

# Behaviorism and Developmental Approaches



A sampler of quotes and critiques

An extraordinary debate on the nature of learning, and ultimately on the nature of man, has waxed and waned throughout the 20th century. It has been by turns brilliant and bitter, lively and soporific, trail-blazing and a dead end. This eclectic collection of quotes may serve as an entree to the issues at stake, and lead the reader to some promising sources. Compiled by Pat Amos for The Autism National Committee.

## THE HISTORY OF A SCIENCE

"The time has come when psychology must discard all reference to consciousness...Its sole task is the prediction and control of behavior; and introspection can form no part of that method." John B. Watson in *Psychological Review*, Vol. 20 (1913), pp. 158-167.

"Historically, Behaviorism started as a reaction against the excesses of introspective techniques....At first its intention was merely to exclude consciousness, images and other non-public phenomena as objects of study from the field of psychology; but later on this came to imply that the excluded phenomena did not exist. A programme for a methodology, which had its arguable points, became transformed into a philosophy which had no point at all." Arthur Koestler, *The Ghost in the Machine*. NY: Random House (1967), p. 17.

"Nearly half a century has passed since Watson proclaimed his manifesto. Today, apart from a few minor reservations, the vast majority of psychologists, both in this country and in America, still follow his lead. The result, as a cynical onlooker might be tempted to say, is that psychology, having first bargained away its soul and then gone out of its mind, seems now, as it faces an untimely end, to have lost all consciousness." Sir Cyril Burt in *British Journal of Psychology*, Vol. 53, No. 3 (1962), p. 229.

"The rule or measuring rod which the Behaviorist puts in front of him always is: can I describe this bit of behavior I see in terms of 'stimulus and response?'" J.B. Watson, *Behaviorism*. London (1928), p. 6.

"It is in the nature of an experimental analysis of human behavior that it should strip away the functions previously assigned to autonomous man and transfer them one by one to the controlling environment." B.F. Skinner, *Beyond Freedom and Dignity*. NY: Alfred A. Knopf (1971), p. 198

"(Physiology) will explain why behavior is indeed related to the antecedent events of which it can be shown to be a function." B.F. Skinner, *Ibid.*, p. 195.

"The task of scientific analysis is not -- as Skinner believes -- to demonstrate that the conditions to which he restricts his attention fully determine human behavior, but rather to discover whether in fact they do (or whether they are at all significant), a very different matter...Surely no scientist would follow Skinner in insisting on the a priori necessity that scientific investigation will lead to a particular conclusion, specified in advance." Noam Chomsky, "Language and Freedom," in *The Chomsky Reader*. NY: Pantheon Books (1987), p. 161.

"...(psychology) must venture beyond the conventional aims of positivist science with its ideals of reductionism, causal explanation, and prediction. The three need not be treated like the Trinity. For when we deal with meaning and culture, we inevitably move toward another idea. To reduce meaning or culture to a material base, to say that they "depend", say, on the left hemisphere, is to trivialize both in the service of misplaced concreteness. To insist upon explanation in terms of 'causes' simply bars us from trying to understand how human beings interpret their worlds and how we interpret their acts of interpretation. And if we take the object of psychology (as of any intellectual enterprise) to be the achievement of understanding, why is it necessary under all conditions for us to understand in advance of the phenomena to be observed -- which is all that prediction is? Are not plausible interpretations preferable to causal explanations, particularly when the achievement of a causal explanation forces us to artificialize what we are studying to a point almost beyond recognition as representative of human life?

The study of the human mind is so difficult, so caught in the dilemma of being both the object and the agent of its own study, that it cannot limit its inquiries to ways of thinking that grew out of yesterday's physics. Rather, the task is so compellingly important that it deserves all the rich variety of insight that we can bring to the understanding of what man makes of his world, of his fellow beings, and of himself. That is the spirit in which we should proceed." Jerome Bruner, *Acts of Meaning*. Cambridge, MA: Harvard University Press (1990), p. xiii.

"We can get a taste of the explanatory force of Skinner's theory from such (quite typical) examples as these: a pianist learns to play a scale smoothly because 'smoothly played scales are reinforcing' (p. 204, *Beyond Freedom and Dignity*); 'A person can know what it is to fight for a cause only after a long

history during which he has learned to perceive and to know that state of affairs called fighting for a cause' (p. 190); and so on.

