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Epiphenomenal Properties

Umut Baysan

Abstract: What is an epiphenomenal property? This question needs to be settled before we get to decide whether higher-level properties are epiphenomenal or not. In this paper, I offer an account of what it is for a property to have some causal power. From this, I derive a characterisation of the notion of an epiphenomenal property. I then argue that physically realized higher-level properties are not epiphenomenal because laws of nature impose causal similarities on the bearers of such properties, and these similarities figure as powers in the causal profiles of these properties.

Keywords: causal powers; epiphenomenal properties; higher-level causation; laws of nature; physicalism; realization

1. Introduction

It is sometimes argued that if higher-level properties that are invoked in the special sciences are not identical with physical properties, they must be epiphenomenal (e.g., Kim [1998]). But what is an epiphenomenal property? The short answer is that it is a property without any causal power. But what is it for a property *not* to have any causal power? To answer that, we should first decide what it is for a property to have *some* causal power. This paper argues that a property can be said to have a causal power insofar as it is lawfully necessitated that its bearers have that power. I call this ‘the nomic bearers thesis’ (NBT). Using NBT, I offer a characterisation of the notion of an epiphenomenal property, and then discuss whether higher-level properties are epiphenomenal.

In section 2, I clarify my uses of the terms ‘property’, ‘power’, and ‘cause’. In section 3, I introduce the problem of epiphenomenal properties. In section 4, I explore a number of ways of explaining the relationship between properties and the causal powers associated with them, and then argue that NBT gives the best explanation. In section 5, I defend NBT from an objection based on nomologically coextensional properties. In section 6, I show NBT’s application on the issue of epiphenomenal properties, and argue that physically realized higher-level properties are not epiphenomenal.

2. Property, Power and Cause

Let me begin with three clarifications. The first one is about properties. Since my purposes here are to regiment the notion of an epiphenomenal property and solve a problem about higher-level properties, I shall assume, without argument, a broadly realist position about properties. I take it that a red chaise longue has the property of *being red* and a corkscrew has the property of *being a corkscrew*.¹ More importantly, I use the term ‘property’ to refer to types, rather than tokens. John’s pain yesterday at 3pm is not a property in this use of ‘property’; it is a token of the type *being in pain*, which has other tokens, e.g., Julie’s pain this afternoon. I am neither endorsing nor rejecting realism about universals. I hold that *if* there are universals, properties are universals; *if* there are none, properties must be identical with sets of ontologically more acceptable entities, such as tropes [Williams 1953] or resembling

¹ I will use *italics* for property names.

(possible) objects [Lewis 1986; Rodriguez-Pereyra 2002]. Most of what I have to say here should be acceptable regardless of where one stands regarding the debate on universals.

In my use of the relevant terms, then we should contrast properties with their instances, which are particulars. I shall talk about a specific case of the instantiation relation, namely the *bearing* relation. Bearing is restricted to cases where the instantiating entity (i.e., the bearer) is a concrete particular, e.g., an ordinary physical object such as a pasta bowl, and the instantiated entity is a property, be it a universal or a nominalistically acceptable substitute for it.

The second clarification is about powers. Some philosophers reserve the term ‘power’ for essentially dispositional natural properties [Contessa 2015; Bird 2016]. Whether there are any such properties can be contested, and I will not take a stance on this issue here. I use the terms ‘power’, ‘causal power’, and ‘disposition’ interchangeably. In my use of these terms, saying/believing that some object has a causal power or a disposition is roughly saying/believing that a certain dispositional expression about that object is true. What makes a true dispositional expression about a particular object (e.g., ‘This vase is fragile’) true is an issue which I will not address.

The third clarification is about causes. I am not in a position to offer a definition of ