
Introduction

Physicalism has outrun its dualistic (and idealistic) competitors and has reached nearly unanimous consensus. The world we live in, it is quite reasonable to believe, is a physical world, not only at its most fundamental level, but through and through: everything there is in this world is either itself a fundamental physical entity (object, property, event, state, process etc.) or else composed of (or constituted by) fundamental physical entities. Since the philosophy of mind is interested in the nature of the mind, especially in the nature of mental *properties*, and since mental properties arguably aren't fundamental physical properties, physicalism with respect to the mind-body problem is the thesis that mental properties are ultimately composed of fundamental physical properties. This makes for three questions: What makes a property a *physical* property? What makes a physical property a *fundamental* physical property? What does it mean to say that a property is *composed of* fundamental physical properties?

To say what makes a property a physical property without begging the question against one or other theory about how mental properties relate to physical properties has proved difficult. For instance, that *F* is a *physical* property should better not entail that *F* is *not* a *mental* property. Otherwise, physicalism would rule out the existence of mental properties, and this is something physicalists cannot accept (except for the few eliminativists). Some have appealed to *physics* to say what makes a property a physical property: what could be more obvious, *prima facie* at least, than that just those properties are physical properties that are the subject matter of *physics*?

But on the one hand, if what makes a property a physical property is defined by reference to *contemporary* physics, physicalism is most likely *false*. If *contemporary* physics determines what is physical and if contemporary physics is *incomplete* (what it presumably is), then if future physics discovers or postulates new properties, they will not be physical properties. But then not every property is either itself a fundamental physical property or composed of fundamental physical properties. On the other hand, if what makes a property physical is defined by reference to *future* physics, physicalism will be true in worlds we would regard as 'dualistic.' For if future research reveals that mental properties can't be accounted for in terms of fundamental physical properties, they will presumably be incorporated into the physical as fundamental constituents

of the world – just as electromagnetic charge was introduced as a fundamental quantity by Maxwell when nineteenth century physics was unable to account for electromagnetic phenomena. But a world in which the set of ontologically fundamental properties includes mental properties is a *dualistic* world, and certainly not one in which physicalism is true.

Suppose, if only for the sake of argument, that the first question – What makes a property a *physical* property? – is settled. Then the second question – What makes a physical property a *fundamental* physical property? – has a straightforward answer: F is a fundamental physical property just in case F is a physical property and not composed of other physical properties. This, however, presupposes an answer to the third question – What does it mean to say that a property is *composed of* (fundamental) physical properties?

One promising answer is that macro-level physical properties are composed of micro-level physical properties in virtue of being *realized* by them. It goes without saying that this micro/macro distinction is *relative*: a micro-level realizer may itself be a macro-level property relative to other, even more fundamental, micro-level properties, of which it is composed in virtue of being *realized* by them . . . and so on until the ultimate realizers – the truly *fundamental* physical properties – are reached. That some properties realize other properties is of course an idea familiar from the groundbreaking discussions of the mind-body problem in the preceding century. When in the fifties and sixties *reductive* physicalists like Smart and Place launched the ‘mind-brain identity theory’ and proclaimed that ‘the mental’ is nothing but a proper part of ‘the physical,’ this was understood as stating the identity of mental and (neuro-) physical *properties*. However, to many it seemed (and still seems) wildly implausible that mental properties like *being in pain* or *believing that Iowa is west of Indiana* are identical to physical properties. One major problem with these alleged property-identities is that mental properties seem to be *multiply realizable* by distinct physical properties (in creatures of different species, in different members of the same species, or even in the same creature at different times). That is, it seems that when Fred believes that Iowa is west of Indiana, the physical realizer of his belief might be distinct (and radically different) from the one Hannah exemplifies when she entertains the same belief. But if a single mental property can be realized by two (or more) distinct physical properties, it can be identical to neither of them. Hence, multiple realizability seems to render psychophysical reductionism impossible.

