ABSTRACT

The paper suggests an alternative universe in which failure is iden-
tified as a systems concern, instead of a human breakdown. The model
presents successful behavior in terms of growth in process efficiency,
rather than the +/- (right/wrong) matrix associated with achievement
orientation. Planning is viewed as a function of identifying behaviors on
the part of the learner which can be utilized for future problem-solving.
In effect, problem-solving and failure are poor bed-fellows.

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Academic and Behavioral Planning through an Alternative Model

A cardinal historical assumption of psychologists and educators establishes
failure as an inevitable concomitant of the human condition. Indeed, the ability
to cope with failure (on the part of children) has been viewed as a measure of
maturity and stability. Sears and Dowley maintain that ". . .as they mature,
children generally discover and use more effective ways of reacting to failure.
Some nursery-age children continue, however, to show immature and undesirable
responses to difficult situations."[1] What is critical in the statement is *not* the recog-
nition of differential coping mechanisms, but the acceptance of failure as both
inevitable, and a channel through which mature and desirable behaviors may be
measured. Despite their readiness to evaluate the behaviors of children, there is
no parallel attempt to test or challenge the positing of failure as an absolute condi-
tion.

Even where the intent is to develop positive, supportive systems for children
under stress, failure continues to be identified as an aspect of (expected) matura-
tion. Valett contends that ". . .everyone fails at times" and Learning Disabled
children, in particular, ". . .have failed so often that they are convinced that they
cannot learn regardless of how hard they might try."[2]

Continuing this line of reasoning, Johnson and Myklebust, while advocating
supportive programs for Learning Disabled children, key their system around the
failure issue. They state that, "Merely knowing that he [the child] has ability, that
there are reasons for his failure and that something can be done is of great
benefit..."[3] What is, perhaps, most disheartening is the notion that failure is our
companion at the very earliest levels of conscious learning. "Since children in the
process of growing up must meet many situations that are difficult for them, the
experience of failure is a frequent one in the nursery school child's life."[4] In short,

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[1]P.S. Sears and W. M. Dowley, "Research on Teaching in the Nursery School," in *Handbook of
Research on Teaching*, ed. N. L. Gage (Chicago: Rand McNally, 1965), p. 843.

[2]R. E. Valett, *Programming Learning Disabilities* (Belmont,Calif.: Fearon Publishers, 1969), p. 4.

[3]D. J. Johnson and H. R. Myklebust, *Learning Disabilities: Educational Principles and Practices* (New
York: Grune and Stratton, 1967), p. 49.

[4]Sears and Dowley, p. 843.

where the progress of a learning organism, relative to fixed objectives and predicted rates of movement, falls short, the analytic descriptor becomes 'failure.'

It is remarkable that the general literature (in psychology and education) on learning has not questioned the presence of failure as an organic aspect of human systems. In the post-Euclidean mathematical world which most of us inhabit, we have grown used to working with notions of plus (+) and minus (-), defining human behavior in axiomatic terms. Indeed, the establishment of failure as an absolute, which we can describe, deal with and even diminish, but not eliminate, closely resembles that body of mathematical theory which views mathematical reality as already existant in the natural environment. Thus, the function of the theoretician is to describe, rather than to question. The great English mathematician, Hardy explicitly stated ". . .I believe that mathematical reality lies outside us, and that our function is to discover or observe it, and that the theorems which we prove, and which we describe grandiloquently as our 'creations' are simply our notes of our observations."[5]

It is our purpose in this paper, to challenge the establishment of failure as a pre-existent human condition, both in mathematical and social-control terms. Although we would have little quarrel with the notion that institutions and systems "fail" (i.e., are unresponsive to individuals within the system) we are convinced that there are available mathematical models which function outside the realm of + /- evaluation, in which process, rather than fixed objectives is the true determinant of successful human behavior. We are further convinced that the alternative systems provide infinitely more functional models for helping human organisms move towards positive resolution of learning and behavior problems.

