

# COGNITION AND BRAIN THEORY

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## SPERRY'S MODIFIED CONCEPT OF CONSCIOUSNESS

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R. W. Sperry has been advocating what he calls "a modified concept of consciousness" for over a decade now.<sup>1</sup> The theory that Sperry is touting is his attempt to untie the world knot; he believes that he has solved the mind-body problem.

Sperry's theory is attractive. Its attractiveness lies in the fact that Sperry is sensitive to the motivations which have led to the acceptance of both materialism and mentalism. Sperry, in constructing his theory, tries to appease both parties. On the one hand, he believes that the activities of neurons are governed by a set of electro-physico-chemical laws which are currently being uncovered by modern science. Thus, Sperry accepts one of the fundamental beliefs current within the world of modern science, a belief which has led to the promotion of materialism. At the same time, he believes that consciousness is real and has causal efficacy. Thus, Sperry is also receptive to the basic intuition which lies at the foundation of the common sense mentalist positions.

The fact that Sperry's theory accepts essential tenets from both the world of science and common sense has allowed Sperry to gain a considerable following within the scientific community. Unfortunately, this source of strength is also his theory's primary weakness. Like the politician who has promised to support every constituency, Sperry has offered too much. Sperry cannot retain all the features which make his theory attractive and still have a theory which is adequate to the task of identifying the nature of consciousness. Something in Sperry's theory must be given up.

### I

The central claim in the theory is that consciousness is an emergent property. Once Sperry has stated this, he labors hard to give an account of emergent properties such that consciousness is neither unique in its mode of existence nor mysterious in its operations.

The reason Sperry can make comparisons between consciousness and other properties is that he considers emergent properties to be "configurational" or "patterned" or "organizational" in nature. Sperry believes that such organizational properties have a real existence of their own and help to bind sub-atomic particles into particular kinds of atoms, atoms into molecules, molecules into cells, and cells into organisms.

Sperry insists that organizational properties are not to be identified with any of the properties, either monadic or relational, which belong to an individual unit; organizational properties belong to complexes, not units, and exist "over and above" the properties of the units. But while organizational properties are different from any of the properties belonging to individual units, Sperry recognizes that organizational properties depend for their very existence upon the actions and movements of the lower level units.

Sperry, however, does not consider the dependence between organizational properties and their constituent units to be a one-way affair. He claims that organizational properties

create dynamic patterns which bind and control the operations of the lower level units. An electron, for example, becomes enmeshed within an electronic circuit and its behavior is governed accordingly.

Sperry, in describing the relationship between organizational properties and their constituent parts, intentionally uses language that is causal in nature. He talks about the organizational properties "superseding" or "governing" or "controlling" the operations of the constituent units.

Such talk would be puzzling to a committed reductionist. The reductionist would argue that in the case of an electronic circuit, for example, the movement of an electron can be fully accounted for by referring only to the forces that operate at the sub-atomic level. Thus, from the reductionist's point of view, any assertion that the higher level organizational properties have a causal influence is nonsense.<sup>2</sup>

Sperry's response to this kind of charge is somewhat clouded, but he seems to be adopting a position as follows: While *in principle* it is possible to account for the movement of electrons in an electronic circuit by utilizing only scientific laws that operate at the sub-atomic level, any viable scientific theory open to the human understanding which predicts the course of electrons would have to make reference to the higher level organizational properties. Since *in practice* such references are necessary and since causal claims are the products of scientific theories, the use of causal language to describe the relationship between organizational properties and their constituent units is appropriate.<sup>3</sup>

Thus, when Sperry considers the case of the brain, he argues that the forces that are operating at the sub-atomic level are "molecular bound"; that is, the sub-atomic elements "are pushed and hauled about in chemical interactions by the enveloping molecular properties."<sup>4</sup> Furthermore, the brain molecules themselves are affected by the dynamics of cellular organization. In sum, the brain contains a complex organizational hierarchy, one in which the higher level organizational properties "supersede" the movements and operations of the lower level units. Sperry believes that this hierarchy is topped by a very complex set of organizational properties which controls the functioning of individual neurons; and Sperry identifies these properties with consciousness.

Since the configurational or pattern properties which Sperry identifies with consciousness "supersede" the activities of individual neurons and yet are dependent upon the actions of the neurons for their very existence, Sperry describes his own theory as a form of interactionism. The interaction is not the traditional one between mental and physical substance, but an interaction between two kinds of material properties which exist at different levels of organization.

## II

There are a number of advantages which Sperry can and has cited in favor of this "emergent interactionism" theory of consciousness. To begin, Sperry notes that his view accepts the existence of consciousness as a real phenomenon which exists in its own right. Thus, Sperry gives credence to at least part of the basic intuition which has led to the acceptance of mentalism.

