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A CYBERNETIC MODEL OF HUMAN CHANGE AND GROWTH¹

by

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¹ I am indebted to Donald Belfer for his help in developing this model and for his work in constructing the actual computer simulations. Richard Boyatzis provided several improvements on our original conception.

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Everyone who helps, be he a therapist, a teacher, a management consultant or a social worker, uses some theory about how people change. In some cases, most notably psychotherapy, this theory is quite explicit and highly articulated. Therapists consciously use their theory of personality change to choose their interventions with clients. In many other instances, the helpers' theory of change is more implicit, often a series of strongly held beliefs that are poorly spelled out and not systematically related to one another. In either case there are, in most helping professions, continuing highly emotional battles about the "correct" approach to use in dealing with a client. In education the conflict between "traditional" and "progressive" approaches has continued for centuries. The parallel issue in child-rearing practice has been between advocates of strict discipline and advocates of permissiveness. Welfare debates often focus on the nature of human nature -- is man inherently lazy or does he have a drive for self-fulfillment and self-respect. Consultants and therapists argue heatedly about the relative merits of directive versus non-directive intervention styles.

Common to all of these debates is the search for a model of human change and growth that will guide the helper in his choice of an intervention strategy. Any technology of helping interventions must be soundly based on a valid model of human change. The purpose of this essay is to build a first approximation of that model of change. The approach to this problem will be to first search the psychological research on human change for general principles about the change process. Having identified a body of generally accepted principles of human change we will then attempt to integrate these principles into a dynamic model of the change process that will allow an assessment of the impact of different intervention strategies.

Psychological theories of human change

A great proportion of the research in psychology has focussed on the question of how people adapt, change and grow. Most of this research falls into three research areas -- research on attitude change, on learning processes, and on human growth and development. The remarkable thing about these three large areas of research is the lack of integration among them. Like the proverbial blind men feeling and describing the elephant, researchers of human change have focused their attention on one aspect of the change process to the exclusion of other theoretical perspectives.

Most of the recent research on attitude change has been concerned with the question of what motivates an individual to change his attitudes. This work has identified a strong human need for cognitive consistency. It seems that we all will change our attitudes and behavior in order to preserve or create some measure of congruity in our view of the world (Brown, 1965). Carl Rogers (1951) and other personality theorists have postulated that it is striving to reduce this dissonance between one's conception of his current self and his ideal self concept that produces the motivation for constructive personality change.

Learning theorists have for the most part been less concerned about the motivation for change. They have focused their efforts on achieving an understanding about how the events in an individual's life shape his behavior. Thorndike's (1913) early statement of the Law of Effect -- that individuals tend to repeat those behaviors that bring satisfaction and avoid those behaviors that bring dissatisfaction has been elaborated into several precise, sometimes mathematical models of how behavior is shaped by positive and negative reinforcement.

The third major focus of research on human change is the growth and de-

velopment theories. These theories have primarily sought to describe and explain the process of human growth, the emergence of self-direction and mastery over one's environment. The major theorists in this area all have slightly different terms for describing this concept. The late Abe Maslow spoke of self actualization, Carl Rogers of self enhancement, Gordon Allport (1960) of proactivity, and Robert White (1959) of efficacy and competence motivation. Nearly all of the modern forms of psychotherapy have taken as their aim, not only the removal of symptoms, but also the development of an individual's capacity for self-direction. Common to all of these approaches is the search for those personal, developmental, and environmental characteristics which allow the individual to control his own destiny and fulfill his own potential.

When contrasted with learning theories and attitude change theories, the growth theories seem to be based on an entirely opposite view of human nature. Attitude change and learning theories define man as reactive and controlled either by his environment or by an internal need to reduce dissonance and inconsistency. The growth theories on the other hand say that man controls his environment and will at times increase dissonance by setting goals for himself and exploring his world. One of the tasks in this essay will be to resolve this apparent inconsistency, to spell out those conditions where man controls and where he is controlled. For one cannot accept one model of man and discard another without doing an injustice to the data. Research evidence and common sense observation can be marshalled to support both models -- the proactive and the reactive. The noted ethologist, Conrad Lorenz (1963) suggests that this dilemma is an illusion. There is no contradiction, he maintains, between the fact that man's behavior is governed by causal stimulus-response type laws and the fact that man strives toward goals and can modify

his behavior by an act of will. "The appreciation of the fact that life processes are directed at aims or goals, and the realization of the other fact that they are, at the same time, determined by causality, not only do not preclude each other but they only make sense in combination. If man did not strive toward goals; his questions as to causes would have no sense, if he has no insight into cause and effect, he is powerless to guide effects toward determined goals, however rightly he may have understood the meaning of these goals..." (p.213).

Each of the above three approaches provides valuable insights into the dynamics of human change. Attitude change theories can help with understanding the origins of motivation for change. Learning theory provides a framework for understanding the impact of the environment on the change process. The growth and development theories can aid us in identifying the conditions for self-direction. The challenge, however, is to build a model of change that is something more than a series of unconnected insights -- a model which deals with the apparent contradictions in the three approaches and identifies their interrelationships.

Modeling the process of change

A prime requirement for a model of human change is that it be dynamic, i.e., capable of depicting over time the changes and interactions among the variables that make up the human personality system. This criterion seems simple and obvious, yet most personality theories have failed to meet it. The emphasis in personality theory has been primarily on human stability rather than change. Gendlin puts the point this way:

Personality theories have chiefly been concerned with the factors that determine and explain different individuals' personalities as they are, and the factors which have brought about the given personality. What is called personality maintains its character despite circumstances. Aspects of an individual fail to puzzle us if his current situation explains them. We do not even attribute it to his personality when an individual shows all sorts of undesir-

able behavior under overwhelmingly bad circumstances, or when he becomes likable and secure under the influence of events which (as we say) would make almost anybody likable and secure. What we do attribute to personality is the reverse: when an individual remains likable and secure under overwhelmingly bad circumstances, and when an individual remains afraid and in pain despite apparent opportunities and good luck. Thus, it could be said that, far from explaining personality change, our theories have been endeavoring to explain and define personality as that which tends not to change when one would expect change.

(Gendlin, 1964, p. 101)

Furthermore, the traditional theoretical and methodological approach of the behavioral sciences are ill-suited to the study of variations in complex systems over time. Most psychological research focuses on one or two variables measured at one or at best two or three different points in time. In this paradigm dynamic system behavior often goes unnoticed between before and after measurement. Statistical methods with the exception of multiple regression techniques and analysis of variance are not well suited to the identification of complex interactions among variables and many involve assumptions about relationships among variables, such as linearity, which are questionable. In addition, most psychological theory has concentrated on one-way definitions of causality, independent and dependent variables, which seem naive from a systems point of view. While much has been learned about human behavior through the use of these methods it would seem that great benefits could be gained by supplementing them with a modeling technique that can depict many variables interacting over time in linear and nonlinear ways in a cybernetic system.

Cybernetics or, more specifically, information feedback control theory, provides one framework for accomplishing this. This rapidly growing body of dynamic theory and principles of structure is greatly enhancing our ability to understand the dynamic functioning of complex systems of all kinds.

Jay Forrester (1969), the leading proponent of the use of cybernetics to analyze social systems, maintains that, "the same principles of structure and the same relationships between structure and behavior apply to a simple swinging pendulum, a chemical plant, to processes of management, internal medicine, economics, power politics, and psychiatry" (p. 5).

The basic unit of analysis in information feedback control theory is the feedback loop. Since this theory is primarily concerned with the dynamic behavior of a system over time its primary focus is on the response of the system to changes in any of the variables that make it up. To illustrate how feedback loops can be used to model the dynamics of a system let us take, as an example, a simple model of individual decision-making behavior (see Figure 1). Note that the arrows in Figure 1 depict cause/effect relationships between variables. The individual's goal effects his decision, his decision effects his action, his action effects environmental conditions which effect his decisions. Thus, a pertinent question to ask about this system would be: How does a change in actual conditions over time cause a change in decision, action and again in actual conditions? This question illustrates the closed-loop, con-

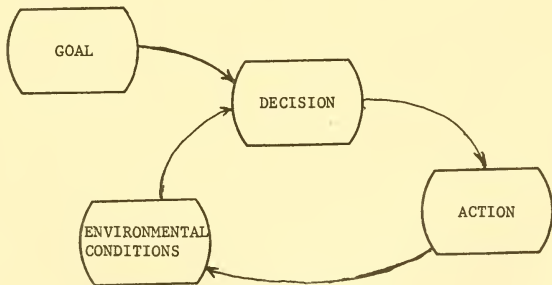


Figure 1.

tinuous nature of the system. A change in actual conditions produces, at some later time, another change in actual conditions. This particular type of feedback loop is known as a negative feedback loop, since a change in a variable in one direction feeds through the system and creates a change in that same variable in the opposite direction. To illustrate, suppose the system is static. Since a discrepancy between environmental conditions and the goal would cause a decision, and therefore cause some change, a static system requires that apparent conditions are equal to the goal.

To illustrate further, let us assume that all the variables in the system are measurable, and that Goal = Environmental Conditions = 10. Now, suppose that the individual gets some new information about the environmental conditions, and revises the value to 12 (a positive change). Now we ask, what happens in the system? Since the value 12 is the individual's best estimate of actual conditions, but the individual would like this value to be 10 (the goal value), he decides to initiate some action. Since he wishes to reduce the discrepancy, he decides to initiate an action of -2. Let us suppose, now, that after some time he is successful and actually reduces environmental conditions by 2 units. He has succeeded in making the environmental conditions equal to the goal, after some time necessary to make a decision, implement it with action and change actual conditions. This simple negative feedback system allows for the maintainance of conditions at some desired level.

Notice that the goal is external to this feedback loop; it is not affected by changes in any of the variables. Now, this is certainly not true in actual human behavior where the goal is not fixed for all time. In fact, there may be other feedback loops involved in the determination of this goal. Thus, the process of individual decision behavior may involve a much more complex

system than this single loop, with each of the variables within any loop being influenced by the behavior of other feedback loops within the system.

To illustrate further using our simple model of behavior, let us look at one positive feedback loop that operates on the goal setting process (see Figure 2).

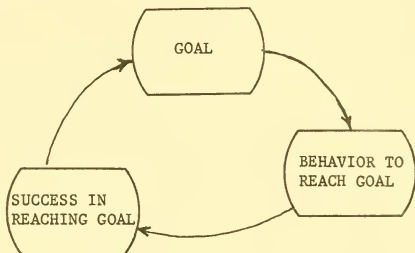


Figure 2.

Here we see that an increase in goals results in increased behavior to reach goals, which leads to success, which leads to further increase in goals and so on. Note that, unlike the negative feedback loop we described, this positive feedback loop required no assumptions about the values of variables to start with, and does not attempt to reduce a discrepancy between two variables. As we might expect, the behavior of this loop is very different from that of the negative loop; it will continue to create change in the variables unless limited by some other part of the system. The positive feedback process is characteristic of growth in all systems be they personality development, economic development or biological development.

The polarity, positive or negative, of a feedback loop is one of its most important characteristics. Two other important characteristics are amplification and delay. To examine amplification, let us return to our illustration of a negative feedback loop. In deciding what action to initiate when he found a discrepancy between his goal and the environmental conditions, we stated that our subject would initiate -2 units of action, since the discrepancy was

+2. However, he might well have decided on -1 or -4 units as an appropriate action to take. This illustrates the problem of amplification. Loosely defined, amplification is the amount of response generated in some variable relative to a change in some other variable. If our subject had chosen -1 units as his response to a change of +2 units in environmental conditions, the system would have had low amplification. If his response were -4 units the system would have had high amplification.

In describing the negative feedback loop, we also mentioned the time necessary to make the decision, implement it with action, and change actual conditions. This necessary time is called the delay. There are actually separate delays for each step in the process, but it has been found that the important factor in determining behavior is the total delay around the whole feedback loop. The effects of amplification and delay on the behavior of feedback loops depends on the polarity of the feedback loop. In the case of the negative feedback loop the characteristic behavior is oscillatory. The swings around the "goal" are wider when the amplification is high, but the system responds faster to a change in any variable. Low-amplification negative feedback loops show less tendency to oscillate, but take longer to bring a variable to a goal value. Changes in the time delay merely increases the response time of the system.

The positive feedback loop has two modes of behavior - a sustained growth or a gradual decay. The sustained growth mode is much more typical, and the rate of growth will be higher with shorter delays and larger amplification.

In what follows the techniques of control theory will be used to analyze the psychological models of human change in an attempt to integrate these models into a single comprehensive representation of the human change process. For clarity of exposition the model will be built in three successive stages -

First, those attitude change variables which explain the origins for motivation to change, then the learning variables that seek to explain how behavior is shaped by the environment, and finally, the growth and developmental theory variables that explain the emergence of self-direction.

Motivation to Change

The central focus of the first stage of the model is the application of the theory of cognitive dissonance (Festinger 1957) to two self-related types of cognitions - the cognitions that make up an individual's perception of himself, his self-image, and the cognitions that make up the ideals and goals he holds for himself, his ideal self. Brehm and Cohen have provided the following brief and lucid statement of the theory of cognitive dissonance:

Cognitive dissonance, according to Festinger is a psychological tension having motivational characteristics. The theory of cognitive dissonance concerns itself with the conditions that arouse dissonance in an individual and with the ways in which dissonance can be reduced.

The units of the theory are cognitive elements and the relationships between them. Cognitive elements or cognitions are "knowledges" or items of information, and they may pertain to oneself or to one's environment. Knowledge of one's feelings, behavior, and opinions as well as knowledge about the location of goal objects, how to get to them, what other people believe, and so forth, are examples of cognitive elements.

The relation that exists between two elements is consonant if one implies the other in some psychological sense. Psychological implication may arise from cultural mores, pressure to be logical, behavioral commitment, past experience, and so on. What is meant by implication is that having a given cognition, A, leads to having another given cognition, B. The detection of psychological implication is frequently possible by measurement of what else a person expects when he holds a given cognition.

A dissonant relationship exists between two cognitive elements when a person possess one which follows from the obverse of another that he possesses. Thus, if A implies B, then holding A and the obverse of B is dissonant. A person experiences dissonance, that is, a motivational tension, when he has cognitions among which there are one or more dissonant relationships. Cognitive elements that are neither dissonant nor consonant with each other are said to be irrelevant.

The amount of dissonance associated with a given cognition is a function of the importance of that cognition and the one with which it is dissonant. The magnitude of dissonance is also a function of the ratio of dissonant to consonant cognitions, where each cognitive element is weighted for its importance to the person. As the number and/or importance of dissonant cognitions increases, relative to the number and/or importance of consonant cognitions, the magnitude of dissonance increases.

