

Changing Perspectives on Brain and Consciousness:
Sperry's Downward Causation as a
New Explanation for Dualism

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"Psychology has a long past but a short history" may still be true as Psychology formally evolves into its second century of existence. However, within this long past and short history the oldest and most important of all issues in the field is that of the mind-body problem. This paper will briefly review and critique some of the major approaches to the understanding of this problem. More importantly, this paper will present a new interpretation of the mind-body problem as developed by Roger Sperry.

Defining and Explaining the Mind-Body Problem

Behavior has been considered to be an outcome of an intervening variable. Historically, there have been three ways to explain the emergence of behavior.

1. Materialism or monism suggests that behavior is strictly a function of physical events.
2. Mentalism or idealism believes that behavior is mediated only by mental or cognitive functions.
3. A more widely accepted approach, referred to as dualism, suggests that both material and mental events are necessary for behavior to emerge.

The classical explanation for dualism was first proposed by Descartes (and later accepted by James) who suggested that mental events can influence physical ones and vice versa. Thus, the dualism approach to the mind-body problem still leaves open to question the relative or weighted values of materialism and mentalism in the final equation.

Several options have been proposed to resolve this question of relative values. They include the following

1. Psychophysical parallelism indicates that the two events are independent but equally affected by environmental determinants. Leibnitz views on this topic were to eventually become the foundation for the work of Psychology's founding father, Wilhelm Wundt (and his student Titchener).
2. Double aspectism suggests that material and mental events cannot be separated as different entities but are unified to produce behavior. According to Spinoza, both variables were merely a reflection of God or nature.
3. An increasingly accepted approach is epiphenomenalism which is founded on the principle that mental events are a byproduct of material or physical ones. This approach reflects modern day Physiological Psychology and the Neurosciences and is founded on the early ideas of Hartley.

These explanations are exhaustive of the possibilities available to date. Mental and physical events have been explained as equal but independent (parallelism), one and the same (double aspectism), and having differing weights - specifically mental events are a function of physical ones (epiphenomenalism).

There is one approach still missing in order to have an exhaustive set of possible explanations for the dualist position. What is left to be included is the exact opposite of epiphenomenalism. In this case, material or physical events are a

byproduct of mental ones. This approach should not be confused with occasionalism which was first proposed by Malebranche. Occasionalism purports that metaphysical events (namely acts by God) cause physical reactions. In the proposed fourth explanation, mental (and not God-directed) events affect physical behavior. During the last part of this century overtures to a revised occasionalism have indirectly surfaced from the growing influence of Cognitive Psychology. Nevertheless, no cohesive explanation exists to date which explains adequately this solution to the dualistic interpretation of the mind-body problem.

Dualism Revised as Consciousness-Brain

The perspective of reverse epiphenomenalism as well as epiphenomenalism places unusual emphasis on neurological (especially brain) substrates (or effects) of behavior. Further, the focus on behavior in this argument has recently been oriented towards the end product of consciousness (see Globus, Maxwell, & Savodnik, 1976). Hence, the question of mind-body dualism may be redefined as a consciousness-brain paradigm.

Consciousness is operationally defined as a complex set of behaviors, presumably mental (though it could be a function or emergent from physical events) resulting in awareness of internal or external information (including, but not limited to sensations, perceptions, emotions, memory, knowledge, etc.). Whereas brain refers to the entire set of neurons located within the cranium, it is best considered as a system of neural networks capable of producing information processing. Thus, the question posed is how, if possible, can a conscious (or for that matter, an

unconscious) state affect the functioning of the neural systems located within the cranium.

Sperry's Concept of Downward Causation

According to Sperry's early writings (e.g., Sperry, 1952), the reliance on mentalistic causation of behavior was both not accepted but not considered. Over the next 35 years, Sperry's view on this topic has undergone considerable change. Indeed, this turnaround has both incorporated the importance of mental causation and emphasized the critical value of consciousness in the causation. This turnaround, with its special emphasis on consciousness, is proposed to serve as the missing alternative explanation for dualism. In other words, Sperry's concepts serve as a model for what may be termed as reverse epiphenomenalism.

Central to Sperry's (in press) model are the following:

1. Subjective meaning is derived on a functional basis.
2. Conscious awareness is an interactive emergent property of brain processing.
3. Emergent mental states interact, not only at their own level, but also downward in a supervenient sense.
4. A revised form of causal 'macro' determinism prevails that involves a relativity feature.

The advantage of this orientation, according to Sperry, is that this approach allows not only for accounting for phenomena heretofore not previously considered but that it builds upon earlier reasoning of objective experimental science. The inclusion of subjective mental behavior completes the microdeterministic reasoning of Neuroscience and Psychology.

Potential Significance of Sperry's Model

The explanation provided by Sperry has both a direct impact on Psychology and an indirect one on science. For both, however, the model implies a paradigm shift. For Psychology, not only does this model help explain dualism from yet another perspective (and, thus, effectively exhausting the possibilities for an explanation of dualism) but encourages a shift from a strictly physiological interpretation of behavior (monism) beyond a traditional explanation of dualism upward causation (epiphenomenalism) to a downward causation (reverse epiphenomenalism).

For science, Sperry believes that this shift parallels "the large scale scientific and socio-ideological implications" of the Copernican and Darwinian revolutions (see Hubel, 1986). This shift may signal a change (return?) to a "great cultural realignment" whose impact may actually be beyond science itself.

Conclusions

The need for alternative explanations for dualism may be easily accepted. What may be less accepted, however, is the notion of what has been termed reverse epiphenomenalism and its potential implications for Psychology and science. Nevertheless, Sperry's model of downward causation appears in line with apparent paradigm shifts both within Psychology and science and hence may be of both descriptive and prescriptive value. To quote the last two sentences from Sperry's first major paper on the topic (Neurology and the Mind-Brain Problem, 1952): "Such an approach would seem to guarantee a least a better understanding of the

brain processes themselves. Whether this in turn may help to resolve the baffling mind-brain enigma remains to be seen" (page 311).