

Never Smile at a Crocodile

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In recent years there have been a number of symposia involving participation by psychologists and philosophers. Whatever the particular theme of a given meeting may be, there is the background notion that there ought to be substantial and continuing communication between psychologists and philosophers in their professional capacities. As one of the earliest current proponents of this idea, I should like to endorse it once again now. However, there is an important place here for some warnings and reminders, hence the title of this paper (courtesy of Walt Disney).

There is a longstanding and strong tendency to think of such interdisciplinary communication along the lines of taking in each other's washing or buying each other's products—in short, to think in terms of a simple exchange, whether of problems, ideas, solutions, or whatnot.

Let me offer the suggestion that this kind of interaction could be generally successful only if there were no difference, as of course there is, between psychology and philosophy; and that the present state of psychology is the result of having proceeded in that way in the past.

The appropriate model is not that of a simple taking or exchange, but rather that of assimilation. Philosophical ideas, arguments, or conclusions have to be transformed, transmuted, beaten, or otherwise wrought into psychological form if they are ever to be part of psychology. And vice versa.

Now, I don't imagine that anyone would really disagree with this sort of reminder. However, as with New Year's resolutions, it's not the swearing off, but the follow-through that presents the problems. Part of the problem is that philosophical arguments tend to have the ring of simple truth and tend to be so presented. It's difficult for anyone who isn't well acquainted with professional philosophy to recognize the degree to which philosophical arguments and philosophical conclusions are limited in their form and outlook by the history and social structure and the customs, standards, and distinctive concerns of philosophers. It's as easy to over-estimate as to underestimate these limitations. So psychologists have tended both to accept some philosophy as simple truth and to reject the rest as nit-picking, kibitzing, and generally pernicious. Conversely, philosophers have tended to seize upon whatever psychologists do that is non-empirical and call that philosophizing. Psychologists look upon non-empirical efforts as philosophizing also, except when it is of the sort they call by such titles as "methodology", "experimental design", "operationalizing", "statistical test", and so on.

Since, as I say, it's not the good intention but the follow-through that presents problems, I will not pursue the warning line any further but instead will illustrate concretely what I take to be an appropriately assimilative interaction between the two disciplines. Doing this will involve a partial spelling out of a way of doing psychology which is unfamiliar to most psychologists and philosophers.

What I will present is a conceptualization, or formulation, of behavior, together with some elaborations and heuristic distinctions designed to provide some idea of how that formulation can be put to psychological use. The formulation of behavior is only one of four primary components of a more extensive conceptual system.

When I say "conceptualization" or "formulation", I want to imply a contrast to either "theory" or "model". The formulation of behavior is a way of talking about behavior *as* behavior and saying what we take it to be either in general or in particular cases. This contrasts with having a model which enables us to talk about anything, including *possibly* behavior, *as if* it were the sort of thing incorporated into the model. And it contrasts with having a theory which enables us to talk about the behavior as being *really* something else (of the sort mentioned in the theory).

As background for later calling attention to some psychological-philosophical points of similarity or relevance, let me introduce an historical context.

The past decade has seen a four-way interaction involving two philosophical camps and two parallel psychological camps. The issues that involve them have to do with the concepts of behavior, action, and cause-effect accounts.

Position 1 is occupied by philosophers who claim that action explanations of human behavior are: (a) fundamental, or (b) in some sense indispensable, or (c) exclusively appropriate in explaining human behavior. Further, they claim that action explanations, which involve reference to intentions, reasons, desires, rules, and so forth, are incompatible with cause-effect accounts of behavior. Because of this, they have seemed to be saying "you're doing it all wrong" to those psychologists who use the deterministic cause-effect idiom as a routine act of faith or as a matter of tradition.

Position 2 is held by a small minority of psychologists who more or less agree with those philosophers and who then make affirmative efforts to employ action explanations in their psychological accounts of human behavior. They tend to run into difficulties with the relation of, e.g., brain tumors (or broken legs, learning histories, etc.), to behavior.

Position 3 is held by a majority of psychologists who practice scientific psychology in university settings. They react with immediate violence against any apparent criticism of cause-effect accounts and dismiss any reference to intentions, desires, reasons, or rules as philosophical nonsense, "folk psychology," or other superstition which has no place in the brave new world of behavioral technology. For most such practitioners, the distinction between behavioral technology and behavioral science is also philosophical nonsense.

Position 4 is held primarily by philosophers who are neo-positivistic in orientation and practice their art in the United States or Australia. They assert that if and when intentions, reasons, desires, etc., are involved in behavior at all, they *are* causes of behavior. Some of them would add that this is because they really are brain processes, and it is brain processes that are the causes of behavior.

As among the philosophical positions, the issue has sometimes been summarized as "Can actions be caused? (or does action imply freedom, hence non-causality?)". The psychological issue might be summarized as "Do deterministic cause-effect accounts *explain* human behavior? (or are they a technician's more or less *inconvenient*

fiction?)”. It might also be put as “Can a rule-following model of behavior carry the weight of a science of behavior? (or is it a rationalistic naïveté which no science can afford?)”.

