitamin content, any shortage of Vitamins A, B, C and G (1954, p. 72).

In other words, as will become even clearer later, the extent to which the children consumed a sufficiency of vitamins and minerals may have been an artifact of both the highly restricted diet list from which the subjects had to choose or of the quantity they ate which was not restricted.

We shall return to a further examination of the study proper after mentioning some of the points raised by Ausubel. He discusses the implication some have drawn from the study, viz., "If the child can successfully choose his diet, he must certainly know what is best for him in all areas of growth and should therefore be permitted to select everything, including his curriculum" (1968, p. 464). Here are some of his concerns:

> Because the individual is sensitive in early childhood to internal cues of physiological need we cannot conclude that he is similarly sensitive to cues reflective of psychological and other development needs; . . .
> . . . [T]here is little warrant for believing that [the endogenous motivations] alone are truly reflective of the child's <u>genuine</u> developmental requirements or that environmentally derived needs are "imposed," authoritarian in spirit, and inevitably fated to thwart the actualization of his developmental potentialities. Actually, most needs originate from without. . .
> . . . one can never assume that the child's <u>spontaneously</u> expressed interests and activities are completely reflective of <u>all</u> of his important needs and capacities. . . . Thus, children typically develop only <u>some</u> of their potential capacities, and their expressed interests cannot be considered coextensive with the potential range of interests they are capable of developing with appro-

priate stimulation (Ibid., pp. 464-465).

Essentially, Ausubel questions the inferential chain which links a student's alleged competencies to make educational decisions to "the fact that nutrition is adequately maintained and existing deficiency conditions are spontaneously corrected when infants are permitted to select their own diets." Not only do his questions need to be answered, however; some methodological questions are equally as telling.

First it is important to examine the choices open to the young child. The complete list of foods utilized is shown in Table 3.6 (Davis, 1954, p. 70).

Table 3.6

FOODS USED IN THE SELF-SELECTION OF DIETS STUDY

Water	Peas	Ry-Krisp
Sweet milk	Turnips	Beef
Sour (lactic) milk	Cauliflower	Lamb
Sea salt (Seisal)	Cabbage	Bone marrow
Apples	Spinach	Bone jelly
Bananas	Potatoes	Chicken
Orange juice	Lettuce	Sweetbreads
Fresh pineapple	Oatmeal	Brains
Peaches	Wheat	Liver
Tomatoes	Corn meal	Kidneys
Beets	Barley	Fish (haddock)
Carrots		

The total population of foods available was carefully chosen in order to "adequately provide all the food elements, amino-acids, fats, carbohydrates, vitamins and minerals known to be necessary for human nutrition." Deliberately excluded were "incomplete" or canned foods,

sugars, or milk products, such as butter or cream.

The list is so constructed that it would be difficult for a child who ate a variety of foods from this list to fail to achieve a balanced diet. Since processed and sweet food were excluded, one would hardly expect a binge to last for long, given the psychological and physiological mechanisms of satiation and stimulus variation preference. There is a further problem, however; the entire list was never presented all at once. It was

> . . . divided and served at three (in the early weeks, four) meals a day, this arrangement providing a wide variety at each meal. Both sweet and sour (lactic) milk, two kinds of cereals, animal protein foods, and either fruits or vegetables were served at each meal according to a fixed schedule (Ibid., p. 70).

As a result, it would be difficult over the long run for a child who typically consumed moderate portions of three or four of the foods presented to fail to select a diet which was at least adequate on all the nutritional dimensions examined.

Some insight into Clara Davis's philosophy of child care, which has been either ignored or grossly misunderstood, becomes apparent when we discover her reactions to the announcement that the subjects' patterns of selective appetite "were developed by sampling, which is essentially a trial and error method." Quite suprisingly, she states that the sampling-trial-and-error process

> . . . accounts for the most glaring fallibility of appetite. From time immemorial adults as well as children have eaten castor oil beans, poisonous fish, toad stools and nightshade berries with fatal results. Against such error, only the transmission of racial experience as knowledge can protect. Such error affords additional proof that in omniverous eaters there is no "instinct" pointing blindly to the "good" or "bad" in food. And since every trial and error method involves the possibility of error, the problem of successful eating by appetite is that of reducing possible errors to those that are most trivial by a prior selection of the foods that are made available for eating (Ibid., pp. 73-74).

Davis then proceeds to explain that our appetites seem to have such "fallibilities" with processed foods. She had planned to experiment with both processed and natural foods "but the depression dashed this hope." She goes on to admit that appetite errors must have been made "but the errors with such a food list were too trivial and too easily compensated for to be of importance or even to be detected" (Ibid., p. 74).

Her conclusion is as important as it is straightforward:

> The results of the experiment, then, leave the selection of the foods to be made available to young children in the hands of their elders where everyone has always known it belongs. . . . Self-selection can have no, or but doubtful, value if the diet must be selected from inferior foods (Ibid., p. 74).

Clara Davis's position, it turns out, is not inconsistent after all with the principle of freedom as intended here. Harvey, Hunt, and Schroder identify several dimensions which help clarify the controversy. The most generic dimension along which training conditions vary, according to them, varies between "unilateral training" and "interdependent training." They call the mid-point of this dimension "accelerated autonomy training." Table 3.7 presents my distillation of their description of the features of each training condition category; it includes their own comparison of their terms to those of Lewin, Lippitt, and White (1939).

It is interesting to compare the features of the unilateral training condition with those of the current approach in teacher education, which consists of requiring the future teacher to fulfill an interminable number of performance requirements. Four features at least overlap: the object of evaluation is the behavior relevant to externally imposed criteria; the behavior which is encouraged is that

TABLE 3.7

FEATURES OF HARVEY, HUNT, AND SCHRODER'S
GENERIC TRAINING CONDITIONS

Dimension	Training Condition Features		
	Unilateral Training	Accelerated Autonomy Training	Interdependent Training
Object of Evaluation	Behavior relevant to externally imposed criteria	None clearly specified	The individual as a person
Focus of Manipulation Efforts	Student behavior	None	Environment
Behavior Encouraged	That which matches externally imposed criteria	None	Exploratory acts; autonomous instrumental activity
Source of Criteria for Evaluating Behavior	Instructor	None	Reality
Position with regard to Externally Administered Punishment	Used to shape behavior to fulfill externally imposed criteria	None used	The alternative of modifying the environment is preferred

TABLE 3.7--Continued

Dimension	Training Condition Features		
	Unilateral Training	Accelerated Autonomy Training	Interdependent Training
Instructor's apparent role in enforcing rules	Source of rules, reward and punishment dispenser	None	Reality intepreter
Lewin, Lippitt, and White's term	Autocratic leadership	Laissez-faire leadership	Democratic leadership

which matches externally imposed criteria; the source of the criteria for evaluating behavior is the instructor; finally, the instructor is the apparent source of rules.

With regard to the remaining features, the performance requirement approach, at least as advocated at the University of Massachusetts, departs radically from the unilateral training dimension. The future teacher is not only allowed to progress at his own pace, but also for every single performance requirement, he has the opportunity to select an instructional route from a minimum of two alternatives. Furthermore, since no penalty exists for failure, the future teacher is able, usually encouraged, to choose an instructional path which includes elements which for him are novel. Thus on the one hand he is encouraged to explore various means but on the other hand they are always means toward achieving fixed ends.

There is no manipulation effort made by the instructor unless the student self-selects an instructional option which features the instructor engaging in direct influence attempts. This approach rejects the use of any punishment. The actual pass-fail decision regarding the individual's attempt to fulfill the requirement is made, when possible, by objective tests or by judges other than the instructor.

All in all, the performance requirement approach as described here is a curious hybrid containing features of all three positions on the unilateral-interdependent continuum. Harvey, Hunt, and Schroder's theory would lead to the prediction that requiring the future teacher to achieve fixed ends rather than encouraging him to engage in autonomous instrumental activity will mean that the individual is more likely to experience only extrinsic motivation rather

than intrinsic motivation. One might also predict that the developmental progression of those who receive their training through such an approach would be arrested at Dewey's Stage 3 (where a premium is placed on fixed universals).

Harvey et al. advocate interdependent training regardless of the student's developmental status (The mechanics of operationalizing interdependent training differ from stage to stage). Unilateral training is postulated to arrest the individual in either their Stage 1 or their Stage 2 depending upon whether the unilateral training was "reliable" or "unreliable" respectively. The definitions of these concepts will not be given here; the important point is that their theory leads to implications for educational procedures as well as to predictions regarding the effects of such procedures as well as of their logically derivable alternatives.

They distinguish between two major kinds of interdependent training: protective and informational. My summary of the distinction appears in Table 3.8. In the protective interdependent training condition, because the instructor intervenes "supportively" to prevent failure, the consequences which would have resulted from unaided student activity are prevented from occurring. However, the consequences which can flow from student activity that has been modified through instructor assistance are allowed to occur. Furthermore, when the latter set of consequences do occur, they usually turn out favorably for obvious reasons. As a result, the protective interdependent training condition—which Harvey et al. assert causes the student to become arrested at Stage 3—violates the criterion described by Lewin:

> Only in a sufficiently free life-space in which the child has the possibility of choosing his goals according to his own needs and

TABLE 3.8

DIMENSIONS OF INTERDEPENDENT TRAINING

Dimension	Training Condition Features	
	Protective Interdependent Training	Informational Interdependent Training
Instructor Role Preceding the Point where Consequences of Student Instrumental Activity are Observable	Serves as role model and prevents failure through the provision of support and assistance	Manipulates "environment so that exploratory activity leads to meaningful progression of skills within the subject's ability limits" (Harvey et al., 1961, p. 130)
Instructor's Reaction to Consequences of Student's Instrumental Activity	Administers rewards (mainly emotional support and encouragement)	Focuses student awareness on and clarifies "the information consequences of the [student's] behavior in terms of [his] reality world (Cantril, 1950)" (Ibid, p.130)

> in which, at the same time, he fully experiences the objectively conditioned difficulties in the attainment of the goal, can a clear level of reality be formed, only thus can the ability for responsible decision develop (Lewin, 1935, p. 179).

In order that the above can occur, the environment has to be suitably planned. In particular,

> . . . if a child is learning the intricacies of social interaction, the activity in which he is experiencing or practicing the interaction must allow him to make many mistakes without endangering the lives or futures of those around him, to say nothing of his own safety. Similarly, such rewards as he receives from the activity must not be too expensive to those around him, or again, the activity would have just those serious consequences which (environmental manipulation should avoid) (Moore and Anderson, 1969, p. 575).

We end up then, in discussing the principle of freedom, advocating freedom a la Clara M. Davis, not the quasi-freedom of the various combinations of accelerated autonomy training and protective interdependent training.

Reflection Encouragement

Our final principle is that of encouragement. Reflection encouragement is what Dewey has urged for so long: reflection on the consequences of the choices made so that the individual could combine the fruits of his past and present experience to improve the quality of his future experience, in other words to close the planning-implementation-consequences feedback loop. Moore and Anderson call this the "Personalization Principle":

> One environment is more conducive to learning than another if it: (1) is more responsive to the learner's activities, and (2) permits and facilitates the learners's taking a more reflexive view of himself as a learner (1969, p. 585).

Relationships among the conditions

The five principles suggested by the theory of internal structures

are interrelated. Teacher preparation curricula should be designed so that the future teacher is guided toward actively experimenting with a set of roles chosen because the disparity between their complexity and that of his internal structures is optimal. Several overt and vicarious role taking opportunities should be developed so that the candidate will have considerable freedom not only to choose among them but also to influence the ends toward which his experimentation with them will aim. And this freedom should be increased as he demonstrates his capacity to reflect upon, develop implications from, and improve upon his modus vivendi.

Optimal disparity, activity, role taking, freedom and reflection are the ingredients of an educational environment which will stimulate developmental progression in the motivational, executive, and representational structures, providing that an appropriate assessment can be made of the current states of these structures. In the next chapter, a way of conceptualizing the representational structure, will be presented that has implications for the manner in which the assessment of this structure should be undertaken.

CHAPTER FOUR

SOME HYPOTHESES REGARDING THE ORGANIZATION OF THE REPRESENTATIONAL STRUCTURE

Reformulation of Harvey, Hunt, and Schroder's Theory

Harvey, Hunt, and Schroder hypothesize that development occurs in a particular sequence. An individual's representational structure can only be said to have progressed from Stage 1 to Stage 2, according to them, if Stage 2 has been thoroughly differentiated from Stage 1. For the structure to advance to Stage 3, Stage 3 must be thoroughly differentiated from Stage 2. Whenever a structure is in transition between a given stage and the one which succeeds it, the individual might best be classified as an admixture of the two involved stages; thus, one would frequently expect to find admixtures of adjacent stages (i.e., stages 1 and 2, stages 2 and 3, or stages 3 and 4).

However, since their theory holds that at any given stage, the structure must be thoroughly articulated and differentiated from the previous stage before it can progress to the following stage, it should be impossible to find individuals who could be classified as admixtures of non-adjacent stages (i.e., stages 1 and 3, stages 1 and 4, or stages 2 and 4). Nevertheless, five teachers were described as "admixtures of [stages] 1 and 3" in one of the studies mentioned in the last chapter (Harvey, Prather, White, and Hoffmeister, 1970, p. 125).

Lewin describes the importance of studying those cases which seem to fall beyond what one's theory would seem to predict. He said that

> The clearest and most important expression of [advancement in the science of psychology], besides the transition from class to serial concepts, is the fact that the validity of particular psychological laws is no longer limited to particular fields. . . It is coming to be realized that <u>every psychological law must hold without exception</u> [underlining mine] (Lewin, 1935, p. 23).

If Lewin's point is to be taken into account, Harvey, Hunt, and Schroder's theory must be reformulated such that it can explain the occurrence of non-adjacent admixtures.

Before describing possible revisions, Lewin's reference to "the transition from class to serial concepts" will be discussed since this notion, too, has guided the nature of the reformulation process. In a portion of the above cited article which preceded the just quoted passage, Lewin compared and contrasted the Aristotelian mode of employing dimensional concepts. He argued that the progression from the former to the latter was what enabled physicists to extend "the field of natural law enormously." He advocated that this transition should be fostered in psychology and noted that it already seemed in progress. As he put it:

> As in physics, the grouping of events and objects into paired opposities and similar logical dichotemies is being replaced by groupings with the aid of serial concepts which permit of continuous variation (Lewin, 1935, p. 22).

On the one hand, Harvey, Hunt, and Schroder refer to Lewin's article and include dimensional concepts in the core of their theory. For example, they describe the internal structure as being dimensional in nature and they concentrate their attention on the concrete-abstract dimension along which, they believe, individuals can be meaningfully

compared. On the other hand, though, their description of each stage has a strong Aristotelian flavor: the individual is thought to be in conflict between a particular logical dichotemy—namely, independence vs. dependency.

The revisions proposed here are based on dimensional concepts in two different ways. First, dependency and independence are conceptualized as two distinct epigenetically developing dimensions, and second, the identifiable portions of each of these dimensions are viewed as dimensions in their own right. Taking up the more fundamental step first, I shall explain why I chose to view dependency and independence as two distinct dimensions instead of as two poles within a single dimension.

Hartup (1963), in reviewing the work of Beller and Heathers, concluded that while that component of the independence dimension having to do with self-assertion tends to be significantly negatively correlated with that component of dependency having to do with affection seeking, on the whole independence and dependency seem to be separate dimensions. He added the following caution, however:

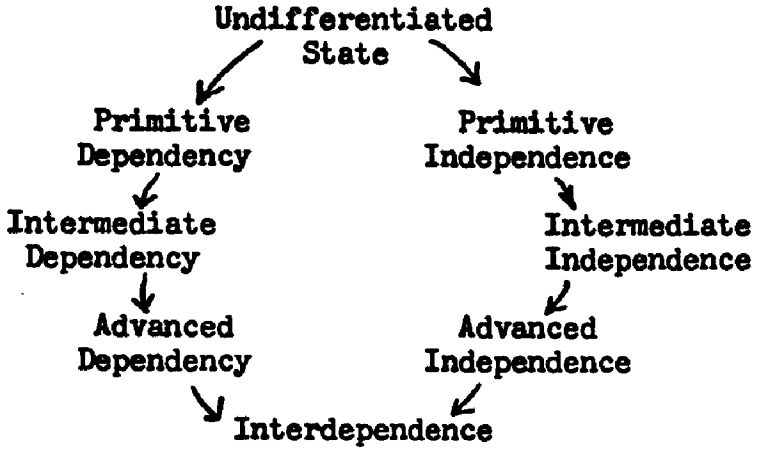
> Although the empirical evidence suggests that dependence and independence are orthogonal factors, this evidence may be, in one sense, artifactual. That is, dependency and independence may or may not be overlapping concepts, depending upon how definitions are formulated and measures constructed. It so happens that when independence is defined in terms of both self-reliance and achievement-striving it is not strongly related to dependency. The main issue is whether defining the two concepts separately increases the investigator's capacity to predict either or both forms of behavior (Hartup, 1963, pp. 338-339).

The above suggests that it at least is not unreasonable to regard the two dimensions as distinct. Accordingly, a representation of Harvey, Hunt, and Schroder's theory which has this feature appears

in Table 4.1.

TABLE 4.1

A REPRESENTATION OF HARVEY, HUNT, AND SCHRODER'S THEORY WHICH EMPHASIZES DIFFERENTIATION WITHIN EPIGENETICALLY DEVELOPING DIMENSIONS



The major difference between the Harvey et al. formulation and the one shown in Table 4.1 is probably more emphasis than substance (Compare Table 3.4 with Table 4.1). Thus, whereas Harvey et al. emphasize the differentiation which must occur between a dependency pole and an independence pole, I would emphasize the differentiations which would occur within each strand. Differentiation is assumed to proceed simultaneously in both strands.

The above reformulation resembles Dewey's theory of stages, at least in the way that Dewey's theory was presented in the previous chapter. As the reader may recall, the description of Dewey's theory placed an emphasis not on the differentiation of a given stage from the one which immediately preceded it, but rather on its differentiation from its more primitive version.

As in both Dewey's theory and Harvey et al.'s original formulation, the differentiation process in each of the strands is assumed

to be stimulated and/or governed by the extent to which parallel differentiations have occurred in the other strand. Specifically, it is assumed that there is an optimal sequence. When an individual's representational structure develops according to this sequence, it moves from an undifferentiated state to a period where Primitive Dependence functioning is dominant. From there, the locus of growth alternates between the two generic dimensions until active interdependent functioning is dominant.

Another important assumption has to do with the instances in which development departs from the optimal sequence; specifically, the individual's functioning is expected to be affected in ways that should be predictable given knowledge of the nature of the departure. To make such predictions, however, additional assumptions need to be made regarding the manner in which the representational structure is organized. Here again, as mentioned above, a Galileian or dimensional approach is advocated; in particular, it is argued that identifiable portions of the two generic dimensions should be viewed as dimensions in their own right.

In other words, each of Harvey et al.'s 7 poles (see Table 3.4) can be viewed as a dimension along which individuals differ. This conceptualization suggests both that it is possible to develop diagnostic procedures to assess an individual's functioning and that the resulting data can be converted into a pole profile. This is essentially what I have done, except that, for reasons discussed below, some of Harvey et al.'s 7 poles have been combined.

Specifically, Pole B type independence and Pole C type independence were fused into one, and similarly, Pole D type dependence

and Pole E type dependence were fused into one. Essentially, Pole C differs from Pole B, and similarly Pole E differs from Pole D, in two ways. The first of these ways, substance, is here held to be minor. The distinction that Harvey et al. make in this regard is shown in Table 4.2.

TABLE 4.2

DESCRIPTIONS OF THE HARVEY, HUNT, AND SCHRODER POLES WHICH ARE HERE BEING FUSED INTO ONE

Pole B type independence; violation, questioning, or transgression of absolutistic control	Pole C type independence; negativistic autonomy or independence; questioning of absolutistic control; development of internal control
Pole D type dependence; chameleon dependence; dependence on external support or help	Pole E type dependence; conditional dependence; mutuality; empirical orientation

It is true that the pole described in the right hand column is somewhat more developmentally advanced than its counterpart in the left hand column; however, the difference between both pairs is far smaller than that between any other pair of poles.

The major difference between the poles in each pair, according to Harvey et al., is in terms of their embeddedness. They explain that

> . . . pole B (opposition) at the first level is embedded in a system of ordering extending to unilateral dependence on absolutistic standards, whereas pole C (second stage independence) is embedded in a system of ordering extending to dependence upon a <u>differentiated</u> source or object of support. Independence at the second stage (pole C) is described within a different system of ordering than at the first stage (1961, p. 89).

Since the notion of embeddedness is not an essential feature of the reformulation, the major reason for making these fine discriminations

in substance is no longer present. Without a compelling reason for refraining from doing so, I reduced the number of poles as indicated.

To avoid confusing Harvey, Hunt, and Schroder's poles with those utilized in my reformulation, I have used numbers as labels rather than letters. The result of the relabeling and fusion processes is shown in Table 4.3.

TABLE 4.3

COMPARISON OF THE POLES AS SET FORTH IN HARVEY, HUNT AND SCHRODER'S ORIGINAL THEORY AND IN ITS PRESENT REFORMULATION

Harvey et al.'s Version	Present Version
Pole A	Pole 1
Poles B and C	Pole 2
Poles D and E	Pole 3
Pole F	Pole 4
Pole G	Pole 5

The poles have been given the following summary labels:

Pole 1: Absolutism, Glorification of Authority

Pole 2: Negativism, Freedom from

Pole 3: Field Dependency, Social Anxiety

Pole 4: Self-Absorption, Freedom to

Pole 5: Active Interdependence, Collaboration.

Both the procedures which were devised to measure these variables and the operationalization of the concepts "is open to" and "is differentiated from" are discussed in Chapter 5.

Hypotheses

Three kinds of hypotheses have been developed, each bearing on the construct validity of the theory: those having to do with the

nature of the five poles, each being viewed more or less as an isolated dimension; those in which "differentiated poles" are compared to "undifferentiated poles"; and those having to do with the developmental significance of the poles.

Poles viewed as isolated dimensions

This set of hypotheses has a single purpose: to determine the validity of the procedures used to arrive at scale scores for each of the poles (Again, these procedures are discussed in Chapter 5); in other words, an answer is sought to the question: Does each of the poles measure what its title claims?

Hypotheses 1.1 through 1.23

Pole 1 (Absolutism) is assumed to be the most concrete of all the poles. Since many studies have been conducted on the nature of concreteness, it is easy to find variables which should correlate with Pole 1 if it in fact is a valid measure of concreteness. Specifically, Harvey and various other collaborators have found that highly concrete thinkers tend to have:

1. A simpler cognitive structure, comprised of fewer differentiations and more incomplete integrations within more central and ego-involving domains but not within domains of low involvement.
2. A greater tendency toward more extreme and more polarized evaluations, namely, good-bad, right-wrong, black-white.
3. A greater dependence on status and authority-related cues as guidelines to belief and action.
4. A greater intolerance of ambiguity expressed in higher scores on such measures as the F Scale and Dogmatism Scale and in the tendency to form judgments of novel situations more quickly.
5. A greater need for or tendency toward cognitive consistency and greater arousal and change from the experience of cognitive dissonance.
6. A greater inability to change set and hence greater stereotype in the solution of more complex and changing problems.
7. A poorer delineation between means and ends and hence a paucity of different methods of solving a problem or achieving a goal.

8. A greater insensitivity to subtle and minimal cues and hence a greater susceptibility to false but obtrusive cues.
9. A poorer capacity to "act as if," to assume the role of the other, or to think and act in terms of a hypothetical situation.
10. The holding of opinions with greater strength and certainty that the opinions will not change with time.
11. A higher score on the factor of dictatorialness reflected in such behavioral characteristics as high need for structure, low flexibility, high rule orientation, high dictation of procedure, high frequency of the usage of unexplained rules, high punitiveness, low diversity of activities and low encouragement of individual responsibility.
12. A lower score on the factor of task orientation.
13. A greater tendency to form and generalize impressions of other people from highly incomplete information (Harvey, 1967, pp. 206-207; the references following each item in the original have been deleted).

Since those who score high on Pole 1 are supposed to think absolutistically and glorify authority, they should resemble the highly concrete thinker as described above. Consequently, Pole 1 is hypothesized to correlate positively with Teacher Alone, Preference for Assigning Dependency, Preference for Evaluating Dependency, Institutionalism-Humanism, Fear of Negative Evaluation, Need Achievement, and Social Restraint and Self-Control. Also Pole 1 is hypothesized to correlate negatively with Achievement via Independence, Assigning Independence, Evaluating Independence, Autonomy, all the Cognitive Complexity variables, and Impulse Expression. The above hypotheses are summarized in Table 4.4.