Fixed Mathematical Models

Although we tend to think of mathematical theory in purely numeric modes, the real function of the mathematician, at least in classic Greek terms, has been to develop languages and models through which we are able to organize human and natural functioning. For the early Greeks, and for their seventeenth and eighteenth century counterparts, mathematics served as a window through which one could view the relationship of man to his natural environment. In a very real sense, twentieth century educators have adopted a mathematical view of the world in which appropriate behaviors can be identified as the plus factors in a mathematical universe, and inappropriate, or even unclassifiable, behaviors labeled with minus valences. In the problem solving universe, inhabited by teaching adult and learning child, we have been taught to measure appropriateness in terms of the closeness of fit between a preidentified solution and the child's statement or physical act relative to that solution. Although educators can and do argue endlessly over the ranges of appropriate solutions, they nevertheless agree that failure is the condition which describes non-congruence between objective and solution.

One could argue, however, that the + /- model of the universe with its attendant assumption of mathematical reality is by no means as absolute as the theorems which grow out of that model. Countering the Hardy position, White states,

> Thus we see that there is no mystery about mathematical reality. We need not search for mathematical "truths" in the divine mind or in the structure of the universe. . .Mathematical concepts are man-made. . .The locus of mathematical reality is cultural tradition, i.e., the continuum of symbolic behavior. . .Mathematical concepts are independent of the individual mind but not wholly within the mind of the species, i.e., culture.[6]

[5]G. N. Hardy, *A Mathematical Apology* (Cambridge: Cambridge University Press, 1941), pp. 63-64.

[6]L. A. White, "The Locus of Mathematical Reality," in *Machines, Music and Puzzles*, ed. J. R. Newman (New York: Simon and Schuster, 1956), pp. 2363-2364.

Once we accept the possibility that mathematical "reality" is a reflection of value systems in the larger cultural environment, we are no longer bound to mathematical models as absolutes, but rather, are free to develop models which conform to, or describe, nonmathematical views of existential reality.

Chapple sees human behavior in mathematical terms, where we interpret behavior dependence.

> [When]. . .the behavior of one individual (animal or human) changes as a consequence of the behavior of another, we are dealing with a state of functional dependence in the mathematical sense. For this assumption to have validity, we have to be able to demonstrate not only that changes occur, but that they take place lawfully — that a mathematical function will describe them.[7]

Within this mathematical definition, there is the genesis of a model in which +/- plays no role, since it does not define the relationship between the organism and a predetermined objective. Rather, the model defines a continuum in which two organisms play an interactive role. The functional definition of that role is the regularity with which particular phenomena occur, and the regularity of the rates of change undergone by those phenomena. Emphasizing the issue further, Chapple maintains that when we view the bi-organism function embedded in a cultural matrix, we must allow for the importance of chance whose ". . .dimensions can merely provide estimates of how often out of so many trials X may happen providing nothing interferes."[8] What is critical in Chapple's view of mathematical reality is the interrelationship between chance and interference. Since both conditions are unexpected, they do not lend themselves to easy categorization within a +/- model. They are, nevertheless, clearly open to mathematical definition. Perhaps the symbol most useful in describing chance and interference would be the ±, indicating the presence of both appropriate and inappropriate conditions without assigning value to either.

In a very real sense, the dilemma presented by the two models, i.e., +/- and +, is best defined in terms of Heisenberg's monumental Uncertainty Principle. While Heisenberg deals with *velocity* and *position*, we can easily translate these in human terms, to read *process* and *fixed objective*, or *progress* and *achievement*. The physicist understood that "Nature puts up with our probings into its mysteries only on conditions. The more we clarify the secret of position, the more deeply hidden becomes the secret of velocity. . .We can distribute the uncertainty as we wish, but we can never get away from it."[9] What is remarkable is that in the fields of education and psychology we have attempted to measure velocity by position, i.e., progress by achievement. When we recognize, however, that the two conditions while interdependent are, nevertheless, distinct, and further, that the measurement of one adversely affects the measurement of the other, we are forced to rethink our notions of failure where achievement (position) and progress (velocity) diverge from a predicted formulation.