Similarly, we can perceive the power of Skinner's behavioral technology by considering the useful observations and advice he offers: 'Punishable behavior can be minimized by creating circumstances in which it is not likely to occur' (p. 64); 'if a person is strongly reinforced when he sees other people enjoying themselves...he will design an environment in which children are happy' (p. 150); if overpopulation, nuclear war, pollution and depletion of resources are a problem, 'we may then change practices to induce people to have fewer children, spend less on nuclear weapons, stop polluting the environment, and consume resources at a lower rate, respectively' (p. 152).

The reader may search for more profound thoughts than these. He may seek, but he will not find." Noam Chomsky, *Ibid.*, pp. 174-175.

"Behaviorism is indeed a kind of flat-earth view of the mind." Arthur Koestler, *Ibid.*, p. 17.

#### ON MIND AS COMPUTER

"(After World War II) 'Mind' remained a forbidden four-letter word in mainstream psychology, to be dealt with (if at all) in quotation marks, whether in voice intonation at symposia or in the inverted commas of print. The methodology of 'scientific psychology' grew stricter and more puritan by the year...

Then, in the late 1950s, came what today is called the cognitive revolution. Psychologists like Herbert Simon and George Miller and linguists like Noam Chomsky devoted themselves not to their subjects' overt, objective responses, but rather to what they knew, how they acquired knowledge and used it. The emphasis shifted from performance (what people did) to competence (what they knew). And this inevitably led to the question of how knowledge was represented in the mind. Could you simulate the mind's knowledge with a computational program (as Simon was attempting to do) or with a theory of mental organization (as Piaget was doing)? 'Mind' was being reintroduced into psychology... " Jerome Bruner, *Actual Minds, Possible Worlds*. Cambridge, MA: Harvard University Press (1986), p. 94.

"Information processing inscribes messages at or fetches them from an address in memory on instructions from a central control unit, or it holds them temporarily in a buffer store, and then manipulates them in prescribed ways: it lists, orders, combines, compares precoded information. The system that does all of these things is blind with respect to whether what is stored is words from Shakespeare's sonnets or numbers from a random number table....information processing cannot deal with anything beyond well-defined and arbitrary entries that can enter into specific relationships that are strictly governed by a

program of elementary operations." Jerome Bruner, *Acts of Meaning*. Cambridge, MA: Harvard University Press (1990), p. 5.

"This new reductionism provided an astonishingly libertarian program for the new cognitive science that was being born. It was so permissive, indeed, that even the old S-R learning theorist and associationist student of memory could come right back into the fold of the cognitive revolution so long as they wrapped their old concepts in the new terms of information processing." Jerome Bruner, *Ibid.*, pp. 6-7.

#### ON REDUCTIONISM

"The solution to the issue of universals lies in exposing a widely held and rather old-fashioned fallacy that the human sciences inherited from the nineteenth century, a view about the relation between biology and culture. In that version, culture was conceived as an 'overlay' on biologically determined human nature. The causes of human behavior were assumed to lie in that biological substrate. What I want to argue instead is that culture and the quest for meaning within culture are the proper causes of human action.. The biological substrate, the so-called causes of human action, is not rtf cause of action but, at most, a constraint upon it or a condition for it. The engine in the car does not 'cause' us to drive to the supermarket for the week's shopping..." Jerome Bruner, *Ibid.*, pp. 20-21

"The attempt to reduce the complex activities of man to the hypothetical 'atoms of behavior' found in lower mammals produced next to nothing that is relevant -- just as the chemical analysis of bricks and mortar will tell you next to nothing about the architecture of a building. Yet throughout the dark ages of psychology most of the work done in the laboratories consisted of analyzing bricks and mortar in the hope that by patient effort somehow one day it would tell you what a cathedral looked like." Arthur Koestler, *Ibid.*, p. 9.

"Once the psychologist discovers the principles of learning for simpler phenomena under the more ideal conditions of the laboratory, it is likely that he can apply these principles to the more complex activities as they occur in everyday life. The more complex phenomena are, after all, nothing but a series of simpler responses." Calvin, A.D., *Psychology*. Boston (1962), p. 376-78.

"The S-R scheme discards a large part of behavior which is an expression of autonomous activity: play, exploratory behavior, any form of creativity." Ludwig von Bertalanffy, *Robots, Men and Minds*. NY: George Braziller (1967), p. 10.

"It is the zoomorphic or rattomorphic fallacy -- the expressed or implicit contention that there is no essential difference between rat and man -- which makes American psychology so profoundly disturbing." Ludwig von Bertalanffy, *Ibid.*, pp. 15-16.