The nature of the four-way interaction is no doubt best summarized as “a free-for-all”.

As one examines the free-for-all, it begins to come across that there’s something extremely slippery about the concept of “behavior” and also of “action”. Otherwise how could so much controversy be sustained? In particular, the term “behavior”, which is so taken for granted on all sides, appears to offer almost unlimited opportunities for ambiguity, equivocation, self-contradiction, confusion, fantasy, and idiosyncrasy, Nevertheless, there seems to be some primitive and unspoken consensus among both philosophers and psychologists as to what sort of thing behavior is. What sort of thing it is, is perhaps best brought out by the Wittgensteinian question, “What is left over in the fact that I raise my arm if you subtract out the fact that my arm goes up?” The primitive notion of behavior which both psychologists and philosophers seem to share is something on the order of my arm going up. The “disagreements” arise in connection with causal or rule-following “*explanations*” of *that*.

A fairly clear illustration of the general view of behavior is provided by Shwayder (1965), who writes as follows:

My theory represents an attempt to explain and understand what it is to see certain things *in* the movements of animate creatures. What we thus see and report upon might be styled as a kind of epiphenomenon with respect to animal movements and situational elements. They are phenomena which we see as residing in the movements only because we have these ways of thinking about those movements. You can, if you need a name, categorize my account as *conceptual epiphenomenalism*...

Here, then, is the kind of question we shall ask: What must the conceptualizing observer of animal movements see in and around those movements that will license him to characterize the movements in a certain way, e.g., as tying shoes?... (p. 13).

But “behavior” is, failing better, a natural word to employ for categorizing a certain kind of animal movement. It is easily carried over into the psychologist’s or philosopher’s technical account... (p. 22).

Indeed, it has in fact been easily carried over into psychologist’s and philosopher’s technical accounts. Few writers have been as explicit about it as Shwayder.¹

Now, against this background, let me introduce a formulation of behavior which was not intended to be a part of all that controversy, but instead, was designed to deal with the conceptual and empirical problems of a science of behavior. This is shown in Formula (1) in Figure 1. Figure 1 contains a parametric formula for behavior and a brief characterization of the terms of the formula. The parameters of behavior are designated as Identity, Motivation, Cognition, Competence, Performance, Achievement, Personal Characteristics, and Significance.

$$(1) \quad \langle \mathbf{B} \rangle = \langle \mathbf{IA} \rangle = \langle \mathbf{I, W, K, KH, P, A, ID, S} \rangle$$

Where

B = Behavior (Instances of behavior are identified directly by locutions in ordinary language)

IA = Intentional Action (The technical designation for behavior under the present parametric analysis)

- I = The “Identity” parameter (Refers to the identity of the individual whose behavior it is; values of this parameter are given by names or individuating description)
- W = “Want” = The motivational parameter (Values of this parameter are given by specifying states of affairs as being wanted)
- K = “Know” = The cognitive parameter (Values of this parameter are given by specifying states of affairs as being distinguished or conceptualized)
- KH = “Know How” = The competence parameter (Values are given by specifying prior states of affairs as a relevant learning history)
- P = “Performance” = The process, or procedural parameter (Values are given by specifying a process)
- A = “Achievement” = The result, or outcome, parameter (Values are given by specifying events and states of affairs)
- ID = The “Individual Difference” parameter (Values are given by specifying personal characteristics of which the behavior is an expression)
- S = The “Significance” parameter (Values are given by specifying behaviors or behavioral patterns engaged in by means of the behavior in question)

Fig. 1. A Parametric Formulation of Behavior.

Notice that Formula (1) is a parametric analysis and not a definition. The parameters of behavior are the ways in which one particular behavior can be the same as or different from another particular behavior as such. Parametric analyses are, of course, familiar to us from their use in mathematics and physics. To begin the study of behavior in this way is to take behavior as a fundamental and intelligible phenomenon. Behavior is fundamental here because it is not reduced to something other than behavior, and it is intelligible because we can state its parameters in intelligible terms. This is quite different from beginning with a definition of behavior, for a definition could only be a way of saying, in one way or another, that behavior is not fundamental because it's really something else. (For example, that it is really the product of a conditioning history, an expression of biological drives, or a process of self-actualization.) It also contrasts with an informal beginning in which “behavior” is referred to colloquially in this way and that way, as needed, but without any way of showing the coherence of all the references to “behavior”, so that behavior remains in principle mysterious rather than intelligible. Philosophical discussions of causal and rule-following explanations of behavior have tended to be of this sort. Approaching behavior as both fundamental and intelligible is, therefore, a noticeable departure from both psychological and philosophical custom.

Notice, too, that Formula (1) is much more complex than anything on the order of my arm going up. Specifying such a fact as my arm going up would be accomplished by a partial specification of the value of just one of the eight parameters, i.e., the Performance parameter.

Finally, you will recognize in Figure 1 that the concept of behavior is presented by means of a formula in set theoretical notation. No set theory is involved here, but it's not a coincidence. This concept of behavior is one whose primary use is calculational rather than simply descriptive. And calculation, of course, is rule-following. So the formulation of behavior as Intentional Action is a rule-following formulation. However, the kind of calculation involved at this point is not of any kind envisaged by philosophers who have talked about action explanations and rule-following. The slipperiness I mentioned

earlier in connection with the concept of behavior may eventually be understood as the consequence of trying to deal with a calculation notion as though it were merely theoretical or simply descriptive.

By way of background for showing how this calculation works, let me introduce a heuristic distinction. Given Formula (1) as a general concept of behavior which serves to organize a subject matter as a range of possible facts, we may then ask, what is the range of possible behavioral facts and what cogent ways are there to stratify or categorize these possibilities? One such way is the three-way division shown in Figure 2. That is, there is no behavioral fact which is not subsumable under one of the following headings: (a) the occurrence of behavior, or (b) the occurrence of observation and/or description of something, or (c) the occurrence of appraisal and criticism of something. For our purposes we will deal with a special case, involving the observation-description of behavior and the appraisal-criticism of a description of behavior. This stratification is codified as the three methodological roles of behavior, observer-describer, and critic, and this is shown in Figure 2.

Notice that in organizing a subject matter as a range of possible facts, we are dealing with facts as primary. This contrasts with the hypothetico-deductive tradition of theories and models in psychology, where mechanisms, structures, and processes are conceptually and methodologically primary. Even our cognitive, existential, and transcendental theories and models, and not merely our stimulus-response or organismic models, have this general character. It is this tradition, rather than the facts of the matter, which gives the “behavior is movement” notion the degree of plausibility it has. There is, of course, a Grade-A precedent in the philosophical literature for recognizing facts as primary. The opening lines of Wittgenstein’s *Tractatus* were: “The world is everything that is the case. The world divides into facts, not things.” On the other hand, of course, what I’m doing here is psychology, not logic or epistemology, and it doesn’t visibly resemble what Wittgenstein did in the *Tractatus*. There is no simple taking over of anything here.

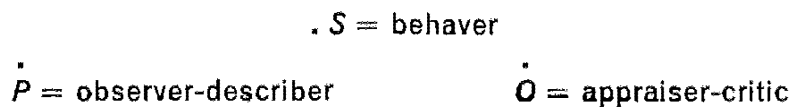


Fig. 2. Methodological Roles.

The three-way division is interesting and heuristic in at least two ways. The first of these is that there could be no science of behavior if there were not behavioral facts of *each* of those three sorts. First, without the occurrence of behaviors there would be nothing for a behavioral science to study. Second, to observe and describe behavior is *ipso facto* what a behavioral scientist does; without that there would be no behavioral scientists and therefore no such science. Finally, it is essential that descriptions of behavior be able to pass certain kinds of critical appraisal in order to qualify, e.g., as scientific descriptions, as explanatory descriptions, as experimentally confirmed descriptions, as possibly true descriptions, et cetera. Were there no such behavior as the making of these appraisals there would be no difference between science and non-science, and so there would be no science.

The other interesting feature is that there are logical relations among the three behavioral categories. To observe and describe behavior is a special case of engaging in behavior. And to criticize a behavior description is a special case of observing and describing behavior. These logical relations provide an internal consistency check and a

representational adequacy check for any conceptualization of behavior. It would be possible, for example, to formulate a general concept of behavior which was of such a sort that observation-description could not be shown as a special case of behavior. Or it might be that appraisal-criticism of descriptions could not be shown as a special case of observation-description. In either case, we would have a prima facie basis for saying that that formulation of behavior was substantively, or representationally, inadequate, i.e., that it was in principle incapable of getting at all the facts of behavior. It would also be possible to introduce a concept of behavior such that observation-description or appraisal-criticism would be demonstrably impossible as special cases. In that case, we would say that the formulation was methodologically paradoxical or self-contradictory. On inspection, it appears that all of our existing and traditional general theories of behavior are either self-contradictory or substantively inadequate in this way. Of course, nobody has been trying to meet this kind of standard in his theorizing, but there is no reason to believe that this is the crucial fact. The inadequacy appears to be built into the very notion of theorizing, and the existential emphasis on the pre-theoretical reflects a recognition of that inadequacy.

Now, let us look more closely at the observer-describer role in order to see what is involved. If observation-description is a special case of behavior and if Formula (1) gives the general case of behavior, then we ought to be able to show in an explicit and non-trivial way what conditions in addition to those given by Formula (1) have to be met in order that a given behavior be a case of observation-description of behavior. In fact, two constraints will do the hard part of the job. They are, first, that the behavior is verbal behavior, and second, that the behavior in question involves the use of the concept of behavior. Our major interest will be with the second condition, but first a word about the first.

$$(1) \quad \langle B \rangle = \langle I, W, K, KH, P, A, ID, S \rangle$$

$$(2) \quad \langle V \rangle = \langle C, L, B \rangle$$

Where

V = Verbal behaviour

C = A concept

L = A locution which stands in 1-1 relation to the concept **C**

B = A class of behaviours which involve **C** in the value of the **K** parameter, i.e., behaviours which involve using the concept **C**.