In short, despite the commitment of some theoreticians to mathematics as an absolute reality, there is sufficient evidence to indicate that both mathematical languages and the conditions they describe are very much a function of cultural environments. Where we view failure as an aspect of reality, we identify the appropriate model; where we view failure as an aspect of uncertainty, we identify

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[7]E. D. Chapple, *Culture and Biological Man* (New York: Holt, Rinehart and Winston, 1970), p. 16

[8]Chapple, p. 11.

[9]W. Heisenberg, "The Uncertainty Principle," in *The World of Laws and the World of Chance*, ed. J. R. Newman (New York: Simon and Schuster, 1956), p. 1051.

the appropriate model; where we view failure as an aspect of systems and institutions rather than of living organisms, we are charged with the obligation of identifying an appropriate model.

Control of Systems

Aside from mathematical definitions, there is a serious philosophical issue concerning the relationship between failure and control. In terms of any notions we may have concerning the rights of individuals to have a major decision-making function concerning their own destiny, one might argue that there should be an explicit correlation between the amount of control exercised by the individual organism and the amount of accountability placed on that organism. To assume that failure is an aspect of the human condition would seem to lead to the conclusion that individuals, being in total control of their processes, are accountable for the degree to which they fulfill stated objectives. In the case of children, assumptions of control are highly questionable. In the case of Learning Disabled children, assumptions of control are unfair.

In terms of the larger society, there has been a continuing anthropological argument dating back to the 19th century among social theoreticians regarding the independent control exercised by individuals in the extended environment. Although early definitions of society and social institutions argued that these institutions were fully under the creative control of their human members, there were indications that man was as much slave to social institutions as he was a master. Kroeber insisted that the larger and more complex a society became the less it was subject to individual or even group control. He maintained that culture, i.e., the institutions and practices constituting it, ". . .have a persistence and can be conceived as going on their slowly changing way 'above' or outside the societies that support them."[10] In effect, the very process of contributing to culture by enriching it and lending variety also confronts individuals with the danger of disassociation.

> How large a share does a given person hold in the stock company of his society, and what dividends of satisfaction does it pay him? It is evident that the complex culture carried by a large society is just too big for one individual to take an active part in it. It also becomes more difficult for each member of the society really to participate in most of its activities. He begins to be an onlooker at most of it, then a bystander.[11]

The lack of control described by Kroeber in cultural terms was extended by Chapple in biological terms. Further, he tied differential rates of equilibrium to the issue of biological and social stress.

> Whenever a compensatory reaction takes place, and before the personality can return to the equilibrium of the unstressed state, the individual's interactional system has to go through its idiosyncratic changes. Yet not all people return to equilibrium by an overcompensatory response. . .Many underreact; the temperamental patterns which stress can trigger off are remarkably varied.[12]

Allport examined the issue of human control and participation as a function of ego involvement. He, too, came to the conclusion that the intensity or sum of activity did not necessarily imply involvement or control. In describing a prototype personality he stated that

> The people he has met are idler-gears like himself, meshed into systems of transmission and far too distracted to examine anyone of the cycles in which they are engaged. Throughout the day

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[10]A. L. Kroeber, *Anthropology* (New York: Harcourt, Brace, 1948), p. 254.

[11]Kroeber, pp. 290-291.

Sam is on the go, implicated in this task and that — but does he, in a psychological sense, *partici-pate* in what he is doing? Although constantly *task involved,* is he ever really *ego-involved?[13]*

As a reflection of larger society we must recognize that school and learning systems present the danger of loss of control, vis-a-vis children, in much the same manner that complex cultures threaten adult control. Kroeber envisioned society in terms of super-organic systems surrounding the organic control possessed by individuals. Jackson envisions schools in extended political terms, where the power is a primary factor ruling on the relationship between children and the teaching institution.

