

Sperry's Emergent Interactionism as a New Explanation for Dualism

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ABSTRACT. Major approaches to understanding the mind-body problem as it relates to consciousness are reviewed in this article. Special emphasis is placed on examining the dualist position and the current interpretations of this approach, including psychophysical parallelism, double aspectism, and interactionism. The limitations of these interpretations are considered, and an alternative is proposed using the ideas of Sperry. The concept of emergent interactionism proposes to explain existing microdeterministic concepts while shifting the focus to a consciousness-brain continuum.

EBBINGHAUS'S (1913) often quoted view of psychology's heritage, "Psychology has a long past but a short history," may still be true as psychology evolves into its second century of formal existence. Within this long past and short history, several important issues have focused psychological thinking. Two of these critical issues are the concepts of consciousness and the mind-body dichotomy. In this article, I briefly review and critique some of the major approaches to the understanding of the mind-body dichotomy, particularly as it relates to consciousness. More important, I present a new interpretation of the mind-body problem and its relationship to consciousness based on ideas developed by Roger Sperry.

Defining and Explaining the Mind-Body Problem

Behavior has been traditionally considered an outcome of or emergent from an intervening variable (e.g., motivation). Historically, there have been three ways to explain the emergence of behavior in an organism.

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1. Materialism or monism proposes that behavior is strictly a function of physical events. Typically, the physical events are associated with or are directly a function of brain activity. For example, Boring (1950) suggested that "the chief function of the brain is—thought, perhaps, or consciousness" (p. 664). Hence, behavior could be considered a direct outcome primarily of brain activity.
2. Mentalism postulates that behavior is mediated only by mental or cognitive functions. The early associationists, such as Mills (1829) and later the Gestalt psychologists, such as Wertheimer, Kohler, and Koffka, suggested that behavior emerged from a strictly cognitive or mental experience. A radical interpretation of mentalism, called nativism, was espoused by Kant (1781/1881), who stated that experience was but an uncovering of preexisting mental or cognitive knowledge.
3. Dualism, a current and more widely accepted approach to the understanding of behavior, suggests that both material and mental events are necessary for behavior to emerge.

The classical explanation for dualism was first proposed by Descartes (1650/1931) and later accepted by James (1890). This explanation suggested that mental events can and do influence physical ones and possibly vice versa. Both must occur at least to a minimal degree for behavior to emerge. However, the questions of the relative or weighted values of materialism and mentalism as well as the direction of causation remain unresolved.

Several options have been proposed to resolve the question of relative values of physical and mental variables. They include the following interpretations:

1. One focus of psychophysical parallelism assumes that material and mental events are independent, but equally affected by environmental determinants. The views of Leibnitz (1765/1896) on this topic eventually became the foundation for the work of psychology's founder, Wilhelm Wundt (1896/1965).
2. Double aspectism suggests that material and mental events cannot be separated as different entities but are unified to produce behavior. According to Spinoza (1677/1888), both variables were merely a reflection of God or nature. More contemporary approaches to double aspectism have been espoused by MacKay (1966), who applied this concept to the neurosciences.
3. An increasingly accepted approach to addressing dualism is epiphenomenalism, which is founded on the principle that mental events are a byproduct of material or physical activity. This approach, founded on the early ideas of Hartley (1749), reflects contemporary physiological psychology and the neurosciences.

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These explanations exhaust the possibilities accepted to date in explaining dualism. In summary, mental and physical events have been explained as (a) equal but independent (parallelism), (b) one and the same (double aspectism), and of differing weights—specifically, mental events are a function of physical ones, and, hence, physical events tend to be more critical than mental ones (epiphenomenalism).

There is one approach still missing in developing an exhaustive set of possible explanations for the dualist position. What is left to be included in this set of explanations is the exact opposite of the current interpretation of epiphenomenalism. This approach could be called reverse epiphenomenalism (or possibly revised occasionalism). In this alternative, material or physical events are a byproduct of mental ones; therefore, mental events are considered more critical. Cognitions could, for example, exert control over physical activity, such as neuronal firings. This approach should not be confused with occasionalism, which was first proposed by Malebranche (Robinson, 1981). Occasionalism purports that metaphysical events (namely, acts of God) cause physical or behavioral reactions in an organism. Such metaphysical events are neither controlled by nor an outcome of the organism, but of some outside, more powerful, and not completely understandable being.