Some reductive physicalists attempted to solve the multiple realizability problem by appealing to *disjunctive properties*. According to Ernest Nagel’s classical model of reduction, the reduction of a property requires a *bridge-law*, a statement expressing the nomic coextensivity of the reduc-

ing and the reduced property. Given the multiple realizability of mental properties, psychophysical bridge-laws can only have the form of (BL), where P_1, \dots, P_n are the different (physical) realizers of a (mental) property M :

$$(BL) (\forall x) (Mx \equiv P_1x \vee \dots \vee P_nx)$$

Reductive physicalists unimpressed by M 's apparent multiple realizability argued that (BL) allows for the reduction of M to the (disjunctive) physical property expressed by the open sentence on the right hand side of the biconditional. However, Putnam and Fodor objected that there is something deeply wrong with supposing (BL) to be a bridge-law apt for the reduction of M . The predicates ' P_1 ,' ..., ' P_n ,' they argued, refer to physical properties that are *too dissimilar* for ' $P_1x \vee \dots \vee P_nx$ ' to designate a genuine natural kind. But if ' $P_1x \vee \dots \vee P_nx$ ' fails to pick out a natural kind, it fails to pick out a well-behaved property with which M can be identified, and reductionism founders.

Putnam, Fodor and many others thus endorsed *non-reductive physicalism*, maintaining that although mental properties (types) cannot be reduced to physical properties, the instances of mental properties (tokens) are identical to instances of physical properties. Non-reductive physicalism, however, faces the question how the existence of *irreducible* mental properties squares with the claim that the only properties instantiated in this world are physical properties. In response, non-reductive physicalists argued that mental properties, although irreducible, ultimately *supervene on*, *depend on* or are *realized by* fundamental physical properties and that this makes them physical properties in a sense broad enough to preserve the spirit of physicalism. For years, *realization* – the relation holding between the realizers of a (mental) property M and M itself – was announced as the paradigm example of a *non-reductive* asymmetric *dependence* relation, which is able to secure *both* the irreducibility of realized properties *and* their broadly physical nature.

In the nineties, however, Jaegwon Kim argued that realization is at root a *reductive* relation. He introduced the '*Causal Inheritance Principle*' according to which realized properties inherit their causal powers entirely from their realizers: lacking any causal powers of their own, i.e. any causal powers *over and above* those of their realizers, realized properties can and should be reduced to (disjunctions of) their realizers. In response to Putnam's and Fodor's claim that the 'unnaturalness' of the properties designated by predicates like ' $P_1x \vee \dots \vee P_nx$ ' makes them unsuited for appearing in laws, thereby preventing the reduction of multiply realized properties *via* bridge-laws like (BL), Kim argued that this is true *only if* the property to be reduced, M in the example above, is itself 'unnatural' and unsuited for appearing in laws. Whatever is wrong

with the property expressed by the disjunctive predicate *infects*, so to speak, the property expressed by ' M ': if there is something about ' $P_1x \vee \dots \vee P_nx$ ' that prevents it from appearing in law-statements and picking out natural kinds, ' M ' cannot appear in law-statements either, and it too fails to pick out a natural kind.

Kim's *Causal Inheritance Principle*, however, raises the suspicion that realized properties are never causally relevant: a realized property M is instantiated on a particular occasion only if one of its realizers P_i is instantiated, and since M inherits *all* its causal powers (on that occasion) entirely from P_i , any causal transaction in which M is purportedly engaged will ultimately be due to P_i . If we accept the principle that what is real must enjoy distinctive causal powers, we are only one step short of outright *eliminativism*, the claim that there are no multiply realizable mental properties: for instance, we give up *being in pain* as a *genuine property* which can be multiply realized, and retain only the predicate ' x is in pain' or the concept *pain* by which we non-rigidly pick out distinct physical properties (distinct 'pain-properties,' the former 'realizers') on different occasions. This seems to be Kim's latest view of the matter: mental *predicates* and *concepts* might play an indispensable role because we use them to group physical properties in ways that are essential for our various descriptive, explanatory and communicative purposes, but the existence of mental *properties* (that enjoy genuine causal powers over and above those of their realizers) is an idle dream.

John Heil, in his *Multiply Realized Properties*, discusses an account of realization recently advanced by Sydney Shoemaker and sets out desiderata any account of the realization relation should fulfill. He claims that arguments to the effect that macro- or 'higher'-level properties like mental properties, color properties, dispositional properties etc. are multiply realized by micro- or 'lower'-level properties often proceed on the tempting but misguided assumption that predicates line up neatly with properties, that is, that every predicate that applies truly to an object designates a *property* of this object – conceived as an entity that this object *literally* shares with all objects to which the predicate truly applies; if, for instance, the predicate 'is red' applies truly to objects of various different shades of red, these objects must have literally something in common, that something being the property of *being red* (or *redness*).