In general, a person may reduce dissonance by decreasing the number and/or importance of dissonant elements compared to consonant, or he may reduce the importance of all relevant elements together. It should

be noted that propositions about the magnitude of dissonance can be tested without there being any actual reduction of dissonance, since a state of dissonance leads to attempts at dissonance reduction rather than necessarily successful reduction.

How dissonance is reduced (or attempts at reduction are made) depends on the resistance to change of relevant cognitive elements. Those cognitions with relatively low resistance tend to change first. The resistance to change of a cognitive element comes from the extent to which such change would produce new dissonance and from some joint function of the responsiveness of the cognition to reality (what it represents) and the difficulty of changing the reality. Where the reality represented is ambiguous (e.g., a diffuse emotional reaction in oneself, a physical stimulus in the presence of considerable "noise," or the prediction of an uncertain future event), the cognitive element can be changed quite readily without any change in the reality. On the other hand, if the reality is quite clear, then the resistance to change of the corresponding cognitive element will generally be proportional to the difficulty of changing the reality.

(Brehm and Cohen 1962, pp. 3-4)

We can summarize the implications of cognitive dissonance theory for the relationship between the self image and ideal self as follows. The amount of dissonance that an individual experiences between his ideal self and his self image will be a function of the degree to which these conceptions are inconsistent with one another. The magnitude of this inconsistency and resulting dissonance will be determined by three factors:

1. The side of the discrepancy between the self image and the ideal self, e.g., the individual who sees himself as a very poor leader and who wants to be a great leader will experience more dissonance than if his goal was only to speak his mind more often in a group.
2. The number of cognitive elements in the self image and ideal self that are inconsistent. Many discrepancies between self image and ideal will produce more dissonance than a few.
3. The degree to which the individual subscribes to the "psychological implication" of dissonance between one's self image and one's ideal self.

This last factor requires further explanation. The psychological implication that a discrepancy between the ideal self and the actual self image is dissonant is not equal for all people. As Roger Brown (1965) points out, a dissonant relationship between two cognitive elements exists not when the elements are logically contradictory, but when the elements are psychologically incompatible for the particular individual in question. Individuals doubtless differ, he says, as to whether given elements are or are not experienced as dissonant with one another. The classical dissonance experiments in the psychological literature work because most people share certain suppressed premises about themselves -- "I say what I believe," "I do things that are worthwhile," and so on. But, "since dissonance derives from premises about oneself and the world, it must vary with self-concept and world-view" (p. 598). Thus, there may be individuals for whom the usual premises do not hold. For such persons, elements which we generally term dissonant can co-exist without creating motivation to change.

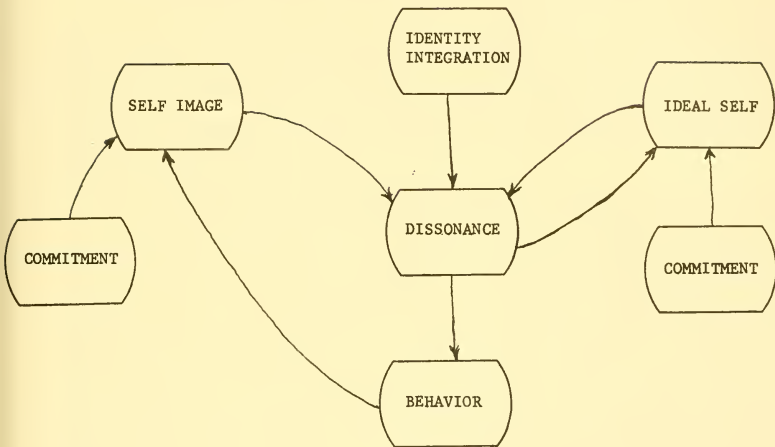
Winter, Griffith, and Kolb (1969) provide empirical evidence for this factor in their study of the self image and ideal self of individuals who were successful and unsuccessful in achieving self-directed behavior change goals that they set for themselves. They found that people who were unsuccessful in achieving their goals scored high on a variable called identity diffusion. A high identity diffusion score indicates confusion about one's self image, indecisiveness, and lack of conviction about one's ideas or actions. In other words, the high-identity-diffusion individual appears to be a person who can tolerate internal ambiguity about himself without experiencing dissonance. He ordinarily conceives himself in contradictory terms. There is for him no dissonance implied by the fact that self image

and ideal self are different from one another. On the other hand, for the identity integrated individual, the individual who knows who he is and what he wants, the dissonance between self image and ideal self is created by the unspoken premise, "I do what I value." Thus, we can conclude that the felt dissonance between self image and ideal self will be mediated by the individual's level of identity integration, i.e., high identity integration will increase felt dissonance while low identity integration will decrease felt dissonance.

To describe how dissonance between self-image and ideal self is reduced, let us refer to Figure 3 which depicts dissonance theory in control theory terms. In this model dissonance can be reduced (or increased) through either or both of the two negative feedback loops. In other words, dissonance between self-image and ideal self can be eliminated by revising the ideal self to match the self-image or by changing one's self image through changing one's behavior so that self image matches the ideal self. A third means of reducing dissonance, reality distortion or changing the self image without changing actual behavior, will be discussed later.

One deficiency of dissonance theory that is readily apparent from the formulation in Figure 3 is that it makes no provision for determining in advance which of the two paths to dissonance reduction will be followed. Will the individual simply abandon his goal (ideal self) when he feels dissonance with the way he sees himself or will he strive to achieve his goal by changing his behavior? To deal with this problem the dissonance theorists have used the concept of commitment to explain the stability or resistance to change of given cognitive elements:

Figure 3. Dissonance Theory



...The role of commitment, then, in the theory of cognitive dissonance is, first, to aid the specification of psychological implication and hence, the determination of what is consonant and what is dissonant and, second, to aid in the specification of the ways in which a person may try to reduce dissonance...Where a person can be clearly committed to a given behavior or decision, information that is unambiguously inconsistent with that commitment should create dissonance and the individual should manifest attempts to reduce that dissonance.

(Brehm & Cohen, 1962, pp. 8-9)

Thus, if a person is highly committed to his goal it will tend not to change, forcing dissonance reduction to take the path of behavior change. If, on the other hand, the person is highly committed to his self image, change will be more likely in the ideal self.

While the concept of commitment is useful in specifying the path dissonance reduction will take, it has some flaws in that the theory of cognitive dissonance includes no specifications as to what circumstances will produce commitment. For these specifications attitude change researchers have relied on common sense psychology (e.g., a person will be committed to acts he has already taken, he will be committed if he announces a commitment in public). One benefit to be discussed from the combination of learning theory and dissonance theory, as we shall see, is a more precise theoretical prediction of the intensity of commitment.

Environmental Shaping of Behavior

Of the many quite similar learning theory frameworks we have chosen Rotter's social learning theory (1954) to describe how human behavior is shaped by environmental events. The reason for choosing this particular theory is that it gives a central role to the concept of expectancy. The expectancy concept is useful in that it translates the law of effect into cognitive terms establishing a link between learning theory and the cognitive attitude change research.

"In social learning theory it is presumed that the relationship between goal preference (reinforcement value) and behavior can be determined only by introducing the concept of the individual's expectancy, on the basis of past history, that the given behavior will actually lead to a satisfactory outcome rather than to punishment, failure, or more generally, to negative reinforcement. Since the early formulations of Tolman (1932), expectancy theories have become more and more widely relied upon both in human learning and personality theories." (Rotter, 1960, p. 305). In Rotter's theory the basic formula for the prediction of behavior is:

$$BP_x, S_1, R_a = f(E_x, R_a, S_1 + RV_a, S_1).$$

The formula is read as follows: the potential for behavior x to occur in situation 1 in relation to reinforcement a is a function of the expectancy of the occurrence of reinforcement a following behavior x in situation 1 and the value of reinforcement a in situation 1.

