

## BEHAVIORIST AGENCY

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**ABSTRACT:** Behavior analysts, as many behaviorists now identify themselves, rarely if ever use the words *action*, *agents*, and *agency*. Instead, following Skinner (1953, 1972), they substitute the eccentric neologism *operant* for the word *action*, the imprecise noun *organism* for the more specific *agent*, the ambiguous term *responses* (or the ungrammatical plural *behaviors*) for the collective noun *behavior*, while avoiding the abstract noun *agency* altogether. Here I revive and explain the terminology of *action*, *agents*, and *agency* while adhering to an austere set of guiding principles that should be acceptable to most behaviorists.

**Keywords:** Action; agents; disposition; response; reflex; cause; explanation

### Behaviorist agency

I seek to forge a broadly behaviorist account of agency with a physicalist underpinning. Such an account should satisfy several requirements. 1. It should be defined in empirical terms. There should be no reference to, or presumption of, events or processes that cannot be observed either directly or indirectly. 2. It should use vocabulary that conforms to the principles of first order (predicate) logic: There should be no obscure talk of counterfactual conditionals or metaphysical necessities. 3. It should be stated in a broadly physicalist language. There should be no commitment to or postulation of anything that is said or believed to be indescribable in the language of physical science. 4. It should acknowledge causal or statistical determinism of all things and events. There should be no postulation of uncaused events, entities, conditions, or processes. 5. It should use descriptive terminology only. There should be no moral or other prescriptive language. 6. It should eschew final causes. There should be no suggestion that the intended or unintended products of an agent's actions are in some mysterious way the efficient causes of those actions.

This is an austere set of restrictions, but if it can be followed the result will merit being called behaviorist and should be acceptable to all behaviorists except those whose epistemology is an unyielding radical empiricism.

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## Syntax and Ontology

There is no such *thing* as agency: the noun *agency* is not the name of an entity, either mysterious or unmysterious, either physical or ethereal. Still, we will not be talking about nothing when we use the word; for although agency is not a *thing*, it is a *property* and *real* in the very same sense as are such physical properties as hardness and durability, and such psychological properties as intelligence and adaptability, all of which are real in the sense that some physically real things have—i.e., embody—them; for just as there are hard and durable things, so there are intelligent and adaptable beings. Unlike such fictitious properties as a power of clairvoyance or demon possession, which nothing real has, agency is a real property of real entities. Let us call those entities *agents*.

Who are some of these agents? The prototypes, to use Rosch's (1973) apt term, are human beings. Unless we are comatose, catatonic, or dead, most of us are agents of great versatility. Other animals, especially anthropoids, and maybe such mammals as dogs, also appear to have some capacity for action. Sometimes, I think that even such insects as wasps can act; for they seek food, remember where they found it, build nests, fight off rivals, and attack gardeners. However, the lower the animal is on the phylogenetic scale the more it is governed by hard-wired reflexes and the less likely its behavior merits description as action.

The same skeptical reservation applies to plant action. As Aristotle (1941), the inventor of biological taxonomy, pointed out, most plants are too well rooted to be capable of moving about from place to place. Granted, the relentless behavior of a vine climbing a trellis to get better light and air can seem like purposive action, as can the determined spread of weeds in your lawn. For this reason, Dretske (1988) writes of *plant behavior*. However, calling plant behavior *action* would stretch the analogy with prototypical human action so thin as perhaps to be metaphorical.

What about robots? One might be tempted to suppose that some of them can act, and many who consider the question will succumb to temptation, thinking "Those new automatic lawn mowers and vacuum cleaners perform tasks without being tended by anybody." That is true and impressive, but unlike human beings these machines are not self-directed and self-controlled agents, who contemplate options and choose between them. Instead, they behave stereotypically, obeying preset programs within preset boundaries such as walls and buried cables. Having no wills of their own, they are, one might say, "stimulus bound," so lack the adaptability to varied environments that human beings and a few other animals have. They are not agents but extensions of human agency.