Hypotheses 2.1 through 2.17

Individuals scoring high on Pole 2 (Negativism, Freedom from) are supposed to be against authority and characterized by a "freedom from" syndrome. Essentially, they reject conventional criteria such as rules of evidence or extent of achievement; they also reject certainty and predictability and dislike engaging in routine patterns of

TABLE 4.4

EXPECTED SIGNS OF THE CORRELATIONS INVOLVING POLE 1
(ABSOLUTISM, GLORIFICATION OF AUTHORITY)

Hypothesis Label	Criterion Variable	Direction Predicted
1.1	Teacher Deciding Alone	Positive
1.2	Preference for Assigning Dependency	
1.3	Preference for Evaluating Dependency	
1.4	Institutionalism-Humanism	
1.5	Fear of Negative Evaluation	
1.6	Need Achievement	
1.7	Social Restraint and Self Control	
1.8	Achievement via Independence	Negative
1.9	Assignment Independence	
1.10	Evaluating Independence	
1.11	Autonomy	
1.12	Complexity	
1.13	Non-stereotypy	
1.14	Rationality	
1.15	Flexibility	
1.16	Dependence-Independence Differentiation	
1.17	Dimensionality Actual	
1.18	Dimensionality Hypothetical	
1.19	Average Dimensionality	
1.20	Minimum Dimensionality	
1.21	Structural Integration	
1.22	Cognitive Complexity	
1.23	Impulse Expression	

behavior. From this description, one might expect that they would be more concerned about controlling how they were evaluated than what they do. Accordingly, Pole 2 is hypothesized to correlate negatively with Teacher Deciding Alone, Preference for Evaluating Dependency, Achievement via Conformity, Institutionalism-Humanism, Need Achievement, and Social Restraint and Self-Control.

Harvey (1966) cites evidence that his System (Pole) 2 individuals

score significantly higher on Srole's Scale of Anomie than representatives of the other three systems. Srole's scale measures the extent to which individuals perceive themselves capable of affecting a desired outcome upon society, high scores having a low sense of self-causality. Consequently, Pole 2 is hypothesized to correlate negatively with Locus of Control. Pole 2 should also correlate positively with Evaluating Independence, with Non-Stereotypy, with Social Avoidance and Distress, and with Impulse Expression.

Harvey (1966) also cites evidence that his System 2 representatives score low on the F scale but high on Rokeach's Dogmatism scale as well as on his measure of Opinionation-Left. It seems reasonable to assume that the high score in Non-Sterotypy would explain the combination of high scores on the Dogmatism scale and low scores on the Authoritarian scale. In particular, because individuals who score high on Pole 2 are expected to reject conventional criteria, certainty, predictability, and routine patterns of behavior, it is hypothesized that Pole 2 will correlate positively with Autonomy, Complexity, and Flexibility.

The rationale behind these last hypotheses is not that high scorers on Pole 2 are autonomous, complex, or flexible individuals; instead, it points to an artifact in these three scales. The items in these scales are primarily "freedom from" items. The items which can be classified as freedom from authority, freedom from conventionality, freedom from structure, etc., on these three scales are shown in Appendix B. The few items on these scales which are positive—i.e., those having to do with active exploration, with acceptance or pleasure in uncertainty and unpredictably, with embracing alternative criteria,

and with a search for subtle changes in stimuli--are also shown in Appendix B.

One would expect individuals who are actually autonomous, complex, and flexible to endorse the positive items. One would expect that those scoring high on Pole 2 will endorse the rejecting items, but respond to the positive items in an inconsistent manner. Therefore, it is hypothesized that a scale comprised of the freedom from items will score positively with Pole 2 but a scale comprised of the positive items will have a correlation with it near zero. Incidentally, Cognitive Complexity should correlate positively with the scale consisting of positive items.

Because of past-but-maybe-changing socialization practices of encouraging boys to be rebellious while inhibiting rebellion in girls, it is further hypothesized that males will score higher on Pole 2 than females. The hypotheses involving Pole 2 are summarized in Table 4.5.

Hypotheses 3.1 through 3.21

Most of the predictions involving Pole 3 are self-evident, given the capsule description: Field Dependence and Social Anxiety. Thus, Pole 3 is hypothesized to correlate positively with Dependency, Preference for Evaluating Dependency, Fear of Negative Evaluation, Need Achievement, and Social Restraint and Self-Control. Furthermore, it should correlate negatively with Achievement via Independence, Evaluating Independence, Autonomy, Alone, Withdrawal and Self-Sufficiency, Complexity, Flexibility, the four variables having to do with dimensionality, Cognitive Complexity, Capacity for Status, Threat, and Impulse Expression.

TABLE 4.5

EXPECTED SIGNS OF THE CORRELATIONS INVOLVING POLE 2
(NEGATIVE, FREEDOM FROM)

Hypothesis Label	Criterion Variable	Direction Predicted
2.1	Evaluating Independence	Positive
2.2	Autonomy	
2.3	Social Avoidance and Distress	
2.4	Complexity	
2.5	Non-Stereotypy	
2.6	Flexibility	
2.7	Impulse Expression	
2.8	"Freedom From"	
2.9	Teacher Deciding Alone	Negative
2.10	Preference for Evaluating Dependency	
2.11	Achievement via Conformity	
2.12	Institutionalism-Humanism	
2.13	Locus of Control	
2.14	Need Achievement	
2.15	Social Restraint and Self-Control	
2.16	"Positive"	Random

Because those who need to depend upon the support of the institution also should score high on Pole 3, it is hypothesized that Pole 3 will correlate positively with Institutionalism-Humanism. A summary of hypotheses having to do with Pole 3 appear in Table 4.6.

Hypotheses 4.1 through 4.9

As was the case with the previous section, the predictions regarding Pole 4 are, with one exception, self-evident from its title: Self-Absorption, Freedom to. Accordingly, Pole 4 is hypothesized to

TABLE 4.6

EXPECTED SIGNS OF THE CORRELATIONS INVOLVING POLE 3
(FIELD DEPENDENCE, SOCIAL ANXIETY)

Hypothesis Label	Criterion Variable	Direction Predicted
3.1	Dependency	Positive
3.2	Preference for Evaluating Dependency	
3.3	Institutionalism-Humanism	
3.4	Fear of Negative Evaluation	
3.5	Need Achievement	
3.6	Social Restraint and Self-Control	
3.7	Achievement via Independence	Negative
3.8	Evaluating Independence	
3.9	Autonomy	
3.10	Alone	
3.11	Withdrawal and Self-Sufficiency	
3.12	Complexity	
3.13	Flexibility	
3.14	Dimensionality Actual	
3.15	Dimensionality Hypothetical	
3.16	Average Dimensionality	
3.17	Minimum Dimensionality	
3.18	Cognitive Complexity	
3.19	Capacity for Status	
3.20	Threat	
3.21	Impulse Expression	

correlate positively with Achievement via Independence, Assigning Independence, Evaluating Independence, Alone, Withdrawal and Self-Sufficiency, and Locus of Control. In addition, it should correlate negatively with Preference for Assigning Dependency and Preference for Evaluating Dependency.

Because rigid controls interfere with an individual's ability to retreat into his own world and conduct activities of interest to him, Pole 4 is expected to correlate negatively with Institutionalism-

Humanism. A summary of the hypotheses involving Pole 4 appears in Table 4.7.

Hypotheses 5.1 through 5.20

Pole 5 (Active Interdependence, Collaboration) should reflect a spirit of positivism. Since individuals who score high on Pole 5 are expected to be able to work effectively both on their own and in collaboration with others, and since they are also expected to seek out challenging opportunities, Pole 5 is hypothesized to correlate positively with Achievement via Independence, Assigning Independence, Evaluating Independence, Alone, all 11 of the variables grouped under the rubric Cognitive Complexity, Mutual, Threat, Active, Locus of Control, and Vigorous Action and the Overcoming of Obstacles. A summary of those hypotheses which involve Pole 5 appears in Table 4.8.

Differentiated poles vs. undifferentiated poles

Hypotheses 6.1 through 6.6

According to the theory, the first differentiation to occur is Pole 2 (Negativism) from Pole 1 (Absolutism). This process is assumed to involve the rejection of what was previously held to be true or important. Form T of the Inventory of Beliefs seems ideally suited for measuring this transformation since the Non-Stereotypy score (See Chapter 5) consists of the number of S-items (items which those who score high on Pole 1 are likely to accept) rejected plus the number of N-items (items which those who score high on Pole 2 are likely to accept) accepted.

As it was noted in the section listing the hypotheses involving Pole 2, subjects scoring high on Pole 2 are likely to accept the

TABLE 4.7

EXPECTED SIGNS OF THE CORRELATIONS INVOLVING POLE 4
(SELF-ABSORPTION, FREEDOM TO)

Hypothesis Label	Criterion Variable	Direction Predicted
4.1	Achievement via Independence	Positive
4.2	Assigning Independence	
4.3	Evaluating Independence	
4.4	Alone	
4.5	Withdrawal and Self-Sufficiency	
4.6	Locus of Control	
4.7	Preference for Assigning Dependency	Negative
4.8	Preference for Evaluating Dependency	
4.9	Institutionalism-Humanism	

"freedom from" items on the Autonomy, Complexity, and Flexibility scales. At the same time, one would not expect those who score high on Pole 1 to endorse these items. The reverse should be true with respect to the Institutionalism-Humanism scale. Finally, the differentiation of Pole 2 from Pole 1 is assumed to be accompanied by a rejection of the achievement orientation which typified those high on Pole 1.

In line with these assumptions, individuals who have differentiated Pole 2 from Pole 1 are hypothesized to score higher on Non-Stereotypy, Autonomy, Complexity, and Flexibility and lower on the Institutionalism-Humanism scales than those who are open to Pole 2 but who have not yet differentiated it from Pole 1 (The operationalism of the concepts of openness and differentiation is explained in Chapter 5). A summary of these Pole 2 vs. Pole 1 hypotheses appears

TABLE 4.8

EXPECTED SIGNS OF THE CORRELATIONS INVOLVING POLE 5
(ACTIVE INTERDEPENDENCE, COLLABORATION)

Hypothesis Label	Criterion Variable	Direction Predicted
5.1	Achievement via Independence	
5.2	Assigning Independence	
5.3	Evaluating Independence	
5.4	Alone	
5.5	Mutual	
5.6	Complexity	
5.7	Non-Stereotypy	
5.8	Rationality	
5.9	Flexibility	
5.10	Dependence-Independence Differentiation	Positive
5.11	Dimensionality Actual	
5.12	Dimensionality Hypothetical	
5.13	Average Dimensionality	
5.14	Minimum Dimensionality	
5.15	Structural Integration	
5.16	Cognitive Complexity	
5.17	Threat	
5.18	Active	
5.19	Locus of Control	
5.20	Vigorous Action and the Overcoming of Obstacles	

in Table 4.9.

Hypotheses 7.1 through 7.4

A major difference between Harvey, Hunt, and Schroder's position and that taken here is that when an individual shows signs of some Pole 3 functioning (Field Dependence), they stress the importance of encouraging the differentiation of Pole 3 from Pole 2 (Negativism). In contrast, I have emphasized encouraging the individual to discriminate between Pole 3 and its ancestor, Pole 1 (Absolutism).

Poles 1 and 3 are expected to correlate in the same direction

TABLE 4.9

EXPECTED SIGNS OF THE REMAINDERS WHEN MEAN CRITERION VARIABLE SCORES OF S'S WHO HAVE DIFFERENTIATED POLE 2[a] FROM POLE 1[b] ARE SUBTRACTED FROM THE RESPECTIVE MEAN SCORES OF THOSE WHO THOUGH OPEN TO POLE 2 HAVE NOT DIFFERENTIATED IT FROM POLE 1

Hypothesis Label	Criterion Variable	Direction Predicted
6.1	Autonomy	Positive
6.2	Complexity	
6.3	Non-Stereotypy	
6.4	Flexibility	
6.5	Institutionalism-Humanism	Negative
6.6	Need Achievement	

[a]Pole 1 measures absolutism, glorification of authority.

[b]Pole 2 measures negativism, freedom from.

with several of the same items since both involve a form of dependency. As the individual's representative structure develops, however, he is expected to increase his capacity to exert control over his destiny. Therefore, while individuals who score high on either Pole 1 or Pole 3 look to others for guidance in evaluating their behavior, when those who have successfully differentiated Pole 3 from Pole 1 are compared to those that haven't, the former should be more willing to control the task-assignment process.

Non-Stereotypy is another scale on which those who have differentiated Pole 3 from Pole 1 should differ. While the former is able to question stereotypic assertions (S-items), such individuals are not as likely as those who score high on Pole 2 to subscribe to

the obverse (N-items). Consequently, the Rationality score should reflect this development.

These assumptions lead to the following hypotheses: those who have differentiated Pole 3 from Pole 1 should score lower on the Preference for Assigning Dependency scale and higher on the Assigning Independence, Non-Stereotypy, and Rationality scales than those who are open to Pole 3 but who have not yet differentiated it from Pole 1. A summary of these hypotheses appears in Table 4.10.

Hypotheses 8.1 through 8.8

Although Pole 2 (Negativism, Freedom from) and Pole 4 (Self-Absorption, Freedom to) both represent a form of independence, it is easier to distinguish between the two types of independence they represent than it is to distinguish between the two types of dependency represented by Poles 1 and 3. This is partially because the level of complexity of any representational structure that attains predominantly Pole 4 functioning must be higher than that of the structure which only attains predominantly Pole 3 functioning.

The developmental theory implies that those who differentiate Pole 4 from Pole 2 should be less inclined to reject the criteria embraced by authority figures although more inclined to develop alternative criteria of their own. As they gain increasing control over their lives, self-sufficiency becomes important to them. They wish to restrain some of their earlier impulsivity. Like those who have attained predominant Pole 3 functioning, they should have second thoughts about the N-items (those which are the obverse of the stereotypic assertions) on the Inventory of Beliefs.

TABLE 4.10

EXPECTED SIGNS OF THE REMAINDERS WHEN MEAN CRITERION VARIABLE SCORES OF S'S WHO HAVE DIFFERENTIATED POLE 3[a] FROM POLE 1[b] ARE SUBTRACTED FROM THE RESPECTIVE MEAN SCORES OF THOSE WHO THOUGH OPEN TO POLE 3 HAVE NOT DIFFERENTIATED IT FROM POLE 1

Hypothesis Label	Criterion Variable	Direction Predicted
7.1 7.2 7.3	Assigning Independence Non-Stereotypy Rationality	Positive
7.4	Preference for Assigning Dependency	Negative

[a]Pole 3 measures field dependence, social anxiety.

[b]Pole 1 measures absolutism, glorification of authority.

When compared to those who are high on Pole 4 but who have not differentiated it from Pole 2, then, those who have completed such differentiation are hypothesized to score higher on the Achievement via Conformity, Achievement via Independence, Withdrawal and Self-Sufficiency, Locus of Control, Need Achievement, and Social Restraint and Self-Control scales and lower on the Non-Stereotypy and Impulse Expression scales. A summary of the Pole 4 vs. Pole 2 hypotheses appears in Table 4.11.

Hypotheses 9.1 through 9.14

The theory suggests that Pole 5 (Interdependence) is a derivative of both Pole 3 (Field Dependence) and Pole 4 (Self-Absorption). In other words, interdependence has both elements of dependency and

TABLE 4.11

EXPECTED SIGNS OF THE REMAINDERS WHEN MEAN CRITERION VARIABLE SCORES OF S'S WHO HAVE DIFFERENTIATED POLE 4[a] FROM POLE 2[b] ARE SUBTRACTED FROM THE RESPECTIVE MEAN SCORES OF THOSE WHO THOUGH OPEN TO POLE 4 HAVE NOT DIFFERENTIATED IT FROM POLE 2

Hypothesis Label	Criterion Variable	Direction Predicted
8.1	Achievement via Conformity	Positive
8.2	Achievement via Independence	
8.3	Withdrawal and Self-Sufficiency	
8.4	Locus of Control	
8.5	Need Achievement	
8.6	Social Restraint and Self-Control	
8.7	Non-Stereotypy	Negative
8.8	Impulse Expression	

[a]Pole 4 measures self-absorption, freedom to.

[b]Pole 2 measures negativism, freedom from.

independence in it. Consequently, it is important to find variables which discriminate between both those which have and have not differentiated Pole 5 from Pole 4 and those which have and have not differentiated Pole 5 from Pole 3.

When Pole 5 has been successfully differentiated from Pole 3, the individual should show signs of independence. Since he is no longer so dependent on the physical and social environment, he should be more flexible and less dogmatic. Further, he should not only be less concerned about stressful situations, he is likely to perceive them to be challenging. He should be capable of co-operating or exercising leadership. Finally, he should have attained what Sanford

considers to be one of the "major goals of development: freedom of impulse" (1962, p. 271).

All in all, such individuals (those who have differentiated Pole 5 from Pole 3) are hypothesized to score higher on the Achievement via Independence, Evaluating Independence, Autonomy, Alone, Rationality, Flexibility, Mutual, Dominance, Capacity for Status, Threat, and Impulse Expression scales and lower on the Institutionalism-Humanism, Social Avoidance and Distress, and Fear of Negative Evaluation scales than those who are open to Pole 5 but who have not differentiated it from Pole 3. The Pole 5 vs. Pole 3 hypotheses are summarized with labels in Table 4.12.

Hypotheses 10.1 through 10.5

The major way in which individuals who have differentiated Pole 5 (Interdependence) from Pole 4 (Self-Absorption) should differ from those who have not yet done so has to do with the yielding of the drive to withdraw, and, as much as possible, conduct life on a solo basis. Thus, the former are hypothesized to score lower than the latter on the Withdrawal and Self-Sufficiency scale.

Furthermore, like those who have differentiated Pole 5 from Pole 3, those who have differentiated Pole 5 from Pole 4 are hypothesized to score higher on the Mutual, Dominance, Threat, and Impulse Expression scales than those who are open to Pole 5 but who have not yet differentiated it from Pole 4. The Pole 5 vs. Pole 4 hypotheses are summarized and labeled in Table 4.13.

TABLE 4.12

EXPECTED SIGNS OF THE REMAINDERS WHEN MEAN CRITERION VARIABLE SCORES OF S'S WHO HAVE DIFFERENTIATED POLE 5[a] FROM POLE 3[b] ARE SUBTRACTED FROM THE RESPECTIVE MEAN SCORES OF THOSE WHO THOUGH OPEN TO POLE 5 HAVE NOT DIFFERENTIATED IT FROM POLE 3

Hypothesis Level	Criterion Variable	Direction Predicted
9.1	Achievement via Independence	Positive
9.2	Evaluating Independence	
9.3	Autonomy	
9.4	Alone	
9.5	Mutual	
9.6	Rationality	
9.7	Flexibility	
9.8	Dominance	
9.9	Capacity for Status	
9.10	Threat	
9.11	Impulse Expression	
9.12	Institutionalism-Humanism	Negative
9.13	Social Avoidance and Distress	
9.14	Fear of Negative Evaluation	

[a]Pole 5 measures active interdependence, collaboration.

[b]Pole 3 measures field dependence, social anxiety.

Developmental significance of the poles

General considerations

It is possible to argue that if the data support the above hypotheses, it should be interpreted as evidence in favor of the assertion that the poles have developmental significance, i.e., that individuals initially score high on Pole 1, then Pole 2, and so on. But it could also be argued that all that has been shown is that the scales measure what they were designed to measure, i.e., that individuals

TABLE 4.13

EXPECTED SIGNS OF THE REMAINDERS WHEN MEAN CRITERION VARIABLE SCORES OF S'S WHO HAVE DIFFERENTIATED POLE 5[a] FROM POLE 4[b] ARE SUBTRACTED FROM THE RESPECTIVE MEAN SCORES OF THOSE WHO THOUGH OPEN TO POLE 5 HAVE NOT DIFFERENTIATED IT FROM POLE 4

Hypothesis Label	Criterion Variable	Direction Predicted
10.1 10.2 10.3 10.4	Mutual Dominance Threat Impulse Expression	Positive
10.5	Withdrawal and Self-Sufficiency	Negative

[a]Pole 5 measures active interdependence, collaboration.

[b]Pole 4 measures self-absorption, freedom to.

who are high on Pole X and low on Pole Y have a predictable profile, but that nothing has been offered which suggests that individuals who are now scoring high on Pole X scored high on Pole Y during an earlier period of their lives.

Since neither cross-sectional data involving subjects spanning a wide age-range nor longitudinal data exist—Chapter 7 contains a description of an overall strategy to collect such data—other less compelling means of providing evidence for the validity of the theory's developmental pretensions had to be devised. Toward this end, three scales were constructed: Purepole, Alloypole, and Fusion.

The nature of the Purepole, Alloypole, and Fusion scales

Although the procedures for constructing these three scales

are discussed in detail in Chapter 5, a little will be said here regarding what each is supposed to accomplish. The only subjects who are eligible to receive a Purepole score are those who appear to be ideal pole types. The scale is constructed such that the higher an individual's score, the more developmentally advanced he should be. If there are any attributes which steadily increase or decrease with development, the variables that measure them should correlate positively or negatively respectively with Purepole.

The only subjects who are eligible to receive a Fusion score are those who appear to fall into three categories: those who received Purepole scores of 1, those who received Purepole scores of 5, and those who received Purepole scores between 1 and 5 (There are actually a few other subjects in the third category; none of these was eligible to receive a Purepole score but all, according to the theory, were developmentally "in the middle"). To the individuals in these 3 groups, Fusion scores of 1, 5, and 3 were assigned respectively.

If there are any attributes whose growth and development curve increases or decreases on an overall basis but swings up and down along the way, the variables that measure them should correlate positively or negatively with Fusion. Further, the magnitude of these correlations should be larger than that of the correlations of these same variables with Purepole. The rationale underlying this latter assertion is that the major fluctuations within the growth curves which suppress the magnitude of the correlations between the variables and Purepole are substantially reduced by grouping all those individuals who are thought to be in a "middle developmental period" into one rather wide category.

The reverse reasoning should also hold; namely, those variables

which measure attributes which are expected to monotonically increase or decrease with development should correlate with a greater magnitude with Purepole than they should with Fusion since the Purepole scale reflects the steady increase or decrease in attribute quantity during the extended middle developmental period, while Fusion assigns all subjects to the same category. In other words, the concentration of criterion variable variance within three Fusion categories instead of five Purepole categories decreases the likelihood that as high a proportion of variance can be explained.

Alloypole is a scale which is very similar to Purepole, except that a greater number of subjects are eligible to receive an Alloypole score. Like Purepole, Alloypole is constructed so that the higher an individual's score, the more developmentally advanced he should be. Since the criteria for determining who is eligible for an Alloypole score are more liberal than those established for Purepole scores, particularly at the lower end of the scale, individuals who are actually somewhat diverse developmentally are grouped together as though they were the same.

As a result, variables which measure attributes which are expected to increase or decrease monotonically with development should correlate with greater magnitude with Purepole than they should with Alloypole. Similarly, variables which measure attributes whose growth and development curve is expected to increase or decrease on an overall basis but fluctuate along the way should correlate with greater magnitude with Fusion than with Alloypole.

The net effect of introducing the Alloypole scale, then, is to enable a researcher to make more precise predictions. In particular,

the magnitudes of a large number of correlations will be hypothesized to be not only larger than one would obtain by chance, but also larger than the threshold established by Alloypole. In my opinion, this kind of threshold-prediction is made too rarely.

Hypotheses 11.1 through 11.18

The developmental process is supposed to result in an increase not only in the extent to which individuals have a sense that they can influence what happens to them, but also the extent to which they feel a desire to have such influence. Further, it should result in an increase in the extent to which individuals enjoy actively engaging in events that are challenging and in experiences which involve intimacy. Such individuals should become increasingly more willing to undertake activities both on their own and in co-operation with others. Their capacity to lead should continually develop and their representational structure should continue to increase in complexity.

Accordingly, Purepole is hypothesized to correlate positively with Assigning Independence, Alone, Mutual, Dominance, Capacity for Status, Threat, Active, and Locus of Control. Further, it should correlate positively with all of the Cognitive Complexity variables described in the next chapter except Complexity and Flexibility. In addition, Purepole is hypothesized to correlate negatively with both Preference for Assigning Dependency and Social Avoidance and Distress. Finally, all the above correlations are hypothesized to be greater in magnitude than the respective correlations of these variables with either Alloypole or Fusion. The Purepole hypotheses are summarized in Table 4.14.

TABLE 4.14

EXPECTED SIGNS OF THE CORRELATIONS INVOLVING PUREPOLE

Hypothesis Label	Criterion Variable	Direction Predicted
11.1	Assigning Independence	Positive
11.2	Alone	
11.3	Mutual	
11.4	Rationality	
11.5	Dependence-Independence Differentiation	
11.6	Dimensionality Actual	
11.7	Dimensionality Hypothetical	
11.8	Average Dimensionality	
11.9	Minimum Dimensionality	
11.10	Structural Integration	
11.11	Cognitive Complexity	
11.12	Dominance	
11.13	Capacity for Status	
11.14	Threat	
11.15	Active	
11.16	Locus of Control	
11.17	Preference for Assigning Dependency	Negative
11.18	Social Avoidance and Distress	

[a]The magnitudes of the above correlations are hypothesized to be larger than the respective correlations between the criterion variables and either Fusion or Alloypole.