In control theory terms this formula translates into a simple three variable positive feedback loop - behavior leads to an environmental response which leads to a change in expectations about the effects of behavior which will alter future behavior. The growth or decay of a given behavior will be determined by the amount of reward or punishment that the individual perceives as contingent on his behavior. The perceived contingency between behavior and reinforcement defines the expectation concept. It is this expectation about the effects of one's behavior that determines the decision to behave.

One particularly important discovery of Rotter and his associates is that individuals differ in the degree that they perceive reinforcements to be contingent on their behavior. Some people have a systematic bias toward seeing environmental events as contingent on their behavior. Others have a systematic bias toward seeing environmental events as unrelated to their behavior. Rotter

defines these biases this way:

When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, change, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control.

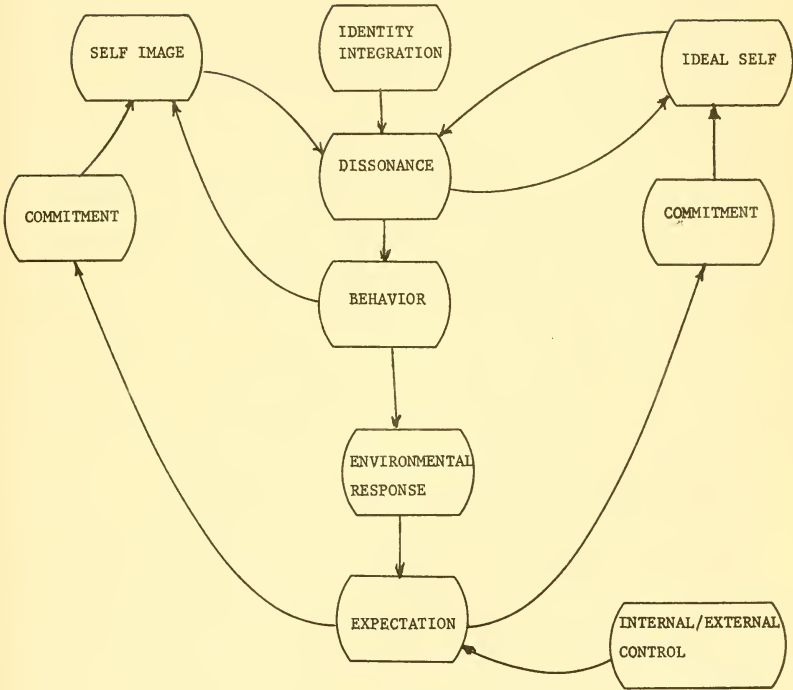
(Rotter, 1966, p. 1)

Thus, the single positive feedback loop that describes the learning process must be conditioned by an external variable - the individual's predisposition toward internal versus external control of reinforcement. This variable will condition the extent to which expectations are formed about the effects of one's behavior. If an individual believes in external control, then behavior-reinforcement contingencies will be less likely to increase the probability of his repeating the behavior than would the same behavior-reinforcement contingencies in an individual who believed in internal control.

"In its simplest form, our basic hypothesis is that if a person perceives a reinforcement as contingent upon his own behavior, then the occurrence of either a positive or negative reinforcement will strengthen or weaken potential for that behavior to recur in the same or similar situation. If he sees the reinforcement as being outside his own control or not contingent, that is depending upon chance, fate, powerful others, or unpredictable, then the preceding behavior is less likely to be strengthened or weakened" (Rotter, 1966, p. 5). Rotter and his associates cite a good deal of experimental evidence to support this hypothesis (Phares, 1957; James and Rotter, 1958; Rotter, Liverant and Crowne, 1963; Benneon, 1961; and Blackman, 1962).

With this brief overview of learning in control theory terms we can now examine the interrelationships between social learning theory and dissonance theory (see Figure 4). The two theories complement and enhance each other well.

Fig. 4. Dissonance Theory and Social Learning Theory



Dissonance theory spells out the dynamics of the decision to behave, but is weak in explaining how behavior is modified by the environment. Social learning theory outlines the dynamics of behavior modification but is less clear about how expectations influence the decision to behave. The linking pin between the two theories is the concept of commitment. To illustrate this link let us take the hypothetical case of Al, who attempts to achieve one of the goals that makes up his ideal self. Let us assume that Al's goal is to be a more active participant in group discussions. He tries to achieve this goal by speaking up in a meeting he attends. This behavior is met with positive reinforcement ("That's a good idea, Al.") This reinforcement increases the expectation that this goal related behavior will be rewarded (assuming for the moment that Al believes in internal control). The effect of this increased expectation will be to increase Al's commitment to his goal of being more active and, therefore, increase the probability that Al will reduce the dissonance between his self image as passive in groups and his goal of being active by changing his passive behavior and self image. If, however, the reinforcement Al receives for being active is negative ("Don't interrupt, Al!"), the effect would be reduced commitment to his goal and an increase in the probability that self image-ideal self dissonance would be reduced by decreasing his aspiration to be active.

At the same time Al receives reinforcement when he is not trying to achieve his goal, i.e., when he is being his old passive self. To the extent that this behavior is rewarding (e.g., he still gets invited to meetings) it will increase his commitment to the way he is making his self-image resistant to change. Negative reinforcement on the other hand will decrease commitment and increase the probability of change in self image.

Thus, the model describes four types of behavior/reinforcement contingencies that influence commitment. Positive reinforcement to ideal self related behavior and negative reinforcement to self-image increases the probability of dissonance reduction through change in self-image and behavior. Negative reinforcement to ideal self related behavior and positive reinforcement to self-image related behavior increases the probability of dissonance reduction through goal reduction or abandonment.

The Capacity for Self-Direction

Let us pause for a moment to evaluate the model of human change we have thus far constructed. At first glance, the model seems reasonable, logical and, in a sense, complete. Individuals experience discrepancies between where they are and where they want to be, they behave to reduce these discrepancies, and the results of their behavior modify their future actions. With the exception of identity integration and internal/external control, the model is a fine picture of rational adaptation. Yet, it is the very rationality and logic of the model which casts doubt on its validity. How are we to explain the illogical and unreasonable behavior that seems to characterize much human change and growth? What about psychopathology, man's resistance to changes that are 'good for him,' his confusion and indecision, his distortion of reality and self perception, his defensiveness and reluctance to adapt to changing environments? And, what of the more positive and noble aspects of man's unreasonableness, his capacity to create dissonance for himself through curiosity and exploration, his ability to shape environment rather than to be shaped by them, indeed, his ability to have an ideal self, to have goals and be guided by them? To deal with these questions we must proceed to the third stage of the model, the growth and development theories. It is these theories

that have sought to answer our questions about the origins of a sense of identity, the capability of veridical perception, the sense of personal control over one's life and the capacity for growth and self-direction.

The growth and development theorists, though the specific focus of their work has been different, some focusing on motivational development, others on cognitive development and others on social/emotional development, all have developed a picture of human growth that is in its broad features quite consistent. Though specific terms may vary and developmental stages do not precisely overlap, nearly all of these theorists agree that human growth proceeds from a state of embeddedness, defensiveness, dependency and reaction to a state of self-actualization, independence, proaction and self-direction. For our purposes we will examine and utilize for our model of human change the work of three of these developmental theorists - Maslow's (1954, 1962), motivation development theory, Perry's (1968) cognitive development model, and Roger's (1951, 1961) model of social emotional development.

