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Language is not an instrument of communication between speaker and hearer, it is their communication--their transaction--as speaker and hearer.

A corollary of the constant code of the linguists is that the forms of language are not altered by the meanings of the speakers, and the forms themselves do not properly "mean" anything. But it can be shown that forms and meanings continually affect one another. In my opinion, these linguists do not understand how language has meaning. Meaning is the end-in-view of speaking and hearing; it is not something extrinsic to speech. Meaning is not thoughts or purposes in the heads of speakers, and it is not, as Bloomfield said, the relation of events prior to their speaking and consequent to their speaking. Meaning is what needs to be said in coping with the actual situation of the speaker and hearer, so far as it can be done by saying. Meaning is not conveyed by speech or pointed to by speech; it is speaker and hearer making sense to one another in a situation. (p. 34)

Again and again I find myself dissenting from the main line of the scientific linguists of the past fifty years--the anthropologists, the positivists, and the structuralists.... It seems to me that in abstracting language from speaking and hearing in actual situations, they make three fundamental, and connected mistakes: (1) they exaggerate constancy and supra-individuality as against the variability and interpersonality of natural language; the "language" that they discuss, with its constant forms and self-contained rules, is sometimes an artifact of their method of investigation. (2) They say that the forms of language can rarely, if ever, be explained by meanings in experience and practical use, and the forms themselves do not have meaning. (3) They have a disposition to treat language and communication as a calculus of forms and processing of information that could dispense with human speakers and hearers altogether. (p. 86-87)

We cannot use words to cope unless we believe in their meaning and assert it, and this belief depends on utterance, grammar, history, the existence of speakers and hearers. Conversely, we cannot finally describe a language, its pronunciation, grammar, and meaning of words, unless we take into account its uses in speaking.... (p. 85)

Paul Goodman: SPEAKING AND LANGUAGE:
DEFENSE OF POETRY, Random House, 1971

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THE AGORA

A new book by J. R. Kantor, PSYCHOLOGICAL LINGUISTICS, comes at a time when this topic has become of interest to psychology and has also produced some major controversies. His OBJECTIVE PSYCHOLOGY OF GRAMMAR published in 1936 was decades ahead of the field--as were several of the areas with which he dealt--and thus received little attention. There is no way yet of knowing whether this latest work will fair any better but at least the chances seem better. Perhaps one of the most outstanding features of the book is the way in which the author has shown the integral nature of language interbehaviors with all other interbehaviors. Numerous diagrams of various types of language situations help to clarify them. This book, as we would expect from its author, is completely consistent with a naturalistic field approach to psychological behavior. As an alternative to the tired old assumptions about language round which many of the debates continue to circle, this work is refreshing. It never departs from an observational base; its constructs are always descriptions of actual events. The book is a culmination of writings on psycholinguistics that began in 1922 that have consistently satisfied the insightful criticisms and criteria of the quoted passages from Paul Goodman. These works have been ignored far too long. This book deserves wide attention.

Steven Brown has started a publication entitled Operant Subjectivity: The Q Methodology Newsletter. It is actually closer to a journal style of publication than of a newsletter. Volume 1, Number 1, 1977 is dated October 1977. Readers might wish to refer to 1972, 3(2) and 1972, 3(3) of these pages for information about Brown's work and that of William Stephenson. There is a close kinship with interbehaviorism. Subscriptions to Operant Subjectivity are, per year, \$5 for individuals, \$7 outside US and Canada, \$7 for libraries and institutions. Address: Steven R. Brown, Editor, Operant Subjectivity, Political Science Department, Kent State University, Kent, Ohio 44242.

