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COGNITION AND MOTIVATION©

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A. DEFINITION OF THE DOMAIN OF MOTIVATION PSYCHOLOGY.

Krech and Crutchfield (1948, p,29) state that "The question of motivation is the question of 'Why'." The essential problems which provoked motivation concepts in the first place were those of the directedness, patterning, and timing of behavior, (Klein, 1960, p.92). The domain of motivation is wide if one excepts the above delimitations.

According to G. Kelly (1960, pp. 49-50) the construct of motivation implies that organisms are essentially-naturally inert and that some external force enlivens them to behave. The question is "What does the organism do when it is not motivated?" If the organism is always "motivated" then the question becomes not whether behavior occurs or not but what behavior occurs. In the explanation of behavior the concept of motive is redundant (in its "energizing" usage). If motivation is considered a question of why behavior occurs at all, then it is most fruitfully studied on a neuro-physiological level (Malmo, 1959).

The distinction between the 'selective' and the 'energizing' aspects of behavior has had a long history. Stout, for instance, distinguished two functions of the mind: cognition (thought and

sentience) and volition (feeling and conation). Recently this distinction has been decried as being artificial. Allport (1961) believes that the distinction between cognition and motivation is artificial because both are "continuous, effortful, goal-directed, self-experienced activities." (p.258) "...all motives are an inextricable blend of feeling and cognition. The root factor in both is a 'set' or 'tendency' (both cognitive and affective). The most important sets are personal traits which are basic modes of striving-and-thinking." (Allport, 1961, p.274) Prentice (1961) views motives as a particular kind of perceptual or cognitive event. (p.503) The laws of motivation, he believes, will be the laws of "cognitive structure." In the several approaches to the definition of motivation the confusion arises because of the failure to recognize that the definition is relatively specific to the particular psychological theory within which it is imbedded. After a review of the concepts which have historically been considered motivational, Littman (1958) attempts a definition of motivation that is sufficiently comprehensive to incorporate all previously used motivational phenomena and all phenomena that might be discovered. The definition turns out to be a statement of what the field of psychology in general is interested in.

Koch (1941) analyzed motivation as an explanatory construct and arrived at three uses of the term "motive": (1) motive is used as a label for a set of phenomena comprising a sub-set of the phenomena of psychology; (2) a label for a set of sentences which describe these phenomena; (3) a particular type of construct whose nature is defined by the particular theory of motivation. Motivation used as a term intending to have some objective reference is an expression of the object language (a language system referring to objective states of affairs). Motivation as a set of historically given sentences is an expression of the syntax language (the language system which describes the vocabulary and structure of the object language). The use of a motivational construct in the object language is usually in the form of an explanatory construct, serving as a conceptual link in the attempted explanation of behavior. This object language usage of motive necessarily involves a theory of motivation and a theory involves some set of postulates from which sentences describing the phenomena of motivation can be deduced. The reason motivation explains little is that the theories of motivation are not put forward in postulational form. (Koch, 1941, pp. 25-6)

B. ENERGY vs STRUCTURE: THE ACTIVE-PASSIVE ISSUE.

Littman (1958) distinguishes between two "kinds of existence": the active and passive principles ("An 'active' is anything that does something to something else; a 'passive' is anything to which something is done." p. 145) Within a given psychological system some concepts are conceived as "active" and others as "passive"; there is no necessary agreement across systems of what is active and what passive. Littman and Koch (1941) can be seen as similar in their views of "what a motivational construct is": whether or not a given construct is considered motivational depends upon the theory in which the concept is imbedded. The active-passive distinction can be viewed as a return to the act-content type of issue.

However, even the active-passive distinction is avoided in some theories. It is unnecessary that there be psychological actives to set behavioral systems into motion; systems may be so constructed that they already have the property of motion or activity. According to Maslow (1943) the problem of activity-change is created by the analytical method of science. The only way change or motion is dealt with is by treating it as a special case of non-change (rest). However, reality is in continuous flux and the static appearance is a result of looking only at its phenomenal aspects. The basic "elements" of physics "are" motion and there is no reason why the structure or elements of psychology have to be conceived of as unchanging. Maslow laments the fact that there is no adequate logical-mathematical tool for representing personality organization as a dynamic (changing) structure. Angyall's biosocial system of personality, Stern's personalistic orientation, and

Allport's (1954, 1955) "event structure" theory all contain concepts which are intrinsically active (defined by postulation as active). In F. Allport the "elements" of the system are "ongoing processes" and "events". The problem of activity-change is built right out of the theory of "structural dynamics" (or "energetics"). The energy of a system is never divorced from the structure (energy is always structured) and therefore the concept of activation can only be revealed by its transsituational generality. "The fact that by varying conditions as dissimilar as appetitional deprivations and verbal incentives it is possible to produce similar shifts in physiological indicants provides a sound basis for introducing the operationally defined concept of activation level that cuts across traditional demarcation lines of specific drives." (Malmo, 1959, p. 377)

In addition to defining some elements as active, the structural arrangements within the system may be considered as the actives. This is most clearly the case in Festinger's (1957) conception of cognitive dissonance. No "cognitive element" taken by its self can be an active (produce dissonance) but certain combinations of elements may be active (dissonant). In their discussion of stability and change in individual behavior, Secord and Backman (1961) place the active (causal) aspects in the interrelations of the elements. [the notions of Heider: structural balance (Cartwright and Harary, 1956), Newcomb: A-B-X model (Newcomb, 1955, 1959) are similar in their placing of the "dynamics" of their systems in the relations between elements]. Secord and Backman propose that both the stability and change in behavior is a function of the social interaction process. Stable patterns in the interaction process are the essential conditions for consistency in individual behavior. The two sources of stability are: (1) the normative role aspects of society and culture and; (2) the interaction process itself. There are "...tendencies of the individual and the persons with whom he interacts to shape the interaction process according to certain requirements, i.e., they strive to produce certain patterned relations." (p. 22) "...the locus of behavioral stability and change lies in the interpersonal matrix, which has three components: an aspect of the self-concept of S, S's interpretation of those elements of his behavior related to that aspect, and S's perception of related aspects of the person with whom he is interacting (O). S strives to achieve congruency among the components of the matrix, a state which is achieved when the behaviors of S and the other imply definitions of self which are consistent with relevant aspects of the self-concept. Congruency is continually threatened by the changing nature of interpersonal relations due to: (a) normative patterns of change, which result in changes in the behavior of O's toward S... (b) fortuitous changes...; and (c) the fact that O's means of establishing congruency for himself often create incongruencies for S." (Secord and Backman, 1961, p. 32).

C. CONCERN WITH STRUCTURE IN PSYCHOLOGY.

It is helpful to distinguish between the terms "system" and "structure." Structure refers to the relations which obtain between elements, the elements themselves are not studied; the emphasis is upon the formal aspects of a system. System refers to both elements (what is structured) and format (structure). According to J. G. Miller (1955) "Systems are bounded regions in space-time, involving energy interchange among their parts, which are associated in functional relationships, and with their environments." (p. 514) The scientific enterprise is set up to discover the structure(s) of nature. It is not concerned with facts per se but with ordered facts. What is important is the type of order rather than the particular elements which are ordered. Science results in the organization of facts originally seen as fragmentary. Organization is achieved by the discovery of connections when one fact is related to another. A set of elements exhibits order (and therefore becomes a system) when, given the properties of some of the members of the set, the properties of the other members of the set (or at least some of them) are determined. This determination is due to the relation that orders the set and is not a property of the elements regarded as a class. (Eysenck, 1952, pp. 16-17) Factor analysis is presumably interested in discovering the structure of a domain of phenomena; it is

concerned with the analysis of interdependence -- how a group of variables are related among themselves, no one of which is marked out by the conditions of study as being of greater prior importance than the others. (Eysenck, 1953, p. 105) In order to have a complete understanding of the elements-events it is necessary to know the structure in which they are imbedded. (F. Allport, 1955, p. 620). This is, of course, one of the main contentions of the Gestalt-field type of psychology. Lewin states: "The relations of psychological events to each other and the breadth of influence of each single experience upon the other psychological processes depend not simply upon their strength, indeed not even upon their real importance. The individual psychological experiences...are rather imbedded in quite definite psychological structures..." (Lewin, 1935, p. 54)

Although Eysenck and Cattell lament the primitive state of psychological nosology, the conceptions of structure are little advanced beyond the stage of analogy and metaphor. Gardner, et. al. (1959, p. 7) list the aspects which a "systemic" theory must deal with: (1) considerations of structural manifolds; (2) the amount of order within and between these manifolds; (3) the relative dependence-independence of subsystems; (4) the controls within and between subsystems; (5) a conception of a hierarchy of controls within the system; (6) the problem of the relative autonomy of the hierarchical subsystems; (7) the problem of the relationship of lower to higher systems.

According to F. Allport (1954) the history of psychological schools and theories can be viewed as a record of attempts to deal with the problem of structure and its laws. There are two reasons for the failure to solve this problem: (1) the most general reason is the fact that the problem has not been approached in its own right. "It has been assumed ... that there is no general structural problem, that the means are already at hand for explaining each specific structure by the traditional methods of scientific logic ... it is assumed that, since every event must have some cause, the ordinary logic of causality should be able to explain the 'structuring' of events." (p. 284) The fact that no explanation has been found is assumed to be due to the fact that the right cause has not been found. (2) The second reason is that "...there is a tendency to believe that the laws which state covariations and thresholds of measurable quantities should be able to bring it about that each element of a phenomenon gets placed in the proper spatial position at the exact time and sequence required for its characteristic structuring." (p. 285)

In the 1954 article, F. Allport demonstrates the inadequacies of the logic of causality for explaining structure and in his book (1955) he demonstrates that the quantitative laws alone cannot explain structure. Natural laws have been usually considered to be of one type -- quantitative. The precise expression of a natural law is assumed to be in the form of quantitative, mensurational propositions and the seeming differences in kinds of laws are due to the fact that they are not stated in precise enough form. Allport proposes that there are two types of natural laws:

1. The type of law which related to quantities or dimensions and their relationships in the phenomenon.
2. The type which deals with the structure of nature. This type of law requires terms other than those of quantity (they are not reducible to quantitative statements). The two types are not separate in their operation but must be studied and formulated separately. The elements of the structural model will be type-patternings of ongoing and events. (Allport, 1955, p. 621)

Structures are neither random, endlessly varied, inexplicable, nor amenable only to quantitative laws; there is such a thing as a unique structural law; this law is completely general in nature and it

must be conceived at first in terms that do not depend in any way upon measurements or laws of quantities. There is a general "homology" between all natural Systems. (Allport, 1955, pp. 622-623)

There are always dimensions that are associated with an event as it occurs. However, the quantitative laws cannot describe the event itself; they can only assume it. These laws cover continuously varying quantities and their relationship. An event is defined as an encounter (point) and is discontinuous: it either occurs or does not. "Something besides a quantity of an abstracted variable is necessary in order to describe it; and in fact, the act of quantification itself could not take place without it. An event...though certainly a part of nature and capable of objective observation, ... does not really belong in the realm of variable or dimensional considerations." (Allport, 1955, p. 624)

II. A COGNITIVE APPROACH.

A. INTRODUCTION: SOME HISTORY OF THE STUDY OF COGNITION.

Modern psychologies of cognition have varied historical antecedents and their only common property appears to be a concern with "central" as opposed to "peripheral" variables. George Kelly's "Personal Construct" psychology has the most ambiguous ties with prior approaches in psychology; it seems to be most closely associated with the phenomenological approach in its similarity to "phenomenological field", "Self concept", "self consistency" and such like. It has also a close conceptual relationship to role theory and "symbolic interactionism" (Rose, 1961).

The cognitive theory of Sarbin and Taft (1960) is directly descended from Tolman's expectancy approach and Brunswick's "probabilistic functionalism;" both of these authors are also influenced heavily by the symbolic interactionist approach (which in psychology is called role theory). The comparative isolation of contemporary thought and research in the two fields of symbolic interaction and expectancy approach in cognitive theory is difficult to understand and unfortunate. J. B. Rotter (1954) makes no mention at all of any of the sociological research and theory in the general problem of social interaction. The same can be said of G. Kelly (1955) (although he seems to be equally isolated from psychology). The situation is no better on the sociological side. For the latest and most complete statement of symbolic interactionism barely mentions the psychological approach to these same problems (Rose, 1961).

Three major approaches to the study of cognitive behavior are discernible in the history of psychology: (1) the testing movement is concerned with assessing differences among individuals in mental abilities. (2) the concern with cognitive processes begins with the introspectionists, particularly of the act school, and continues on up to Bruner, Goodnow and Austin (1956) "strategies used in concept attainment" and Sarbin, Taft, and Bailey (1960) in their "process of instantiation". (3) the third approach involves a return to the study of individual differences but with a concern for very general cognitive styles. An attempt is made to isolate typologies of cognitive behavior: "The individual's style...influences the quality of most...of his cognitive products." (Kagan, Moss, and Sigel, 1961, p. 14)

The study of cognitive controls and styles (G. Allport classifies them under the rubric of "ideational schemata", 1960, p. 250) has developed independently of the study of social interaction and is best seen as an unexpected combination of psychoanalysis (especially ego psychology) and classical experimental perception psychology. The major impetus to the recent study of cognitive structure and style stems mainly from the increased interaction between psychoanalysis and academic

psychology. The conceptual origin lies in the psychoanalytic tradition while the operational-mensurational aspect comes from experimental psychology.

B. COGNITIVE CONTROLS AND STYLES (KLEIN et al)

1. General considerations.

The operation of these controls on the stimulus environment is conceived of as follows: "...the influence of cognitive controls is very much a matter of highlighting certain environmental features and reducing the effectiveness of others..." (Gardner, et. al. 1959, p. 12) "A cognitive attitude [control] describes a way of organizing a transmitted array of information...[they]...have the status of intervening variables and define rules by which perception, memory, and other basic qualitative forms of experience are shaped." (Klein, 1960, p. 107) Cognitive attitudes or controls "...center attention upon a person's typical strategies of perceiving, remembering and thinking." (Klein, 1960, p. 87) A variety of cognitive controls contributes to self-consistency in a person's behavior. (Klein, 1960, p. 87).

Cognitive style is a structural arrangement of cognitive attitudes. These styles are conceived of as "...ways of contacting reality, whereby one's intentions are coordinated with the properties, relations and limitations of events and objects." (Klein, 1960, p. 88).

"Cognitive controls are...slow-changing developmentally stabilized structures: (a) they are relatively invariant over a given class of situations and intentions; (b) they are operative despite the shifts in situational and behavioral contexts typical of cognitive activity from moment to moment. Cognitive controls refer to a level of organization that is more general than the specific structural components underlying perception, recall and judgment. The invariant which defines a control has to do with the manner of coordination between a class of adaptive intentions and a class of environmental situations. They are the individual's means of programming the properties, relations, and constraints of events and objects in such a way as to provide an adaptively adequate resolution of the intentions which brought him into an encounter with reality." (Gardner, et. al., 1959, pp. 5-6)

What Gardner et. al. (1959, 1960) have done in their monographs is to make some combination of one or more tests of specific cognitive behavior serve as an operational definition of a given cognitive control. These controls are fairly independent within people and so various combinations of the degree of possession of these controls define a person's cognitive style. A cognitive control is defined by a combination of tests of cognitive behavior and a cognitive style is defined by a combination of cognitive controls.

2. Properties of cognitive controls as distinct from needs. (Klein, 1954)

a. "Cognitive controls...are, like needs, directive; they resolve disequilibria and exert a selective influence on the cognitive field. But they are not linked, as needs are, to a range of satisfaction-giving objects; they are forged by the impact of adaptive problems for which they become instruments of resolution. [this is similar to G. Allport's distinction between motivational and instrumental attitudes]

(1. We can observe them in situations and behaviors involving a variety of cognitive functions such as memory and perception.

(2. We infer them not from symbolic content of percept, memory, or phantasy as we do the presence of need, but from formal qualities of behavior, that is, from the particular ways that responses to the stimulus field are organized. This implies that cognitive controls may involve and organize basic processes such as schematizing, or conceptualizing behavior, mapping (cf. Tolman), absolute and differential thresholds, anticipation, attention, concentrations, etc.