Once this assumption is given up, a predicate like 'is in pain' (or 'is red') may plausibly be taken to hold of an object in virtue of a property possessed by that object, without having to claim that this very property must be the 'multiply realizable' entity of *being in pain* (or *painfulness*), shared literally by all and only objects in pain. Quite the contrary, 'higher-level' predicates like 'is in pain' (or 'is red') may pick out *different* properties (different physical 'realizers,' to speak with the

multiple realizationist) on different occasions. Like Kim, Heil abandons higher-level properties in favor of higher-level predicates. Unlike Kim, however, he argues that this does not threaten the causal relevance of *being in pain, believing that p* etc. since the truth maker for ‘Fred is in pain’ (or ‘Fred believes that *p*’) is Fred’s exemplifying a physical property (a ‘realizer’) P_i , and P_i , Heil claims, is uncontroversially causally relevant.

Carl Gillett, in his *Non-Reductive Realization and Non-reductive Identity: What Physicalism Does Not Entail*, criticizes Kim’s reductive account of realization. Kim lately insisted that the classical Nagelian model of reduction *via* bridge-laws ought to be replaced by a ‘*Functionalization model of reduction.*’ According to this new model, the reduction of a multiply realized property M proceeds *via* defining M ’s causal role and finding the occupants of this role, i.e. M ’s various realizers. The *Functionalization model of reduction*, like the *Causal Inheritance Principle*, entails that the causal powers of a multiply realized property M are a subset of the causal powers of its *realizers* P_1, \dots, P_n – thereby opening up again the possibility of reduction.

Gillett appeals to the possibility of *strongly emergent properties* to argue, contra Kim, that there may be properties covered by the *Functionalization model of reduction* that are nevertheless *irreducible*. A property instantiated at a particular time t is strongly emergent if and only if it (1.) is realized (at t) by a structured complex of fundamental physical properties and (2.) ‘non-causally’ determines the causal powers at least one of these fundamental properties exerts (at t). The existence of such strongly emergent properties implies the existence of ‘*downward causation*’ since strongly emergent properties at least partially determine causal transactions at a lower level. By employing and defending the concept of strong emergence, Gillett attempts to reintroduce a realization-based, truly *non-reductive* version of physicalism, according to which there are irreducible macro-level properties which make a genuine causal contribution of their own (if only by ‘non-causally’ determining the causal contributions of their realizers).

Of course, the claim that there are strongly emergent (macro-level) properties doesn’t square well with the *Principle of Causal Closure*, which claims that every (fundamental) physical event that has a sufficient cause at all has a sufficient (fundamental) physical cause. Therefore, Gillett’s account is threatened, at least if it is reasonable to think both that the physical world we live in is causally closed and that the *Principle of Causal Closure* is an indispensable part of any serious version of physicalism. Gillett, however, argues – against the majority of physicalists – that the *Principle of Causal Closure* should be given up in favor of what he calls ‘*Patchwork physicalism*’: Patchwork physicalism

agrees with reductive physicalism that all macro-level properties are realized by structured complexes of fundamental physical properties, but differs from it by holding that there is a ‘patchwork’ of fundamental laws of nature that includes macro-level laws which involve irreducible, strongly emergent properties.

Gene Witmer, in his *Multiple Realizability and Psychological Laws: Evaluating Kim’s Challenge*, discusses Kim’s claim that if we follow Putnam and Fodor and appeal to the inability of disjunctive predicates like ‘ $P_1x \vee \dots \vee P_nx$ ’ to figure in law-statements, we must draw a similar dismal conclusion about predicates like ‘ M ’ with which they are supposedly coextensive. Witmer develops and evaluates three strategies that might underlie Kim’s claim. The first strategy, the *Unprojectibility Argument*, argues that multiply realizable properties like M are not *projectible*, i.e. not capable of figuring in lawlike generalizations which are confirmable by their positive instances, because their corresponding disjunctive ‘realizer sums’ $P_1 \vee \dots \vee P_n$ are not projectible. If this is correct, then even if there were true generalizations involving mental properties, they would not be confirmable in the same way genuine laws usually are confirmable. Witmer argues that the *Unprojectibility Argument* fails because it rests on the unfounded assumption that properties expressed by predicates like ‘ $P_1x \vee \dots \vee P_nx$ ’ are unprojectible.