The Archives of the History of American Psychology announces its annual Research Fellowship. A stipend of \$500 will be awarded. This is considered as aid to a scholar wishing to utilize the primary resources of the Archives of the History of American Psychology. The stipend is intended to defray travel and research expenses and the recipient is expected to reside in Akron while using the materials of the Archives. Candidates should submit a prospectus of the work planned, a vita, and two letters of recommendation. It is particularly important that there be evidence that the Archives is the most suitable place for the work to be undertaken. Preference will be given to advanced graduate students and younger post doctoral scholars. Applications should be completed by March first. The award will be announced not later than April 15th and will be in effect until December 31, 1978. Applications should be sent to the chairman of the University of Akron awards committee: Mr. John V. Miller, Jr., Director of Archival Services, University of Akron, Akron, Ohio 44325.

A recent book of interest: N. J. Block & Gerald Dworkin: THE IQ CONTROVERSY: CRITICAL READINGS, New York: Parthenon Books, 1976. The book presents papers giving various arguments as well as extended debates with rebuttals and counter-rebuttals. The final chapter by the editors is called "IQ, Heritability, Inequality" and is an excellent

analysis of the various assumptions, their relation to empirical data, and their logical consequences. The social implications are also discussed. Block and Dworkin find major errors in the works of Jensen and Herrnstein whose works are among those offered in the volume. An article by Mary Jo Bane & Christopher Jencks, "Five Myths About Your IQ" maintains a few myths itself but on the whole offers a very readable account of major myths that educators, social reformers, students, the public, and researchers as well would do well to examine.

We have received three comments on information that appeared in the preceding issue. One is from William Stephenson concerning Cyril Burt:

I was Cyril Burt's assistant and colleague during the early years of his professorship at University College, London (during the years 1928-37), and although Burt's early work on the intelligence-heredity problem preceded my appointments, I remain one of the last of those in psychology who knew him well as a colleague during those years, in relation to heredity and related aspects of his work. I have so far not made public my views on the fraudulency with which Burt has been charged--the matter is sad and more complex than headlines and brief abstractions afford--but I would ask for compassion until the story is fully told.

An example of the necessity for this has reference to your Quarterly's note on Burt in Volume 7, No. 3, 1976-7: it is true that Burt's work was used to support those who framed the Education Act of 1944 in Britain, which in effect saved many Public Schools (i.e. private schools in England) from near bankruptcy, and which creamed off some fifteen percent of eleven-year-olds in England for Grammar Schools, leaving the rest to ill-supported elementary schools. Burt himself, however, did not support this drastic and unwarranted division; and I myself wrote strongly against the assumptions and provisions of the Act in my Testing Schoolchildren (Longman Green, 1948), recommending the American system of high schools, which is now (1976) being adopted in Britain.

This example, of an all-too-easy assumption of personal accountability, in no way changes the matter of professional blame. Burt's rigid acceptance of psychometry based on the assumption of the objectivity of individual differences, was a serious mistake, not to be expected of a scholar so well versed in the metaphysics and logic of modern science. But Burt was not alone in this, since almost all psychometrists then, and still now, suffer the same lapsus intelligentiae. At the same time, as some readers of this note may guess, I was warning Burt of his mistake--to no avail, of course. In passing, however, I hope that psychologists will not color Burt all black, with fraud as the pencil, forgetful of his prolific, creative contributions to educational psychology in the early decades of this century. And incidentally, Burt's knighthood was in recognition of the contributions made by psychologists to the war effort, rather than to Burt alone.

A second comment is from Ken Pearce who teaches in a private (what we call "public") school in England:

There has been a complaint recently in Britain that the Open University is "infested" with Marxists. In reading Professor Steven Rose's comments on the desire of the guardians of the status quo to believe in the established tripartite system, it is easy to understand why complaints arise--: even in the late 20th century the voice of dissent is interpreted by some as being evidence of dissolute

tendencies in society. Of course, those who dislike reading the evidence of Burt's falsification of "research" data are those who would seek to perpetuate the order established by that data, and it is my unfortunate duty to point out that we still have schools operating under the old "tripartite" system, as grammar, technical, or secondary schools!! Indeed, I am now working in a school of the latter type and am constantly enraged by the comments of some other members of the staff who still talk as if the 11+ IQ tests were infallible. (In that part of Lincolnshire in which I teach the IQ test is still used to determine which type of school is "appropriate" for the children of that area!) I am filled with hope for the future when I read extracts from world sources in your publication; at least some of the people will eventually perceive the issue to be wider than they presently consider it to be.

The third comment is from Jim McKearney regarding the note by Zeiser and Heyduk:

In all fairness, I think it should be noted that the brand of "behaviorism" they discuss is Watsonian in character (or at most what Skinner has called "methodological behaviorism"). Skinner takes great pains to stress that "covert" events cannot be excluded from analysis; indeed, this forms part of the basis for his separation of methodological from radical behaviorism. Similarly, he cannot be identified with the position that behavior is an "action-reaction" process in which environmental stimuli elicit specific responses. Further, he has consistently emphasized the functional importance of the stimulus and response as opposed to their physical or topographical nature. I agree with your statement that behaviorists and interbehaviorists are allied; on the other hand, it would be unfortunate if an oversimplification of behaviorism, or its exclusive identification with the naive variety of Watson and Hull, were to create or perpetuate a spurious conflict between the two. Nothing in Skinner's radical behaviorism is in conflict with the emphasis of interbehaviorism. Instead, the interbehavioral approach is more comprehensive, and calls attention to more of the important determinants of behavior than Skinner explicitly emphasizes.

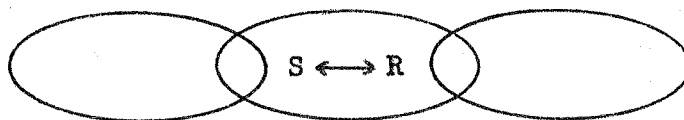
In the preceding issue the editor announced that he was seeking a new editor to take over the Quarterly. He was fortunate in persuading Ronald G. Heyduk to assume these duties beginning in 1978. A message from the editor-elect informs us that the Interbehavioral Quarterly will become The Interbehaviorist beginning in its ninth year and eighth volume. It will originate from the Department of Psychology, Kenyon College, Gambier, Ohio and thus will share the same home as the Psychological Record. Associate editors will include the present editor and founder, Noel W. Smith; Donna Cone who will continue; and Paul T. Mountjoy who will be newly joining but who has made contributions from time to time throughout the past. Attendant upon these administrative changes will be several other changes, including the new title, new "journal-style" format, and probably a new "face sheet" design. Such changes will be more cosmetic than substantial: The Interbehaviorist will continue to provide a forum for the exchange of information and ideas concerning the development of objective psychology. As before, the endeavor will be to scrutinize modern empirical and theoretical psychology, separating events from what is cultural imposition, and offering alternatives when necessary in an effort to encourage a naturalistic psychology, that of a field of interbehaviors. Your continued support and contributions are requested in order that The Interbehaviorist can attempt to provide a continuing intellectual stimulus.

As a feature article we present another translation from André Tilquin's LE BEHAVIORISME. The style of writing in this section of the book was particularly difficult to work with. It uses extremely lengthy sentences with series of appositional clauses and numerous indefinite pronouns whose referents are often difficult to determine. The translation attempts to break up some of the sentences into shorter ones, smooth out others, and write in some of the referents for the pronouns. The reader will still find much of the writing problematical but to do more with the translation would require entirely recomposing it. As for substance, the interbehaviorist will find much to disagree with. The editor felt that the selection was worth presenting in these pages because of the fact that it does address interbehavioral concepts however poorly: it seems important to understand what is being perceived and misperceived about interbehaviorism and to be apprised of counter-arguments. As this selection is one of a limited number of commentaries on Kantor's works (it also includes other writers, especially Tolman) we are making it available to our readers. The topic is operationism. For the reader who may wish to consult interbehavioral writings on operationism the following list is offered:

Cone, D. M. Comment: Operationism vs. operational definition. Interbehavioral Quarterly, 1975, 6(3), 3-4.

Kantor, J. R. The operational principle in the physical and psychological sciences. Psychological Record, 1938, 2, 1-32.

Moore, J. On the principle of operationism in a science of psychology. Behaviorism, 1975, 3, 20-138.



