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Physicalism, realization, and structure

Gary Fuller

Philosophy and Religion Department, Central Michigan University, USA

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ABSTRACT

In the philosophy of mind and psychology, a central question since the 1960s has been that of how to give a philosophically adequate formulation of mind-body physicalism. A large quantity of work on the topic has been done in the interim. There have been, and continue to be, extensive discussions of the ideas of physicalism, identity, functionalism, realization, and constitution. My aim in this paper is a modest one: it is to get clearer about these ideas and some of their interrelations. After providing some background and history, I shall focus on two related topics: the distinction between a functional property and a structural one and the dispute over whether a realization account of the mental-physical relation provides a better physicalist account than a constitutional account.

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1. Introduction

Many philosophers concerned with the mind-body problem think of themselves as physicalists (formerly materialists). Physicalism is roughly the view that everything is physical, or, better, that all facts, including psychological facts and facts of the special sciences, obtain in virtue of facts of fundamental physics.¹ In the philosophy of mind and psychology a central question since the 1960s has been that of how to give a philosophically adequate formulation of mind-body physicalism. A large quantity of work on the topic has been done in the interim. There have been, and continue to be, extensive discussions on the ideas of physicalism, identity, functionalism, realization, and constitution.

My aim in this paper is a modest one: it is to get clearer about these ideas and some of their interrelationships. After providing some background and history, I shall focus on two quite general questions: first, *What is the distinction between a functional property and a structural property?* and second (and it turns out that this is a related question), *Does a realization account of the mental-physical relation provide a better physicalist account than a constitutional account?*

E-mail address: fulle1g@cmich.edu.

¹ Perhaps we should restrict ourselves to facts involving objects, properties, and events that have causes and effects (Papineau, 2001). This restriction rules out the fact that $2 + 2 = 4$ and even, perhaps, the “fact” that torturing cats solely for one’s own pleasure is just morally wrong.

2. Background

2.1. Identity

In the beginning was identity: mind just is identical to brain. Physicalism is the view that all non-physical facts, including all mental facts, obtain in virtue of physical facts. If all mental phenomena, all mental tokens and types, are identical to physical phenomena, then obviously physicalism will be satisfied, at least with respect to the mental. Mere token-identity, however, is not enough to give us an adequate physicalism. Philosophers gave a number of reasons why not. For some a satisfactory account of state and event identity presupposed property identity. An early account of token state and event identity (Kim, 1972; cited by; Adams, 1979) held that the two states of *a*’s being *F* and *b*’s being *G* are identical if and only if the objects *a* and *b* are identical and the properties *F* and *G* are identical.² So, an adequate identity theory would have to espouse, and have an account of, property identity, and in general type identity between the mental and the physical.

There was a lot of initial discussion about what counts as property (and type) identity. Obviously, linguistic synonymy of property expressions or words would not do as a necessary condition since, e.g., “water” does not seem to be synonymous with “H₂O.” Philosophers such as J. J. C. Smart (1959) looked to theoretical identities for illumination: the stuff type *water* = the stuff

² There was also the objection to Davidson’s (1970) token physicalism that he could not explain how mental tokens cause other token events in virtue of their mental properties.

type *H2O*, the property *being hot* = the property of having a *high Mean Kinetic Energy*, and the event type *lightning* = the event type *electrical discharge*. A suggested criterion for identifying these properties was that they could be reduced to one another, where reduction was spelled out in various ways, often in terms of law, or theory, reduction. At the very least identity required nomological correlation in both directions between the properties.

2.2. Functionalism

Functionalism, along with the related notion of the physical realization of a functional state (or property), posed a threat to the identity theory, or at least to a comprehensive identity theory that covered all mental states. According to functionalism, mental properties are identical to functional properties, but that does not mean that they are identical to physical properties. According to the most familiar kind of functionalism, causal role functionalism, for Fred to experience pain is just for him to be in some state or other (e.g., some physical state) that has certain causes and effects (or at least certain cause–effect dispositions), a state that is caused by pinpricks and contact with hot stoves, and so on, and that causes wincing, groaning, and the desire to get out of the state, and so on. In general for the functionalist, for a person to be in a mental state is to be in a first-order physical state (first order relative to the functionalized mental state) that plays a certain causal role in a causal system of states including physical inputs and physical outputs and other internal physical states. In picturing functionalism, one might draw a box with dots inside, representing the internal states, dots outside on both sides of the box, representing physical stimuli and physical behavior, and arrows connecting the dots, representing causal relations between inputs, outputs, and internal states.