Sperry believes that at least a number of scientists have been willing to accept this much. Sperry notes, however, that most scientists who have accepted the reality of consciousness have reduced its status to that of a mere correlate or an acausal epiphenomenon. Sperry believes that one of the principal advantages of his theory is that it recognizes that conscious properties exert an active influence in brain dynamics. Thus, Sperry's emergent interactionism is in accord with the common sense view that mental entities not only exist, but are a driving force in day to day activities.

What has prevented other scientists from assigning consciousness an active role is their belief that the forces operating on the electrons, atoms and molecules within the brain are the same as the forces operating on such entities elsewhere in the universe. Since the basic electrical, physical, and chemical laws are not to be violated, it appears that no room has been left for consciousness to exert itself.

Sperry, however, believes that he has successfully circumvented this argument by identifying consciousness with certain neural organizational patterns. Sperry maintains that if scientists are going to successfully account for the ebb and flow of electrons within the higher level neural circuits, then they must refer to such organizational properties. But Sperry, in accordance with his general views concerning organizational properties, does not believe that the necessity for such references means that any of the electro-physico-chemical laws operating at the lower levels are being violated. Thus, Sperry believes that he has achieved the best of two worlds. He has met the demands of the scientists while retaining an active role for consciousness.

A final advantage in favor of Sperry's theory -- an advantage that Sperry himself does not explicitly cite, but one which is certainly responsible for part of his view's appeal -- is that his theory embodies a spirit of uniformitarianism. In explaining consciousness, Sperry appeals only to forces and principles which he believes operate elsewhere in the universe. Sperry believes that consciousness emerges in the same fashion and has the same sort of causal efficacy as other configurational and pattern properties. In fact, consciousness stands at the apex of a hierarchy of such properties. Thus, while consciousness is in a sense unique, it arises in a fashion which is common.

### III

The above account is appealing. Nevertheless, trouble begins as soon as one remembers that many things happen in the brain; it is the locus of a vast melange of neural activity. Some of this activity ultimately results in eye movements, hand gestures, and speech, activities which are normally under one's conscious control. But the brain also governs heart and respiration rates, controls the release of hormones, and maintains a constant body temperature. Unless one is a Zen master, these activities lie outside one's sphere of awareness. Thus, an elementary truth about brain activity is that there is more than meets the conscious I.

It is problematic for Sperry that, from the point of view of consciousness, not all brain activity bears fruit. One can accept his contention that the nature and the exact timing of brain events are governed by the organizational patterns of the brain's constituent neurons. But, as Dalbir Bindra has pointed out<sup>5</sup>, if Sperry is going to make the further claim that such organizational patterns constitute consciousness, then Sperry must provide a method for differentiating between those neural configurations which are to be identified with consciousness and those which are not.

Sperry's response to this challenge is two-fold. He begins by remarking that the circuitry which demarcates consciousness is incredibly complex. Thus, consciousness is not to be identified with any of the elementary, low-level organizational patterns belonging to neurons. He adds that this complexity helps explain why consciousness is not, as of yet, well understood.

But Sperry admits that complexity alone is not the identifying trademark of consciousness. He writes "Only *some* of the dynamic holistic properties that emerge in the higher levels of cerebral activity are conscious phenomena. Many others are not, even though the unconscious activities may in some cases be equally or more complex."<sup>6</sup> Thus, while Sperry has ruled out the possibility that any of the simple pattern properties of neurons can be identified with consciousness, he still has to pick and choose among the more complex neural organizational properties.

This leads to Sperry's second remark. Sperry claims that what ultimately differentiates the organizational patterns which are to be identified with consciousness are their operational functions. "The neural mechanisms of conscious experience are not just more complex, they are specifically structured on an operational, functional basis to create particular sensations, percepts, and feelings, and to provide a rapid representation of spatial reality."<sup>7</sup> What Sperry has in effect done is claimed that those organizational patterns which produce the various forms of consciousness count.

But Sperry cannot do this. He cannot, on the one hand, say that certain organizational properties *produce* consciousness and then turn around and *identify* consciousness with those very same properties. He stands in violation of the principle: If A produces B, then A is not the same as B. It is as if he acknowledged that the passage of the moon overhead produces high tides and then tried to claim that the passage of the moon is a high tide.

This is not a trivial matter. The most natural way to differentiate between different cerebral organizational patterns is in terms of what phenomena they produce. But if Sperry is going to identify consciousness with some of the patterns themselves, then this route for differentiating among the organizational patterns is cut off. And with this pathway gone, it is hard to imagine what other route Sperry can take.

### IV

The best option open to Sperry is for him to make certain alterations in order to save at least part of his theory. At first blush, it might appear that the necessitated changes are rather insubstantial. But this innocuousness is only a seeming thing. The redeeming changes would shear from Sperry's theory some of what he considers its principle advantages. I suspect that Sperry would find such changes otiose.