Therefore, to ask whether robots act is to ask the wrong question. A better question is whether agency of the sort that human beings possess can be robotocized. And the answer is: It cannot be ruled out a priori, but although the rise of "information technology" in our lifetimes has been impressive, and although some computers can play chess better than even some world class players, no computer is yet a match for a human brain, which is still obviously the most complex entity on

earth and gives us an unmatched ability to learn a variety of tasks, adapt to a variety of circumstances, and effect stupendous changes in our physical environment.

What, then, is this property called “agency” and said to be distinctive of agents—their nominal essence, so to speak? A complex property, it comprises both a *disposition* to act and an *ability* to act or to refrain from acting. We know that most human beings, and perhaps some animals, have this property; for (a) we have observed that they do in fact sometimes act and sometimes refrain from acting, and (b) it is a truth of language that what *does* act has the *ability* to act and must also have the *disposition* to do so; for (c) without these, it neither could act nor would choose to act. Since this statement merely spells out what is meant by the words used, it does not seem disputable.

### Embodiment

Where do agents keep their abilities and dispositions? The question is ill-posed. Dispositions and abilities are not organs, like eyes and stomachs, which might have specific locations in the body. Therefore, the safest proposition is that our abilities and dispositions are widely dispersed throughout our bodies, in our brains, muscles, nerves, bones, sinews, skins, and glands, perhaps even in our fingers and hair. (My sometimes ungovernable hair certainly has its own dispositions).

If we don’t know exactly where and how dispositions and abilities are embodied, how do we know that they *are* embodied? Mostly, we don’t know, though we are not entirely ignorant in the matter. We all know that females behave differently when they are pregnant, and the physiologists have told us why: there has been a dramatic change in their estrogen levels. Farmers know that a boar hog or stallion becomes more malleable and less dangerous when castrated, as do human males who have been made into eunuchs or undergone hormone treatment for prostate cancer. There has been a severe drop in their testosterone levels. For spectacular examples of how rises in testosterone level influence behavior, think of raging bull elephants and rutting stags.

These commonplace examples are alone sufficient to establish the general principle: *there are no dispositions without bodies, and changes in the body can produce changes in behavior that cannot be understood fully without reference to these changes*. What are needed, then, are more scientifically certified explanations of precisely which changes in an animal’s physiology yield which changes in behavior under what conditions. Fortunately, thanks to comparatively new technologies such as FMRI and CAT, behavioral physiologists and neurologists have made great progress in our lifetime relating our behavior to our bodies.

For examples, consult the work of LeDoux (2002) and Gazzaniga (2011), both of whom focus on the brain; or Sapolsky (2018), whose specialty is hormones. Then contrast either with Aristotle, who reportedly attributed human emotions to the heart. It was apparently not until Napoleon’s surgeons saw how wounds to the brains of soldiers changed their behavior that anybody guessed the importance of an intact brain, the organ that must, above all others, be understood if we are to understand behavior fully. Let us hope for more advances from our neuroscientists.

Ignorance of human physiology enabled theologically minded philosophers, from Plato through Augustine and Aquinas to Descartes, to suppose that our bodies were occupied by immaterial spirits that controlled our behavior. Because these spirits were by definition not only unobserved but also unobservable, their unreality was conveniently set beyond disproof, as was belief that we had “wills” that were “free” in the sense that they miraculously enabled us to make choices unmotivated by anything but pure reason; never mind that this claim struck astute observers of human behavior as contrary to plain facts. Aristotle never fell for any of this.

Nowadays, of course, radical empiricists and hard-nosed materialists scoff at belief in such ethereal entities as spirits. With “deliberate abusiveness,” Ryle (1949) spoke of the “ghost in the machine,” and Skinner of the “myth of autonomous man.” I share the aversion of both men to metaphysical fictions, and I too wonder why anyone would believe in what no one can discover by any conceivable means. However, I also believe in the ancient philosophical adage that *function follows form*, which means that, if physical entities are behaving in certain ways, it must be because their capacities and dispositions to behave in those ways are rooted somehow in the internal conformations, organizations, and constitutions of their bodies, even if none of us yet knows precisely where or how. Once the immaterial soul has been eliminated from consideration, there is simply no other place but the body in which such traits might find a home; they can’t exist in thin air.

