Naturalism, Specialism, and the Completeness of Physics

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In discussions of philosophical naturalism, the naturalist thesis—that everything there is is a natural object—is frequently assumed rather than argued for. Many philosophers take it for granted that naturalism is right, and thus occupy themselves with showing how it is possible.

Before going any further, I must first make it clear that, by naturalism, I mean the restrictive naturalism, or physicalism, of philosophers such as David Papineau, Jaegwon Kim, Fred Dretske, et cetera. In fact, I will henceforth refer to this form of naturalism as physicalism in order to discourage conflation with 'expansive naturalism' (held by, perhaps, such philosophers as Ludwig Wittgenstein, John McDowell, Donald Davidson, and so on—this list is contentious).

The claim that naturalism/physicalism is generally assumed may seem absurd since there are, after all, volumes of contemporary literature on it. But what I mean is this: most of the arguments that purport to be arguments for physicalism are reductions that show physicalism is possible. For example, a philosophical physicalist might show how mental states can be reduced to physical states or show how talk of numbers can in principle be reduced to talk of physical phenomena. What these arguments assume is that physicalism follows from a reduction that shows its possibility, or that, in other words, once physicalism is shown to be non-contradictory, it follows necessarily. But of course that something is possible does not mean it is actual.

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One may well concede to the physicalist the possibility of certain of his reductions and yet ask why one should take things to actually be this way.

Given the popularity of the physicalist thesis, the paucity of truly positive arguments for it is surprising. I suspect this lack has something to do with the intuitive appeal of physicalism (a modern phenomenon), but I will not dwell on the psychological appeal of physicalism. David Papineau, at least, offers an argument for the actuality of physicalism in his seminal book Philosophical Naturalism. Let's examine it.

Papineau thinks that the (forthcoming) completeness of physics supports two positions: supervenience and token congruence. The conjunction of these positions is supposed to establish physicalism. Either position taken on its own fails to do so. Papineau writes "supervenience and token congruence are together sufficient for physicalism" (my emphasis). I understand Papineau to regard the relation of the conjunction of supervenience and token congruence to physicalism as analytic. Physicalism, as Papineau means it, simply is supervenience and token congruence. So, if we establish both supervenience and token congruence, there is no further question as to whether physicalism, too, is correct; that physicalism is correct would follow simply by virtue of the logical relations of these words. This allows a systematic division of the claims of physicalism. Each conjunct can be evaluated on its own.

Why should supervenience and token congruence (and thus physicalism) be accepted? Papineau writes, "both supervenience and token congruence are strongly supported by an important feature of science, namely the internal completeness of physics." In other words, there is (at least) one argument (broadly understood) that supports both of these conjuncts. Thus Papineau's overall argument for physicalism from the completeness of physics has this form:

(1) The completeness of physics (C) is true.
(2) If C is true, then supervenience (S) is true.
(3) If C is true, then token congruence (T) is true.
(4) If S and C are true, then physicalism (P) is true.

(5) Since S and C are true by the first three premises, P is true by the fourth premise.

The structure of this essay reflects the shape of Papineau's argument: first, an elucidation of what is meant by 'the completeness of physics'; second, an examination of whether the completeness of physics entails supervenience; lastly, a close look at token congruence and whether it follows from the completeness of physics. As I have already said, I will follow Papineau's lead and consider (4) to be analytic. So if the first three premises are correct, then Papineau's conclusion of physicalism follows as a matter of course.

What does Papineau mean by 'the completeness of physics'? In explaining this notion, Papineau is duly careful not to build his physicalist conclusion into his definition. One might be tempted to hear 'the completeness of physics' as simply the idea that whatever there is, it is explained by physics, i.e. a mere reworking of the physicalist thesis. If one meant to ground claims of physicalism in the completeness of physics understood in this sense, he would find himself arguing in a circle.

Papineau, however, does not make this mistake. He writes that physics is complete "in the sense that all physical events are determined, or have their chances determined, by prior physical events according to physical laws." In other words, whatever is described as a physical event can be sufficiently explained in physical terms, a claim which does not (yet) deny that there might also be non-physical events. So, if a billiard ball (qua physical object) rolls across a table (qua physical event), we need not revert to any non-physical explanation in order to understand what is (physically) taking place. We are able to describe the movement of the billiard ball entirely in terms of physical causes, and explanations on the order of, say, my intentions in playing a game of billiards are superfluous to the understanding of the physical events taking place on the billiard table.

The completeness of physics is the claim that physics is a closed system of explanation, and in asserting (or assuming) the
completeness of physics, one need not deny that there are, roughly speaking, other things in the world. Neither does the completeness of physics obviously or immediately entail that these other things must, in some way or another, be reducible to physics. Further philosophical work is required in order for one to see how physicalism might follow from the completeness of physics. The completeness of physics is merely the thesis that physical causes exhaustively determine physical events.

The completeness of physics is supposed to support supervenience. Papineau puts forward two premises that entail this conclusion. The first premise is that two identical physical states issue in the same consequences (or chances thereof). The second premise is that different 'mental states' must have the potential to manifest themselves in at least some 'physical contexts'. In other words, if there exists some mental state, it must be the kind of thing that could in theory be physically detected under the right circumstances. (It is a truism that, if something can be physically manifested, it can be physically detected.) This could be through behavior but does not need be so; differing neurophysiological brain-states would suffice. In other words, mental states are manifested in physical states by necessarily issuing in physical consequences (or chances thereof), and thus a difference in mental state could not exist without a correlative difference in physical state (i.e. a difference in the actual consequences or a difference in the chances of certain consequences following).

These two premises entail supervenience. The first premise tells us that physical states lead to consequent physical states (which lead to further consequent physical states, and so on) with necessity, and so there is no 'room' for other, non-physical, causes for what occurs in a physical-causal chain of events. If a non-physical cause exists in such a chain, it occupies the same 'space' as some physical cause already in play. That is, if any other, non-physical, cause exists, it is strictly coincidental with certain of the physical causes that issue in the consequent physical states. A non-physical cause would be unable to cause any diver-
gence in the physical-causal chain. The second premise tells us that mental states are manifested in these physical states so that a change in a mental state necessarily has a correlate change in a physical state. In other words, mental states do cause physical events. Thus there is a 'strict coincidence' between mental and physical states; and this 'strict coincidence' is the same phenomenon as supervenience. If two systems are exactly the same physically, they must also be exactly the same mentally since, if there is a mental difference between the two systems, there must also be a physical difference between the two systems. But since by hypothesis the two systems are physically identical, we have ruled out the possibility of two physically identical systems having non-identical mental phenomena.

I find Papineau's move from the completeness of physics to supervenience merely plausible because, while the conclusion surely follows from the premises, I see no iron-clad argument for accepting the second premise (the 'manifestability of the mental' premise). Indeed Papineau too admits merely the plausibility of this premise. He writes that his defense of it "and hence of supervenience, is less than fully principled." The vulnerability of this premise lies in the felicity of the counter-supposition that there are mental states that have no physical manifestation. There is, at least, no obvious logical incoherence in such a supposition.

Papineau thinks that the state of affairs that would warrant a rejection of the second premise is exceedingly implausible. Papineau writes that, if there were a mental state that had no potential for physical manifestation, then it would be "undetectable" — and who would wish to suppose there to be such things as 'undetectable mental states'? And if we suppose 'undetectable mental states', why not 'undetectable leprechauns' sitting on your shoulder? If such exist, it is a very weak sense of 'exist' that is in play here. So this line of thought has some intuitive appeal. What must be added, though, is that Papineau is talking about physical detectability. However, this is not to say that one could not detect such a mental state in some other way. Suppose one detects these mental states mentally! And to say
that 'mental detection' is something that must itself be physically manifestable is to beg the question.

I have had thoughts, feelings, and so forth — 'mental states', if you will — that neither led to physical action nor would have under any circumstances (nor did my 'detection', or awareness, of these mental states lead to any potential for different physical action — at least as far as I know). Papineau's recourse to such a thought must be to say that such mental states must have strictly coincidental physical states (perhaps confined to the brain), but this is to argue in a circle. The very question is whether or not such things must have physical manifestability (either in the brain or elsewhere), and there is no obvious reason to suppose such mental states must be physically manifestable. No reason, that is, except for the thesis of physicalism itself, but this is the very claim at stake. When Papineau writes that supposing non-physically-manifestable mental states "[flies] in the face of empirical findings," he is lapsing into the assumption of physicalism and failing to actually argue for it. Mental states that have no physical manifestation are, by hypothesis, not the sorts of things that empirical findings speak for or against, and so in a debate over their existence, empirical findings are irrelevant. No matter how many times an empirical (physical) test fails to return evidence of a non-physical object, the likelihood of that non-physical object's existence remains unaffected. No empirical finding could confirm either the existence or non-existence of such an object, and this goes for non-physically-manifestable mental states. When Papineau says that supposing the existence of such objects flies in the face of empirical findings, Papineau is himself making a claim that flies in the face of what can be soundly inferred from empirical findings.