(3. Because we detect them through formal qualities of response, it does not matter if experimental stimuli are neutral or of the "loaded" variety, as long as an adaptive requirement has been so carefully built into the situation as to elicit the particular attitude...

b. While they serve an equilibrating function, cognitive attitudes do not necessarily eliminate or reduce tension. They equilibrate in the sense of resolving an imbalance created by a problem, an instruction, or a reality requirement, but they are not tension-reducing in the sense of producing...quiescence, and in fact they may operate at times in such a way that tension is increased...

c. ...the action of cognitive attitudes upon need...summarized: Cognitive controls determine the manner of disposal or 'rerouting' of need-energy in conformity with immediate reality. They check direct need satisfaction and in this sense function as delay mechanisms." (Klein, 1954, pp. 262-265)

3. Functional aspects.

"A cognitive attitude is triggered by a situation, a requirement to adapt...to detect the control components -the cognitive attitudes -- in behavior, one must know a person's explicit intentions and the circumstances he has to adapt to, particularly the options offered by the situation he is coping with." (Klein, 1960, p. 107) "...the 'antecedent conditions' of a cognitive control are the adaptive requirements of a task... the expectations about the functions that a response must serve in a situation." (Klein, 1954, p. 267) "To say that they are adaptive means, not so much that they provide, in different degrees, an accurate translation of reality, but that they provide in each instance a workable fit. The concept of cognitive attitude alerts us to the individually varying standards of such a working fit in the 'feedback' strategies that guide perceptual, cognitive and motor activity." (Klein, 1960, p. 105) "They govern the extent of informational feedback -- the degree and extent of renewed encounter with stimuli or ideas before an adaptive intention is deemed met and an adaptive behavioral sequence is terminated." (Gardner, et. al., 1959, p. 10) "They

involve the application of automatized standards of adequacy to behavior or experience. If the behavioral outcome does not meet these standards of adequacy, perceptual or ideational activity is renewed to a point reflecting the inherent requirements of the control." (Gardner, et. al. 1959, p. 10)

The concept of cognitive control. "...provides for the fact that individuals differ in how 'accurate' perception has to be in order to be effective for the purpose at hand. In order to meet a subjective standard...cognition musters complex processes that make possible perceptual contact with [aspects of the environment] ...and it incorporates these processes into a larger 'feed-back' strategy that includes appropriate conceptual and motor activity. The significance of 'feedback' activity is that it coordinates the phases of perceptual-cognitive-motor action and reaction with drive aims, on the one hand, and with environmental structures and probabilities, on the other. Different phases of the total cognitive event would, then, be expected to reflect the larger adaptive strategy." (Klein, 1960, p. 107)

"The outcome of a cognitive control is a pattern of attribution, in which stimulus events and ideas are brought into a relation to each other as relevant and irrelevant, experienced and non experienced, segments of a stimulus field." (Gardner, et. al., 1959, p. 11)

"...cognitive controls seem especially important in attaining for the individual...autonomy from the environment...Reactions that originally occurred in relation to the external world are increasingly displaced into the interior of the organism in the form of generalized programming arrangements, so that similar adaptive situations eventually become equivalent with respect to the organism's modes of response." (Gardner, et. al. (1959, p. 13)

C. CONCEPTUAL AND OPERATIONAL DEFINITIONS OF COGNITIVE VARIABLES.

1. Leveling-sharpening (LS).

- a. Conceptual definition. This refers to the degree of differentiation of memory traces and schemata, particularly those representing sequences of stimuli. Leveling implies a low level of articulation in a sequence of stimuli whereas sharpening implies a high level. (Gardner, et. al., 1959, pp. 22-23)
- b. Operational definition.

(1. The schematizing test: This requires judgments of a series of 150 squares which gradually increase in size. There are two aspects of the subject's response: (a) his discriminative sensitivity ("perception") (b) his means of reporting or communicating the response to the experimenter (crudity or refinement of the yardstick used, preference for certain scaling units over other, the range of scale value covered by his judgments). This aspect of the response is independent of discriminative accuracy. (a) A major aspect of performance on this test is the degree to which the subject keeps pace with the progressive increase in size. This can result from the persistence of perceptual set or it may be an assimilation effect resulting from the perceptual processes representing new squares and the trace aggregate representing the smaller squares seen previously. (b) The second major aspect is the accuracy with which the subject ranks the sizes of the successive stimuli. Low ranking accuracy of the sizes of the successive stimuli could result from: (1) inability to discriminate small stimulus differences; (2) lack of a consistently stable conception of the previous stimuli; (3) relatively

unsustained, spotty attention resulting in inexact registration of individual squares-- squares which registered more vividly will have disproportionate influence on the ranking; (~) large assimilation effects between processes representing new squares and memory traces of preceding squares. (Gardner, et. al, 1959, pp. 23-26)

(2. Kinesthetic time error test: The subject judges the weight of a comparison stimulus in relation to that of a standard. In condition I a light intervening stimulus is placed between the comparison and standard. Condition II uses a heavy intervening stimulus. In condition III there is no interpolated weight. The subject is to judge the relative weights of the test stimuli and try to ignore the interpolated weight. Time Error (TE) is the difference between the Objective Mid-point and the Subjective Mid-point (point of subjective equality, PSE). TE is related to the way the subject experiences the progression of different weights. The progression is viewed as a series of gradients and the interpolated stimulus acts as an intrusion into the comparison process; the subject experiences a series of 'ups' and 'downs' in intensities. He is required to attempt to ignore or suppress the interpolated stimulus but this can not be done completely since it provides a quality of stimulation similar to that of the other two stimuli: The degree to which the subject can partial out this intervening stimulus is reflected in his TE score, and seems to be a function of his proneness to assimilation effects. (Gardner, et. al, 1959, pp. 27-29)

2. Tolerance for unrealistic experiences (TUE)

a. Conceptual. This involves acceptance of experiences which do not agree with what one knows to be true. Tolerant subjects take their experience a~ face value and have relatively little need to mold it in terms of "usual" or "expected" reality; intolerant subjects resist perceptual or cognitive experience in which ideational or immediate sense data controvert conventional reality. (Gardner, et. al., 1959, p. 31)

b. Operational

(1. Apparent movement test: This involves tachistoscopic presentation of a profile of a horse with feet astride. The subject is told that although he might later experience "movement" of the horse, no actual movement occurs. The experimenter slowly increases the alternation rate until the subject reports his experience changing from that of one figure alternately succeeding the other to that of a single figure moving back and forth. After recording the alternation rate at which this occurs (in cycles per second), the E continuously increases the rate until the subject reports his experience changing to that of two figures "flashing on and off" simultaneously. There are large individual differences in: (a) the alternation rates at which "motion" is first perceived; and (b) the range of alternation rates over which "motion" persists. The experience is "unrealistic" when the apparent movement is in the context of the conflicting information -- the subject knows he is actually seeing two stationary figures appearing alternately and he is confronted with an issue of "tolerance". Individual differences in range of apparent movement

depend upon how tenaciously subjects hold to their knowledge that the horses do not actually move. (Gardner, et. al., pp. 32-34)

(2. Aniseikonic lenses test: This involves use of a set of lenses which alter the size and shape but not the focus of images transmitted through them. The distortion experience does not appear immediately but develops gradually. The subject's comments are recorded and the time of each remark is noted. The subject is also asked to adjust a bar to vertical after he reports distortion. The distortion effect depends on the disparities between monocular and binocular cues produced by the lenses. The amount of distortion depends on: (a) the amount of binocular disparity produced by the lenses; (b) the properties of the stimulus object -- rectilinear objects are less distorted; (c) the distance from the stimulus object; (d) the familiarity of the stimulus object -- familiar objects are less distorted.

There are sharp individual differences in the speed with which subjects recognize distortion. It seems possible for a subject to facilitate the experience of distortion by focusing on distortion-prone objects or to delay it by focusing on distortion-resistant objects. If the person experiences discomfort in an unfamiliar field, he may attempt to stabilize the field. An additional determinant is the extent to which small changes or disparities are noticed. (Gardner, et. al. 1959, pp. 35-38)

3. Equivalence range (ER)

a. Conceptual. This involves individual preferences in modes of categorizing perceived similarities and differences assessed in terms of the tendency to use many "narrow-range" as opposed to a few "broad-range" categories in sorting tasks. The essential difference between subjects at the opposite poles lies in the degree to which they are impelled to act upon or ignore an awareness of differences. "Narrow range" implies a detailed categorization of certain aspects of experience; the subjects have relatively exact standards for judging similarity. "Broad-range" subjects are less concerned about fine stimulus differences and group stimuli into broader categories. (Gardner, et. al., 1959, p. 39)

b. Operational

(1. Object sorting test: Here 73 objects of varying familiarity are presented in a fixed random arrangement. The test encourages spontaneous categorizing behavior and the instructions are designed to allow each subject to reveal his categorizing propensities. (Gardner, et. al., 1959, pp. 40-41)

(2. Size constancy test: The subject views a standard figure through a reduction screen and compares the standard circle with 23 other circles of various size. All judgments are monocular and made with the dominant eye. The subject is trained to recognize the difference between real and apparent size. The subject makes an ascending and descending series of comparisons. Effective retinal matching requires the subject to reflect critically and analytically upon his experience. There are two conflicting tendencies: (a) the over learned response to actual object size; (b) the experimental demand to respond in terms of retinal size. This required facility in adopting the unfamiliar retinal set and the pre-training was done to control this factor.

4. Focusing-scanning (FS)

a. Conceptual. Focusing involves: (1) a tendency to narrow awareness and to keep experiences discrete; (2) a tendency to separate affect from idea. Focusers narrow attention to the relevant or dominant datum. Focusing involves an underlying preference for experiencing the world in a narrowed, discriminating way. Focusers do not commit themselves to a clear-cut affective experience. (Gardner, et. al., 1959, pp. 46-47)

b Operational

(1. Size estimation test I: The subject is required to adjust a variable circle of light to the sizes of disks which he holds. The disks vary in amount of contrast to the hand. Accuracy in this kind of size estimation is a function of the degree of attention deployment. Practically all errors are overestimations and one basis for this overestimation is an "imbalance in relative centration", i.e., looking at the standard stimuli longer than at the comparison stimulus or looking for relatively long periods at the standard stimuli in individual centrations. Low error would stem from balanced centration, including short individual centrations upon the standard stimuli. Scanners, who characteristically deploy attention broadly, overestimate little and focusers, who limit their scanning largely to the most obvious and interesting objects in the field (the standard stimuli) overestimate much more. (Gardner, et. al., 1959, pp. 48-49)

(2. Picture sorting test: This consists of 60 pictures of varied content, emotional loading and artistic quality. The time taken to sort each card is recorded. After the test each subject is asked to describe his experience and inquiry is made of the degree of difficulty experienced in sorting, his conception of his sorting, how natural the task seemed, and whether or not he experienced the pictures in the terms required by the instructions. There are several possible reasons for using the Indifferent category: (a) a wish to avoid or circumvent experiences of affect; (b) a wish not to express feelings and to use the category for pictures felt "too hot to handle"; (c) a slow reaction to the picture with no momentary feeling concerning the picture; (d) use of the category simply because it is provided and requires little decision effort (non-motivation). (Gardner, et. al., 1959, pp. 50-52)

5. Constricted-flexible control (CFC)

a. Conceptual. Consistent modes of reacting to interfering and contradictory cues. Constricted subjects resort to counteractive measures in their attempts to overcome the disruptive effect of intrusive cues. When possible, their responses are guided by the most central or obvious aspect of a field; i.e., they cope with distracting stimuli by ignoring them in favor of a salient, easily confirmable stimulus attribute. When external cues contradict internal, the conflict is resolved in favor of the most obvious external cues. These subjects tend to avoid using feelings or emotional reactions as a source of information and are resistive to change, preferring to maintain sets long after they are appropriate. Flexible subjects are relatively comfortable in situations

that involve contradictory or intrusive cues. They are not over impressed with a dominant stimulus organization if the instructions make another part of the field more appropriate. They are capable of differential response to specified aspects of a field in the face of explicitly interfering cues. They do not tend to suppress feeling or other internal cues. (Gardner, et. al., 1959, pp. 53-54)

b. Operational

(1. Color-word test: The test is in three parts: (a) Part I is a warm up page of color names, printed in black and in random order. (b) Part II is a page of color strips which match the arrangement of the words in part I. (c) Part III the colors and color names appear in contradictory combinations. Cumulative reading times and errors are recorded. In Part III, two contradictory, familiar, easily available response tendencies are pitted against each other - the overlearned inclination to read words and the more adaptively relevant but unfamiliar requirement to concentrate on the colors. Both sets of stimuli (words and colors) are always present and it is physically impossible to separate the competing stimuli. Rapid color-naming in Part III depends upon two processes: (a) relative restriction of attention to the relevant colors; (b) active inhibition of the more readily available response to the incongruous color words. Efficiency in overcoming the interfering effects of the words may be enhanced if the subject can quickly surmount the initial tension created by the difficulty of the task and if he can discard previous responses quickly and approach each new color-word combination in its own right.

(2. Incidental recall test: This test is also in three parts: (a) Part II of the color-word test (colors alone); (b) read colors in a page of 'neutral' words; (c) read the colors in a page of thirst-related words. The subject is instructed to ignore the words and read only the colors; later he is asked to recall as many of the words as he can. Recall of relatively many words could result from: (a) a specific inability to avoid responding (attending) to words, even though directed to ignore them; (b) a general tendency to be aware of relatively many cues in a stimulus field (scanning). (Gardner, et. al., 1959, pp. 58-59)

(3. Size estimation test II: In this test, the subject judges the sizes of symbol-bearing disks under conditions of perception and memory. The apparatus is the same as for size estimation test I.

Perceptual condition: overestimation could be the product of several tendencies: (a) a tendency for interesting objects (interest is enhanced by the pictures on the standard disks) to loom large in judgment; (b) a relaxed standard of accuracy, often accompanied by an absence of self-critical attitudes in judgments; (c) the greater attractiveness of the symbol-bearing disks as compared to the empty circle of light; Under- and over-estimation could result from: (d) "Shrinkage" of the memory image; since the subject must turn his head to look from the standard to the comparison stimuli he must adjust the comparison field to conform to his memory of the standard; (e) The fact that the symbols are smaller than the disks the subjects are asked to judge, (1) The presence of the smaller symbols may make the disks seem more

compact; (2) The subject may be unable to restrict his attention to the disk alone but notice the symbol also. Variability of judgments in the perceptual condition may arise from the qualitative difference between the standard and comparison fields. The standard stimuli are solid surfaces of objects whereas the comparison field is an empty circle of light. Hence size constancy must be maintained in the face of transformation of context. Variability of judgment may be accounted for by a failure to allow for different mediating conditions. Also, if apparent size in this test is a function of the deployment of attention to disk and/or symbol, variability of judgment could reflect fluctuations in attending to these sources of conflicting size impressions.

Memory condition: variability may be a result of an assimilation tendency ~ subjects with relatively undifferentiated memory schemata for the disks may show more variability in recall. (Gardner, et. al., 1959, p. 59-63)

(4. Free association test: The subject is asked to report, for three minutes, everything that comes to mind after hearing each of the two stimulus words: "dry" and "house". Two aspects of the test: (a) it provides two anchor words; (b) the instructions encourage freedom of response, although the key words are given as starting points. The subject has the option of remaining with the stimulus word or drifting to more remote associations. The flexible subjects are less bound by the stimulus than the constricted subjects. The constricted subjects give relatively few responses and many of these are highly fragmented consisting only of single words. (Gardner, et. al., 1959, pp. 63-64)

6. Field dependence-independence (FD-I)

a. Conceptual. Individual differences in the ability to extract an item from the field in which it appears. Dependence is associated with: (1) general passivity in dealing with the environment; (2) lack of self-awareness and relatively poor control of impulses, with accompanying fear of aggressive and sexual impulses and high anxiety; (3) low self-esteem, including low evaluation of the body and a primitive body-image. Independence is associated with: (1) activity in dealing with the environment; (2) awareness of 'inner life' and effective control of impulses, with low anxiety; (3) high self-esteem, including confidence in the body, and a relatively adult body image. (Gardner, et.al., 1959, p.67)

b. Operational.

(1. Rod and frame test: a square frame within which is mounted a rod, both of which can be rotated independently. The chair in which the subject sits can be placed in three positions (upright, tilted right or left). The only cues available to the subject are those from his body and those from the rod and frame. In this test, two sets of cues are pitted against each other. Accurate estimation of the verticality of the rod requires: (a) that the subject attend selectively to bodily cues (his only source of information concerning true

vertical) and respond to these cues effectively; and (b) that he not attend to, or in some way actively resist responding to, the misleading frame. Individual differences represent variations in a general capacity to articulate stimulus fields, in the sense of responding to relevant cues while surmounting the misleading effects of irrelevant cues. (Gardner, et. al., 1959, pp. 70-71)

(2. Embedded figures test: 24 complex figures and 8 simple figures; each complex figure contains one of the simple figures. Subjects are required to indicate the location of the simple figures by tracing them with a stylus but are not allowed to use the stylus while searching for the simple figures. Solution time is the total time occupied by the subject in searching for the simple figure before finding it. The subject is required to respond to certain cues in the face of competing effects of other cues (similar to the Rod and Frame task). In contrast to the Rod and Frame task, the important cues are all visual and the subject knows his successes and failures. Also the Embedded Figures task makes it more explicit that the subject is confronted with the specific task of disentangling one part of the field from its context. To perform effectively, the subject must maintain an adequate memory image of the simple figure while searching for it ;in the complex figure. Before being shown the simple figure in each trial, the subject is shown the complex figure and asked to describe it. The way the figure is first experienced may set the stage for later dealings with it and also may represent individual differences in perceptual differentiation. Most descriptions are essentially geometrical but some are object names. The geometrical descriptions are more abstract and represent a higher degree of perceptual articulation. Two major clusters of item-figures are used: Perceptual -- the simple figure is usually perceived, the simple figure is less completely masked by the complex figure; Conceptual -- these are usually more difficult items; the figures seem to contain alternative correct solutions and the simple figure defies direct perception.

Gardner, et. al. (1959) factor analyzed most of the scores used to measure the controls and describe and interpret two factors for men and three for women.

7. Factor-men: Scanning (Fm-S)

a. Conceptual definition. "The extensive scanner [high factor score] actively peruses objects about him and is continually searching or scanning the field, becoming aware in this process not only of the field properties relevant to his present intentions but also of fringe properties. One consequence of extensive scanning of object properties is the stabilization of conceptions of objects. A second consequence...is a slowing of decision making. Since these subjects tend to deploy attention to relatively many aspects of stimulation, both when the field was external and when it was internal, they took a long time to make choices...doubt and uncertainty prominently accompany extreme scanning." (Gardner, et. al., 1959, pp. 88-89)

b. Operational definition.

(1. Percentage distant free associations to 'dry' and 'house'. (a. High score: give many associations distant in content from the stimulus words. The

"field" is an internal one consisting of spheres of meanings in which the stimulus words are embedded. (p. 82) (b. Low score: give many associations close to the stimulus words. This is a result of limited scanning of the internal field of meanings surrounding the stimulus words. (p. 86)

(2. Variability of perceptual and memory judgments in size estimation II test.