Acceptance of this reasoning is standard practice in all the physical sciences. As readers will know, physicists have long explained visible and tangible properties by referring to previously unseen physical microstructures, the reality of which were subsequently confirmed by advances in the technology of observation. Why do magnets attract iron nails? It is because their constituent molecules are arranged in dipole, not because they contain immaterial forces. Why is glass fragile? It is because the chemical bonds between its molecules are weak (If you don’t know what that means, ask a chemist; I don’t know either). Physical scientists have been offering and confirming such explanations since Democritus conceived of the atom and Archimedes used the idea to explain the comparative weights by volume of various materials.

Of course, these explanations do not tell us how unobserved structures *cause* the observed features of materials. However, ruling out explanations that invoked such structures just because they were speculative would have stalled the progress of physics, the oldest, most highly developed, most authoritative, most admired, and most useful of the empirical sciences. Forbidding similar “theoretical constructs” in a fledgling science like the science of behavior is guaranteed to stop it in its tracks. It might already have done so. Of what use or interest is a science of psychology if its practitioners cannot speak of *motives, inclinations, tendencies, and drives*—behavioral *dispositions* by other names?

Given the spectacular successes that the physicists have enjoyed these last three centuries with the hypothetic-deductive method of explanation and experimentation, it is hard to understand why behaviorists would want to hobble themselves by restricting their methodology to simple induction and denouncing as

illegitimate explanations that plumb below the observable surface, since it is only there that really illuminating explanations are likely to be found.

### One Objection

Nevertheless, there are reasons why some investigators prefer the surface. One is that explanations invoking hypothetical properties are not *causal explanations*, the only kind wanted by scientists more interested in prediction and control than in theory. As just seen, however, the standing physical explanations of fragility and magnetism do not tell us which events cause some materials to *become* fragile or magnetic; they merely tell us what it means for them to *be* fragile or magnetic. Finding out how to make iron magnetic or strong like steel takes new inquiries.

In the meanwhile, it is an error to mistake structural explanations for attempts to identify efficient causes. Rather, as I have shown elsewhere, (Hocutt, 1974) they give what Aristotle's translators mislabeled "material causes." For a simple illustration of the point, consider why Socrates died. The well-known answer is "He was made to drink poison." That answer gives us the efficient cause of the great Athenian's demise. But drinking hemlock would not have killed Socrates if it had not harmed his body. So, there is another answer to our question: the hemlock destroyed Socrates' physiological integrity, a fact that we need to know to understand why the efficient cause of his death was in fact efficient. A man with an iron stomach would presumably not have been affected, much less killed.

Analogous remarks apply to "formal causes" such as Socrates' mortality and humanity. That Socrates would not have died if he had been an immortal god or a block of stone instead of a mortal man made of perishable flesh is not a trivial fact despite its seeming obviousness. Nevertheless, talk of both formal and material causes is today mistakenly regarded as *nonsensical* when it is rather *syncategorematic*. Like the phrases "fictional beings," which are not beings, and "prospective husbands," which are not husbands, "formal causes" are not *causes* in currently accepted usage, in which the phrase "efficient causes" is pleonastic.

The point? Explanations giving formal "causes" are oranges and shouldn't be judged as if they were apples, statements of efficient causes. Thus, taken on their own terms, explanations such as the following are perfectly respectable. Why did that object break? It was breakable. Why does that child learn faster than that one? She is more intelligent and more willing. Why are men more aggressive than women? Nature or evolution made them that way. Such explanations sound tautological because they are meant to be. All truths of language are tautologous, but that does not make them either useless or dispensable.

Admittedly, we feel better about all high abstractions when we can tie them down to something more concrete—like "She learns quickly because she has a good brain and got a good education," or "Men rule the world because they are filled with testosterone." However, until we can find concrete anchors like these, we may regard explanations invoking merely formal "causes" as promissory notes that will eventually cash for real money.