Hypotheses 12.1 through 12.10

Achievement via Independence, Evaluating Independence, Autonomy, Complexity, Non-Stereotypy, Flexibility, and Impulse Expression are variables that are expected to have growth and development curves which increase over a long term basis but fluctuate along the way. In particular, they are expected to increase during the period when Pole 2 functioning (Negativism) is dominant, subside somewhat when Pole 3 functioning (Field Dependence) is dominant, and eventually climb again

as development proceeds. On the other hand, Teacher Deciding Alone, Preference for Evaluating Dependency, and Institutionalism-Humanism are expected to do exactly the reverse.

Accordingly, Fusion is hypothesized to correlate positively with Achievement via Independence, Evaluating Independence, Autonomy, Complexity, Non-Stereotypy, Flexibility, and Impulse Expression. Further, it should correlate negatively with Teacher Deciding Alone, Preference for Evaluating Dependency, and Institutionalism-Humanism. Finally, all the above correlations are hypothesized to be greater in magnitude than the respective correlations of these variables with either Purepole or Alloypole. The Fusion hypotheses are summarized in Table 4.15.

Hypothesis 13.1

The rationale for this next hypothesis is self-evident once the construction of the two scales is understood; this is described at the end of the next chapter. Hypothesis 13.1 is that the Developmental Maturity scale will correlate positively with the Purepole-equivalent scale.

Hypothesis 14.1

According to Harvey, Hunt, and Schroder's theory, an individual cannot progress developmentally until he differentiates the most developmentally advanced pole to which he is open from that which precedes it. If their theory is accurate, the only differentiations that an individual needs to make are those that involve poles which are adjacent to each other (Pole 2 from Pole 1, Pole 3 from Pole 2, Pole 4 from Pole 3, and Pole 5 from Pole 4).

TABLE 4.15

EXPECTED SIGNS OF THE CORRELATIONS INVOLVING FUSION

Hypothesis Label	Criterion Variable	Direction Predicted
12.1	Achievement via Independence	Positive
12.2	Evaluating Independence	
12.3	Autonomy	
12.4	Complexity	
12.5	Non-Stereotypy	
12.6	Flexibility	
12.7	Impulse Expression	
12.8	Teacher Deciding Alone	Negative
12.9	Preference for Evaluating Dependency	
12.10	Institutionalism-Humanism	

[a]The magnitudes of the above correlations are hypothesized to be larger than the respective correlations between the criterion variables and either Purepole or Alloypole.

In contrast to the Harvey et al. position, the theory developed here implies that an individual may be engaged in an attempt to differentiate between any pair of poles. However, it is expected that the largest group of individuals who are actively struggling with a differentiation are likely to be working on differentiating between either the poles in the adjacent pairs at either end of the developmental continuum (either Pole 2 from Pole 1 or Pole 5 from Pole 4) or between a pair of poles in which only one pole intervenes (either Pole 3 from Pole 1, Pole 4 from Pole 2, or Pole 5 from Pole 3). These, of course, were the five pairs studied in the section on "differentiated vs. undifferentiated" poles.

Reviewing the rationale for limiting the active work on differentiations primarily to these, the theory states that the Pole 2

from Pole 1 differentiation (Negativism from Absolutism) is the one which must be made in order to have both a dependency and independence strand. After Pole 2 is differentiated from Pole 1, the most difficult differentiations should always be those within a developmental strand rather than between the two strands. Thus in the dependency strand, the difficult differentiations should be Pole 3 from Pole 1 (Field Dependence from Absolutism) and Pole 5 from Pole 3 (Interdependence from Field Dependence). In the independence strand, the difficult differentiations should be Pole 4 from Pole 2 (Self-Absorption from Negativism and at the same time "Freedom from" from "Freedom to") and Pole 5 from Pole 4 (Interdependence from Self-Absorption). Pole 5 (Active Interdependence) is the developmental goal for both strands of development, representing a creative blend of the best characteristics of each. Because the theory implies that the five differentiations discussed in this paragraph will be the most difficult, it is possible that they might also be the most time consuming. If this conclusion is valid, a stop-action assessment should reveal that the proportion of subjects who are struggling with them as compared to all possible differentiations would be higher than that expected by chance. Further, it is possible that when a subject is actively attempting to differentiate between two poles, he might be open to both of them.

The above reasoning leads to the following hypothesis: Those subjects who are open to only two poles will be open to one of the following pairings more often than would be expected by chance: Poles 1 and 2, Poles 1 and 3, Poles 2 and 4, Poles 3 and 5, and Poles 4 and 5. The rival Harvey et al. extrapolated hypothesis would be: Those subjects who are open to only two poles will be open to one of the following

pairings perhaps 100 per cent of the time, but if not, certainly more often than would be expected by chance: Poles 1 and 2, Poles 2 and 3, Poles 3 and 4, and Poles 4 and 5.

Summary of Hypotheses

All of the hypotheses with the exception of the three below are collected together in Tables 4.16, 4.17, and 4.18.

Hypothesis 2.17: Males will score higher on Pole 2 (Negativism) than females.

Hypothesis 13.1: The Developmental Maturity scale will correlate positively with the Purepole-equivalent scale.

Hypothesis 14.1: Those subjects who are open to only two poles will be open to one of the following pairings more often than would be expected by chance: Poles 1 and 2, Poles 1 and 3, Poles 2 and 4, Poles 3 and 5, and Poles 4 and 5.

Having described the hypotheses to be tested, we shall now turn to a description of the methodology employed and the results obtained. The next chapter will focus on the former, the sixth on the latter, and the seventh on the implications for action.

TABLE 4.16

DIRECTIONS OF HYPOTHESIZED CORRELATION BETWEEN THE POLES AND THE CRITERION VARIABLES

Criterion Variables	Poles				
	1 Absolutism	2 Negativism	3 Field Dependence	4 Self-Absorption	5 Inter-Dependence
Dependency			+		
Teacher Deciding Alone	+	−			
Preference for Assigning Dependency	+			−	
Preference for Evaluating Dependency	+	−	+	−	
Achievement via Conformity		−			
Achievement via Independence	−		−	+	+
Assigning Independence	−			+	+
Evaluating Independence	−	+	−	+	+
Autonomy	−	+	−		
Alone			−	+	+

TABLE 4.16--Continued

	Poles				
	1 Absolutism	2 Negativism	3 Field Dependence	4 Self-Absorption	5 Inter-Dependence
Withdrawal and Self-Sufficiency			−	+	+
Institutionalism-Humanism	+	−	+	−	
Mutual					+
Social Avoidance and Distress		+			
Complexity	−	+	−		+
Non-Stereotypy	−	+			+
Rationality	−				+
Flexibility	−	+	−		+
Dependence-Independence Differentiation	−				+
Dimensionality Actual	−		−		+
Dimensionality Hypothetical	−		−		+

TABLE 4.16--Continued

Criterion Variables	Poles				
	1 Absolutism	2 Negativism	3 Field Dependence	4 Self-Absorption	5 Inter-Dependence
Average Dimensionality	−		−		+
Minimum Dimensionality	−		−		+
Structural Integration	−				+
Cognitive Complexity	−		−		+
Capacity for Status			−		
Threat			−		+
Fear of Negative Evaluation	+		+		
Active					+
Locus of Control		−		+	+
Vigorous Action and the Overcoming of Obstacles					+
Need Achievement	+	−	+		
Social Restraint and Self-Control	+	−	+		

TABLE 4.16--Continued

Criterion Variables	Poles				
	1 Absolutism	2 Negativism	3 Field Dependence	4 Self-Absorption	5 Inter-Dependence
Impulse Expression	−	+	−		
"Freedom From"		+			
"Positive"		Random			

TABLE 4.17

EXPECTED SIGNS OF THE REMAINDERS WHEN MEAN CRITERION VARIABLE SCORES OF S'S WHO HAVE DIFFERENTIATED A GIVEN POLE FROM A SECOND GIVEN POLE ARE SUBTRACTED FROM THE RESPECTIVE MEAN SCORES OF THOSE WHO THOUGH OPEN TO THE FIRST POLE HAVE NOT DIFFERENTIATED IT FROM THE SECOND

Criterion Variables	Pole Comparisons				
	2/1 or Negativism / Absolutism	3/1 or Field Dep. / Absolutism	4/2 or Self-Abs. / Negativism	5/3 or Interdep. / Field Dep.	5/4 or Interdep. / Self-Abs.
Preference for Assigning Dependency		−			
Achievement via Conformity			+		
Achievement via Independence			+	+	
Assigning Independence		+			
Evaluating Independence				+	
Autonomy	+			+	
Alone				+	
Withdrawal and Self-Sufficiency			+		−

TABLE 4.17--Continued

Criterion Variables	Pole Comparisons				
	2/1 or Negativism Absolutism	3/1 or Field Dep. Absolutism	4/2 or Self-Abs. Negativism	5/3 or Interdep. Field Dep.	5/4 or Interdep. Self-Abs.
Institutionalism-Humanism	−			−	
Mutual				+	+
Social Avoidance and Distress				−	
Complexity	+				
Non-Stereotypy	+	+	−		
Rationality		+		+	
Flexibility	+			+	
Dominance				+	+
Capacity for Status				+	
Threat				+	+
Fear of Negative Evaluation				−	
Locus of Control			+		

TABLE 4.17--Continued

Criterion Variables	Pole Comparisons				
	2/1 or Negativism / Absolutism	3/1 or Field Dep. / Absolutism	4/2 or Self-Abs. / Negativism	5/3 or Interdep. / Field Dep.	5/4 or Interdep. / Self-Abs.
Need Achievement	−		+		
Social Restraint and Self-Control			+		
Impulse Expression			−	+	+

The table should be read as follows: the first "+" in the column headed by the title "2/1 or Negativism/Absolutism" means that when the mean Autonomy score of S's who have differentiated Pole 2 (Negativism) from Pole 1 (Absolutism) is subtracted from the mean Autonomy score of S's who, though open to Pole 2, have not differentiated it from Pole 1, the remainder is expected to be positive.

TABLE 4.18

DIRECTIONS OF HYPOTHESIZED CORRELATIONS OF PUREPOLE AND FUSION WITH THE CRITERION VARIABLES

Criterion Variables	Purepole[a]	Fusion[b]
Teacher Deciding Alone		-
Preference for Assigning Dependency	-	
Preference for Evaluating Dependency		-
Achievement via Independence		+
Assigning Independence	+	
Evaluating Independence		+
Autonomy		+
Alone	+	
Institutionalism-Humanism		-
Mutual	+	
Social Avoidance and Distress	-	
Complexity		+
Non-Stereotypy		+
Rationality	+	
Flexibility		+
Dependence-Independence Differentiation	+	
Dimensionality Actual	+	
Dimensionality Hypothetical	+	
Average Dimensionality	+	
Minimum Dimensionality	+	
Structural Integration	+	
Cognitive Complexity	+	
Dominance	+	
Capacity for Status	+	
Threat	+	
Active	+	
Locus of Control	+	
Impulse Expression		+

[a]The magnitudes of the correlations between those variables which have pluses or minuses opposite them in the Purepole column and Purepole are hypothesized to be larger than the respective correlations between those variables and either Fusion or Alloypole.

[b]The magnitudes of the correlations between those variables which have pluses or minuses opposite them in the Fusion column and Fusion are hypothesized to be larger than the respective correlations between those variables and either Purepole or Alloypole.

CHAPTER FIVE

METHODOLOGY

Research Design

Selection of subjects

Four hundred juniors and seniors were allowed to pre-register for Foundations of Education, a course which is required for students who seek certification as either elementary or secondary teachers. Then according to their schedules the students were sorted by a computer into approximately three equal sections. The experimenter decided to include 72 subjects in the experiment, the highest multiple of 24 which could be feasibly met twice every three weeks. (The reason for needing a multiple of 24 will become clear in the section on scheduling appointments.)

Because sex was deemed an important variable (c.f. Koenig and McKeachie, 1959), the 133 IBM cards were sorted into three piles: Male, Female, and Can't-tell. Those in the Can't-tell pile--students with a first initial only or a name which might belong to a member of either sex--were eliminated from the experimental group. It had been hoped that the experimental group would be half males and half females, but there are more females than males desiring to be teachers. It did not seem fair to reduce the number of males in the teaching assistant's sections beyond a certain minimum so a compromise was reached: The number of males in the experimental group was set at 32, the highest multiple of 4 below the ideal number of 36 (the reason for needing a multiple of 4 will also become clear in the section on scheduling appoint-

ments). The 32 males were selected using a table of random numbers from the Male pile; the 40 females were selected by the same procedure.

The subjects' initial orientation to the experiment

For both ethical reasons and because their active cooperation was needed, students who had been assigned to the experimental section were asked to consent to being used as subjects. In particular they were told that the instructor was conducting an experiment based on the assumption that some students respond best to one set of learning and performance conditions while others respond best to a very different set. They were told that they would be working alone, first in one set of conditions, and then in another until they had had a chance to discover the nature and consistency of their reactions to four different sets. The purpose of the experiment was to find out whether those who felt they got the most out of Condition A differed in some consistent way from those who felt they got the most out of Condition B, and whether both of these differed again in some consistent way from those who felt they got the most out of Condition C or D. If it turned out that there were indeed differences among these groups, a teacher could give his students a few questionnaires, score them, and on the basis of the results decide what conditions to establish for each student.

The subjects were told that they would have to go through the process in reverse. That is, they would be filling out several questionnaires and, during the course of the experiment, they might find themselves reponding unfavorably to some of the learning and performance conditions.

They were given the choice of remaining in the experimental group to which they had been randomly assigned or requesting to be re-

assigned to one of the off-shoot subsections. The advantages of the latter were that they would be in a small group of students and that none of their time would be consumed in filling out questionnaires which were often somewhat personal. The advantages of participating in the experiment were that each student would meet with the instructor on a one to one basis, that he would have a chance to learn about himself in some detail, and that his participation would contribute to the advancement of social science. None of the subjects chose to utilize the option of changing sections.

A sheet was then distributed which described the objectives of the course. Since the objectives of the course, particularly objectives 5-7, are relevant to the description of some of the treatment conditions as well as some of the data collection methods, a portion of the description has been reproduced below. In part it said:

> You are:
>
> 1) To acquire the desire and the requisite skills to direct your own learning;
> 2) To formulate meaningful and productive questions;
> 3) To explore areas of interest within education;
> 4) To identify and utilize unorthodox but appropriate resource persons and materials;
> 5) To develop a future-oriented concept of evaluation; this means that evaluation is conceived not as a past-oriented process of assigning a value to your work along a goodness-badness dimension, but as a future-oriented, multidimensional process. Thus, you are encouraged to utilize your course experience to improve the quality of your future experience.
> 6) To evaluate your work using the future-oriented, multidimensional concept described above; and
> 7) To develop a more accurate self-concept; of particular interest are the following dimensions:
>   a) The nature and strength of those of your values which influence how you utilize opportunities to direct your own learning,
>   b) The nature and consistency of your reactions to various learning and performance conditions,
>   c) The extent to which you depend upon the guidance of authority figures,

d) The extent to which you resist utilizing the guidance of authority figures,
e) The extent to which you engage in evaluation of your work as a result of authority figure initiative, and
f) The extent to which you engage in evaluation of your work as a result of your own initiative.

In addition to the above, which are relevant to everyone, you are encouraged to develop, articulate and attempt to achieve your own objectives.

Integrity of experimental population

After the entire group met for the explanation of the nature of the course and the purpose of the experiment, two subjects, both males, dropped the class before their first appointment. In a telephone follow-up made by a secretary (to increase the chances that the individuals involved might reveal feelings about the experiment or the experimenter), both students indicated that scheduling problems, rather than the nature of either the course or the experiment, had forced them to drop out. Neither was replaced.

From time to time, the experimenter found himself in a conflict of interest situation. The role of educator conflicted with the role of experimenter in such instances as the decision regarding the number of males to be included. Perhaps the most important instance involved four boys and two girls who stopped coming for appointments without explanation.

What is the proper behavior for an experimenter here? It is not clear, for some might argue that the failure to keep appointments should be accepted as data to be supplemented at the end of the experiment by a follow-up interview. Others might argue that the students should be telephoned with the intention of encouraging them to participate in each of the four treatments as called for by the experimental

design. What is the proper behavior for an educator in this situation? This is not clear either although many would recommend that the AWOL students should be called in to discuss the situation.

In this instance, the experimenter-instructor met with each of the students individually and, during the course of discussion, suggested that the subjects behavior raised the possibility that he or she should drop the course. For one boy, this suggestion shifted the course of the discussion dramatically. He indicated that he had always known in the back of his mind that he didn't have the attributes of an effective teacher but had somehow assumed he would change magically. Now that he had learned something about what those who hire teachers look for (a topic he chose himself), he had come to the realization that he was just as far away from beng an effective teacher as before. It now seemed highly unlikely that the spontaneous metamorphosis he had so frequently fantasized would occur. After considerable discussion, he decided to drop the course and seek counseling. The other five subjects all responded to their conferences by committing themselves to doing the remaining work at an accelerated pace. Out of the 72 original subjects, then, 69 remained in the experiment to the end. The data are incomplete on six subjects.

Major Treatment Variable #1--Who has the authority to assign

In half the treatments, the student had the authority to develop his own assignment. Most students, particularly at the beginning of the semester, did not have a clear notion of what they wanted to do. The instructor's behavior was programmed to take a pre-arranged set of steps in the following sequence whenever appropriate, or perhaps both more precisely and more awkwardly, whenever not inappropriate:

Encourage the student to choose a general topic

Whenever a student said he couldn't think of anything, he was handed a Foundations of Education textbook (Ehlers, Henry (ed.) Crucial Issues in Education, Fourth Edition. New York: Holt, Rinehart and Winston, 1969) with the suggestion that he look through the table of contents. The sole qualification was that the topic had to be clearly related to the field of education. In questionable cases, the instructor reserved the right to make the final judgment.

Brainstorm with the student possible aspects of the topic he might wish to pursue

The purpose here, as far as the instructor was concerned, was to illustrate both the range of subtopics within and some major dimensions of the general topic. Although the instructor attempted to concentrate his suggestions on aspects that might interest the student, he actively tried to refrain from giving any clues as to which sub-topics he suspected the student might prefer. Thus, although his tendency to build on the suggestions of the student might be interpreted as the providing of positive reinforcement for the student's ideas, the intention was to reinforce only the generation of ideas in general, not to show weighted approval for a certain idea or idea cluster.

Help the student convert his description of what he wanted to learn into one or more focusing questions

The instructor and the student collaborated to phrase in question format the student's concerns. The degree of structure provided by the focusing questions varied considerably from the rather narrow focus provided by the question, "What do those who are responsible

for hiring teachers look for as they screen potential employees?" To the broader focus provided by the question, "What Church-State issues have been raised by the existence of the First Amendment to the Constitution?" To the divergent focus provided by the question, "What federal legislation would you recommend to rectify inequalities in educational opportunity that exist as a result of racial prejudice?"

The student was given the authority to change direction if, as he pursued his task, the question as originally formulated didn't seem as appropriate as a closely related question. The intent was to distinguish this freedom--which is a necessary part of scholarship--from the license of changing the focusing question just because the task turned out to be a difficult one. Sometimes the lack of availability of key resource persons or materials forced the student to exercise this prerogative.

Brainstorm with the student possible resource persons and materials

This activity was seen as one of the mechanisms to achieve course objective #4: "To identify and utilize unorthodox but appropriate resource persons and materials." In addition to suggesting textbooks, and professional journal articles, the instructor encouraged the student both by instruction and by example, to think of such data sources as popular magazines, films, resource persons--not only experts but also individuals who might by virtue of their association with a problem or issue be knowledgeable about one or more specialized aspects of it--the card catalogue, and the reference librarian.

Sometimes it made sense to suggest that the student consider designing and carrying out a survey or an experiment. Sometimes it was

suggested that the student consider systematic observation, either repeated observations of the same setting or cast of characters over time, or of very different groups of individuals engaged in the same or similar activities.

As in the step devoted to selecting one or more aspects of the chosen topic to pursue, the instructor actively attempted to refrain from giving any clues as to which resource persons and/or materials he would personally prefer, as well as to which ones he suspected the student might prefer.

Check with the student to determine whether or not there was agreement as to what the student had committed himself to do

In order both to reduce the likelihood that the student strayed from his original plan due to whim or convenience and to determine whether or not the instructor's perception of what the student had committed himself to do was sufficiently similar to that of the student, the instructor wrote down the focusing questions as he understood them as well as the list of possible methodologies to employ that the instructor and student had developed between them. He then read what he had written to the student who was to verify whether or not it was an accurate representation of the plan to which the student thought he had committed himself or to make whatever revisions were required.

The other two treatments

In the remaining two treatments, the instructor reserved to himself the authority to assign the student one or more focusing questions. In doing so, he attempted to avoid being either arbitrary or condescending. The intent here was to offer two reasonable points on the

"Who decides" continuum rather than setting up one of the points as a straw man. Accordingly, the instructor made an effort to appear if not enthusiastic then at least genuinely interested in the potential inherent in the focusing questions. This was accomplished in part by employing appropriate tones of voice, gestures, and facial expressions, but also by describing the range of related subtopics within and some major dimensions of the general topic under which the focusing questions could be subsumed. In addition, the instructor described the variety of resource persons and materials the student could utilize. Finally, the student was given comparable latitude to alter the nature of the focusing questions if key resource persons or material did not seem to be available or if a closely related question seemed more appropriate. In other words, the student-assigns treatments were equated with the instructor-assigns treatments in terms of the emotional tone of the instructor, the amount of information about the way the focusing questions fit into the general topic, and in terms of the nature and degree of latitude given to alter the focusing question if necessary.

A major problem that needed to be solved was how to make the subject matter for both groups equivalent. It was solved by a yoking procedure which will be described more fully in the section on scheduling appointments. In essence, a student who was in one of the instructor-assigns treatments was given a question to pursue that had been self-assigned by one of the students in the student-assigned treatments.

Occasionally, the authorized[1] assignment-initiator, that is the

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[1]The modifier "authorized" is used to distinguish those assignment-initiators who have assignment-recipients yoked to them from those who do not. For reasons which will become clear in the section on scheduling appointments, the latter are called "alternate assignment-initiators."

student in the student-assigns treatment to whom the assignment-recipient was yoked, chose a highly specialized question to pursue. For example, an authorized-initiator whose field was social studies chose as his focusing question, "How has the teaching of social studies evolved in American schools?" Here since the assignment-recipient's field was mathematics, it was felt that a case could be made for making the psychologically equivalent focusing question read, "How has the teaching of mathematics evolved in American schools?" In general, the focusing question was only changed when the authorized initiator chose a topic related to his own field of specialization, and in such instances, the field of the assignment-recipient was substituted in its place.

Each of the four treatments or segments were approximately three weeks long. The actual duration varied from subject to subject due to scheduling difficulties. The student met with the instructor at the beginning of each segment, at the midpoint and at the end. Since in each segment except the final one the last meeting of a particular segment became the first meeting of the following segment, the instructor and student had a total of nine sessions together. The average session lasted between 20 and 25 minutes but ranged from a little over 5 minutes to well over an hour.

During the session which was held half way through the segment, the student was asked how he was coming, whether there were any problems or intriguing findings he wished to share, and whether or not he wanted to continue working on the focusing questions he had been pursuing. Since the assignment initiators had been delegated control over their assignments, it seemed totally consistent with the purpose of the experiment to allow them to change topics provided that the new topic

was also clearly related to the field of education.

If the authorized initiator changes his topic at the halfway point, must that of the assignment recipient also be changed? The policy adopted by the instructor was to give the assignment recipient the prerogative of choosing at the halfway point during the segment whether or not to continue to pursue the set of focusing questions he had previously been assigned or to be assigned another set. The rationale for this policy is consistent with the general policy enumerated above; viz., to make every aspect of the student-assigns and instructor-assigns treatments equivalent except the treatment variable, i.e., who assigns.

One might now wonder what should happen if the authorized-initiator decided to continue pursuing the set of focusing questions he originally assigned himself and the assignment-recipient decided he wanted to be assigned a new set. In such situations, the assignment-recipient was in fact assigned a new topic. The question of which topic to assign was resolved by following a pre-established priority system which will be explained in the section on scheduling appointments. At this point, the important feature on this procedure is that the assignment-recipient was pursuing the same set of focusing questions as the assignment-initiator so that the two treatments provided equivalent conditons except on the dimension of who did the assigning.

Major Treatment Variable #2--Who has control over the evaluation process

During the orientation session in which the nature of both the course and the experiment was described, the instructor's philosophy of evaluation was explained. In addition to the oral explanation, which contained concrete examples, the students were also given the written

summary reproduced below:

An Alternative Philosophy of Evaluation

Evaluation is usually conceived of as a past-oriented, unidimensional process. Probably most of your teachers have done little more than assign a value to your work along a single goodness-badness dimension. Evaluation can be conceived of as a future-oriented multidimensional process which helps you utilize your previous experience to improve the quality of your future experience.