## ON MEASURING

"Now obviously, research on anything will yield findings that mirror its procedures for observing or measuring. Science always invents a conforming reality in just that way. When we `confirm' our theory by `observations,' we devise procedures that will favor the theory's plausibility." Jerome Bruner, *Ibid.*, p. 104.

"The first step to understanding friendships of persons with developmental disabilities is to develop a practical, meaningful, and measurable or observable definition of friendship. Defining friendships has proven to be a challenging endeavor for researchers...Currently, there are two common methods that are used to assess relationships among children: sociometric assessment techniques and behavioral observation." Christine M. Hurley-Geffner, "Friendships Between Children with and without Developmental Disabilities," in *Teaching Children with Autism*, ed. Koegel and Koegel. Baltimore: Brookes Publishing (1995), p. 120.

"Let us face the fact: a large part of modern psychology is a sterile and pompous scholasticism which, with the blinders of preconceived notions or superstitions on its nose, doesn't see the obvious; which covers the triviality of its results and ideas with a preposterous language bearing no resemblance either to normal English or normal scientific theory; and which provides modern society with the techniques for the progressive stultification of mankind." Ludwig von Bertalanffy, *Ibid.*, p. 6.

## ON BEHAVIOR AS RESPONSE TO ENVIRONMENT

"Psychology, in the first half of the twentieth century, was dominated by a positivistic-mechanistic-reductionistic approach which can be epitomized as the robot model of man. Notwithstanding the great differences in theories such as psychoanalysis, classical and neobehaviorism, learning theory, `thinking machines' and the simulation of behavior by computers, they all shared a basic conception which served as an a priori framework for experimental and clinical research, theory, psychopathology, psychotherapy, etc. It is important to identify this predominant ideology.

Basic for the (behaviorist) interpretation of animal and human behavior was the stimulus-response scheme or, as we may also call it, the doctrine of the primary reactivity of the psychophysiological organism. Behavior is response to stimuli coming from outside...So far as it is not innate or instinctive, behavior is shaped by outside influences that have met the organism in the past: classical conditioning after Pavlov, instrumental conditioning after Skinner, early childhood experience after Freud, secondary reinforcers after more recent theories." Ludwig von Bertalanffy, *Ibid.*, pp. 7-8.

"Applied Behavior Analysis employs methods based on scientific principles of behavior to build socially useful repertoires and reduce problematic ones...The

behavior analytic view is that autism is a syndrome of behavioral deficits and excesses that have a neurological basis, but are nonetheless amenable to change in response to specific, carefully programmed, constructive interactions with the environment." Gina Green, *Behavioral Intervention for Young Children with Autism*. Texas: Pro-ed (1996), pp. 29-30.

"Consider Skinner's claim that 'we sample and change verbal behavior not opinions' (so a behavioral analysis reveals) (p. 95, *Beyond Freedom and Dignity*). Taken literally, this means that if, under a credible threat of torture, I force someone to say, repeatedly, that the Earth stands still, then I have changed his opinion. Comment is unnecessary, and we perceive at once the significance of the behavioral analysis that yields this conclusion." Noam Chomsky, *Ibid.*, p. 170.

"The image of man as robot is a projection into science of the Zeitgeist of the period, as, in the last resort, all basic theoretical notions are. Man as a machine that can be programmed; all those machines equal like automobiles coming from the assembly line; equilibrium or comfort as ultimate value; behavior as a business transaction with minimum expense and maximum gain -- this is a perfect expression of the philosophy of commercial society. Stimulus-response, input-output, producer-consumer are all the same concepts, only expressed in different terms. " Ludwig von Bertalanffy, *Ibid.*, p. 12.

"Few readers will be shocked by the news that extrinsic motivators are a poor substitute for genuine interest in what one is doing. What is likely to be far more surprising and disturbing is the further point that rewards, like punishments, actually undermine the intrinsic motivation that promotes optimal performance.... " Alfie Kohn, *Punished By Rewards*. NY: Houghton Mifflin (1993), p. 68.

"The first explanation (of why rewards undermine motivation) has an appealing simplicity to it and seems to make sense on the basis of our real-life experience: anything presented as a prerequisite for something else -- that is, as a means toward some other end -- comes to be seen as less desirable. 'Do this and you'll get that' automatically devalues the 'this'." Alfie Kohn, *Ibid.*, p. 76.