Maslow's theory of self-actualization is based on the concept of a hierarchy of motives. Human motives are ordered on a continuum ranging from lower order deficiency needs to higher order growth needs. Five general categories of needs are identified on this continuum - physiological needs, safety needs, relatedness needs, esteem needs and self-actualization needs. Human growth takes place as each successive class of lower human needs is met. As physiological needs are met, safety needs emerge, as safety needs are satisfied the person begins to need human relationship, and so on. The central thesis of Maslow's work is that motivation for growth and self-actualization is dependent on satisfaction of lower order deficiency needs, i.e., physiological needs and needs for security and psychological safety. When man is threatened, hungry and insecure, his actions are defensive and reactive. Only when these

deficiencies are removed can man be proactive and creative. "Assured safety permits higher needs and impulses to emerge and to grow towards mastery. To endanger safety means regression toward the basic foundation" (Maslow, 1962, p. 47). Thus, for Maslow, and as we shall see, for the other growth theorists as well, conditions of psychological safety are the critical catalyst for the emergence of self-direction.

Human growth is something more, however, than a change in one's motivational desires and concerns. There are also changes in cognitive and intellectual structures that take place. The seminal work on cognitive growth by Jean Piaget has shown how cognitive structures develop from the embeddedness of the young child in his sensory world to his mastery of the environment through the use of symbolic representation. Particularly useful for our work, with its focus on change and growth in adults, is the extension of Piaget's work on children to young college students (Perry, 1968). Perry's research based on extensive interviews with Harvard undergraduates, has identified the outlines of the emerging structure of adult cognition. His work identifies three major developmental phases.

In the first stage the individual is struggling with an absolutist, right-wrong concept of knowledge. This framework gives way in the second phase of development to a diverse, relativistic conception of knowledge. In the third phase the individual develops the ability to make personal commitments in a relativistic world. Each of these three phases has three subphases, making up a total of nine developmental positions. Perry's brief description of these nine positions is included below. Though these are described in student/teacher terms, the model applies to the wider world as well.

- Position 1. The student sees the world in polar terms of we - right-good versus other - wrong-bad. Right Answers for everything exist in the Absolute, known to Authority whose role is to mediate (teach) them. Knowledge and goodness are perceived as quantitative accretions of discrete rightnesses to be collected by hard work and obedience (paradigm: a spelling test).
- Position 2. The student perceives diversity of opinion, and uncertainty, and accounts for them as unwarranted confusion in poorly qualified Authorities or as mere exercises set by Authority "so we can learn to find The Answer for ourselves."
- Position 3. The student accepts diversity and uncertainty as legitimate but still temporary in areas where Authority "hasn't found The Answer yet." He supposes Authority grades him in these areas on "good expression" but remains puzzled as to standards.
- Position 4. a) The student perceives legitimate uncertainty (and therefore diversity of opinion) to be extensive and raises it to the status of an unstructured epistemological realm which he sets over against Authority's realm where right-wrong still prevails, or b) the student discovers qualitative contextual relativistic reasoning as a special case of "what They want" within Authority's realm.
- Position 5. The student perceives all knowledge and values (including authority's) as contextual and relativistic and subordinates dualistic right-wrong functions to the status of a special case, in context.
- Position 6. The student apprehends the necessity of orienting himself in a relativistic world through some form of personal Commitment (as distinct from unquestioned or unconsidered commitment to simple belief in certainty).
- Position 7. The student makes an initial Commitment in some area.
- Position 8. The student experiences the implications of Commitment and explores the subjective and stylistic issues of responsibility.
- Position 9. The student experiences the affirmation of identity among multiple responsibilities and realizes Commitment as an ongoing, unfolding activity through which he expresses his life style.

The importance of Perry's work for our model of human change is that it describes the intellectual developmental prerequisites for self-direction, these being the experience of knowledge as personally relevant, and the experience of choice and commitment as organizing life principles. If knowledge

is felt to be 'owned' by authorities, one's ideals and images of the future can only have a cold and lifeless quality, more likely to be experienced as rules or constraints than personal guides for action. The man in position 1 is helplessly dependent on authorities to make decisions for him, to tell him right from wrong. With relativism comes the challenge of evaluating one's personal experience and the corresponding responsibility for belief and actions. When this challenge is met choices and commitments can be made, ideals and images of the future have substance and personal meaning and become guides to action.

Yet, another facet to our understanding of human growth is provided by the work of Carl Rogers. His model of the developmental process, based on his observations as a psychotherapist, emphasizes, as we might expect, the social-emotional side of man. Rogers, like Maslow, feels that human growth occurs under conditions of psychological safety, specifically in situations where the person experiences unconditional positive regard. "...The client experiences himself as being fully received. By this I mean that whatever his feelings - fear, despair, insecurity, anger; whatever his mode of expression - silences, gestures, tears or words; whatever he finds himself being in this moment, he senses that he is psychologically received, just as he is by the therapist. There is implied in this term the concept of being understood, empathically and the concept of acceptance" (Rogers, 1961, pp. 130-131).

Rogers' description of the growth process that occurs in this condition quite parallels that of Maslow and Perry, yet it focuses more on the emotional life and the self image of the person. The person's image of himself moves from a narrow, rigid and fixed set of constructs to a more open tentative formulation of present experience, a growth pattern congruent

with Perry's movement to a relativistic view of knowledge. Feelings become more accessible to the person and there is an increasing congruence between experience and self image. Finally, there is an increasing sense of personal responsibility for one's problems and ownership of one's experience. Rogers' more precise definition of this process in seven stages is given below:

First stage: There is an unwillingness to communicate self. Communication is only about externals.
Feelings and personal meanings are neither recognized nor owned.
Personal constructs are extremely rigid.
Close and communicative relationships are construed as dangerous.
No problems are recognized or perceived at this stage.
There is no desire to change.
There is much blockage of internal communication.

Second stage: Expression begins to flow in regard to non-self topics.
Problems are perceived as external to self.
Feelings are described as unowned or sometimes as past objects.
Feelings may be exhibited, but are not recognized as such or owned.
Experience is bound by the structure of the past.
Personal constructs are rigid, and unrecognized as being constructs, but are thought of as facts.
Differentiation of personal meanings and feelings is very limited and global.
Contradictions may be expressed, but with little recognition of them as contradictions.

Third stage: There is a freer flow of expression about the self as an object.
There is also expression about self-related experiences as objects.
There is also expression about the self as a reflected object, existing primarily in others.
There is much expression about or description of feelings and personal meanings not now present.
There is very little acceptance of feelings. For the most part feelings are revealed as something shameful, bad, or abnormal, or unacceptable in other ways.
Feelings are exhibited, and then sometimes recognized as feelings.
Experiencing is described as in the past, or as somewhat remote from the self.
Personal constructs are rigid, but may be recognized as constructs, not external facts.
Differentiation of feelings and meanings is slightly sharper, less global, than in the previous stages.
There is a recognition of contradictions in experience.
Personal choices are often seen as ineffective.

Fourth stage: The client describes more intense feelings of the 'not-now present' variety.
Feelings are described as objects in the present.
Occasionally feelings are expressed as in the present, sometimes breaking through almost against the client's wishes.
There is a tendency toward experiencing feelings in the immediate present, and there is distrust and fear of this possibility.