To apply this alternative philosophy of evaluation, you would have to focus on both content and process. With regard to the content, you would review the insights you have gained, the attitudes and values you have begun to reconsider, and the questions you have formulated in order to make wiser decisions from here on regarding what gaps in your knowledge to fill, what tributaries to explore, and, equally important, what content areas to avoid for the immediate future.

With regard to the process, your first step would be to reflect upon the value of the time you spent interacting with the content. You would attempt to distinguish between the times which were more or less unproductive (when you seemed to be spinning wheels or doing busywork) and the times which were more or less productive (when you seemed to be learning something meaningful). After determining what conditions existed and what steps you took during these various times, you would then be able to design and implement new work procedures which would enable you to decrease the proportion of future effort which is unproductive and increase the proportion of such effort which is productive.

In two of the four treatments the authority to control the process of evaluating the students' work was totally delegated to the student. Each student in a student-evaluates treatment was specifically encouraged to utilize the procedures for evaluation suggested above, but he was also authorized to choose another set of procedures if he preferred. In order to make the delegating real rather than illusory, the students were told that they could decide whether or not to put any of their thoughts or findings into writing as well as whether or not to share them with the instructor. They were further told that every possible option had already been selected at least once.

One of the hazards of adopting this self-evaluation system is that some of the students may simply skip the evaluation phase. More seriously, some students may seize the opportunity to escape doing

any work at all. The instructor can always require that work be turned in, but this may influence the student to shape his work to meet what he infers are his instructor's standards. In an attempt to reduce the possibility that those in the student-evaluates treaments would take advantage of this loophole, the instructor supplemented his description of the options open to them with the statement, "The one thing you are not free to do is to conduct no evaluation of your work at all. I want to be sure that this point is clear: Regardless of how you carry it out, you have the responsibility to evaluate everything you do during this segment. This is one of the very few course requirements. In my opinion, it is a particularly important one." It would be naive to assume that the above statement had a very sizable effect. It is even possible that it suggested the possibility of avoiding work to a few that might not have thought of it on their own, or that some students utilized the very fact that a statement had been made which implied they might attempt to avoid work as justification for so doing. The above statement was made with these possibilities in mind, but with the hope that the experiment would illuminate some of the issues which bear on this problem. In particular, it was hoped that the data from the experiment might suggest which students are likely to benefit from controlling the process of evaluating their own work and which are likely to suffer from being exposed to the temptation which is a concomitant of this privilege. A teacher could then obtain the best of both worlds by restricting the autonomy of the latter and increasing it for the former.

In the two treatments in which the instructor had the authority to designate the evaluation process to be utilized, he asked the students to apply the procedures described in the "Alternative Philosophy of

Evaluation" statement. Further, they were told to write up what they took into account, its relationship to their future decisions, and what decisions they have already made as a result of undergoing the evaluation process.

Scheduling Appointments

The two dichotemous treatment variables generate four different treatments. They are:

Student assigns, student evaluates (hereafter abbreviated SS)

Student assigns, instructor evaluates (hereafter abbreviated SI)

Instructor assigns, student evaluates (hereafter abbreviated IS)

Instructor assigns, instructor evaluates (hereafter abbreviated II).

The first scheduling problem the experimenter faced was to decide the order in which the subjects should undergo the treatments. Since the subject's memory was to be the source of data from which the ratings on the dependent variables would be obtained, it was important to reduce as much as possible the influence of primacy and recency effects. It was important also to guard against two threats to internal validity: first, the threat of any of the treatments being affected by a major extra-experimental event; and second, the danger of biasing the results of the experiment by either the tendency for a subject to react in a special or unique way to the first segment merely because of its novelty or the related tendency to react differently to the second, third, or fourth segment because of his accumulated experience in the preceding segments.

Although the sources of error described above could not be eliminated, varying the sequences across subjects has the effect of preventing any of these sources from systematically affecting one

particular segment. Since there were a total of four different segments, the number of possible sequences is 4! (4 factorial) or 24. Since there were 32 boys and 40 girls, it was then possible to distribute the subjects so that every sequence had exactly three subjects assigned to it, and that any given sequence had at least one boy and at least one girl (eight would have to have two boys and one girl and sixteen would have to have one boy and two girls.)

The second scheduling problem was to devise a procedure of pairing students so that each subject in an instructor-assigns segment could be given an assignment developed by a subject in a student-assigns segment. Since males frequently have been found to have different interests from females, individuals were only yoked to those of the same sex.

A tentative plan was developed whereby whoever might be assigned to sequence 6 (II-SS-SI-IS) could be double-yoked to someone assigned to say sequence 13 (SI-II-IS-SS), that is one in which an assignment-initiator in one was always paired with an assignment-recipient in the other. Two drawbacks occurred to the expérimenter and as a result, a new plan was developed.

The first objection was that each person would be yoked to the same person twice and might as a result end up with two assignments that were quite alike if not in content then in perspective. It is possible that some would not see this as a disadvantage, particularly since the situaton in most courses is that a single instructor develops all the assignments. The second objection is perhaps more serious, namely, that if the authorized initiator did not arrive at his appointment so that the instructor would have an assignment ready for the assignment-recipient, there would be no previously designated person who could act as

alternate initiator.

To overcome both of these objections, a number of steps were taken. First, the subjects were grouped randomly in sets of four, each set containing only members of the same sex. The experimenter then had the task of grouping the 24 sequences into clusters of four such that both of the following conditions were fulfilled:

1) In each segment, one subject would be an authorized initiator, one subject would be an alternate initiator, and the remaining two S's would be assignment recipients.
2) No subject would be an authorized initiator more than once.

One such cluster is shown in Table 5.1.

TABLE 5.1

TREATMENT SEQUENCES TO WHICH EACH OF THE CLUSTER 1 SUBJECTS WERE ASSIGNED

Subject	Segment Number			
	1	2	3	4
A	(SS)[a]	II	IS	SI
B	SI	(SS)	II	IS
C	IS	SI	(SS)	II
D	II	IS	SI	(SS)

[a]In each segment, the subject undergoing the circled treatment is the authorized initiator. Thus in the fourth segment, subjects B and C are yoked to (i.e., receive assignments from) subject D, and both subjects A and D initiate their own assignemts.

To cope with situations in which an assignment recipient arrived before the authorized initiator had come up with an assignment for himself, which could happen if the authorized initiator asked for more time to decide or missed an appointment, the following priority

list was developed. The instructor was to use the highest priority assignment still available:

1. Authorized initiator, current segment
2. Authorized initiator, previous segment
3. Alternate[1] initiator, current segment
4. Fellow assignment-recipient, previous segment
5. Instructor-developed assignment

Thus, if during his second conference in the fourth segment subject C from the cluster shown in Table 5.1 wanted his assignment changed, the instructor would assign him the first available assignment from this list:

1. D's 4th segment assignment
2. D's 3rd segment assignment
3. A's 4th segment assignment
4. B's 1st segment assignment
5. An instructor-developed assignment

Since at the halfway point of the student-assigns treatments, the assignment-initiator had the option of assigning himself a second set of focusing questions, the instructor might have had up to eight different focusing questions from which to draw before he was forced into assigning the student a focusing question he himself had developed. In actuality, however, the priority list usually contained less than eight available sets of questions. First of all, assignment initiators frequently chose to continue pursuing the set of focusing questions they had previously developed. Second, students were just as likely to miss an appointment or need additional time to develop a topic during the early segments, when the list contained as many as eight student-initiated assignments. Third, some of the focusing questions were unavailable because they had already been used during earlier "emergencies." Fourth, when some subjects were given the opportunity to be

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[1] In Table 5.1 the alternate assignment-initiators in Segments 1-4 respectively are subjects B, C, D, and A.

assignment-initiators they decided to continue topics they had been assigned in earlier segments. Finally, through coincidence or because the subjects communicated among themselves, a few assignment-initiators chose topics which one or both of the yoked assignment-recipients had already carried out.

For all the above reasons, the instructor found it necessary to have available an instructor-developed assignment. A focusing question was chosen which was being discussed in Congress, on television talk shows, as well as in magazine columns and editorial pages: "What federal legislation would you recommend to rectify inequalities in educational opportunity that exist as a result of racial prejudice?"

So far, the grouping of subjects into same-sex clusters of four has been discussed. Now that the priority system has been explained, it is time to describe the procedure for matching subjects with sequences. At the initial orientation session, the subjects were asked to sign their names on an appointment schedule which indicated the times the instructor had available during the first week of classes. Using the priority schedule as a guide, in each cluster, the subject who signed up for the appointment which came first became the authorized-initiator during the first segment, the subject who signed up for the second appointment became the alternate-initiator during the first segment and the subject who signed up for the third appointment became whichever assignment-recipient turned out to be an authorized-initiator first. The order at the starting gate thereafter fixed the track in which they would run. Thus, in the cluster shown in Table 5.2, the earliest scheduled subject became Subject Q, the next became Subject S, the third, Subject R, and the last, Subject T.

TABLE 5.2

TREATMENT SEQUENCES TO WHICH EACH OF THE CLUSTER 5 SUBJECTS WERE ASSIGNED

Subject	Segment Number			
	1	2	3	4
Q	SI	II	SS	IS
R	IS	SI	II	SS
S	SS	IS	SI	II
T	II	SS	IS	SI

During his first appointment, each subject was told the sequence in which he would go through the four segments. In order to meet the guidelines described to date in each of the remaining segments, the appointments for each cluster of four had to be scheduled so that the authorized-initiator always went first, the alternate-initiator would go second, and whichever assignment recipient had been an alternate initiator most recently would go third. Thus, for the cluster shown in Table 5.2, the order of appointments during each of the segments is shown in Table 5.3 below.

TABLE 5.3

SCHEDULING SEQUENCES FOR CLUSTER 5 SUBJECTS

Segment #	Order in which subjects were scheduled			
1	Q	S	R	T
2	R	T	S	Q
3	S	Q	T	R
4	T	R	Q	S

Operationalization of Concepts and Variables

Pole Scores

From the battery of questionnaires administered to the subjects during the early portion of the semester, questions were sorted into one of six piles: Possibly Pole 1, Possibly Pole 2, Possibly Pole 3, Possibly Pole 4, Possibly Pole 5, and None of the Above. The first sort was made on the basis of the face validity of the item, given the theoretical description of the scale. In general, 50 to 60 items ended up in each of the first five piles as a result of this preliminary sort.

Next, any item which contained a response selected by 75 per cent or more of the subjects was eliminated; items were desired which yielded a more even split. A further modification of Possibly Pole Items consisted of eliminating those which could be either Pole 1 or Pole 3 (the two poles measuring dependency) as well as those which could be either Pole 2 or Pole 4 (the two poles measuring independence); items were desired which would accentuate the difference among the poles. This procedure, of course, has the effect of reducing the correlation which otherwise might exist within these two sets of poles as defined theoretically. Rather than being seen as a detriment, this effect was deliberately sought; nevertheless, it should be kept in mind while interpreting the data.

The final step consisted of a cycle of between two and five iterations of the following procedures: The pool of items was factor analyzed. Those items which did not load on the first unrotated factor with a correlation greater in magnitude than .40 were eliminated. The items that remained were again factor analyzed to insure that the elimination of peripheral items did not remove too sizable a portion

of the common variance, in other words, to ensure that all the remaining items loaded on the new unrotated factor with a correlation at least as large as .40.

The Pole 4 scale (Self-Absorption, Freedom to) had a false start. It initially contained, it turned out, an over-representation of a narrow category of items having to do with the extent to which the individual engaged in introspection. Ultimately, only introspection items were left and the procedure had to be begun again with some of these items eliminated.

The individual's score on the pole scales consisted of his "factor score" which measures the extent to which the individual possesses the characteristic which is common to all the items. Thus, the items which load highest on the first unrotated factor contribute more than those which load less. The final versions of each of these scales including the correlation of each item with its scale score is shown in Appendix C. The scale scores thus obtained were then converted so that each of the five scales had a mean of 100 and a standard deviation of 20.

The Concept of Openness

To facilitate the explanation of the operationalization of the concept of openness, some terminology will be presented. First, to avoid cumbersome sentences, the terms "Pole X" and "Pole Y" are occasionally used to refer to any pole in general. Further, the phrase "Pole X is open" is a shorthand way of saying that "the individual's representational structure is open." Finally, "P(X)" refers to an individual's score on Pole X.

Now, then: to operationalize the concept of openness, an arbitrary cutoff point was set as a criterion for deciding whether or not a pole is open. Specifically, Pole X is considered "open" if $P(X) \geq 110$; in other words, an individual's representational structure is considered to be open to Pole X if the individual's score on Pole X is greater or equal to half a standard deviation above the mean. As the individual can intuit from this definition of openness, Pole X is considered "closed" if $P(X) < 110$.

Note that the concept of pole openness thus defined is not an intrapersonal concept. Thus, if the poles are normally distributed, approximately 31 per cent of a population would be open to Pole X and 69 per cent would be closed to it.

The Concept of Differentiation

Differentiation is considered to be directional in nature. Thus, the phrase "Pole X is differentiated from Pole Y" implies that Pole X is more developmentally advanced than Pole Y. To operationalize the concept of differentiation, two criteria were established. The statement "Pole X is differentiated from Pole Y" implies both that $P(X) \geq 110$ and $(P(X) - P(Y)) \geq 10$. In other words, Pole X must be open, and further, the individual's score on Pole X must be greater than or equal to half a standard deviation more than his score on Pole Y.

The Criterion Variables

For convenience, the criterion variables have been grouped into six categories, namely, those having to do with dependency, independence, interpersonal orientation, cognitive complexity, ascendancy and self-assurance, and activation. Each category will be considered in the

order just given.

Dependency Criterion Variables

Dependency

This scale came from a forced choice questionnaire assessing not only tendencies toward dependency, but also toward aggression, flight, pairing, and work in social stress situations. The five categories were derived from Bion's theorizing and reported by Thelen (1967). A coded copy of the instrument was obtained from the latter. A Sample item is:

When I wanted to work with Frank, I . . .
A. felt we could do well together. (Pairing)
B. asked if it would be alright with him. (Dependency)

There were 20 items that were keyed as relating to Dependency.

Teacher Deciding Alone

This 24-item scale gauges the extent to which a student perceives that classroom decisions should be made by his teacher acting alone. Each item describes a classroom decision; the student must indicate who of the following should make the decision: The student alone, the teacher alone, the class as a whole, the student plus one or a few other students as a small group, or the student and the teacher. The student's score was the number of times he chose the "teacher alone" response. This scale also came from Thelen's test battery. A sample decision is "How much help should you accept from another student."

Preference for Dependency in Assigning

Preference for Dependency in Evaluating

Both of these scales are too complicated to describe here and are discussed in Appendix A.

Achievement via Conformance

This 38-item scale comes directly from the California Psychological Inventory (Gough, 1957). According to the manual, the purpose of the scale is "to identify those factors of interest and motivation which facilitate achievement in any setting where conformance is a positive behavior" (p. 11). A sample item is: "I have a very strong desire to be a success in the world" (True is scored as indicating Achievement via Conformance).

Independence Criterion Variables

Achievement via Independence

This 32-item scale also comes directly from the CPI. The manual description gives the same purpose as that given in the previous scale except that the setting is one in which "autonomy and independence are positive behaviors" (p. 11). A sample item is: "I looked up to my father as an ideal man" (False is scored as indicating Achievement via Independence).

Assigning Independence and Evaluating Independence

Both of these scales are described in Appendix A.

Autonomy

The original 43-item scale came from the Omnibus Personality Inventory, but 11 items were eliminated because it was felt that they were only getting at a peripheral aspect of a highly central concept. The manual says:

> The characteristic measured by this scale is composed of liberal, non-authoritarian thinking and a need for independence. High scorers show a tendency to be independent of authority as traditionally

> imposed through social institutions. They opposed infringements on the rights of individuals and are tolerant of viewpoints other than their own; they tend to be realistic, intellectually and politically liberal, and much less judgmental than low scorers (Heist and Yonge, 1968, p. 4).

A sample item is: "Society puts too much restraint on the individual" (True is scored as indicating autonomy).

Alone

This 20-item scale is composed of two ten-item scales from Thelen's test battery. Each asks the student to rate activities which he would be undertaking by himself on a five point scale. The dimension on the first scale is the extent to which the activity is perceived to be worthwhile; the dimension on the second scale is the extent to which the activity is perceived to be enjoyable. Sample items from the first and second respectively are: "Work independently on a project you choose yourself" and "Reading a book in order to learn all about some topic." The Alone scale score was merely a sum of the 20 ratings since all of them were keyed in the same direction.

Withdrawal and Self-Sufficiency

This ten-item scale is also taken directly from Thelen. He developed a total of 60 items and keyed them to a category system constructed by Charles Morris. All the items in the set begin with the root "To get the most out of life it is important to . . . " A sample ending loading on the Withdrawal and Self-Sufficiency scale is "'go it alone,' for the most part, and not be dependent on others." Thelen used a 9-point scale; here, a 5-point scale was used ranging from "Not at all important" to "Very important." The subject's score was the sum of his rating since all of the items were keyed in the same direction.

Interpersonal Orientation Criterion Variables

Institutionalism-Humanism

This test, containing 20 items, was designed to measure the extent to which teacher candidates are humanistically oriented. The future teacher is to respond to statements about schools, teachers, and pupils on a 5-point scale from "Strongly agree" to "Strongly disagree." Here, the questions were scored to load on the other end of the continuum which seems to relate to the extent to which the individual glorifies institutions as opposed to people. Here is one of the items: "It is desirable to require pupils to sit in assigned seats during assemblies" (Agreement loads on the Institutionalism side of the continuum).

Mutual

On the Thelen battery of tests referred to above, some of the questions load on more than one scale. Ten of them load on the Mutual scale which seeks to determine the extent to which students enjoy cooperating with a common purpose. A sample item is: "Listening to others in a group of your friends discuss their ideas and beliefs about some problems you all have."

Social Avoidance and Distress

This 28-item scale obtained from Allen Menlo measures both the extent to which individuals experience distress, discomfort, fear, and anxiety in social situations as well as the extent to which they deliberately attempt to avoid social situations; it has an unusually high degree of "homogeneity" (i.e., internal consistency) (Watson and Friend, 1969). A sample item is: "I often feel on edge when I am with a group of people" (True is scored as indicating the presence of distress in

and avoidance of social situations).

Cognitive Complexity Criterion Variables

Complexity

From the original 32-item OPI Complexity scale, 25 items were chosen. The OPI manual says:

> This measure reflects an experimental and flexible orientation rather than a fixed way of viewing and organizing phenomena. High scorers are tolerant of ambiguities and uncertainties; they are fond of novel situations and ideas. Most persons high on this dimension prefer to deal with complexity, as opposed to simplicity, and very high scorers are disposed to seek out and to enjoy diversity and ambiguity (Heist and Yonge, 1968, p. 4).

A sample item is: "Usually I prefer known ways of doing things rather than trying out new ways" (False is scored as indicating Complexity).

Non-Stereotypy

This 100-item scale is computed from Form T of the Inventory of Beliefs, an adaptation by George Stern of the original Inventory of Beliefs; a copy of Form T and the scoring key were provided by Stern. Stern, Stein, and Bloom describe what they call a Stereopath Syndrome (1954, p. 190) which characterizes those who will accept as true cliches, pseudo-rational statements, and inappropriate generalizations. An example of an S-item is: "Literature should not question the basic moral concepts of society." They describe what they call a Non-Stereopath Syndrome (1954, p. 195) which characterizes those who will reject S-items but accept the reverse of such statements. An example of an N-item is: "Literature which questions the basic moral concepts of our society is good." Form T contains 60 S-items and 40 N-items. A subject's Non-Stereotypy score consists of the number of S-items he rejects plus the number of N-items he accepts.

Rationality

This 100-item scale is computed from the same items on Form T of the Inventory of Beliefs as the Non-Stereotypy scale described immediately above. It consists of the number of S-items rejected plus the number of N-items rejected. The Rationality Syndrome is also described by Stern, Stein, and Bloom (1954, p. 198) but will not be discussed further here.

Flexibility

This scale from the CPI has 22 items and was developed according to the manual "to indicate the degree of flexibility and adaptability of a person's thinking and social behavior." A sample item is: "I often wish people would be more definite about things" (False is scored as indicating flexibility).

Dependence-Independence Differentiation

Dimensionality Actual

Dimensionality Hypothetical

Average Dimensionality

Minimum Dimensionality

Structural Integration

The above six scales are discussed in Appendix A. What can be said here is that all of these measures, along with Preference for Assigning Dependency, Preference for Evaluating Dependency, Assigning Independence, and Evaluating Independence, are based on a questionnaire which is included in this report as Appendix D. This questionnaire required the subjects to rank order the four segments they went through along eight different dimensions. Along these same eight dimensions they were also asked to rank order the four conditions hypothetically

(i.e., unfettered by idiosyncracies that might have influenced their actual experience such as the nation-wide campus disruption and student strike caused by the cumulative effect of the Kent State shootings and the intervention by United States troops into Cambodia). It should also be mentioned that because rank order tasks often confuse subjects, the questionnaire appearing in Appendix D was administered individually and orally at the student's final appointment.

Cognitive Complexity

This variable was developed using the procedure described above for constructing the pole scales. The items on this scale along with their extent of correlation appear in Appendix C.

Ascendancy and Self Assurance Criterion Variables

Dominance

This 46-item scale comes directly from the CPI. According to the manual its purpose is "to assess factors of leadership ability, dominance, persistence, and social initiative" (Gough, 1957, p. 10). A sample item is: "I doubt whether I would make a good leader" (False is scored as indicating Dominance).

Capacity for Status

This scale, containing 32 items, is also from the CPI. Its purpose is "to serve as an index of an individual's capacity for status (not his actual or achieved status). The scale attempts to measure the personal qualities and attributes which underlie and lead to status" (Ibid., p. 10). Here is an example of one of the items: "I tend to be on my guard with people who are somewhat more friendly than I had expected" (False is scored as indicating a Capacity for Status).

Threat

This 10-item scale comes from the same section of the Thelen battery as does the Mutual scale described above. It consists of determining the extent to which subjects enjoy activities which have a component of threat associated with them related to the exposure of private feelings. One of the items is "Telling a group of friends your most intimate and personal feelings." The scale score is computed by summing the individual Likert-type ratings, all of which are loaded in the same direction.

Fear of Negative Evaluation

This 30-item scale also obtained from Menlo, measures the extent to which the subject fears receiving negative evaluations from others. It was developed simultaneously with the Social Avoidance and Distress scale discussed above and also has an unusually high degree of homogeneity (Watson and Friend, 1969). A typical item is "I rarely worry about seeming foolish to others" (False is scored as indicating Fear of Negative Evaluation).

Activation Criterion Variables

Active

This 25-item scale includes half of the items contained in the Mutual and Threat scales as well as a quarter of the items contained in the Alone scale; it also includes other items in the Thelen battery not included in any of the above scales. The subject's score is the sum of his ratings of the extent to which he enjoys being active in the manner portrayed by the various items. The sample item provided under Threat Above also loads on the Active scale.

Locus of Control

This 14-item scale obtained from Mark Chesler was developed by Rotter (1966) to measure the extent to which individuals felt that they could influence their own fate. Those scoring low on the scale seem to believe that the successes and failures in their life are for the most part determined by luck or chance. The items follow a forced choice format, e.g.,:

Check the one you more strongly believe:

_____Without the right breaks one cannot be an effective leader.
_____Capable people who fail to become leaders have not taken advantage of their opportunities.

The latter option loads on the scale score.

Vigorous Action and the Overcoming of Obstacles

This 10-item scale follows the format of the Withdrawal and Self-Sufficiency scale described above; it is one of the scales in the Thelen battery that is based on the theorizing of Charles Morris. These items gauge the extent to which the subjects feel it is important to, for example, "plunge courageously into the challenges of life."

Need Achievement

This 9-item scale was developed by Myers and given to me by Menlo. It measures the extent to which students seem to possess a need to achieve academically. A typical item is: "I have a very strong desire to excel academically" (True indicates a need to achieve academically).

Social Restraint and Self Control

This 10-item scale is the third and last of the Thelen scales which is based on the work of Charles Morris. Its title is self-

explanatory; one of the items asks the subject how important he feels it is to "hold my feelings in check and lead a life of self control."

Impulse Expression

The original items on this scale came from the work of Sanford, Webster, and Freedman (1957). The Impulse Expression scale on the OPI contains a portion of their items and six of these were eliminated from the scale used here. The remaining 53 items have the same purpose, namely, to assess:

> . . . a general readiness to express impulses and to seek gratification either in conscious thought or in overt action. High scorers have an active imagination, value sensual reactions and feelings; very high scorers have frequent feelings of rebellion and aggression (Heist and Yonge, 1968, p. 5).