(a. High: relatively stable judgments of size in both conditions. The judgments do not become more variable in the memory condition. The stability is a function of the sampling of relatively many properties of the objects. (p. 84) (b. Low: judgments were unstable in the perceptual condition and became more variable in the memory condition. (p. 86)

(3. Accuracy in matching comparison with standard in terms of apparent size in size constancy test.

(a. High: more accurate; because they are generally free ranging in their attentiveness to the properties of objects, the experience of retinal size is more available and is used. (p. 84) (b. Low: These subjects have difficulty experiencing retinal size in the constancy situation; they respond to the obvious "object" character of the stimulus and find it difficult to "scan" their experience for indications of retinal size. (p. 86)

(4. Average error in size estimation I.

(a. High: less tendency to overestimate the size. Centration on an object results in overestimation of its size; the tendency to peruse all aspects of the field leads to reduced centration upon the standard disks and results in less overestimation. (p. 85) (b. Low: more overestimation. Their attention is limited to the more obvious or dominant aspects of the stimulus field, attention is centered on the standard stimuli and this leads to overestimation. (p. 86)

(5. Color word test: reading time of colors alone and incidental recall.

(a. High: the difficulty is in reading colors. This requires both the perception of colors and finding the name of the color. This choice of appropriate names from among the alternatives is slow. They are able to recall many words in spite of the instructions to ignore the words. (pp. 84-85) (b. Low: they name colors quickly and smoothly and recall few words. The selection of the appropriate color name offers no problem because they are less aware of the other possibilities. (p. 87)

(6. Rod and frame: average error when body is erect.

(a. High: large error; they respond to cues from all three sources (rod, frame, and body) and cues from the frame are misleading. (p. 85) (b. Low: accuracy in this portion of the Rod and Frame Test results not from an ability to respond differentially to the various sets of cues but from the fact that little attention is paid to misleading incidental cues. (p. 87)

(7. Schematizing test: ranking accuracy.

(a. High: higher accuracy in ranking squares is a result of the greater degree of awareness of multiple aspects of objects. These subjects compare their previous impressions of the sizes of squares with the currently appearing square. Ranking accuracy has two determinants: the degree to which successive experiences assimilate (leveling-sharpening) and the extent of scanning of the field of memories of

previous stimulation. (pp. 85-86) (b. Low: relative inaccuracy in ranking squares is a function of limited scanning of previous impressions of sizes. (p. 87)

(8. Embedded figures: mean log time for the 'conceptual' cluster. (a. High: relatively quick to identify the simple figures in the more complex of the figures; free-ranging scanning facilitates the extraction process. (p. 86) (b. Low: require long times to find the simple figures due to limited scanning of the complex designs. (p. 87)

8. Factor-men: Tolerance for Unrealistic Experiences (Fm-TUE).

a. Conceptual definition. This reflects the extent to which individuals limit themselves to what they know to be objectively true. Subjects tolerant of unrealistic experiences (high factor score) organize their behavior in terms of the experiences that are inconsistent with their knowledge of reality. (p. 89) Intolerant subjects (low factor scores) organize their behavior only in terms of experiences that conform to conventional reality or to what they know to be objectively true. (p. 91) "Intolerant' subjects seemed engaged in continual efforts to make their experience conform to the actual state of affairs in the external world. 'Tolerant' subjects seemed in equally adequate contact with external reality, but were much more relaxed in their acceptance of both ideas and perceptual organizations that require deviation from the conventional." (p. 93)

b. Operational definition.

(1. Free association: productivity and average length of unit. (a. High : a tolerance for emerging ideas that might deviate from the conventional will lead to a freer rein of association which is indicated by long associative units and, consequently, long protocols. (p. 89) (b. Low: short associative units, short protocols and excessive blocking of the associative stream; (p. 91)

(2. Aniseikonic lenses: log recognition (of distortion) time. (a. High: quick to recognize and accept distortion; a ready acceptance of sense impressions at variance with the knowledge of the actual shapes of things. (p. 91.) (b. Low: slow to report tilt on the first trial with the lenses but on the second trial they report tilt as quickly as the high scorers. This discrepancy suggests that the delay on the first trial is not an inability to see tilt, but a reluctance to accept and report the deviant experience. (p. 92)

(3. Schmatizing: increment error comparing the estimates of size increase with the actual rate of increase (regression). (a. High: extreme lagging; the instructions state that the squares to be seen may range from 1 to 18 inches. The appearance of many small squares early in the test causes nearly all the subjects to lag behind the actual increase in size. For tolerant subjects, the knowledge of the actual range yields to their experiencing of consistently small squares in the first part of the test. (p. 91) (b. Low: the greater conformance to actual changes in size probably reflects adherence to the knowledge of the nature of the stimuli provided by the instructions and

consequent resistance to the impression induced by the small squares in the first part. (p. 92)

(4. Apparent movement: mean range. (a. High: wide range; since they are informed that the movement is an illusion, the broad range of apparent movement experience reflects an acceptance of the stimulus organizations that deviate from the knowledge of the actual state of affairs. (p. 91) (b. Low: Narrow range;

(5. Kinesthetic time error: assimilation (the difference between conditions II and I -- Heavy vs light interpolated weight). (a. High: much assimilation - yielding to the apparent changes induced by the interpolated weights. The interpolated weight tends to obscure the actual weight of the first stimulus and thus interferes with the subject's experience of it. High-scorers tend to accept this violation of previous experience. (p. 91) (b. Low: little assimilation. The effort to make experience conform to actual conditions prevents yielding to apparent changes. (p. 92)

9. Factor-women: Field Articulation (Fw-FA).

a. Conceptual definition. This applies to situations of perceived incongruity. Subjects who are field dependent and have constricted control (high factor score) organize fields containing stimulus incongruities along the simplest possible lines. Because of this, they do not cope effectively with tasks in which they are required to respond selectively to relevant cues in fields containing contradictory and interfering cues. In situations where it is possible, they resolve incongruity by responding only to the most compelling elements and ignoring others. (p. 94) Subjects who are field independent and have flexible control (LOW Score) are able to articulate incongruous configurations of cues by confining attention to those aspects of the field required and they either ignore or actively resist responding to the contradictory cues. (p. 97)

b. Operational definition.

(1. Rod and Frame: average error when body is tilted and erect. (a. High: large error; accuracy can be achieved in this test only by selectively directing attention to bodily cues while ignoring or actively withholding response to the compelling visual cues from the frame. Most of the error arises from an actual alignment of the rod with the frame. (p. 96) (b. Low: small error; respond selectively to the relevant bodily cues and adjust the rod accurately. (p. 97)

(2. Embedded figures: mean log time for both clusters. (a. High: long solution time; the inability to articulate the complex design by directing attention only to potentially relevant areas of the complex designs leads to the slowness. (p. 96) (b. Low: short time;

(3. Free association: productivity and average length of unit. (a. High: short units and protocols; much blocking of the associative stream. Performance reflects the inability to direct ;attention to relevant (related to the stimulus)

items in the memory. (p. 96) (b. Low: protocol is quite fluent with long idea units, few pauses and long protocol. At ease in selecting, from complex memory schemata, relevant and irrelevant responses. (p. 98)

(4. Color-word: interference -- speed of part III compared to II. (a. High: high interference; the reading time for Part III (color-word) is much slower than for part II (colors alone). The reading speed is erratically variable in Part III. The difficulty in responding differentially to contradictory sets of cues produces a marked disruption in performance in this situation where the conscious experience of incongruity is unavoidable. (p. 96-7) (b. Low: attend effectively to the relevant color cues and performance is not erratically variable. (p. 98)

(5. Size estimation II: variability of perceptual and memory conditions. (a. High: variable, in order to perform in a stable manner the subject must preserve the constancy of his impression of disk size in spite of the distracting figures on the disks and the disparity between a solid disk and the circle of light used as the comparison stimulus. Unarticulated initial responses to relevant and irrelevant cues makes for high variability in the perceptual condition and saturates the memory schema with conflicting cues. (p. 97) (b. Low: stable; able to develop stable impressions of disk sizes in the perceptual condition and this initial attentiveness only to cues relevant to the task prevents contradictory irrelevant cues from finding representation in the memory. (p. 98)

(6. Size estimation II: constant error in perceptual condition. (a. High: under estimation; they underestimate because they cannot withhold attention from the irrelevant, smaller pictures on the disks. The presence of the figures may produce an "inherence" effect which makes the disks seem smaller than they would without the figures. Subjects who direct attention to both the disks and irrelevant pictures have maximal inherence effects. (p. 97) (b. Low: over-estimation; they respond only to the disks and their withholding of attention from the figures leads them to show minimal "inherence" effects. (p. 98)

10. Factor-woman: Leveling-Sharpening (Fw-LS).

a. Conceptual definition. This applies to situations involving the temporal pattering of stimuli; it pertains to differentiation in memory organization as a function of the extent to which successive stimuli assimilate to each other. (p. 100) Levelers (high factor score) show relatively simple, undifferentiated memory organizations. There is a relatively high degree of interaction among memories and present precepts so that elements lose their individuality. (p. 100) Memories of past impressions also less available. (p. 105) Sharpeners have small assimilation effects in a variety of situations and they maintain discrete impressions and memories of successive stimuli.

b. Operational definition.

(1. Schematizing: Ranking accuracy and Increment error (regression) (a. High: inaccurate ranking and extreme lagging. When impressions of earlier

stimuli are not discrete there is no clear scale against which to judge each new stimulus and so the relative estimates of the size are inaccurate. Assimilation leads to underestimation of the sizes of the progressively larger squares and so lagging occurs. (p. 102) (b. Low: accurate intraserial rankings and low increment-error scores due to minimal assimilation among perceptual processes and memory traces. (p. 103)

(2. Kinesthetic time error: assimilation. (a. High: much assimilation between impressions of the initial weight and impressions of the intervening weights. (p. 102) (b. Low: preserve accurate impressions of the weights of the standard stimuli despite the intervening stimuli. (p. 103)

(3. Size estimation II: constant error of perceptual condition and variability of memory condition. (a. High: overestimation and variable; In this test the subject has to turn away from the standard disk to adjust the comparison disk and an adequate memory of the standard is needed. The leveler centers on the standard longer in order to obtain a stable memory image and consequently overestimates its size. Variability in the memory condition reflects the lack of clarity and discreteness in the memory traces of the individual disk sizes. (p. 102) (b. Low: underestimate and less variable; They develop a stable memory image of the standard with a minimum of fixation.

(4. Aniseikonic lenses: log recognition time. (a. High: slow to experience tilt in both the first and second trials; this suggests that it is not reporting the tilt but the actual recognition which is slow. Wearing the lenses confronts the subject with a new stimulus organization that conflicts with his previous experience. Subjects characterized by assimilation among new stimuli and preceding stimulus organizations will be slow to recognize and report the experience of tilt. (p. 102) (b. Low: quick to experience tilt. They respond to the new set of cues produced by the lenses as a separate experience and do not try to assimilate it to previous impressions. (pp. 103-4)

(5. Free association: percentage distant associations to "dry", percentage of "home" responses and, average length of unit (a. High: associations close to "dry", few "home" responses, long units. They produce a smaller number of idea units than sharpeners so the protocols are no longer. The associations drawn from the memory schemata are organized in a global and undifferentiated fashion. The content of the associations is relatively undifferentiated from the stimulus (few remote associations to "dry" and few responses to "house" dealing with the home). (p. 102-103) (b. Low: Sharpeners tend to break up their associations into a large number of short units (reflects a highly differentiated memory organization). The content of the associations to the stimulus words does not remain close. (p. 104)

(6. Color-Word: reading time for colors alone. (a. High: slow. Rapid and accurate reading of colors is an unusual reading requirement. To do well, the subject must have ready access to the color names and this is optimal when the subject's semantic schemata are highly differentiated. Levelers semantic schemata are less differentiated. (b. Low: rapid color reading.

11 Factor-women: Equivalence Range (Fw-ER).

a. Conceptual definition. This involves the degree to which subjects judge stimuli to be similar, it does not represent sensitivity to differences but pertains to the subjective criteria used to categorize experiences (p. 105) It is relevant to tests involving direct or implicit demands to make judgments of similarity. (p. 108) Broad equivalence range (high factor score) people show relatively relaxed and inclusive criteria of similarity. (p. 105) They dismiss differences in detail and consider objects in terms of their associated meanings, rather than in terms of physical properties. (p. 109) Narrow equivalence range (low score) people are reluctant to judge disparate stimuli or distinguishable aspects of their experience as "similar." They tend to respond to the inherent properties of objects rather than to their connotative implications. (p. 109)

b. Operational definition

(1. Object sorting: number of groups. (a. High: sort objects into a few large groups which tend to be loose aggregates defined by their usual (normal) location or by personal experience. (p. 105) (b. Low: many small groups. Unwilling to consider more than a few objects as having enough in common to belong to the same group. (p. 107)

(2. Size constancy: mean diameter. (a. High: nonretinal match. The adjustment is much closer to the actual object size than to the correct retinal equivalent. (pp. 105 and 107) (b. Low: The subjects are asked to adopt an unfamiliar set in this test. These subjects are able to compartmentalize the two different ways of experiencing an object. (p. 107)

(3. Free association: percentage distant associations. (a. High: many distant associations. The criteria of relevance is broad. (p. 107) (b. Low: Associations hover closely around the most obvious meanings of the stimulus words. These words define the categories and the subjects produce (or report) only closely related ideas. (p. 107)

12. Stimulus Acceptance-Rejection (SAR). (See Kogan Analytic Approach)

a. Conceptual definition. This is the cognitive basis which Couch and Keniston (1960) postulate for the agreeing response set.

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|---|--|
| The Yeasayer: | The Naysayer |
| A Stimulus Acceptance vs Rejection: | |
| <ol style="list-style-type: none"> 1. Accepts stimuli 2. Has pervasive readiness to respond to or yield to inner and outer forces demanding expression 3. Desires and actively searches for emotional excitement, novelty change and adventure. | <ol style="list-style-type: none"> 1. Rejects stimuli. 2. Has pervasive unwillingness to respond to inner and outer forces 3. Careful scrutiny and evaluation of internal and external stimuli. |
| B. External vs Internal Orientation: | |
| <ol style="list-style-type: none"> 1. Externally oriented, extroverted 2. Less conventional. 3. Parents remain external figures. 4. Anti- or non-intrceptive. Reacts in a more obvious and overt way to moods. 5. Orients outward towards the group values. 6. More valuable, speaks more easily about self. Wanders from the topic. Takes suggestions readily. 7. Makes self at ease with interviewer 8. Self-concept is behaviorally defined and evaluated by conventional standards 9. Little concern with values and ideals; does not internalize. | <ol style="list-style-type: none"> 1. Internally oriented, introverted. 2. Has conventional religious ideology strongly internalized. More conventional in many areas of social behavior and attitude. 3. Identifies with parents. 4. Intrceptive and psychologically minded. Uses much introspection and self analysis. Expresses self in indirect and complex ways. Weighs and considers each answer. Feels easily criticized. Requires more questioning and prodding. 5. Orients inward towards own values. 6. Shy and reserved about self. 7. Creates a task oriented atmosphere and initiates and maintains an intellectual relation with interviewer. 8. Self-concept is subjectively defined and evaluated by personal standards. 9. Continuously influenced by values which are felt as an integral part of themselves; Internalizes. |

| THE CONTRAST BETWEEN | |
|--|---|
| The Yeasayer: | The Naysayer |
| C. Personality Integration and Conflict: | |
| <ol style="list-style-type: none"> 1. More able and willing to admit unacceptable impulses. 2. Behavior is determined more by external factors in the immediate situation. 3. Problems center on inadequate controls. 4. Id dominated; tendency to externalized superego. Experiences guilt as external to central self. 5. Has low perseveration of mood and emotional cathexes. | <ol style="list-style-type: none"> 1. Uses denial mechanism and a general inhibition or repression of desires. 2. Behavior determined more by internal control and response to inner subjective reflections. 3. Problems center on excessive inhibition and lack of spontaneity. Worry about shyness and lack of social poise. 4. Superego dominated; tendency to emotional dissociation and repressive controls. Superego is firmly integrated into ego ideal. 5. Has high perseveration of feelings and attachments. |
| D. Impulse Control: | |
| <ol style="list-style-type: none"> 1. Able to express emotions and impulses freely and openly without inhibition. Little concern with impulse control. 2. Expresses aggression and hostility immediately and openly. 3. Expresses affection, sex, and tenderness directly and easily. 4. Has anal expulsive characteristics and responds to "anally colored" situations with typical expressive reactions. 5. Emotionally intense expressive behavior. Talks with enthusiasm about their impulsivity, love of excitement and novelty. | <ol style="list-style-type: none"> 1. Suppresses, represses and controls impulses by strong ego domination. Much concern with impulse control. Wants to maintain inner equilibrium. 2. Expresses hostility mostly in covert way; open aggression is extremely controlled. 3. Constricted, inhibited and repressed in expression of libidinal impulses. 4. Has anal retentive characteristics and shows typical controlled reactions. 5. Stresses avoidance of strong feelings and favors a balanced form of expression. Defensive and embarrassed about emotional impulsivity and their manner of expressing inner feelings. |
| E Competition and Distrust: | |
| <ol style="list-style-type: none"> 1. Admits a distrust of other's altruism 2. Accepts competition as a realistic part of life. | <ol style="list-style-type: none"> 1. Has a "reactive" trust of others. 2. Tries to minimize competition and conflict. |
| F. Intellectual Orientation: | |
| <ol style="list-style-type: none"> 1. Loose and emotional, concrete, less conceptual view of world. 2. Responds to the "surface" of item meanings; does not reflect on full implications; gives impulsive and immediate answers. 3. Enthusiastic, colloquial and extreme items are paid most attention to. | <ol style="list-style-type: none"> 1. More consistently intellectual and has a high regard for rationality. 2. Analyzes and dissects each item; considers it from several view points; attempts to be logical. 3. Guarded, qualified and negative-intellectual-orientation items are paid most attention to. |

| THE CONTRAST BETWEEN | |
|--|---|
| The Yeasayer: | The Naysayer |
| G. Secondary process: | |
| 1. Has low psychological inertia. 2. Has minimum amount of secondary processes intervening between inner "stimulus" and manifest "response." Quick reaction. 3. Has passive-releasing ego. | 1. Has high psychological inertia 2. Has long secondary processes causing considerable delay in emotional responsiveness. Slow reaction. Resistant to movement and change. 3. Has active-controlling ego. |

b. Operational definition. The Over-all Agreement Score (OAS). The scale contains items that measure heterogeneous content variables from widely different psychological areas. The content variables are psychologically "balanced" - an equal number of items of the opposite ends of each of the dimensions measured are used. The total number of items in the over-all response measure is 360 so the general response tendency has sufficient opportunity to manifest itself. A 20-item Agreement Response Scale (ARS) was developed which correlates +.79 with the OAS.