"Even people can be devalued (as Kant realized) if human interaction is seen as a means to some other end. When children were invited to play with someone else in order that they might have access to one of that child's toys -- or, in another study, when they were offered cookies for playing with a partner -- they were less interested in future interactions with the other child." Alfie Kohn, *Ibid.*, p. 77.

"It is well to realize both the power and the limits of manipulating psychology and behavioral engineering. If you manipulate a dog according to Pavlov, a rat

according to Skinner, a cat according to Thorndike, you will obtain the results described by those authors. That is, you select, out of their behavioral repertoire, such responses as may be controlled by punishment or reward, you make the animals into stimulus-response machines or robots. The same, of course, is true of humans." Ludwig von Bertalanffy, *Ibid.*, p. 13.

"We do know that certain basic processes work for all persons and that a working knowledge of these processes is essential for providing effective help. One such procedure, or principle, used for providing help is the pleasure-pain principle, which is infinitely better understood today than when first proposed by the Greeks. This principle was renamed learning by trial and error, and later called The Law of Effect and instrumental learning. Today most persons refer to this principle as operant conditioning and the application of that principle as behavior modification or applied behavior analysis. In psychology and education, operant conditioning may well be like the principle of gravity in physics. We all know about gravity, but you need to know it in detail to transport a person to the moon." O. Ivar Lovaas, *The ME Book*. Texas: Pro-Ed (1980), p. 3.

"Werner Heisenberg... has laconically declared: 'Nature is unpredictable'; it seems rather absurd to deny the living organism even that degree of unpredictability which quantum physics accords to inanimate nature." Arthur Koestler, *Ibid.*, p. 17.

"A 'response', the layman would imagine, is an answer to a stimulus; but 'operant responses' are 'emitted' to produce a stimulus which occurs after the response; the response 'acts upon the environment in such a way that a reinforcing stimulus is produced' (B.F. Skinner, *The Behavior of Organisms*, p. 22). In other words, the response responds to a stimulus which is still in the future -- which, if taken literally, is nonsensical. An 'operant response' is not in fact a response, but an act initiated by the animal; but as organisms are supposed to be controlled by the environment, the passive term response is mandatory in the entire literature." Arthur Koestler, *Ibid.*, p. 12.

"Laws of learning apply to individuals with deviant organic structure as they do to individuals with less deviant structure." O. Ivar Lovaas, *Ibid.*, p. 2.

"These programs start out with the most simple tasks, such as how to teach a child to sit in a chair, how to help him attend to his teacher, and how to better manage disruptive behaviors....

Developmentally disabled persons have to work particularly hard. Their work is to learn, your job is to teach. The responsibility is shared. With responsibility, the developmentally disabled individual takes on dignity and 'acquires' certain basic rights as a person....They have no right to act bizarrely, many professional opinions notwithstanding. On the contrary, you have a right to

expect decent behavior from your children. If you work hard for your child, he should be grateful, work hard, and show affection to you in return. You have to teach him that, and the programs in this book will help you do so." O. Ivar Lovaas, *Ibid.*, p. 5.

"Consider as an example (of behavior shaping) teaching your child to say 'mama.' You may begin by breaking this word down into two sounds separated by a pause. You may further break down the two sounds into their component parts, teaching your child to first say 'MM' and then 'ah.' The sound 'mm' can also be broken down into two behaviors; pressing your lips together and vocalizing while your lips are together. You may initially reward the child for an approximation of the sound 'mm,' that is reward him when he closes his lips in preparation for making the sound, even if he does not yet vocalize (his 'mm' is voiceless). Once he is to the point that he makes this sound readily (perhaps in imitation of your closing your lips), you begin working on the second part of the behavior, that is, vocalizing. Perhaps it will be necessary to 'prompt' him. In any event, you reward him only after he closes his lips and vocalizes. Once he has that behavior, start rewarding him for saying 'ah.' Then put the two sounds together; 'mah.' When he can say 'mah,' then insist that he say the sound twice before he is rewarded; in this way you have built or shaped the behavior (saying 'mama') using the technique of rewarding successive approximations of the target behavior." O. Ivar Lovaas, *Ibid.*, p. 20.

"For Skinner, what we call 'knowledge of French' is a 'repertoire acquired as a person learns to speak French' (p. 197, *Beyond Freedom and Dignity*)....But what does it mean to say that some utterance of English that I have never heard or produced belongs in my 'repertoire'...? Noam Chomsky, *Ibid.*, p. 164.