Fig. 3. Verbal Behaviour.

Formula (2) in Figure 3 provides the conceptual specification of the general case of verbal behavior. For heuristic convenience, it is placed next to Formula (1) in order to make clear why Formula (2) shows the general case of verbal behavior to be a special case of intentional Action. To say that a given behavior is verbal behavior is to say something about, first, the values of the Performance and Cognitive parameters of that behavior; second, a relation between these parametric values; and third, a relation between this behavior and a class of other behaviors. I will say just three things about all this. First, this behavioral approach to language is a far cry from the traditional notion that the task of psycholinguistics is to provide an account of the (presumably physiological) mechanisms whereby linguistic competence is realized in overt performance. Second, in spite of being different in this way, it does connect to existing

and potential linguistic theory, and, so far as I know, it's the only psycholinguistic formulation that does this. Any transformational grammar or other syntactic theory may be assimilated directly as a theory of L, the Locution, in Formula (2), i.e., as a detailed and systematic specification, from the critic's viewpoint, of what a performance has to be like in order to be a paradigmatic linguistic performance. Third, you'll notice that there is specified a one-to-one connection between locution and concept. It would take a much longer time than we have to explain why this is necessary when absolutely everyone with any kind of sophistication regarding language knows absolutely that it just isn't so and couldn't possibly be. I will say only that Formula (2) is not a general *description* of verbal behavior, but rather, a conceptualization of verbal behavior, and that is something that has no possible truth values but instead, has to be *used*. But using the concept of verbal behavior is just a special case of using the concept of behavior, and that is what our second constraint deals with.

Our second condition which distinguishes observation-description as a special form of behavior is that such behavior involves using the concept of behavior. This raises the question of how the concept is used. And the answer is that the observer uses the concept of behavior, not as a simple description, but as a calculational system. The details of the calculational system are given in Table 1.

TABLE 1. Behavior as Calculation

Element	Operation	Product
1. <I, W, K, KH, P, A, ID, S>	Substitution	< I, W, , KH, P, A, ID, S> Cognizant Action Description
2. „	Substitution	<I, , , KH, P, A, ID, S> Deliberate Action Description
3. “	Substitution	<I, W, K, KH, P, , ID, S> Social Practice Description
4. “	Substitution	< I W, K, KH, , A, ID, S> Symbolic Behavior Description
5. “	Deletion	<θ, θ, K, KH, P, A, B, θ > Activity Description
6. “	Deletion	<θ, θ, B, θ, P, A, θ, θ,> Performance Description
7. "	Deletion	<θ, θ, B, θ, θ, A, B, θ> Achievement Description
8. “	Deletion	<I, W, K, KH, P, θ, ID, S> Performative Description
9. “	Deletion	<θ, B, K, θ, P, A, θ, θ,> Stimulus-Response Description
10. “	Identity	<I, W, K, KH, P, A, ID, S> Intentional Action Description
11. “	Reduction	<I, C, C, C, C, E, ID, S> Purposive Description
12. “	Reduction	<I, C, C, C, E, E, ID, S> Cause-Effect Description

What is shown there is a fairly conventional sort of representation which I call the Element-Operation-Product model of a formal system. In the present case, we introduce a single initial Element and four Operations. The initial Element is simply the formula for behavior. A Product is generated by performing an Operation on this initial Element. Each Product is eligible to serve as a new Element upon which some further Operation could be performed, and so on.

Each product is a form of description of behavior.

The important thing here is that an unlimited number and variety of behavioral concepts are immediately available for either description or enactment to any individual who has acquired the concept of behavior and can use it in this way as a calculation system. Thus, intentional Action works somewhat like a generative grammar and is conceptually rich in the way that a grammar is conceptually rich (as contrasted with, e.g., a simple description or a taxonomy). Technically speaking, one of the things it does for us is to provide an alternative to the traditional appeals to “generalization”, “creativity”, ‘spontaneity’, and so on in accounting for the variety of particular human behaviors relative to their learning basis.

If, in Table 1, we survey the Products that are generated most simply by performing single Operations on the formula for behavior we find some interesting results.

Let us look first at the results of simple Substitution. These results are given on lines 1, 2, 3, and 4 of Table 1. Formally speaking, these four formulas show us that Formula (1), the general concept of behavior, is both recursive and reflexive. Substantively, we can distinguish four general forms of behavior description corresponding to four generic varieties of behavior, namely, “cognizant action”, “deliberate action”, ‘social practice’, and ‘symbolic behavior’.

The representational capacity of these four forms of description is roughly as follows: (1) A Cognizant Action Description is a description of behavior in which the concept of behavior is used (is part of the value of the cognitive parameter of the describer’s behavior). It therefore is capable of representing the case of an individual who either: (a) is describing behavior, or (b) knows what he is doing. One comment here. Recall that one of our problems was to state the additional conditions which distinguish the role of observer-describer as a special case of the general case of behavior. The two additional conditions mentioned were: (1) that the behavior was verbal and (2) that the behavior involved the use of the concept of behavior. In elaborating the latter notion via Table 1, we have arrived at a form of description whose representational power includes condition (2). We can, therefore, state that condition now more precisely and systematically: observation-description is behavior which is correctly described as “cognizant action”.

(2) Next, a Deliberate Action Description is capable of representing the case of a behavior who distinguishes among behaviors not merely cognitively but motivationally as well (concepts of behavior appear as part of the values of both cognitive and motivational parameters.) That is, he identifies a set of behavioral options and chooses his own behavior from among them on the basis of his acquired mastery of certain critical perspectives which give him reasons for and against certain choices. (In saying this, you will recognize, I am skipping some steps, since talking about those critical perspectives as something that would have to be explicated by developing our third methodological stratum, i.e., the appraiser-critic.)

Two comments here. First, I would suggest, that it’s this concept of deliberate action which philosophical references to intentions, reasons, desires, and so on have been efforts to delineate. The notion of choosing among a set of behavioral options in our observable behaviors (such as tying shoes or criticizing nonsensical accounts of behavior) is what underlies the myriad references to “free” choice (or “free will”) and “determinism”. Second, the argument that the three kinds of behavior shown in Figure 2 are essential to the existence of a behavioral science can be transformed into the argument that the occurrence of deliberate action is essential in that way (because deliberate action is presupposed by the role of appraiser-critic) and that, therefore, any

purportedly general theory of behavior which could not show this (deliberate action as a special case of behavior) or which would leave no room for deliberate action could not be taken seriously as a general account of behavior. Any deterministic theory would be of that sort. That is, no deterministic theory could be taken seriously as a general account of behavior, because it would imply the absence of deliberate action. Now, it may seem harsh and dogmatic, or perhaps presumptuous, to reject our traditional ideology of explanation so summarily, but it is just as clear and just as simple as saying that no statement to the effect that nobody ever said anything could be taken seriously as a general account of language. Such a “statement” would be nonsensical, not false.

(3) Next, a Social Practice Description is capable of representing extended patterns of behavior, whether involving one person or more than one, since it represents the occurrence of one behavior as the Achievement (the consequence) of the occurrence of another behavior, and so it provides a representation of joint, or collective, behavior. (To accomplish this generally would, of course, involve repeated substitution operations to generate more and more elaborate patterns.) Social Practice Descriptions, therefore, give us formal access to all kinds of social behavior and social phenomena.

One comment here. There is a connection between social practices and deliberate action. For any social practice, there are some number of alternative ways in which it could be carried off. Because of this, the participation in social practices is what provides the behavioral options, the choice among which constitutes deliberate action. I would suggest that this is: (a) why philosophers like Winch have proposed that social science is just the specification of the social practices and their organization in any given society, and (b) why the rule-following model is proposed for psychology as a social science rather than as a biological science.

(4) Finally, for the last of our four substitutions, a Symbolic Behavior description is capable of representing the case where engaging in a given behavior is accomplished by engaging in a second behavior. For example, the case where I warn you by pointing backward and saying “There’s a police car following us”. Or the case where I illustrate some assimilative possibilities between psychology and philosophy by reading a paper to a learned group. This form of description, therefore, gives us formal access to the aspects of depth, meaningfulness, and significance in behavior. This aspect of behavior is also codified as the Significance parameter of Formula (1).

If we now move on to the results of using the Deletion operation, we find a set of incomplete descriptions of behavior. These are shown on lines 5-9 in Table 1. They are incomplete in the sense that in each case there is one or more of the parameters of intentional action about which the description says nothing. This is comparable to talking about material objects but saying something only about their weights and locations, or talking about visible colors but only about their intensities. The differences among the forms of incomplete description have to do with which and how many parameters of behavior they are noncommittal with respect to. In Table 1, the deleted parameters are indicated by thetas (θ) on lines 5-9.

There are two major reasons that an observer-describer might normally have for giving deficient, or incomplete, descriptions of behavior. The first is that as an observer he doesn’t have the informational basis for giving a complete description. The second is that he is formulating behavioral regularities which don’t involve all the parameters of the behavior. For example, if we consider such ordinary activities as playing chess, telephoning a friend, driving a car, or putting someone in a double bind, different people will do them for different reasons, so if we want to represent these activities as behavior

patterns which are common and repeatable we have to leave out any reference to those various motivations.