III. COGNITIVE FACTORS IN OPINION FORMATION.

A. GENERAL CONSIDERATIONS.

This section will attempt to relate some of the current conceptions of cognitive behavior described to the process of opinion formation in individuals. As Rokeach (1960) states in his discussion of the existing approaches to authoritarian beliefs: "What was...lacking was a theory that could tie together in a more general way the organization of belief with the organization of cognition." (p. 17) Further he states: "...a basic requirement is that the concepts to be employed in the description of belief systems must not be tied to any one particular belief system; they must be constructed to apply equally to all belief systems." (Rokeach, 1960, p. 6) The cognitive emphasis then implies a very general approach to opinions and attitudes -- a contentless approach emphasizing the structural aspects. This generality can be seen in the definition of cognitive processes as "The means whereby organisms achieve, retain, and transform information." (Bruner, Goodnow, and Austin, 1956, p. vii)

B. BELIEFS, ATTITUDES AND OPINIONS.

1. Definitions

a. Krech and Crutchfield. "A belief is an enduring organization of perceptions and cognitions about some aspect of the individual's world...a pattern of meanings of a thing; it is the totality of the individual's cognition about the thing." (p. 150-51) The term belief is used in a generic sense to include knowledge, opinions, and faith.

An attitude is "...an enduring organization of motivational, emotional, perceptual, and cognitive processes with respect to some aspect of the individual's world." (p. 152)

Beliefs are the cognitive embodiment of attitudes; all attitudes incorporate beliefs, but all beliefs are not part of attitudes. Beliefs are motivationally relatively neutral

but, when embedded in attitudes, are subject to "dynamic pressures"; i.e., the object of an attitude is viewed as a goal under specified conditions.

(1. The characteristics of beliefs and attitudes. (pp. 158-167)

(a. The objects of beliefs and attitudes: The kind of belief or attitude is determined by its object; the content refers to the various cognitions that are organized together around a specific kind of object.

(b. The structure of beliefs and attitudes: There are three relatively independent dimensions to a "belief-attitude space": Clarity of the individual perceptions and cognitions involved; Differentiation (complexity or degree of detail) in the structure of the belief-attitude; Specificity (isolation or generality) - the degree of intercommunication between the belief-attitude and other beliefs and attitudes.

(c. The strength and importance of beliefs and attitudes: Two other dimensions which are considered to be conceptually independent are:

Strength- the amount of change over time or through a variety of experiences or resistance to change in the face of contradictory beliefs or under the pressure of motivational forces (rigidity).

Importance - "...beliefs and attitudes are likely to be more important when they are functionally related to the more central characteristics of the individual's personality structure, when they are well organized and generalized, and when they are based upon needs for identification with other people and groups. They are likely to be more salient when they are newly formed or when they are in process of change or when they are being subjected to challenge by other people or by apparent logical inconsistency with other newly developing beliefs and attitudes." (Krech and Crutchfield, 1948, p. 164)

(d. The verifiability of beliefs and attitudes: There are three points on the continuum of verifiability: Knowledge - those beliefs the individual conceives of as being verifiable and verified. There is no necessary relation between the perceived facts and objective facts to which the beliefs pertain. Opinion - occupy an intermediate position on the verifiability dimension; an opinion is a belief yet to be verified. Faith - the beliefs of the individual which he recognizes to be intrinsically unverifiable.

(2. Belief-attitude and the objective facts: There is no one-to-one correlation between beliefs and objective facts and the strength of beliefs does not necessarily depend upon the degree of correspondence with objective facts.

b. Smith, Brunner, and White. The discussion and definition of attitudes by these authors is quite similar to the definition of cognitive controls and styles by Klein, et. al. Smith, Brunner and White conceive of traits as being "...highly generalized, dynamic and directive dispositions, hierarchically organized, and subject to modification by experience...The possession of certain traits would predispose the

individual to the adoption of certain general attitudes toward the social world about him." (Smith, Brunner and White, 1956, p. 8)

An attitude is "...a predisposition to experience a class of objects in certain ways, with characteristic affect; to be motivated by this class of objects in characteristic ways; and to act with respect to these objects in a characteristic fashion." (Smith, et. al., 1956, p. 33) Attitudes toward a social object have been used as an explanation of the selective nature of attention paid to the informational environment concerning those objects. (Smith, et. al., 1956, p. 13) In this sense attitude is a basic determinant of opinion, or at least it determines the bounds of the opinion.

c. G. Allport. A trait is "...a neuropsychic structure having the capacity to render many stimuli functionally equivalent, and to initiate and guide equivalent (meaningfully consistent) forms of adaptive and expressive behavior." (Allport, 1961, p. 347) There are two distinctions ordinarily used to differentiate a trait from an attitude: (a) An attitude always has an object of reference while a trait is aroused by so many objects that no attempt is made to specify them; the trait is more general (a higher level of integration) than an attitude. (b) Attitudes are usually pro or con, favorable or unfavorable; they lead one to approach or withdraw from the object. This attribute gives a motor cast to the concept of attitude.

d. Rokeach. "The belief system is conceived to represent all the beliefs, sets, expectancies, or hypotheses, conscious and unconscious, that a person at a given time accepts as true of the world he lives in. The disbelief system is composed of a series of subsystems rather than merely a single one, and contains all the disbeliefs, sets, expectancies, conscious and unconscious, that, to one degree or another, a person at a given time rejects as false." (Rokeach, 1960, p. 33)

2. Functional aspects.

a. Krech and Crutchfield. Beliefs and attitudes give continuity to the person's personality, give meaning to daily perceptions and activities, and they serve in the attempted achievement of various goals.

b. Smith, Brunner and White. These authors state the expressive function of opinions as follows: "...a man's opinions reflect the deeper-lying pattern of his life..." (p. 38) "Given a person with certain initial endowments of energy and cognitive equipment, there inevitably develops a style of adjustment to the world which is shaped and limited both by constitution and by the intervening opportunities the person has had for learning and adapting. Opinions...reflect the man's style of operating." (p. 38)

c. Brunner, Goodnow and Austin. The authors distinguish two types of categorizing:

(1. Identity categorization: this is relatively trivial as far as the study of cognitive behavior is concerned. It is defined as classifying a variety of stimuli as forms of the same thing. (p. 2)

(2. Equivalence categorization: this is more important and it is where an individual responds to a set of discriminably different things as the same kind

of thing or as amounting to the same thing. (p. 4) There are three broad classes of equivalence categories:

(a. Affective: These are groupings which appear to depend heavily upon whether or not the things placed in the same class evoke a common affective response. "Characteristically, categories marked by an affective defining response are not amenable to ready description in terms of the properties of the objects comprising them. The difficulty appears to lie in the lack of correspondence between affective and linguistic categories." (p. 4)

(b. Functional: Here equivalence is based on an external function. The objects fulfill a concrete and specific task requirement. (p. 5)

(c. Formal: These categories are made by "...specifying the intrinsic attribute properties required by the members of a class...one can state reliably the diacritica of a class of objects or events short of describing their use." (p. 5)

(3. Categorizing serves several purposes:

(a. The organism reduces the complexity of his environment by categorizing discriminably different events as equivalent. (p. 12)

(b. Categorizing is the means by which the objects of the world are identified. (p. 12)

(c. The establishment of a category based on a set of defining attributes reduces the necessity of constant learning. (p. 12)

(d. Categorizing provides direction for instrumental activity. (p. 12)

(e. Categorizing permits the opportunity for ordering and relating classes of events. (p. 13)

d. Judgment and Instantiation. Krech and Crutchfield (1948, p. 157-8) speak of a judgment as a process of characterizing objects in terms of certain categories. It is the momentary product of perceptions, beliefs and attitudes. Opinions are judgments that persist in a stable way for the individual over a period of time.

The process of instantiation (Sarbin, Taft and Bailey, 1960, p. 47) is one of the stages in the process of inference where the occurrence is converted into an instance of a general class. Instantiation is in itself a multistage process called taxonomic sorting (p. 60). Taxonomic sorting is the processural aspect of instantiation in which an occurrence is sorted as a member of a species or class; formally it is written as:

A has characteristic x (the occurrence).

x is the defining characteristic of species M (the mediation).

A is a member of species M (the instantiation).

In person cognition there are several types of mediation:

(1. Mediation via specific exemplars: (p. 61) In the absence of other knowledge, the inferring person uses a specific person as an exemplar of a species; formally written it is:

A has characteristic x.
x is characteristic of B, who is the exemplar of species M.
Therefore, A is a member of species M.

(2. Analogical mediation: (p. 62) Different species share certain characteristics; here particularistic inferences are made on the basis of attributes common to species. Formally it is:

A has characteristic x.
x and y are defining characteristics of species M.
Therefore, A has characteristic y and is a member of species M.

(3. Metaphoric mediation: (pp. 62-3) Here persons are characterized by trait-names which are employed in other contexts and carry surplus meanings which may serve as the bridge for inferences about other dispositions and performances. Here the verbal system serves as the connecting link between the observed occurrence and the predictions; to the extent the metaphor accurately maps both the perceived characteristic and the inferred disposition, the prediction will be valid.

A has characteristic x.
x is denoted by L.
Species M is denoted by L.
Therefore, A is a member of species M.

(4. Mediation through trait substitution: (pp. 63-4) Person-objects are complexes of characteristics; certain characteristics are regarded as frequent accompaniments of others ("implicit personality theory"). A trait whose manifestations are not directly observed is inferred from conduct or from traits presumed to be concomitant or correlative.

A has characteristic x.
x is a concomitant or correlate of characteristic y.
y is a defining characteristic of species M.
Therefore, A is a member of species M.

A subtype of this mediational process emphasizes perceived similarities between traits:

A has characteristic x.
Characteristic x is similar to characteristic y.
y is a defining characteristic of species M.
Therefore, A is a member of species M.

(5. Reductive mediation: (p. 65) By the process of elimination the person classifies the object:

A has characteristic x.
x is a defining characteristic of species M and species N.
y is a defining characteristic of species N.
A does not have characteristic y.
A is not a member of species N.
Therefore, A is a member of species M.

e. Rokeach. Belief systems serve two sets of functions:

- (1. They are the person's theory for understanding the world he lives in (this is similar to Kelly's "personal construct", 1955).
- (2. They are also the person's defense network through which information is filtered, in order to render harmless that which is threatening. (p. 400)

f. Scheerer. (1954) Similar to Rokeach, is Scheerer's two characteristics of attitudes: (1). Cognitively, they organize and order certain events into a unified view, a representational structure. (2). The emotional or subjective nature of attitude consists in its functional significance for the person in supporting a stable relationship between him and his social field. (p. 119)

C. ROKEACH: OPEN AND CLOSED BELIEF SYSTEMS

1. The cognitive basis of the open-closed mind. "...the ability (or inability) to discriminate substantive information from information about the source, and to assess the two separately." (p. 60) "...in any situation in which a person must act, there are certain characteristics of the situation that point to the appropriate action to be taken...The same situation also contains irrelevant factors, not related to the inner structure or requirements of the situation...A basic characteristic that defines the extent to which a person's system is open or closed [is] ...the extent to which the person can receive, evaluate, and act on relevant information received from the outside on its own intrinsic merits, unencumbered by irrelevant factors in the situation arising from within the person or from the outside." (p. 57)

2. The formation of new belief systems. The essence of the difference between open and closed persons in the formation of new systems lies in the ability to synthesize rather than analyze. There are several variables that determine the ability to form new systems: (p. 398)

- a. The ability to remember or keep in mind all the new parts to be integrated.
- b. A willingness to "play along" or entertain new systems. (TUE)
- c. Past experience, which determines whether a particular system is, psychologically speaking, new or not.
- d. Presenting new beliefs to be formed into new systems all at once or gradually. In closed persons the formation of new systems is facilitated when the new beliefs are

presented all at once; the new beliefs do not have to be reconciled with old ones. In open persons it makes no difference.

e. The degree to which there is isolation within the belief system. The less intercommunication between individual beliefs the more the formation of new systems is retarded.

3. The defining characteristics of open-closed systems: (pp. 55-6)

| A Belief-Disbelief System Is | |
|---|---|
| Open | Closed |
| <i>A. to the extent that, with respect to its organization along the belief-disbelief continuum,</i> | |
| <ol style="list-style-type: none"> 1. the magnitude of rejection of disbelief subsystems is relatively low at each point along the continuum; 2. there is communication of parts within and between belief and disbelief systems; 3. there is relatively little discrepancy in the degree of differentiation between belief and disbelief systems; 4. there is relatively high differentiation within the disbelief system; | <ol style="list-style-type: none"> 1. the magnitude of rejection of disbelief subsystems is relatively high at each point along the disbelief continuum; 2. there is isolation of parts within and between belief and disbelief systems; 3. there is relatively great discrepancy in the degree of differentiation between belief and disbelief systems; 4. there is relatively little differentiation within the disbelief system; |
| <i>B. to the extent that, with respect to the organization along the central-peripheral dimension,</i> | |
| <ol style="list-style-type: none"> 1. the specific content of primitive beliefs (central region) is to the effect that the world one lives in, or the situation one is in at a particular moment, is a friendly one; 2. the formal content of beliefs about authority and about people who hold to systems of authority (intermediate region) is to the effect that authority is not absolute and that people are not to be evaluated (if they are to be evaluated at all) according to their agreement or disagreement with such authority; 3. the structure of beliefs and disbeliefs perceived to emanate from authority (peripheral region) is such that its substructures are in relative communication with each other, and finally; | <ol style="list-style-type: none"> 1. the specific content of primitive beliefs (central region) is to the effect that the world one lives in, or the situation one is in at a particular moment, is a threatening one; 2. the formal content of beliefs about authority and about people who hold to systems of authority (intermediate region) is to the effect that authority is absolute and that people are to be accepted and rejected according to their agreement or disagreement with such authority; 3. the structure of beliefs and disbeliefs perceived to emanate from authority (peripheral region) is such that its substructures are in relative isolation with each other, and finally; |
| <i>C. to the extent that, with respect to the time-perspective dimension there is a</i> | |
| <ol style="list-style-type: none"> 1. relatively broad time perspective. | <ol style="list-style-type: none"> 1. relatively narrow, future-oriented time perspective. |

D. SOME RELATIONS BETWEEN THE COGNITIVE FACTORS AND OPINION FORMATION.

The problem is what predictions can be made about the formation of an opinion of an individual if we know his "cognitive style." In general, these cognitive factors tend to determine the bounds which an opinion may take (the formal characteristics) more than the specific content. However, if one knew the relevant informational environment for an individual (his present opinions about an object or topic and the characteristics of the new information about this object or topic which he is to use to form an opinion) we should be able to predict which aspects of the new data he will select to form his opinion. In this section I will take some of the cognitive variables described previously and relate their relevance for opinion formation by making some predictions.

- 1. Leveling-sharpening:** A leveler would be: more influenced by arguments given early (primacy), more influenced by points which are made to stand out, unable to decide when there is information on both sides.
- 2. Tolerance for unrealistic experiences (TUE):** The intolerant would: be more likely to select out familiar points in an argument and forget the unfamiliar, be more likely to reject emotional appeals, be more influenced by majority opinion, require more information before stating an opinion, make more effort to rationalize conflicting statements, be more likely to reject innovation.
- 3. Equivalence range:** People with a narrow range would: make more attempts to integrate conflicting information, have more exact standards for comparison of statements (require unambiguous presentation of arguments), be less influenced by catch-words and slogans, see fewer statements in an argument as relevant for forming an opinion, be slower in the formation of an opinion.
- 4. Scanning-focusing:** Scanners would: be aware of more items of information, be less likely to see conflicting points in an argument, take longer to form an opinion, have a less stable opinion once formed. Focusers would: arrive at an opinion quicker, reject more information as irrelevant, magnify the importance of the points considered relevant, not be influenced by emotional appeals.
- 5. Constricted and field dependent vs flexible and field independent:** Constricted and field dependent people would: form an opinion around the most emphasized point in an argument, forget conflicting points, be less sure of their opinion and take longer to form it in the situation where there is information irrelevant to the argument, be more resistant to changing opinions once formed, be more influenced by group consensus, be more swayed by persuasion attempts.
- 6. Stimulus accepting-rejecting:** Yeasayers would: form opinions quickly when only one side was given, be influenced by emotional appeals, be influenced by group pressure, agree with both sides of an argument and so would have an unstable opinion, be influenced by the information source.
- 7. Open vs closed mind:** Closed minded people would: strongly reject information which conflicted with their present information, treat the information as a unit and react to it on that basis, not notice points which were contradictory on their side, be ignorant of the

counter arguments (forget or not see the point of the counter argument), be much affected by fear appeals, be much influence by the source of the information.