School is also a place in which the division between the weak and the powerful is clearly drawn. This may sound like a harsh way to describe the separation between teachers and students, but it serves to emphasize a fact that is often overlooked, or touched upon gingerly at best. Teachers are indeed more powerful than students, in the sense of having greater responsibility for giving shape to classroom events, and this sharp difference in authority is another feature of school life with which students must learn how to deal.[14]

Defining the issue even more sharply, Jackson argues that individual behavior is not as important as the assumptions, made by others, about that behavior. In short, the child has to adjust to evaluation by others rather than a personal assessment of his own behavior.

Running through all of the above positions is the consideration of control in human behavior. Clearly, no individual can be held responsible for every aspect of his behavior, when so many lie outside the realm of self. In the extended environment he is subject to the super-organic functioning of culture; his own biological responses are both variable and not necessarily responsive to particular goal orientations; in his daily functioning he becomes overwhelmed by the mass of activity demanded of him, in which he has only the most minimal ego involvement; and, even in the most personal learning situations, he is subjected to political systems in which external evaluation is the critical variable. How then, can we hold children responsible for failure in systems, both physiological and man-made, which grant them only minimal control and responsibility. Would it not be both functionally and philosophically logical to evaluate the success or failure of the institutions and simply to identify the position and velocity of the child?

Failure as a Fixed Condition

There is little question that contemporary education and psychologists are well aware of the negative impact of failure on the learning organism. Both in theoretical developments and in the assessment of research data we have been alerted to the functional implications of failure as far as risk-taking is concerned, and the cybernetic implications relative to the breakdown of feedback channels. Valett went so far as to argue that Learning Disabled children had to be "carefully programmed" in order to insure success in the fact of their long history of failure. Newcomb, Turner and Converse were concerned about the effects of failure on the creativity of learning organisms, contending that the accumulation of failure taught the individual to view his own creativity as a form of deviance.[15] Allport summed up the problem by indicating that assessment of failure in effect was a way

[13]G.W. Allport, *Personality and Social Encounter* (Boston: Beacon Press, 1960), p. 187. (Boston: Beacon Press, 1960), p. 187

[14]P. W. Jackson, "Life in Classrooms," in *Current Perspectives in Social Psychology,* ed. E. P. Hollander and R. Hunt (3rd ed.; Oxford: Oxford University Press, 1971), p. 80.

[15]T. M. Newcomb, R. H. Turner, and P. E. Converse, *Social Psychology* (New York: Holt, Rinehart and Winston, 1965).

of identifying past adjustments. "While people are living their lives forward, psychologists are busy tracing them backwards."[16]

Although all of the references cited above and considerable additional body of general literature agree on the negative effects of failure, they equally agree that human failure *IS*. Under no circumstances do they examine the proposition that human failure *ISN'T*. As a result, the primary function of the educator and psychologist becomes one of inuring or insulating the child to withstand the effects of his own failure. More importantly, by identifying failure as the opposite of success, the cumulative effect is to increase the weight of failure over time since the more objectives we have to move towards (i.e., success), the higher the probability of experiencing some degree of non-success.

In the +/- mathematical model, the largest proportion of space is occupied by the minus (-) condition. We identify, usually within relatively narrow limits, the actions, behaviors, and solutions which are acceptable in the plus (+) portion of the model. We do not, however, have to identify non-acceptable behaviors because they are, in effect, identifiable by virtue of their not matching pre-set plus conditions.
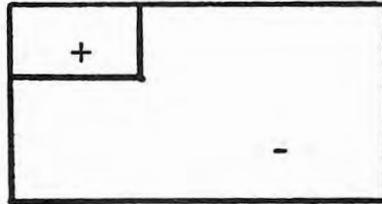

Figure I: +/- Universe

The more permissive, or flexible, the solution conditions, the larger the plus (+) proportion of the universe-and it is to this expansion of the + universe that much of the contemporary literature is addressed. In pragmatic terms, however, there is a degree of "cop-out" involved in accepting the model since no one can be held responsible for minus (-) conditions, i.e., failure, when they are organic affects of a universe which has closely defined plus (+) behaviors