Among the incomplete forms of description, there are two which may be of some special interest here. The first of these is the Performance Description shown on Line 6. I mentioned earlier that in their discussions psychologists and philosophers have generally shared an implicit notion of what “behavior” is and that it corresponds to only one of the parameters of intentional action. Actually, it corresponds to two of them, i.e., Performance and Achievement. In our present terms, therefore, psychologists and philosophers have been giving Performance Descriptions of behavior as though these were simply descriptions of behavior. This is overtly the case, for example, in the Skinnerian definition of an operant as “a response that has an effect on the environment”. It also holds for Schwayder’s formulation. If one implicitly defines behavior by reference to only two of the eight parameters of Formula (1), clearly, the remaining aspects of behavior will be dealt with, if at all, in a more or less *ad hoc* manner. It is this gap between two and eight parameters which, as I commented above, provides unparalleled opportunities for ambiguity, equivocation, and confusion in our references to “behavior”.

There’s an interesting feature of Performance Descriptions. They are neutral as between behavior on the one hand and posture and movement on the other. Under a Performance Description, there is no logical difference between my eye blinking and my blinking my eye or between my arm going up and my raising my arm. Because Performance Descriptions are equivocal in this way, it is standard practice for psychologists to generate physiological or quasi-physiological causal accounts of certain movements and then reinterpret the movements as behavior so as to have accomplished an “explanation” of that behavior. (Recall Schwayder also.) Physiological and movement accounts of behavior may be categorized as more or less detailed and elaborate Performance Descriptions. They are accounts of ways in which that behavior may happen, and only by an act of faith can we transform them into what happens *whenever* that behavior happens or into what *must* happen if that behavior is to happen.

It’s also the case that the English lexicon is ambiguous with respect to all the forms of description shown in Table 1. We don’t have distinctive terminologies for these various forms of description. I could say, “He’s telephoning a friend”, and be giving *any one* of the forms of description shown in Table 1. If I wanted to make it clear that I was giving an Activity Description in ordinary English, which isn’t always plain English, I would have to say something like, “He’s telephoning a friend—but I don’t know why”. However, if one didn’t recognize that the phrase “but I don’t know why” was an informal explicit deletion operation, it would be easy to come to suppose that the “why” was something distinct from the “behavior” and find it necessary to re-introduce the “why” as an “explanation” of the so-called “behavior”. It’s not at all difficult to think of the philosophers of action in this regard.

In the light of these various considerations it would be astonishing if there were *not* a great deal of confusion and controversy concerning “behavior” and “movement”.

Next, the Achievement Description is of interest because it rounds out our picture of intentional action as a calculational system. An Achievement Description, which is shown on Line 7, refers only to the results produced and not to any intention or process of producing that result. We noted that in Table 1, the single initial Element is intentional action. There were also four Operations to be performed on this Element. Now, having generated the notion of an Achievement Description, we are in a position to be more precise and systematic again. The performing of an Operation on an Element

must, in the general case, be given by an Achievement Description of intentional Action. That is, it is only something that one has to achieve, not something one has to deliberate upon or intend, though one may. We have the overall result, then, that (a) the Element is intentional action, (b) each Operation is, minimally, a defective form of intentional action, (c) each Product as a form of description of intentional action, and (d) the giving of such a description as intentional action. So there is no part of the calculational system which takes us beyond the concept of intentional action. This gives a strong sense to the statement that the concept of intentional action is a calculational system.

Next, on line 10, the Identity Operation is a formal device, comparable to adding zero or multiplying by one. Its effect is to change the status of Formula (1) from that of Element to that of Product. As a Product it can serve as a form of behavior description.

Our final operation is that of Reduction, and the result is a cause-effect description. The Reduction operation consists of eliminating the distinctions among two or more parameters of intentional Action, as shown in lines 11 and 12. In those formulas the collapsed, or amalgamated, parameters are indicated by C's or E's. To understand how this works you have to remember the characterization of the several parameters of intentional action and also keep in mind that the values of K, W, and KH are given by specifying states of affairs (see Figure 1.), whereas values of P are given by specifying a process and values of A are given by specifying an event. Then, when you have the amalgamations shown in Table 1, the English version becomes "Under certain conditions (states of affairs), something (process, event) happens non-accidentally", which is a cause-effect form of description. Notice that this is possible because the concept of intentional Action already contains the notion of the non-accidental production of an effect. The function of the Know How parameter is precisely to exclude accidental happenings from the range of instances of intentional Action. (Conversely, one of the functions of Achievement Descriptions is to enable an observer to specify a given result as *un-intended*.) Further, the motivational parameter is what conceptually defines the unit of behavior. When the state of affairs that is wanted becomes a state of affairs that is achieved (that has been brought about), the process of bringing about that result is ended. When we engage in behavior with some end in view, if we accomplish that end, we do not regard that generally as accidental. So, indeed, under certain conditions, something happens non-accidentally.

Notice that causality emerges here simply and directly as the non-accidental production of a result. As such, it has nothing to do with determinism. The latter is, rather, an extraneous theological interpretation which one may or may not add to a causal account. We do need cause-effect accounts as part of a science of behavior. As to the theology of determinism, I would suggest that in behavioral science we have no need for that kind of hypothesis. More strongly, as I have indicated above, any deterministic ideology is incompatible with a science of behavior.