### A Second Objection

We have looked at one reason for balking at talk of psychological properties. Another reason is fear of reifying them as autonomous homunculi. Skinner thought it enough to say that Samuel Johnson drank no alcohol. To add that the dictionary maker was “temperate” seemed to invoke a hidden inner cause that no eye could espy or ear hear.

Surely, this was a mistake. Temperance is manifest whenever alcohol is readily available but not consumed. So avoiding behavioral dispositions for fear of sliding into spiritualism is like avoiding sex for fear of sliding into lechery. One might as well doubt the ability of balls to bounce and of wheels to turn. Those who do doubt it are using the wrong tests. They should try throwing the ball against the wall and giving the cart a push.

To measure psychological properties also requires the right tests, and the fact of the matter is that we have long had many good and useful tests of psychological properties. For examples, think of IQ tests, MMPIs, MSATs, and so on. Granted, these never yield perfect measures, but perfection of measure is too much to expect. Besides, the reliability and accuracy of a test can usually be improved with convergent measurements. Hence the carpenter advises his apprentice: *measure twice, cut once*. That is how one knows that a board is 6' long give or take 1/16" or that Jones has an IQ of 120 give or take half a standard deviation, usually about as close as we can expect to come. Granted, psychological traits differ from physical traits, but if any trait, physical or psychological, is measurable, it must be observable in some way.

The \$64 question, then, is: How do the psychological test makers measure supposedly invisible traits? And the \$64 answer is: On the theory that psychological traits manifest themselves in identifiable kinds of behavior, the testers take a sample of the tested individual's behavior. For readers who are not expert in these matters, here is roughly how it works: Once constructed, a test's *reliability* is confirmed by finding that retests yield similar results, and the test's *validity* is confirmed by finding that it picks out those who have more of the trait in question than those who have less.

Does the school's IQ test consistently enable teachers to predict which students will learn easier and faster, or learn what other students cannot? Then it is a good (i.e., reliable and valid) test of intelligence. Whether the intelligence thereby measured was a product of nature or nurture is a separate question into which we need not go here, though we know that it is a function of both. The moral of the story is that the successes of psychological testing have demonstrated that psychological properties can be measured, and what can be measured can be observed, if only by observing how these properties manifest themselves in behavior.

### A Third Objection

This last remark brings us to the third and probably most important reason that some behaviorists disavow psychological traits and dispositions: belief that these properties cannot be *observed directly*, only *inferred* hypothetically from observations of behavior, making them dubious fictions rather than proven realities. Some behaviorists regard such “hypothetical constructs” as both *fallible* and *needless*—*fallible* because a man might not be drinking because he is thirsty but to get some pills down or to get drunk, *needless* because we can always talk instead of probabilities of response as these are determined by frequencies of observation. These are no doubt the sorts of considerations that made logical positivists of distinguished physicists like Schlick and Mach, both of whom influenced Einstein for a time, and one of whom, Mach, influenced Skinner.

However, no procedure is mistake-proof. So, the fact that observers can err when assessing personal dispositions and abilities does not discredit belief in the reality of these characteristics. Besides, few physicists any longer share the austere epistemological dispositions of Schlick (1925) and Mach (1893/2013). Theoretical physics is again a booming enterprise, thank goodness; and black holes, which have recently been “photographed,” were once invisible by definition. Nor was anybody there to observe the “Big Bang” of cosmologist George Lemaitre’s speculations.

As for probabilities, it must most certainly be granted that they are necessary for scientific reasoning, but dispositions are not *identical with* probabilities, merely *measured* by them. So, grant that A is more likely than B to solve a problem and that we know this because we have observed it in the past. Still, we are left with a question: What difference between A and B explains the difference in their behavior? Here we might need to invoke A’s superior intelligence. True, this characteristic will itself need further explaining, either in terms of nature or nurture, or in terms of brain structures and sizes. But such is the way of science. Answers to one question pose another.