Here is one of the items: "I often act on the spur of the moment without stopping to think" (True is scored as indicating a readiness to express impulses).

Derivative Measures

Purepole

To be included in the sample which received a Purepole score, a subject not only had to have one of his poles be open--$P(X) \geq 110$--but that pole had to be "differentiated from"[1] all the other poles. If he was eligible to receive a Purepole score, it merely consisted of the number of the "completely differentiated" pole. For example, a Purepole score of 4 implies both that $P(4) \geq 110$ and that $[P(4) - P(Y)] \geq 10$, where the latter statement holds not only for

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[1]For Purepole and Fusion, the statement "Pole X is differentiated from Pole Y" does not imply, as it does elsewhere throughout the text, that Pole X is more developmentally advanced than Pole Y.

Y = 1, 2, and 3 but also for Y = 5. Here is a sample profile which would qualify for a Purepole score of 4 (The scores are in order from Pole 1 to Pole 5): 96 - 108 - 102 - 121 - 110. As one can see, those who receive Purepole scores can be considered ideal types.

Alloypole

To be included in the sample which received an Alloypole score, the individual had to be open to a pole which was also differentiated from all less developmentally advanced poles. This pole did not, however, need to be differentiated from more developmentally advanced poles as it would have had to be to receive a Purepole score. If he qualified according to this criterion, his Alloypole score consisted of the number of the most developmentally advanced pole eligible. Here is a sample profile which would qualify for an Alloypole score of 4: 96 - 108 - 102 - 121 - 126. Everyone who received a score on the Purepole scale necessarily received the same score on the Alloypole scale but the reverse is not true; for example, the individual with the Alloypole scale score of 4 mentioned above is ineligible for a score on the Purepole scale. The reason he is ineligible is that if his score on Pole 5 (126) is subtracted from his score on Pole 4 (121), the remainder (-5) is not greater than or equal to 10.

Fusion

The Fusion scale is similar to the Purepole scale but the eligibility rules are liberalized. In a sense, Poles 2, 3, and 4 are fused into one cluster. Thus, if a subject received a 1 or a 5 on the Purepole scale, he would also receive a 1 or a 5 respectively on the Fusion scale. But if he received a 2, 3, or 4 on the Purepole scale, he would receive a 3 on the Fusion scale. In addition, however,

he would also receive a 3 on the Fusion scale if he were open to either Pole 2, 3, or 4 whether or not that pole was differentiated from the other two in the cluster, provided that one of them was differentiated from both Poles 1 and 5. Here is a profile which would lead to a Fusion score of 3: 101 - 128 - 106 - 124 - 91.

Developmental Maturity

The Developmental Maturity scale is an empirically derived variable, based only on data collected on subjects who were eligible to receive Purepole scores (The Purepole scale, described above, places ideal pole types on a scale from 1 to 5--the high end of the scale being the most developmentally advanced). To qualify for inclusion in the Developmental Maturity scale, an item had to meet all three of the following criteria: First, the item had to correlate with Purepole with a magnitude greater than or equal to .40. Second, the responses on this item had to be distributed such that no response was selected by as many as two thirds of the subjects receiving Purepole scores. Third, when the responses to the item were plotted against the corresponding Purepole scores, most of the resulting scatter diagram had to be confined within a fairly narrow, more or less monotonically increasing (or decreasing) band. This last criterion ensured that the correlation represented an ability of the item to separate those who were developmentally advanced from those who were not; in other words, it provided protection against the operation of a statistical artifact. All the items which qualified were combined into the Developmental Maturity scale which appears in Appendix E.

Because some of the items were dichotemous and the remaining ones utilized 5-point scales, a decision had to be made regarding the

most suitable manner of combining the two sets of items into a single scale. The dichotemous component contained 22 items, had a standard deviation of 5.77, and correlated .888 with Purepole; the multiple choice component contained 32 items, had a standard deviation of 17.28, and correlated .886 with Purepole.

While the optimum weighting of each component can be determined utilizing the standard computational procedures for calculating multiple regression coefficients, when that method is compared to that described below, the gain in "paper prediction power" is likely to be very small and in all probability it would consist only of illusory precision. The method that was used involved tripling the dichotemous score to make the variances roughly equivalent. The main advantage of using the whole number 3 rather than a properly weighted fraction is that users of this scale can compute raw scores easily by hand. When the tripled dichotemous score is added to the multiple choice score, the resulting Developmental Maturity score correlated .93 with Purepole.

Purepole-equivalent scores

Thirty-seven subjects had pole profiles which rendered them ineligible to receive a Purepole score. Of these, 12 were closed to all 5 of the poles. The remaining 25 subjects were assigned a Purepole-equivalent score. To compute this score, the numbers of the poles to which the subjects were open were averaged. For example, an individual with the profile 91 - 106 - 128 - 113 - 122 is ineligible to receive a Purepole score. He is open to Poles 3, 4, and 5. The average of the numbers 3, 4, and 5 is 4, so the individual would receive a Purepole-equivalent score of 4.

Since the research design and the operationalization of concepts and variables have been presented, let us now proceed to an examination of the results.

CHAPTER SIX

RESULTS

Experimental Criterion Measures

Although the Pole scales were constructed so that no two poles would contain the same item, no attempt was made to prevent either the pole scales or the Cognitive Complexity scale from overlapping with the criterion variables. Consequently, the degree of overlap between the theoretical constructs and the criterion variables must be taken into account in interpreting the results. Although the overlap factor will be mentioned every time its influence is expected to be sizable, Table 6.1 is included so that the reader may draw his own conclusions.

TABLE 6.1

NUMBER OF ITEMS WHICH EXPERIMENTAL SCALES CONTAIN IN COMMON WITH EACH OTHER AND WITH THE CRITERION VARIABLES

Variable name	# of items in scale	Pole 1 N=14	Pole 2 N=18	Pole 3 N=17	Pole 4 N=9	Pole 5 N=13	Cogn[c] cxy N=7
Dependency	20	0	0	0	0	0	0
Teacher Deciding Alone	24	0	0	0	0	0	0
Preference for Assigning Dependency	8	0	0	0	0	0	0
Preference for Evaluating Dependency	8	0	0	0	0	0	0
Achievement via Conformity	38	0	3[a]	0	0	0	0
Achievement via Independence	32	1	0	0	0	0	1

TABLE 6.1--Continued

Variable name	# of items in scale	Pole 1 N=14	Pole 2 N=18	Pole 3 N=17	Pole 4 N=9	Pole 5 N=13	Cogn[c] cxy N=7
Assigning Independence	1	0	0	0	0	0	0
Evaluating Independence	1	0	0	0	0	0	0
Autonomy	32	2	0	1[a]	0	0	1
Alone	20	0	0	0	0	2	0
Withdrawal and Self-Sufficiency	10	0	0	0	7	0	0
Institutionalism-Humanism	20	4	0	0	0	0	0
Mutual	10	0	0	0	0	0	0
Social Avoidance and Distress	28	0	0	0	0	0	0
Complexity	25	0	2	3[a]	0	0	5
Non-Stereotypy	100	4	1	0	0	0	0
Rationality	100	4	1	0	0	0	0
Flexibility	22	0	0	0	0	0	0
Dependence-Independence Differentiation	8[b]	0	0	0	0	0	0
Dimensionality Actual	8[b]	0	0	0	0	0	0
Dimensionality Hypothetical	8[b]	0	0	0	0	0	0
Average Dimensionality	16[b]	0	0	0	0	0	0
Minimum Dimensionality	16[b]	0	0	0	0	0	0
Structural Integration	2[b]	0	0	0	0	0	0
Cognitive Complexity	7	0	0	1[a]	0	0	7
Dominance	46	0	1[a]	0	0	0	0
Capacity for Status	32	0	0	0	0	0	0
Threat	10	0	0	0	0	0	0
Fear of Negative Evaluation	30	0	0	0	0	0	0
Active	25	0	0	0	0	0	0
Locus of Control	14	0	0	0	0	0	0
Vigorous Action and the Overcoming of Obstacles	10	0	0	0	1	0	0
Need Achievement	9	0	1	0	0	0	0
Social Restraint and Self-Control	10	0	0	1	0	0	0

TABLE 6.1--Continued

Variable name	# of items in scale	Pole 1 N=14	Pole 2 N=18	Pole 3 N=17	Pole 4 N=9	Pole 5 N=13	Cogn[c] cxy N=7
Impulse Expression	52	0	5	0	0	0	0
Pole 1 (Absolutism)	14	14	0	0	0	0	0
Pole 2 (Negativism)	18	0	18	0	0	0	0
Pole 3 (Field Dep.)	17	0	0	17	0	0	1[a]
Pole 4 (Self-Absorption)	9	0	0	0	09	0	0
Pole 5 (Interdependence)	13	0	0	0	0	13	0
Freedom From	43	2[a]	2	2[a]	0	0	0
Positive	30	0	0	2[a]	0	0	6
Developmental Maturity	54	3[a]	0	0	0	7	1

[a]Scored in the opposite direction

[b]Each of these questions required the subject to rank four elements; each such complete ranking involves six pair-wise comparisons.

[c]Cogn Cxy refers to the Cognitive Complexity scale.

Cognitive Complexity criterion variables

The correlations between the experimental Cognitive Complexity measures and more established criteria of complexity are shown in Table 6.2. An analysis of these correlations suggests that the six measures based on the dimensional analysis described in Appendix A do not measure what they were designed to measure, but that the differentially weighted Cognitive Complexity scale described in Chapter 5 seems to have succeeded in achieving the objectives established for it.

Looking first at those based on the dimensional analysis, the correlations in the first six rows of Table 6.2 range from -.31 to .22 and average -.07 (with or without the correlations with the experimental Cognitive Complexity scale included). If these measures accomplished

TABLE 6.2

RELATIONSHIP OF EXPERIMENTAL COGNITIVE COMPLEXITY MEASURES TO OTHER CRITERIA OF COMPLEXITY

	Complexity	Non-Stereotypy	Rationality	Flexibility	Cognitive Complexity
Dependence-Independence Differentiation	.06	.02	-.19	.04	-.08
Dimensionality Actual	-.03	-.08	-.28[b]	-.15	-.12
Dimensionality Hypothet.	-.21	-.15	-.20	.05	-.12
Average Dimensionality	-.14	-.14	-.31[b]	-.07	-.15
Minimum Dimensionality	-.05	-.08	-.21	-.11	-.07
Structural Integration	.13	.15	.22	.09	.14
Cognitive Complexity	.66[c]	.47[c]	.32[c]	.45[c]	1.00

[a] N=63

[b] $p < .05$

[c] $p < .01$

their intended purpose, the correlations would all be positive and at least moderate. As it is, only the correlations for the measure of Structural Integration are consistently positive, and these never attain significance.

It is not clear why the dimensional approach failed to result in the construction of valid measures of cognitive complexity except that one or more of its assumptions must have been wrong. Perhaps it is the assumption that an individual capable of viewing a set of learning conditions multidimensionally is likely to utilize several dimensions whenever he is asked to rank the elements in the set along several criteria; in other words, it is possible that a cognitively complex person may utilize a single dimension as a basis for several rankings.

One other possibility has occurred to me: perhaps the eight criteria are all sufficiently distinct from each other that even the most cognitively simple undergraduate has no trouble discriminating among them. If this were the case, the scores could hardly be expected to reflect the extent of complexity that actually exists. Whether or not this is one of the factors which contributes to the fruitlessness of these measures, the fact that they fail to serve their purpose has led to the decision to refrain from further comment on the hypotheses in which they serve as criterion variables (Hypotheses 1.16-1.21, 3.14-3.17, 5.10-5.15, and 11.5-11.10).

Turning now to the one experimental scale that seemed to successfully measure Cognitive Complexity, the correlations between Cognitive Complexity and the four criterion variables range from .32 to .66 and average .475--all of them significant at the .01 level. The lowest correlation is between the Cognitive Complexity scale

and Rationality. Perhaps this is because those who score very high on the Rationality scale tend to engage in social relationships in a distant and impersonal manner, "cathecting ideas rather than persons" (Stern, Stein, and Bloom, 1954, p. 197). Cognitive complexity as viewed here is postulated to be related to the development of "abstract independence" (Harvey, Hunt, and Schroder's term) on the one hand, but to the development of interdependence on the other. Perhaps, then, the fact that the Rationality scale contains this feature attenuates what would otherwise be a fairly high correlation.

Not only does Cognitive Complexity correlate .66 with the slightly abridged OPI Complexity scale, but it also correlates .43 with Capacity for Status, -.52 with Fear of Negative Evaluation, and .51 with Autonomy. Finally, and this is viewed to be particularly important, its correlations with the Freedom From and Positive items culled from the Complexity, Flexibility, and Autonomy scales are respectively .44 and .80. It seems, then, that this short but positively-oriented scale taps a general factor of cognitive complexity and is suitable to be used as a criterion variable.

Dependency and Independence criterion variables

The correlation between the experimental Dependency and Independence measures and other somewhat more familiar criteria are shown in Table 6.3. The data summarized in this table provide positive but limited support for viewing the four experimental measures as fulfilling their functions.

The correlations between these and Achievement via Conformity and Achievement via Independence are all low--between -.21 and .21. This finding is only partly unexpected; possessing the capacity to

TABLE 6.3

RELATIONSHIP OF EXPERIMENTAL DEPENDENCE AND INDEPENDENCE MEASURES TO OTHER CRITERIA OF DEPENDENCE AND INDEPENDENCE

	Preference for Assigning Dependency	Preference for Evaluating Dependency	Assigning Independence	Evaluating Independence
Dependency	.14	.19	-.03	-.15[b]
Teacher Deciding Alone	.22	.11	-.21	-.25[b]
Preference for Assigning Dependency	1.00	.38[c]	-.41[c]	-.21
Preference for Evaluating Dependency	.38[c]	1.00	-.27[b]	-.34[c]
Achievement via Conformity	-.21	.04	.21	-.09
Achievement via Independence	-.04	-.05[b]	.08	.15[c]
Assigning Independence	-.41[c]	-.27[b]	1.00	.45[c]
Evaluating Independence	-.21	-.34[c]	.45[c]	1.00[b]
Autonomy	-.20	-.18	.28[b]	.30[b]
Alone	-.12	-.18	.28[b]	.10
Withdrawal and Self-Sufficiency	-.18	-.21	.21	.15

[a] $N=63$

[b] $p < .05$

[c] $p < .01$

achieve is not hypothesized to be related to the desire to depend upon or be free from the control of authority figures but the capacity to achieve independently should be related to the desire to be free to pursue one's own ends or evaluate one's work according to one's own criteria.

Since both "Freedom from" and "Freedom to" subjects may have scored high on Assigning and Evaluating Independence, the correlation of either with Achievement via Independence should not be particularly high. On the other hand, it is unlikely that those who shrink from the responsibility of controlling either the assignment or the evaluation process will possess very much of the capacity to achieve independently. Accordingly, the scatter diagram should reflect a small variance at the low end of the Assignment via Independence scale, but a large variance at the high end. This should result in a positive correlation higher than those obtained (.08 and .15).

It will be recalled that in Chapter 4, research was discussed which suggested that the concepts of independence and dependency were somewhat orthogonal to each other depending upon how they are defined. Thus, if the experimental Dependency measures (Preference for Assigning Dependency and Preference for Evaluating Dependency) are correlated with the somewhat more known Independence criterion variables (Autonomy, Alone, and Withdrawal and Self-Sufficiency) and if the experimental Independence measures (Assigning Independence and Evaluating Independence) are correlated with the somewhat more known Dependence criterion variables (Dependency and Teacher Deciding Alone) the resulting correlation coefficients should be small but negative. All ten of them are, ranging from -.03 to -.25 and averaging -.17.

On the other hand, Assigning Independence and Preference for Assigning Dependency were defined in such a way--see Appendix A--that one would expect the negative correlation between them to be higher; similarly, the negative correlation should also be higher between Evaluating Independence and Preference for Evaluating Dependency. The two correlations respectively are -.41 and -.34 both significant at the .01 level.

The correlations of the experimental Dependency measures with the Thelen Dependency measures should be a least moderate and positive. In actuality they are all positive ranging from .11 to .22 and averaging .155; none, however, are significant. It is possible that Thelen's items, which were designed for secondary students, are not valid for college students; but this explanation does not seem very satisfying.

The correlations of the experimental Independence measures with the somewhat more known Independence criterion measures should also be at least moderately positive. Again they are all positive, this time ranging from .10 to .30 and averaging .22. Half of them are significant at the .05 level.

Finally, it was assumed that the assignment component of either dependency or independence would be somewhat distinct from the evaluating component of these two measures. Assigning Independence and Evaluating Independence were defined such that it was impossible for a subject to obtain either the highest possible score on both measures or the lowest possible score on both measures. This definitional artifact should attenuate the correlation between them somewhat. This same artifact, though, should not affect the correlation between

Preference for Assigning Dependency and Preference for Evaluating Dependency, since these two scores were determined on the basis of eight rankings instead of on the basis of only one. The correlation between the members of the former pair is .45 whereas that between the members of the latter pair is .38; both are in line with expectations.

All in all, the results shown in Table 6.3 are, while far from spectacular, at least more encouraging than those shown in Table 6.2. Since the experimental Dependency and Independence measures were all highly focused to measure components of the teacher-student relationship and since the criterion variables with which they were validated were designed to be more diffuse, it seems, in balance, worth retaining these measures for purposes of testing out the hypotheses set forth in Chapter 4.

Construct Validity of Pole Variables

Each pole as an isolated entity

Hypotheses 1.1-1.15, 1.22 and 1.23

All 17 of the criterion variables correlated with Pole 1 (Absolutism) in the directions predicted and fifteen of the correlations turned out to be statistically significant. Specifically, Pole 1 correlated positively at the .01 level with Teacher Deciding Alone, Preference for Evaluating Dependency, Institutionalism-Humanism, Need Achievement, and Social Restraint and Self Control. In addition, Pole 1 correlated negatively at the .01 level with Achievement via Independence, Assigning Independence, Evaluating Independence, Autonomy, Complexity, Non-Stereotypy, Rationality, Flexibility, and Cognitive Complexity. At the .05 level, Pole 1

correlated positively with Fear of Negative Evaluation. The data bearing on these hypotheses are summarized in Table 6.4.

TABLE 6.4

CORRELATIONS OBTAINED BETWEEN POLE 1 (ABSOLUTISM, GLORIFICATION OF AUTHORITY) AND THOSE CRITERION VARIABLES WHICH BEAR ON HYPOTHESES 1.1-1.15, 1.22, AND 1.23

Hypothesis Label	Criterion Variable	Correlation N=63
1.1	Teacher Deciding Alone	.35[d]
1.2	Preference for Assigning Dependency	.24
1.3	Preference for Evaluating Dependency	.38[d]
1.4	Institutionalism-Humanism	.73[d]
1.5	Fear of Negative Evaluation	.30[c]
1.6	Need Achievement	.37[d]
1.7	Social Restraint and Self-Control	.45[d]
1.8	Achievement via Independence	-.43[d]
1.9	Assigning Independence	-.35[d]
1.10	Evaluating Independence	-.39[d]
1.11	Autonomy	-.70[d]
1.12	Complexity	-.50[d]
1.13	Non-Stereotypy	-.73[d]
1.14	Rationality	-.47[d]
1.15	Flexibility	-.54[d]
1.22	Cognitive Complexity	-.48[d]
1.23	Impulse Expression	-.23

[a] Results bearing on hypotheses 1.16-1.21 are not presented here because the experimental criterion variables upon which they were based did not prove valid.

[b] The correlations in the upper portion of the table were predicted to be positive; those in the bottom portion of the table were predicted to be nagative.

[c] $p < .05$

[d] $p < .01$

Hypotheses 2.1-2.15

All 15 of the criterion variables correlated with Pole 2 (Negativism) in the directions predicted and 14 of the correlations turned out to be statistically significant. Specifically, Pole 2 correlated positively at the .01 level with Autonomy, Social Avoidance and Distress, Complexity, Non-Stereotypy, Flexibility, Impulse Expression, and "Freedom From." Pole 2 correlated negatively at the .01 level with Teacher Deciding Alone, Achievement via Conformity, Need Achievement, and Social Restraint and Self Control. At the .05 level, Pole 2 correlated negatively with Preference for Evaluating Dependency, Institutionalism-Humanism, and Locus of Control. The data bearing on these hypotheses as well as on Hypothesis 2.16 are summarized in Table 6.5

Hypotheses 2.16 and 2.17

It was predicted that the correlation between Pole 2 (Negativism) and "Positive" would be somewhat random. Whereas there is no way to confirm a null hypothesis, it is at least possible to determine whether the data seem to conform to expectations. The correlation between these two dimensions turned out to be .22; this is not statistically significant at even the .05 level and therefore could be this large purely by chance. It seems safe to say that Hypothesis 2.16 was not unreasonable.

In passing it should be noted that the fact that Pole 2 correlated .67 with "Freedom From" and only .22 with "Positive" carries important, though self-evident, implications regarding the proper interpretation of the Autonomy, Complexity, and Flexibility scales from which they were drawn.

TABLE 6.5

CORRELATIONS OBTAINED BETWEEN POLE 2 (NEGATIVISM, FREEDOM FROM) AND THOSE CRITERION VARIABLES WHICH BEAR ON HYPOTHESES 2.1-2.16

Hypothesis Label	Criterion Variable	Correlation N=63
2.1	Evaluating Independence	.18
2.2	Autonomy	.48[c]
2.3	Social Avoidance and Distress	.32[c]
2.4	Complexity	.68[c]
2.5	Non-Stereotypy	.47[c]
2.6	Flexibility	.33[c]
2.7	Impulse Expression	.58[c]
2.8	"Freedom From"	.67[c]
2.9	Teacher Deciding Alone	-.35[c]
2.10	Preference for Evaluating Dependency	-.27[b]
2.11	Achievement via Conformity	-.49[c]
2.12	Institutionalism-Humanism	-.25[b]
2.13	Locus of Control	-.26[b]
2.14	Need Achievement	-.60[c]
2.15	Social Restraint and Self-Control	-.45[c]
2.16	"Positive"	.22

[a]The correlations in the upper portion of the table were predicted to be positive; those in the middle portion were predicted to be negative; the one in the bottom portion was predicted to be random (relatively close to zero).

[b] $p < .05$

[c] $p < .01$

It was also predicted that male subjects would score higher on Pole 2 than female subjects. As is clear from the data presented in Table 6.6, this hypothesis is confirmed at the .025 level.

Hypotheses 3.1-3.13 and 3.18-3.21

Out of the 17 criterion variables, 15 correlated with Pole 3 (Field Dependence) in the directions predicted (neither of the other

TABLE 6.6

MEAN SCORES ON POLE 2 (NEGATIVISM) FOR MALE SUBJECTS COMPARED TO FEMALE SUBJECTS

	Males N=27	Females N=36
Mean	106.19	95.42
Standard Deviation	19.65	18.45

[a] $t = 2.19$; $p < .025$

two that correlated in the opposite direction achieved significance), and 11 of these correlations turned out to be statistically significant at the .01 level. Specifically, Pole 3 correlated positively at the .01 level with Institutionalism-Humanism, Fear of Negative Evaluation, Need Achievement, and Social Restraint and Self Control. Pole 3 correlated negatively at the .01 level with Achievement via Independence, Evaluating Independence, Autonomy, Complexity, Flexibility, Cognitive Complexity, and Capacity for Status. The data bearing on these hypotheses are summarized in Table 6.7.

The unusually high correlation of .90 between Pole 3 and Fear of Negative Evaluation is partially explained by the fact that 8 out of the 17 items on the Pole 3 scale are included in the Fear of Negative Evaluation scale. This appears to be the major characteristic which Pole 3 measures.

Hypotheses 4.1-4.9

Out of the 9 criterion variables, 8 correlated with Pole 4 (Self-Absorption) in the directions predicted (the remaining variable which correlated in the opposite direction did not achieve signifi-

TABLE 6.7

CORRELATIONS OBTAINED BETWEEN POLE 3(FIELD DEPENDENCE, SOCIAL ANXIETY) AND THOSE CRITERION VARIABLES WHICH BEAR ON HYPOTHESES 3.1-3.13 AND 3.18-3.21

Hypothesis Label	Criterion Variable	Correlation N=63
3.1	Dependency	.18
3.2	Preference for Evaluating Dependency	.19
3.3	Institutionalism-Humanism	.33[c]
3.4	Fear of Negative Evaluation	.90[c]
3.5	Need Achievement	.44[c]
3.6	Social Restraint and Self-Control	.50[c]
3.7	Achievement via Independence	-.37[c]
3.8	Evaluating Independence	-.38[c]
3.9	Autonomy	-.48[c]
3.10	Alone	.04
3.11	Withdrawal and Self-Sufficiency	.16
3.12	Complexity	-.61[c]
3.13	Flexibility	-.62[c]
3.18	Cognitive Complexity	-.58[c]
3.19	Capacity for Status	-.37[c]
3.20	Threat	-.21
3.21	Impulse Expression	-.22

[a]Results bearing on Hypotheses 3.14-3.17 are not presented here because the experimental criterion variables upon which they were based did not prove valid.

