SOME ASPECTS OF CHANGE PROCESS IN
PERSONAL CONSTRUCT SYSTEMS

DISSERTATION

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CHAPTER I

GENERAL INTRODUCTION TO THE PROBLEM

Personal construct theory assumes an individual's psychological processes to be constantly changing and evolving in the direction of improved understanding and prediction of his environment. These "psychological processes" are best understood, according to this theory, through the individual's constructs - i.e., the dimensions across which he perceives and orders his environment, and particularly his "people" environment, his social world. These constructs, or dimensions, constitute forms of perception of, and thus prediction as to, others' behaviors and attitudes. These predictions sometimes turn out to be accurate, i.e., are validated; sometimes they turn out to be inaccurate, i.e., invalidated. It is assumed that these will have different effects, and that as these processes of validation and invalidation go on in a person's life, he will be modifying his specific constructs and their applications in various ways. Furthermore, as specific constructs are modified, this may also modify the network of his whole construct system.

In Kelly's original presentation of personal construct theory (20), some particular ways are proposed in
which individual constructs and construct systems are assumed to change or develop as the individual moves toward improvement of his predictions. Others have been suggested by or demonstrated in particular experimental situations by various researchers who have followed up hypotheses either suggested by the original statement of the theory or of other derivation. Within these, however, there have been relatively few if any studies of the changing individual construct systems of "normal" people in "normal" situations. --i.e., not experimentally manipulated nor in psychotherapy --and it is with this peculiar problem that this research is concerned.

One of the reasons for this gap in the area of research on construct system change (aside from personal research preferences and/or biases, convenient "captive" subjects, and rationalizations both legitimate and questionable too numerous to list) is the problem of rate of change. Longitudinal studies in non-experimental situations which are timed to catch a segment of change are difficult to do within the time limits of the usual researcher. To deal with this problem, and because of other interests of this researcher, (and, to be realistic, an opportunity open to her), a particular group was chosen in which it was felt that there was optimal likelihood of change in sufficient quantity to be significantly measurable. This was done on two bases: age and setting. The group was late adolescents:
the setting, their first entrance into a particular college "live-in" situation with somewhat unique characteristics as a culture.

Two areas of previous research appear to support this choice of group, at least on the basis that change is likely to occur. The first is that on changes in college students. Two studies are outstanding here: one on students at Bennington College done by Newcomb and his associates (32), and another on Vassar students done by Nevitt Sanford and his associates (42). Both of these support the view that changes do occur, especially in the freshman year, and that these changes are related to basic attitudes, adjustments, and even perhaps personality patterns. For example, "The freshman year ... goes a long way toward either establishing or reaffirming certain enduring habits and values of life" (42). An additional study of personality change in students in a number of colleges, proceeding from these findings, is currently in process under the auspices of T. C. McConnell of the University of California Centre for the Study of Higher Education at Berkeley. So apparently others feel also that college is a time of significant change.

Another area of research relevant to the assumption of change in this group is that on exposure to new cultures, such as that which occurs when United States students go abroad, or when foreign students come here. Here also there
is clear evidence of change, though its "basic" nature is less emphasized. A particularly interesting finding for us as we define our situation is that of "more or less distinguishable phases in the course of sojourn adjustment" (44, p. 7). These are four: an initial spectator phase, where there is no serious confrontation of difficulties in adjusting to the new culture nor personal commitment to work toward solution; a phase of involvement where these are worked through; a relatively stabilized modus vivendi phase which is eventually arrived at; and a phase of anticipation and reappraisal as either return to the old culture or a change to another new one becomes imminent. This conceptualization may help us with selecting appropriate times between which to assess—or expect—change; at least it may provide us with a rationale!

In summary, then, we are interested in some aspects of the nature of change in personal construct systems, and in this change as it occurs in "normal" people in a "real" rather than a simulated situation. For this study we have chosen to use a college freshman group—for reasons of interest, evidence from previous research that this may be a time when change is occurring rapidly enough that we may "catch" some of it in our research net, and the opportunity which was available to us.
CHAPTER II

THEORETICAL BACKGROUND AND RELEVANT RESEARCH

Personal Constructs: The Theory

As we indicated in introducing our area of study, the personal construct theory of individual psychology is based in a sense on a "perpetual motion" model, but with an added quality of directionality in this motion.

Kelly makes this quite clear in his "fundamental postulate": "A person's processes are psychologically channelized by the ways in which he anticipates events" (20, p. 46). In further exposition of this postulate he comments that "the person is not an object which is temporarily in a moving state, but is himself a form of motion" (20, p. 48). The directionality lies in Kelly's concept of man as the prototype of the scientist--the anticipator, ever seeking better prediction of his world, of his future. The process the individual uses in this anticipation is construing (or abstracting, or categorizing): he does this by noting features which are characteristic of some elements in his experience and not of others. This process is not necessarily verbal; there are many equivalence-difference dimensions which any individual uses which have not been spelled out verbally. But these construing dimensions as
used by man the scientist have two clear characteristics, according to personal construct theory: they are necessarily dichotomous in nature (i.e., a dimension is always comprised of a construct and a contrast), and they are interlocked or woven into an organized network or system for any individual (i.e., there are ordinal and other relationships between dimensions).

One further emphasis seems important before taking up the process of change: that is that both the construct-contrast dimensions used by an individual and the relationships within his network of dimensions are essentially unique. He may find common ground or "construe" with others, to be sure—but this theory does not assume nomothetic construct-contrast dimensions for mankind: here it differs from Osgood's "theory of meaning" (33). Nor does it assume common structures of constructs nor of their use for mankind: here it differs from the propositions of Bruner, Goodnow, and Austin (6). (Both of these theories do, however, use categorization based on similarity-difference dimensions as a basic principle: in this aspect they are very close to personal construct theory.)

Nor does person construct theory, as we have said before, assume static-ness; rather it assumes movement. "A person chooses for himself that alternative in a dichotomized construct through which he anticipates the greater possibility for extension and definition of his
system" (20, p. 64). And furthermore, "A person's construction system varies as he successively construes the replications of events" (20, p. 72). This is experience, learning: it is an "of course" in personal construct theory, a basic assumption. It is, in effect, the "perpetual motion" mentioned earlier. It comes about through changes in the individual's constructs and construct system, and in his use of them. But how, in what ways, or what directions—this is what this research aims to explore. We shall shortly be coming to specifics, i.e., hypothesized directions of change to be investigated, but first let us look at some of the basic research on the over-all theory of personal construct systems.

**Personal Constructs: Some Previous Research**

Two questions come promptly to the fore in this area of research. One is instrumentation, and the second is the problem of how one measures or identifies consistencies in this perpetually moving object—the individual.

On the first question—instrumentation—we are presently fortunate that Kelly, with his student research team, early recognized the need for some device which might make feasible the "operationalizing" of the assumptions and hypotheses of personal construct theory. Recognizing the need, they evolved the Role Construct Repertory Test (20). Essentially this technique involves the naming by the subject of individuals from his personal experience who fit
into a number of role titles (such as teacher you liked best, recent acquaintance you would like to know better) presented by the examiner. The subject first compares these named individuals (figures) in triads, indicating which two are alike and different from the third in some important way, then specifies this dimension of like-different as a construct-contrast, and finally applies the dimension as he finds it relevant to the remainder of the figures he has named.

This instrument is, it is obvious, related to the family of sorting and concept-formation tests, such as the Vigotsky (16), the Goldstein-Scheerer (13), and those used by Bruner, Goodnow and Austin in their research (6). It differs, however; first, in that the subject is sorting real people from his own experience, and second, in that there is concern in this technique for the content and interrelationships of concepts rather than merely for their level of abstraction.

Research in personal construct theory has been proceeding apace since the development of this instrument, and several studies have struggled to cope with the question of reliability or the stability of measures derived from it.

Hunt (18), in a preliminary study of construct consistency, found that an individual tends to give identical verbal constructs after a one-week interval with another set of role figures (given to the same role titles).
Agreement was approximately 70 per cent for both college students and hospitalized patients. (It was slightly lower—65.5 per cent—for the seven women included in his college student sample.) Bieri and Blacker (4), working also with college students, found a correlation \( r \) of .82 for the number of different verbally identified constructs based on sorts of the same figures after two weeks. Mitsos (30) found that nine out of ten individuals (psychiatric aides) repeated a significantly greater than chance number of constructs after a three-month period when the role titles given were "representative" (as in the original form of the test), only two out of seven did so when the role title list was homogeneous (personal friends).

Number of figure changes within role titles has also been studied. Pederson (36) found that after an interval of a week, his college student group, when free to choose either the same or a different figure for each role title, repeated a mean of 77 per cent of the figures. Mitsos (30) found that after three months his group repeated all of the figures, but it is unclear in his report whether this identity was fostered in some way by the experimenter.

The above studies have dealt with verbal statements of construct-contrast dimensions, and with figure naming. It is also possible to derive from the matrix (i.e., tabulated) form of the Role Construct Repertory Test a series of
measures of these dimensions and their use which is independent of verbal statements or naming.

One such area of concern has been that of identification—with ideal self, and with other figures such as mother, father, or therapist. This is of considerable interest, but as it is not included presently within the purview of this research (although we hope to analyze it later) it will not be reported in detail here.

Another which has received considerable attention is that of the simplicity or complexity of the patterns produced on the matrix, i.e., of the functional use by the individual of his construct system as a way to differentiate between events. This has been called cognitive complexity.

One mode of analysis used for this purpose is factor analysis. Levy and Dugan (24) did a conventional factor analysis of four individual protocols, finding that a repertory of fifteen constructs could be explained by four orthogonal factors. Kelly has since developed a non-parametric (and time saving) equivalent to factor analysis, using generalized construct patterns. Jones (19) using this method, found that this usually brought out two to seven construct factors per protocol, and an equivalent number of figure factors if the generalized patterns used were figure rather than construct patterns. Pederson (36), working with college students and using this same method of eliciting factors, found no significant consistency over a one week
interval, and questioned this method of analysis. However, using the degree of generality of the first construct factor (i.e., how much of the protocol it explained) as a measure of simplicity, he found consistency significant at the .01 level. He also found significant consistency in the use of the same pairs within triads, and noted that this consistency was highest for the most "simple" protocols (judged by the mean number of factors).

Bieri (3) developed an abbreviated index of cognitive complexity-simplicity reflecting differentiation among figures by matching each construct row pattern to every other and counting those with not more than two "misses" to a row. (More matches meant more simplicity.) With retest after a very brief interval (within the same experimental session), he found a test-retest correlation (r) of .78.

These studies of personal construct systems all seem to indicate some considerable degree of consistency over time, but certainly it is not perfect. This seems in general accord with the tenets of personal construct theory—that there is patterning for an individual, but also constant motion and change. (Too much consistency, if we accept the "perpetual motion" assumption of the theory, would mean an insensitive instrument.) This level of "reliability," as Chassan (8) has pointed out, may also be viewed as a function of the heterogeneity and probabilistic
nature of the behaviors measured rather than as indicating defect in the instrument.

Another area of concern to researchers is the generality of inference feasible from the measures on any instrument. This might be called "validity"—but in any event it has within it at least two patterns of approach. One is in terms of relationships to other measures purporting theoretically or otherwise to deal with the same or closely related variables. These we will discuss as we take up the specific variables with which we shall be working in this research. One general example of such a study, however, is that done by Hamilton (15), who found that constructs elicited by the Role Construct Repertory Test do have some generality, at least to those elicited by a selection of pictures from Murray's Thematic Apperception Test (31) and Symonds' Picture Story Test (46).