Technically speaking, once you have a C-E form of description, you can do anything you want with it. You can substitute anything you want for C or for E and you can taxonomize any way you want for C or E. For example, you can substitute a Performative Description for C, and an Achievement Description for E and the result will be Formula (1) again. Or substitute a Performative for C and an intentional Action for E and you have a Social Practice Description, which is a kind of cause and effect description, as Gilbert Ryle pointed out some time ago. One interesting case results from substituting a Performance Description for E. In connection with that you could designate the "Cause" as consisting of historically derived "controlling variables" and you would have the vintage notion of the "conditioned operant response". But the "Cause" can also be

divided into the same three kinds of fact as were originally given by the cognitive, motivational, and competence parameters of Formula (1). The difference would then be that you could now speak of the operation of reasons, intentions, desires, learning histories, etc., as *causes* of “behavior”. That sounds familiar, too, from the philosophical literature. (Recall Position 4, mentioned earlier.)

The particular value of a C-E form of description is not its representational power, but its technological application. If C produces E non-accidentally, then a person who wanted to accomplish E but couldn’t do so directly might well do it by producing C non-accidentally; and a person who merely observed the occurrence of C might well expect to observe E. Our knowledge of what could be expected to lead to what is codified directly in C-E descriptions. Thus, for a behavioral technician whose interest is in predicting or controlling someone’s behavior, C-E descriptions would provide a cookbook of sorts. Since prediction or control of behavior may sometimes serve as a check on our scientific understanding of behavior, or as a demonstration of such understanding, C-E descriptions have some scientific value also.

This concludes our survey of Products in Table 1, and we will not have time for any further development of the methodological roles of observer-describer and critic. Looking back on the material I’ve presented, I would comment on it in three ways.

First, briefly, a reminder that this was a fragment of a considerably more extensive formulation, and as such, any presentation of it would have to leave some number of loose ends. I’ve tried to keep that to a minimum.

Second, although I can’t claim to have shown this in detail, I think you will not find it entirely implausible to suppose that the intentional Action formulation gives us access to the full range of possible behavioral facts and, moreover, does this in a systematic, rather than *ad hoc*, way. If so, it provides a conceptual framework which relates every part of psychology to every other part and relates psychology non-reductively to every other science and discipline. (They are, all of them, forms of human behavior.) We saw with the Substitution operations that we had access to self-awareness, language, rationality, social behavior, and meaningfulness in behavior. We saw with the Identity and Deletion operations that we had access to those aspects of human behavior which are shared with other, non-human species. That is, the sentient, motivated, adaptive, mobile, circumstantial, and instrumental aspects, as well as individual and group variation. Via Performance and Achievement, we had access to physiological conditions relevant to behavior. And we saw with the Reduction operation that we could give descriptions in a cause and effect format which laid their technological cash value on the line. Given this much, it wouldn’t be all that whimsical to say that Formula (1) is “the human equation”.

The intentional action formulation is a rule-following formulation. Indeed, it would be difficult to find a better explicit example of rule-following in psychology. Notice, however, that this way of representing and unifying the subject matter of psychology and of the various sciences as quite unlike anything suggested by the philosophers of action who discuss rule-following or by philosophers of science, who don’t seem to get much beyond theorizing about the problematic logic of scientific “explanation” and of the “confirmation” of theories by experimentation. One of the better analogues to the present formulation is the concept of “deep structure” in linguistics, though, indeed, it is only an analogue. A key feature here is that our move toward scientific understanding does not lie in seeking simple empirical universals or procedural touchstones, nor yet in the clerical application to behavior of *ad hoc* formulas such as “cause-effect”, “stimulus-response”, “input-output”, *et al.* Instead we look for conceptual and methodological

unity by formulating the phenomenon of behavior as behavior, but doing so in sufficient logical depth to do some basic justice to the phenomenon.ⁱⁱ You could say, *pace* Sigmund Koch, that Formula (1) “homogenizes” the subject matter of psychology because it places the entire subject matter within a single logical domain. But you could equally say that it organizes the diversity of that subject matter and puts it all together. That isn’t child’s play, but it can be done.

And it should be done. We are long overdue for a responsible and systematic examination of the pre-empirical aspects of behavior and behavioral science. The relation of the pre-empirical aspect of psychology to its empirical aspect, when it is reflected upon at all, is generally thought of on the model of the relation of philosophy to physical sciences. (I have already noted the tendency to call pre-empirical psychological investigations “philosophizing”.) Let me suggest that a better model, though one which has its own limitations, as provided by the relation of pure mathematics to applied mathematics. This model has at least the advantages of getting the methodological priorities straight and of suggesting the vast extent of the pre-empirical aspects of behavior upon which our empirical studies are parasitical. Very likely only the next generation of behavioral scientists will begin to have the preparation and motivation to engage in the taxing study of a domain which today is almost completely foreign to our current academic practitioners of psychology, namely, the domain of behavior itself. Such a study would be one of the major prerequisites in taking us beyond technology and superstition toward a scientific understanding of behavior.