[b]The correlations in the upper portion of the table were predicted to be positive; those in the lower portion were predicted to be negative.

[c]$p < .01$

cance), and 4 of these correlations turned out to be statistically significant. At the .01 level, Pole 4 correlated .68 with Withdrawal and Self-Sufficiency (Note that 7 out of the 9 items on the Pole 4 scale are from the 10-item Withdrawal and Self-Sufficiency scale). At the .05 level, Pole 4 correlated negatively with Preference for

Assigning Dependency, Preference for Evaluating Dependency, and Institutionalism-Humanism. The data bearing on these hypotheses are summarized in Table 6.8.

TABLE 6.8

CORRELATIONS OBTAINED BETWEEN POLE 4 (SELF-ABSORPTION, FREEDOM FROM) AND THOSE CRITERION VARIABLES WHICH BEAR ON HYPOTHESES 4.1-4.9

Hypothesis Label	Criterion Variable	Correlation N=63
4.1	Achievement via Independence	-.22
4.2	Assigning Independence	.23
4.3	Evaluating Independence	.22
4.4	Alone	.12
4.5	Withdrawal and Self-Sufficiency	.68[c]
4.6	Locus of Control	.07
4.7	Preference for Assigning Dependency	-.30[b]
4.8	Preference for Evaluating Dependency	-.27[b]
4.9	Institutionalism-Humanism	-.30[b]

[a]The correlations in the upper portion of the table were predicted to be positive; those in the lower portion were predicted to be negative.

[b] $p < .05$

[c] $p < .01$

Hypotheses 5.1-5.9 and 5.16-5.20

All of the 14 criterion variables correlated positively with Pole 5 (Interdependence) as predicted and 11 of these turned out to be statistically significant. At the .01 level, Pole 5 correlated positively with Assigning Independence, Alone, Mutual, Cognitive Complexity, Threat, and Active. At the .05 level, Pole 5 correlated positively with Achievement via Iddependence, Evaluating Independence,

Non-Stereotypy, Rationality, and Vigorous Action and the Overcoming of Obstacles. The data bearing on these hypotheses are summarized in Table 6.9.

TABLE 6.9

CORRELATIONS OBTAINED BETWEEN POLE 5 (ACTIVE INTERDEPENDENCE, COLLABORATION) AND THOSE CRITERION VARIABLES WHICH BEAR ON HYPOTHESES 5.1-5.9 AND 5.16-5.20

Hypothesis Label	Criterion Variable	Correlation N=63
5.1	Achievement via Independence	.27[c]
5.2	Assigning Independence	.35[d]
5.3	Evaluating Independence	.29[c]
5.4	Alone	.48[d]
5.5	Mutual	.48[d]
5.6	Complexity	.09
5.7	Non-Stereotypy	.30[c]
5.8	Rationality	.26[c]
5.9	Flexibility	.19
5.16	Cognitive Complexity	.32[d]
5.17	Threat	.35[d]
5.18	Active	.45[d]
5.19	Locus of Control	.10
5.20	Vigorous Action and the Overcoming of Obstacles	.30[c]

[a]Results bearing on Hypotheses 5.10-5.16 are not presented here because the experimental criterion variables upon which they were based did not prove valid.

[b]All of the correlations were predicted to be positive.

[c]$p < .05$

[d]$p < .01$

Pole intercorrelations

Before moving on to the next set of hypotheses, data will be presented showing the relationships among the poles: Table 6.10 contains the relevant correlation matrix. The pole intercorrelations

TABLE 6.10

POLE INTERCORRELATIONS

	Pole 1 Absolutism	Pole 2 Negativism	Pole 3 Field Dependence	Pole 4 Self-Absorption	Pole 5 Inter-Dependence
Pole 2	-.45	1.00	-.30	.05	-.17
Pole 3	.43	-.30	1.00	-.01	-.01
Pole 4	-.13	.05	-.01	1.00	.12
Pole 5	-.26	-.17	-.01	.12	1.00

confirm expectations. It was hoped that pole scales could be found that would correlate virtually zero with all the other pole scores, but the number of items available in the original item pool plus the nature of the dimensions themselves precluded this from happening. Thus, since Pole 2 is a rejection of anything that resembles Pole 1, the correlation almost has to be negative. The fact that those who score high on Pole 1 endorse S-items and reject N-items while those who score high on Pole 2 do the reverse makes this practically inevitable. Below are 3 items that contributed to the Pole 1 scale which correlate high enough with Pole 2 when scored in the opposite direction to qualify as candidates for Pole 2. In each case, the response which correlates positively with Pole 1 is given first, then its correlation with Pole 1, and finally the magnitude of its negative correlation with Pole 2.

Parents are much too easy on their children nowadays. (True, .77, .46)
I would rather be a steady and dependable worker than a brilliant but unstable one. (True, .61, .47)
Students are frequently justified in violating school regulations. (False, .51, .40)

Furthermore, as was mentioned in Chapter 5, it was presumed

to be a difficult task to select items which discriminated Pole 3 from Pole 1. Here, for example, are three items that contributed to the Pole 1 scale which correlate high enough with Pole 3 when scored in the same direction to be included in it. As before, the response which correlates positively with Pole 1 is given first, then its correlations with Poles 1 and 3 respectively.

It is often necessary to remind pupils that their status in school differs from that of teachers. (Strongly Agree, .68, .43)

One of the major causes of juvenile delinquency in that parents are too easy on their children nowadays. (True, .74, .49)

I would rather be a steady dependable worker than a brilliant but unstable one (True, .61, .49)

The correlation of -.30 between Pole 2 and Pole 3 can partly be explained by the fact that both of them correlate over .40 in magnitude with Pole 1. The correlations between all the poles and Poles 4 and 5 are low enough to be considered desirable with the possible exception of that between Poles 1 and 5. This correlation, -.26, is between the least and most developmentally advanced poles. It certainly isn't upsetting to find a negative correlation between them, given that the variance in one accounts for less than 7 per cent of the variance in the other.

Conclusion

All in all, the above results suggest that the pole scales accomplish their purpose reasonably well. In light of the large number of statistically significant and sometimes fairly sizable correlations, the few that did not achieve significance can be viewed as providing sharper clarity on exactly what the pole scales are not measuring. The magnitudes of the correlations between the poles

and their respective criterion variables are not uniformly high, but then, subjects who had differentiated Pole X from Pole Y were included with those who had not differentiated the former from the latter but who had received the identical Pole X score. The predictions that were made regarding the differences between subjects who had differentiated one pole from another and those who had not will be explored now.

Differentiated poles vs. undifferentiated poles

In this section, the comparisons are always between criterion variable means for subjects who are open to Pole X and who have differentiated Pole X from Pole Y and criterion variable means for those who are open to Pole X but who have not differentiated Pole X from Pole Y.

Hypotheses 6.1-6.6

When the mean scores on the criterion variables of those subjects who are open to Pole 2 (Negativism) but who have not differentiated it from Pole 1 (Absolutism) are subtracted from the mean scores of those who have, all six of the differences are in the predicted directions and four of these are significant. Specifically, from the group of subjects who were open to Pole 2, in comparision to those who had not differentiated Pole 2 from Pole 1, those who had done so scored significantly higher on the Complexity, Non-Stereotypy, and Flexibility scales, and significantly lower on the Need Achievement scales. The data bearing on these hypotheses are contained in Table 6.11.

Hypotheses 7.1-7.4

When the mean scores on the criterion variables of those

TABLE 6.11

COMPARISON OF CRITERION VARIABLE MEANS FOR SUBJECTS WHO HAVE AND THOSE WHO HAVE NOT DIFFERENTIATED POLE 2 (NEGATIVISM) FROM POLE 1 (ABSOLUTISM)

	Pole 2 is Open				
	Pole 2 is differentiated from Pole 1. N=16		Pole 2 is not differentiated from Pole 1. N=4		
	Mean	S.D.	Mean	S.D.	
Autonomy	25.06	3.17	22.50	4.65	N.S.
Institutionalism-Humanism	39.50	3.50	46.50	4.73	N.S.
Complexity	17.94	3.57	12.25	2.22	$p < .005$
Non-Stereotypy	67.50	7.14	57.25	9.43	$p < .025$
Flexibility	15.31	4.29	10.50	3.11	$p < .05$
Need Achievement	1.44	.81	3.00	2.58	$p < .05$

[a] In each comparison, the mean that is underlined was predicted to be the larger.

subjects who are open to Pole 3 (Field Dependency) but who have not differentiated it from Pole 1 (Absolutism) are subtracted from the mean scores of those who have, all four of the differences are both in the predicted directions and statistically significant. Specifically, from the group of subjects who were open to Pole 3, in comparison to those who had not differentiated Pole 3 from Pole 1, those who had done so scored significantly higher on the Assigning Independence, Non-Stereotypy, and Rationality scales, and significantly lower on the Preference for Assigning Dependency scale. The data bearing on these hypotheses are contained in Table 6.12.

TABLE 6.12

COMPARISON OF CRITERION VARIABLE MEANS FOR SUBJECTS WHO HAVE AND THOSE WHO HAVE NOT DIFFERENTIATED POLE 3 (FIELD DEPENDENCE) FROM POLE 1 (ABSOLUTISM)

	Pole 3 is Open				
	Pole 3 is differentiated from Pole 1. N=11		Pole 3 is not differentiated from Pole 1. N=13		
	Mean	S.D.	Mean	S.D.	
Preference for Assigning Dependency	6.00	2.10	<u>7.31</u>	1.38	$p < .05$
Assigning Independence	<u>6.64</u>	1.75	4.92	2.60	$p < .05$
Non-Stereotypy	<u>67.55</u>	7.27	51.85	7.91	$p < .005$
Rationality	<u>70.09</u>	9.32	61.77	8.46	$p < .025$

[a] In each comparison the mean that is underlined was predicted to be the larger.

Hypotheses 8.1-8.8

When the mean scores on the criterion variables of those subjects who are open to Pole 4 (Self-Absorption) but who have not differentiated it from Pole 2 (Negativism) are subtracted from the mean scores of those who have, 6 out of 8 differences are in the predicted directions and four of them are statistically significant. Specifically, from the group of subjects who were open to Pole 4, in comparison to those who had not differentiated Pole 4 from Pole 2, those who had done so scored significantly higher on the Achievement

via Conformity, Need Achievement, and Social Restraint and Self-Control scales and significantly lower on the Impulse Expression scale. The data that bear on these hypotheses are summarized in Table 6.13.

TABLE 6.13

COMPARISON OF CRITERION VARIABLE MEANS FOR SUBJECTS WHO HAVE AND THOSE WHO HAVE NOT DIFFERENTIATED POLE 4 (SELF-ABSORPTION) FROM POLE 2 (NEGATIVISM)

	Pole 4 is Open				
	Pole 4 is differentiated from Pole 2. N=15		Pole 4 is not differentiated from Pole 2. N=9		
	Mean	S.D.	Mean	S.D.	
Achievement via Conformity	<u>27.20</u>	3.26	23.89	2.47	P=.01
Achievement via Independence	<u>21.00</u>	4.58	21.22	4.32	N.S.
Withdrawal and Self-Sufficiency	<u>43.47</u>	3.11	43.78	2.77	N.S.
Non-Stereotypy	58.20	8.03	<u>62.56</u>	8.99	N.S.
Locus of Control	<u>9.13</u>	4.05	7.33	3.00	N.S.
Need Achievement	<u>4.60</u>	2.06	1.56	1.88	$p < .005$
Social Restraint & Self-Control	<u>35.60</u>	6.91	28.78	6.02	$p < .025$
Impulse Expression	23.73	6.52	<u>33.33</u>	3.04	$p < .005$

[a] In each comparison, the mean that is underlined was predicted to be the larger.

Hypotheses 9.1-9.14

When the mean scores on the criterion variables of those subjects who are open to Pole 5 (Interdependence) but who have not

differentiated it from Pole 3 (Field Dependence) are subtracted from the mean scores of those who have, all 14 of the differences are in the predicted directions and 8 of these are statistically significant. In particular, from the group of subjects who were open to Pole 5, in comparison to those who had not differentiated Pole 5 from Pole 3, those who had done so scored significantly higher on the Alone, Rationality, Flexibility, Capacity for Status, Threat, and Impulse Expression scales and significantly lower on the Social Avoidance and Distress and Fear of Negative Evaluation scales. The data that bear on these hypotheses are summarized in Table 6.14.

Hypotheses 10.1-10.5

When the mean scores on the criterion variables of those subjects who are open to Pole 5 (Interdependence) but who have not differentiated it from Pole 4 (Self-Absorption) are subtracted from the mean scores of those who have, all 5 of the differences are in the predicted directions and three of them are statistically significant. In particular, from the group of subjects who were open to Pole 5, in comparison to those who had not differentiated Pole 5 from Pole 4, those who had done so scored significantly higher on the Mutual, Dominance, and Impulse Expression scales. The data bearing on these hypotheses are summarized in Table 6.15.

Conclusion

In general, the data presented in this section support the concept of "differentiated" poles being different in significant and important ways from "undifferentiated" poles. The overwhelming majority of differences were in the direction predicted and a substantial

TABLE 6.14

COMPARISON OF CRITERION VARIABLE MEANS FOR SUBJECTS WHO HAVE AND THOSE WHO HAVE NOT DIFFERENTIATED POLE 5 (INTERDEPENDENCE) FROM POLE 3 (FIELD DEPENDENCE)

	Pole 5 is Open				
	Pole 5 is differentiated from Pole 3. N=13		Pole 5 is not differentiated from Pole 3 N=5		
	Mean	S.D.	Mean	S.D.	
Achievement via Independence	23.31	2.75	21.00	3.24	N.S.
Evaluating Independence	7.00	.41	6.00	2.35	N.S.
Autonomy	25.08	3.03	22.80	3.56	N.S.
Alone	75.15	7.41	64.20	4.92	$p < .01$
Institutionalism-Humanism	36.46	8.20	42.20	7.53	N.S.
Mutual	40.69	2.53	37.80	5.26	N.S.
Social Avoidance and Distress	4.69	5.95	11.60	4.72	$p < .025$
Rationality	73.77	7.70	65.00	6.40	$p = .025$
Flexibility	14.77	3.47	11.60	1.52	$p < .05$
Dominance	29.92	5.66	26.20	6.76	N.S.
Capacity for Status	22.15	2.54	17.40	2.41	$p < .005$
Threat	36.08	4.46	27.20	6.53	$p < .005$
Fear of Negative Evaluation	8.08	5.63	19.40	4.72	$p < .005$
Impulse Expression	29.46	6.83	22.80	6.38	$p < .025$

[a]In each comparison, the mean that is underlined was predicted to be the larger.

number of these were statistically significant to different degrees despite the small number of cases which qualified for analysis. The construct validity of the poles seems to be high enough to warrant proceeding to the final section in this chapter which deals with

TABLE 6.15

COMPARISON OF CRITERION VARIABLE MEANS FOR SUBJECTS WHO HAVE AND THOSE WHO HAVE NOT DIFFERENTIATED POLE 5 (INTERDEPENDENCE) FROM POLE 4 (SELF-ABSORPTION)

	Pole 5 is Open				
	Pole 5 is differentiated from Pole 4. N=9		Pole 5 is not differentiated from Pole 4. N=9		
	Mean	S.D.	Mean	S.D.	
Withdrawal and Self-Sufficiency	37.78	6.24	43.67	2.60	N.S.
Mutual	41.44	2.65	38.33	3.84	$p < .05$
Dominance	31.67	4.77	26.11	6.09	$p < .05$
Threat	36.22	4.12	31.00	7.38	N.S.
Impulse Expression	31.44	5.39	23.78	6.94	$p < .05$

[a] In each comparison, the mean that is underlined was predicted to be the larger.

questions concerning the sequence of development.

Developmental significance

This section contains the data which bear upon the most important and most interesting hypotheses, those relevant to the question: Are the poles only ordinary dimensions or do they have the developmental significance asserted? The bulk of the predictions which have developmental significance had to do with Purepole, Fusion, and Alloypole. It will be recalled that some variables were thought to correlate highest of the three with Purepole, others with Fusion, and none of the selected variables were supposed to correlate highest with

Alloypole. The data that bear on these predictions appear in Table 6.16. In each row, the correlation hypothesized to be the highest is underlined.

TABLE 6.16

RELATIONSHIP OF PUREPOLE, FUSION, AND ALLOYPOLE TO CRITERION VARIABLES HYPOTHESIZED TO CORRELATE WITH ONE OF THEM

Criterion Variables	Purepole N=26	Fusion N=31	Alloypole N=47
Teacher Deciding Alone	-.25	-.33	-.11
Preference for Assigning Dependency	-.38	-.33	-.22
Preference for Evaluating Dependency	-.48[b]	-.38[b]	-.31[b]
Achievement via Independence	.30	.38[bd]	.33[b]
Assigning Independence	.51[c d]	.47[c]	.38[c]
Evaluating Independence	.31	.36[bd]	.33[b]
Autonomy	.38	.56[cd]	.37[c]
Alone	.57[cd]	.57[c]	.46[c]
Institutionalism-Humanism	-.41[b]	-.53[cd]	-.46[c]
Mutual	.57[cd]	.50[c]	.47[c]
Social Avoidance and Distress	-.40[bd]	-.26	-.29[b]
Complexity	.01	.24	.11
Non-Stereotypy	.43[b]	.59[cd]	.38[c]
Rationality	.40[b]	.49[c]	.47[c]
Flexibility	-.01	.20	.13
Cognitive Complexity	.35	.47[c]	.39[c]
Dominance	.42[bd]	.26	.33[b]
Capacity for Status	.49[bd]	.48[c]	.41[c]
Threat	.52[c d]	.41[b]	.41[c]
Active	.50[c d]	.36[b]	.35[b]
Impulse Expression	.36	.42[bd]	.16
Positive	.29	.42[b]	.32[b]

[a] In each row, the correlation which is underlined was hypothesized to be larger than the others.

[b] $p<.05$

[c] $p<.01$

[d] The hypothesis receives support.

Hypotheses 11.1-11.4 and 11.11-11.18

Focusing first on those hypothesized to correlate highest with Purepole, all 12 of the variables correlated in the predicted directions. Nine of these correlations were statistically significant, and 8 were indeed larger than the respective correlations of the criterion variables with either Fusion or Alloypole. The variables which fulfilled both criteria and correlated with Purepole positively were Assigning Independence, Alone, Mutual, Dominance, Capacity for Status, Threat, and Active. Two variables fulfilled both criteria and correlated negatively with Purepole, namely, Social Avoidance and Distress and Preference for Evaluating Dependency; the latter variable had been predicted to correlate highest with Fusion. Assuming that the attributes measured by the above variables actually do increase or decrease monotonically with development, the assertion that Purepole, and therefore the pole scales approach, has developmental significance receives impressive support.

Hypotheses 12.1-12.10

Of the variables expected to correlate highest with Fusion, all ten correlated in the predicted directions. Seven of these correlations were statistically significant, and six were indeed larger than the respective correlations of the criterion variables with either Purepole or Alloypole. The only variable to fulfill both criteria and correlate negatively with Fusion was Institutionalism-Humanism. The variables which fulfilled both criteria and correlated positively with Fusion included Achievement via Independence, Evaluating Independence, Autonomy, Non-Stereotypy, Impulse Expression, Rationality, Cognitive Complexity, and the composite scale containing

"Positive" items; the last three variables had been predicted to correlate highest with Purepole. Again, assuming that the attributes discussed in this section actually increase or decrease with development on an overall basis, and undergo up-and-down swings along the way, the data again support the notion that the pole scale approach has developmental significance.

Hypothesis 13.1

The correlation between the Developmental Maturity and Purepole-equivalent scales was .40, which, since only 25 subjects were included in the analysis, is barely significant at the .05 level. Given the inadequacy of the Purepole-equivalent scale as a criterion variable, however, Hypothesis 13.1 received reasonable support. Thus, the Developmental Maturity scale seems indeed to be measuring the extent of development on a single dimension.

An analysis of the Developmental Maturity scale items was conducted to identify the more promising items for the purpose of revising the scale. Only those items were retained which not only correlated in the same direction with both Purepole and Purepole-equivalent, but also which accounted for at least 5 per cent of the Purepole-equivalent scale variance. The latter criterion was sufficiently lenient to allow several items whose correlations with Purepole-equivalent had failed to achieve significance to be retained for further testing; this seemed a necessary step given the inadequacy of the Purepole-equivalent scale as a criterion of effectiveness for the items.

Out of the original 54 items, 19 were retained. The magnitude of the correlations of these 19 items with Purepole-equivalent

ranged from .23 to .57 and averaged .38. These items constitute a revised Developmental Maturity scale and are shown in Appendix F. Some uses of this scale are suggested in Chapter 7.

Hypothesis 14.1

Altogether, there are ten possible pole pairings (1-2, 1-3, 1-4, 1-5, 2-3, 2-4, 2-5, 3-4, 3-5, and 4-5). Since all of the poles have the same mean and standard deviation (See Chapter 5), if chance were the only process operating, each pole pairing should occur with equal frequency. The extrapolated Harvey et al. rival hypothesis asserts that only four of these (1-2, 2-3, 3-4, and 4-5) will occur. Approximately 40 per cent of those individuals who are only open to two poles should be open to the above pairings on the basis of chance alone. If the extrapolated Harvey et al. hypothesis is correct, 100 per cent of such individuals should be open to these pairings.

The dimensional approach claimed no such exclusiveness; Hypothesis 14.1 properly predicted that there should be more pairings falling into the 5 categories (1-2, 1-3, 2-4, 3-5, and 4-5) than can be explained by chance alone; if chance were the only factor, the prediction would be that 50 per cent of the subjects open to only two poles would be included in the above categories. The data which bear on these three explanations (Unidimensional Development, Multidimensional Development, and Chance) are presented in Table 6.17.

Forty per cent of the subjects are open to the pairings mentioned in the Unidimensional Development (extrapolated Harvey et al.) prediction, exactly the percentage predicted by chance. On the other hand, 70 per cent of the subjects are open to the pairings

TABLE 6.17

NUMBER OF SUBJECTS OPEN TO ALL POSSIBLE PAIRINGS OF TWO POLES

	Pole 1 Absolutism	Pole 2 Negativism	Pole 3 Field Dependence	Pole 4 Self-Absorption
Pole 2 Negativism	0[bc]			
Pole 3 Field Dependence	6[c]	3[b]		
Pole 4 Self-Absorption	0	4[c]	1[b]	
Pole 5 Interdependence	0	2	0[c]	4[bc]

[a] N = 20

[b] The pairings into which all subjects should fit according to the Unidimensional Development (extrapolated Harvey et al.) prediction.

[c] The pairings likely to be most common according to the Multidimensional Development (Eiseman) prediction.

labeled most likely by the Multidimensional Development (Hypothesis 14.1) prediction; since the probability of finding a percentage as large or larger than 70 by chance is .0576 (or a little less than 1 out of 17), the 20 per cent difference is a little too small to achieve statistical significance.

Summary of Findings

The data suggest that the five poles have considerable validity both as isolated "personality" dimensions and, when used in combination, as attribute predictors. It is debatable as to whether or not the data supporting the latter usage can be interpreted on

its own strength as evidence for claiming that the poles have developmental significance. However, the predictions based on constructs derived from arranging subjects who fit various ideal-type definitions along an alleged developmental continuum were confirmed in sufficient number to provide considerable credence to the theoretical stance set forth.

But as Dewey pointed out, the value of ideas and findings should be measured by the significance of what they suggest. Accordingly, let us move on to the final chapter in which some implications of the above are mentioned both for application to the education of teachers and for future research.

CHAPTER SEVEN

IMPLICATIONS FOR USE OF THE POLE SCALES AND FOR FURTHER RESEARCH

Implications for Diagnosis

Now that the basic assumptions underlying the theory seem to have received support from the data, it is time to describe the implications in more detail. To increase the probability that a future teacher will make maximum progress toward becoming an actively interdependent, mature collaborator with his future colleagues and students, the cognitive theory postulated here implies that those charged with his preparation should establish the priorities listed in Table 7.1.

TABLE 7.1

PRIORITIZED INSTRUCTIONAL TASKS GIVEN THAT THE MOST DEVELOPMENTALLY ADVANCED POLE OPEN HAS BEEN IDENTIFIED

1. Differentiate Pole N from Pole N-2
2. Differentiate Pole N from Pole N-1
3. Differentiate Pole N+1 from Pole N-1
4. Differentiate Pole N+1 from Pole N

[a]"Pole N" refers to the most developmentally advanced pole which is open.

Several steps in the diagnostic process are implicit in Table 7.1: the instructor must first identify the most developmentally advanced pole open. Then he should go through the list, one task at a time, determining whether or not the task needs doing. As soon as he

finds one that still needs to be done, he should design a way to help the student make progress toward its accomplishment.