IV. COGNITIVE STYLE AND INTERPERSONAL TRUST.

A. GENERAL FORMULATION.

The general hypothesis is that knowing the cognitive styles of the separate individuals in a dyad, one will be able to predict the style of the interaction, both in the initial stages and as the relation develops. More specifically, the conjunction of cognitive styles of the inter-actors will set limits on the outcome of the interaction such that styles A and B will allow outcomes X and/or Y but not Z. Therefore, two problems arise: the prediction of the non-occurrence of Z and the prediction of X and/or Y. This means that the occurrence of Z and/or the non-occurrence of both X and Y is a definite refutation of the prediction; but the nonoccurrence of Z or the occurrence of X and/or Y is only consistent.

The formation stage of interaction can be conceived as a sampling process: "...the early exploratory interactions are very important in determining the further fate of the potential relationship. The interaction occurring during this period ... (is) a sampling process in which the pair of individuals, by virtue of the items each selects from his behavioral repertoire, experience a sample of the possible interactions and outcomes represented by their joint matrix." (Thibaut and Kelley, 1959. p. 20 and chap. 5) The sampling of the other's cues and the presentation of behavioral cues to the other are the individual contributions to a dyad. The individual's cognitive style may influence both of these processes but probably influences the perception of the other's cues more directly. The manner in which the cognitive style influences the presentation of behavioral cues is probably according to some expectancy mechanism like George Kelly's "Personal Construct" formulation:

1. Fundamental Postulate: "A person's processes are psychologically channelized by the ways in which he anticipates events." (Kelly, 1955, p. 103)

2. Commonalty Corollary: "To the extent that one person employs a construction of experience which is similar to that employed by another, his psychological processes are similar to those of the other person." (Kelly, 1955, p. 104) The cues an individual uses to anticipate the other's behavior are those of the current behavior of the other; one selects certain of these cues to give the appropriate behavior for these cues.

B. INTERPERSONAL TRUST.

Interpersonal trust is probably the most important aspect of interpersonal relations but it has received little study in psychological social psychology. For research in courtship, marriage and family the study of interpersonal trust has obvious practical and theoretical importance; the concept of mutual trust is implicit in much of the literature on mate selection. More study has been made of the factor of similarity in friendship and mate selection than has been made of the factor of mutual trust. I conceive of mutual trust as a necessary but not sufficient condition for the development of friendship and (especially) love relationships. If "love" is used in the usual sense of concern about and desire for the loved object, then the development of a "love relation" is dependent on the willingness of the parties to trust each other. (Waller and Hill, 1951, discuss security as a component in the sentiment of love on p. 112). In turn, the development of mutual trust is dependent on the sampling process mentioned earlier and this in turn is dependent on certain cognitive styles of the individuals involved.

The bias in behavior sampling in the formation stages which is the result of selective perception mediated by the cognitive styles of the individuals can be partially eliminated by circumstances (beyond the control of the pair) which force more representative behavior to be exhibited. However, the bias cannot be completely eliminated; even though each individual performs a large and representative sample of his behavior the cognitive styles of the individuals set certain limits on the cues that will be utilized and considered relevant.

A situation of free choice of interaction is classified by Sarbin, Taft and Bailey (1960) as symmetrically reciprocal where the 'analyst' and 'object' engage in interaction that is not primarily assessment oriented. Here the information value of the cues from the other can range from low to medium. This is due to the fact that the attention of the interactors may be taken up with the social interaction itself or have some other focus than that of deriving information about the characteristics of the other person (Sarbin, Taft and Bailey, 1960, pp. 216-222). In this situation, where each individual determines what behavior he will display as a result of the interaction process itself and each determines whether or not he will continue the interaction, the cognitive style may give rise to more and more bias in sampling. If the behavior which becomes dominant is disruptive, then the interaction is discontinued and the sampling stops. In a situation where the individuals are more or less forced to interact, but where the type of behavior to be used is chosen by the individuals involved, then the cognitive styles of the interactors will have maximum effect on the type of relationship which develops.

Thus far Deutsch and his associates (Deutsch, 1958, 1960a, 1960b; Deutsch and Krauss, 1960; Solomon, 1960) have done the most experimental work in the situation of trust and suspicion. I will therefore quote from his definitions and discussion.

1. The problem of trust: "The problem of trust arises from the possibility that if, during cooperation, each cooperator is individually oriented to obtain maximum gain at minimum cost to himself (without regard to the gains or cost to the other cooperators), cooperation may be unrewarding for all or for some." (Deutsch, 1960a, p. 123)

2. The definition of trust: "The essential features of a situation confronting the individual with a choice to trust or not in the behavior of another person [are] ...(a) the individual is confronted with an ambiguous path, a path that can lead either to an event perceived to be beneficial CVa +) or...harmful CVa -); (b) he perceives that the occurrence of Va + or Va - is contingent upon the behavior of another person; (c) he perceives the strength of Va - to be greater than Va +. If the individual chooses an ambiguous path with such properties he has made a trusting choice." (Deutsch, 1960a, p. 124)

3. Mutual trust: This exists "...when [individuals] I and II have complementary social trust with regard to each other's behavior...I trusts II to behave in a certain way and is willing to do what II trusts him to do; the same is true for II. Each perceives that the other person is aware of his intent and his trust." (Deutsch, 1958, p. 267)

4. The definition of suspicion: "The essential features of a situation confronting the individual with a choice to be suspicious or not of the behavior of another person are ...(a) the individual is confronted with the possibility that a potentially harmful event (Va -) will occur; (b) he perceives that the occurrence of Va - is contingent upon the behavior of another person; and (c) he perceives the possibility of engaging in behavior that will prevent or reduce the harmful consequences of the other person's behavior, if it occurs...a suspicious

choice...is a choice to engage in behavior to prevent or reduce the harmful consequences of another person's behavior...A choice not to take an ambiguous path may be considered as a type of suspicious choice...an individual is more likely to make a suspicious choice the greater is the perceived strength of VA-, the more confidence that he has that the suspected behavior of the other person will occur, and the more able he believes he is to prevent or reduce the harmful consequence of the other person's behavior." (Deutsch, 1960a, p. 125)

5. "Mutual suspicion exists when each person expects the other person to produce a malevolent event in regard to himself and, in turn, is ready to produce a malevolent event for the other based upon this expectation. In mutual suspicion...one is not necessarily aware that the other's desire to produce a malevolent event is contingent upon the expectation of being the object of a malevolent event." (Deutsch, 1958, p. 267)

6. Perceived intentions: "To trust another person to produce a beneficial event X (or to suspect that another person will produce a harmful event Y) an individual must have confidence that the other individual has the ability and intention to produce it." (Deutsch, 1960a, p. 125)

7. Situational responsibility: "...the trustworthy person is aware of being trusted and...he is somehow bound by the trust which is invested in him...Being responsible to the trust of another implies that the responsible person will produce 'X' (the behavior expected of him by the trusting individual) even if producing 'Y' (behavior which violates the trust) is more immediately advantageous to him." (Deutsch, 1958, p. 268)

8. A scale of responsibility: "The degree of responsibility of an individual to the trust of another can be measured by varying either the attractiveness of engaging in untrustworthy behavior, Y, or the unattractiveness of the activities involved in producing the expected behavior, X; the more responsible the individual, the more likely he is to produce X, despite either its unattractiveness or the attractiveness of producing Y." (Deutsch, 1958, p. 268)

9. Trust, personality and the trust situation: In his study of trust and the F scale (California), Deutsch made the following statement of the game type of situation he uses: an individual's "...behavior toward the other is congruent with what he expects from the other, and also, what he expects from the other is congruent with his behavior toward the other...the personality predispositions tapped by the experimental game are...internalizations of a reciprocal pattern of interrelationships with another. In other words, what appears to be internalized is a system of interrelations between oneself and the other, including the norms which prescribe both what to expect from the other and how to act toward the other." (Deutsch, 1960b, 139-140) "Subjects who are trusting when they have to choose between trusting or not trusting are very likely to be trustworthy even when they can gain by being untrustworthy; the reverse holds for subjects who choose to be suspicious rather than trusting." (Deutsch, 1958, p. 278)

C. THE RELATION BETWEEN INTERPERSONAL TRUST AND COGNITIVE STYLE.

The ideal mode of predicting the outcomes of interaction from cognitive styles would be to specify the stimulus characteristics of the particular interaction situation (e.g., task, set, role characteristics, properties of the other person, etc.) and then use the profile of cognitive controls to predict the cues that an individual is most likely to use to determine which behavior he will select from his repertory.

The situation Deutsch uses is a "two person non-zero sum game" (a favorite phrase in Sophisticated social psychology) of a particular type: the "prisoner's dilemma". The matrix is as follows:

| | | | |
|--------|----|----------|---------|
| | | Person I | |
| | | A | B |
| Person | X | + \ + | -- \ ++ |
| | II | ++ \ -- | - \ - |

"The essential psychological feature of the game is that there is no possibility for 'rational' individual behavior in it unless the conditions for mutual trust exist. If each player chooses to obtain either maximum gain or minimum loss for himself, each will lose. But it makes no sense to choose the other alternative, which could result in maximum loss, unless one can trust the other player." (Deutsch, 1958, p. 270) In order to allow maximum effect of the cognitive style, the players are allowed to choose their moves as they wish.

We may now turn to a few guesses as to what specific cognitive controls or styles will be most likely associated with trusting or suspicious behavior. These guesses are not based on the direct analysis of the stimulus usages of the individuals but on secondary consequences of cognitive style (Klein, 1960, pp. 110-112); i.e. we "...think of certain types of behavior as a secondary adaptation to a cognitive attitude, after the continual and repeated reliance upon the attitude." (Klein, 1960, p. 111)

1. Leveling: "...the leveling attitude produces an over simplified world...The blurring of temporally extended stimuli characteristic of levelers could lead to a relatively impoverished conceptual structure...The associated qualities of ingenuousness and naiveté and the experiences of surprise that we find...in levelers are conceivably secondary consequences of the attitude." (Klein, 1960, p. 111) We would "predict" that levelers would make trusting responses and be trustworthy. There is however a complication involved; conceivably trusting and trustworthy individuals have a longer time span and separate out consequences of their behavior over time. If this is true they would tend to be sharpeners. Although leveling-sharpening refers to memory it also may hold for the degree of articulation among possible future consequences which might result from the person's present behavior.

2. Scanning: Here there is a close attentional investment - the hard, close look. "...the price of the constant close look is a slow down in the identifying and categorizing of relevant details...doubt, uncertainty, and mistrust are prominent accompaniments of the scanning attitude." (Klein, 1960, p. 111) Scanners should make more suspicious responses and be untrustworthy.

3. When scanning appeared in the context of **sharpening, narrow equivalence range** in categorizing and **constricted response to ambiguity**, the dominant attitudes of people with this configuration were "...intense control and inhibition, with very pronounced

intellectualizing tendencies, pervasive experiences of ambivalence, mistrust, expectations of being hurt. They regarded the world as a source of malevolence and danger, and had a generally pessimistic outlook on the present and the future." (Klein, 1960, p. 111). The persons with scanning, sharpening, narrow equivalence range and constricted response to ambiguity should make suspicious responses and be untrustworthy.

4. Field dependence-independence: Field independent people have the following personality characteristics: activity in dealing with the environment, an awareness of "inner life" and effective control of impulses with low anxiety, high self-esteem, including confidence in the body and a relatively adult body image, and a generally individualistic orientation. The individualistic orientation should give rise to suspicious and untrustworthy behavior in the "prisoner's dilemma" situation. The problem here is that field dependent people are generally more maladjusted and so they may also be suspicious and untrustworthy.

5. Equivalence range: Making a trusting response involves the expectation of trustworthy behavior on the part of the other. This in turn involves a broader time span (into the future). Individuals with broad equivalence ranges should have a broad time span and would therefore be more trusting and trustworthy; this is especially true if the interaction is to continue over a relatively long period of time.

D. SOME IMPLICATIONS OF THE STUDY OF THE RELATION BETWEEN COGNITIVE STYLE AND TRUST FOR COURTSHIP, MARRIAGE AND FAMILY RESEARCH.

Waller and Hill (1951), in chapters 8 and 9, discuss the game like attributes of dating and courtship. The sections on "Factors in exploitation" and "The principle of least interest" are discussions of the differential power aspects; laboratory analogs of this type of situation can be formed by using selected payoffs in the game matrix. (Thibaut and Kelley, 1959, discuss this under the heading of "fate and behavior control" in chapter 7 and Solomon, 1960, systematically varied the power relations and observed their effect on the development of interpersonal trust). To the extent that the individual has a cognitive style which is associated with a strategy of suspicion and mistrust in the game situation, this individual will view his dating relations in terms of rating, exploitation, barter and bargain, and "the line".

The implications that trust and suspicion have for the development of intimacy and security in a love relation are basic: the choice of trust determines whether or not there will be intimacy and security. Waller and Hill describe the aspect of trust in their discussion of intimacy: "The engaged dyad is characterized by increasing intimacy. The quality of the interaction changes as members of a pair make themselves assessable to one another. The capacity to love fully is closely related to the willingness to make one's self accessible to another without fear of being hurt. Indeed, accessibility is the key to intra-pair communication, accommodation and in fact, to eventual intra-pair habituation." Waller and Hill, 1951, p. 232)

V. NON-INTELLECTUAL COGNITIVE VARIABLES IN THE USE OF MENTAL ABILITY.

A. INTRODUCTION

This section of the paper will attempt to relate some of the current conceptions of cognitive behavior (previously described) to the use of mental ability (specifically to creativity). As stated, the cognitive emphasis implies a contentless approach emphasizing the structural aspects -the channeling of intellect. Guilford, et. al. (1957b), in their study of some personality traits which might be related to the use of creative-thinking aptitudes, conclude that "...there is very little relationship between traits of temperament and interest and performance in tests of creative thinking...it does not appear that we can account for any of the abilities in the area of fluency, originality and flexibility in terms of non-aptitude qualities...within populations we may conclude that except for the special relations of flexibility factors to perseveration and persistence, none of the creative-thinking activities appear to be even substantially accounted for in terms of temperamental and motivational traits, under the usual testing conditions. In everyday life, variations in motivation and temperament might have much more influence, having much greater freedom to operate upon performance." (Guilford, et. al., 1957b, p. 39) The non-aptitude traits were defined in terms of items on a personality questionnaire and the various scales measuring the traits were based on from two to ten items. The forty original personality-temperament traits were reduced, by factor analysis, to sixteen factors. These they expanded into twenty-four traits of personality which were used in the correlational analysis with creative-thinking factors. The conclusion was that there were consistent trends in their data with "much rationality...in the relationships between trait and factor measures..." (Guilford, et. al. 1957b, p. 38) although most of the correlations were small and not significant. The type of R-R study undertaken was especially subject to the "social desirability" factor which could obfuscate and attenuate the relationships which exist between personality traits and creative ability factors (also many of the scores were based on a few items). More recently, Guilford (1957, 1961) has considered creative-thinking as "divergent production" with 21 to 24 possible separate "factors". These factors depend on the various combinations of "products" and "contents" produced by the "divergent-production" operation. In 1950 Guilford had this to say about nonintellectual aspects of creativity: "Some of the abilities contributing to creative success are probably non-intellectual; for example, some of them are perceptual." (p. 447) I wish to propose some possible relations between certain non-intellectual cognitive-personality variables and the factors which are believed to constitute creative-thinking and also the type of cognitive behavior creative individuals (socially defined as such) will be expected to display.

B. DEFINITIONS OF ADDITIONAL RELEVANT CONCEPTS.

1. Regression in the service of the ego (RSE)

a. Conceptual definition.

In addition to the cognitive variables previously defined, the concept of "regression in the service of the ego" has particular relevance to the study of creativity. Three different approaches are available to the psychological study of creativity : the process, the product, and the person. In this concept of adaptive regression Ernest Kris (1952) was interested primarily in the process of creativity. "Regression in the service of the ego is a partial, temporary, controlled lowering of the level of psychic functioning to promote adaption. It promotes adaption by maintaining, restoring or

improving inner balance and organization, interpersonal relations and work. It is a process which increases the individual's access to preconscious and unconscious contents, without a thorough going sexualization or aggressivization of major ego functions, and therefore without disruptive anxiety and guilt...the primary and secondary (relative) autonomy of higher ego functions is not impaired. The process implies central controlling functions in the ego which may suspend some other functions...and may emphasize generically primitive mechanisms," (Schafer, 1960, pp. 122-123) The "level of psychic functioning" has to do with the distinction between primary and secondary process. The primary process is "...generically and formally the more primitive, operates with unneutralized drive energies, and its regulative principle is tension reduction (the pleasure principle); it strives toward immediate discharge of energy accumulations by a direct route and through the mechanisms of displacement, condensation, substitute formation, and symbolization.

The secondary process operates by the principle of least effort; its energies are relatively neutralized, i.e., relatively bound in motives and structures of a highly socialized nature, and freely available for whichever ego activities of the moment may require energetic support; it is oriented toward objective reality; it follows the safest course toward the sought-for object in reality, using delays of impulse, detours, and experimental action in thought, until the suitable object and modes of action have been found." (Schafer, 1960, p. 123) "At the moment of creation, thinking is more fluid and often more drive dominated and less logical than usual; it is generally pervaded by intense emotionality..." (Pine and Holt, 1960, p. 370) (See Table 1.)

