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Minding Rachlin's Eliminative Materialism

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Rachlin's teleological behaviorism eliminates the first-person ontology of conscious experience by identifying mental states with extended patterns of behavior, and thereby maintains the materialist ontology of science. An alternate view, informed by brain-based and externalist philosophies of mind, is shown also to maintain the materialist ontology of science, but without eliminating the phenomenology of consciousness. This view implies that to be judged human, machines not only must exhibit complicated temporally structured patterns of behavior, but also must have first-person conscious experience. Although confirming machine sentience is likely to be problematic, extended contact with a machine that results in a person interacting with it as if it were conscious could reasonably lead to the conclusion that for all intents and purposes it is.

Evidently, Rachlin (2012), like many other scientists and philosophers, finds problematic the internality, privacy, ineffability, and nonphysicality of mental events such as consciousness of the external world, the subjective experience of pain, qualia, raw feels, and so on. The philosopher of mind Colin McGinn (1994) discussed various ways in which thinkers have tried to deal with this dilemma, one of which is to "eliminate the source of trouble for fear of ontological embarrassment" (p. 144). This is what Rachlin has done. By identifying mental events and states with extended patterns of behavior, he has dispatched the phenomenology of consciousness *tout de suite*, leaving behind a purely materialist account of human behavior. It follows immediately that a machine can be human, provided only that it can be made to behave as a human behaves over extended periods of time. The only problem that remains, then, is to determine what patterns of behavior constitute "behaving like a human," and this is what Rachlin addresses in his paper.

Thirty-two years ago, the noted philosopher John Searle (1980) published a paper in *Behavioral and Brain Sciences* in which he presented his now-famous Chinese room argument against the computational theory of mind that is entailed by cognitive science and much artificial intelligence research. Rachlin was a commentator on that article and in his published remarks made arguments similar to those advanced in his present paper. In Searle's response to Rachlin, he said "I cannot imagine anybody actually believing these [i.e., Rachlin's] views. … What am I to make of it when Rachlin says that 'the pattern of the behavior *is* the mental state'? … I therefore conclude that Rachlin's form of behaviorism is not generally true" (p. 454). Rachlin's version of eliminative materialism will be regarded as not generally true by anyone who, like Searle, believes that an adequate account of human behavior must accept as real and deal

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with the phenomenology of consciousness. And their number is legion. In an earlier paper, Rachlin (1992) commented on widespread "antibehaviorist polemics from psychologists of mentalistic, cognitive, and physiological orientations as well as from philosophers of all orientations" (p. 1381). This sentiment is directed toward behaviorism as philosophy of mind. It gives rise to charges that behaviorism is ludicrous (Edelman, 1990), an embarrassment (Searle, 2004), and not generally true. Unfortunately, such sentiments and charges often generalize to behavior analysis, the science of behavior, which of course can be practiced in the absence of any commitment to a philosophy of mind, and probably usually is.

For most people, philosophers and scientists included, conscious experience with a first-person, subjective ontology is prima facie evident as a property of human existence. *Res ipsa loquitor*. Rachlin does not explicitly deny this, but neither does he assert it. To assert it, given his teleological behaviorism, it seems that he would have to revert to a form of dualism, probably epiphenomenalism. There would have to be something *in addition to* temporally extended patterns of behavior, which would be the conscious experience. On the other hand, if he denied it, well, then Searle and many others would continue to wonder how he, or anyone, could believe such a thing.

There are at least three alternatives to Rachlin's eliminative materialism. One is to practice the science and clinical application of behavior analysis without a commitment to a specific philosophy of mind. This is not a bad alternative. Philosophers, and perhaps some scientists, might eventually sort things out and develop an understanding of conscious experience that could inform the science and clinical practice of behavior analysis in a useful way. It is important to note that this alternative entails agnosticism about mind, not eliminativism. A second alternative is to revert to a form of dualism that acknowledges consciousness as *res cogitans*. This is probably not a good idea because dualism, like eliminative behaviorism (behaviorism that entails eliminative materialism), is roundly rejected by philosophers and scientists of all persuasions (e.g., Searle, 2004). In our scientifically minded world, we do not like the idea that a substance could exist that is not matter (dualism), just as we do not like the idea of denying what appears to be right under our noses (eliminative behaviorism). A third alternative is to try to reconcile the first-person, subjective ontology of consciousness with the materialist science of behavior. This is a tall order, but philosophers of mind have been working on a general form of this problem for many years. This third alternative will be considered further in the remainder of this paper.

THE PHENOMENOLOGY OF CONSCIOUSNESS

What is consciousness? Many philosophical treatises have been written to address this question. This vast literature cannot be reviewed fully here, but we can get at least a basic understanding of the nature of consciousness by considering what is called *intentionality*. This is an idea that was introduced by Franz Brentano (1874/1995) and was later developed by Edmund Husserl (1900–1901/2001) and Jean-Paul Sartre, among others. Intentionality refers to the phenomenal fact that consciousness always appears to have an object. Consciousness is not an entity that exists on its own, like, say, a chair. Instead, it is a process or action, a consciousness *of* something. It is a *relation* toward objects in the world. Consciousness is not a thing, as its nominative grammar misleadingly suggests (cf. Wittgenstein, 1953/

1999). It will be helpful to keep in mind the Husserlian motto, consciousness is always consciousness *of* something.

In a remarkable paper, Sartre (1947/1970) rhapsodized that Husserl had delivered us from the "malodorous brine of the mind" in which contents of consciousness float about as if having been consumed. No, said Husserl, consciousness, or mind, cannot have contents because it is not a substance with, among other things, an inside. It is not a stomach. The objects of conscious experience are not assimilated into the mind, according to Husserl, they remain out in the world, the point that Sartre celebrated in his brief paper. Consciousness is always consciousness *of* these external objects, *tout cour*. Husserlian intentionality also extends to consciousness of ourselves:

> We are … delivered from the "internal life" … for everything is finally outside: everything, even ourselves. Outside, in the world, among others. It is not in some hiding-place that we will discover ourselves; it is on the road, in the town, in the midst of the crowd, a thing among things, a human among humans. (Sartre, 1947/1970, p. 5)

This understanding of conscious experience is echoed in Rachlin's view that extended patterns of behavior in the external natural and social world are constitutive of humanity (and consciousness). Hilary Putnam (1975) advanced an analogous, externalist view of meaning, and Maurice Merleau-Ponty's (1942/1963) phenomenology and psychology likewise have a strong externalist cast (Noë, 2009).

Sartre (1957/1960) further developed his view of consciousness in *The Transcendence of The Ego: An Existentialist Theory of Consciousness*, in which he discussed what might be considered two classes of conscious experience. The first, which will be referred to as primary conscious experience, does not entail an "ego," that is, a reference to the person who is having the conscious experience:

> When I run after a street car, when I look at the time, when I am absorbed in contemplating a portrait, there is no *I*. There is consciousness of the streetcar-having-to-be-overtaken, etc. … In fact, I am then plunged into the world of objects; it is they which constitute the unity of my consciousnesses; it is they which present themselves with values, with attractive and repellent qualities—but *me*, I have disappeared. … There is no place for *me* on this level. (pp. 48–49)

It is possible, however, to reflect on having a conscious experience, which then creates, as it were, the ego as a transcendent object, according to Sartre. This will be referred to as secondary conscious experience. In an act of reflection, "the *I* gives itself as transcendent" (Sartre, 1957/1960, p. 52), that is, as an object of consciousness, and hence as an object in the world. Furthermore, "the *I* never appears except on the occasion of a reflective act" (p. 53). This represents a radical break with Husserl, who held that the *I* always stood on the horizon of, and directed, conscious experience. For Sartre, the ego does not exist except in an act of reflection, and then it is an object of consciousness just like any other.

If phenomenology is the study of consciousness, and if human consciousness is always consciousness of the external world in which humans are immersed at every moment of their waking lives, then the study of consciousness must be the study of human existence. In this way, for Sartre, phenomenology becomes existentialism. What is important is not what a human being has as a set of properties, that is, his essence, but what the human being does, his existence or being-in-the-world (Heidegger, 1927/1962). The resonance of this perspective with a behavioral point of view is noteworthy. I have discussed some of the common grounds between behavior analysis and existential philosophy in other articles (McDowell, 1975, 1977). The task of the existential phenomenologist is to describe human existence, a topic that Sartre (1956/1966) turned

to in *Being and Nothingness*. The task of the behavior analyst is to understand human behavior, which is a different approach to what is in many ways the same thing.