Having said all that, I still find supervenience a plausible claim. That is to say, my intuitions (and no more) are in sympathy with supervenience, though I think Papineau's defense of it is even less principled than he realizes. Yet, setting aside the question of supervenience, it remains to be asked whether the completeness of physics supports the other half of the conjunc-
tion that is physicalism: token congruence. To this question, the answer is no (and for what it is worth this time the assertion goes unredeemed by any sympathetic intuitions held by the author of this essay).

First, it is necessary to get into view what exactly 'token congruence' means. What must be true for a claim of token congruence to obtain? Papineau writes, "To get physicalism proper we need to require... that the mental is in some sense the same substance as the physical, so as to rule out doctrines like epiphenomenalism." So in order for "physicalism proper" to obtain, one needs to augment supervenience with the claim that "the mental is in some sense the same substance as the physical." This is a rather murky remark. What it means to count "in some sense" as the same substance must be settled, and it is incumbent on the physicalist to do this without abusing the in-some-sense clause to the point of rendering his claim trivial.

Let's look at what token congruence is not. Papineau is concerned to distinguish physicalism from epiphenomenalism, and he suggests establishing token congruence does just this. He writes, "supervenience isn't physicalism, for it leaves open the possibility of epiphenomenalism." Thus whatever epiphenomenalism claims, token congruence is supposed to in some way claim the opposite. Epiphenomenalism is roughly the claim that, while supervenient, the mental and the physical are, in some important sense, distinct, or 'not the same substance.' That is, while there exists strict coincidence between the mental and the physical, they are, again in some sense, two different things. Papineau writes "In order to ensure physicalism, we need to require in addition that mental phenomena do not just co-vary with physical phenomena [as claims the epiphenomenalists], but are in some sense congruent with them." Papineau thinks mental phenomena do more than just co-vary with physical phenomena, and the epiphenomenalists that they merely do.

The phrase 'in some sense' has by now been repeated several times. My intention in doing this has been to bring out that everything hinges on the exact sense in which Papineau means
to claim the mental and the physical are the same. So then let’s ask it: in exactly what sense are the mental and the physical tied more closely than mere co-variance? Papineau writes that "the mental is ontologically inseparable from the physical," and this seems to be the 'sense' in which the mental and the physical are the same substance. This is still a rather murky remark. To elaborate further: since it is, Papineau thinks, clearly wrong to say, "Your arm would have gone up even if you did not want it to," and also wrong to say, "Your arm would have gone up even if such-and-such physical events (in your brain, shoulder, \textit{et cetera}) had not happened," we have here a strict coincidence between wanting one’s arm to go up and the relevant neurophysiological occurrences. Taken in conjunction with Papineau’s belief that, since the mental can be rightly said to cause the physical (just as the physical can be rightly said to cause the physical), it would imply "an absurd proliferation of causal overdetermination" were the mental and the physical not to be the same substance (at least in some sense). In other words, it is the sheer implausibility of such overdetermination that causes Papineau to rule out the 'ontological separability' of the mental and the physical. It is so implausible to suppose that there are two causes here that the physical cause and the mental cause must be the same cause, and thus they are 'ontologically inseparable.'

Granting Papineau that overdetermination both appears to occur and yet would be so absurd that we should deny it and claim instead that the mental and the physical are in some sense the same substance, we should ask why Papineau takes his argument to prove physicalism and not 'mentalism.' Even if we are convinced by Papineau that his argument for token congruence proves the mental and the physical to be, in some sense, the same thing, it is still necessary to explain the priority given to the physical side of the equation. Couldn't this argument support just as well some form of idealism in which everything is reducible to the mental? Why claim that this argument shows the mental to collapse into the physical instead of that it shows things to be the other way around?
In a footnote, Papineau touches on these thoughts and gives his answer in terms of the completeness of physics. He writes, "Why doesn't this argument work in reverse, and also show that all physical differences must depend on mental differences?"\textsuperscript{18} The completeness of physics, Papineau thinks, provides an answer to this question; he writes, "The essential reason is that the mental is not complete."\textsuperscript{19} To unpack why this is a reason (indeed the essential one): every physical state can be completely explained by antecedent physical causes. A mental state, on the other hand, is something that may sometimes be completely explained by antecedent mental states and sometimes not. Thus priority is granted to the physical because it has no need of non-physical explanation whereas the mental seems as though it must sometimes either go unexplained or be explained by something outside the realm of the mental. Though the move from observing that physics is a closed system of explanation to claiming its ontological priority may seem like an absurd non-sequitur, let's set that objection aside. At the very least, if it is true that physics constitutes a closed system while the mental realm does not, there is something particularly interesting about physics (though, again, why this specialness should lead Papineau to claim ontological priority for physics may yet be opaque).