A second approach to "validity" is that of the reflection of change as predicted by the theory in response to some manipulation of the environment. Several studies have been done of this type. Poch (37), working with college students in experimental situations, found her hypothesis supported that "there is a significant relationship between outcomes of prediction, ('right' or 'wrong,' validated or invalidated) and changes in the constructs involved; and that, furthermore, the 'wrong' predictions will provide significantly more construct changes than will
the 'right' predictions." In addition, she found "striking support" for her hypothesis that "the use, or invocation, of a construct for prediction will vary significantly between two situations separated in time requiring similar predictions when predictions made in the first situation were 'wrong'; and that the invocation of a construct for prediction will tend to be repeated following evidence that the earlier predictions were 'right.' Bieri (2) also working with college students, found that greater change occurred in experimentally invalidated dimensions than in validated ones, and also that changes in figure descriptions were greater than changes in the applications of constructs when each of these was separately invalidated.

Thus it seems over-all that the primary measuring device of personal construct theory, the Role Construct Repertory Test, has some reasonable consistencies (though not enough to make us suspect it of insensitivity), that it has some relatedness to other measures, and that it does identify change where change would be predicted by the theory.

Personal Constructs: Our Questions

We are not in this research primarily interested in the over-all generality of change. However, we shall ask a few over-all questions en route to our more specific hypotheses. Noting in particular Bieri's finding (2) mentioned above that figure descriptions are more changeable
than construct applications, we should like to hypothesize that when both types of change are available and neither is experimentally demanded, (1) the amount of change in relation to figures and that in relation to constructs will be positively related, and furthermore (2) the amount of change in relation to figures will be greater than that in relation to constructs.

**Generalization or ?**

The concept of generalization of one type or another has long been invoked by observers, experimenters and theorists to account for consistencies in behavior, both human and animal. It has to do with two variables: the observed consistencies in behavior from one set of conditions to another, and some dimension of similarity which accounts for this. The question on the latter, still unresolved, appears to be "what dimension?"

Wallach (48), in a recent article, discusses this question, and identifies four types of similarity dimension which have been and are being used in relation to generalization: common environmental properties, common responses, primary stimulation gradients (neural), and assignment to a common category.

The first of these may be exemplified by Hovland's well known study (17) demonstrating the generalization of conditioned galvanic skin response to tones of varying similarity in intensity and frequency--i.e., common physical
stimulus (environmental) properties. However, question is raised as to the all-explaining quality of this dimension by other studies, especially of more complex, or less specifically psychophysical, processes.

Among those who have suggested and defended the alternative of generalization across the dimension of response similarity is Mandler (29), who emphasizes "the differentiation of stimulus conditions depending on the evocation of responses made by the organism." "Stimulus factors," he says, are thus "dependent upon the particular response repertory and previous experiences of the individual." Dollard and Miller (9) use a similar explanation in their concept of cue-producing responses. Mandler broadens the concept of "response" to include whatever goes on inside the organism, however, and which this appears to make his theory more tenable, it also renders it considerably less testable.

Primary (neural) stimulation gradients have been invoked to some degree by such "opposing" figures as Pavlov and Kohler. Pavlov (35) called this "irradiation"—a spread of cortical stimulation to adjacent brain areas. Kohler in a recent lecture at Ohio State University on The Mind-Body Problem invoked, and demonstrated through electroencephalographic tracings, a similar phenomenon. But this concept also seems not clearly and consistently demonstrable, especially in more complex processes, and the search for
better bases for judging the similarity dimension still continues.

A relatively new approach in this field, and the one in which we are particularly interested, is that of similarity as based on assignment to common categories. This postulates that the subject's similarity recognition depends on his classification of events as like some and unlike others, on the basis of criteria or classification rules. The bases of these last are hypothesized differently by various theorists.

Razran (39) in 1949 suggested a categorization-rating view of generalization, i.e., that the organism categorizes stimuli on a crude step-type similarity-dissimilarity scale. Furthermore, he went on to point out (38) as he experimented with semantic generalization (using homophones and synonyms) that learned meanings were often significantly involved in the process.

Osgood (33) and Bruner, Goodnow and Austin (6) have proceeded on from this point and elaborated the nature of the categories which determine similarity. Both emphasize the fact that the criterial factors include both samenesses (of events within a category) and differences (from events outside it). But in both these theories, the generalization or similarity dimensions are imposed by the experimenter: what meaningful dimensions to use is his decision, and relevant to his theory or experimental purposes. To be
sure, Osgood (34) derives his semantic differential pairings normatively from a massive data collection process—but he then presents these ready-made nomothetically derived data to the subject, without knowledge or checks as to how these dimensions are perceived and defined by this specific individual. It would seem that we might well take a fresh look at this nomothetic-to-idiographic sequence. We would suggest deriving first principles (rather than dimensions) from the idiographic level in terms of the subject's own perception or categorizations, then proceeding to more general or nomothetic hypotheses on this basis.

This, it seems to us, is a point where personal construct theory and its methodology can make a particular contribution. As has been indicated earlier, this theory assumes "categories" as does this last form of similarity dimension. Further, it assumes that each individual has his own particular construct-contrast dimensions, and his own particular systematic organization within these. Beyond this, it presents a method, the Role Construct Repertory Test matrix, through which we can investigate these. We can through use of this matrix not only obtain verbal communication of the labels of these dimensions and of their varying similarities to each other, but we can also see to what extent—more or less—the subject construes these as applying similarly to a number of significant figures in his life. We may find, for example, that while he uses two
particular dimensions to describe his parents as opposed to his roommate, and that they are synonymous by both dictionary and Osgood, they are not at all the same in terms of his application of them to his favorite teacher, the adult he has known with the most objectionable views, or his doctor. And this gives us information on how functionally similar these two dimensions are for our individual subject—i.e., what is similarity for him in practice, as he predicts and corrects his predictions in his world. More broadly, we can thus identify, and quantitatively measure, subject-defined rather than experimenter-defined similarity. From this, it is a ready (?) step to identify a particularly clearly changing construct-contrast dimension (i.e., for this individual) and then to observe the degree of change in other dimensions which are of varying similarity to it in terms of their application to the same significant figures in his life.

The question then arises, perhaps, of "why bother?" Generalization has been assumed by learning theorists for a long time, and by personal construct theory apparently also—although it is not fundamental in this last.

These are two types of reasons for inquiring into this matter, in the mind of this writer. One is some rather intriguing research findings of an earlier researcher; another lies in a number of clinical concepts, theories, or hypotheses.

To identify first the research, Bieri (2) was apparently also interested in this problem when he did his
doctoral dissertation investigation in 1953, studying generalization in figure and construct change. He, after getting Role Construct Repertory Test protocols from his subjects, gave them validating and invalidating experiences with respect to selected constructs and selected figures. He then analyzed not only the changes (as did Poch (37) cited earlier) but also how these affected related or similar constructs or figures. He found the curve of generalization, at least as based on this type of subject-defined similarity gradient, to be far from smooth. Rather it sloped sharply away from the critical construct or figure, then rose again before tapering off on the expected generalization curve. Thus, to illustrate (see Figure 1 below) if the changed dimension (Dc) is placed at the left of the abscissa, and we range beside it in order of their decreasing similarity to it the remaining dimensions elicited (D1, D2 . . . Dn), the classic generalization hypothesis would predict a curve something like this:

![Figure 1](image)

Classical Curve of Generalization
Instead, Bieri's findings indicated a curve of the following type, although there was considerable individual variation:

![Stylized Form of Bieri's "Generalization" Curve](image)

This finding intrigued both Bieri (perhaps of necessity) and this writer (not of necessity). There also seems to be considerable clinical theoretical thinking and practical observation which provides further food for thought on this question of generalization or ?.

Freudian theory is of course undergirded to a great extent by the concept of generalization, although it is not so labelled. Symbols and symbolic reactions (e.g., in dreams or in compulsive rituals) fall somewhere along a gradient of similarity to the original event or conflict. Displacement, the shunting off of a behavior or feeling to another object which is similar to but less threatening than the original object, is another example. Transference, the application to the therapist by the patient of affect and attitudes originally developed concerning a parent, is a
major theme also grounded in the (unspecified) concept of generalization.

Sullivan (45) carries this last concept further to apply to the full range of interpersonal relationships, and sees the patient reacting to others "as if" they were significant figures from an earlier experience. These reactions are often, thus, inappropriate and maladaptive, because they are based on perceptions framed in earlier contexts. These perceptions Sullivan terms "paratoxic," and they seem for him to be applied in reference to a sort of similarity scale: for example, older women are reacted to as mothers, bosses as fathers, and so forth.

Underlying both of these formulations seems to be the notion of a break-point in the slope of the generalization curve as it approaches the central or original object. Something causes the displacement, something called, at least part of the time, "threat." Extrapolating, we wonder if this pattern of generalization which Bieri (2) found is not one which will appear to some extent whenever "threat" is being felt in the relation to an important part of the individual's construct system.

"Threat," in personal construct theory terms, is "the awareness of an imminent comprehensive change in one's core structures" (20, p. 565). This concept of threat seems to make reasonable a conceptualization of the basis of this break in the generalization curve. Perhaps, when an
important dimension (or perception of a figure) is invalidated by experience, or when any dimension (or perception of a figure) is severely changed, related or similar dimensions (or perceptions of figures) are clung to or rigidified as protection against threat, and only more distant dimensions or figure perceptions remain flexible, at least temporarily. Clinical observations, such as those of the individual who persists in seeing a punitive and rejecting parent as "loving," would seem to lend credence to this suggestion. In any event, this is one notion we should like to explore further in this research.

First, then, we should like to check the over-all classic generalization curve as it applies to changes within construct systems in "real life."

Second, if, as Bieri's findings suggest, there is considerable individual variation in the pattern, we should like to test the hypothesis that this is related to the extent of threat or change in the construct system. That is, we would hypothesize that in the individuals where the classic generalization curve holds, there is a minimum of "threat" or change, and where it does not or where the Bieri form of the curve appears, there is significantly more.

**Differentiation (Cognitive Complexity)**

As we have indicated earlier in this paper, an area which has aroused some interest and research is that of the simplicity or complexity of individual construct systems,
i.e., the more dimensions he has to apply and the greater the discrimination with which he applies them—the more effective will be his predictions. This would mean, in terms of Kelly's assumption of man the scientist forever striving to improve his predictive system, that cognitive complexity in these terms would increase as experience brings changes in the individual construct system.

This is in line with Dollard and Miller (9), who assume that in therapy a person learns above all to discriminate. It is also consistent with general Freudian as well as Sullivanian theory on the eventual "limitation" in therapy of early generalized transference phenomena, and with the goals of "insight" therapy in general.

A number of research studies have been done from the vantage point of personal construct theory in this area. Bieri (3), for example, found that cognitively complex individuals tended to be better predictors (of others) than cognitively simple individuals. Gardner (12) found the complexity dimension, i.e., having a number of categorization possibilities at hand, related to behavior on a number of psychophysical tests. Bieri and Blacker (4) found that cognitive complexity as measured by the Role Construct Repertory Test significantly related to that derived from Rorschach protocols.