The elements of Sartre's understanding of consciousness discussed here can be summarized in three statements. (a) Consciousness is always consciousness *of* something and hence it is a process or action, a relation to things in the world. It follows that consciousness is not a substance or object (i.e., it is not *res cogitans*), and consequently it is not something that can have contents, like a stomach, or that can be located in a part of space, such as the brain, the head, or elsewhere in the body. (b) The "ego" or *I* is not something that stands behind and directs consciousness, as Husserl supposed. Instead, the *I* is given as an object of consciousness in an act of reflection; it is an object of consciousness like any other. Furthermore, the *I* does not exist except in an act of reflection. It follows that at least two classes of conscious experience can be distinguished, namely, primary consciousness, which is consciousness of objects in the world that does not include a reference to the consciousness of the subject, and secondary consciousness, which entails an act of reflection and hence includes a reference to the consciousness of the subject. These types of consciousness are not fundamentally different inasmuch as both are conscious experiences *of* something. But in secondary consciousness, the something entails a reference to the consciousness of the subject and hence creates the Sartrean *I*. (c) If conscious experience always exists with reference to the world, then it is probably best to study and try to understand it in the context of the human being acting in the world, which is to say, in the context of human existence, action, and behavior in the natural and social environment.

No doubt some philosophers would take issue with some of these points. Searle (2004), for example, would probably want to include a few additional considerations. But I think most philosophers would agree that this is at least a good start to understanding the nature of consciousness. Before going any further, it might be worthwhile to consider a possible contradiction. Why, if consciousness is right under our noses and therefore is immediately apparent, do we need a phenomenological analysis of it? Why do we need philosophers to tell us about the nature of conscious experience? Don't we already know, because we have it? The answer to these questions is that the brute fact of consciousness is what is right under our noses. It is possible that a careful analysis could uncover something important about its properties and nature, or could refine our understanding of it. If, when a philosopher says something like "consciousness is always consciousness *of* something," we examine our own conscious experience and find that it is consistent with the philosopher's statement, then we have benefited from the philosophical analysis.

Since the work of Husserl and Sartre, the philosophy of mind has come to be influenced strongly by neuroscience. Many contemporary philosophers of mind seek a physical, that is, a materialist, account of consciousness, and most (maybe even all) look to brain function as the source of conscious experience. This focus on the brain is likely to be problematic in view of the foregoing analysis of consciousness as a property of human interaction with the natural and social environment. Nevertheless there are some ideas in these brain-based philosophies that are worth considering.

BRAIN-BASED PHILOSOPHIES OF MIND

Three points of view will be discussed in this section, namely, those

advanced by John Searle, Thomas Nagel, and Colin McGinn. Searle puts forward the idea that conscious experience is a natural property of the material function of the brain, and therefore something that simply happens as the brain goes about its business of regulating commerce between the whole organism and its environment. Nagel's view is similar, except that he is wary of contamination by remnants of Cartesian dualism. A view like Searle's may be overreacting in a way, and hence too insistent on *res extensa*. An alternate possibility, according to Nagel, is that a new conceptual framework is required that would allow us to consider both brain function and conscious experience as a single type of thing, undercutting, as it were, the duality of Descartes. McGinn likewise advances a point of view much like Searle's, but he concludes, pessimistically, that a full understanding of how brain processes give rise to conscious experience is, in principle, beyond human comprehension.

John Searle

Searle (2004) believes that much confusion was created by, and has persisted because of, the language of Cartesian dualism. *Res extensa* and *res cogitans* are too starkly bifurcated. What is needed is an expanded notion of the physical that permits a subjective element. Such a notion would allow conscious experience to be a part of the physical world. Consciousness, according to Searle (1992, 2004) is caused by brain processes and therefore is causally reducible to them. Conscious experience nevertheless retains its subjective, first-person ontology and therefore is not *ontologically* reducible to brain processes. The two, neural activity and conscious experience, are different aspects, or levels of description, of the same thing, in the same way that, say, the molecular structure of a piston and the solidity of the piston are different aspects, or levels of description, of a piston (Searle's example). However, in the case of conscious experience and the brain processes that cause it, the two aspects have different ontologies, that is, the reduction of conscious experience to brain processes is causal but not ontological.