There is little open acceptance of feelings, though some acceptance is exhibited.

Experiencing is less bound by the structure of the past, is less remote and may occasionally occur with little postponement.

There is a loosening of the way experience is construed. There are some discoveries of personal constructs; there is the definite recognition of these as constructs; and there is a beginning questioning of their validity.

There is an increased differentiation of feelings, constructs, personal meanings, with some tendency toward seeking exactness of symbolization. There is a realization of concern about contradictions and incongruences between experience and self.

There are feelings of self responsibility in problems, though such feelings vacillate.

Though a close relationship still seems dangerous, the client risks himself, relating to some small extent on a feeling basis.

Fifth stage: Feelings are expressed freely as in the present.

Feelings are very close to being fully experienced. They 'bubble up,' 'seep through,' in spite of the fear and distrust which the client feels at experiencing them with fullness and immediacy.

There is a beginning tendency to realize that experiencing a feeling involves a direct referent.

There is surprise and fright, rarely pleasure, at the feelings which 'bubble through.'

There is an increasing ownership of self feelings, and a desire to be these, to be 'the real me.'

Experiencing is loosened, no longer remote, and frequently occurs with little postponement.

The ways in which experience is construed are much loosened.

There are many fresh discoveries of personal constructs as constructs, and a critical examination and questioning of these.

There is a strong and evident tendency toward exactness in differentiation of feelings and meanings.

There is an increasingly clear facing of contradictions and incongruences in experience.

There is an increasing quality of acceptance of self-responsibility for the problem being faced, and a concern as to how he has contributed. There are increasingly freer dialogues within the self, an improvement in and reduced blockage of internal communication.

Sixth stage: A feeling which as previously been 'stuck,' has been inhibited in its process quality, is experienced with immediacy now.

A feeling flows to its full result.

A present feeling is directly experienced with immediacy and richness.

The immediacy of experiencing, and the feeling which constitutes its content, are accepted. This is something which is, not something to be denied, feared, struggled against.

Self as an object tends to disappear.

Experiencing at this stage, takes on a real process quality.

Another characteristic of this stage of process is the physiological loosening which accompanies it.

The incongruence between experience and awareness is vividly experienced as it disappears into congruence.

The relevant personal construct is dissolved in this experiencing moment, and the client feels cut loose from his previously stabilized framework. The moment of full experience becomes a clear and definite referent. Differentiation of experiencing is sharp and basic. In this stage, there are no longer 'problems,' external or internal. The client is living, subjectively, a phase of his problem. It is not an object.

Seventh stage: New feelings are experienced with immediacy and richness of detail, both in the therapeutic relationship and outside. The experiencing of such feelings is used as a clear referent. There is a growing and continuing sense of acceptant ownership of these changing feelings, a basic trust in his own process. Experiencing has lost almost completely its structure-bound aspects and becomes process experiencing - that is, the situation is experienced and interpreted in its newness, not as the past. The self becomes increasingly simply the subjective and reflexive awareness of experiencing. The self is much less frequently a perceived object, and much more frequently something confidently felt in process. Personal constructs are tentatively reformulated, to be validated against further experience, but even then, to be held loosely. Internal communication is clear, with feelings and symbols well matched, and fresh terms for new feelings. There is the experiencing of effective choice of new ways of being.

With these brief sketches of the human growth processes from the motivational, intellectual and social-emotional perspectives, let us return to the task at hand, the integration of the growth and development theories into our model of the human change process.

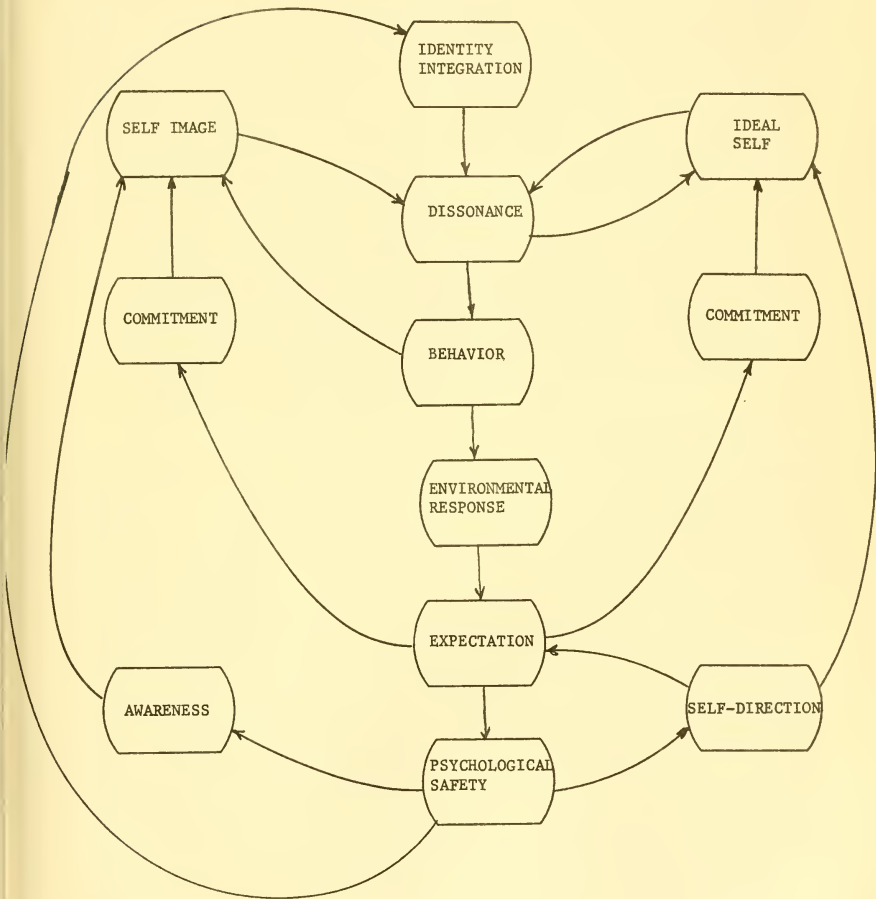
The focal point of this integration is the concept of psychological safety. For nearly all of the growth theorists some variant of this concept is the chief condition for growth to occur; and we will argue that it is a person's position or stage of growth that will determine the nature of the change process. Change will be defensive and reactive if the person is at a lower stage of growth and proactive and self-directed if he is at a higher stage of growth.

So, we must begin by asking, "What are the environmental conditions that produce a sense of psychological safety?" While there is danger of overgeneralizing the variety of positions that have been taken in answer to this ques-

tion, there does seem to be a thread that is common to all, namely that psychological safety occurs when the individual expects positive results to flow from his actions. Rogers gives his clients this safety through unconditional regard. By accepting all of the client's behavior and feelings the client comes to expect positive regard and thereby feels safe. From this felt safety emerges self-confidence and growth. Maslow believes that "growth takes place when the next step is subjectively more delightful, more joyous, more intrinsically satisfying than the last" (1962, p. 43) When one expects positive, pleasurable, good things to happen to him he feels secure and safe. When he expects trouble he feels threatened. Stated so simply the point is obvious. Yet, from this simple truth emerges an understanding of the more complex human dynamics behind the aphorism, "Nothing succeeds like success," and its opposite, the crushing cycle of deprivation and poverty. For the safety of success produces growth and more successful adaptation, while failure produces regression and more failure.