Two seemingly opposing findings are those of Leventhal (22) who found that cognitively simple judges
tended to show a greater increase in accuracy of prediction when given additional information than did cognitively complex judges, and of Lundy and Berkowitz (25) who found that cognitively complex individuals are more likely than cognitively simple ones to change their attitudes as a result of influence. Leventhal also found cognitive complexity not related to academic aptitude.

There thus seems to be a measurable factor of cognitive simplicity-complexity which does discriminate between individuals, and does have relationship to their behavior in various other situations. It seems, however, that there are two aspects to this concept: the number of different construct-contrast dimensions the individual uses, and the discrimination with which he employs them to differentiate between parts of his social world. We should like to suggest that one may occur without the other, and that perhaps the condition where the person uses a variety of verbally apparently different dimensions but uses them nondiscriminately might be called "pseudo-complexity"—for it has the appearance without the effectualness of true complexity.

The question we should like to investigate in this area, then, is whether our subjects increase in the number of dimensions they have available, and in their discrimination in the use of them. We would (hopefully) hypothesize both of these.
Range of Convenience

According to personal construct theory, any construct-contrast dimension "is convenient for the anticipation of a finite range of events only" (20, p. 68). In other terms, any dimension used by an individual has restricted relevance or applicability, i.e., limited range of convenience. Furthermore, this is an individual matter, as, for example, the black-white dimension may or may not, to a given person, be a relevant dimension by which he predicts people. Any individual's whole construct system may thus be "loaded" with constructs which are of limited utility to him in his constant search for effective means by which to anticipate events.

But again according to Kelly's statement of personal construct theory, experience is made up of the successive reconstruing of events, and movement toward and the "improvement" of prediction based on these. So changes in the range of convenience of constructs and in the total construct system presumably would occur, and this would be, hopefully, in such directions as would improve prediction.

Two areas of directed (i.e., by others) change where this concept of range of convenience is used, though not under the same nomenclature, come to mind. In education and teaching, for example, one central objective is almost uniformly to increase the student's application of learned principles. More relevant in terms of personality theory,
perhaps, is the area of psychotherapy. Here seems to be inferred the concept of developing a more effective range of convenience, at least of particular types of constructs (such as seeing more people as potentially accepting), but it is obscured under the over-all heading of generalization. Perhaps the most closely related view is that of the semantic therapists, whose objectives are to clarify the levels of abstraction—and hence the ranges of convenience—of the concepts used by the client so that they will be of maximal utility to him.

However, while this seems to be an area of rather general, if hazy, concern among those involved with change in personality and through education, no specifically relevant research has been found in the literature.

We remain with our question as to whether change occurs in the range of convenience of an individual's constructs and construct systems in such directions as would improve his predictions. We would hypothesize that this will usually mean that the range of convenience of the dimensions he uses will increase, and this we propose to investigate.

Dependencies

The plural form of the word above is used intentionally. In personal construct theory, whether or not an individual is "dependent" or "independent" is a relatively
meaningless question, as all people are assumed to be "de­
pendent." The most significant question is whether the
individual makes appropriate allocations of his dependen­
cies: as related one would seem to be the extent to which
he construes all others or no one as "leaning-posts-or-not,"
i.e., indiscriminately perceives all or no people as pre­
dominantly suppliers or non-suppliers of dependency needs.

The theme of dependence growing toward independence
is a central one in nearly all textbooks on adolescence.
With the group we are studying, its inclusion seems almost
inescapable. Dollard and Miller (9) assume it as an "of
course" in our society: "in our society people learn inde­
pendence" (p.93). They also assume it as a desirable goal
of psychotherapy. Wolberg (49), with practically every
other writer in the field of psychotherapy, discusses at
length how to deal with "dependency problems." There seems
no question but that this is generally perceived as an
important dimension of growth.

To return to personal construct theory, the direction
of change hypothesized is toward appropriate allocation of
dependencies, and an appropriate balance of use of the
dependency dimension in perceiving other people. For still
maturing individuals, both these are hypothesized, and the
appropriate allocation is presumed to be in the direction
of wider distribution.
Strangely, while this is a clear and important concept in personal construct theory, and while there has even been a special modification of the Role Construct Repertory Test devised to study this question (the Situational Resources Repertory Test (20)), no research in the area seems to have been published. We are thus left with our questions, or hypotheses—whether dependency allocations, as we predict, become more widely distributed, and whether use of the dependency dimension in perceiving other people will come into appropriate balance. These also we shall investigate.

**Construct Content Types**

Three particular content categories of construct-contrast dimensions appear to have "caught the eye" of other researchers as well as this one in terms of their significance as measures of change in the direction of improved prediction. While there are multitudinous possibilities in this area of content categories, we shall confine ourselves to looking into these three.

"Dynamic" construct dimensions, i.e., those which permit the perceived figure to change rather than holding him fixed and immutable in his position, would increase, according to personal construct theory, as a person moves in the direction of improving his predictions. Such perceptions—i.e., "dynamic" ones—seem intuitively to be
— negatively related to rigidity factors such as those discussed in literature on brain damage and in Freudian writing on compulsivity as well as in various other aspects of personality theory. This apparent relationship was investigated by Maher (27) with college students. He found that his subjects used relatively few non-dynamic dimensions (the median was four out of a possible twenty-two), and that there was no relationship between their performance on the Role Construct Repertory Test in this respect and their Einstellung performance. For reasons partially related to recent findings on the Einstellung measure and partially related to the clarity of personal construct theory prediction in this matter, we shall still investigate this hypothesis: that "dynamic" construct dimensions and their use will increase in the change process.

"Psychological" constructs--those dealing with personality traits or psychological attributes as opposed to physical, situational or relational dimensions--might also be hypothesized to increase according to personal construct theory. (Or is this merely a psychologist's wishful thinking?) Rohrer (41) investigated this area, and found that neuropsychiatric patients used fewer psychological constructs than did "normals"; this would fit in with the hypothesis that improved prediction means increased use of such dimensions. He also found that hospital patients decreased their use of psychological constructs during their
hospital stay, which, if we assume that hospitalization implies improvement, is a finding in reverse of our hypothesis. This last assumption (hospitalization = improvement), however, is sufficiently uncertain, and other possible explanations sufficiently reasonable, that we shall continue to hypothesize that psychological construct dimensions and their use will increase as part of the process of change toward improved prediction. This also we shall investigate.

"Value" or "conventionalized" construct dimensions, i.e., those commonly (in our culture) considered "good" or "bad," "virtuous" or "evil," may be presumed from personal construct theory to lessen in number and use with improvement in predictive power. Rogers and Dymond (40) include a study in their battery of research on psychotherapy on the effect of psychotherapy on acceptance of others, which would seem intuitively to be negatively related to the use of value dimensions in construing others. (Their findings, however, did not show significant relationship.) Freudian theory, with its comment on the power of a too-severe superego seems also related. Erich Fromm also plays on this theme (11). The picture of the "ideal" psychotherapist as "non-judgmental" or "value-free" which we find in a vast majority of writings on psychotherapy would seem to indicate freedom from value judgments as the ultimate peak of development!
Specifically, however, in personal construct theory, Kelly, in his statement that "man is not necessarily a victim of his culture" (20, p. 700) seems to imply that he hopefully moves toward not being so. We will therefore continue with our hypothesis that value dimensions—assessing others as "virtuous" or "evil"—will decrease in number and use with the change toward improved prediction.

We are, then, in summary, investigating the hypotheses on the content of construct-contrast dimensions that "dynamic" and "psychological" dimensions will become more numerous and more used, while "value" dimensions will decrease in number and use, in the process of change within our group.
CHAPTER III

RESEARCH DESIGN

The Problem

Our research problem, then, is one of assessing some aspects of change and of the process of change, across a number of variables as indicated in the chapter previous. The design problem was to find an appropriate group (preferably, as indicated in the introduction, of "normals"), an appropriate instrument, an appropriate situation to maximize chances of meaningful change, an appropriate timing and procedure for the same purpose, and appropriate methods for analyzing results.

The Sample

Selected for this purpose was a group of freshmen women, all entering college and dormitory living for the first time. An effort was made to get all those in the entering class of the particular college who fitted into this category. Practical matters involving a very heavy placement testing schedule necessitated the omission of a few very high achievers in the physical sciences who had to take another test at the time set aside for this project, however. One hundred and one girls took the first test. Of
these, one foreign student and six transfer students were eliminated as special cases. Two were unable to complete the test because of tension and/or illness. Eleven more dropped out because of absence at the time of the second testing. Three completed the test but with sufficient errors in following instructions to make the protocols unscorable. The remaining group of seventy-eight freshmen women was used as the sample. Their ages range from sixteen to nineteen, their geographical background from New York to California and from rural to urban, and their interests from international relations, psychology and education to mathematics and science to "undecided." They are all able students: their mean score on the College Entrance Examination Board Scholastic Aptitude Test (Verbal Section) is 591—a standard deviation above that for college freshmen women throughout the country.

They are, in summary, a group of late adolescents that we may (hopefully) assume to be "normal" (i.e., without severe and diagnosed emotional problems), but they are all female, and within a limited range of ability and undoubtedly also of socioeconomic status. To the extent that these effect change process, we must generalize with caution.

The Instrument

Personal construct theory, like a few other theories, has its own characteristic methodology--the Role Construct Repertory Test. (It can hardly be called an instrument, as
Its modifications are so freely created and used as to obscure almost completely the presumably once created "original.") Basically, this methodology involves a series of role titles for various representative figures in the individual's life. The individual assigns figure names from his personal experience to these role titles. By considering these figures in combinations of three, it is possible for him then to identify construct-contrast dimensions by contrasting figures who are alike in some important way with the third figure who is different. These dimensions he then applies to the remaining figures as appropriate. For the group administration (which was used in this study) a grid or matrix form is used in which the individual enters the names of the role figures at the tops of columns, then, by comparing triads of figures circled in the rows, identifies his construct-contrast dimensions for each row in turn.

In working out the specific form of the Role Construct Repertory Test used in this study, several factors were taken into consideration. First, the group form of administration was decided on because of the necessity of getting a large group of individuals tested immediately following their arrival on campus. (Individual administrations would have prolonged this period by its very unwieldiness in time.) Second, we wished to have a range of types of roles--ones related to the new situation and ones related to the old; peer figures and authority figures;
figures with positive and with negative valence for the individual; those associated with conventionalized values, and so forth. Role titles were thus defined on this basis. Third, we wished to have some of each of these types of figures in each of two parts of the instrument, as we wished to be able to identify both what changes occurred in perceptions of the same figures and what changes occurred in the figures chosen to fill the same role titles if freedom to choose anew were given. Similarly, we wished to be able to see what changes occurred in the use of the originally identified construct-contrast dimensions, and also what changes in dimensions occurred if freedom to use new ones were given. And finally, we wished to have an instrument which we could persuade subjects to complete—i.e., not too tedious or ponderous a one.

For these reasons we evolved an instrument with a quadrant type of matrix (Appendix I). Essentially, it consists of twenty role titles to be filled in (i.e., given names from his own experience) by the subject on the first testing: on the second testing, ten of these names are given back to him for re-use, while he is asked to again fill in names for the ten remaining role titles, using the same or different ones, whatever he prefers, and if he remembers them. Similarly, there are twenty-four construct-contrast dimensions to be filled in on the first testing by comparing triads of figures; on the second testing, twelve of these
are given back for re-use, i.e., reapplication to the twenty figures while twelve more are left open to be filled in as on the first testing. Thus, on retest, in Quadrant I, "old" figures and "old" constructs are used; in Quadrant II, "old" figures and "old" constructs are used; in Quadrant III, "old" figures and "new" constructs are used; and in Quadrant IV, "new" figures and "new" constructs are used.