Thomas Nagel

Nagel's view falls somewhere between Searle's and McGinn's. Early on, Nagel (1974) expressed doubt about whether existing conceptual categories and schemes could be used to obtain an effective understanding of consciousness from a physicalist perspective. Searle wanted to expand the concept of the physical to include subjective elements. In contrast, Nagel wants to expand the concept of the subjective to include elements of the physical (Nagel, 1998, 2002). The first step is to acknowledge that the manifest properties of conscious experience, such as its subjectivity and first-person ontology, do not exhaust its nature. In other words, there also may be physical properties that are not manifest in the conscious experience itself. This is an important and plausible idea, and it bears repeating. The manifest properties of conscious experience, in particular its first-person, subjective ontology, may not exhaust its nature. There may be other, perhaps physical, properties of consciousness that we do not experience directly. For example, as I type these words I experience the movement of my arms, hands, and fingers on and over the keyboard, but I do not experience the many neuron firings and electrochemical events that I know are occurring in my central and peripheral nervous system, and that in principle could be detected with appropriate instrumentation. It is possible that my conscious experience of my body *entails* these neuron firings and chemical events, rather than just goes along with them.

Whereas Searle expresses his view with assertive certainty, Nagel is more

tentative. To say that the mental supervenes on the physical, which Nagel (1998) believes to be the case, does not constitute a solution to the problem. Instead, it is "a sign that there is something fundamental we don't know" (Nagel, 1998, p. 205). Nagel's (2002) view is that a radically different conceptual framework is required in order to understand these matters fully:

> If strict correlations are observed between a phenomenological and a physiological variable, the hypothesis would be not that the physiological state causes the phenomenological [which is Searle's view], but that there is a third term that entails both of them, but that is not defined as the mere conjunction of the other two. It would have to be a third type of variable, whose relation to the other two was not causal but constitutive. This third term should not leave anything out. It would have to be an X such that X's being a sensation and X's being a brain state both follow from the nature of X itself, independent of its relation to anything else. (p. 46)

X would have to be something "more fundamental than the physical" (Nagel, 2002, p. 68). I understand this to mean that X must be something *conceptually* more fundamental than the physical, not a *substance* that is more fundamental than the physical. An example would be a field (Nagel's example), analogous to the electromagnetic, gravitational, and Higgs fields that have proved to be useful in physics. An appropriately conceived field might be understood to give rise to both brain processes and conscious experience, and also to explain their connection and interaction. Nagel (2002) goes on,

> We may hope and ought to try as part of a scientific theory of mind to form a third conception that does have direct transparently necessary connections with both the mental and the physical, and through which their actual necessary connection with one another can therefore become transparent to us. Such a conception will have to be created; we won't just find it lying around. A utopian dream, certainly: but all the great reductive successes in the history of science have depended on theoretical concepts, not natural ones—concepts whose whole justification is that they permit us to give reductive explanations. (p. 47)

Colin McGinn

Whereas Nagel is hopeful that a true understanding of consciousness in the material world can be achieved, McGinn (1993, 2002) has given up hope. Like Searle and Nagel, McGinn believes that conscious processes supervene on brain processes but are not ontologically reducible to them. Searle believes that this provides a reasonable understanding of consciousness, but Nagel finds this view incomplete. McGinn also disagrees with Searle, but unlike Nagel, believes it will never be possible, even in principle, to understand the relation between conscious experience and material reality. There is a reason why efforts to understand this relation for thousands of years have failed. It can't be done. This does not mean there is no relation, it just means that the human intellect is too limited to understand it. McGinn refers to this as cognitive closure. Just as a dog can know nothing about quantum physics because of its intellectual limits, a human cannot fully understand conscious experience and its relation to the material world because of his or her intellectual limits (McGinn's example).

Making Sense of the Brain-Based Philosophies

Searle seems confident that an expanded notion of the physical, which includes a subjective element, together with the understanding that conscious experience is causally but not ontologically reducible to physical states in the brain, is a reasonable solution to the mind–body problem. But how can we be sure this is true? Is there an experiment that could conceivably produce results that show Searle's solution to be false, that is, that conscious experience can exist independently of brain states? If not, then McGinn's pessimism may be warranted. But we can't be sure that McGinn's idea of cognitive closure is true either, because it is not possible

to prove the negative. In view of these uncertainties, it may be that Nagel has the best perspective. A new analytic framework that entails a conceptual X "more fundamental than the physical" may help us to understand in a transparent way how conscious experience is related to material reality.

RECONCILING CONSCIOUS EXPERIENCE WITH THE MATERIAL WORLD

Missing from all these philosophies, no doubt because they are so taken with contemporary neuroscience, is an understanding of how the natural and social environment figures into the workings of brain and consciousness. Where is consideration of the streetcar-having-to-be-overtaken, the watch-having-to-be-consulted, the portrait-having-to-be-understood? The earlier phenomenological analysis revealed the importance of such considerations, but even from a purely naturalistic perspective their importance is obvious; there would be no brain and no consciousness if there were no external environment. Indeed, the brain and consciousness are *for* the world of human existence, action, and behavior, they are *for* overtaking the streetcar, consulting the wristwatch, and understanding the portrait. Contemporary philosopher of mind, Alva Noë, agrees: "The conscious mind is not inside us; it is … a kind of attunement to the world, an achieved integration. … The locus of consciousness is the dynamic life of the whole, environmentally plugged-in person or animal" (Noë, 2009, p. 142).