Reverse Epiphenomenalism as Consciousness-Brain

In the proposed fourth explanation, mental (but not God-directed) events affect physical behavior. These mental events could occur as a function of experience, thought, or consciousness much in the same way that Gestalt psychologists conceived how behavior would emerge from sensory experiences. Indeed, the argument could be made that this proposed alternative is an extension of Gestalt thinking to the neurosciences. That is, the emergent qualities of a sensory experience could develop into a unique experience not fully explainable by the components of that experience, and, furthermore, such an experience could exert an effect or control over the original sensory or neuronal activity. Presumably, an alternative interpretation of the origin of these mental events is that the experience, thought, or consciousness was preexisting. The role of the organism would be to essentially discover these cognitions much in the same manner that a computer might search through already developed files.

Regardless of the origin of the cognitions, what is unique to this position is that these mental events would result in physical outcomes. Further, such outcomes, by definition, would be primarily neurological or brain states, although conceivably they could be hormonal, cardiovascular, and so on. Finally, brain states would serve a subservient role to mental events. Thus, consciousness would control the brain, rather than be a byproduct of brain activity. The concept of brain-consciousness would shift accordingly to con-

consciousness-brain. In essence, this shift would result in a reversal of the classical notions of epiphenomenalism.

During the last part of this century, overtures to a reverse epiphenomenalism or revised occasionalism have indirectly surfaced from the growing influence of cognitive psychology, the neurosciences, and a combination of the two, cognitive neuroscience (see Shallice, 1990). The so-called cognitive revolution, often dated to the publication of such books as Neisser's *Cognitive Psychology* (1967), has challenged the pervading concepts in psychology as being microdeterministic. The scientific materialism of Skinner (1964) and others has been slowly replaced with alternative models that allow for subjective and cognitive experiences. Nevertheless, no cohesive explanation exists to date that adequately presents a viable alternative or fourth interpretation to the dualistic approach to the mind-body problem.

The perspective of epiphenomenalism as well as reverse epiphenomenalism places emphasis on neurological (especially brain) substrates (or effects) of behavior. Indeed, neuroscience is founded on the assumption that behavior is but an outcome of patterned or cohesive neuronal firings. Recently, the focus has been oriented toward more complex end products. Clinical neuropsychology, for example, has shifted from understanding basic behaviors, such as motor speed, to cognitive activities, such as short-term memory (Puente, 1992). In the neurosciences, the focus has similarly shifted to such issues as consciousness (see Globus, Maxwell, & Savodnik, 1976). This revolution has extended to the study of animal behavior, in which self-consciousness in nonhuman primates (Gallup, 1982) and consciousness in animals (Griffin, 1981) have been considered.

Consciousness is defined as a complex set of behaviors, presumably mental (though it could be a direct function or emergent from physical events) that results in awareness and adaptive utility of internal or external information (including, but not limited to sensations, perceptions, physiological or hormonal activity, emotions, memory, personality, knowledge, and so forth). Whereas brain refers to the entire set of neurons located in the cranium, it is best considered as a system of neural networks capable of producing information processing that happen to be located within the cranium. Thus, the question posed is how can a conscious (or, for that matter, an unconscious) state affect the functioning of the neural systems located within the cranium.

Sperry's Concepts as Reverse Epiphenomenalism

According to Sperry (e.g., 1952), the reliance on mentalism as an explanation for behavior has neither been considered nor accepted by science. Furthermore, the possibility of mental events affecting physical outcomes has been considered an even less plausible explanation. Sperry (1976) stated that the concept that "physiological events in the brain can be influenced by the

contents of subjective experience has long been vigorously opposed by nearly all scientists and most 20th century philosophers" (p. 463).

Three assumptions underscore the attacks on the viability of mentalism and of subjective or mental events causing physical activity. One assumption is that behavior can be fully explained by and is a direct cause of neural activity. Second, it is difficult, if not impossible to empirically measure subjective activity. Hence, because it cannot be empirically measured, it must be of little concern to psychology. Finally, it is not possible for subjective experience to exert direct causal influence on physical or neurological events. This possibility is fully accepted only in paranormal research, clearly outside the scope of mainstream scientific psychology. However, this later point may be the most critical to psychology. Psychology's long past is rarely questioned. Psychology's formal history, in contrast, is considered suspicious by hard scientists simply because of the classical definition of the field. Skinner's (1930) definition of psychology as "the scientific study of behavior" accepted micro-determinism and materialism. Subjective or cognitive experiences, inherently difficult to define and even more difficult to measure, find little room for inclusion in this schema. Subjective experiences, in contrast, continue creeping into folk psychology and other popular applications of the discipline as well as the more progressive or cutting-edge research in the field (e.g., cognitive neuroscience).