This form was put through several "dry runs" with small classes of upperclass psychology students, and sample scoring and rating was done to assure as far as possible that this instrument would produce results—hopefully the ones we hypothesized, but at least quantifiable ones!

As a final check, a few comparisons on the basis of variations from chance were made on the instrument as used in the final study, as follows.

If chance alone is operating, we might assume that changes in check patterns would be randomly distributed through the four quadrants, and thus that the number of changes in Quadrant I pattern will equal those in Quadrant II which will equal those in Quadrant III which will equal those in Quadrant IV. Presumably, however, since no new factors are operating in Quadrant I, while one (either new constructs or new figures) is operating in Quadrants II and III, and two (both new constructs and new figures) in
Quadrant IV, the number of changes in patterns of checks should range themselves as follows:

Quadrant I < Quadrants II or III
Quadrant IV > Quadrants II or III

Results of this analysis are given below in Tables 1 and 2.

**TABLE 1**

**MEAN NUMBERS OF CHANGES IN CHECK PATTERNS**

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadrant I</td>
<td>24.05</td>
</tr>
<tr>
<td>Quadrant II</td>
<td>32.22</td>
</tr>
<tr>
<td>Quadrant III</td>
<td>34.41</td>
</tr>
<tr>
<td>Quadrant IV</td>
<td>40.19</td>
</tr>
</tbody>
</table>

**TABLE 2**

**SIGNIFICANCES OF DIFFERENCES BETWEEN QUADRANTS IN MEAN NUMBERS OF CHANGES IN CHECK PATTERNS**

<table>
<thead>
<tr>
<th>Quadrants</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadrants I and II</td>
<td>6.49</td>
<td>&lt; .0001²</td>
</tr>
<tr>
<td>Quadrants I and III</td>
<td>6.57</td>
<td>&lt; .0001²</td>
</tr>
<tr>
<td>Quadrants IV and II</td>
<td>5.95</td>
<td>&lt; .0001²</td>
</tr>
<tr>
<td>Quadrants IV and III</td>
<td>5.43</td>
<td>&lt; .0001²</td>
</tr>
</tbody>
</table>

¹Wilcoxon Matched-Pairs Signed-Ranks Test.
²One-tailed tests.

It is clear that the four quadrants in our instrument produce amounts of change in the relationships predicted. That is, in Quadrant IV where two factors (figures and constructs) are "new" in the post-test, the amount of change is significantly greater than where only one is "new" (in Quadrants II and III); similarly, in Quadrant I where there
is no "new" factor in the post-test, changes are significantly fewer than in Quadrants II and III. This seems to lend support to our expectation that variations other than random or chance are being measured by our instrument.

The Procedure

Timing of test administrations in change assessment, i.e., when in the process of immersion into a new-culture-bath measurements are made, is an important factor, according to the Committee on Cross Cultural Education of the Social Science Council (44). It may be remembered that in the first chapter of this paper we referred to the stages identified in these studies—the initial spectator phase, the phase of involvement, the relatively stable modus vivendi phase, and the final phase of anticipation and reappraisal. For lack of any better rationale for timing choice, it was decided to attempt to apply these concepts to our college freshmen. Obviously, involvement starts early for them (especially as they are freshmen women, besieged as in all colleges by eager upperclass men). It was decided therefore to give the first administration as soon as possible after arrival on campus, in order to be as close to the pre-change spectator phase as feasible. This turned out to be the second day after arrival, when the test was given as part of an over-all placement test program which characteristically includes a number of items given for research purposes.
For the second testing, however, a more difficult question arose. In terms of phases, it seemed clear that we should try for near the end of the first "stable" modus vivendi phase—and we say the "first" because we suspect that college life as a freshman woman is not as a sophomore woman is not as a senior, and so on, and that college adjustment is very probably made up of a series of these cycles. But if we are studying change process, the end is not what we need to find, but rather a logical way station, and this is what we sought.

At this college, a number of the freshmen women will be going out on cooperative jobs off the campus and over the country after the first one or two quarters of study. These individuals are selected by the college administration on a number of bases such as maturity, financial need, job skills, and suitable job openings. It seemed to us that this would, if permitted to influence our selection of subjects, bias the group in more unpredictable ways than we cared to cope with. (And it would shrink the number, too!) In addition, what first Christmas vacation home from college is not a period of "reappraisal"? So we decided that approximately three months after the first test administration, i.e., as close to the end of the quarter ending just before Christmas as we could get without entanglement with final examinations, job assignment decisions, and Christmas parties was the best time—and the second testing was set for December 9.
As indicated above, the first administration was done as part of the freshman placement program, and students were notified by the college testing office to appear for this test as for all other aspects of the program. When the group was assembled and had received their test blanks, they were told briefly that this was a research project concerned with better understanding college freshmen's attitudes, and that they would be asked to come again for a brief session toward the end of the quarter. They were told it was not compulsory that they take the test, but that we would appreciate it very much if they would—and that they might also find it interesting, as it certainly was unlike any other tests they had been taking in that there were no right or wrong answers, and that the material on them was to be kept entirely confidential. (None refused, though two were unable to complete the task, pleading illness.) Specific instructions were given in written form (Appendix 1), and questions were answered from this form, with no further amplification.

Approximately a week previous to the second administration time, a note was sent out to those who had taken the test the first time, merely saying that as they doubtless remembered, it had been said that we would be asking for a brief session with them again toward the end of the quarter, and this was that request. Time and place were given, and the
comment that we very much appreciated their giving their time, as their participation was important and we were much interested in the outcomes of our study. A supplementary testing session was given that evening to take care of a few individuals who had time conflicts.

No oral instructions were given at this time, except to "take your papers and go ahead," and the students worked directly and entirely from the written materials given them (Appendix 1).

The Scoring

From the Role Construct Repertory Test protocol, with both verbally stated construct-contrast dimensions and figure names and the check patterns in the matrix, there appear a seemingly endless number of scoring possibilities, each giving some hopefully significant aspect of measurement. All possible variations have not been used (contrary to what the reader may feel as he goes through those which were), but only those relevant to specific hypotheses with which this researcher was concerned.

The protocols, it will be remembered, were composed of a pre- and a post-test for each individual. Sketching these in outline form may clarify our presentation of scorings. (Appendix 1 contains the full forms used.)
It will be seen thus, that in each quadrant we have different variations between pre and post test. Thus, on the post test, the subject is working in

Quadrant I with "old" figures and "old" constructs,
Quadrant II with "new" figures and "old" constructs,
Quadrant III with "old" figures and "new" constructs,
Quadrant IV with "new" figures and "new" constructs.
The scores can thus be divided accordingly as is meaningful for the hypotheses under examination.

Scoring was of three types, as follows:

1. **Number** of checks in each column (vertical) and each row (horizontal) in both pre- and post-tests, and in some cases the deviations of these from the theoretical and from the actual mean.

2. **Similarity** (i.e., matching of checks and voids) of each row (construct) check pattern with each other row pattern of the same test and of each column (figure) pattern of the same test for both pre- and post-tests.

3. **Change** from pre- to post-test in terms of
   a. number of new figure names used
   b. number of new construct-contrast dimensions as verbally labelled
   c. dissimilarity (i.e., lack of matching of checks and voids) of each row check pattern in the post-test from its parallel in the pre-test, and the same dissimilarity for each column check pattern
   d. differences in numbers of specific content types of construct-contrast dimensions (e.g., "psychological") from pre- to post-test.

This last, of course, required a previous rating of each dimension as, for example, "psychological" or not. The same was true of the judgment of the "newness" of verbally stated dimensions (3.b above). For these subjective
judgments a special process was set up to assess and assure reliability of ratings.

The Ratings

On each variable requiring subjective judgment, two judges rated verbally stated construct-contrast dimensions according to stated criteria (Appendix 2) on a random sample of ten paired (pre- and post-) protocols from this study, as well as ten paired protocols from another study (47) which also used the same type of instrument (the Role Construct Repertory Test) and the same variables. For the statistical test, phi coefficients were used primarily to assess the reliabilities, as ratings were made on a dichotomous basis. Maximal phi coefficients for each distribution were calculated, as well as chi-square conversions to check for significance. However, it was felt that it might also be reasonably assumed that the raters' judgments of a variable were along a continuous dimension (for example, some construct-contrasts are very "dynamic," some moderately so and in varying degrees, some not at all). For this reason, tetrachoric correlations were also calculated, and are also indicated in Table 3, given below.

Reliability as checked by both these methods (phi coefficients and tetrachoric correlations) seem within satisfactory range, and on this basis the remainder of the
TABLE 3
INTERJUDGE RELIABILITIES OF RATINGS OF 440
CONSTRUCT DIMENSIONS

<table>
<thead>
<tr>
<th>Variable</th>
<th>φ</th>
<th>φ_{max}</th>
<th>\chi^2</th>
<th>p</th>
<th>r_t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overlap (within test)</td>
<td>.87</td>
<td>.98</td>
<td>666.072</td>
<td>&lt;.01</td>
<td>.99</td>
</tr>
<tr>
<td>Overlap (between tests)</td>
<td>.91</td>
<td>.95</td>
<td>529.984</td>
<td>&lt;.01</td>
<td>.99</td>
</tr>
<tr>
<td>&quot;Extremes&quot;</td>
<td>.88</td>
<td>.91</td>
<td>681.427</td>
<td>&lt;.01</td>
<td>.99</td>
</tr>
<tr>
<td>Dependency</td>
<td>.78</td>
<td>.94</td>
<td>535.392</td>
<td>&lt;.01</td>
<td>.96</td>
</tr>
<tr>
<td>&quot;Dynamic&quot;</td>
<td>.86</td>
<td>.92</td>
<td>650.848</td>
<td>&lt;.01</td>
<td>1.0</td>
</tr>
<tr>
<td>&quot;Value&quot;</td>
<td>.76</td>
<td>.94</td>
<td>508.288</td>
<td>&lt;.01</td>
<td>.96</td>
</tr>
<tr>
<td>&quot;Psychological&quot;</td>
<td>.88</td>
<td>.95</td>
<td>681.427</td>
<td>&lt;.01</td>
<td>.98</td>
</tr>
</tbody>
</table>

protocols were rated by one judge only, using, of course, the same criteria as during the ratings for reliability checks.

The Analyses (Hypotheses and Statistical Tests)

A first step performed was the conversion of the broadly stated hypotheses (see previous chapter) into operational terms, and a second, determination of the appropriate statistical test. These decisions are summarized below.