### Radical Empiricism

The objections just considered and answered were all made from the point of view of radical empiricism. Few philosophers or scientists any longer take this philosophy as seriously as many once did. The problem with it was simply that, in order to avoid possibly mistaken speculations, its proponents raised the bar of observability so high that nothing could get over it. They did this by declining to count as observations anything but momentary sensations that they mistakenly thought to be mistake-free because devoid of interpretation.

This misbegotten policy was misguided in multiple ways. First, and most importantly, nothing is *absolutely* observable or unobservable—observable or unobservable *in itself*. Useful observation requires competent and knowledgeable observers in conditions that permit accurate observation. Even the sighted see nothing in the dark, and even loud sounds cannot be heard by the deaf. Also, an observer must know what she is looking for. That is why a scientist who needs data on which to speculate or base inferences wants his observations to be made by someone with good eyes, good equipment, and a proven capacity for the task,

preferably another trained scientist. Of lesser value are the reports of amateurs, who have brought little but enthusiasm to their observations and wouldn't know a finch from a titmouse.

Second, there is always more to observing than having sensations, and despite positivist devotion to "sense data," an uninterpreted sensation is more ground than figure, more provocation than resolution, more question than fact. Thus, our response to a sudden noise is to start and ask, "What was that?" Until that question is answered, there is no observation—no conclusion and no statement; there is only a puzzle. Hence, if I may quote from memory, Peirce asserted (1931/1958) that intelligent observing always involves thoughtful testing of tentative hypotheses about the likely causes of what is sensed. In other words, you don't just look a potentially important thing over; you "size it up." R.L. Gregory (1987) urged the same point. Thus, the response to an odor might be "That smell is propane," and the response to a loud noise might be "That crash was a tree falling."

Finally, as Hanson (2018) pointed out with a brilliant metaphor that wears its meaning on its sleeve, observation is "theory-laden." Quine (1953) underscored the point with his "myth of a sensory given," and Goodman (1978) repeated the expression. Nor were they the first to recognize this truth. In fact, these authors were all restating an ancient aperçu. Heraclitus observed 25 centuries ago "Sight and hearing are useless to those who don't know their language." (For those whose Bayesian priors are too rigid, the popular saying is "There are none as blind as those who will not see.") Kant (1929/1781) added a pleasingly symmetric version: "Concepts without percepts are empty, but percepts without concepts are blind" (p. 93). A century later, Whewell declared that there is no experiment properly so-called without a hypothesis to guide it. This sentiment was also voiced by Einstein, who said, according to Heisenberg (1968), "Whether you can observe a thing or not depends on the theory which you use. It is the theory which decides what can be observed" (p. 40).

### **Actions as Causes**

Agency has so far been defined as an ability and disposition to act, but I have been too busy defending the concepts of abilities and dispositions to explain more fully what it means to *act*. It is time to undertake that forbidding and formidable task, with which I will need and have considerable help from some of my more able forebears.

Fortunately, the common, if imprecise, idea of action is already possessed by virtually all native speakers of English, a language full of names of actions. Also fortunately, doing the philosopher's job of reminding us of what has been either forgotten or overlooked, some very fine philosophers analyzed the idea of action and spelled it out for our benefit in the last half of the 20<sup>th</sup> century. Among these philosophers were Anscombe (1963), Chisholm (1966), Davidson (2001), and Dretske (1988). There are others, of course, but the last two will suffice for present purposes.



## Skinner

However, before we look at what our philosophers had to say, let us look again at Skinner's (1953,) illuminating and useful if imperfect attempt to explain actions without designating them as such. In Skinner's lexicon, which has become standard for behavior analysts, actions are renamed *operants* and said to be *emitted* by a behaving *organism* that *operates on* the environment instead of *being operated on* by it. By contrast, reflexes are renamed *respondents* and said to be *elicited* by environmental *stimuli*. So far, so good.