The second strategy, the *Inexplicability Argument*, turns on Kim’s *Causal Inheritance Principle*, which apparently implies that laws involving multiply realizable properties must be explicable by virtue of being derivable from laws governing their different realizers. Therefore, if such derivability is ruled out, there is reason to think that there are no laws governing multiply realizable properties. Witmer suggests on Kim’s behalf a number of ways in which one might argue against such derivability, but none, he claims, succeeds.

The third strategy, the *Explanatory Multiplication Argument*, combines considerations of projectibility with the *Causal Inheritance Principle* to claim that if we project a generalization about a multiply realizable property to cases realized differently from those already observed, we will be committing ourselves to an inexcusable proliferation of independent explanations. Witmer suggests that although the *Explanatory Multiplication Argument* does not establish that such projections *must* be unwarranted, it does establish an important conditional conclusion, viz. that such precarious projections are warranted *if* explanations of a certain sort pertaining to the already observed cases are forthcoming. However, since it is an open empirical question whether those explanations are forthcoming, Witmer concludes that Kim’s rejoinder to non-reductive physicalism gives us no reason (yet) to despair of psychological laws involving multiply realizable properties.

Paul Noordhof, in his *Not Old ... But Not That New Either: Explicability, Emergence and the Characterisation of Materialism*, objects against the allegation that the relation of *strong supervenience* appealed to by many non-reductive physicalists in order to spell out their claim that non-fundamental properties are composed of fundamental physical properties is *too weak* (a set of higher-order properties Σ strongly supervenes on a set of lower-order properties Π just in case necessarily, for any property S in Σ an object x has S only if there is a property P in Π such that x has P and NECESSARILY, if any object y has P , y has S). In particular, he considers the objection that British Emergentism and Ethical Nonnaturalism – both allegedly *incompatible* with a physicalist worldview – also appeal to strong supervenience in order to explicate the relationship between emergent mental properties and physical properties, or between nonnatural ethical properties and natural properties, respectively.

Noordhof argues that non-reductive physicalism and British Emergentism can be distinguished by the *modal force* they assign to the second (capitalized) necessity operator in the standard formulation of strong supervenience: non-reductive physicalism interprets it as expressing *metaphysical* necessity, while British Emergentism interprets it as expressing only *nomological* necessity. Moreover, he argues that although Ethical Nonnaturalism claims that ethical properties strongly supervene on natural properties *and* do so with metaphysical necessity, it is *not* incompatible with physicalism since the reason that is given for why ethical properties are not reducible to natural properties is exactly the same reason non-reductive physicalists give for maintaining that mental properties are not reducible to physical properties: viz. their multiple realizability. Thus, by the standards of Ethical Nonnaturalism, non-reductive physicalists would have to hold that mental properties are ‘nonnatural,’ so there is no problem with both Ethical Nonnaturalism and non-reductive physicalism appealing to the same kind of supervenience relation.

John Bolender, in his *A Farewell to Isms*, argues that philosophical thinking and in particular theory construction in the philosophy of mind is dominated by ‘*ism*’-*thinking*, i.e. by the tendency to suppose that any philosophical theory about the mind-body relationship must fit neatly into one of the major philosophical categories of *physicalism*, *dualism*, *idealism* etc. Bolender attempts to show that this tendency toward ‘ism’-thinking impedes progress in the philosophy of mind, either by leading to an unfair criticism of already existing theories (because they are unjustly placed into one or the other major ‘ism’-category), or by making the formulation of novel, innovative theories more difficult.

Using empirical results from cognitive science about the role of prototypes in concept-formation, Bolender argues that expecting every mind-

body theory to fit into some broad 'ism'-category or other primes theorists for constructing further versions of well-known and already established 'isms.' Philosophers in the age of 'physicalism' for example are more likely to invent a theory which unambiguously belongs to 'physicalism' as opposed to something which is harder to classify or which, even though clearly physicalist, nevertheless contains important elements from some contrasting 'ism.' The unfortunate result of 'ism'-thinking, of course, is that broad ranges of possible theories or promising ranges of less typical theories are entirely ignored.