That physics is unique in its forthcoming completeness is something that I think should be questioned, but to do so, it is necessary to switch registers slightly and juxtapose the physical, not to the mental, but to the special (as in the 'special sciences', in which the study of the mental is included).\textsuperscript{20} Papineau— as well as all other philosophical physicalists— is arguing as much against the special sciences in general as he is against the mental,\textsuperscript{21} and it is because of its completeness that he picks outs physics as special amongst the sciences. So, is Papineau right that physical is special in a way the special sciences are not?

The special sciences are as potentially complete as the physical sciences. If we allow a conjunction of the various branches of the special sciences, I take it that we may well give a complete account of every 'special' state in terms of antecedent
special states. For example, we explain the freak cyclone in terms of the flapping of a butterfly's wing without jumping sciences as long as we consider meteorology and biology to be continuous with each other. We could say that combining our knowledge of meteorology with biology in this way deepens our understanding of both sub-sciences; knowing the effect a butterfly can have on storms and vice versa can be understood under the holistic heading of 'bio-meteorology.' Once we combine biology, meteorology, cosmology, psychology, and so forth, I see no barrier to giving a full description and causal explanation of all special states in special terms. We might call this 'the completeness of the special.' Given these considerations, I see no reason to not reverse Papineau's professed intuition "that chemical phenomena... are all at bottom physical... What is more, I am inclined to think the same about the phenomena studied by meteorology, biology, psychology, sociology and the other so-called 'special sciences.'" One might equally say, "I am inclined to think gravity, particles, mass, and so on — in sum, all aspects of the so-called 'physical sciences'— are all at bottom special."

To raise and respond to a few objections to my suggestion that this way of looking at the special sciences really is analogous to Papineau's conception of physics: first, why should we allow a conjunction of sciences to be called 'a' science? After all, it is the completeness of physics that is appealing, and the way I have described special science makes it seem no more than a hodge-podge of different fields thrown together after the fact. My response is that combining, say, biology and meteorology, is simply broadening our understanding of what there is and how it relates to what else there is. That is physics' prime directive too (plus, it would seem, a few considerations about minimizing its ontology). Combining the forces 'electricity' and 'magnetism' into 'electromagnetism' was a great achievement for physical science, and congruently, to recognize the interconnectedness of butterflies and cyclones is to deepen our understanding of both butterflies and cyclones. One might next object that we will never have sufficient
special science to account for all cases of special events and objects. There are two sorts of answers to this objection. First, I point out that special science and physics are in the same boat in this regard. Neither physical science nor special science as it currently stands offers us a complete explanation of their respective fields, and based on observation of how these sciences have developed so far, it seems likely that our current categories and explanations will necessarily undergo some revision as we move forward toward greater overall understanding. Thus this objection might equally be made against the completeness of physics.

Second, I take Papineau's cue and suggest that we simply define 'special science' as the science of whatever categories are ultimately needed to give full explanations for all special effects (echoing Papineau's definition of physics: "the science of whatever categories are needed to give full explanations for all physical effects"\(^{25}\)). In fact, special science might be uniquely open to introducing theology into the fold if it turns out to be a requisite category of explanation, and in this way, special science may be able to take in stride the idea that the universe requires a necessary cause, or that there must be an unmoved mover, \textit{et cetera} (things which may pose a legitimate explanatory problem for the thesis of the completeness of physics if the category 'physics' is not to be expanded to the point of being unrecognizable as such).

Finally, one might worry that, since there clearly are physical phenomena, even the most chauvinistic special scientist cannot claim that everything is at bottom a special object. Of course, this chauvinistic special scientist—mirroring his chauvinistic physical scientist counterpart—will claim that discourse on 'physical objects' is simply a way of talking about special objects, that such talk is in principle reducible to talk of special objects.

Thus the priority of physics is lacking in Papineau's account (even assuming ontological priority follows from completeness) since it is not unique in its potential completeness. Until some other distinguishing attribute of physics is suggested and defended, we could just as well be 'specialists' as 'physicalists' since Papineau's argument for token congruence supports the
conclusion that everything is at bottom physical no more than it supports the conclusion that everything is at bottom special. If these are contradictory theses, then there is surely something wrong with Papineau's argument.