Accompanying the issue of proportion in the model is exclusion. Inherent in a description of appropriateness is the exclusion of all other behaviors from the plus (+) evaluation. Certainly most achievement and skill-oriented measures posit exclusive plus (+) categories in the form of mental age, intelligence, skill levels, and the like. Yet, especially on the part of children, most learning behaviors (as opposed to test results) are a conglomerate of actions, some of which are interpretable in relation to an established objective, and some of which are unexpected, unique, and non-identifiable. In the +/- model, only those which relate to appropriate movement can be given a positive valence. The others may be either ignored or identified in negative terms. In any case, they are certainly excluded from the + condition. What is humanly disturbing is the possibility that, given the need for individuals and groups to function within systematic frameworks, children and adults grow dependent on precise interpretations of plus and minus behavior. Most of us can count, and we therefore, ultimately, develop high minus totals. We then must develop techniques for dealing with the imbalance between our plus and minus counts.

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[16]Allpost, p. 61.

Wouldn't it be marvelous if the minuses were really not minuses at all? Once we are willing to accept the fact that mathematical models are really culturally derived, we are free to challenge the Euclidian $+/-$ model which assigns maximum weighting to a minimum set of behaviors. We do not have to look far to find elements of mathematical language which allow us to identify the bulk of human behavior in terms more closely resembling reality, i.e., $\pm$ or $\overset{>}{=}$ or $\overset{<}{=}$. What we are simply stating with these three symbols is that most behaviors are a combination of precise and imprecise movements towards objectives ($\pm$) or behaviors leading to results beyond the original parameters of the objective and therefore easily misinterpreted ($\overset{>}{=}$) or behaviors deviating from expected solution paths which may or may not lead the organism to appropriate solution ($\overset{<}{=}$). It is remarkable that in these three symbols, the minus condition has been substantially limited, and only appears in conjunction with the plus ($+$). We would contend, however that these three symbols are more descriptive of learning behavior than is the $+/-$.

What is critical in the use of this symbolic language is a careful identification of behaviors which are absolutely *unacceptable* in each unique learning universe. The $+/-$ model demanded identification only of appropriate behaviors, leading to a categorization of all behaviors in (-) terms. Once we change the procedure and demand identification of (-) conditions, we are led to the recognition that (-) behaviors are, at the very most, as narrowly confined as ($+$) behaviors, with the bulk of human activity assignable to neither category.
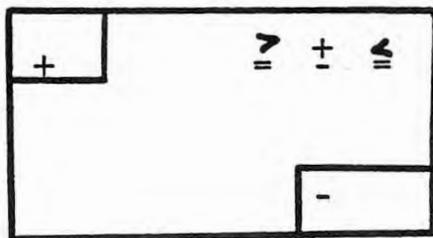

Figure II: Alternative Universe

In field observations, the authors have found that adults have difficulty defining the minus condition. When confronted by the necessity to indicate "absolutely unacceptable" behavior, they arrive at the conclusion that short of physically and emotionally destructive acts, they can not negatively categorize most of the approaches used by children at arriving at solutions. What comes to the surface is that most of the behaviors we have been used to identifying in minus (-) terms are, simply, non-plus. In other words, success and failure are not automatic antonyms. Rather, each is composed of a closely defined set of specifications. Perhaps most remarkable of all, is the feeling on the part of teachers[17] that most of the minus (-) defined conditions are a result of system failures rather than human inadequacy. Restated, teachers and parents are the first to recognize that there are very few (absolutely) wrong behaviors. Rather, many which were previously identified in these terms are, more accurately, either "a mixed bag" or simply not yet correct. Obviously, we begin to get process definitions rather than achievement statements.