"A trial can be thought of as a single teaching unit. It starts with the teacher's instructions and ends with the child's response, or failure to respond. Failure to respond may be defined as no response within 3 to 5 seconds following the teacher's instructions...The instructions for the trials have to be paced or timed correctly. Koegel, Russo, and Rincover (1977) referred to this aspect of training as the discrete trial procedure. The intent is to present your instructions and the training material clearly, concisely, and discriminably, that is, in a neat little package with a definite start and a definite conclusion." O. Ivar Lovaas, *Ibid.*, p. 21.

"Thus, for many behavior analysts, the focus of behavioral intervention plans has become the elimination of maintaining contingencies and the teaching and reinforcing of adaptive replacement behaviors... The ability to determine the function a problematic behavior is serving assists in the identification of skill deficits and in the design of a behavioral intervention that emphasizes the teaching of positive replacement behaviors. Such proactive interventions, often referred to as behavior support strategies... are reflective of a developing movement for creating positive approaches that address global lifestyle

concerns of people with disabilities...and a move away from simply targeting for elimination unwanted behaviors.

It is apparent that an ability to identify the functional relationships between target behaviors and the variables present in the individual's environment is critical for such proactive intervention strategies." Kimberly Mullen and William Frea, "A Parent-Professional Consultation Model for Functional Analysis", *Teaching Children with Autism*, ed. Koegel and Koegel. Baltimore: Brookes Publishing (1995), pp. 178-179.

#### ON SYSTEMS OF CONTROL

The intentional design of a culture and the control of human behavior it implies are essential if the human species is to continue to develop. Neither biological nor cultural evolution is any guarantee that we are inevitably moving toward a better world." B. F. Skinner, *Ibid.*, p. 175.

"The principle of making the controller a member of the group he controls should apply to the designer of a culture." B. F. Skinner, *Ibid.*, p. 172.

"To be effective, Applied Behavior Analysis treatment must be delivered by individuals with extensive training in the methods, ideally under the ongoing supervision of professionals who have advanced training and experience in Applied Behavior Analysis principles and methods." Gina Green, *Ibid.*, p. 42.

"In human service systems, an obvious application of group contingencies is the delivery of rewards to intervention agents when clients for whom they are responsible display favorable behavior change. For example, when John learns to tie his shoes, both John and his teacher receive special rewards and recognition. It appears to be less obvious (or at least, it is less often observed in practice) that when John's teacher masters specified intervention skills, both she and her trainer should receive professional rewards. And it is still less evident (and rarely mentioned) that administrators' professional rewards should be contingent upon the measurable successes of trainers, trainees, and clients.

Yoking the reinforcement contingencies of all of the participants in a human service organization is a systems design that supports clients' progress. Unfortunately, such group contingencies can be vitiated by tenure systems, unions, and ambiguous lines of authority and responsibility." L.E. McClannahan and P.J. Krantz, "On systems analysis in autism intervention programs," *Journal of Applied Behavior Analysis*, 26 (1993), 589-596.

"In fact, there is nothing in Skinner's approach that is incompatible with a police state in which rigid laws are enforced by people who are themselves subject to them and the threat of dire punishment hangs over all." Noam Chomsky, *Ibid.*, p. 177.

"Cui bono? -- Who benefits? -- is always a useful question to ask about a deeply entrenched and widely accepted practice. In this case (of behavior modification via rewards) it is not merely the individual rewarder who comes out ahead; it is the institution, the social practice, the status quo that is preserved by the control of people's behavior. A pair of psychologists who reviewed token economies and similar plans in classroom settings observed that those peddling such systems 'have used their procedures to serve the goals and value of the existing school system.' More generally, these psychologists encourage us to ask, 'To what extent is behavior modification...helping the existing institutional system achieve its present goals, e.g. goals of control for the sake of control, order and (misleading) tranquility, thus preventing rather than producing needed change?' " Alfie Kohn, *Ibid.*, p. 29.

#### ON TERMINOLOGY

"...it is no wonder that we can 'explain' behavior by using the nontechnical term 'reinforce' with the full range of meaning of 'like' or 'enjoy' or 'learn something from' or whatever....But it is important to bear in mind that this system of translation leads to a significant loss of precision, for the simple reason that the full range of terms for the description and evaluation of behavior, attitude, opinion, and so on must be translated into the impoverished system of terminology borrowed from the laboratory (and deprived of its meaning in transition)." Noam Chomsky, *Ibid.*, p. 172.