Table 1: Contrast between primary and secondary process (adapted from Schafer, 1960)

| Psychological Function | Characteristics of psychological function under: | |
|------------------------|---|--|
| | Primary Process | Secondary Process |
| Thinking | Unreflective, Timeless, Concrete. | Reflective, Time perspective, Abstract concepts corresponding to reality relations are used. |
| Memory | Organized around drive, Other memories not available. | Conceptual, Reality oriented, Depend on needs of the real situation, Freely available |
| Perception | Drive selected and organized, Disregard of external context, Diffuse. | Adaptively selected and organized, Bounded by objective context, Articulated, Stable. |
| Affect | Diffuse, Unmodulated. | Articulated, Varied, Subtly blended. |
| Motility | Rapid spilling over into action and participation, Grossness of action. | Restrained, Modulated. |
| Self | Reality and thought confused (blurred boundary) Wish is deed, Fantasy is event, Past is Present | Maintains boundaries and coherence. |
| Defense | Weak (consciousness overwhelmed by normally unconscious impulses, affects, & fantasies.) | Strong. |
| Ego Ideal | Megalomaniac, Unattainable, Infantile conceptions. | Reality oriented, Attainable conceptions. |
| Super-ego | Archaic severity. | Close to ego. |
| Ego as a Whole | Passive, Discharge of impulses occurs independently of the ego. | Active ego, Controls or postpones discharge. |

b. Operational definition.

(1. Amount of expression of primary process: Using the Rorschach all responses that have aggressive derivatives, libidinal derivatives, anxious content, or various non logical or bizarre formal qualities are scored. The final ranking for amount of primary process is based upon the proportion of the Subject's responses that have scorable primary process elements, with double weighting for extreme instances. (Pine and Holt, 1960, p. 373; Holt and Havel, 1960)

(2. Effectiveness of control over primary process: Defense-demand is defined in terms of the acceptability of the response in ordinary social communication (rated on a six-point scale). Defense-effectiveness is defined in terms of the success of the controlling factors associated with the primary

process material (e.g. the form level, the associated affective response of the person, the intellectual or esthetic context of the response and the person's evasiveness or confusion) (rated on a six-point scale) Final score is based on the ratio of well-controlled responses (i.e., high demand and effective defense) to poorly-controlled responses (i.e., ineffective defense whatever the demand level). (Pine and Holt, 1960, p. 373; Holt and Havel, 1960)

(3. Adaptive versus maladaptive regression: This is a combination of the two scores of amount of expression and effectiveness of control. At one extreme are people high on both amount of expression and effectiveness of defense (controlled or adaptive regression to primary process modes of thinking). At the opposite extreme are people who are high on the amount of expression but low on effectiveness of defense (uncontrolled or maladaptive regression to primary process modes of thinking). In the middle are people who are low on amount of expression (constricted control). (Pine and Holt, 1960, p. 373; Holt and Havel, 1960)

2. Creativity

a. Factors of creativity. Guilford has done extensive studies of the various attributes of creativity which are presumably present in all individuals. He was not interested in studying creative people but in discovering creative traits. The creative personality is defined as a pattern of traits which are characteristic of creative persons and this pattern is manifest in creative behavior which includes inventing, designing, contriving, composing and planning. (Guilford, 1950, p. 444) However, in the studies he has done on creativity, Guilford has used subjects who are not necessarily highly creative. The following list of creativity factors is taken from a combination of sources (Guilford, 1957; Guilford, et. al., 1951, 1952, 1957a). Some of the defining tests are given in parentheses.

(1. Associational fluency (AF): The ability to produce words from a restricted area of meaning; tests have simple restrictions and limited potential. (Controlled associations--write synonyms for each given word. Simile insertions--write adjectival completion for a simile.)

(2. Conceptual foresight (CF): The ability to anticipate the needs or the consequences of a given situation. (Pertinent questions--write questions, the answers to which would serve as a basis for making a decision in a conflict situation. Alternative methods-list different ways of accomplishing a given task.)

(3. Conceptual redefinition (CR): The ability to shift the function of an object or part of an object and use it in a new way. (Gestalt transformation--indicate the object having a part that will serve a specified purpose. Object synthesis--name an object that could be made by combining two given objects. Concept synthesis--combine two ideas to suggest a new idea).

(4. Elaboration (E): The ability to specify details that contribute to the development of an idea or the variation of an idea. (Planning elaboration--fill in as many details as necessary to make a briefly outlined activity work.

Figure production--add to given lines in order to make a meaningful figure; score is based on the number of details drawn).

(5. Expressional fluency (EF): The ability to think rapidly of appropriate connected wording. (Four-word combinations--write four-word sentences with the first letter of each word given. Simile interpretation--complete the sentence that states an analogous idea).

(6. Figural adaptive flexibility (FAF): The ability to give up one perceived organization of lines in order to see another. (Hidden pictures--find hidden faces in pictures. Gottschaldt figures--in a complex figure find a given simpler figure.) situation in which there is little restriction and quality does not count.

(7. Ideational fluency (IF): (Thing listing--write names of things fitting broad classes. Brick uses, fluency--list different uses for a brick; score is number listed. Consequences test--the number of immediate or less remote consequences listed in response to certain hypothetical changes in the world. Plot titles--the number of low-quality or non-clever titles listed as appropriate titles for simple story plots).

(8. Originality (O): The ability to produce remotely associated, clever or uncommon responses. (Plot titles--the number of clever titles listed as appropriate titles for simple story plots. Symbol production--produce symbols to represent given activities and objects. Quick response--word association test in which only five seconds is allowed to respond, score is based on uncommonness of responses. Associations I--think of a single word that is associated in a meaningful way with each of the two given words; completion response).

(9. Penetration (P): The ability to see beyond the immediate and obvious. (Social institutions--suggest far-sighted improvements for social institutions. Similarities--write ways in which common objects of a pair are alike. Consequences test--number of remote consequences listed in response to certain hypothetical changes in the world).

(10. Sensitivity to problems (SP): The ability to recognize practical problems, see defects, needs, deficiencies, the unusual and what needs to be done. (Seeing problems--list problems that might arise in connection with common objects. Seeing deficiencies--point out the way in which a described plan or activity is faulty. Social institutions--suggest two improvements for several institutions; score is the number of direct or obvious improvements.)

(11. Spontaneous flexibility (SF1): The ability to produce a diversity of ideas in a situation that is relatively unrestricted, to shift mental set freely making it possible to get away from more obvious and more trite responses, to react to a relatively unstructured situation in divergent channels or directions. (Brick uses, flexibility--list different uses for a brick; score is number of classes of uses. Unusual uses--list different, peculiar uses for common objects).

(12. Structural adaptive flexibility (SAF): The ability to change set in order to meet new structural requirements imposed by changing problems; the ability to restructure problems, to solve problems in different ways, to drop associative connections just used and to adapt to new ones. (Match problems--take away matches and leave a specified numbers of squares or triangles. Planning air maneuvers--select the most direct path in "skywriting" letter combinations).

(13. Structural redefinition (SR): The ability to reorganize elements in terms of the structural properties of material, assigning a new function or use to the elements involved. (Camouflaged words--find the name of the sport or game concealed in a sentence. Hidden figures--indicate which of five figures is hidden in a given figure. Picture gestalt--indicate the object or part in a photograph which will-serve as a specified purpose).

(14. Word fluency (WF): The ability to rapidly produce words fulfilling specific structural (letter) requirements. (Prefixes--write words containing a specified prefix. Word listing, I--write words containing one specified letter. Disarranged words--make a word out of scrambled letters).

b. Knowledge processes, creative thought and the science of induction

There has been a resurgence of interest in the "mechanical" associative approach to creativity in recent years. Mednick (1962) defines the creative thinking process as "the forming of associative elements into new combinations which either meet specified requirements or are in some way useful. The more mutually remote the elements of the new combination, the more creative the process or solution...Creative thinking as defined here is distinguished from original thinking by the imposition of requirements on originality...The originality of a response is simple inversely related to its probability in a given population." (Mednick, 1959, p. 221) (Some of the problems of "art critics" would be solved if this simple distinction were but used -- e.g. proclaiming a production generated by some random process as a great work of art -- monkey painting and random number music. The product may indeed be good but this only by "chance" since the requirements imposed on the originality are virtually none. The product cannot be labeled creative due to this absence of requirements.)

There are three different approaches available to the psychological study of creativity: the process, the person, and the product. In his concept of adaptive regression Ernest Kris (1952) was interested in primarily in the process of creativity. "At the moment of creation, thinking is more fluid and often more drive dominated and less logical than usual; it is generally pervaded by intense emotionality.." (Pine and Holt, 1960, p. 370) This section will concentrate on the process, the next section will deal with some aspects of creative individuals, while the creative product is left to the psychology of esthetics.

One general modern theory of creative thought is that of Campbell (1959, 1960). He relates creative thought to the general problem of induction and sketches a comparative psychology of knowledge processes (i.e., mechanisms which provide the basis for adaptive locomotion in environments). In this way the model is an evolutionary one (adaptive variation) as opposed to the Gestaltist insight oriented "mystique of the creative genius and the creative act". Campbell formulates a hierarchy of knowledge process which serves as an outline of the comparative psychology of knowledge processes: (Campbell, 1959, pp. 158-159)

- (1. Genetic mutation and selective survival.
- (2. Bisexuality and heterozygosity which, combined with selective survival, make possible more rapid adjustments to environmental changes.
- (3. Blind trial and error problem solving.
- (4. Learning, the retention of adaptive response patterns for subsequent utilization thus abbreviating the trial and error process.
- (5. Perception, visual exploration of potential locomotor alternatives, substituting for overt exploration.
- (6. Observational learning characteristic of social animals, in which the observing animal learns from observing the outcomes to an exploring animal, and thus profits even from experience that may prove fatal to the exploring animal.
- (7. Imitation, in which a model for behavior is acquired perceptually from the behavior of another organism.
- (8. Linguistic instruction about the nature of the world or the correct responses to be made.
- (9. Thought, in which potential locomotions are symbolically checked against a mnemonically represented model of the environment.
- (10. Social decision making, in which the partial observations of many persons are pooled into a single more adequate model of the environment.
- (11. Modern science, a systematic social accumulation of information.

Campbell isolates the theme which is recurrent in most knowledge processes as follows: (1960, p. 380)

- (1. A blind-variation-and-selective-retention process is fundamental to all inductive achievements, to all genuine increases in knowledge, to all increases in fit of system to environment.
- (2. "The many processes which shortcut a more full blind-variation-and-selective-retention process are in themselves inductive achievements, containing wisdom about the environment achieved originally by blind variation and selective retention.
- (3. "In addition, such shortcut processes contain in their own operation a blind-variation-and-selective-retention process at some level, substituting for overt locomotor exploration or the life-and-death winnowing of organic evolution."

At the level of creative thought there is a substitute exploration of a substitute representation of the environment and the solution is selected from the numerous exploratory thought trial according to a criterion which substitutes for an external state of affairs. To the extent that these three substitutions are accurate the solutions put into overt action are adaptive, leading to intelligent behavior which

lacks the overt blind character of its covert base. However, "... insofar as thought achieves innovation, the internal emitting of thought trials one by one is blind, lacking prescience or foresight. The process as a whole...provides 'insight' for the overt level of behavior, once the process has blindly stumbled into a thought trial that 'fits' the selection criterion..." (Campbell, 1960, p. 384)

Campbell postulates six creativity processes (1960, p. 397):

- (1. A mnemonic representation of the environment-tasks: varies in scope, accuracy, and fineness of detail.
- (2. A mnemonic search or thought-trial process: varies in the accuracy with which it represents potential overt exploration.
- (3. A thought-trial generating and changing process: varies in rate, heterogeneity, idiosyncrasy, and lack of repetitiousness among successive thought trials.
- (4. Selective criteria: varying in number, accuracy or representation of environmental contingencies, precision, sharpness or selective ratio.
- (5. A preservation or propagation process which provides retention for the selected thought trials of a different order from the memory traces of the nonselected trials: varies in accuracy and accessibility.
- (6. A reality testing process: in which the selected thought trials are checked out by overt locomotion in the external environment: varies in sensitivity to disconfirming feedback.

A possible scheme of interrelation of Campbell's processes, Guilford's factors of creativity and the cognitive variables would be as follows: (in the creativity factors-a large amount of the factor is associated with high ability in the process. For the cognitive variables a moderately high--not extreme--position on the end of the dimensions indicated in the table is associated with high ability in the process)

Table 2

| Creative Process | Creativity Factor | Cognitive Variables |
|--------------------------------------|---|--|
| Representation of the environment | Conceptual Foresight (CF) Figural Adaptive Flexibility (FAF), Penetration (P), Sensitivity to Problems (SP). | Flexible Control (CFC) Broad Equivalence Range (ER), Field Independence (FDI), Scanning (FS), Sharpening (LS), Tolerant of Unrealistic Experiences (TUE). |
| Representativeness of thought-trials | Conceptual Foresight (CF), Elaboration (E), Figural, Adaptive Flexibility (FAF) | Narrow Equivalence Range (ER), Sharpening (LS) Tolerant of Unrealistic Experiences (TUE) |
| Generating Thought-Trials | Associational Fluency (AF), Expressional Fluency (EF), Ideational Fluency (IF), Originality (O), Spontaneous Flexibility (SF), Word Fluency (WF) | Flexible Control (CFC), Able to Regress Adaptively (RSE), Tolerant of Unrealistic Experiences (TUE) |
| Selection Criteria | Conceptual Redefinition (CR), Structural Adaptive Flexibility (SAF), Structural Redefinition (SR), Penetration (P), Sensitivity to Problems (SP), Figural Adaptive Flexibility (FAF). | Flexible Control (CFC), Narrow Equivalence Range (ER), Scanning (FS), Field Independence (FDI), Tolerant of Unrealistic Experiences (TUE) |
| Retention of Thought-Trials | | High Sharpening (LS) |
| Reality Testing | Conceptual Redefinition (CR), Figural Adaptive Flexibility (FAF), Sensitivity to Problems (SP), Structural Adaptive Flexibility (SAF), Structural Redefinition (SR). | Flexible Control (CFC), Narrow Equivalence Range (ER), Field Independence (FDI), Scanning (FS), Tolerant of Unrealistic Experiences (TUE) |

This scheme of interrelations is an attempt to put meat on the processes listed by Campbell since he sees the "unfavorable ratio of hypothesized unobservable processes to observable input-output variables" as a serious problem in his model. Since the other two domains are relatively well tied down to test operations, a specification of the applicability of these domains to the processes will help operationalize the hypothesized processes in creative thought.

Maltzman (1960) has done work in the area of "generating thought trials" in his training of originality. "The basic problem in the training of originality is to devise a means of increasing the frequency of uncommon behavior. Once it takes place it may receive reinforcement and increase the probability that other original behavior will occur. Four procedures have been used for increasing originality: ~1) Presenting an uncommon stimulus situation for which common or conventional responses are not readily available. (2) Evoke different responses to the same stimulus situation; here the successive responses become more uncommon. (3) Evoke uncommon responses as textual responses. (4) Use instructions to increase originality. Maddi, et al., (1962) were able to decrease the novelty of imagery for subjects by playing monotonous recordings prior to their writing TAT

stories. These subjects however were higher in their desire for novelty. The subjects who heard novel recordings and the subjects who engaged in free activity (controls) did not differ among themselves in either the desire for novelty or the amount of novel imagery produced in their stories.

Research in the area of the selection processes has been done by Harlow (1959) in the area of "Learning set and error factor theory". In discussing the issue of uniprocess vs. duoprocess learning he states that the single major learning process is inhibitory "...learning consists only in the elimination of incorrect response tendencies elicited in the learning situation." (p. 531) This is certainly related to concepts such as "editing talent" and the research by Brunner on categorizing and Sarbin and Taft on "instantiation" are relevant. It is Campbell's belief that the major determinant of a genuinely innovative achievement is not the "talent differences in the generation of the trials" (i.e., there are no real differences between the 'hits' and the 'misses') but it is the selective retention aspect which is crucial (the elimination of chaff via error factor elimination); "...explanation [of creativity] in terms of special antecedents will very often be irrelevant...the causal- interpretations..deifying the creative genius to whom we inpute a capacity for direct insight instead of mental flounderings and blind-alley entrances of the kind we are aware typify our own thought processes." (Campbell, 1960, p. 391)

c. Predicted relations between cognitive variables and creativity factors

Table 3 gives a summary of some hunches of how the scores on these two domains of personality would fall. The most likely cognitive profile of individuals who are socially defined as creative would be: sharpners, tolerant of unrealistic experiences, have a broad equivalence range, be scanner, be field independent, be stimulus acceptors, and be able to regress adaptively.

Table 3 Predicted relations between cognitive variables and creativity factors

| Creative Factors (see pp. 43-45) | Cognitive Variables: | | | | | | | | | | | | | |
|-------------------------------------|----------------------|------|------------------------------|------|-------------------|-----|-------------------|-----|---------------------------------|-----|--------------------|-----|----------------------------------|------|
| | Leveling Sharpening | | Tolerance Unreal Experiences | | Equivalence Range | | Focusing Scanning | | Control Constricted vs Flexible | | Field Independence | | Regression Service Ego (ability) | |
| | Lev | Shrp | Low | High | Broad | Nrw | Foc | Scn | Con | Flx | Dep | Ind | Un. | Able |
| AF | — | + | — | +0 | — | + | + | — | —0 | +0 | —0 | +0 | —0 | +0 |
| CF | - | +0 | — | + | +0 | —0 | — | + | — | + | — | + | 0 | 0 |
| CR | —0 | +0 | — | + | — | + | — | + | — | + | — | + | — | +0 |
| E | — | +0 | — | + | + | —0 | — | + | —0 | +0 | — | + | — | +0 |
| EF | — | + | — | +0 | — | + | + | — | —0 | +0 | —0 | +0 | —0 | +0 |
| FAF | —0 | +0 | — | + | + | —0 | — | + | — | + | — | + | — | +0 |
| | * | | | | * | | | | ** | | * | | | |
| IF | — | +0 | — | + | — | + | — | + | — | + | — | + | — | + |
| | ** | | | | *** | | | | * | | * | | | |
| O | — | +0 | — | + | — | + | — | + | — | + | —0 | +0 | — | + |
| P | — | +0 | — | + | — | + | — | + | — | + | — | + | 0 | 0 |
| SP | — | +0 | — | + | + | —0 | — | + | — | + | — | + | 0 | 0 |
| SF | — | +0 | — | + | — | + | — | + | — | + | — | + | — | + |
| SAF | —0 | +0 | — | + | — | + | — | + | — | + | — | + | — | +0 |
| | * | | | | * | | | | ** | | * | | | |
| SR | —0 | +0 | — | + | + | 0 | — | + | — | + | — | + | — | +0 |
| | * | | | | *** | | | | ** | | * | | | |
| WF | — | + | — | +0 | + | —0 | + | — | —0 | +0 | —0 | +0 | —0 | +0 |

Interpretation of Table.