To aid us in examining these dynamics in greater detail, let us turn to Figure 5 which shows the complete control theory model of human change, adding growth and development theory to learning theory and dissonance theory. Using this figure as a guide we can now trace the specific effects of increased psychological safety on the change process. One major effect of increased psychological safety is an increase in awareness, what Rogers calls openness to experience. To understand this relationship it is necessary to first understand something about the self image and the defenses of denial and distortion which cause restricted awareness and non-veridical perception. The self image, as we mentioned earlier, does not always reflect an accurate picture of one's behavior. It is subject to filters, biases and distortions that arise out of the individual's need to maintain a self-concept that satisfies his need for

Figure 5. The Complete Control Theory Model of Human Change Incorporating Dissonance Theory, Learning Theory and Growth Theory



the acceptance and approval of other people and of his need to approve of himself. Thus, when the person develops a self-concept, the fact that what other people think of him is important will lead him to see himself in terms of those of his actions, thoughts or feelings that have received approval or support in the past. These standards of right and wrong, what Rogers calls conditions of worth, are the cause of defensiveness. In our need to be worthy, we 'touch up' our self-portrait. Hall and Lindsey, 1957, describe Harry Stack Sullivan's concept of the self system in this way:

The self system as the guardian of one's security tends to become isolated from the rest of the personality; it excludes information that is incongruous with its present organization and fails, thereby, to profit from experience. Since the self guards the person from anxiety, it is held in high esteem and protected from criticism. As the self system grows in complexity and independence it prevents the person from making objective judgments of his own behavior and it glosses over obvious contradictions between what the person really is and what his self system says he is. (p. 139).

But, under conditions of psychological safety (unconditional positive regard) defensiveness is reduced and the self image is modified to correspond with behavior. "Under certain conditions, involving primarily complete absence of any threat to the self-structure, experiences which are inconsistent with it may be perceived and examined, and the structure of the self revised to assimilate and include such experiences"(Rogers, 1951, p. 508). Under sustained conditions of psychological safety growth occurs and the individual becomes fully aware and open to his experience. The effect of this awareness and the change and adaptation process can be seen by tracing its impact on other variables in the feedback loop.

An accurate self-image that correctly reflects actual behavior will lead to more realistic assessments of the discrepancies between actual affairs and ideal state and hence more successful adaptive behavior. This success would, of course, accelerate the growth of the positive feedback loop - increasing psychological safety and awareness still further. Rogers

describes this process this way:

The person who is fully open to his experience would have access to all of the available data in the situation, on which to base his behavior; the social demands, his own complex and possible conflicting needs, his memories of similar situations, his perception of the uniqueness of this situation, etc., etc. The data would be very complex indeed. But, he could permit his total organism, his consciousness participating, to consider each stimulus, need, and demand, its relative intensity and importance, and out of this complex weighing and balancing, discover that course of action which would come closest to satisfying all his needs in the situation. An analogy which might come close to a description would be to compare this person to a giant electronic computing machine. Since he is open to his experience, all of the data from his sense impressions, from his memory, from previous learning, from visceral and internal states is fed into the machine. The machine takes all of these multitudinous pulls and forces which are fed in as data, and quickly computes the course of action which would be the most economical vector of need satisfaction in this existential situation (1961, p. 190).

A second effort of psychological safety is on identity integration.

The sustained experience of psychological safety should produce movement to a sense of identity while insecurity and threat will most probably produce increasing identity diffusion. This relationships will, however, most likely be subject to a fairly long time delay. Our research with the identity integration available (Winter, Griffith and Kolb 1969) suggests that it is a personality characteristic that changes quite slowly. Only a continued exposure to threat or freedom from threat should affect it. Perhaps this is what Erikson (1958, 1962) means when he suggests that a kind of moratorium is important in the formation of identity - a period of relative isolation and freedom from the daily demands of life.

The third major effect of psychological safety is on the capacity for self-direction. It is this capacity that Maslow and Perry call self-actualization and that Robert White calls efficacy or competence motivation. It is the ability of the individual to master his immediate environmental demands and to give his life a direction and purpose. In the model outlined here self-direction affects three other variables in the model, expectation, be-

havior, and ideal self.

The link between self-direction and expectations has already been partially discussed in the learning theory section. There we saw that the nature of expectation and hence one's ability to learn from his own experience was influenced by the degree to which the individual believed that events were controlled by his behavior. The hypothesis here is the belief in internal control is a function of the individual's psychological safety. Sustained threat will increase feelings that events are beyond one's control, decrease the ability to learn from experience which, following through the model, will serve to increase failure and threat. Sustained success experiences will have the opposite effect. The word "sustained" is used here because it appears that belief in internal and external control is a relatively stable attitude like identity integration that would be relatively insensitive to a single success or failure (a long time delay in control theory terms).

An increase in the capacity for self-direction also means increased involvement, risk-taking, and exploration in behavior. This is perhaps best described in White's description of competence motivation or the research of David McClelland (1961) and his associates on achievement motivation. In this model the effect of increased self-direction is an increase in the individual's tendency to try new behavior related to his ideal self. It tends to increase the probability that the individual will try to reduce dissonance between self-image and ideal self by attempting to act in accord with the ideal.

Finally, self-direction produces changes in the ideal self. We have seen in Perry's description of intellectual growth developmental changes in the source of and personal commitment to ideals and goals. When the capacity for self-direction is low the person relies on the external judgments of

of authority for definitions of right and wrong, good and bad. With growth comes personal choice and commitment to these ideals, with the result that they are more resistant to change under pressure. Ideals become less likely to change when they conflict with current conditions, and as a result they, rather than preservation of self-image, become motivaters of action.

Rogers emphasizes the importance of internal structures of evaluation in his definition of an effective helping relationship: "So I have come to feel that the more I can keep a relationship free of judgement and and evaluation, the more this will permit the other person to reach the point where he recognizes that the locus of evaluation, the center of responsibility, lies within himself. The meaning and value of his experience is in the last analysis something which is up to him, and no amount of external judgement can alter this"(1961, p. 55).

Our own work on the capacity for self-direction has shown that individuals who are successful in changing themselves conceptualize their goals in conditional terms acknowledging their personal desire to be better than they are, while unsuccessful individuals avoid stating goals or commitments(Winter, Griffith and Kolb, 1969).

THE DYNAMICS OF HUMAN CHANGE

So far we have described in a general way many inter-relationships among the variables that psychologists use to describe human change. It now remains for us to describe the dynamic effects of these inter-relationships all acting together over time. To do this we must make some educated guesses about the exact quantitative inter-relationships among the variables and allow the computer to keep track of the model's behavior over time. Forrester (1971) explains why this is necessary.

The mental model is fuzzy. It is incomplete. It is imprecisely stated. Furthermore, within one individual, a mental model changes with time and even during the flow of a single conversation. The human mind assembles a few relationships to fit the context of a discussion. As the subject shifts so does the model.

...the most important difference between the properly conceived computer model and the mental model is in the ability to determine the dynamic consequences when the assumptions within the model interact with one another. The human mind is not adapted to sensing correctly the consequences of a mental model. The mental model may be correct in structure and assumptions, but, even so, the human mind - either individually or as a group consensus - is most apt to draw the wrong conclusions. There is no doubt about the digital computer routinely and accurately tracing through the sequences of actions that result from following the statements of behavior for individual points in the model system (1971, p. 54).