We are already back to the theme of this paper, but, thirdly, I want to return specifically to the four-way interaction that I referred to earlier. In the light of the parametric analysis of behavior and the calculation of forms of description, that four-way free-for-all doesn’t seem at all perplexing, It certainly wasn’t a historical necessity, but neither is it at all surprising that there would be those viewpoints, those committed ways of talking, those parochialisms, those misunderstandings, and those controversies. As I’ve tried to indicate at various relevant points, it seems that all the facts of the matter lie within the range of behavioral possibilities to which Formula (1) gives us systematic access. More particularly, these facts have to do with the range of behavioral options open to observer-describers and critics in our current psychological and philosophical practices. (Recall the discussion of “deliberate action” and its relation to behavioral options and the participation in social practices.) For that very reason, however, that controversy isn’t of much intellectual interest. Given the generative and representational power of Formula (1), I find it hard to imagine pursuing those “controversial” issues or waiting upon their possible “resolution” in order to carry on my business as a psychologist dealing with both human action and non-theological causal explanation. Which is not to say that I wouldn’t be keeping my eyes open to see how those issues develop. Indeed, I think we have a potential for a converse assimilation here. The conclusion that those issues are not inherent in the subject matter, but are only generated as historical accidents by the current customs and styles of philosophers and psychologists is not, of course, a conclusion that I would expect could simply be taken over by philosophers. However, I have no doubt that with some of the concepts and distinctions I’ve presented here one could construct a philosophical argument to that general effect, and that argument would be a philosophical one and it would merit attention by philosophers.

I guess I should say that with a smile.

ⁱ One can imagine a determined philosophical phenomenologist finding Ford automobiles a mysterious phenomenon and then explaining, "A Ford automobile is a species of color. It consists of an actual color patch, together with some epiphenomenal habits of thought which lead us to see *in* some colors the color of rubber, metal, glass, et cetera, and which, further, we experience under the conceptual categories of "material object" and "made by Ford"." And one can (perhaps) imagine Euclid proceeding to define a square as an actual line plus four epiphenomenal somethings called "angles". Whether one considers these examples to be latent nonsense or patent nonsense, they are of a piece with the formulation of behavior as consisting of actual movement plus an epiphenomenal habit of thought on the part of an observer.

In the history of science, little progress, if any, appears to have been achieved by stratifying the subject matter into primary and secondary levels of reality. Yet it would be difficult to claim that scientists, including behavioral scientists, have been any less avid participants in this philosophical pastime than the philosophers themselves. It was not very long ago, for example, that it was common knowledge (textbook style) that perception consisted of actual sensation plus an epiphenomenal something called "meaning". That particular example has passed into history, but if we substitute "controlling variables" for Shwayder's "situational elements" and substitute "operant" for Shwayder's "animal movements" we will in essence (in substance?) have the currently most fashionable psychological formulation of what it is that straightforward behavioral descriptions such as "He was tying his shoes" are epiphenomenal in relation to.

ⁱⁱ I have been, in effect, arguing for the conceptual autonomy of behavioural science. I have made the case primarily in regard to philosophy, since it appears that some of the major current pathologies of behavioural science have arisen in this connection. The case could equally well be made in regard to other disciplines such as linguistics, physiology, and mathematics. I have already said something about linguistics, and I should like to make two comments concerning mathematics.

(a) First, although I have used the "Element-Operation-Product" model of a formal system, the concept of intentional Action is not a formal system in just the way set theory and other mathematical systems are "formal". I will mention two points of difference: (1) For any of the familiar formal systems, the use of that system must be described in terms which lie outside of that system (e.g., the use of a mathematical system must be described in non-mathematical, and specifically, behavioural, terms); in contrast, the use of the IA system is necessarily describable in IA terms. (2) In any of the familiar formal systems the Elements and Operations belong to different logical categories (compare "addition" and "25"). In contrast, in the IA system, both can be given by the same range of forms of behaviour description. The relation between traditional formal systems and the IA system is very much the same as the relation of a performance description to a social practice description.

(b) The point of a formal handling of behaviour is not that one can then "grind out descriptions" any more than the point of arithmetic is that one can then "grind out numbers". Rather, a calculational system is a device which enables us with finite means to comprehend and encompass a domain which is infinite in degree or complexity and it is the only known means of accomplishing this, in rigorous detail as contrasted with just being vague. The need for this is no less apparent in the infinite domain of behavioural possibility than it is in the domain of mathematical possibility and so proceeding in this way is not an unreflective mimicry of mathematics. To paraphrase John Locke, "God has not been so sparing of man as to make him merely two-legged and to leave it to Aristotle and Euclid to make him rational".

REFERENCES

SHWAYDER, D. *The Stratification of Behavior*. New York: The Humanities Press, 1965.