1. General hypotheses

   a. As previously stated
1. the amounts of change in relation to figures and in relation to constructs will be positively related; and
2. the amount of change in relation to figures will be greater than that in relation to constructs.

b. As operationally defined, with appropriate statistical test

1. a. Number of changes in figure names and number of changes in verbally stated constructs will be positively correlated.
   (Product moment r)
   b. Numbers of pattern changes in Quadrants II and III will be positively correlated.
   (Product moment r)

2. a. Number of changes in figure names (i.e., percentages of total possible) will be greater than number of changes in verbally stated constructs (i.e., percentages of total possible)
   (Wilcoxon Matched-Pairs Signed-Ranks Test)
   b. Number of pattern changes in Quadrant II will be greater than number of pattern changes in Quadrant III
   (Wilcoxon Matched-Pairs Signed Ranks Test)

2. Generalization or?

a. As previously stated
   1. does the generalization curve appear overall in its classic form, and
2. in those individuals where this curve occurs, is there a minimum of "threat" or change as opposed to when it does not or where the Bieri form of the curve appears?

b. As operationally defined, with appropriate statistical test

1. a. In Quadrant I, those figures most similar in pattern on the pre-test to the most changed figure will change most and vice versa; i.e., there will be a positive correlation between degrees of change and of similarity.

(Product moment r)

b. In Quadrant III, those figures most similar in pattern on the pre-test to the most changed figure will change most and vice versa; i.e., there will be a positive correlation between degrees of change and of similarity.

(Product moment r)

c. In Quadrant I, those constructs most similar in pattern on the pre-test to the most changed construct will change most and vice versa; i.e., there will be a positive correlation between degrees of change and of similarity.

(Product moment r)

d. In Quadrant II, those constructs most similar in pattern on the pre-test to the most changed
construct will change most and vice versa: i.e., there will be a positive correlation between degrees of change and of similarity.

(Product moment r)

2. a. In Quadrant I,

1/ for those S's with positive correlation between similarity on pre-test to most changed figure and degree of change, as opposed to those with negative correlation;

(Phi coefficient φ)

a/ total change in figure names will tend toward the mean.

(Moses Test of Extreme Reactions)

b/ total change in figure patterns will tend toward the mean.

(Moses Test of Extreme Reactions)

c/ change in the most changed figure will tend toward the mean.

(Moses Test of Extreme Reactions)

2/ for those S's with positive correlation between similarity on pre-test to most changed construct and degree of change, as opposed to those with negative correlation;

(Phi coefficient φ)
a/ total change in constructs (verbally stated) will tend toward the mean.
   (Moses Test of Extreme Reactions)

b/ total change in construct patterns will tend toward the mean.
   (Moses Test of Extreme Reactions)

c/ Change in the most changed construct will tend toward the mean.
   (Moses Test of Extreme Reactions)

b. In Quadrant II

1/ for those S's with positive correlation between similarity on pre-test to most changed construct and degree of change, as opposed to those with negative correlation;
   (Phi coefficient)

a/ total change in constructs (verbally stated) will tend toward the mean.
   (Moses Test of Extreme Reactions)

b/ total change in construct patterns will tend toward the mean.
   (Moses Test of Extreme Reactions)

c/ change in the most changed construct will tend toward the mean.
   (Moses Test of Extreme Reactions)
c. In Quadrant III,

1/ for those S's with positive correlation between similarity on pre-test to most changed construct and degree of change, as opposed to those with negative correlation;

\[(\Phi\text{ coefficient } \varnothing)\]

a/ total change in figure names will tend toward the mean.

(Moses Test of Extreme Reactions)

b/ total change in figure patterns will tend toward the mean.

(Moses Test of Extreme Reactions)

c/ change in the most changed figure will tend toward the mean.

(Moses Test of Extreme Reactions)

3. Differentiation (Cognitive Complexity)

a. As previously stated

1. do our subjects increase in the number of dimensions they have available, and

2. in their discrimination in the use of them?

b. As operationally defined, with appropriate statistical test

1. Number of overlapping constructs (verbally judged) in the pre-test will be greater than in the post-test.

(Wilcoxon Matched-Pairs Signed-Ranks test)
2. Mean of total similarity of figure patterns in the
pre-test will be greater than in the post-test.
(Wilcoxon Matched-Pairs Signed-Ranks test)

3. Mean of total similarity of construct patterns in
the pre-test will be greater than in the post-test.
(Wilcoxon Matched-Pairs Signed-Ranks test)

4. Range of convenience
   a. As previously stated
      Range of convenience of individual construct systems
      will increase.
   b. As operationally defined,\(^1\) with appropriate statisti-
      cal test
      1. Over-all, constructs used on the post-test will
         have a wider range of convenience than those used
         on the pre-test.
         (Wilcoxon Matched-Pairs Signed-Ranks Test)
      2. Constructs given on the post-test will have a
         wider range of convenience than those given on the
         pre-test, i.e.,

---

\(^1\)Kelly notes in his discussion of the analysis of Role
Construct Repertory Test protocols that while we may safely
assume that a check for a figure on a given construct means
it is within the range of convenience of that dimension, we
may not safely assume that a blank means it is not; it may
mean that the figure is at the contrast end. Because of
this defect in method, it has been suggested that subjects
be asked to mark (+) if the figure is at the construct end
of the dimension, (-) if it is at the contrast end, and leave
a blank when the dimension does not apply. This we (unfor-
tunately for this purpose) did not do. We can thus only hope-
fully assume that the number of checks will give us an incom-
plete, but directionally accurate, indication of the extent
of applicability or range of convenience of a given dimension.
a. Number of checks in Quadrants III and IV of the pre-test will be less than in Quadrants III and IV of the post-test.  
(Wilcoxon Matched-Pairs Signed-Ranks Test)
b. Number of checks in Quadrants III and IV of the post-test will be greater than in Quadrants I and II of the post-test.  
(Wilcoxon Matched-Pairs Signed-Ranks Test)

3. Constructs given on the pre-test will decrease in range of convenience when re-used on the post-test.
a. Number of checks in Quadrants I and II of the pre-test will be greater than in Quadrants I and II of the post-test.  
(Wilcoxon Matched-Pairs Signed-Ranks Test)

4. "Extreme" constructs (verbally judged) will decrease and become less used on the post-test.
a. Number of "extreme" constructs (verbally judged) on the pre-test will be greater than on the post-test.  
(Wilcoxon Matched-Pairs Signed-Ranks Test)
b. Mean number of checks per "extreme" constructs on the pre-test will be greater than on the post-test.  
(Wilcoxon Matched-Pairs Signed-Ranks Test)

5. Dependencies
   a. As previously stated
1. the use of the dependency dimension for perceiv­
ing other people will come into appropriate balance, and
2. dependency allocations will become more broadly distributed.

b. As operationally defined, with appropriate statistical test

1. Number of dependency constructs used will tend toward a mean in the pre-test less than in the post-test.
   (Wilcoxon Matched-Pairs Signed-Ranks Test)

2. Mean number of checks per dependency construct will be less in the pre-test than in the post-test.
   (Wilcoxon Matched-Pairs Signed-Ranks Test)

6. Construct Content Types

a. As previously stated

1. "dynamic" constructs will increase in number and be more used,

2. "psychological" constructs will increase in number and be more used, and

3. "value" constructs will decrease in number and be less used.

b. As operationally defined, with appropriate statistical test
1. a. Number of "dynamic" constructs used on the pre-test will be less than on the post-test.
   (Wilcoxon Matched-Pairs Signed-Ranks Test)
   b. Mean number of checks per "dynamic" construct on the pre-test will be less than on the post-test.
   (Wilcoxon Matched-Pairs Signed-Ranks Test)

2. a. Number of "psychological" constructs used on the pre-test will be less than on the post-test.
   (Wilcoxon Matched-Pairs Signed-Ranks Test)
   b. Mean number of checks per "psychological" construct on the pre-test will be less than on the post-test.
   (Wilcoxon Matched-Pairs Signed-Ranks Test)

3. a. Number of "value" constructs used on the pre-test will be greater than on the post-test.
   (Wilcoxon Matched-Pairs Signed-Ranks Test)
   b. Mean number of checks per "value" construct on the pre-test will be greater than on the post-test.
   (Wilcoxon Matched-Pairs Signed-Ranks Test)
CHAPTER IV

RESULTS AND DISCUSSION

Generality of Change

This group of hypotheses had to do with the generality of change, and with a particular finding of Bieri's (2). We wished first to see whether the amount of change in constructs and in figures, as measured through verbal change and through pattern changes in the appropriate quadrants, were positively correlated. Results are given in the following table.

TABLE 4

<table>
<thead>
<tr>
<th>Construct-FIGURE CHANGE RELATIONSHIPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Correlation</td>
</tr>
<tr>
<td>Construct change/ figure change (verbally measured)</td>
</tr>
<tr>
<td>Construct change (Quadrant III)/ figure change (Quadrant II) (patterns)</td>
</tr>
</tbody>
</table>

\textsuperscript{1}One-tailed test.

It seems, as expected, that there is a clear and statistically significant relationship between figure change and construct change. Certainly, however, it is not high
enough to be adequate for individual prediction: the proba-
ability is high that the individual who is changing his
perceptions of significant people in his life is also find-
ing new dimensions across which to view them, but it is not
by any means a certainty. Apparently the degree to which
one type of change goes on is not a sure predictor of the
degree to which the other is also—and individuals do differ.

We also hypothesized, as check on Bieri's findings
(2), that in general figure changes would be greater than
construct changes, both as measured by amount of pattern
change and as measured verbally. Table 5 below gives our
results on this question.

**TABLE 5**

<table>
<thead>
<tr>
<th>MEAN CHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figures (Quadrant II)</td>
</tr>
<tr>
<td>As verbally measured (percentages)</td>
</tr>
<tr>
<td>Pattern changes³</td>
</tr>
</tbody>
</table>

¹Wilcoxon Matched-Pairs Signed-Ranks Test.
²One-tailed tests.
³For scoring derivation, see 3.c. on page 43.
Our hypothesis is supported by this data when verbal measures are used, but not when the pattern measures are. In fact, here the trend appears (though with what significance cannot be identified) to be in the opposite direction. Two explanations appear to be possible for this last.

There is first the possibility—even likelihood—of a statistical artifact in the data. This is that there is room in any given quadrant for twelve construct dimension changes, but only for nine figure name changes. (One of the ten is the self, real or ideal, whose name, thus does not change.) Thus, intuitively it would seem probable that in a matrix of the dimensions 9 (figures) by 12 (constructs), there would be less pattern change where the dimension of 12 (constructs) was held constant and that of 9 (figures) permitted to vary than vice versa. This possible artifact might well be powerful enough to nullify any significance of results in the opposite direction. It does not hold, of course, for the verbal measures, as it can there be corrected by the use of percentages.

Secondly, there is a theoretical possibility of explanation of these findings, as suggested by Baker's work (1). This is that in the "growing-up" process (and our subjects are late adolescents, certainly still in this process), constructs are developing and changing with considerable rapidity. This might well, it would seem be accelerated considerably with immersion in a new culture or situation,
as was the case with our subjects. On the other hand, the identification of new "important figures" would probably also be accelerated—and in what relationship these two accelerations would function is problematic. It seems, therefore, that all we can say is that our attempted confirmation of Bieri's finding (2) is suggestive (in that it holds when using verbal measures), but is not conclusive, as there is a possible artifact in a part of our data which is not extricable in such a way as to make the results trustworthy.

One other point of interest in the data, however, becomes clear if the pattern changes are converted into percentages. They are approximately 30 per cent of the total possible change in any quadrant (which is 108). It seems, thus—though we have no conclusive significance level on which to lean—that our group is both changing names of figures more than stereotypes and changing names of construct dimensions more than their use. This again seems intuitively reasonable as a mode of change, and has, as a matter of fact, long been a concern of both educators and therapists. Further study is needed of situations and stages of development in which this tendency does or does not appear, and of course even this finding needs checking for possible artifacts as well as for significance.
Generalization or ?