There is little question that neurological activity is critical in the production of behavior. However, it is less tenable that behavior is only an outgrowth of or an emergent from neural mechanisms. Sperry (1987) has already provided relatively simple examples of how the reverse can occur, that is, how mental events can cause physical changes. Such a reversal is mimicked in evolution, where more global pressures affect specific behavioral patterns (Sperry, 1964). This concept could be best understood as a downward control, of consciousness exerting control on specific neuronal firings. In summary, whereas consciousness emerges from brain activity, the emergent properties of consciousness, in turn, control brain activity (Sperry, 1967).

The outcome is one of emergent interactionism that could be considered as mentalistic monism (Dubrovsky, 1988). However, it must be understood that brain states are not identical to mental states (or vice versa). The two, at one level, could be considered separate entities, at least from the standpoint of attempting to manipulate experimental variables as one does in a factorial experiment. At a more complex and presumably more correct level, the two are so interdependent that it is impossible to factor analyze them into their components, as it is impossible to do the same in a Gestalt phenomena. To do so would result, at best, in an incomplete understanding of the underlying assumptions and, at worst, in a gross misunderstanding of its structure, dynamics, and implications of the emergent system.

Radical behavioristic approaches espoused by Skinner (1971) suggest that subjective experiences are unmeasurable and hence outside the domain of psychology. Others (Vandervort, 1991) have cited Popper's (1959) concept of testability as being critical to calling any endeavor scientific. Sperry (1991) has indicated that advances in the mind/brain sciences will eventually resolve this problem. The question of how to address subjective experience may be much closer than thought (e.g., P300). The study of mental programming, including organization, planning, and self-assessment and correction of behavior, especially in brain-damaged individuals, offers unique objective windows to typically inaccessible subjective experiences.

Sperry also addressed the issue of the inability of subjective experience to exert influence on physical activity. Sperry's own research with callosum-bisected patients as well as a host of other neuroscience research (e.g., Sperry, 1964) pointed to the existence of a downward or subjective causation. Such causation emerges from the personal, cognitive, or conscious experience of the organism and directly affects the actual brain state. The outcome is a downward rather than upward causation.

Sperry's views on this topic have undergone considerable change since his early neurobiological research. For example, Sperry's first published study (1939), which happened to be in the *Journal of General Psychology*, focused on the physiological processes of peripheral nervous system activity. Little reference, if any, was made to mental events in this or in earlier works. This turnaround in thinking about mind-brain has both incorporated the importance of mental causation and emphasized the critical value of consciousness in the causation. This changed perception, with its special emphasis on consciousness, is proposed to resolve several longstanding problems with science. For example, this approach would bring subjective mental phenomena to the brain sciences (Sperry, 1970). Further, such an approach would have direct implications for the joining of morals and values to the traditionally socially isolated enterprise of science (see Sperry, 1991). From a history of psychology perspective, this turnaround serves to complete the number of possible explanations for dualism. Sperry's concept of emergent interactionism and downward causation not only further enhances the role of consciousness but allows for a more plausible interaction between objective and subjective states.

The emergent interactionism, nevertheless, is such that a classical dualist position becomes untenable simply because the two variables are not mutually exclusive or separate. They are, by definition, inseparable because one gives rise and controls the other in a synergistic fashion. This synergism may help explain why Sperry rejected his own concepts as dualistic and considered them closer to a monistic (i.e., mentalist) approach. Because the importance of subjective experience is highlighted, it is not unreasonable to label the explanation mentalistic as well. Historically, however, mentalism has implied

a single concept and has ignored physiological substrates or concomitants. Sperry's ideas build, not detract from, the microdeterministic approaches of behaviorism and the neurosciences. Thus, to label emergent interactionism as mentalistic monism or idealism is to provide a label that does not fully encapsulate the full extent of the ideas. Sperry's ideas are best labeled as a form of dualism, reverse epiphenomenalism, or emergent interactionism. This form of dualism is so radically different from the others that it could be considered a bridge between different ways of explaining behavior. These ideas are materialistic, mentalistic, and dualistic in scope, much in the manner that consciousness and brain are separate yet similar entities.

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