— = individuals in the extreme (upper quartile) of the cognitive variable will score significantly below the mean of the general population on the creative factor.

+ = the same as above except they will score above the mean on the creative factor.

O = the same as above except they will score at the mean on the creative factor.

When there are two entries in a cell (i.e. "—0" or "+0") this means that no clear-cut prediction could be made but the direction of the trend is indicated.

Relevant findings from the Gardner, Jackson and Messick (1960) study: * = tend to confirm the predicted relationship; ** = no relationship found; *** = opposite relationship found.

Comparison of tests used in studies done by Gardner et al and Guilford et al:

| Gardner, et. a | | Guilford, et. al | |
|---------------------|---------------------|------------------|---------------------------------------|
| Test | Ability | Test | Ability |
| Concealed Figures | Flexibility Closure | Gottschaldt | Figural Adaptive Flexibility (FAF) |
| Designs | Flexibility Closure | Hidden Figures | Structural Redefinition (SR) |
| Spatial Orientation | Spatial Relations | Air Maneuvers | Structural Adaptive Flexibility (SAF) |
| Thing Categories | Idea Fluency | Thing Listing | Ideational Fluency (IF) |

The reasoning that went into making the predictions can be summarized as follows:

(1. Leveling-Sharpening (LS)): (a) Leveling implies a low level of articulation in memory traces and therefore implies an inability to discriminate between similar elements in memory. This should be a disability in most tasks. (b) Sharpening will facilitate and Leveling will hinder performance on tasks which require fluency in selection of responses from knowledge (or memory) of a class of responses; e.g. Associational fluency (AF), Expressional fluency (EF), and Word fluency (WF). (c) Sharpening may facilitate or not affect and Leveling will moderately hinder performance in tasks which are less structured than the above, i.e., when the boundary of the response class is ambiguous; e.g. Conceptual fluency (CF), Elaboration (E), Ideational fluency (IF), (Gardner et al, 1960, found no relation), Originality (O), Penetration (P), Sensitivity to problems (SP), Spontaneous flexibility (SF). (d) Sharpening may facilitate or not affect and Leveling will slightly hinder performance on tasks which are largely perceptual, i.e., do not involve memory. Sharpening may facilitate this since it implies a greater availability of specific memory data; e.g., Conceptual redefinition (CR), Structural adaptive flexibility (SAF), Structural redefinition (SR). (e) Sharpening may facilitate or not effect and Leveling may hinder or not effect performance on Figural adaptive flexibility (FAF) since it is almost entirely perceptual (non-memory) in nature. (Gardner, et al, 1960, found no relationship).

(2. Tolerance for Unrealistic Experiences (TUE)): (a) Low TUE implies organizing behavior in terms of conventional reality, making efforts to have experience conform to actual states of affairs. High TUE implies organizing behavior in terms of experience inconsistent with knowledge of reality; the person is in adequate contact with reality but can accept cognitions which require deviation from the conventional. TUE operates only in unusual circumstances. When this is the case the person with high TUE is able to use the data available from the situation whereas the low TUE person introduces distortion. (b) High TUE will facilitate and low TUE will hinder performance on tasks which require flexibility, redefinition of the situation and when the task requirements are ambiguous and defined by the individual but require fluency; e.g., Conceptual foresight (CF), Conceptual redefinition (CR) Elaboration (E), Figural adaptive flexibility (FAF), Ideational fluency (IF), Originality (~O), Penetration (P), Sensitivity to problems (SP), Spontaneous flexibility (SF), Structural adaptive flexibility (SAF), and Structural redefinition (SR). (c) High TUE may facilitate or not affect and low TUE will hinder performance on tasks which have well defined requirements (are unambiguous); e.g. Associational fluency (AF), Expressional fluency (EF) and Word fluency (WF).

(3. Equivalence Range (ER): (a) This involves the degree to which stimuli are judged to be similar in tasks requiring judgments of similarity. Broad ER implies inclusive criteria of similarity, dismissing differences in detail, and considering stimuli in terms of meanings rather than physical aspects. Narrow ER implies a reluctance to judge distinguishable aspects of experience as similar, responding to the inherent properties of stimuli. (b) Broad ER will facilitate and narrow ER will inhibit performance on tasks which require seeing relationships based on non-obvious similarities and differences among elements of the task or which require consideration of stimuli in terms of associative meanings rather than physical details; e.g., Associational fluency (AF), Conceptual redefinition (CR), Expressional fluency (EF), Ideational fluency (IF) (Gardner, et al, 1960, found a slight trend in the opposite direction), Originality (O), Penetration (P), Spontaneous flexibility (SF), Structural adaptive flexibility (SAF). (c) Narrow ER will facilitate and broad ER may hinder or not affect performance on tasks requiring attention to details; e.g., Conceptual foresight (CF), Elaboration (E), Figural adaptive flexibility (FAF) (Gardner, et al, 1960, found some verification for this), Sensitivity to problems (SP), Structural redefinition (SR), Word fluency (WF).

(4. Focusing-Scanning (FS): (a) Scanning implies an active perusal of objects, searching, becoming aware of both task relevant and irrelevant properties, obtaining a stable conception of objects and slow decision time. Focusing implies a narrowing of awareness to dominant data and keeping experiences discrete, separating affect from idea, a preference for experiencing the world in a narrowed way, and not committing oneself to clear-cut affective experience. (b) Scanning will facilitate and Focusing will hinder performance on tasks which require attention to many details and a stable conception of objects and where speed of decision (or performance) is not important; e.g., Conceptual foresight (CF), Conceptual redefinition (CR), Elaboration (E), Figural adaptive flexibility (FAF), Ideational fluency (IF), Originality (~O), Penetration (P), Sensitivity to problems (SP), Spontaneous flexibility (SF), Structural adaptive flexibility (SAF), and Structural redefinition (SR). (c) Focusing will facilitate and Scanning will hinder performance in tasks which require attention to a few dominant aspects but which include irrelevant aspects and where speed of decision (performance) is important; e.g., Associational fluency (AF), Expressional fluency (EF), and Word fluency (WF).

(5. Constricted-Flexible Control (CFC): (a) Constricted control implies taking counteractive measures to overcome disruptive effects of intrusive cues, responses being guided by the most central stimuli, coping with distracting stimuli by ignoring them in favor of salient easily confirmable stimuli, using obvious external cues when internal and external cues are in conflict, avoiding using feelings and inner stimuli as a source of information, resistance to change and maintaining an inappropriate set. Flexible control implies comfort in situations with contradictory cues, not relying exclusively on dominant stimuli, capability of differential responding to specific aspects of the situation in the face of explicitly interfering cues and using internal cues. (b) Flexible control will facilitate and Constricted Control will inhibit performance on tasks which require differential responding to specific conflicting aspects of the situation where the less obvious stimuli are the more useful, which require use of internal cues and require a shift of set; e.g., Conceptual foresight (CF), Conceptual redefinition (CR), Figural adaptive flexibility (FAF) (Gardner, et al, 1960, found no relationship), Ideational fluency (IF) (Gardner, et al, 1960, found some verification), Originality (~O), Penetration (P), Sensitivity to problems (SP), Spontaneous flexibility (SF), Structural adaptive flexibility (SAF), and Structural redefinition (SR). (c) Flexible control may facilitate or not effect and Constricted control may inhibit or not affect performance on tasks which do not involve conflicting response tendencies nor involve redefinition of the situation; e.g., Associational fluency (AF), Elaboration (E), Expressional fluency (EF) and Word fluency (WF).

(6. Field Dependence-Independence (FDI): (a) This involves individual differences in the ability to extract items from a field, especially a perceptual item. Field Dependence implies passive dealings with the environment, low self awareness/poor impulse control and low self esteem. Field Independence implies active dealings with the environment, high self awareness, good impulse control and high self esteem. (b) Field Independence will facilitate and Field Dependence will inhibit performance in tasks (especially perceptual) which require active cognitive manipulation, reorganization and selectivity (where certain aspects of the task must be disregarded in favor of other aspects); e.g., Conceptual foresight (CF), Conceptual redefinition (CR), Elaboration (E), Figural adaptive flexibility (FAF) (Gardner, et al, 1960, verified this), Ideational fluency (IF) (Gardner, et al, 1960, verified this), Penetration (P), Sensitivity to problems (SP), Spontaneous flexibility (SF), Structural adaptive flexibility (SAF), and Structural redefinition (SR). (c) Field Independence may facilitate or not affect and Field Dependence may inhibit or not affect performance on tasks which are non-perceptual and do not involve extracting certain aspects of the environment; e.g., Associational fluency (AF), Expressional fluency (EF), Originality (O), and Word fluency (WF).

(7. Regression in the Service of the Ego (RSE): (a) The ability to RSE will facilitate and the inability to RSE will inhibit performance in tasks where the requirements are loose, ambiguous and defined by the person and where fluency is required; e.g. Ideational fluency (IF), Originality (O) and Spontaneous flexibility (SF). ~b) The ability to RSE may facilitate or not affect and the inability to RSE will inhibit performance in tasks which require flexibility and redefinition of the situation; e.g. Conceptual redefinition (CR), Elaboration (especially the figure production test) (E), Figural adaptive flexibility (FAF), Structural adaptive flexibility (SAF) and Structural redefinition (SR). (c) The ability to RSE may facilitate or not affect and the inability to RSE will inhibit or not affect performance in tasks which require fluency but within well defined limits; e.g. Associational fluency (AF), Expressional fluency (EF), and Word fluency (WF).

d. The creative individual

In much of the research on the creative individuals, these people are defined as those who score creatively on the particular test used. In the discovery of an individual who is creative (using the social definition of creativity) there are at least two possible sources of error using test scores. One type is stated by Guilford as follows: "Creative people differ considerably in performance from time to time...(they have) rhythms of creativity...any criterion, and probably any tests of creativity...would show considerable error variance due to function fluctuation. Reliabilities of tests of creative abilities and of creative criteria will probably be generally low." (Guilford, 1950, p. 445) In a similar vein Anderson (1960) has spoken of another time relevant problem in the measurement and discovery of creative individuals. The tests given for identifying talent are measures that take very short periods of time. Uncommon and remote responses increase with time while clever response does not. The deep concern with a problem over a period of time on the part of an able person results in a creative output and the tests of ability measure the level of ability and not whether the person will be (or can become) deeply concerned with the problem area. The estimation of ability hinges on what the person does with his talents over time. Since complex forms of creativity are concerned with the organization of ideas, the structuring of concepts, and the selection of relations over time, the prediction of the ability to create by the use of short term measures may be sharply limited.

Campbell lists five ways in which thinkers may differ according to the trial-and-error model (Campbell, 1960, pp. 391-392):

1. The accuracy and detail of the representations of the external world, of the possible locomotions in it or manipulations of its elements, and of the selective criteria. This seems to be a qualitative difference in the responses generated in that differences in the accuracy of representation correspond to differences in the amount of information and intelligence.
2. Differences can also occur in the number and range of variations of thought trials produced--the more numerous and varied they are the greater the chance of success. It is this variation which results in a larger proportion of eccentric and deviate individuals in the class of innovators.
3. The "editing talent" may differ widely, for a precise application of a selective criterion is necessary to weed out the bulk of the inadequate trials.
4. There are differences in the number of selective criteria available at a given time against which thought trials are judged. The more such criteria which the individual is able to keep in mind the more likely he is to achieve "serendipitous advance on a problem tangential to his initial main line of endeavor." (p. 392)
5. Finally, there are differences in the competence of the retention, cumulation and transmission of the encountered solutions.

Getzels and Jackson (1959) made a study of the differences between adolescents high in intelligence but average in creativity (IQ group) and adolescents high in creativity but average in intelligence (Creative group). They found that the school achievement of these two groups (as measured by standardized achievement tests) was equally superior to the school population from which they were drawn. Despite this equally high school achievement the IQ students were preferred by teachers over the Creative students who did not differ from the average student in teacher ratings. In this vein Mednick (1962) reports a study by Miller which found that students who score high on his test of remote associations (RAT) get higher grades from teachers rated as flexible than from teachers rated as dogmatic. The low scorers receive higher grades from teachers rated dogmatic than from teachers rated as flexible. Mednick, 1962, p. 228).

In fantasy production (TAT stories) the Creative students' stories included stimulus-free themes, unexpected endings, and humor and playfulness significantly more often than the IQ students' stories. The Creative adolescents were more diffuse in their occupational goals (chose a greater number of occupations) and gave significantly greater proportion of unconventional occupations. Kowalski (in Mednick, 1962, pp. 228-229) reports that the amount of overlap with the general population of the keys of the Strong on which the high RAT students were high in interest was greater than of the low score RAT students: "The significant keys of the higher creatives had significantly less commonalty (with the general population) than the significant keys of the low creatives." (Mednick, 1962, p. 229)

The Creative students ranked the attribute "having a sense of humor" as being important more often than did the IQ students (who did not differ from the average students on this attribute ranking). "...the high IQ adolescent wants the qualities he believes make for adult success and the qualities

that are similar to those he believes teachers like; the high Creative adolescent favors personal qualities having no relationship to those he believes make for adult success and are in some ways the reverse of those he believes his teachers favor." (Getzels and Jackson, 1960, p. 122) Kowalski found that the high creatives were more atypical and liberal in their views of sexual morality and the rights of women (the groups compared were undergraduate women) (Mednick, 1962, p. 228).

In general, the Creative adolescents enjoy risk and the uncertainty of the unknown, they have the ability to produce new forms, they risk conjoining elements that are customarily thought of as independent and dissimilar, they go off in new directions, they free themselves from the usual and diverge from the customary. "...the high IQ adolescent seemed to possess to a high degree the ability and the need to focus on the usual, to be channeled and controlled in the direction of the right answer -- the customary. He appeared to shy away from the risk and the uncertainty of the unknown and to seek out the safety and security of the known." (Getzels and Jackson, 1959, p. 56) "The high IQs seem to converge upon stereotyped meanings, to perceive personal success by conventional standards, to move toward the model provided by teachers, to seek out careers that conform to what is expected of them. The high Creatives seem to diverge from stereotyped meanings, to move away from the model provided by teachers, to seek out careers that do not conform to what is expected of them." (Getzels and Jackson, 1960, p. 123).

These two groups of adolescents appear to have different sources of motivation which Atkinson (1958) and McClelland (1958) call the "motive to achieve" and the "motive to avoid failure". With the motive to achieve greater than that to avoid failure the person is more willing to take "calculated risks" (i.e., risks which offer a little less than 50/50 chance of winning). Golann (1962) proposes a "creativity motivation" which is similar to the above. It refers to the "...tendency for individuals to differ in the degree to which they attempt to experience their fullest perceptual, cognitive, and expressive potentials in their interaction with their environment...the attempt to realize one's potentials more fully will often lead to behavior which is creative in terms of the individual's previous repertory, and occasionally to behavior which is judged by others to be creative..." (Golann, 1962, p. 590)

C. ON THE RELATIONS BETWEEN FAMILY ENVIRONMENT & CREATIVITY

Getzels and Jackson (1961) and Strodbeck (1958) have both done research on the use of ability as it is influenced by the family of the adolescent.

Although Strodbeck studied families of two different ethnic groups (which differ in the degree of success they have attained in the United States) I will take the liberty of generalizing his results and speculations to families of any background. He concludes that there are five factors within the family which are important for achievement (especially for men) in the United States (Strodbeck, 1958, pp. 186-189)

1. A belief that the world is orderly and amenable to rational mastery and a person can and should make plans which will control his destiny (as opposed to the belief that man is subjugated to a destiny which is beyond his control).
2. A willingness to leave home to make one's way in life (as opposed to a stress on "familism").
3. A preference for individual rather than collective credit for work done. The familistic organization, with the emphasis upon collateral rewards, has not fit the requirements for

achievement of status in the United States; individual credit must be sought within a framework of norms which are pointed toward the betterment of both society and the individual.

4. The belief that man can improve himself by education and no one should submit to fate and accept a lower station in life

5. Equalitarian power relations within the family - when these exist the son can move to new loyalties, to larger systems of relationship without an outright rupture of family controls. Such an adjustment to new institutions outside the home is harder the more the home has tended to be dominated by one parent or the other. The conflict will be less and the frustration less when the break comes (and consequently the emotional and intellectual adjustment more efficient) if the son comes from a home where controls were already diffuse and equalitarian. "...to achieve on the American scene, one must adjust to a more or less impersonal, bureaucratic system where power lies not with the individual but with the system, and is used to reward and punish according to the way individuals live up to impersonal specialized standards of performance...the family is also a 'power system' and...the son's adjustment to it should generalize to his life outside." (Strodtbeck, 1958, p. 188)

This particular configuration of variables is relevant to achievement in school and in the occupational market place but is not particularly relevant to creativity.

Getzels and Jackson (1961) studied the families of the two groups of adolescents (both sexes): the IQ and the Creative.