Sperry can begin to salvage part of his theory by holding fast to his claim that the

various forms of consciousness are produced by certain cerebral organizational patterns. Thus, he would be identifying consciousness with the products of neural organizational patterns rather than with the organizational patterns themselves. Under this conception, consciousness would have a status akin to that of magnetic fields or radio waves. Magnetic fields can be produced by certain molecular alignments and radio waves by specific kinds of electronic circuitry; but the magnetic fields and radio waves are not to be identified with such alignments and circuitry; they exist as separate phenomena in themselves which stand over and above the organizational patterns which produce them. Given this conception, Sperry could easily distinguish which neural circuits are important. Those circuits which produce tickles, color patches and bell rings, i.e., consciousness, count; those which do not, fail to count.

But if Sperry takes this line, he gives something up. Exactly what he gives up depends upon which of two options he chooses.

On the one hand, Sperry could argue that consciousness, unlike magnetic fields or radio waves, has no further causal effects. Such a position would make it easy for Sperry to explain why he had previously misspoke. Since consciousness has no causal effects, it is easy to slip in one's references from talking about consciousness itself to talking about the ever present neural circuits which produce consciousness. References to the two are easily confused.

But the choice of this option destroys what Sperry considers the principle advantage of his theory. Sperry feels that, in presenting his modified concept of consciousness, he has "put consciousness to work" -- he has given consciousness its rightful place as a causal determinant in a person's actions. But if Sperry's theory is modified in the presently proposed fashion, then all the real work is being done by the neural organizational patterns and not the concomitant property, consciousness. Thus, the present proposal reduces consciousness to something that Sperry thinks that it is not; namely a mere correlate or an acausal epiphenomenon.

Sperry can avoid epiphenomenalism by choosing a second option, one which tightens the analogy between consciousness on the one side and magnetic fields and radio waves on the other. Sperry could acknowledge that consciousness not only exists as a phenomenon which stands over and above the neural networks which produce it, but add that consciousness has its own causal efficacy which stands apart from the causal efficacy of the neural networks. In this view, the brain would be akin to an induction motor which produces a magnetic field which, in turn, affects the operation of the motor. The brain produces consciousness; consciousness, in turn, alters the movement of electrons and the firing of synapses within the brain.

But this conception of consciousness runs counter to an element of scientific conservatism within Sperry. Sperry believes that the electro-physico-chemical laws which govern the behavior of particles ranging in size from the sub-atomic to the molecular are, for the most part, already known. He does not believe that, within this area of scientific investigation, any major surprises are forthcoming. In particular, Sperry does not believe that neurologists are going to have to postulate the existence of a new, presently unknown force in order to explain the behavior of an electron within the brain. Presently existing laws are sufficient.

Sperry constructed his modified concept of consciousness with this in mind. He hoped to incorporate the existing scientific laws governing the operations of electrons, atoms, and molecules without augmentation. Sperry felt that the discovery of any new scientific laws would be confined to the higher levels of organization, to the cellular and super-cellular levels. But if Sperry is forced to modify his theory of consciousness so that consciousness has an expanded causal role -- so that the effects of consciousness are not simply those of an organizational pattern -- then one of the touted advantages of Sperry's theory falls.

## V

I have argued that, at present, Sperry's theory is inadequate because he cannot differentiate between those organizational patterns which are to be identified with consciousness and those which are not. If Sperry tries to accommodate this criticism by altering his theory, then either epiphenomenalism or an unforeseen form of causal interactionism results. My intention was not to prove that these latter two theories are inadequate; each has its own appeal and could be given a serious defense. Rather, I have tried to show that each of the latter theories contains a feature which Sperry considers objectionable.

Sperry has tried to construct a theory of consciousness which would give consciousness a causal role and yet, within the world of science, leave everything the same. This is asking too much. I am afraid that the world knot has been tied tighter than that.

## FOOTNOTES

1

Sperry is a prolific writer. Most of his recent articles (since about 1966) have contained at least some reference to his theory of consciousness. Rather than bombarding the reader with a complete and seemingly endless list of such articles, I have practiced a savage economy and pared the list down to just three central presentations: "A Modified Concept of consciousness," *Psychological Review*, 76 (1969), 532-6. "An Objective Approach to Subjective Experience: Further Explanation of a Hypotheses," *Psychological Review*, 77 (1970), 585-90. "Mental Phenomena as Causal Determinants in Brain Function," in *Consciousness and the Brain*, G. Globus, G. Maxwell and I. Savodnik (eds.), (New York: Plenum Publishing Co., 1976), 163-77.

2

See, for example, C. Wade Savage, "An Old Ghost in a New Body," in *Consciousness and the Brain*, 130-1.

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For an interesting, thorough and sensitive discussion of this whole issue, see William C. Wimsatt, "Reductionism, Levels of Organization, and the Mind-Body Problem," in *Consciousness and the Brain*, 205-67.

4

Sperry (1976), 168.

5

"The Problem of Subjective Experience: Puzzlement on Reading R. W. Sperry's 'A Modified Concept of Consciousness,'" *Psychological Review*, 77 (1970), 582-4.

6

Sperry (1976), 168.

7

Sperry (1970), 589.

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