Our first group of hypotheses in this section relate to the classic generalization curve—a sloping linear gradient across the dimensions of change and similarity. One check on such a concept is a correlation: these are given in the table below.

**TABLE 6**

**DEGREE OF CHANGE AND SIMILARITY TO MOST CHANGED ITEM**

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>$r$</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (Figures)</td>
<td>.15</td>
<td>not significant</td>
</tr>
<tr>
<td>III (Figures)</td>
<td>-.10</td>
<td>not significant</td>
</tr>
<tr>
<td>I (Constructs)</td>
<td>.08</td>
<td>not significant</td>
</tr>
<tr>
<td>II (Constructs)</td>
<td>.02</td>
<td>not significant</td>
</tr>
</tbody>
</table>

It is apparent that these relationships are not along true linear gradients, and that in no case of change in figures or constructs does the classic generalization curve hold to the point of statistical significance. This is in accord with Bieri's findings. He, in addition, suspected from his data a different kind of curve of generalization (Figure 2), starting with low change in the most similar items and rising before taking the classic form of downward slope toward minimal similarity and minimal change. Curves produced by our data are shown below.
Degree of Change and Similarity: Figures

Similarity to Most Changed Figure
Figure 4

Degree of Change and Similarity: Constructs

Similarity to Most Changed Construct
Figure 5
Notable here is the "fit" of Bieri's concept of the generalization curve—except for that for figure change in Quadrant III. This is the quadrant in which "new" constructs, derived from the same triad as the "old" ones, are applied to the "old" or same figures. This curve also appears to be very similar in form to the others except for an initial high "tail," expressing high change for very similar or practically identically construed figures. While this "tail" may be a chance variation, there seems a possible reason for it, intuitive, to be sure, which lies in a presumably high affect-loading of significant figures. Constructs or dimensions seem less affect-loaded than people, and thus this effect may not appear in these areas (Figure 5). In Figure 4, however, Quadrant I shows the Bieri curve, "low at the ends and high in the middle." In this quadrant, the subject reconstrues the same figures using the same constructs, and there is no way for him to deal with the threat of change in one affect-laden figure except to "hold tight" to his old construings of the most similar figures. In Quadrant III, however, another maneuver is possible to avoid too much stress: he can change constructs, and thus to some extent change the most similar figures with the most changed ones, still leaving them safely "together." Perhaps, thus, the Bieri curve in this case only starts a short similarity-distance from the most changed figure, but continues after this operation has lessened the threat of
change within a cluster of important and similarly con-
strued figures.

In our second group of hypotheses, we also used this concept of "threat," and suggested that with extremes of change (much or little), there might be a different form of the curve appearing than when change was more moderate. More specifically, we suggested that where the classic generalization curve holds, there would be moderate change, but that some other form of curve, perhaps that of Bieri, would be characteristic of individuals showing more extremes of change, either high or low. Table 7 below indicates our findings on this point. ("Classic" generalizers are defined as those with positive change—similarity phi coefficients. See pages 47-48 for detailed hypotheses.)

Our hypotheses appear to be generally upheld, except in two situations. Over-all patterns of change do not seem to uniformly show this characteristic difference, nor do Quadrant I figure measures.

One may suspect in the first case (over-all change patterns) that too many variables are involved to show any clear trend. One of these might be "changes" which are not real ones, but rather simple reversals (e.g., "good-bad" to "bad-good" based on a shift in perception of one member of the basic triad from which that dimension was derived). Another might be weary "chance" checking done by subjects as they tired of the task. And there may be others.
TABLE 7

"MODERATE" VS "EXTREME" CHANGE AS DIFFERENTIATING "CLASSIC" GENERALIZERS FROM OTHERS

<table>
<thead>
<tr>
<th>Re Figures</th>
<th>Significance of Differences¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in most changed figure</td>
<td>Quadrant I not signif.</td>
</tr>
<tr>
<td>Change in total figure patterns</td>
<td>Quadrant III &lt; .001</td>
</tr>
<tr>
<td>Change in figure names</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; .02</td>
</tr>
<tr>
<td></td>
<td>&lt; .05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Re Constructs</th>
<th>Quadrant I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in most changed construct</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Change in total construct patterns</td>
<td>&lt; .02</td>
</tr>
<tr>
<td>Change in constructs (verbal)</td>
<td>not signif.</td>
</tr>
<tr>
<td></td>
<td>not signif.</td>
</tr>
<tr>
<td></td>
<td>&lt; .001</td>
</tr>
<tr>
<td></td>
<td>&lt; .05</td>
</tr>
</tbody>
</table>

¹Moses Test of Extreme Reactions.

In the second case, measures of figure change in Quadrant I seem not to differentiate significantly either. It is interesting to note that this is the same area, though not the same quadrant in which we saw the added initial "tail" on an otherwise Bieri-type curve (Figure 4). It may be that the heavy affect-loading of significant figures combined with the impossibility of construct-change in this Quadrant I produces some particular effect which we failed to predict. Perhaps the separate curves for the "classic" generalizers as opposed to the others in each of these groups will clarify what has happened here.
Figure 6
Figure Change and Similarity

Figure 7
Construct Change and Similarity
In Figure 6, it is apparent that the change in most similar figures is reversed in Quadrant I and Quadrant III. That is, in Quadrant III, most similar figures are most changed in the case of "classic" generalizers (who are also significantly less extreme in amounts of change) and least changed for the others who are more extreme in change (and perhaps more threatened). In Quadrant I, this is reversed: most similar figures are less changed by the "classic" generalizers, while the others change most similar figures more. There is an unanswerable question of significance here, but perhaps this indicates a reversal of effect between the earlier mentioned combination of heavy affect-loading of significant figures and the impossibility of construct change, as appears in Quadrant I, and the same heavy affect-loading combined with potential construct change, as in Quadrant III.

Figure 7, showing patterns of construct change, however, does not also demonstrate this difference. As in Quadrant III figure change, most similar constructs are most changed by "classic" generalizers, while the others change less their most similar figures. Thus Quadrant I—that in which we identified the "threat" of change of figures most similar to the maximally changed one paired with the impossibility of reconstruing to reduce this "threat"—is the only one where our pattern of differentiation between "classic" generalizers and others at the points of greatest
and next-to-greatest similarity does not hold. And it is the one where changes do not significantly differentiate "classic" generalizers from others. Possibly, then, our over-all hypotheses on "threat" or amount of change as differentiating the generalization curves holds when—and only when—this "threat" is not too great, or where there is some freedom to use another mechanism (e.g., reconstruing) to deal with it.

Over-all, then, we confirm Bieri's finding that the classic generalization curve is not characteristic, at least of our total group of subjects, and that as a group there seems to be a tendency for their generalization curves to be "low at the ends and high in the middle" as his data would suggest. Beyond this, we do seem to find that there are some subjects who do follow the classic generalization gradient in their changing of their construct systems, and that these are, by and large, those for whom the amount of change (and thus perhaps "threat") is neither very high nor very low. This distinction fails in one case only—that where one may intuitively postulate high affect-loadings with no freedom to reconstrue, and thus perhaps almost uniformly (for all subjects) high "threat." It would seem, therefore, that the Bieri curve of generalization is by no means a general pattern for all individuals, and that we need to explore more fully the conditions under which it occurs—especially related to degree of threat.
Differentiation (Cognitive Complexity)

We hypothesized in this area that our subjects would become increasingly discriminating, i.e., cognitively complex. They would thus move toward more different construct dimensions as verbally defined, and their applications of these to figures would become less stereotyped or similar. Table 8 below summarizes our findings.

Table 8
CHANGES IN DIFFERENTIATION (COMPLEXITY)

<table>
<thead>
<tr>
<th></th>
<th>Pre-test Mean</th>
<th>Post-test Mean</th>
<th>Significance of Predicted Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overlapping constructs as verbally stated</td>
<td>18.7</td>
<td>17.8</td>
<td>p &lt; .14</td>
</tr>
<tr>
<td>Similarity in figure patterns</td>
<td>7.25</td>
<td>7.56</td>
<td>not signif.</td>
</tr>
<tr>
<td>Similarity in construct patterns</td>
<td>1.22</td>
<td>1.20</td>
<td>p &lt; .44</td>
</tr>
</tbody>
</table>

1Wilcoxon Matched-Pairs Signed-Ranks Test.
2One-tailed tests.

It is apparent that figures, i.e., the people in our individuals' worlds, do not become more differentiated. If anything, they become more stereotyped, although we have no indication that this trend is statistically significant. Our group does, however, seem to move somewhat toward more complexity of construct dimensions (verbally labelled), although the low significance (p < .14) raises question on
the validity of this finding. In discrimination between construct patterns, they appear to increase also, though at such a low level of significance that we cannot assume this to be a stable direction.

We can only conclude from this data that while the change process towards greater differentiation and cognitive complexity of construct systems may be going on in our group, we have not "caught" it in our research net. For these late adolescents coping with a new culture, other types of change are apparently overshadowing this one in significance. Again, intuitively and by hindsight, this seems reasonable. This may well be a time of expansion and broader generalization rather than of differentiation. Our next section, on the range of convenience or applications of construct dimensions, may shed more light on this question. Let us see.

Range of Convenience

In this area, we hypothesized that as a part of the improvement in predictive power of the individual's construct system, the range of convenience would increase over-all, including a number of effects which would bring this about. Table 9 below indicates some of the differences found.

It will be noted that our subjects show a substantial and significant tendency to increase the number of
TABLE 9

CHANGES IN MEAN USE OF ALL CONSTRUCTS

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadrants I and II</td>
<td>83.33</td>
<td>92.75</td>
</tr>
<tr>
<td>p</td>
<td>not sign.</td>
<td>p .0016</td>
</tr>
<tr>
<td>Quadrants III and IV</td>
<td>86.78&gt;</td>
<td>97.32</td>
</tr>
<tr>
<td>p</td>
<td>.00001</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>170.11</td>
<td>190.08</td>
</tr>
<tr>
<td>p</td>
<td>.00001</td>
<td></td>
</tr>
</tbody>
</table>

¹One-tailed tests, using Wilcoxon Matched-Pairs Signed-Ranks Test.

applications of all constructs: the difference is approximately 20 (p < .00001). The increase of range of convenience of the "new" constructs given on the post-test (in Quadrants III and IV) over those given and used on the pre-test (in Quadrants III and IV) is also clear (10.54, p < .00003). And so is the increased applicability of the "new" constructs on the post-test over those "old" ones which are being re-used in Quadrants I and II (4.56, p < .0116). However, it is interesting that the expanding utility of construct systems seems to include even the "old" and (we assumed) less useful construct dimensions. Our prediction that these would decrease in range of convenience fails to achieve significance; as a matter of fact, the change appears to be in the opposite direction, and even these "old" constructs also increase in usefulness!

We also hypothesized that "extreme" construct dimensions, i.e., those of more limited applicability by verbal
definition, would decrease in numbers and use. Table 10 indicates our results on this aspect of range of convenience changes.