A flow chart describing the steps leading to the identification of a diagnostic pattern is contained in Table 7.2. A list of the fifteen diagnostic patterns, each containing a description of the pole profile, a statement of the instructional task, and recommendations for designing the conditions conducive to accomplishing the task, appears in Table 7.3.

An assumption consistent with the position taken in Chapter 3 and implicit in Table 7.3 needs to be made explicit; viz., that the optimal way to induce an individual to make a particular differentiation is to provide him with the freedom to choose between two alternatives; the alternatives should be selected so that the distinction between them is great enough to be perceived by the individual but small enough to make the choice a challenging one; the challenge should arise from the more developmentally advanced alternative (which, given his cognitive structure, he is less predisposed to prefer) containing features which intrigue him to the point where he experiences conflict; finally, the conflict should be one in which the more developmentally advanced alternative would seem to him to have a comparative advantage sufficient to offset his predisposition so that in the long run he would be expected to counteract his predisposition at least a substantial minority of the time.

Applications of Diagnostic Information

An example might help to clarify how Table 7.2 and Table 7.3 should be used. Let us take Andrew Weil as our subject, a future

TABLE 7.2

DETERMINATION OF DIAGNOSTIC PATTERN FROM POLE PROFILE DATA

	Most Developmentally Advanced Pole Open														
	1 Absolutism	2 Negativism			3 Field Dependence				4 Self-Absorption				5 Interdependence		
Is N[a] differentiated from N-2?	No N-2 exists	No N-2 exists			3D1			3N1	4D2			4N2	5D3		5N3
Is N differentiated from N-1?	No N-1 exists	2D1[c]		2N1[d]	3D2		3N2	--	4D3		4N3	--	5D4	5N4	--
Is N+1 differentiated from N-1?[g]	No N-1 exists	3D1	3N1	--[e]	4D2	4N2	--	--	5D3	5N3	--	--	--	--	--
Diagnostic Pattern	A[b]	B	C	D	E	F	G	H	I	J	K	L	M	N	O

FOOTNOTES TO TABLE 7.2

[a]N refers to the most developmentally advanced pole open; if no pole is open, N should refer to the pole with the highest score.

[b]The letters in the bottom row identify diagnostic patterns which are explained in Table 7.3.

[c]"2D1" means "Pole 2 is differentiated from Pole 1."

[d]"2N1" means "Pole 2 is not differentiated from Pole 1."

[e]"--" means that there is no point in answering this question since the diagnostic pattern has already been determined.

[f]To read this table, find the column headed by the most developmentally advanced pole open and answer the questions in each row starting with the first and working down. The letter in the last column identifies the diagnostic pattern.

[g]Here, differentiation does not imply what it does in all other contexts, that Pole N+1 is open; by definition, Pole N+1 is closed.

TABLE 7.3

ANALYSIS AND RECOMMENDATIONS

Analysis	Recommendation
Diagnosis A	
Pole 1 (Absolutism) is the most developmentally advanced pole open. The instructional task is to differentiate Pole 2 (Negativism), which is closed, from Pole 1.	Create conditions where the individual must choose between Pole 2 and Pole 1 so that any of Pole 2's threatening elements have been eliminated or reduced to a minimum to the extent that Pole 2 might have a comparative advantage.
Diagnosis B	
Pole 2 (Negativism) is the most developmentally advanced pole open and it is differentiated from Pole 1 (Absolutism). Further, Pole 3 (Field Dependence) is also differentiated from Pole 1[b]. The instructional task, then, is to differentiate Pole 3, which is closed, from Pole 2	Create conditions where the individual must choose between Pole 3 and Pole 2 so that any of Pole 3's threatening elements have been eliminated or reduced to a minimum to the extent that Pole 3 might have a comparative advantage.
Diagnosis C	
Pole 2 (Negativism) is the most developmentally advanced pole open and it is differentiated from Pole 1 (Absolutism). Pole 3 (Field Dependence), however, is not differentiated from Pole 1. The first instructional task is to create conditions conducive to this differentiation.	Since Pole 3 is closed, whatever elements appear to be threatening should be eliminated or reduced to a minimum. The student should be presented with a series of choices between Pole 3 and Pole 1 where the discriminations become progressively more subtle, with Pole 3 having a comparative advantage.

TABLE 7.3--Continued

Analysis	Recommendation
Diagnosis D	
Pole 2 (Negativism) is the most developmentally advanced pole open; it is not, however, differentiated from Pole 1 (Absolutism). The instructional task is to induce this differentiation.	Because Pole 2 is open, the objective of inducing differentiation between Pole 2 and Pole 1 should be achievable without too much concern for the level of threat. The student should be provided with a series of choices such that he can react against some of the aspects which may concern him about Pole 1.
Diagnosis E	
Pole 3 (Field Dependence) is the most developmentally advanced pole open and it is differentiated from both Pole 1 (Absolutism) and Pole 2 (Negativism)[a]. Further, Pole 4 (Self-Absorption) is differentiated from Pole 2. The instructional task, then, is to differentiate Pole 4, which is closed, from Pole 3[a].	Create conditions where the individual must choose between Pole 4 and Pole 3 so that any of Pole 4's threatening elements have been eliminated or reduced to a minimum to the extent that Pole 4 might have a comparative advantage.
Diagnosis F	
Pole 3 (Field Dependence) is the most developmentally advanced pole open and it is differentiated from both Pole 1 (Absolutism) and Pole 2 (Negativism)[a]. Pole 4 (Self-Absorption), however, is not differentiated from Pole 2. The first instructional task is to create conditions conducive to this differentiation.	Since Pole 4 is closed, whatever elements appear to be threatening should be eliminated or reduced to a minimum. The student should be presented with a series of choices between Pole 4 and Pole 2 where the discriminations become progressively more subtle, with Pole 4 having a comparative advantage.

TABLE 7.3--Continued

Analysis	Recommendation
Diagnosis G	
Pole 3 (Field Dependence) is the most developmentally advanced pole open and it is differentiated from Pole 1 (Absolutism); it is not, however, differentiated from Pole 2[a]. It is unlikely that the individual will develop openness to Pole 4 (Self-Absorption) unless Pole 3 is differentiated from Pole 2. The instructional task is to induce the latter differentiation.	Because Pole 3 is open, the objective of inducing differentiation between Pole 3 and Pole 2 should be achievable without too much concern for the level of threat. The student should be provided with a series of choices such that he can react against some of the aspects which may concern him about Pole 2.
Diagnosis H	
Pole 3 (Field Dependence) is the most developmentally advanced pole open but Pole 3 is not differentiated from Pole 1 (Absolutism). Because Pole 3 is not differentiated from its more primitive form, the individual is less likely to be able to differentiate Pole 4 (Self-Absorption) from Pole 2 (Negativism), since the latter differentiation is facilitated by the distinction between Pole 3 and Pole 1 achieving clarity. The instructional task, then, is to induce the differentiation of Pole 3 from Pole 1.	Because Pole 3 is open, the objective of inducing differentiation between Pole 3 and Pole 1 should be achievable without too much concern for the level of threat. Most important is that the student be presented with a series of choices where the discriminations become progressively more subtle, but are within his range of possibility.
Diagnosis I	
Pole 4 (Self-Absorption) is the most developmentally advanced pole open and it is differentiated from both Pole 2 (Negativism) and Pole 3 (Field Dependence)[a]. Further, Pole 5 (Interdependence) is differentiated from Pole 3[b]. The instructional task, is to differentiate Pole 5 from Pole 4.	Create conditions where the individual must choose between Pole 5 and Pole 4 so that any of Pole 5's threatening elements have been eliminated or reduced to a minimum to the extent that Pole 5 might have a comparative advantage.

TABLE 7.3--Continued

Analysis	Recommendation
Diagnosis J	
Pole 4 (Self-Absorption) is the most developmentally advanced pole open and it is differentiated from both Pole 2 (Negativism) and Pole 3 (Field Dependence)[a]. Pole 5, however, is not differentiated from Pole 3. The first instructional task is to create conditions conducive to this differentiation.	Since Pole 5 is closed, whatever elements appear to be threatening should be eliminated or reduced to a minimum. The student should be presented with a series of choices between Pole 5 and Pole 3 where the discriminations become progressively more subtle, with Pole 5 having a comparative advantage.
Diagnosis K	
Pole 4 (Self-Absorption) is the most developmentally advanced pole open and it is differentiated from Pole 2 (Negativism). It is not, however, differentiated from Pole 3 (Field Dependence)[a]. It is unlikely that the individual will develop openness to Pole 5 (Interdependence) unless Pole 4 is differentiated from Pole 3. The instructional task, then, is to induce this differentiation.	Because Pole 4 is open, the objective of inducing differentiation between Pole 4 and Pole 3 should be achievable without too much concern for the level of threat. The student should be provided with a series of choices such that he can react against some of the aspects which may concern him about Pole 3.
Diagnosis L	
Pole 4 (Self-Absorption) is the most developmentally advanced pole open but it is not differentiated from Pole 2 (Negativism). Because Pole 4 is not differentiated from its more primitive form, the individual is less likely to be able to differentiate Pole 5 (Interdependence) from Pole 3 (Field Dependence), since the latter differentiation is facilitated by the distinction between Pole 4 and Pole 2 achieving clarity. The instructional task is to induce the differentiation of Pole 4 from Pole 2.	Because Pole 4 is open, the the objective of inducing differentiation between Pole 4 and Pole 2 should be achievable without too much concern for the level of threat. Most important is that the student be presented with a series of choices where the discriminations become progressively more subtle, but are within his range of possibility.

TABLE 7.3--Continued

Analysis	Recommendation
Diagnosis M	
The individual has differentiated Pole 5 (Interdependence) from both Pole 3 (Field Dependence) and Pole 4 (Self-Absorption). The instructional task is to enhance his current Pole 5 functioning.	Enlist his involvement in designing activities which will challenge him to stretch his capacity. Such activities should require him to utilize his own intelligence as well as to draw upon and stimulate that of others.
Diagnosis N	
Pole 5 (Interdependence) is open and it is differentiated from Pole 3 (Field Dependence). It is not, however, differentiated from Pole 4 (Self-Absorption). In order to increase the individual's capacity to profit from the experience and experiences of others, the instructional task is to induce the differentiation of Pole 5 from Pole 4.	Because Pole 5 is open, the objective of inducing differentiation between Pole Pole 5 and Pole 4 should be achievable without too much concern for the level of threat. The student should be provided with a series of choices such that he can react against some of the aspects which may concern him about Pole 4.
Diagnosis O	
Pole 5 (Interdependence) is open but it is not differentiated from Pole 3 (Field Dependence). To increase the individual's capacity to play a more active and more self-directed role, the instructional task is to induce the differentiation of Pole 5 from Pole 3.	Because Pole 5 is open, the objective of inducing differentiation between Pole 5 and Pole 3 should be achievable without too much concern for the level of threat. Most important is that the student be presented with a series of choices where the discriminations become progressively more subtle, but are within his range of possiblity.

[a]The "differentiation" of either Pole 3 (Field Dependence) from Pole 2 (Negativism) or of Pole 4 (Self-Absorption) from Pole 3 is not a differentiation in the usual sense that the individual must learn (or has learned) to discriminate between them (i.e., literally tell them apart). Here the term implies only that the

FOOTNOTES TO TABLE 7.3--Continued

individual should be encouraged (or has already developed the capacity) to recognize, appreciate, and desire the benefits associated with the more developmentally advanced pole.

[b] Here, differentiation does not imply what it does in all other contexts: that the more developmentally advanced pole is open. In this particular instance, it happens to be closed, but the individual scored at least a half of a standard deviation higher on it than on the less developmentally advanced pole

teacher whose pole profile is 88-122-113-138-106. Pole 4 is the most developmentally advanced pole to which Andy is open (since his score on Pole 5 is below 110). Thus, we should enter Table 7.2 at the top of Column 4 (Self-Absorption).

The question in the first row asks: Is Pole 4 differentiated from Pole 2? Since Andy's score on Pole 4 (138) is ten or more points greater than his score on Pole 2 (122), the answer is "Yes." Therefore, we now move down the left side of Column 4 to the portion labeled "4D2."

Next we ask: Is Pole 4 differentiated from Pole 3? Since Andy's Pole 4 score is also ten or more points greater than his Pole 3 score (113), the answer is again "Yes." Accordingly, we move down the left side of Column 4D2 to the portion labeled "4D3."

The last question asks: Is Pole 5 differentiated from Pole 3? Since Andy's Pole 5 score (106) is less than ten points greater than his Pole 3 score (113)--in fact, the former is smaller than the latter--the answer is "No." We therefore move down to the right side of Column 4D3 to the portion labeled "5N3."

Finally, we look in the Diagnostic Pattern row under column 5N3 where we learn that Andy's profile seems to be described by

Diagnostic Pattern J. We thereupon look up Diagnostic Pattern J in Table 7.3. There the suggestion is made that we present Andy with a series of Choices between Pole 5 (Interdependence) and Pole 3 (Field Dependence) functioning where the threatening elements contained in the interdependent option are reduced to a minimum so that it might appear to Andy to be the more attractive.

If we imagine we are conducting a unit on coping with drug use, we could offer Andy the following choice: For the Field Dependent option, he could choose to read a technical report which discusses the effects of a particular drug which he would be required to follow up by writing a paper on the extent to which the author's conclusions appear to be warranted by the evidence presented. For the Interdependent option, he could choose to join with a colleague to plan and conduct a series of interviews with a range of persons associated with drug use (lawyers, judges, users, pharmacists, etc.) which they would be required to follow up by developing a way to share what they learned with others which is unique, interesting, and informative and which requires both Andy and his partner to plan an active but distinct role.

The attractiveness of the Field Dependent option can be varied by, among other things, changing either the nature of the drug to be studied or the scope of the paper to be submitted. The degree of threat in the Interdependent option can be varied by altering the nature of the group to which the findings of the survey research effort are presented. If size of audience is a threat factor, for example, the presentation can be given to another pair.

The point of the above example is to illustrate that the

pole profiles can be used to guide the designing of learning opportunities. One of the important next steps is the development of a technology of designing learning opportunities that fulfills the recommendations set forth in Table 7.3. At this point, the theory has not been refined to the point where it is intuitively obvious how to proceed. Some possible directions that application might take are sketched below.

Independent study program

An independent or individualized program provides the instructor with sufficient flexibility to establish a different set of learning conditions for each student. This application requires the smallest degree of adaptation, although, as it was pointed out immediately above, much work remains to be done before the diagnostic pattern recommendations become more than vague guidelines.

Grouping patterns

The set of diagnostic patterns contains a variety of bases for grouping students according to the instructor's purpose. For example, students could be grouped according to whether or not the degree of threat is a consideration in designing conditions for instruction. Students could be grouped together according to whether the choices they should be encouraged to make lie totally in the dependent strand, totally within the independent strand, or involve both strands. Students could be placed into homogeneous groups (where students are classified as sharing the same diagnostic pattern) or heterogeneous groups (where a specific mix was thought to be desirable) depending upon the instructional objectives. It might make the most sense to

encourage students to take an active part in both kinds of groups.

Instructor-student match

Following Thelen (1967), it might prove beneficial to match students with instructors whose pole profiles either appear to be compatible and/or maximally conducive to developmental progression. It may turn out that the best matching procedure has less to do with the instructor's developmental profile than with his skill in designing learning opportunities which are consistent with the recommendations derived from the diagnostic patterns. David Hunt's current research focusing on the ability of teachers to "radiate environments" shows promise in this regard.

The theory as content

The developmental theory can be taught to future teachers as content. Comprehension of the theory as well as discussion of possible applications at the elementary and secondary level may help them perform their future roles as teachers more effectively.

Direct feedback counseling

It might prove helpful, in conjunction with the notion of the theory as content, to provide future teachers with direct feedback regarding their own developmental status. Then, in either individual or group counseling sessions, the future teachers could be involved in shaping plans to facilitate their own development.

Recommendations for Future Research

Obtaining additional data regarding the theory's developmental assertions

As suggested in passing in Chapter 4, two kinds of data would be very helpful in establishing the validity of the theory's devel-

opmental assertions: cross-sectional data on individuals at various ages or, even better, longitudinal data on a sizable group of individuals over several years. With the former, one could determine whether age tends to correlate with the number of the pole which exerts dominant influence on the individual's behavior; with the latter it would be possible to discover one way or the other whether individuals actually peaked at Pole Y before acquiring a high score on Pole X. Neither of these kinds of data is available from the present study. It seemed more sensible to start by developing, validating, and revising the key constructs before initiating either a more comprehensive cross-sectional study or a far more costly and time consuming longitudinal study.

When it is known that valid scales exist for each of the poles, then a cross-sectional study can be conducted efficiently, i.e., with minimal questionnaire time on the part of the subjects. As a matter of strategy, it probably makes more sense to conduct a cross-sectional study before engaging in a longitudinal study (to prevent the wasting of several years of follow-up effort if the cross-sectional study shows that the developmental component of the theory is untenable) but to select the population in such a way that the younger indivduals are more heavily represented. Thus, if the data from the cross-sectional study prove to be encouraging, the first round of data has already been collected from a group that can be observed over time.

The ultimate test of the theory's utility, of course, is showing that the profiles obtained from the constructed inventory lead to educational implications which when heeded hasten the develop-

mental process. To obtain the full range of objectives, then, the longitudinal study just proposed should contain a sufficient number of subjects to permit retaining one fairly large subsample as a control group while providing at least one subsample of subjects for experimentation.

The best of all worlds (research-wise) would exist if several competing strategies of utilizing the profile data were tested simultaneously (on different subsamples) and compared. One strategy, for example, might consist merely of making the instructor aware of the data. Another might involve no more than teaching the theory to the subjects to se if they could and would stimulate their own and/or each other's development. A third, of course, would consist of training instructors to employ the intervention strategy advocated in the beginning of this chapter.

The Developmental Maturity scale as a research tool

The Developmental Maturity scale, or future revisions of it, has considerable potential value as a research tool because it permits comparisons between otherwise unlike subjects. For example, if the theory implied that subjects with Profile A should be placed in Training Condition A and subjects with Profile B in Training Condition B, the change in mean Developmental Maturity scores of each of the following experimental and control groups could be compared between Time 1 and Time 2:

A subjects experiencing Training Condition A
B subjects experiencing Training Condition A
A subjects experiencing Training Condition B
B subjects experiencing Training Condition B
A subjects experiencing "normal classroom conditions" and
B subjects experiencing "normal classroom conditions."

This same strategy can be employed to compare the effectiveness of various grouping patterns, instructor-student match combinations, and so on.

Another possible application of the Developmental Maturity scale is as a selection tool. If it is correct that the more developmentally advanced a person's representational structure the more effective he can be as a teacher, it might make sense to utilize the Developmental Maturity scale as a screening device. The timing of such screening is partly a matter of philosophy: Those who are pessimistic about what a pre-service teacher preparation program can accomplish might choose to administer the scale to those applying to a certification program to aid in admissions decisions; those who are more optimistic might choose to administer the scale to those graduating from a preparation program to aid in hiring decisions.

Before the scale is put to either use, however, it is important to discover whether those who score highest are in fact judged to be more effective teachers. The problems of identifying appropriate criteria of teacher effectiveness which usually plague researchers in this area are partly ameliorated by the theoretical stance adopted here. The description of the interdependent teacher which appears in Chapter 1 suggests some important ingredients of effective teaching. What is not known, however, is the extent to which those who score high on Pole 5 (Interdependence) or on the Developmental Maturity scale actually resemble the interdependent teacher as characterized.

The research need being identified applies not only to the Developmental Maturity scale, but to the five pole scales as well.

It involves discovering their behavioral correlates (as opposed to their paper-and-pencil correlates). Such research requires either extensive observation or the development of appropriate pupil growth measures. The former implies both the development of rating scales and the training of raters. The latter involves a rather tenuous chain of inferences and raises intriguing problems of teacher-student match, an interesting and important area of research in its own right.

Other possible research directions

Returning to the five pole scales qua scales, there are some technical issues which can be explored; for example, What are the maximally meaningful cutoff points for both openness and differentiability? To phrase what is meant here in other language: At what point would trained judges be able to sort individuals into a "Open to Pole 3" and "Closed to Pole 3" dichotemy? Would it be more fruitful to consider such a dimension as a trichotemy?

To broaden the scope of the suggestions, research might be conducted on the relationships among the postulated structures. Does it make sense to develop means of measuring the motivational and executive structures? If so, is the approach here appropriate? Is there a way of conceiving of either which is as fruitful as the combination Dewey and Harvey, Hunt, and Schroder blend is held to be here?

One other too frequently neglected area of research also needs to be undertaken. What is the nature of the dissemination program that would stimulate the adoption of a validated version of

the above? How concrete do illustrations of the recommendations which follow from the diagnoses have to be before teachers can comprehend, apply, and adapt them to suit their specialized needs? What additional training is needed before teachers can design their own alternatives?

Conclusion

The above questions make clear that much must be done before the potential which seems to exist in this approach becomes a kinetic reality. Thus, I am concluding with the hope that others will join in the effort to make progress toward resolving the above questions. The tasks are too complex for one man.

APPENDICES

APPENDIX A

PROCEDURES FOR COMPUTING THOSE EXPERIMENTAL CRITERION VARIABLES WHICH ARE BASED ON THE QUESTIONNAIRE APPEARING IN APPENDIX D

Each subject was asked to rank the experimental segments in which he participated from most to least according to the extent to which he did or perceived he was doing each of the following (More detailed descriptions of 4 of the 8 dimensions below appear in Appendix D which contains the instructions given to the subjects):

1. Achieving success
2. Engaging in self-improvement
3. Avoiding failure
4. Being independent
5. Doing things that he was already good at
6. Using his intelligence
7. Feeling comfortable
8. In general, getting the most of the opportunity that existed

When he carried out the above 8 rankings, he labeled the segments according to the order in which he went through them. Thus, a subject's ranking of the segments from most to least according to the extent to which he was able to achieve success might look like this:

Most:	Third segment
Second Most:	First segment
Third Most:	Fourth segment
Least:	Second segment

A shorthand way of writing the above is 3-1-4-2 where the progression from left to right implies a progression from most to least.

Each subject was asked to perform the ranking of the segments in terms of their chronological order rather than in terms of the experimental conditions operating in order to de-emphasize the influence of these conditions on his ranking; that is, the intent of this ranking was to discover what the subject's actual experience had been, not what he might think it should have been given the conditions which had been established.

The subjects went through the four sets of conditions in various orders, but since the order in which any given subject experienced the experimental conditions was known, his "chronological ranking" could be expressed in terms of the experimental features. Thus, the ranking 3-1-4-2 for Subject #7 could be expressed IS-SS-SI-II. Here, once again, the progression from left to right implies a progression from most to least. Furthermore, the two-letter abbreviations have the following meaning (which is explained in detail in Chapter 5):

SS means "Student assigns, Student evaluates"
SI means "Student assigns, Instructor evaluates"
IS means "Instructor assigns, Student evaluates"
II means "Instructor assigns, Instructor evaluates."

The subject performed the set of eight rankings again, the second time using the letters to identify the segments (to highlight the features). The first set of rankings will hereafter be called a subject's "actual" ranking since he was ranking something he actually experienced; the second set will be called his "hypothetical" ranking since he was ranking how he might react ceteris paribus.

Specific Scales

In developing scores for the first six scales mentioned below,

only the hypothetical rankings were used. The actual rankings are used only in the last four.

Assigning Independence

The Assigning Independence score measures how important it is to the individual to control the assigning process as far as the dimension "using his intelligence" is concerned. If he ranked a "student assigns" segment first along the "using his intelligence" dimension, he would receive 5 points on this scale; if he ranked one of the "student assigns" segments second, he would receive 2 points; if he ranked one of them third, he would receive 1 point (Note that two out of the four segments are "student assigns" segments).

If the sample ranking provided above is used as an example (IS-SS-SI-II)--where the first letter in each pair indicates who is in control of the assignment process--it would be scored as follows: 2 points for a second ranking and 1 point for a third for a total score of 3.

Evaluating Independence

The Evaluating Independence score measures how important it is to the individual to control the evaluating process as far as the dimension "using his intelligence" is concerned. The scoring procedure is identical to that used for Assigning Independence, except that the second letter of the segment abbreviation (which indicates who is in charge of the evaluation process) is used rather than the first. In the example above, the individual would receive 5 points for his first ranking and 2 points for his second ranking for a total of 7 points.

Preference for Assigning Dependency

This scale measures the extent to which the individual is open to benefitting from a relationship in which he is dependent for guidance on an instructor. The identical procedure that was used to derive an Assigning Independence score on the "using his intelligence" dimension was employed on the other seven dimensions. The individual's Preference for Assigning Dependency score simply consisted of subtracting whichever of his 8 "Assigning Independence" scores was the lowest from 8.