However, despite contrasting the two, Skinner continued for a time to describe both respondents and operants as *responses*, using a term that suggested to many readers that both were alike in being simple and straightforward functions of stimuli. When this caused him to be accused of practicing Pavlov style stimulus-response psychology, Skinner acknowledged that his terminology could be misleading and excused it by remarking that it had become customary. It was an honest observation, but it did not mitigate the confusion. In fact, it exacerbated it—as, unfortunately, did Skinner's claim that operants were controlled by consequences that came *after* them. Here was backwards causation in spades.

There is more. Although Skinner's (1953) use of the colloquial adjective *emitted* suggested, correctly, that operants came from *within* the agent, this was an implication that Skinner (1972) would emphatically disclaim. Also, Skinner's (1953) claim that operants operated on the environment, instead of being operated on by it, implied that at least some control was exercised by the behaving organism, not by the environment—also an idea that Skinner (1972) repudiated while emphatically assuring us that *all* the credit for an organism's behavior belonged to its environment.

If it were not for these belated qualifications and reversals, Skinner's (1953) explanation of operants would have continued to comport with common understanding of the standing concept of action, and his explanation of respondents would correspond to common ideas about reflexes. In the common view, and in Skinner's as first set out, actions are distinguishable from reflexes in being voluntary and proceeding from an agent without being elicited by a specific stimulus, while reflexes are passive responses to proximal stimuli; so, actions change the environment while reflexes are changes made in the responding organism by the environment.

Skinner (1972) does continue to insist that respondents are “controlled” (i.e., caused) by their eliciting stimuli, and operants are “controlled” (i.e., strengthened or weakened—literally, made more or less probable) by their consequences. I know of no place where he pauses to note that his talk of “control” was equivocal: respondents and operants were “controlled” in different senses of the word, respondents by the efficient cause of the stimulus, operants by the final cause of increases in the “organism's” responses.

What was wrong with all of this? Two things: First, respondents are responses to readily identified stimuli, but, as Skinner would eventually acknowledge, the stimuli that operants are purportedly responses to are often, if not

usually, impossible to identify; for they might in particular cases be any of a large variety of distinguishable environmental circumstances and events. Second, Skinner's use of the verb "control" was inexact in that a single response on a particular occasion logically cannot be made more likely by its consequences; once made, it has probability of 1. Only a *kind* of response can be made more or less likely.

To his credit, Skinner eventually clarified this last point by talking of *classes* of stimuli and responses. However, he still unwisely retained the metaphor "control" as a synonym for *cause*. According to Webster's *Dictionary*, to *control* is "to have power over, to regulate," which requires a controller, usually a person, but certainly not, as Skinner said, "the environment," which is not a person and varies with each "organism" despite the singularity of Skinner's designation of it.

Having thus carped at Skinner's terminology, I should now say in his defense that the pioneering task he had undertaken was so complex that such verbal slips were inevitable. Furthermore, when he recognized them, he acknowledged them, as a good scientist should. The question that remains is whether anybody has since done better. I shall now argue that some have— but not until after having benefitted from reading Skinner they undertook to correct his mistakes.

### Davidson

As just seen, Skinner distinguished actions from reflexes by comparing the ways in which they were "controlled," i.e., caused. In other words, he treated them both as primarily *effects*. The philosophers that we will consider next treat actions as primarily a kind of *causes*; *in their view, it is reflexes that are merely effects*. What kind of causes are actions? The kind that only agents with a power of agency can bring into being.

Concerned mostly with specifying the requirements for legal and moral responsibility, philosophers such as Anscombe (1963) and Chisholm (1966) emphasized that mere motion is not action. Having your arm moved by somebody else is not your action; you must move it yourself. Some action also had to be intentional, and it was so only if caused by the agent's intentions, internal psychological states. Thus, Anscombe declared that *every* action is intentional "under some description." If you turned on the light, you must have intended to do so. However, none of these philosophers were metaphysical dualists; all of them took for granted that the "mental" causes of actions were physical events within the agent's body.

On this point, Davidson (2001) agreed with Anscombe and Chisholm but wanted to explain what it meant to say that actions are causes. To illustrate Davidson's theory, he imagined an agent, call him Sam, who once alerted a burglar by flipping a switch that turned the light on. Sam did *not* intend to alert the burglar, since he did not know she was there. Yet, another description of what Sam did might be "He alerted the burglar by turning on the light." If the burglar subsequently died from jumping out the window, still another possible description of Sam's action is 'He caused the burglar to take an action that killed her.'