Le Behaviorisme Origine et Développement de la
Psychologie de Réaction en Amérique

(The Origin of Behaviorism and Development of Psychology of Reaction in America)

André Tilquin

Paris: Librairie Philosophique, 1942

Translated by Lucien Leduc and Venice Sakell

Behaviorism and Operationalism

If a truly epistemological dualism is implied somewhere it is in the concept of Kantor, in that of Tolman, and in that of Bridgman himself. Kantor may well consider sensible qualities as objectives, as properties of objects that are independent of the actions and reactions of the subject, and as a psychologist study the interbehavior of organisms with such concrete objects. But then, either the knowledge is interbehavior, an operation, in which case the sensible qualities can be defined only by those operations, or else the sensible qualities are independent of operations. In the latter case one must admit, along with a knowledge that is interaction and that ends up in constructions, another knowledge concerning the sensible qualities, which it is very difficult to characterize in Kantor's system. But at least one can say that it provides us with givens, crude data. This is what is commonly known as immediate experience. To call the contemplation of these qualities an operation constitutes an obvious abuse of the word. There would be an operation if there were a discriminative response. But if the known quality is other than a discriminative response, one must necessarily admit, along with a knowledge by way of operations of constructs, a direct knowledge of data.

The same epistemological dualism is implied in most of the psychological operationalisms which we have cited: the object or event possesses properties that are immediately given, but its scientific definition is made not in terms of its properties but in terms of the operations executed upon it. One then admits, to use Kantor's terminology, an operand or a discriminand provided with sensible qualities, which may be viewed as a point of application of the operations or of the discriminative responses; but this does not interest science: the only things that have scientific dignity are the operations.

This thesis is explicitly proposed or exposed by Tolman. In examining his operationalistic behaviorism, we have shown that the psychological concepts that he utilizes and that he gives as constructions, inventions, fictions, were probably no more fabricated than they had been in the first presentation of his system, inferred from behavior. It seemed to us that they (concepts) were drawn from that part of his direct experience which is called the field of his consciousness.

In fact Tolman repeats that direct experience does not enter into our science, neither in psychology nor in physics, other than as the determinants of behavior, which as intermediate variables of causal equation could not be and are not

expressions of this direct experience (8, p. 461; 9, p. 359; 10, p. 90). But if this experience is not part of science, perhaps it is the source for it, the point of departure, and if the concepts do not express it, or signify it, perhaps they come forth from it? Direct experience in the form called introspection, could deliver for us psychological concepts which would then undergo a scientific purification. They would be then deprived of all connotations, of all reference to an intuitive essence apprehended by a single subject, in order to be defined and tested by experiences susceptible of being reproduced by an infinite number of independent investigators (10, p. 89). In brief, although coming from an introspective source, they would be emptied of their original material (raw feel, quale) and defined functionally and operationally by the experiences from which they receive a scientific status and verification.

This interpretation, in so far as it does not forcibly imply a spirit-body dualism, is in accord with the ideas of Tolman concerning the character of the initial given that immediate experience possesses, but only in that measure. For if immediate experience, which "contains as much objectivity as subjectivity, which is neither my private world nor yours" is, according to Tolman, the only tangible reality given to us and the final matrix, rich and qualified which gives birth to the sciences, these sciences, however, in spite of this image, do not emerge from immediate experience and do not retain anything of its nature. Immediate experience is not relived in the sciences, no more so in psychology than it is in physics, in spite of the contrary belief (9, p. 359-360). Between science and immediate experience there is a hiatus, a solution of continuity. Tolman insists that the true dichotomy (Ibid., p. 363), is not between physical existences and mental existences, but between the reality captured in immediate experience and science. For the ontological spirit-body dualism is substituted the epistemological dualism, immediate experience-science (see also 3, p. 128-129). For science is a construction which is realized, certainly, beginning with and in reference to immediate experience, but which borrows no material from it (9, p. 363). Immediate experience is not the mine out of which science comes, but the ground, the base upon which it is built. Or in other words science is not a reduplication of immediate experience, a photograph that would reproduce it in whole or in part, but rather a topographical map, a plan that permits us to direct ourselves toward it. "Physics does not present to us another reality that is hidden behind that of immediate experience. Psychology does not study the reality of immediate experience in a manner more direct than physics does. Physics is a system of logical constructions, a system of rules and equations, that help us to find our way through successive moments of immediate experience ...psychology...is nothing but another similar system of logical constructions, another similar system of rules and equations, which, added to those of physics, will give us an additional aid to pass from one moment of experience to the next" (9, p. 359).