Papineau seems to think that being able to offer some sort of physical description of every event means that there is only physics (even if this description *seems* to leave out important aspects of an event). But we could put everything in special terms, and we might then equally argue that everything is special and that the physical supervenes on the special instead of the other way around. Clearly both of these views fail to get things right. It is the notion that we must decide between these two positions that is confused. Like a coin (or better an *n*-sided die), a complete account of *what there is* must account for multiple interlocking, yet distinct and irreducible, aspects of reality. We could define the whole of a coin in terms of its relation to its 'heads' side, and equally so for 'tails' (or, again, the whole of an *n*-sided die might be described in terms relative to one of its faces). However, such descriptions leave out an important perspective on, or way of understanding and explaining, the object in question. That a mode of description is, or may be, complete grants it no ontological priority.
1. See Bilgrami (2010) for a brilliant genealogy of naturalism.
2. At first pass, these positions seem to have this relationship to each other: supervenience does not entail token congruence, but token congruence requires that supervenience be true. So perhaps one should say that establishing token congruence establishes physicalism, but if this is so, it is because token congruence entails supervenience.
4. One might still ask whether it makes sense to call the conjunction of supervenience and token congruence ‘physicalism’, but for the purposes of this essay, this question is not of interest.
5. Ibid., p. 13.
6. Ibid., p. 16.
7. Ibid., p. 17.
8. Ibid., pp. 17-18.
9. Ibid., p. 20.
10. Ibid., p. 20.
11. Of course, I'm writing about these mental states *now* so, clearly, they have manifested themselves! - Well, suppose I speak this way because of a mistaken belief that these mental states could not be physically manifested. Might not what I'm saying still apply to yet other mental states, ones that I would not even mention in this oblique way? And perhaps what I say here is true of other people's mental states. Their mental states may remain utterly private while I, by luck or insight, happen to describe them here in this essay.
12. Ibid., p. 20.
13. Ibid., p. 11.
15. Ibid., p. 21.
16. Ibid., p. 23.
17. This essay is primarily about the relationship between the completeness of physics and Papineau's argument for physicalism, but I find myself unable to resist adding a digressive footnote at this point. So, a digression: I think there is an equivoca-
tion of the word 'cause' as used in 'mental cause' and 'physical cause' and that this equivocation makes the "absurd proliferation" of causes identified by Papineau seem woefully unabsurd. When we say "My arm went up because I wanted it to" and "My arm went up because such-and-such neurons fired in my brain", there is simply something different meant by each 'because'. In the first sentence, I am perhaps distinguishing an intentional action from a non-intentional one, and in the second, I am, by hypothesis, offering an explanation of a physical state based on an antecedent physical cause. Why this form of overdetermination - if we can still call it that - is supposed to strike anyone as absurd is beyond me. If all such events are 'overdetermined', they are not overdetermined in virtue of having multiple causes of the same kind but rather in virtue of having multiple causes of different kinds - Aristotle, for example, had such a view of causation - and depending on the discussion at hand, we may speak of different kinds of cause as the different senses become appropriate. And this seems tantamount to saying that the same event can be described in multiple ways. The claim is now closer to platitude than absurdity, and it is hard to imagine how it could motivate anyone to claim different causes of the same event must really be the same cause.

18. Ibid., p. 18.
19. Ibid., p. 18.
20. The special sciences comprise basically every field of science that is not physics. Psychology, meteorology, lepidoptology, geology, chemistry, anthropology, and many others are examples of special sciences.
21. The change in registers from 'physical v. special' to 'physical v. mental' occurs on pp. 10 - 11 of Papineau's *Philosophical Naturalism*.
22. In fact, I don't think it is even necessary to conjoin the various special sciences. If we chose to do so, we could create a closed system of explanation for, say, weather as long as we make sufficient use of the 'or chances thereof' clause that Papineau uses in his description of physics. We might say, "Here is how weather behaves usually. It is governed by causal relationships, though
there are times when weather-events just happen. However, we have models for these 'random' cases that do a good job of predicting the likelihood of such things. So we can define the completeness of meteorology like this: two meteorological states will issue in the same consequent meteorological states or chances thereof.

23. Ibid., p. 9.
24. One might continue objecting on a similar note: physics puts things in terms that are utterly simple (e.g. atoms, or maybe fermions and bosons) whereas the objects of special science are composites (e.g. storms composed of wind and rain, butterflies that have complicated life cycles, yellow rubber ducks that are complexes of 'yellow', 'rubber' and 'duck', and so on). It is true that the objects of special science may all be viewed as composite concepts given the right schema, but this is also true of 'basic' physical objects (which are understood in terms of mass, spin, and so forth). The idea of an atom is as conceptually rich as the idea of a butterfly or a storm. The simplicity that physics claims seems to be that of a minimal ontology. But what counts as simple is relative, and there are considerations of simplicity in which the special sciences will emerge as simpler than physics. But no more of this here.
25. Ibid., pp. 29-30.
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References