Functionalist properties were said to be topic neutral, or what comes to the same thing, to be second-order properties (where ‘first-order’ and ‘second-order’ are relative notions). Also, although functional properties and physical properties are *instantiated* by objects, functional states are said to be *realized* by physical states. For Fred to be in pain is for him to be in some first-order state or other, we may know not what, that has the appropriate place in the physical causal system. Fred has, or instantiates, the functionalized property of being in pain, and he also instantiates the notorious physical property of having his C-fibers fire.³ However, the state of Fred’s having the functional property of being in pain is *realized* by Fred’s state of having his C-fibers fire.⁴ This functional state of Fred’s is realized by his C-fiber-firing state just in case that physical state has the appropriate causes and effects, or, in other words, occupies the appropriate place in the causal system.⁵

Functionalism posed, and poses, a threat to the identity theory because of the thought, which many philosophers found plausible, that mental states, viewed as functional states, might have many different physical realizers. Fred’s belief twenty years ago that the Louvre is in Paris may have been realized by a different brain-state

type than Fred’s present belief about the Louvre, not to speak of Philippe’s present Louvre belief or ET’s Louvre belief. Functionalism holds that mental states can be *multiply realizable* by different brain states and so cannot be identical to them.

Functionalism generated all sorts of questions and problems. Let me briefly sketch a few of these. First, there is the question of how to turn pain into a functional property. Perhaps it can be determined *a priori* that pain is *not* a functional property at all, e.g., by way of the absent and inverted qualia arguments or other *a priori* arguments (Chalmers, 1996). Or, if pain can be functionalized, what should determine the causal system into which the pain state will be placed: commonsense, or folk psychology, or some suitable cognitive science?⁶ Second, there is the familiar necessary connection, or *virtus dormitiva*, problem. If Fred’s pain state just is the state that typically causes wincing and groaning, then isn’t there a necessary connection between the functional state and the behavior it is supposed to causally explain? But causal relations are contingent and so, according to functionalism, pains cannot cause behavior. But they do, and so functionalism is false. Finally, there is the causal exclusion worry. Just as the completeness of physics seems to rule out the causal efficacy of mental states construed dualistically, so it also seems to rule out mental causation if the mental states are construed functionally.⁷

3. Concrete, abstract,⁸ and constrained realizations

Many functionalists supposed that the physical properties that realized the mental properties were relatively concrete: e.g., properties involving neurons made out of familiar organic stuff. But perhaps the physical properties that realize the mental are more abstract: the physical properties that realize pain might abstract away from familiar organic stuff and even from some compositional features of neurons, such as being made of cell bodies, axons, and dendrites. If the realizing property of Fred’s pain was more abstract than C-fiber firing, then perhaps all pains, including fish pain and lobster pain, are realized by this more abstract property. Indeed, it might turn out that the abstract property is the only nomologically possible realizer of pain, in which case we would have strong support for the *identity* between the abstract property and pain.⁹

Adams’ (1979) paper provided an early statement and development of this view. He was following Kim (1972) and was followed by others (e.g., Polger (2004), pp. 1–38). Consider the property of heat, possessed by the water in my kettle on the stove (this quantity

⁶ One argument in favor of cognitive science, especially for contentful mental states, was that folk psychology cannot give us the appropriate causal system because it is too context sensitive and even contains false generalizations (Stich, 1983).

⁷ In more detail, the exclusion argument goes something like this (Kim, 1998, pp. 30–38; Yablo, 1992, p. 247). If a state, or event, *x*, is causally sufficient for an event *y*, and there is no causal overdetermination, then any state, or event, *z*, distinct from *x*, is causally irrelevant to *y*: in other words, under these conditions *z* is *excluded* from causing *y*. The state of Fred’s C-fibers-firing, plus surrounding physical conditions, is causally sufficient for his wincing. Fred’s being in pain, construed functionally, is distinct from the state of his having his C-fibers fire (because of multiple realizability). Further, it is implausible to hold that there is causal overdetermination here. Therefore, the physical brain state does all the causing and the pain state is causally excluded.

⁸ My use here of the concrete–abstract contrast may be a bit sloppy. If you prefer putting the contrast in terms of specific vs. more general, that would be fine as well. Nothing hangs on this terminology.

⁹ In their recently published (2016), which I have been able to look at only briefly, Polger and Shapiro seem to reject the idea that realization and identity are compatible, but also suggest that this disagreement with them may be “just a terminological choice” (pp. 29–33).

³ The C-fiber brain state is notorious because in reality C-fibers end at the upper spinal cord.

⁴ See Shoemaker, 2007, pp. 10–11.

⁵ Earlier on, the subjects of the realized and realizer states were held to be the same. Fred’s functional state of being in pain is realized by Fred’s having his C-fibers fire. Recently, it has been argued that the two subjects could be distinct (Gillett, 2003). Fred’s pain state might be realized by his brain’s being in a C-fiber-firing state, where the person Fred is distinct from, not identical to, Fred’s brain. (It can be argued that the person Fred is not identical to his brain, since Fred might go out of existence but not his brain if his brain were “scrambled” by completed rewiring the neural circuits [Lockwood, 1987]). I, and I think most functionalists, have, or would have, no problem with supplementing the earlier *flat* conception of realization with a *dimensional* one (Gillett, *op. cit.*; Shoemaker, 2007; Pereboom, 2011, pp. 135–136).

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