"A widely acclaimed but seldom utilized method of teaching generalization and maintenance is to introduce the child to the positive contingencies that naturally consequate appropriate behavior in integrated environments....For example, a woman with severe disabilities who masters the language and social skills necessary to buy and ice cream cone is naturally reinforced for using her newly learned skills when she receives the ice cream. " Robert Koegel, Lynn Kern Koegel, and Deborah Parks, "'Teach the Individual' Model of Generalization: Autonomy Through Self-Management," *Teaching Children with Autism*, ed. Koegel and Koegel. Baltimore: Brookes Publishing (1995), pp. 68-69.

"Skinner confuses science with terminology. He apparently believes that if he replaces commonplace 'mentalist' expressions with terminology drawn from the laboratory study of behavior, but deprived of its precise content, then he has achieved a scientific analysis of behavior. It would be hard to think of a more striking failure to comprehend even the rudiments of scientific thinking." Noam Chomsky, *Ibid.*, p. 182.

#### ON PAST ACCOMPLISHMENTS

"The discipline of Applied Behavior Analysis is based on more than 50 years of scientific research and evolves continually as new evidence emerges." Gina Green, *Ibid.*, p. 31.

"The body of research on early behavioral intervention for autism is quite small, and many important questions remain to be answered." Gina Green, *Ibid.*, p. 38.

"Behavioral intervention is a 'package' treatment with many elements and dimensions...The only published, comprehensive package of procedures and skill sequences for teaching young children with autism is *The ME Book* (Lovaas et al., 1981)." Gina Green, *Ibid.*, p. 40.

"The record of fifty years of ratomorphic psychology is comparable in its sterile pedantry to that of scholasticism in its period of decline, when it had fallen to counting angels on pin-heads -- although this sounds a more attractive pastime than counting the number of bar-pressings on the box." Arthur Koestler, *Ibid.*, p. 18.

#### ON POSSIBLE FUTURES

On the "three modern titans of developmental theory -- Freud, Piaget, and Vygotsky" (p. 136): "If for Freud the key lay in the informed struggle against the past, for Piaget it was in the appropriate nourishment of the present....For Piaget, growth happened naturally. To ask how one can hasten it was to ask 'la question americaine.' The drama consisted in honoring its natural growth, not in comparing its present status with what it would later be or might become.... It is this respectful explication of the self-sufficiency and dignity of the child's mind in terms of its own logic that is now finding its way into canonical forms of the culture. It has begun to have a profound effect on common sense education. Piaget's motto, 'To learn is to invent,' may yet alter the view that to teach is simply to transmit, to fill a vacuum....For (Vygotsky), the mind grows neither naturally nor unassisted. It is determined neither by its history nor by the logical constraints of its present operations. Intelligence, for him, is readiness to use culturally transmitted knowledge and procedures as prostheses of mind. But much depends upon the availability and the distribution of those prosthetic devices within a culture. Vygotsky is a growth theorist whose ideas could serve liberation ideology..." Jerome Bruner, *Actual Minds, Possible Worlds*. Cambridge, MA: Harvard University Press (1986), p. 141.

...I contrast an objectivist perspective on individuals and their development with a relational perspective. The objectivist tradition of Plato and Descartes is the basis of our current scientific methodologies. It is the view that perceptions and cognitions are characterized by their contents, contents that are a more or less direct copy of the way the world is structured. The cognitive contents are believed to be freed from the context in which one learns about the world....

I believe that cognition and perception are not mirrors of reality, but relational processes that reflect the ways in which we have experienced the world. Our initial cognitions and memories are in the form of direct action procedures, as

the Swiss epistemologist and developmental psychologist Jean Piaget pointed out....

To continue treating the mind as a disembodied relationless computational machine, as an objective thing inside the head, is to be blind to the evidence of one's own cognitive experience." Alan Fogel, *Developing Through Relationships*. Chicago: University of Chicago Press (1993), p, 4.

"From a dynamic point of view, therefore, the developmental questions are not what abilities or core knowledge infants and children really 'have' or what parts of their behavior are truly organic or genetic but how the parts cooperate to produce stability or engender change....Knowing when systems are in transition is important because theory predicts that interventions can only be effective when the system has sufficient flexibility to explore and select new solutions. For developmentalists interested in providing effective and appropriate interventions for children who are at physical, emotional, or social risk, knowing that a certain trait is 25% heritable is of little use. Instead, the therapist needs to know the history of the system in all its richness and complexity, its current dynamics, and how the interventions can disrupt the stability of the current dynamics to allow new and better solutions to emerge."

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