Immediate experience, be it the starting point of psychology or of physics, offers us properties, and not psychological states. These properties are either independent properties or perspective properties, that is to say, are either properties that are inherent in the objects and independent of the relations of these objects with the organism, or properties which depend on these relations (9, p. 360-361). But, perspective or independent, these qualities are equally given in immediate experience: both are equally real and must be placed on the same level. Real dualism is not between "perspectives" and "independents", but between them and the scientific constructions by which we explained them (9, p. 363). The psychological explanation, to limit ourselves to it, consists in

intention, expectation, etc. and in formulating laws which determine the functioning of these psychological processes. For psychological phenomena, the mental states of early psychology, are not given in and through immediate experience; they are not known nor are they knowable directly. Immediate experience, or if your wish, consciousness or introspection cannot reveal the existence of psychological phenomena for the reason that they are constructions made from perspectives and independents, the only things given by immediate experience. The psychological processes, assumed by the scientist in order to explain behavior are thus not elements or parts of immediate experience. They are intellectual constructs created in order to explain the coincidence of a determined stimulus and a determined response (9, p. 363-364). If one thinks that the concepts utilized by Tolman to explain behavior, and which he now claims are constructed by the scientist, are exactly in their expression if not in their content, those of introspective psychology, one may doubt that introspection is as powerless as he says to reveal psychological states and that introspection does not intervene in his behavior. At least one cannot contest the exactness of his distinction between science and immediate experience.

Whatever Kantor may say, Bridgman himself admits that along with conceptual knowledge which is of an operational nature there is a sensible knowledge. It is then the task of the physicist as best he can to formulate this sensible knowledge in terms of operations even though sensible knowledge is not itself of an operational nature. It is "experience" that gives to the physicist the initial knowledge of phenomena, of "physical situations", as Bridgman says, and consequences of results of operations and it is also experience which gives him knowledge of fundamental operations with which he constructs his definitions of phenomena. For when one defines a concept "one regresses until one is in the presence of operations that one must accept as unanalyzable and apprehendable only in an intuitive manner by personal experience" (2). There is also, according to Bridgman a very precise distinction between experiences that are operations and constitute the matter of physical concepts, and experience which is composed of sensible intuitions. Taken in the second sense, the word experience probably has in the sentence above the same meaning which it had for James when he writes that it is the summum genus to which everything must belong or must have belonged in order that we may talk about it.

The twin brother of operationalism, logical positivism, also believed in its beginnings, in this dichotomy and even presented it as fundamental (1, p. 286). Scientific knowledge, or knowledge in its correct meaning (Erkenntnis), communicable, a priori, purely formal and relational, is opposed to immediate experience or Erlebnis, incommunicable apprehension and deprived of a qualitative content. Like the preceding doctrines, but contrary to Kantor who insists on insensible transitions by which one goes from data to constructs, logical positivism affirms a most distinct discontinuity between the concepts of science and the givens of experience. Sensible givens remain outside of science, which emerge by a kind of extraction from immediate experience. Law does not spring forth from facts as was believed in the epistemology of John Stuart Mill any more than the concept comes forth abstractly from sensible givens as was believed in the psychology of Hamilton. More energetically than the preceding doctrines, logical positivism even argues that science is constructed according to the sensible givens; because for logical positivism science is entirely a priori and analytical. What role then does immediate experience play? It is immediate experience that permits the giving of an empirical content to the formal enunciations of science, and consequently to verify them by means of conventions of classifications [conventions décisives] or "Zuordnungsdefinitionen" (Reichenbach) which establish a communication between the world

of science and the world of immediate experience.* Thus are obtained enunciations of "empirical science" which express formal structure but not the content of experience (Ibid., p. 286). The latter is not and cannot be expressed: it can only be indicated, shown. The content of experience, in so far as it is lived, given, remains exterior to science.