TABLE 10

CHANGE IN OCCURRENCE AND USE OF "EXTREME" CONSTRUCTS

<table>
<thead>
<tr>
<th></th>
<th>Pre test</th>
<th>Post test</th>
<th>Significance of predicted differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean number of &quot;extreme&quot; constructs used</td>
<td>5.9</td>
<td>5.0</td>
<td>p &lt; .001</td>
</tr>
<tr>
<td>Mean usage per &quot;extreme&quot; construct</td>
<td>5.7</td>
<td>6.6</td>
<td>not signif.</td>
</tr>
</tbody>
</table>

1 Wilcoxon Matched-Pairs Signed-Ranks Test.
2 One-tailed tests.

It appears that the construct vocabulary of these subjects does decrease in its inclusion of "extremes" (such as "always cheerful," "highest ideals"), but even here, more people are identified as within the range of these constructs when they are used. Our hypothesis that such dimensions will decrease in utility is not supported, and again, the contrary seems true.

Over-all, then, these subjects--late adolescents newly exposed to the world of college--seem to be expanding the applicability of the dimensions across which they view their worlds. More people are included and predicted--and thus, one would guess, much less of their new world is strange to them. This might well be an aspect of the change
process for this particular age and situation for these subjects, it seems, however; as such it appears intuitively reasonable. But we may well be wary of generalizing this striking pattern of expansiveness to all human change processes, as we noted in the previous section. And in addition, for the purposes of this research, we wonder how such a pronounced direction of change will affect other hypotheses relating to utility of construct dimensions. We must see.

Dependencies

Our hypotheses in this section were that the number of dependency dimensions used for perceiving others would become less extreme, and that these dimensions would be more broadly allocated—i.e., that in another sense, the range of convenience of dependency constructs would increase. Table 11 below gives our findings.

TABLE 11
CHANGE IN OCCURRENCE AND USE OF DEPENDENCY CONSTRUCTS

<table>
<thead>
<tr>
<th></th>
<th>Pre test</th>
<th>Post test</th>
<th>Significance of predicted difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean number of dependency constructs used</td>
<td>11.1</td>
<td>9.9</td>
<td>(no prediction)</td>
</tr>
<tr>
<td>Mean deviations from these means</td>
<td>5.1</td>
<td>4.2</td>
<td>$p &lt; .01^2$</td>
</tr>
<tr>
<td>Mean usage per construct</td>
<td>7.6</td>
<td>8.5</td>
<td>$p &lt; .001^2$</td>
</tr>
</tbody>
</table>

1 Wilcoxon Matched-Pairs Signed-Ranks Test.
2 One-tailed tests.
It is clear that there is a significant trend away from the extremes of using very many or very few dependency constructs \((p < .01)\), as we hypothesized. Our prediction as to broader allocations of these dependencies seems also supported. It is interesting, in addition, that while we predicted no direction in the change in the number of such dimensions used, there seems to be a slight decrease, and this does, upon checking, appear significant \((p < .03, \text{ two-tailed test})\). Again, for this group of subjects who are at the college freshman stage of burgeoning independence, this decrease seems intuitively reasonable, though it is not a basic part of personal construct theory.

**Construct Content Types**

Here we hypothesized that "dynamic" and "psychological" dimensions would increase in frequency and use, and that "value" constructs would decrease in the same ways. Results are given below in Table 12.

It is clear that our predictions are all supported except for that of decrease in the utility of "value" constructs: they appear to increase in applicability, and thus our hypothesis is not upheld.

In relation to "dynamic" construct dimensions, it is interesting that our subjects used an average of 44 to 45 out of a possible 48: Maher (27), as reported earlier, found his college student subjects using approximately 18 out of
TABLE 12

CHANGE IN OCCURRENCE AND USE OF CONSTRUCT CONTENT TYPES

<table>
<thead>
<tr>
<th></th>
<th>&quot;Dynamic&quot;</th>
<th>&quot;Psychological&quot;</th>
<th>&quot;Value&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean number of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>constructs used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre test</td>
<td>44.4</td>
<td>41.8</td>
<td>4.25</td>
</tr>
<tr>
<td>Post test</td>
<td>45.0</td>
<td>42.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Significance of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>predicted differ.(^1)</td>
<td>p &lt; .01(^2)</td>
<td>p &lt; .05(^2)</td>
<td>p &lt; .01(^2)</td>
</tr>
<tr>
<td>Mean usage per</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>construct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre test</td>
<td>7.2</td>
<td>7.2</td>
<td>7.2</td>
</tr>
<tr>
<td>Post test</td>
<td>8.0</td>
<td>8.0</td>
<td>8.6</td>
</tr>
<tr>
<td>Significance of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>predicted differ.(^1)</td>
<td>p &lt; .001(^2)</td>
<td>p &lt; .001(^2)</td>
<td>not signif.(^2)</td>
</tr>
</tbody>
</table>

\(^1\)Wilcoxon Matched-Pairs Signed-Ranks Test.
\(^2\)One-tailed tests.

a possible 22. "Dynamic" dimensions, are apparently high in the repertoire of college students wherever they may be: permitting others change and movement is part of their pattern of perception. And from our data, it seems to increase, at least early in their college stay.

"Psychological" dimensions we found to be increasing also. "Institutionalization" in a college setting seems to produce, or at least permit, this effect: Rohrer (41), quoted earlier, found the reverse to be true for "institutionalization" in a mental hospital. This is a comforting note for college counselors who sometimes in moments of
gloom feel an awful similarity between the two types of institutions! More seriously, however, it is also doubtless reflecting a real difference in interactions patterns and environment, and perhaps indicates a direction in which mental hospitals might well be moving—indeed, one in which many already are.

In relation to "value" dimensions, we do find the predicted decrease in the extent of naming these as "important" differentiating criteria. When they are so identified, however, their use is apparently increased, and our hypothesis of decrease is not supported. It may be recalled that we earlier made reference to this hypothesized decrease as possibly related to acceptance of others, i.e., to non-judgmental attitudes. This inferred relationship raised question for us as to a possible difference between those dimensions where the positive ("good") pole was emergent (i.e., where checks indicate judgment of "virtue"), and those where the negative ("bad") pole was the one to which checks applied. We found that the use of the positive pole increased markedly \( p < .001 \), while the use of the negative pole decreased \( p < .309 \) though not reaching a level of satisfactory significance. Apparently, then, if these data were indicative of general change process (and admittedly this is a unique group of subjects), the over-all hypothesis we set up earlier needs refinement in some such fashion as this: "value" dimensions will become less prominent in the
repertoire, and applications of these dimensions will increase at the positively valued pole and decrease or remain equal at the negatively valued pole. This restatement seems consistent with Rogerian theory on increased acceptance of others, if not with personal construct theory, which does not emphasize this aspect of interpersonal relationships.
CHAPTER V

SUMMARY AND CONCLUSIONS

We have made a number of predictions concerning change process in personal construct systems, using Kelly's Theory of Personal Constructs as a base. Our procedure was a test-retest check in a "real" rather than an experimental situation, but also in a situation and with a group in which we might expect maximal change within a short period. These procedural decisions have introduced a very real — and sometimes confusing— multiplicity of factors.

Prominent among these is the fact that while we have used this group to test many general change process predictions, we still may not legitimately go too far beyond groups of this type in our generalizations from our own results. This was a selected (for "academic ability" and "normalcy") group: it was a group at a particular point in late adolescence: it was a group just thrust into a new culture and living setting. Whether our confirmation or disconfirmation of particular theoretical predictions would hold with less selected groups, with groups of different ages, or with groups in different life situations, we do not know. We find ourselves, therefore, raising these questions
on all our findings, and identifying needs for further 
research in these areas.

Despite this, however, some of our findings stand 
out in clear confirmation of the results of earlier experi­
mental work and/or of theory heretofore untested. Some 
others do per se raise specific critical questions for 
further study.

For example, we find first that there is apparently 
a general change factor working: that is (beyond the fact 
that our group did change significantly in the three months 
between test administrations) that a person who is changing 
his perceptions of people is apt to be also and to somewhat 
the same degree changing the dimensions across which he 
orders these perceptions. But this is not a "tight" rela­
tionship, and there are apparently wide individual vari­
tions. In this group, naming specific people as representing 
certain figure descriptions changed more than did the 
dimensions across which these people were construed by the 
individual (at least at a verbal level), and this confirms 
earlier experimental work. However, there are questions 
here which need further study. As we have said earlier, 
change processes may not be uniform, either at different 
stages of development or under different conditions. Some­
times construct dimensions may be changing apace, while the 
persons in the individual's world stay fairly stable. 
(Perhaps this is true in normal childhood, or in long
psychotherapy, for example.) And sometimes people may be changing, but the terms in which they are construed stay quite stable. (This might be true in a move to a new city, or job, or a college, as in this case.) Research is needed to check on this, and results would certainly have utility for counselors and developmental psychologists, as well as for studies of cross-cultural impacts.

We also find that the pattern of generalization across which these changes occur is not uniformly the classic one which relates similarity and change in a straight linear relationship. The typical pattern for the group is rather a curvilinear one, where constructs or figures most similar to those undergoing maximal change are held relatively changeless while those at a moderate similarity-distance change most and those least similar again change little.

This, which is also confirmation of earlier experimental results, would appear to have many implications for education as well as counseling or psychotherapy. It reinforces our interest in the utility of the definition of similarity as subject-perceived. In addition, it would seem useful to remember as one teaches or counsels that "shaking" one foundation construct or perception of a person may bring with it more rigid clinging to similar (to the individual) ones, and thus perhaps less freedom to explore, learn, or reconstrue in these also important areas. But there is further complication: our findings indicate that there are
wide individual differences in this pattern of generalization of change. Many individuals do follow the classic generalization curve in construct system change: when a figure or construct dimension changes, its similarity-neighbors do too, in diminishing degrees with greater similarity-distance. Furthermore, the individuals who follow this orderly, logical, and "classic" change or learning process appear to be those who are moderate and perhaps gradual in the degrees to which they change their perceptions of people or the dimensions they use in these perceptions. The others—who do not follow such orderly, logical, and straight-line processes—seem also to be those who change a great deal or very little: they are at the extremes. This last, we suggest, may be an indication of threat, and perhaps anxiety, or some sense of chaos. If so, this should be more characteristic of some groups than of others. Persons in psychotherapy, for example, might well react in this way, and so perhaps might those children whose people-worlds are uncertain and unpredictable to them. This again needs further research, but if this suggestion from our study is further verified, the implications for clinical work, especially, are even more clear. For example, this measure of change process may be useful in identifying degree and areas of felt "chaos," and it may also in specific terms be useful in identifying points in the individual's people-world and construing system which can be used most effectively
for lessening this same chaos. And finally, our data cause us to wonder whether the effect of threat is completely linear: extreme threat may produce different effects than that at a lower level. We also suggest further study of this point.

Second, we find the differentiating use of construct systems (cognitive complexity) not increasing as we had predicted. By hindsight, we suggest that this time of introduction to a new world of college and adulthood may be a time of increasing generalization rather than of differentiation, and find this "hunch" supported by our next findings.

In these, we find that, as predicted by personal construct theory, the individuals in our group expand the utility of their construct dimensions as they change them, both in broadening their application and in the diminution of "extreme" verbal descriptions of these dimensions. This expansion, clear as it is in our group, seems both theoretically and intuitively "right" for them, still developing and not yet "at" full maturity (if there is such a point). We would suggest, however, that perhaps in later life, or when the world of an individual becomes more unchanging, there may be some slow-down (at least) in this process of expansion, perhaps combined with an increase in differentiation and cognitive complexity. It seems, thus, that the predictions of personal construct theory in these aspects need to
be also reviewed and studied at other stages of life and experience.