Let us acknowledge that Nagel's view may constitute the beginning of a reconciliation, but that his unifying conceptual X should be sought not in the context of brain and consciousness alone, but in the context of brain, consciousness, and world. This may be our best hope for reconciling conscious experience with the material world of brain and behavior. Obviously, the reconciliation is far from complete; indeed, it has hardly begun. Furthermore, its ultimate achievement is far from certain. But this perspective at least allows us to talk about consciousness in a reasonable way from a materialist perspective.

Mental Causation

One problem a reconciliation like this poses is the possibility of mental causation. If we admit consciousness into our account of human action, then aren't we also admitting the possibility that mental events can cause physical events, such as bodily motion? The answer to this question is yes, but it is not a *necessary* feature of such a reconciliation. Searle (2004), for example, takes mental causation as a given because it is manifest in conscious experience. But recall that for Searle, a mental event is an aspect of, and is itself caused by, a physical event, specifically a brain process. Hence it is the brain process, which entails both a physical and a mental aspect, that is the actual cause. Given Searle's expanded understanding of the physical, mental causation really consists in a physical event causing another physical event. A brain process causes, say, behavior, and also the conscious experience of the mental aspect of the brain process causing the behavior. So far so good. But what causes the brain process in the first place? Searle entertains the possibility that the organism as an agent may initiate the brain process. This is the 2,400-year-old Aristotelian idea of an internal principle of movement, a principle that Aristotle used to explain the motion of all natural objects, including celestial and sublunary bodies, and animate beings and their parts (McDowell, 1988). But it could be that the causes of motion instead lie outside the bodies. In the case of celestial and sublunary bodies, the Aristotelian internal causes were abandoned in

favor of external forces during the Middle Ages (for sublunary bodies) and during the Enlightenment (for celestial bodies; McDowell, 1988). Similarly, in the case of animate beings and their parts, classical behavior analysis has sought to replace the internal motive principle with an external cause, namely, the organism's past adaptive interaction with its environment. Evidently then, admitting consciousness, and with it the experience of mental causation, does not necessarily introduce agency into an account of human action and behavior. Instead, it is possible that mental causation is only an appearance, in the same way that the setting sun and the stationariness of the earth are appearances.

A DIFFERENT APPROACH: BUILD A CONSCIOUS ARTIFACT

The interesting work of thinker, neuroscientist, and Nobel laureate Gerald Edelman brings us back to a consideration of machine humanity. From a philosophy of mind similar to Searle's, Edelman (1990) goes on to develop an elaborate and detailed neurobiological theory of consciousness that is based on his theory of neuronal group selection (Edelman, 1987). Neuronal group selection is a theory about how the brain, understood as a selectional system, regulates the behavior of whole organisms in their environments. Briefly, neural circuits subserving behavior are selected by value systems in the brain, which are activated when the organism's behavior produces consequences in the environment. This is a theory about the functioning of whole brains in whole organisms that are actively engaged with their environments, and as such is a theoretical rarity in contemporary neuroscience. Interestingly, Edelman's theory is consistent with our understanding of the phenomenology of consciousness, and it shares features with a behavior-analytic point of view, both in terms of its focus on whole organisms behaving in environments that may provide consequences for behavior, and in terms of its selectionist principles. The latter have been discussed extensively in behavior analysis (e.g., Skinner, 1981; Staddon & Simmelhag, 1971), and have been used explicitly in behavior-analytic theory building, which has met with some success (McDowell, 2004; McDowell, Caron, Kulubekova, & Berg, 2008). I have summarized Edelman's theory of neuronal group selection and discussed its connection to selectionism in behavior analysis in another article (McDowell, 2010).

Edelman believes that a machine built with a selectionist nervous system would have at least primary conscious experience. How can one know for sure? Build the machine. Edelman believes this is possible and, moreover, he is committed to making it happen. In a recent paper, he and two colleagues assert that "there is now sufficient evidence to consider the design and construction of a conscious artifact" (Edelman, Gally, & Baars, 2011, p. 1). Determining that such an artifact is conscious (no mean feat, as discussed below) would confirm that material objects and processes can in fact give rise to conscious experience.