That at least was the initial conviction of the Vienna circle. But logical positivism in becoming physicalism (4), soon realized, that by virtue of the rules established by it, the assertion that immediate experience would be incommunicable apprehension and deprived of a qualitative content constitutes an "enunciation which has no meaning" for it is not verifiable. How could we in fact demonstrate, that is to say, make public and communicate that which is private and incommunicable? Experience which is called immediate can be nothing if it is not the apprehension of discriminable and expressible relations. Let us observe what those who invoke it do when we ask them to justify its existence. "Almost invariably they indicate a situation that implies a discrimination such as I see red. Elementary discriminations--that is then the meaning of the immediately given--and discriminative reactions are evidently public and communicable." To affirm that there is only one reality but two ways of knowing it is again to formulate an enunciation that can have no meaning. For how can one verify that reality is unique if our knowledge is double? For a coherent positivism there can be only one type of knowledge and all speculation on the existence and the nature of a reality, distinct from knowledge that we have of it, is a pseudo-problem (7, p. 238-239).

Likewise, a coherent operationalism can only accept an operational definition of immediate experience. Such precisely is the extension given by Stevens to Bridgman's doctrine. "Experience...on which physical science is founded, is only a term which implicitly at least denotes the sum of the discriminative reactions executed by human beings: for to experience is for science to react discriminately" (6, p. 521). Of all the operations by which one can describe a concept, the simplest is certainly the operation of denoting, that is to say, of indicating, of showing, the corresponding object (5, p. 324). But denotation implies discrimination as a necessary condition. In order to indicate an object one evidently must be able to distinguish it from other objects" and let us add that the object indicated is indicated in so far as it is distinguished and not experienced. Discrimination or execution of differential responses is then the fundamental operation of all science (5, p. 324).

If epistemological dualism is not acceptable for a logical positivism (logical above all with itself) nor for a decided operationalism, it is even less admissible in a behaviorism, especially if this behaviorism quite uselessly lends allegiance to the preceding doctrines. All epistemology implies, no doubt, a certain psychology; but the logician has perhaps the right to neglect the psychological implications of his doctrine, whereas the psychologist cannot afford the luxury of admitting a psychology of knowledge which ruins psychological knowledge. The behaviorism of Tolman and Kantor in accepting epistemological dualism contradicts itself or in any case limits itself singularly. The behavioristic method can no longer be the only method of psychology if next to a knowledge which is reactional and operational, one makes room for an intuitive knowledge. One may reduce, as

*The original reference number given here is 590, p. 289. The reference list goes only to 455. --ed.

Tolman had done, this place to the extreme by affirming that sensible knowledge always remains outside of science: sensible knowledge is its point of departure, even if it does not virtually contain science, even if science is built against immediate experience. Sensible knowledge is also the end for science, for it is by function of this experience that scientific assertions have meaning and are tested. Science, as all knowledge, including immediate experience or empirical intuition, is a product of psychological activity. To affirm that all psychological activity is behavior and to admit at the same time a knowledge which is not behavior, is definitely to contradict oneself. That is the inevitable destiny of all behaviorism that believes itself to be autonomous. Refusing to lend support to the established sciences, to define a stimulus as a function of physics, he is necessarily led to regard this stimulus as a sensible given, and he who calls himself autonomous and believes himself to be independent of all metaphysics, is forced to rely on common sense, this being the worst of all metaphysics which does not know itself. To explain the adaptation of the response to the stimulus, certainly it is necessary that the stimulus be something and that it possess determinations that are independent of the reactions and anterior to them. If one refuses to view it as a certain type of spatio-temporal order, for example as a vibration of a certain frequency, length of wave, amplitude, there is no other resource than the power of inherent qualities, foundation of the adaptive character of the responses. But then behaviorism denies itself or limits itself; for the knowledge of these qualities which precedes and establishes reactions, can not be a reaction: it [knowledge ?] escapes a strictly behavioristic psychology. To be coherent behaviorism must then affirm that what common sense calls sensible qualities are discriminative responses to physically defined stimuli. This is, as we have seen, the thesis of the strict behaviorism of Weiss.