Fourth, we find as predicted that our subjects do move away from using very many or very few dependency constructs, and that they are distributing their allocations of these dependencies more widely. This is the direction of mature adjustment, in personal construct theory.

Fifth, we explored changes in the identification and use of some content types of construct dimensions. "Dynamic" (as opposed to static) and "psychological" (as opposed to relational or situational) constructs were found to increase in frequency and use, and "value" constructs to decrease in frequency, as predicted. "Value" constructs also increase in use, contrary to prediction. Here, we have some "hunches" that these may differ with different stages and settings, for the above trends seem rather too "typical" of our college freshman intelligentsia, and we would again urge further inquiry.

Over-all, then, we have explored a number of specific aspects of the change process which is normal and continuous according to personal construct theory. Those predicted specifically by the theory we have largely demonstrated in our findings, and to the extent that any theory's utility is evaluated by its predictive power, this theory has, at least in this study, acquitted itself well.
In addition, we have explored some hypotheses on generalization in the change process which seem to have a number of specific implications for personal construct theory as well as practical potential in such fields as education, counseling, and psychotherapy.

From both of these, we have suggested particularly that further research dealing with these aspects of change process be focussed on filling in the gaps of what happens in different types of situations and at different stages of development. Perhaps we shall be doing some of this ourselves, and we hope that there will be others—"volunteers" as well as Ph. D. candidates—who will also be working on these problems.
APPENDIX I

THE INSTRUMENT
Follow the instructions carefully:

1. **Title:** Use the right-hand corner of the first line to write the title. This title will appear at the head of each column.
2. **Introduction:** Place the title in the upper right-hand corner of the first page, followed by a blank line and the body of the text. For the next page, place the title in the upper right-hand corner of the page and the body of the text below it.
3. **Body of the Text:** Continue the text by entering the body of the text. The first line of each paragraph should be aligned with the left margin of the page.
4. **Conclusion:** End the text with a concluding paragraph that summarizes the main points discussed in the document.
5. **Reference:** Include any necessary references or citations at the end of the document.

Example:

```
Title: Experiment on Acoustic Phenomena

Introduction:

In this experiment, the acoustic properties of different materials were studied. The goal was to determine the effect of material properties on sound propagation.

Materials:

- Polystyrene
- Aluminum
- Wood

Procedure:

1. Set up the experiment in a controlled environment.
2. Measure the temperature and humidity to ensure consistent conditions.
3. Record the sound wave data using a high-frequency sensor.
4. Analyze the data using statistical software.

Results:

The results showed that the absorption coefficient of sound varied significantly between the materials. Polystyrene had the highest absorption coefficient, followed by aluminum and wood.

Conclusion:

The experiment demonstrated the importance of material selection in designing acoustic systems. Further research is needed to explore the effects of different environmental conditions on sound propagation.

References:


Acknowledgments:

The authors thank the staff of the laboratory for their assistance during the experiment.
```
The kind of person you would most like to be:

- The kind of person who your own personal treasures.
- The kind of person who is kind to others who have to know personal treasures.
- The kind of person who you can talk about your personal treasures.
- The kind of person you have to know you would like to know better.
- The kind of person you feel most understood of.
- The kind of person you feel most like to help or for whom you feel sorry.
- The kind of person you would like to talk to.
- The kind of person you would like to talk to whom you would talk to.
- The kind of person whom you have to know better.
- The kind of person whom you feel most understood of.
- The kind of person whom you feel most like to help or for whom you feel sorry.
- The kind of person whom you would like to talk to a lot.
- The kind of person who you have found most interesting.

The kind of person whom you have found most interesting:

- As the kind who has been most interested in you.
- As the kind who has been most interested in others who appeared to dislike you.
- As the kind who once appeared to have seldom been interested in whom you were dissertation later.
- As the kind who once appeared to have seldom been interested in whom you were dissertation later.
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DO NOT INSERT ANY NAMES. IF A PERSON APPEARS IN TEXT, SIMPLY MAKE A SECOND REFERENCE.
Role Construct Repertory Test
Form AC - 3

INSTRUCTIONS

This test has three parts: (1) GRID, (2) OVERLAY SHEET, and (3) INSTRUCTIONS. The test is designed to help us understand Antioch students and some of the people who have played parts in their lives.

1. Start with the OVERLAY SHEET. Lay it sidewise across the top of the GRID so that the numbered descriptions of persons correspond to the numbered columns in the GRID. Note that the first 10 have been filled in just as you filled them in when you took this test last fall. Now fill in the last 10: they may or may not be the same names you used last time, as you wish. Remember you need only identify each person well enough that you will have him clearly in mind when you work on the grid. You are identifying people only for your own use: all names will be cut off the grid before it is scored.

When you have named each of the persons called for on the OVERLAY SHEET, lay it aside. From now on, use only the GRID.

2. Now look at the first row of squares on the GRID. Note that three squares (in columns 2, 3, and 9) have circles in them. This means that you are to consider the three people whose names appear at the heads of these three columns. In what important and significant way are two of them alike — in what way are these two set off from the other one?

When you have decided which two are alike, and the important way in which they are alike, put an X in the circles corresponding to the two who are alike. Put no mark in the other circle.

Write in the blank under CONSTRUCT the word or short phrase that tells how these two are alike.

Write in the blank under CONTRAST what you consider to be the opposite of this characteristic.

(If you need to amplify either your CONSTRUCT or your CONTRAST, use the back of the sheet: be sure to put down the number of the comparison to which your statement applies.)

3. Now consider each of the other 17 persons whose names appear at the heads of columns 1 to 20. In addition to the two persons whom you have already marked with an X, which others also have this important characteristic? Put a check (✓) under the name of each other person who has this important characteristic. (Don't forget columns 1 and 20.)

When you have decided which two are alike, and the important way in which they are alike, put an X in the circles to show which two are alike. Write the CONSTRUCT and the CONTRAST in the blanks at the right as you did before. Then consider the other seventeen persons. Check ✓ the ones who also have the characteristic noted.

4. Continue for the next 10 rows on the GRID.

5. In row 13, you will note there are no circles, but the CONSTRUCTS and CONTRASTS which you wrote in the last time you took the test have been copied just as you wrote them. Now put a check (✓) under the name of each person to which the CONSTRUCT applies, i.e. who has this important characteristic. (Don't forget columns 1 and 20.)

6. Complete the GRID, doing each row from 14 on as you did row 13, i.e., putting a check (✓) under the name of each person to which the CONSTRUCT on that row applies, i.e. who has this important characteristic.

7. Now, note that on the GRID the letters M and F appear at the head of each column. Circle M or F as appropriate, to indicate the sex of the individual named by you in that column.

8. Finally, put your name on the upper right-hand corner of the GRID, and turn in all three parts of the test. Thank you!

11/58
The kind of person you prefer to work with is:

1. The person who you can relate to personally.

2. The person who you feel more comfortable with.

3. The person who you would most like to work with.

4. The person who you feel most compatible with.

5. The person who you would most like to work with because:
   - Their approach is fun.
   - Their approach is effective.
   - Their approach is productive.

6. The person who you would most like to work with because:
   - Their approach is different.
   - Their approach is more interesting.
   - Their approach is more challenging.

7. Your biggest strength is:
   - Your ability to organize.
   - Your ability to communicate.

8. Your biggest weakness is:
   - Your ability to communicate.
   - Your ability to prioritize.

9. How do you think your strengths and weaknesses can be used to your advantage in the workplace?

10. How do you think your strengths and weaknesses can be used to improve your job performance?

11. Your most important weakness is:
   - Your ability to prioritize.
   - Your ability to communicate.
   - Your ability to adapt.

12. Your most important strength is:
   - Your ability to adapt.
   - Your ability to communicate.

13. What is the most important thing you can do to improve your job performance?

14. What is the most important thing you can do to improve your job satisfaction?

15. If you had to choose a second choice, what would it be?

---

DO NOT RETELL ANY NAME. IF A PERSON MAKES A SECOND ORDER, SIMPLY MAKE A SECOND ORDER.

---

Panel: AC

Note: Complete the report on page 3.
APPENDIX II

RATING CRITERIA
Rating Criteria

A. Overlap or "identity" of constructs

Definition: Those which appear to be defining the same dimension or pole of a dimension.

Criteria: Synonyms or near-synonyms, either as words or phrases. (Half-credits given for partial fulfillment of criteria.)

Examples: a/ For full credit
self-centered selfish, interested
jovial joking
sour glum
shy blackward with people
b/ For half credit
intelligent, interesting intelligent, friendly
energetic verve
affectionate warm
untempermental calm

B. "Extreme" constructs

Definition: Those with limited range of convenience, i.e., superlatives in either direction or intense terms where the same dimension could be expressed in milder terms.

Criteria: a/ Superlative in the word or phrase itself, i.e., where a more moderate term could be used.
b/ Superlative in the suffix ("est").
c/ Superlative in the modifier.

Examples: a/ brilliant bullying
did everything in their power to . . .b/ wisest person I know
c/ always glum
very loving

C. "Dependency" constructs

Definition: Those by which certain persons are construed in relation to the subject's own survival.
Criteria: a/ Self-referent (as object) constructs.
c/ Constructs which are psychological, involving nurturance, succorance, support or submission, and interpersonal (necessarily within the word itself or explicitly specified as with reference to people).

Examples: a/ nice to me
good to me
b/ warm
friendly
domineering
helpful
angry with people (but not angry alone)

D. "Dynamic" constructs

Definition: Those which allow the other person movement as opposed to those which hold him immutable.

Criteria: Those characteristics which are generally thought of as being changeable by the individual as opposed to unchangeable by him.

Examples: thoughtful
hypocritical
wishy-washy (but not, e.g. sisters young intelligent)

E. "Value" constructs

Definition: Those which are morally conventionalized.

Criteria: Those characteristics which are commonly considered as "good" or "bad," "virtuous" or "evil." (Half-credits given for those with these overtones.)

Examples: a/ For full credit
trustworthy
religious (person, not belief)
high ideals
sexual pervert
b/ For half credit
conceited
helpful
sincere
loyal
lazy
F. "Psychological" constructs

Definition: Those which pertain to personality traits or psychological attributes, as opposed to those pertaining to impersonal or external factors or those pertaining to relationships alone.

Criteria: As in definition.

Examples: quiet imaginative cheerful domineering loving (but not, e.g., teachers blonde married he helped me I like him)


15. Hamilton, R. J. Generality of Personal Constructs. Unpublished doctoral dissertation. The Ohio State University, 199-.


42. Sanford, N. Personality Development During the College Years. *J. Soc. Issues*, 1956, 12, No. 4.


I, Frances Enid Smith Lemcke, was born in Tokyo, Japan, on February 14, 1914. My elementary-school training was at home (in Japan) under the Calvert School System; my secondary school education was completed at the Canadian Academy in Kobe, Japan. After a year of private study of music, I entered Antioch College, from which I received the degree of Bachelor of Arts in 1937.

In 1955, after having married, raised two children and held a number of positions at Antioch College, including Secretary of the College Examining Program, Associate and Acting Dean of Students, and General Counselor, I entered The Ohio State University as a graduate student. Since that time I have continued to work with Antioch College as General Counselor on a part-time basis until 1958–1959 when, on full leave from that position, I served an internship at the Columbus Psychiatric Institute and Hospital and worked on this research project.