DISCUSSION

A reasonable alternative to Rachlin's eliminative materialism is to admit the reality of first-person subjective conscious experience and seek to reconcile it with the material world by means of Nagel's X, understood in the context of the whole organism (brain included) behaving adaptively in the natural and social environment.

Machine Humanity

This alternative implies that for a machine to be judged human it must have conscious experiences that are characterized by a first-person subjective ontology, and it also must be

able to do all the things that Rachlin said it must be able to do. Is this possible? We have seen that Edelman and his colleagues believe so. Among other philosophers and scientists, opinions vary. No doubt building a conscious machine would be a complicated and challenging task. At least as complicated and challenging would be the task of determining whether the machine really was conscious. A small start might be made by testing it in mental rotation experiments, and comparing the results to those obtained from human subjects (Edelman et al., 2011). Koch and Tononi (2011) suggested a visual oddity test in which the artifact would be required to tell the difference between a sensible picture (e.g., a person sitting in a chair at a desk) and a nonsense picture (e.g., a person floating in the air above the desk). A third method of testing for consciousness would be to observe extended patterns of behavior, which would tell us something about the artifact's conscious state. Rachlin of course would approve of this method (it is his tough Turing test), whether he thought the behavior *was* the consciousness or only indicative of it. He gave a good example of such testing in his commentary on Searle's (1980) Chinese room article:

> [A conscious robot] might answer questions about a story that it hears, but it should also laugh and cry in the right places; it should be able to tell when the story is over. If the story is a moral one the robot might change its subsequent behavior in situations similar to the ones the story describes. The robot might ask questions about the story itself, and the answers it receives might change its behavior later. (p. 444)

This is probably the best of the three methods of determining consciousness. The more behavior that is observed, and the more complicated, subtle, temporally organized, and teleological it appears to be, the more convinced we would be that the robot had conscious experience. But can we be *sure*? I suspect we could be no more or less sure than we can be about another person's consciousness. After lengthy experience with the machine (as in Rachlin's Dolly II example), we may interact with it as a matter of course as if it were conscious. If pressed, we would admit that we were not absolutely certain that it was. But at some point, after extended interaction, during which there was no behavioral indication that the machine was not conscious, the absence of absolute certainty probably wouldn't matter. At that point, for all intents and purposes, we would take the artifact to be sentient, which is what we do with other people. Does this mean that the extended behavior *is* the consciousness? No. According to the perspective developed here, it means that the existence of acceptable extended behavior necessarily implies the *other* aspect of its material realization, which is consciousness. The two go together. They are necessary comanifestations of the more fundamental X of Nagel. In this sense, Nagel's X is like dark matter. We don't know what it is, but it helps us to explain our observations of the world.

Consequences for Formal- and Efficient-Cause Behavior Analysis

Rachlin's emphasis on temporally extended and organized patterns of behavior is valuable and interesting. Would his teleological behaviorism change in any way if its elimination of conscious experience were rescinded and replaced by a view that acknowledged the existence and reality of consciousness? Of course it would entail this new understanding of conscious experience, but other than that it seems there would be little, if any, change. The use of utility functions, the assertion of correlation-based causality, and so on, would remain the same, and the science based on these tools and ideas could proceed as it always has. If Nagel's "utopian dream" were realized at some point,

then Rachlin's program might be affected, depending on what the X was asserted to be. But then again it might not. The discovery of synapses, for example, dramatically improved our understanding of how neurons worked, but this information does not affect the science of behavior analysis in any discernible way. The discovery of the dopaminergic value system in the brain comes a bit closer because it deals with the rewarding properties of external events. But this information also does not affect the science of behavior analysis, except insofar as it confirms what behavior analysts knew in more general terms had to be the case anyway.

The same can be said for classical, efficient-cause behavior analysis. Accepting the version of Nagel's theory discussed here probably would not change its practice or clinical application in any discernible way, depending again on what Nagel's X ultimately turned out to be. In view of these considerations, I feel confident in predicting that most (of the few?) behavior analysts who read these papers, when they return to their laboratories and clinics, will not give a second thought to the philosophy of mind that their science or clinical practice entails. However, if pressed by interlocutors who charge ludicrousness, embarrassment, or untruth, they may wish to call up some of these ideas as transcendent objects of consciousness, and with them dispatch the naysayers forthwith.

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