1. Education and occupation of parents: Fathers of the IQ group had higher educational status and both mothers and fathers of the IQ group had more specialized training (there is more "professionalization of education" in the parents of the IQ group). The fathers of the IQ group tend to be in academic or educational occupations while the fathers of the Creative group are in business. More mothers of the IQ group have no outside employment and therefore probably have more time to spend with their children than do the mothers of the Creative group, more of whom have some employment outside of the home.

2. Age of parents: There is no difference between the two groups in the mean ages of the parents but there is a greater mother-father age difference in families of the IQ group. Getzels and Jackson speculate on the reason for this and put forth two possibilities: "waiting to finish advanced academic training before risking marital responsibilities, and waiting to be satisfactorily 'settled' to maintain a family in the 'right' style. Both reasons suggest an apparently greater insecurity among the high IQ parents..." (Getzels and Jackson, 1961, p. 355)

3. Mother's memories of own home: The chief difference between the two groups is in the money area-- the IQ mothers mention finances significantly more often and emphasize financial hardship.

4. Reading interests in the home: The IQ families report reading more magazines and the IQ mothers mention taking children's magazines more often.

5. Parental satisfaction and dissatisfaction with the child and with his school: The IQ parents both observe more about their children and the school and they observe a greater number of

objectionable qualities in their children and school. This implies a greater "vigilance" and a "critical" or at least "less accepting" attitude.

6. Parental satisfaction with their child-rearing practices: The IQ mothers express fewer misgivings and uncertainties in this area.

7. Kinds of friends preferred for their children: The IQ mothers had more to say on this subject and they mentioned external specific characteristics, whereas the Creative mothers mentioned internal general traits.

In summary "The parents of the high IQ student tend to recall greater financial difficulties during their own childhood and hence, at least by inference, may be said to have experienced in the past, and perhaps the present, greater real or imagined personal insecurity than is true for the parents of the highly creative students. The high IQ parents seem to be more 'vigilant' with respect to their children's behavior and their manifest academic performance...the parents of the high IQ students tend to be more critical of both their children and the school...They appear equally concerned with the desirable qualities possessed by their children's friends. The qualities they would like to see..., which may in a sense be conceived as projections of the qualities they would like to see in their own children, focus upon such immediately visible virtues as cleanliness, good manners, studiousness. In contrast, the parents of the creative adolescents focus upon less visible qualities such as the child's openness to experience, his values, and his interests and enthusiasms...the overall impression of the high IQ family is one in which individual divergence is limited and risks minimized. The overall impression of the high Creative family is one in which individual divergence is permitted and risks are accepted." (Getzels and Jackson, 1961, p. 359)

Maltzman's studies on the training of originality fit in here for "The basic problem in the training of originality is to devise a means of increasing the frequency of uncommon behavior. once it takes place it may receive reinforcement and increase the probability that other original behavior will occur." (Maltzman, 1960, p. 241) From the above description of the homes of the two groups, the family atmosphere of the creative adolescents is certainly more conducive to original behavior, and the risks involved in possible mistakes are not seen as punishing as they are in the high IQ family.

The emphasis on control (vigilance) prevalent in the IQ families would not allow the "regression in the service of the ego" to occur which is a keynote of creativity; "...variation in the typical level of psychic functioning appears to depend significantly on the ego identity of the individual and what it [the ego] and its community will support." (Schafer, 1960, p. 132) "...the variety of dangers involved [in adaptive regression] emanate from the very motives and fantasies that empower creative work. The dangers are reductions of the ego's relative autonomy from the id, disturbances of the complex balance between active and passive ego function, and the ego's greater vulnerability to superego condemnation." (Schafer, 1960, p. 128)

Schafer lists six conditions favoring adaptive regression (pp. 129-131):

1. The presence of a well-developed set of affect signals. The individual must be relatively secure in his sense of being in touch with his feelings. When the regressive process threatens to get out of hand the appropriate affect signals will set in motion corrective measures. The confidence in these signals makes it safe to regress.
2. A secure sense of self and a well-established ego identity. The movement closer to the primary process domain means that the boundary between id and ego is vague and where there is a secure sense of self, one can tolerate momentary blurring of the boundary.
3. Relative mastery of early traumata. This implies that the crises and crucial experiences of early development have not been sealed off from the development of the total personality but have been given a place in it and have undergone progressive transformations and working through.
4. Relative moderateness of superego pressures and flexibility of defenses and controls.
5. A history of adequate trust and mutuality in interpersonal relations, particularly in the early mother-child relation.
6. Self-awareness and personal and effective communication to others; the need for cultural meaningfulness.

On the basis of the findings of Getzels and Jackson and Schafer's description of the conditions which favor ease of adaptive regression, one can make some guesses as to the type of child rearing practices which will be conducive to creativity given the "mental power." One can apply a type of hydraulic analogy to the use of mental ability in a rather simple-minded way: we postulate that each individual has an inborn mental potential--"brain power". What is usually referred to as "motivation" is the determinant of how much of the total potential will be used. The structural aspects of cognitive style and adaptive regression determine the direction of use of the individual's mental ability. The amount of potential of inborn mental ability is assumed to be distributed normally in the population. People at the extreme high end of ability will appear superior to the population as a whole (even though they may be using proportionally less of their total potential) simply because they have so much. In this way they may be considered very creative (in the normative sense) in spite of the fact that they have cognitive styles which militate against creativity. Within any given sub-population of individuals with similar mental potential and controlling the motivational variables one could predict whether a given individual would be creative or "scholarly" (convergent thinker, or whatever the alternative happens to be) by knowledge of his "cognitive profile".

I believe that the cognitive aspects are largely learned; and further that they are mostly learned early in life and consequently acquired in the family. Using Sears, Maccoby and Levin's (1957) study of childrearing practices we can make some predictions as to which practice will facilitate adaptive regression and consequently result in a greater likelihood of creative use of mental ability. Most generally those practices which foster "basic trust" (Erikson, 1956) and allow the child to progress to independence at his own pace, the practices which help the child weather the crises of growth and eventually develop a healthy personality, will be the most facilitative. The tolerance of dependency behavior along with the rewarding of independence can be viewed as the prototype of

adaptive regression. The child goes exploring his world and the parents reward this behavior (with due caution for safety); but at times he will not feel up to the trials and problems he meets. At such times the child will most likely regress - be more dependent. Those parents who punish this regression undermine the base for later regression in the service of the ego and the child does not learn this as an adaptive mechanism. Those who allow this regression do not thereby make the child less able to cope with his environment but, on the contrary, the study by Sears, Maccoby and Levin shows that these children become just as independent or more so than those whose parents punish them for "being like a baby."

BIBLIOGRAPHY

- Allport, F.H. (1954) "The Structuring of Events: Outline of a General Theory with Applications to Psychology." Psychological Review, 61, 281-303
- Allport, F.H. (1955) Theories of Perception and the Concept of Structure. N.Y.: Wiley
- Allport, G.W. (1960) "What Units Shall we Employ?" In Lindzey (ed.) Assessment of Human Motives. N.Y.: Grove, pp. 239-260.
- Allport, G.W. (1961) Pattern and Growth in Personality. N.Y.: Holt, Rinehart, and Winston
- Anderson, J.E. (1960) "The Nature of Abilities." In Torrence (ed.) Talent and Education. Minneapolis., Minnesota: U. of Minnesota, pp. 9-31.
- Atkinson, J.W. (1958) "Motivational Determinants of Risk-Taking Behavior." In Atkinson (ed.) Motives in Fantasy, Action, and Society. N.Y.: VanNostrand, pp. 322-339
- Brehm, J.W. and Cohen (1962) A.R. Explorations in Cognitive Dissonance, N.Y.: Wiley
- Bruner, J.S., Goodnow, J.J. (1956) Austin, G.A. A Study of Thinking. N.Y.: Wiley
- Campbell, D.T. (1959) "Methodological Suggestions From a Comparative Psychology of Knowledge Processes", Inquiry, 2, 152-182.
- Campbell, D.T. (1960) "Blind Variation and Selective Retention in Creative Thought as in Other Knowledge Processes." Psychological Review, 67, 380-400.
- Cartwright, D. and Harary, F. (1960) "Structural Balance; A generalization of Heider's Theory." In Cartwright and Zander (eds.) Group Dynamics, 2nd ed., Evanston, Ill.: Row Peterson, pp. 705-726
- Couch, A. and Keniston, K. (1960) "Yeasayers and Naysayers: Agreeing Response Set as a Personality Variable." Journal of Abnormal and Social Psychology, 60, 151-174.
- Deutsch, M. (1958) "Trust and Suspicion." Journal of Conflict Resolution, 4, 265-279.
- Deutsch, M. (1960a) "The Effect of Motivational Orientation Upon Trust and Suspicion." Human Relations, 13, 123-140.

- Deutsch, M. (1960b) "Trust, Trustworthiness, and the F Scale." Journal of Abnormal and Social Psychology, 61, 138- 140 .
- Deutsch, M. and Krauss, R.M. 1960) "The Effect of Threat Upon Interpersonal Bargaining." Journal of Abnormal and Social Psychology, 61, 181-189.
- Erickson, E.H. "Growth and Crises of the Healthy Personality'." In Kluckhohn, Murray, and Schneider (eds.) (1956) Personality in Nature Society, and Culture. 2nd ed., N.Y.: Knopf, pp. 185-225.
- Eysenck, H.J. (1952) Scientific Study of Personality. London; Routledge and Kegan
- Eysenck, H.J. (1953) "The Logical Basis of Factor Analysis." American Psychologist, 8, 105-114
- Festinger, L. (1957) A Theory of Cognitive Dissonance. Evanston, Ill.: Row, Peterson
- Gardner, R.W., Holzman, P.S., Klein, G.S., Linton, H.B., and Spence, D.P. (1959) "Cognitive Control: A Study of Individual Consistencies in Cognitive Behavior.", Psychological Issues, vol. 1, (no. 4) Whole no. 4, International Universities Press, N.Y.
- Gardner, R.W., Jackson, D.S. and Messick, S.J. (1960) "Personality organization in cognitive controls and intellectual abilities" Psychological Issues, vol. 2, (no. 4) Whole No. 8, N.Y., International Universities Press
- Getzels, J.W. and Jackson, P.W., (1959) "The Highly Intelligent and the Highly Creative Adolescent: A Summary of Some Research Findings.: in C.W. Taylor (eds.) Research Conference on the Identification of Creative Scientific Talent, Salt Lake City, Utah: U. of Utah Press, pp. 46-57.
- Getzels, J.W. and Jackson, P.W. (1960) "Occupational Choice and Cognitive Functioning: Career Aspirations of Highly Intelligent and of Highly Creative Adolescents." Journal of Abnormal and Social Psychology, 61, 119-123.
- Getzels, J.W. and Jackson P.W. (1961) "Family Environment and Cognitive Style: A Study of the Sources-of Highly Intelligent and of Highly Creative Adolescents . " American Sociological Review, 26 , 351- 359
- Golann, S E. (1962) "The creativity motive", Journal of Personality, 30, 588-600
- Guilford, J.P. (1950) "Creativity." American Psychologist, 5, 444-454.
- Guilford, J.P. (1957) A Revised Structure of Intellect, Report Psychology Lab., #19, Los Angeles: U of So. Calif., April
- Guilford, J.P. (1961) "Factorial Angles to Psychology." Psychological Review, 68, 1-20.
- Guilford, J.P., Wilson, R.C., Christensen, P.R. and Lewis, D.J. (1951) A Factor-Analytic Study of Creative Thinking, I: Hypotheses and Descriptions of Tests. Report Psychology Lab. #4, U. of So. Calif., April

- Guilford, J.P., Wilson, R.C., Christensen, P.R. (1952) A Factor-Analytic Study of Creative Thinking. II: Administration of Tests and Analysis of Results. Report Psychology Lab., #8, Los Angeles: U. of So. Calif., July
- Guilford, J.P., Frick, J.W., Christensen, P.R. and Merrifield, P.R. (1957a) A Factor-Analytic Study of Flexibility in Thinking, Report Psychology Lab., #18, Los Angeles: U. of So. Calif., April
- Guilford, J.P., Christensen, P.R., Frick, J.W. and Merrifield, P.R. (1957b) The Relations of Creative-Thinking Aptitudes to Non-Aptitude Personality Traits, Report Psychology Lab., #20, Los Angeles. U. of So. Calif., Dec.
- Harlow, H.F. (1959) "Learning set and error factor theory," in Koch (ed.) Psychology: A Study of a Science, Vol. 2, N.Y.: McGraw-Hill
- Heider, F. (1958) The Psychology of Interpersonal Relations, N.Y.: Wiley
- Holt, R.R. and Havel, J. (1960) "A method for assessing primary and secondary process in the Rorschach" in Rickers-Orsiankina (ed.) Rorschach Psychology, N.Y.: Wiley, pp. 263-315.
- Kagan, J., Moss, H.A., Siegel, I.E. (1961) "The psychological significance of styles of conceptualization" paper presented at a conference on Basic Cognitive Processes in Children, U. of Minnesota, Minneapolis, Minn.
- Kelly, G.A. (1955) The Psychology of Personal Constructs, N.Y.: Norton
- Kelly, G.A. (1960) "Man's Construction of His Alternatives." In Lindzey (ed.) Assessment of Human Motives, N.Y.: Grove, pp. 33-46
- Klein, G.S. (1954) "Need and Regulation." In Jones (ed.) Nebraska Symposium Motivation, Lincoln: U. Nebraska Press, pp. 224-274
- Klein, G.S. (1960) "Cognitive Control and Motivation." In Lindzey (ed.) Assessment of Human Motives. N.Y.: Grove, pp. 87-118
- Koch, S. (1941) "The Logical Character of the Motivation Concept: I and II." Psychological Review, 48, 15-38, 127-154
- Krech, D. and Crutchfield, R.S. (1948) Theory and Problems of Social Psychology, N.Y.: McGraw-Hill
- Kris, E. (1957) Psychoanalytic Explorations in Art, N.Y.: International Univ. Press
- Lewin, K. (1935) A Dynamic Theory of Personality. Trans. D.K. Adams and K.E. Zener, N.Y.: McGraw-Hill
- Littman, R.A. (1958) "Motives, History, and Causes." In Jones (ed.) Nebraska Symposium on Motivation, Lincoln: U. Nebraska Press, pp. 114-168
- McClelland, D.C. (1958) "Risk Taking in Children With High and Low Need for Achievement." In Atkinson (ed.) Motives in Fantasy, Action and Society. N.Y.: VanNostrand, pp. 306-321

- Maddi, S.R., Charlens, A.M., Maddi, D., and Smith, A.J. (1962) "Effects of monotony and novelty on imaginative productions" Journal of Personality, 30, 513-527
- Malmo, R.B. (1959) "Activation: A Neuropsychological Dimension." Psychological Review, 66, 367-386.
- Maltzman, Irving, (1960) "On the Training of Originality." Psychological Review, 67, 229-242.
- Maslow, A.H. (1943) "Dynamics of Personality Organization." Psychological Review, 50, pp. 415-439, 441-458
- Mednick, S.A. (1962) "The associative basis of the creative process" Psychological Review, 69, 220-230
- Miller, J.G. (1955) "Toward a General Theory for the Behavioral Sciences." American Psychologist, 10, 513-531
- Newcomb, T.M. (1955) "An Approach to the Study of Communicative Acts." In Hare, Borgatta and Bales (eds.) Small Groups, N.Y.: Knopf, pp. 149-163.
- Newcomb, T.M. (1959) "Individual Systems of Orientation." In Koch (ed.) Psychology: A Study of a Science. Vol. 3: Formulations of the Person and the Social Context, N.Y.: McGraw-Hill, pp. 384-422.
- Pine, F. and Holt, R.R. (1960) "Creativity and Primary Process: A Study of Adaptive Regression." Journal of Abnormal and Social Psychology, 61, 370-379
- Prentice, W.C.H. (1961) "Some Cognitive Aspects of Motivation." American Psychologist, 16, 503-511
- Rokeach, Milton (1960) The Open and Closed Mind, N.Y.: Basic Books
- Rose, A.M. (ed.) (1961) Human Behavior and Social Process, N.Y.: Houghton, Mifflin
- Rotter, J.B. (1954) Social Learning and Clinical Psychology, Englewood Cliffs, N.J.: Prentice-Hall
- Sarbin, T.R., Taft, R., and Bailey, D.E. (1960) Clinical Inference and Cognitive Theory, N.Y.: Holt, Rinehard, Winston
- Schafer, R, (1960) "Regression in the Service of the Ego: The Relevance of a Psychoanalytic Concept for Personality Assessment." In Lindzey (ed.) Assessment of Human Motives, N.Y.: Grove, pp. 119-148
- Scheerer, M. (1954) "Cognitive Theory." In Lindzey (ed.) Handbook of Social Psychology, Cambridge, Mass.: Addison-Wesley, pp. 91-142
- Sears, R.R., Maccoby, E.E., and Levin, H. (1957) Patterns of Child Rearing, Evanston, Ill.: Row Peterson

- Secord, P.F. and Backman, C.W. (1961) "Personality Theory and the Problem of Stability and Change in Individual Behavior: An Interpersonal Approach." Psychological Review, 68, 21-32.
- Smith, M.B., Bruner, J.S., and White, R.W. (1956) Opinions and Personality. N.Y.: Wiley
- Soloman, L. (1960) "The Influence of Some Types of Power Relationships and Game Strategies Upon the Development of Interpersonal Trust." Journal of Abnormal and Social Psychology, 61, 223-230
- Strodbeck, F.L. (1958) "Family Interaction, Values, and Achievement." In McClelland et. al Talent and Society, N.Y.: VanNostrand, pp. 135-194
- Thibaut, J.W. and Kelley, H.H. (1959) The Social Psychology of Groups. N.T.: Wiley,
- Waller, W. and Hill, R. (1951) The Family: A Dynamic Interpretation, N.Y.: Dryden,