Not surprisingly, some found this analysis unintuitive. Should Sam really be said to have caused the burglar's death by turning on the light? One thinks not.

That the intruder caused her own death when she jumped out the window is intuitively a more satisfying analysis. However, there is a problem: Causation appears to be *transitive*, if cause A has effect B which has further effect C, then C also counts as an effect of A. Does it not follow, then, that Sam caused the burglar's death by flipping that switch? No doubt, the lawyer for Sam's defense will point out that, since he did not *intend* to kill her, he is not guilty of her *murder*.

Was this a *reductio absurdum* of Davidson's analysis? He thought not. What all of it showed was only that one and the same action—viz., Sam's flipping that switch—*can have several more or less complete descriptions*, each of which might be true but apt only for a certain purpose, say a trial for murder. Davidson concluded that, in the final analysis, Sam performed only *one* action: *He moved some muscles and turned on the light*; after that, it was all effects. It followed that, to avoid irrelevant moral and legal concerns, *scientific* study of action should focus on what Danto (1965) had called *basic actions* such as moving muscles to turn on lights, full stop. What lawyers might wish to make of Sam's actions by adding more remote effects to their descriptions of them is of no philosophical or scientific concern.

What happened to the transitivity of causation? Davidson paradoxically concluded that causation was transitive and action was causation but not transitive, a seeming contradiction. This paradox stimulated a great deal of discussion among philosophers, but I know of none who proposed what seems to be the solution: Causes are only partially transitive. Belief to the contrary presumes that causation involves an unbroken chain of isolatable events: a single determinate cause A has one determinate effect B which has a single determinate effect C, and so on. In this construal, A is the sole cause of B, which is the sole effect of A, and so on to C and beyond.

That sounds logical at first hearing, but in the real world, causes and effects do not come singly; they come in bunches. Cause A is always one of many circumstances that must exist for the occurrence of A to bring about B, and B is itself one of many causal factors needed to yield effect C, and so on. So, talk of *the* cause or *the* effect of a *single* event is simplistic; causation is irreducibly a relation between *kinds* of events. Talk of the cause of *single* events makes such limited sense as it does only if it is about the factor that, when added to other existing factors, makes the total sufficient for the effect. 'The last straw broke the camel's back' means 'The Bactrian's load was already at its limit given the creature's previously abused spine.'

The moral of the story is that, in single cases, the contribution of cause A to effect B is always partial and becomes attenuated at each successive link of the causal chain. Consider a succession of links ABCDE, each having a probability of .9 in producing its immediate successor. Given A, the probability of B=.9, C=.81, D=.73, E=.66, and so on. Descriptions of actions that identify them by their effects will always be either endless or incomplete, and in any case useless or misleading. Sam cannot be accused of having caused the intruder's death *all by himself*. He had only a small and accidental part in it.

Recognizing that talk of causes and effects has ambiguity in single cases, Kantor, and Smith (1975) suggested talking instead of a causal field or mesh. That terminology explains why, to find the causes of any effect, an experimental scientist

must focus on a few elements of the field and pull on one string of the net at a time in order to disentangle it from the others. More literally, she must start by isolating a single determinate event and seek laws that relate events like it to a class of antecedents.

That was clearly Skinner's method in studying operant behavior by pigeons, and he had great success with it. Galileo, the greatest experimental scientist since Archimedes, had proved this method by studying a few carefully machined balls rolling down an inclined groove in order to discover the laws of falling bodies in idealized circumstances. The fact that the balls absorbed kinetic energy in their rotation down the groove was an effect for a later generation to analyze. It was also left to our astronauts to conduct a more obvious test by comparing the falls of two objects of different weights on the moon, where the lack of an atmosphere meant that there was no need to fear deflection of either object by wind.