While there are an infinity of possible inter-relationships among the variables we have described and hence infinite room for error in the precise definition of these inter-relationships we have discovered as have Forrester and his associates that there is some margin for error when what one is interested in is the behavior of total system. It turns out that small changes in the precise definition of an inter-relationship between, for example, psychological safety and awareness have little effect on the total dynamic behavior of the system. The system structure in terms of dominant feedback loops is a far more important determinant of system behavior than any single inter-relationship among two variables. Having made our educated guesses and built a computer model let us proceed to examine some of these dynamics.

The behavior of a complex system such as the model of human change often produces results that are counter to our first intuitive expectations. Interventions taken from a single limited theoretical perspective often turn out to have unanticipated consequences. Often the short run and long run consequences of a change strategy are quite different. At times the most immediately obvious intervention point is the least effective while a less obvious intervention can produce great change.

To illustrate, let us examine the impacts of an intervention strategy

that punishes undesirable current (self image related) behavior and for the most part ignores ideal-related behavior. We are, for example, punished for parking in no parking zones but not rewarded for leaving our cars at home and using public transportation. The penal system is another more intensive application of this basic change strategy.

The computer simulation shown in Figure 6 depicts the typical consequences of such a change strategy for a person who begins with average levels of identity integration, psychological safety and self-direction. As can be seen from the increasing convergence over time of self-image and ideal self and from the decrease in dissonance, the negative feedback to self-image related behavior produces the result of eliminating this undesirable behavior.

But, before we are too quickly satisfied let us examine the simulation again. On closer examination the intervention strategy is not as successful as it appears. Note that the ideal self decreases slightly over time and that commitment to the ideal self, initially low, is now still lower. In addition, commitment to the self-image, initially high, is now quite low. The implication of this is that while behavior has been changed during the application of negative feedback, the change represents simple compliance (Kelman, 1961) rather than a lasting change in behavior to which the individual is committed. Once negative feedback to the self-image is removed, the individual will be likely to revert to other more rewarding behavior.

Another unintended consequence of the intervention is seen in the decreases in identity integration, psychological safety, and self-direction. Here is a perfect example of how the short run and long run consequences of an intervention can differ. While in the short run the individual's behavior has been modified to conform to a desired standard, it has been at some cost to the individual's ability to adapt, to grow, and to be self-directed. If

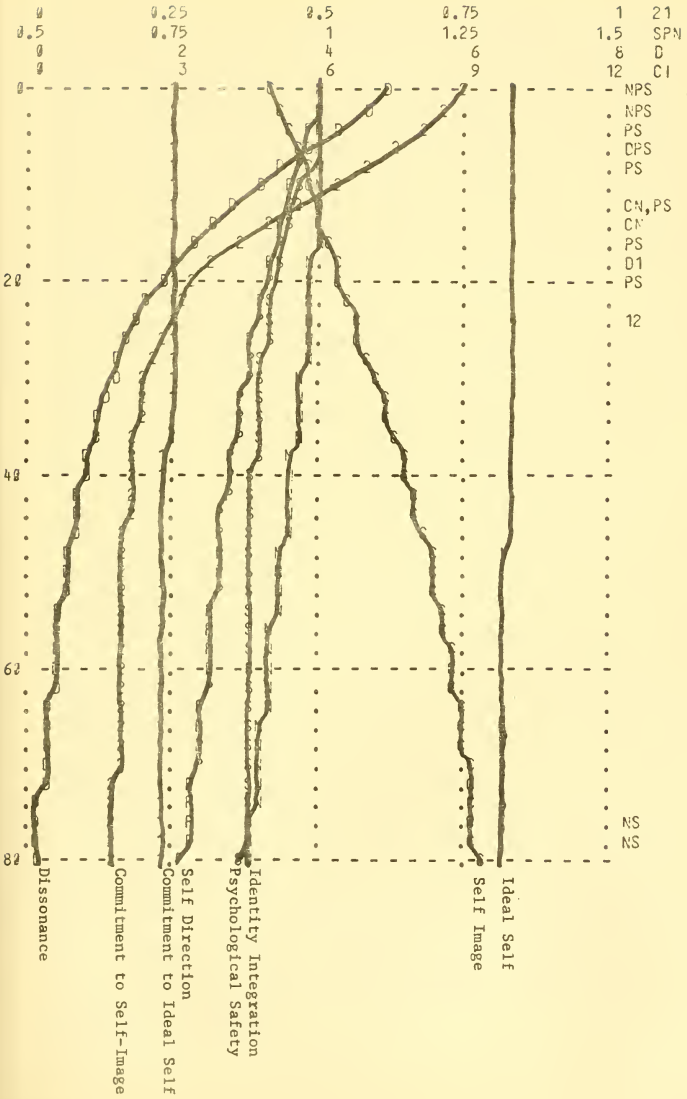


Figure 6. The Consequences of an Intervention Strategy that Gives Negative Feedback to Self-Image Related Behavior

we were now to do another simulation of this individual's behavior, only this time beginning his with reduced levels of identity integration, psychological safety and self-direction, we would find that it would take longer for current behavior to reach ideal behavior. Decreased identity integration produces less felt dissonance and decreased psychological safety produces an increase in distorted perception. These combine to reduce the motivation to change even in the face of punishment. Our case has become resistant to change, an intransigent.

There is here a further important point. We can see from this analysis how simple change theories can become self-fulfilling prophecies. Imagine, for example, the prison guards or policemen who primarily deal with men who have experienced, some for many years of their lives, this change strategy. These penologists experience first-hand what happens when you try to be lenient with these men, when you try to give them responsibility. They take advantage of it. Punishment is the only language they understand. More punishment makes this fact more true.

It is interesting to contrast this obvious intervention strategy with the less obvious intervention recommended by more enlightened penologists and formulated most clearly by Rogers (1951, 1961). This strategy of unconditional positive regard prescribes interventions aimed at increasing psychological safety by increasing expectations of positive feedback on behavior.

This strategy, of course, rouses the ire of the "experienced" penologists cited above because it will not work and secondly because it sometimes involves doing the exact opposite of what their change strategy dictates, i.e., rewarding undesirable behavior. Yet, the Rogerian strategy does work in the case we have been examining, although it takes longer for self-image and ideal to converge.

But, there are benefits which make up for the increase in time required for change to occur. Commitment to self-image and ideal are both high indicating that the change is likely to remain after the intervention. The capacity for self-direction has also increased. The individual has not become more dependent on the change agent as in the first strategy. He has become more independent in that his ideals have become internalized, he is experiencing more directly the discrepancies between who he is and who he wants to be, and he feels responsible for his behavior and its consequences.

We cannot conclude from this simple case that the "traditional" penologists are wrong and Rogers is right. The point is that the most appropriate and effective intervention strategy depends upon the state of the system. By analyzing and depicting complex systems such as human personality in their component feedback loops it is possible to specify precisely the complex interactions among several different processes and to determine the effects of these interactions over time. In addition, it is possible through computer simulation to ascertain the probable effects of a change in one variable in a system on other variables and on the behavior of the system as a whole. Such a simulation can be of great value in selecting helping interventions designed to bring about improvement in a system's functioning. As Phillips and Weiner put it,

Within the cybernetic framework, although not unique to it, variables are selected and regulated in the feedback chain which are most amenable to manipulation and control. In structured therapy, elusive causes are not sought that might operate to produce a disordered system: the therapist goes directly to the element (information) in the feedback loop that has a meaningful coefficient of efficiency in maintaining the loop, and he proceeds immediately to try to insert the change (1966, p. 96).

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