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[17]The data at this moment are in the preliminary stages of investigation. For the Dworkin System see: Y. S. Dworkin and N. E. Dworkin, "Teacher Planning: A Function of Management," in *Proceedings of the 1974 Interdisciplinary Conference on Structural Learning,* ed. J. Scandura (Merge Press, 1974); Y. S. Dworkin, N. E. Dworkin, and B. Brown, "Information Flow in School Systems," in *Proceedings of the 1974 Conference of the American Cybernetics Society* (in press); Y. S. Dworkin and N.E. Dworkin, "A Teacher Planning System,"*1974 In-Service Continuing Program*(Prince Georges County,1974); and Y. S. Dworkin and N. E. Dworkin, "An Alternative to Achievement Testing," in *1975 Proceedings of the Interdisciplinary Conference on Structural Learning* (in press).

An Alternative Working Model

In relating the entire discussion to working with children, the question is whether alternative models have a functional utility, re: teaching techniques, classroom management, parental involvement, etc. At the very least, the +/- model does identify "no-no's". The problem is that since isolation of failure teaches the child only to avoid particular behaviors, there is very little direction given vis-a-vis the paths toward the (+) condition. The model given the child only eliminates, in theory, the repetition of error, and even here, research has indicated that negative knowledge of results is not even affective in terms of repetitive error avoidance. Kaess and Zeman have demonstrated that not only does negative knowledge of results lead to a higher incidence of group errors, but that negative information also ". . .makes it more likely that S will repeat the original error."[18]

In the alternative model, the objective of the teaching adult is to identify each "bit" of behavior or action that approaches the (+) condition. Thus, the learning organism is presented with a model of at least partially appropriate behavior rather than a model of avoidance. In essence, it is a method for increasing the possibility of positive knowledge of results through the process of the child's own behavior. Unlike the +/- model in which the child, following knowledge of results, still must search for appropriate paths — the alternative model identifies the appropriate paths traveled by the child.

What is perhaps most critical is the treatment of the (-) condition, even in the alternative model. Regardless of how positively teachers and parents function within a given system, repetitive non-success will still have an impact on the willingness to take risks. If the minus condition continues to be identified as an organic failure condition, there may still be a high correlation between an increase in the (-) condition and a parallel decrease in risk-taking. In the alternative model, however, the (-) condition is defined as system failure (i.e., a lack of fit between the child and the framework within which he is asked to operate). Consequently, the function of the adult is to identify those channels in the system which will help the child move towards the (+) condition. The critical path is movement *towards* the condition since this brings the child into the largest sector of the model ($\pm$, $\overset{\geq}{=}$, $\overset{\leq}{=}$) in which the child and the adult, in an interactive process, can identify models of appropriateness based on the child's own activity.

Summary Statement

The major contention of the authors is that failure is not an inherent organic condition in human growth. What we have traditionally defined as failure should really be viewed as two separate conditions. One is a continuous process in which success has not yet been achieved and the other is a system breakdown, in which fit between child and process channels must be redefined. Failure is no more sacrosant than is the mathematical model within which it has functioned. Accepting failure as a theorem has the effect of limiting the (+) or success sectors of the universe within which the child must operate. Expanding the universe of legitimate process between adult and child is entirely feasible if we are willing to develop alternative models in which appropriateness (+), uniqueness (>), and continuing search (<) are stressed. Aside from the descriptive precision of the alternative model, re: the process between adult and child, it has been the author's experience that concentration on the appropriate behaviors already exhibited by the child is a healthier approach (for both adult and child) than the accumulation of failure.

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[18]W. Kaess and D. Zeaman, "Postive and Negative Knowledge of Results on a Pressey-type Punchboard," *Journal of Experimental Psychology* 60 (1960): 15.

La planification académique et comportementale selon un nouveau modèle

L'article propose un univers différent dans lequel l'échec concernerait le système plutôt que d'être imputé à une difaillance humaine.

Le modèle présente le comportement couronné de succès comme une croissance de l'efficacité plutôt que comme un des termes de l'alternative +/- (bon/mauvais).

La planification est ccnsidérée comme une fonction de l'identification des comportements de la part de l'apprenant et ceux-ci peuvent être réutilisés pour la solution de problèmes futurs. En réalité, la solution des problèmes et l'échec ne font pas bon ménage.