Now that experimenters have the means to peer into the body, methods similar to those of Galileo and Skinner can be used to test the theory that the ultimate causes of basic actions are events in the agent's brain. There being no law against it except a self imposed one, behavior analysts might one day choose to become neurophysiologists too. A few already have.

### Dretske

It was left to Dretske (1988) to spell out the implications of Davidson's analysis. As Dretske explains, to act is to do something, to make some change, to bring about some effect, to cause something to happen, usually something desired. Acting therefore always involves moving either your entire body in order, say, to get somewhere, or a single appendage in order, say, to move something out of the way. Like other analysts, Dretske contrasts actions with their contraries, but he distinguishes two kinds. One is undergoing or suffering an involuntary change or event, such as stumbling over an obstacle or accidentally falling off a ladder. In these cases, you move in response to an external stimulus or as a result of something that happens to you, not because you have any inner disposition to move. So, kicking a dog and stepping over it are actions, but stumbling into a dog because you were tripped are not, and everybody, including the dog, knows the difference.

A second contrary of action is reflex. Involuntary movements such as sneezing and reflexive coughing are responses, and in Dretske's lexicon they count as behavior; but they are not actions. Skinner (1953) sometimes called them "reflex actions," but although some of our great grandparents had the habit of inducing sneezes by sniffing snuff, people don't usually choose to sneeze. True, sneezing is often described as something *you do*, as is coughing—such is the looseness of workaday language. But while some coughing can be voluntary, coughing from a cold is usually not only involuntary but hard to suppress without cough syrup. Dretske nevertheless agrees with Skinner in calling reflexes *behavior*, though in colloquial speech "behavior" is synonymous with "action" and does not also denote reflexes. When your mother told you to behave, she was asking you to suppress a giggle, not a sneeze.

To be clear, it must be emphasized that nothing in Dretske's talk of inner causes entails the existence of unobservable homunculi or immaterial selves that make decisions for agents without anything motivating those decisions. In Dretske's hypothesis, all of the internal causes of actions—including such "mental" causes as thoughts, beliefs, and desires—are presumed to be physical events or states that had causes in the agent's environment and history. There is in Dretske's account no postulation or presumption of a prime mover unmoved; his agents are not gods with a miraculous capacity to transcend the natural order of things. So nothing will preclude regarding the internal motives of actions as themselves the effects of determinate external causes.

In another era, the materialist Thomas Hobbes (1994) put a similar hypothesis by guessing that thoughts were just "motions in the brain." To Hobbes, this hypothesis provided an obvious basis for common sense, folk psychology explanations of behavior: You wanted an apple; you saw one; you ate it. Where else could your desire and perception be than in your gut and brain? Hobbes had no way to test this hypothesis, but we do now. So, there is no longer a good reason for behavioral scientists to hamper themselves by refusing to consider similar hypotheses.

### Summary and Conclusion

We have just briefly reviewed three ways to talk about actions. Davidson tried regarding them as causes identifiable with their effects. Actions are certainly causes but, as Davidson duly noted, identifying them with their remote effects is not always apt, for there is simply no way to know all the manifold and distant effects of any cause, since there is no way to discern the causes of an effect without experiments that isolate one cause from the other circumstances which make it efficient. Davidson ended up identifying basic actions with the movement of muscles that have a direct effect on the environment—e.g., moving a hand to flip a light switch to turn on the light. The more remote of these effects are discounted as serves one's purpose when describing the action.

Accepting Davidson's claim that actions are causes, Dretske remembered that they also *have* causes and attributed them to internal mental but physical events. This attribution would have displeased the Skinner of 1972, but it captures our workaday concept of action very well and also comports with Skinner's 1953 claim that actions are emitted from within rather than elicited from without and operate on the environment rather than being merely operated on by it. This idea is heresy for some true believing behavior analysts, and Skinner later took much of it back, but it is consistent with both common sense and a more liberal understanding of the requirements for a coherent behaviorism. Call this methodological behaviorism if you like. Better still: call it 'embodiment behaviorism.' But please don't call it metaphysical dualism; for it is not.

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