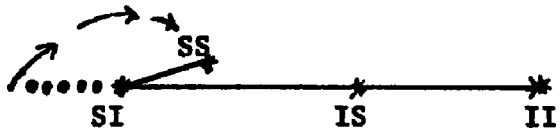
Preference for Evaluating Dependency

If "Evaluating" is substituted in the above section for "Assigning," the procedures for computing the Preference for Evaluating score will become clear.

Dependence-Independence Differentiation

The Dependence-Independence Differentiation scale attempts to measure the extent to which the individual's concept of independence is differentiated. This scale and the four that follow it are based on the theorizing of Clyde Coombs (1964). The individual's ranking on the "Being Independent" dimension established partly how he perceived this dimension. All of the other rankings were fit into this one if they were compatible with it.

For example, if an individual's "Being Independent" ranking was SS-SI-IS-II, the ranking SI-SS-IS-II could be compatible with it provided that the distance between SS and SI on the dependence-independence continuum was smaller than that between SI and IS. As the diagram below shows, the individual could be "occupying a position"



at SI (in the sense that the closer a position was to SI, the greater his preference for it) while still viewing that position (i.e., SI) to be less independent than SS. The point is that for some dimensions (such as avoiding failure) the individual might prefer to be less independent.

Note that the line segment SI-SS is essentially "folded over" onto SI-II. Using Coombs' multidimensional unfolding approach, one can determine which orderings could have resulted from such a folding and which would be impossible. It became possible to determine which of the following was true:

a. The individual "occupied positions" only at one end of the independence dimension (If so, his score was 8 points);

b. The individual "occupied positions" only at the two ends of the independence dimension (If so, his score was 11 points);

c. The individual "occupied positions" either at just one end or at both ends but in either case at one point in the middle (If so, his score was 13 points. He would have received no extra points for being at both ends of the dimension because, according to Harvey, Hunt, and Schroder (1961), an individual does not select a middle point on a salient dimension unless he has already articulated both of the extremes);

d. The individual "occupied positions" either at one end or at both ends but in either case at two points in the middle (If so, his score was 15 points).

As a result, the more differentiated the individual's concept of independence (i.e., the more he believes he should be on different places on the dependence-independence continuum depending upon on which dimension he is attempting to maximize performance) the higher

his score.

Dimensionality Hypothetical

The purpose of this scale is to gauge the degree of complexity of the individual's cognitive structure. Using multidimensional unfolding technology, the subject's eight hypothetical rankings were explained or accounted for by the fewest number of dimensions possible. Thus, the more dimensions that were needed to explain an individual's ranking, the more cognitively complex he was assumed to be and the higher the score he received.

The scoring for this dimension is the same as in the Dependence-Independnece Differentiation scale, namely 8 points for each dimension on which the individual is located at both ends, and so on. Note that the individual receives a great many more points for selecting an ordering which requires a new dimension than one which merely requires a further differentiation of an already existing dimension.

Dimensionality Actual

The same procedure was used to determine this scale score as was used to determine the Dimensionality Hypothetical score except that the individual's actual rankings were used, not his hypothetical rankings.

Average Dimensionality

It was felt that the two dimensionality scores described above might not reflect the cognitive complexity of an individual as well as some combination of the two scales. That is, an individual might be cognitively complex but not need very many dimensions to account for

one set of rankings; hopefully, the extent of the complexity of his cognitive structure would be revealed by the other set of rankings. As a result, Average Dimensionality consisted of a simple average of Dimensionality Hypothetical and Dimensionality Actual.

Minimum Dimensionality

This scale was designed to fulfill the same objective as Average Dimensionality, namely, to give credit for evidence of cognitive complexity even though such evidence may not emerge on a reliable basis. It is assumed that if an individual demonstrates once that he has a cognitively complex structure, repeated measures are not needed; in other words, if an individual receives a particular score it means that he must be at least that cognitively complex, but no real basis exists for estimating whether his real score is any higher. Thus, for his Minimum Dimensionality score he was given whichever of his scores on the Dimensionality Hypothetical and Dimensionality Actual scales was higher. This then set the maximum possible lower bound (hence the name "Minimum Dimensionality") on the extent to which his cognitive structure is complex.

Structural Integration

The purpose of this scale was to determine the extent to which there seemed to be a connection between his hypothetical view of the world and his actual experience. Consequently, his hypothetical ranking on the "Be independent" dimension was compared to his actual ranking on the "Be independent" dimension. The distance measure used was the standard procedure of counting the minimum number of transpositions necessary to move from one ranking to the other. The scale was then reversed so that those scoring high would receive credit for a high degree of structural integration.

APPENDIX B

"FREEDOM FROM" AND "POSITIVE" ITEMS ON THE FLEXIBILITY AND THE ABRIDGED AUTONOMY AND COMPLEXITY SCALES

"Freedom From" Items

From the Autonomy Scale

I should like to belong to several clubs or lodges. (F)
Society puts too much restraint on the individual. (T)
Parents are much too easy on their children nowadays. (F)
Every wage-earner should be required to save a certain part of his income each month so that the will be able to support himself and his family in later years. (F)
It is not the duty of a citizen to support his country right or wrong. (T)
There must be something wrong with a person who is lacking in religious feeling. (F)
Young people sometimes get rebellious ideas, but as they grow up they ought to get over them and settle down. (F)
The surest way to a peaceful world is to improve people's morals. (F)
One of the most important things children should learn is when to disobey authorities. (T)
Science has its place, but there are many important things that can never possibly be understood by the human mind. (F)
In the final analysis, parents generally turn out to be right about things. (F)
It is a pretty callous person who does not feel love and gratitude for his parents. (F)
Every person ought to be a booster for his own home town. (F)
Nothing in life is worth the sacrifice of losing contact with your family. (F)
If you start trying to change things very much you usually make them worse. (F)
I dislike women who disregard the usual social or moral conventions. (F)
Unquestioning obedience is not a virtue. (T)
I have been inspired to a way of life based on duty which I have carefully followed. (F)
Disobedience to the government is sometimes justified. (T)
I am in favor of strict enforcement of all laws no matter what the consequences. (F)
I believe it is a responsibility of intelligent leadership to maintain the established order of things. (F)
We should respect the work of our forefathers and not think that we know better than they did. (F)
Only a fool would try to change our way of life in this country. (F)

From the Complexity Scale

It is a good rule to accept nothing as certain or proved. (T)
The unfinished and the imperfect often have greater appeal for me than the completed and the polished. (T)
I dislike following a set schedule. (T)
I have always hated regulations. (T)
Politically I am probably something of a radical. (T)
I always see to it that my work is carefully planned and organized. (F)
My way of doing things is apt to be misunderstood by others. (T)
I like to have a place for everything and everything in its place. (F)
For most questions there is just one right answer, once a person is able to get all the facts. (F)
Many of my friends would probably be considered unconventional by other people. (T)
I much prefer friends who are pleasant to have around to those who are always involved in some difficult problem. (F)
I find that a well-ordered mode of life with regular hours is not congenial to my temperment. (T)

From the Flexibility Scale

I find that a well-ordered mode of life with regular hours is congenial to my temperment. (F)
I often start things I never finish. (T)
For most questions there is just one right answer, once a person is able to get all the facts. (F)
I like to have a place for everything and everything in its place. (F)
I am known as a hard and steady worker. (F)
I am in favor of a very strict enforcement of all laws, no matter what the consequences. (F)
I always see to it that my work is carefully planned and organized. (F)
I set a high standard for myself and I feel others should do the same. (F)

"Positive Items"

From the Autonomy Scale

I have been quite independent and free from family rule. (T)
The trouble with many people is that they don't take things seriously enough. (F)
It's better to stick by what you have than to try new things you don't really know about. (F)

It is better never to expect much; then you are rarely disappointed. (F)
Kindness and generosity are the most important qualities for a wife to have. (F)
The most important qualities of a husband are determination and ambition. (F)
I read a great deal even when my work does not require it. (T)

From the Complexity Scale

Usually I prefer known ways of doing things rather than trying out new ways. (F)
I want to know that something will really work before I am willing to take a chance on it. (F)
I don't like things to be uncertain and unpredictable. (F)
I like to go alone to visit new and strange places. (T)
I like to fool around with new ideas, even if they turn out later to have been a total waste of time. (T)
I prefer to engage in activities from which I can see definite results rather than those from which no tangible or objective results are apparent. (F)
Straightforward reasoning appeals to me more than metaphors and the search for analogies. (F)
I don't like to work on a problem unless there is a possibility of coming out with a clear-cut and unambigous answer. (F)
It doesn't bother me when things are uncertain and unpredictable. (T)
I find it difficult to give up ideas and opinions which I hold. (F)
Trends toward abstractionism and the distortion of reality have corrupted much art in recent years. (F)
Some of my friends think that my ideas are impractical if not a bit wild. (T)
I dislike having others deliberate and hesitate before acting. (F)

From the Flexibility Scale

I often wish people would be more definite about things. (F)
It is annoying to listen to a lecturer who cannot seem to make up his mind as to what he really believes. (F)
It is hard for me to sympathize with someone who is always doubting and unsure about things. (F)
Our thinking would be a lot better off if we would just forget about words like "probably," "Approximately," and "perhaps." (F)
A strong person will be able to make up his mind even on the most difficult questions. (F)
I don't like to work on a problem unless there is a possibility of coming out with a clear-cut and unambiguous answer. (F)
It bothers me when something unexpected interrupts my daily routine. (F)
I don't like things to be uncertain and unpredictable. (F)

The trouble with many people is that they don't take things seriously enough. (F)
People who seem unsure and uncertain about things make me feel uncomfortable. (F)

Unclassified Items

The items below do not fit into the "Freedom From" or "Positive" categories. Along with the items included above, they represent the entire Autonomy, Complexity, and Flexibility scales as administered to the subjects.

From the Autonomy Scale

All groups can live in harmony in this country without changing the system in any way. (F)
In most ways the poor man is better off than the rich man. (F)

From the Flexibility Scale

I never make judgements about people until I am sure of the facts. (F)
Most of the arguments or quarrels I get into are over matters of principle. (F)
Once I have my mind made up I seldom change it. (F)
I think I am stricter about right and wrong than most people. (F)

APPENDIX C

FINAL ITEMS FOR EACH OF THE POLE SCALES AS WELL AS THE COGNITIVE COMPLEXITY SCALE

The extent to which each item is correlated with the scale upon which it loads is shown at the left of the item. The items were not administered to the subject as shown (i.e., all the items from a given scale concentrated together); rather, they were mixed in with items which tapped other characteristics. Here, the True-False items are presented first, then the multiple choice items. Within these two categories, the items are presented such that the correlation permits the reader to comprehend rapidly the essence of each scale. A full description of the scale construction and scoring procedures utilized is provided in Chapter 4.

Pole 1--Authority Glorification, Absolutism

.77 Parents are much too easy on their children nowadays. (T)

.74 One of the major causes of juvenile delinquency is that parents are too easy on their children nowadays. (T)

.62 Other countries don't appreciate as much as they should all the help that America has given them. (T)

.62 Now that America is the leading country in the world, it's only natural that other countries should try to be like us. (T)

.61 I would rather be a steady and dependable worker than a brilliant but unstable one. (T)

.52 It is a pretty callous person who does not feel love and gratitude for his parents. (T)

.51 Speak softly, but carry a big stick. (T)

.51 Students are frequently justified in violating school regulations. (F)

.50 There may be a few exceptions, but, in general, members of a racial group tend to be pretty much alike. (T)

.46 I believe it is a responsibility of intelligent leadership to maintain the established order of things. (T)

Please indicate whether you Strongly Agree, Agree, are Undecided, Disagree, or Strongly Disagree with the following statements:

.68 It is often necessary to remind pupils that their status in school differs from that of teachers. (SA)

.66 The best principals give unquestioning support to teachers in disciplining pupils. (SA)

.64 It is more important for pupils to learn to obey rules than that they make their own decisions. (SA)

.52 Pupils cannot perceive the difference between democracy and anarchy in the classroom. (SA)

Pole 2 -- Anti-authority, freedom from

.69 I have always hated regulations. (T)

.65 I find that a well-ordered mode of life with regular hours is not congenial to my temperament. (T)

.62 I regard myself as a more consistent and harder worker in my classroom assignments than the typical student in my classes. (F)

.60 I do not mind taking orders and being told what to do. (F)

.59 I would rather be a brilliant but unstable worker than a steady and dependable one. (T)

.57 I have often either broken rules (school, club, etc.) or inwardly rebelled against them. (T)

.57 I never cared much for school. (T)

.57 I think I would like to belong to a motorcycle club. (T)

.56 At times I have been so entertained by the cleverness of a crook that I hoped he would get by with it. (T)

.55 When the community makes a decision, it is up to a person to help carry it out even if he had been against it. (F)

.54 I must admit I find it very hard to work under strict rules and regulations. (T)

.53 I think I could do better than most of the present politicians if I were in office. (T)

.50 Police cars should be especially marked so that you can always see them coming. (T)

.50 I have often gone against my parents' wishes. (T)

.49 No censorship on the presumed morality of books and movies can be justified. (T)

.44 At times I have very much wanted to leave home. (T)

Indicate whether you feel that for you the following are Not at All Important, Not too Important, About Average, Quite Important or Very Important:

.44 Working hard to attain the good things of life honestly. (NAI)

Pole 3 -- Field Dependence, Social Anxiety

.81 I worry about what people will think of me even when I know it doesn't make any difference. (T)

.79 Sometimes I think I am too concerned with what other people think of me. (T)

.75 I often worry that I will say or do the wrong things. (T)

.73 I often worry that people who are important to me won't think very much of me. (T)

.73 I rarely worry about seeming foolish to others. (F)

.70 I am afraid people will find fault with me. (T)

.67 I don't like things to be uncertain and unpredictable. (F)

.64 It doesn't bother me when things are uncertain and unpredictable. (F)

.61 I rarely worry about what kind of impression I am making on someone. (F)

.60 I feel very upset when I commit some social error. (T)

.58 I should like to belong to several clubs or lodges. (T)

.51 I usually try to do what is expected of me, and to avoid criticism. (T)

.49 I like to have a place for everything and everything in its place. (T)

.49 I don't like to undertake any project unless I have a pretty good idea as to how it will turn out. (T)

.44 Even when I have gotten into trouble I was usually trying to do the right thing. (T)

Indicate whether you feel that for you the following are Not at All Important, Not too Important, About Average, Quite Important or Very Important:

.51 Achieving success. (VI)

.48 Trying always to act in a socially acceptable manner. (VI)

Pole 4 -- Self Absorption, Freedom to

Indicate whether you feel that for you the following are Not at All Important, Not too Important, About Average, Quite Important or Very Important:

.85 Finding the center or real meaning for life within myself, e.g., self-awareness. (VI)

.83 Being aware of and understand my innermost thoughts. (VI)

.81 Finding inner peace and contentment through self-understanding and independence. (VI)

.74 Having time to think about the deep issues of my personal life. (VI)

.54 Having much freedom at home, school and work. (VI)

.53 Having confidence in my personal strength and ability to do things on my own. (VI)

.51 Cherishing personal privacy and the chance it affords to simply be myself. (VI)

.45 Finding the most enduring satisfactions within myself. (VI)

.45 Realizing that though the world is disappointing I can find happiness in me. (VI)

Pole 5 -- Active Interdependence, Collaboration

Indicate whether you feel that for you the following activities are Worthless, Not too Worthwhile, About Average, Quite Worthwhile, or Very Worthwhile:

.74 Working with a committee to prepare a lesson to present to the class. (VW)

.74 Going to the library with your committee to do research. (VW)

.71 Working with other students in designing and completing a project. (VW)

.69 Evaluating the quality of committee work with other group members. (VW)

.68 Preparing on your own to make a report to the class. (VW)

.65 Being a member of a committee that plans a special event for the class. (VW)

.65 Doing research in the library for your term paper. (VW)

.61 Having a conference with the teacher concerning your progress in class. (VW)

.61 Organizing a group activity with a few other students. (VW)

.58 Discussing with the teacher possible activities you could do. (VW)

.54 Discussing class material with a group of other students. (VW)

.48 Having planning sessions in which the whole class is involved. (VW)

COGNITIVE COMPLEXITY

.74 I don't like to work on a problem unless there is a possibility of coming out with a clear-cut and unambiguous answer. (F)

.72 I prefer to engage in activities from which I can see definite results rather than those from which no tangible or objective results are apparent. (F)

.64 I don't like things to be uncertain and unpredictable. (F)

.59 Usually I prefer known ways of doing things rather than trying out new ways. (F)

.57 Straightforward reasoning appeals to me more than metaphors and the search for analogies. (F)

.57 I like poetry. (T)

.54 It's better to stick by what you have than to try new things you don't really know about. (F)

APPENDIX D

THE QUESTIONNAIRE WHICH LED TO THE EXPERIMENTAL MEASURES DESCRIBED IN APPENDIX A

Looking back over your experience this past semester, rank the four segments you went through according to the extent to which you achieved success. In other words, in which segment--just give me the number: 1, 2, 3, or 4--were you most able to achieve success--that is, do things that were challenging, make progress toward difficult goals?

(Subject answers)

And which one second most?

(Subject answers)

And third?

(Subject answers)

OK, now please rank in the same manner the segments according to the extent to which you did or perceived you were doing each of the following:

Engaging in self-improvement -- that is, learning new things, doing better than you had been able to do in the past? . . .

Avoiding failure? . . .

Being independent -- that is, having a lot of freedom to decide what you would do, and not having the perception that someone was watching over you and telling you what to do? . . .

Doing things that you were already good at -- that is, doing the things you had learned how to do well and enjoy doing, using the skills and abilities that you already had? . . .

Using your intelligence? . . .

Feeling comfortable? . . .

In general, getting the most out of the opportunity that existed? . . .

Fine. Now we're ready for the second part.

Probably under ideal circumstances, a segment containing one set of features would be more conducive than that containing another set of features to your deriving benefit from it, but due to circumstances such as the time of year, the given topic, the press of work in other courses, involvement in campus or national issues, or in personal matters such as family business, it didn't work out the way it might have. We shall go through these same items again. This time you will be ranking the segments in the order in which you would expect to do each of the following if all other things were equal.

However, in order to help you focus on the learning conditions themselves, rather than the things that happened during the semester which didn't have anything to do with them, you are to use a two-letter code--you might want to jot this down so you'll have it in front of you--"S" will stand for student and "I" for instructor. The first of the two letters indicates who assigns; the second, who evaluates. Thus "SS" means "Student assigns and Student evaluates"; "SI" means that "Student assigns and Instructor evaluates." Altogether, then, there are four possibilities: SS, SI, IS and II.

All right, which of these conditions would be most conducive toward your achieving success--that is doing things that are challenging, making progress toward difficult goals?

(Subject answers)

OK, please go through the rest of the ranking as you did before.

(Subject finishes the ranking for "achieving success"; he then is asked to rank the four sets of conditions for learning along the other seven dimensions above in the same hypothetical-but-nevertheless-experienced-based manner.)

APPENDIX E

DEVELOPMENTAL MATURITY SCALE ITEMS

The correlation coefficient in the left hand margin shows the extent to which the item correlates with Purepole.

.44 No world organization should have the right to tell Americans what they can or cannot do. (F)

.40 Any man can find a job if he really wants to work. (F)

.56 Speak softly, but carry a big stick. (F)

.40 Labor, since it represents the majority, should be given a greater voice in a democracy than capital. (T)

.45 I have difficulty in starting to do things. (F)

.44 I like things to be uncertain and unpredictable. (F)

.60 I crave excitement. (T)

.47 I like worldliness in people. (T)

.49 Kindness and generosity are the most important qualities for a wife to have. (F)

.46 I like to work late at night. (T)

.42 I have a very strong desire to be a success in the world. (T)

.47 I like poetry. (T)

.45 Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it. (F)

.51 I would like to hear a great singer in an opera. (T)

.46 Most people inwardly dislike putting themselves out to help other people. (F)

.42 I think most people would lie to get ahead. (F)

.40 I have very few quarrels with members of my family. (F)

.51 I would be willing to describe myself as a pretty "strong" personality. (T)

.44 I get sort of annoyed with writers who go out of their way to use strange and unusual words. (F)

.47 I sometimes feel that I do not deserve as good a life as I have. (F)

.50 It is easy for me to give an oral report before a class. (T)

.53 I have a very strong desire to excell academically. (T)

Please indicate whether you Strongly Agree, Agree, are Undecided, Disagree, or Strongly Disagree with the following statements:

.49 Student governments are a good "safety valve" but should not have much influence on school policy. (SD)

.46 It is often necessary to remind pupils that their status in school differs from that of the teacher. (SD)

.53 Pupils cannot perceive the difference between democracy and anarchy in the classroom. (SD)

.47 Pupils often misbehave in order to make the teacher look bad. (SD)

Indicate whether you feel that for you the following activities are Worthless, Not Too Worthwhile, About Average, Quite Worthwhile, or Very Worthwhile.

.50 Take a test or quiz. (VW)

.47 Take notes while the teacher lectures. (VW)

.43 Be a member of a panel discussion. (VW)

.57 Grade or evaluate your own performance in an activity. (VW)

.57 Discuss with the teacher possible activities you could do. (VW)

.42 Explain a homework problem to the class. (VW)

.44 Engage in class discussion of a movie or filmstrip. (VW)

.58 Discuss class material with a group of other students. (VW)

.49 Prepare on your own to make a report to the class. (VW)

.60 Work with other students in designing and completing a project. (VW)

.48 Go to the library with your committee to do research. (VW)

.58 Begin homework assignments. (VW)

.40 Be a member of a committee that plans a special event for the class. (VW)

.64 Evaluate the quality of committee work with other group members. (VW)

Indicate whether you feel that for you the following activities are Not At All Enjoyable, Not Too Enjoyable, Enjoyable, About Average, Quite Enjoyable, or Very Enjoyable.

.48 Reading a story in which the author describes the inner-most private feelings of the characters. (VE)

.66 Reading a book in order to learn all about some topic. (VE)

.48 Listening to others in a group of your friends discuss their ideas and beliefs about some problem you all have. (VE)

.49 Sitting by yourself remembering things that happened today. (VE)

.52 Giving another student your opinion of his strengths and weaknesses. (VE)

.41 Having a student committee you belong to appraise the performances of the various members. (VE)

.48 Telling another student your ideas about a problem you both have. (VE)

.42 Writing a letter in which you explain your deepest feelings. (VE)

.52 Hearing the private experiences of another student. (VE)

Indicate whether you feel that for you the following are Not At All Important, Not Too Important, About Average, Quite Important, or Very Important.

.46 Doing things actively and with enthusiasm. (VI)

.40 Plunging courageously into the challenges of life. (VI)

.41 Living in a reasonable and intelligent way. (VI)

.49 Developing understanding of others through self-awareness. (VI)

.44 Being able to do things that are new and interesting even if they are risky. (VI)

APPENDIX F

REVISED DEVELOPMENTAL MATURITY SCALE ITEMS

The correlation coefficients in the left hand column are between the item and Purepole (N = 26); those in the right hand column are between the item and the Purepole criterion scores which are equal to the average of the numbers of the poles to which the individual is open (N = 25).

.40	.25	Any man can find a job if he really wants to work. (F)
.56	.24	Speak softly, but carry a big stick. (F)
.45	.33	I have difficulty in starting to do things. (F)
.49	.38	Kindness and generosity are the most important qualities for a wife to have. (F)
.46	.34	I like to work late at night. (T)
.40	.37	I have very few quarrels with members of my family (T)
		Please indicate whether you Strongly Agree, Agree, are Undecided, Disagree, or Strongly Disagree with the following statements:
.46	.42	It is often necessary to remind pupils that their status in school differs from that of teachers. (SD)
.53	.54	Pupils cannot perceive the difference between democracy and anarchy in the classroom. (SD)
.47	.23	Pupils often misbehave in order to make the teacher look bad. (SD)
		Indicate whether you feel that for you the following activities are Worthless, Not Too Worthwhile, About Average, Quite Worthwhile, or Very Worthwhile.
.57	.53	Grading or evaluating your own performance in an activity. (VW)

.58	.23	Discussing class material with a group of other students. (VW)
.49	.29	Preparing, on your own, to make a report to the class. (VW)
.60	.32	Working with other students in designing and completing a project. (VW)
.48	.47	Going to the library with your committee to do research. (VW)
.40	.41	Being a member of a committee that plans a special event for the class. (VW)
.64	.57	Evaluating the quality of committee work with other group members. (VW)
		Indicate whether you feel that for you the following activities are Not At All Enjoyable, Not Too Enjoyable, Enjoyable, About Average, Quite Enjoyable, or Very Enjoyable.
.41	.45	Having a student committee you belong to appraise the performances of the various members. (VE)
		Indicate whether you feel that for you the following are Not At All Important, Not Too Important, About Average, Quite Important, or Very Important.
.49	.55	Developing understanding of others through self-awareness. (VI)
.44	.26	Being able to do things that are new and interesting even if they are risky. (VI)

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