One must then go from logical positivism to physicalism, from the operationalism of Bridgman to that of Stevens, from the behaviorism of Tolman and of Kantor to that of Weiss. There are not two types of knowledge, a conceptual knowledge and a sensible knowledge bearing on data, qualities. Nor are there two languages in which those two knowledges would be expressed. All knowledge is always, from beginning to end construction, operation, reaction: for all knowledge begins and ends by discriminations. One can certainly call the elementary discriminations facts and the more complex ones concepts: it is a question of convention. But then one runs the risk of transforming unconsciously a simple difference of degree into a difference of nature.

Immediate experience which is the point of departure and about which Tolman, Kantor, and Bridgman speak, is then only the sum of their elementary discriminative responses, the ensemble of their propositions-facts [constats]. Scientific knowledge is, to be sure, something else, but it is not of a different nature. "With the aid of propositions-facts [constats] we formulate laws which... (are) indications that permit us to arrive at predictions, which in their turn may be controlled by propositions-facts [constats]..." Thus there is always comparisons between enunciations and enunciations and not, as even the Vienna circle believed, between enunciations and a reality or things (4, p. 298-299). This physicalistic description becomes this in behavioristic language: to certain of our discriminative responses we respond by a recording of verbal reactions, some by verbal response of generalization, and to others by one or several verbal responses which constitute substitutes of eventual discriminative responses. The execution of these discriminative responses will constitute the verification of the prediction (11, p. 209, 221). Thus scientific knowledge from the behavioristic point of

view is developed from a series of biosocial symbolic responses, "linguistic", and it is always a relation between responses and other responses and not between responses and reality. The symbolic character of the enunciations and responses may lead one to speak of science as a construction, but the "givens" to which one opposes science are already themselves constructions.

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Knowing all there is to know about the physiological or chemical effects of drugs will not explain why people may take them habitually. Addiction is a behavioral process and may lose its meaning on other levels of analysis. Seen in this way, exhaustive knowledge of the molecular pharmacology of alcohol or heroin may be no more valuable in understanding how these drugs can preempt and control so much behavior than knowledge of the physical properties of electricity, of the physiology of pain, or of the metabolic effects of food ingestion can illuminate how these processes control behavior. There can be no basis of "addiction" that resides solely in the structure or function of the nervous system simply because the phenomenon does not exist there. By analogy, no individual group member can generally be said to be the basis of a "mass hysteria" or any other distinctly group process; the group phenomenon could not exist without individuals, just as there could be no behavior without a nervous system, but it cannot be fully understood in terms of them either. To again borrow a term from systems theory, complex behavior has "emergent" qualities that preclude its total understanding on the basis of the separate structures or parts that make it up.

James McKearney: "Asking Questions About Behavior"
Perspectives in Biology and Medicine, 1977, 21,
109-119.

The most frequent pattern for papers in the field of physiological psychology is the presentation of a physiological concept which is then defined operationally, the presentation of a psychological concept which is then defined operationally and the assertion that the two concepts are related on the basis of a significant experimental correlation between the two operational procedures. This of course is an entirely unwarranted procedure, since it omits the necessary stage of discussing the proposed logical relation between the two superordinate constructs; it fails to provide a related line of descent from each concept to the subordinates (the alleged operational definitions) and consequently any finding of correlation between the two operational definitions is without logical significance, however great its statistical significance.

D. Bannister: "The Myth of Physiological Psychology", Bulletin of the British Psychological Society, 1968, 21, 229-231.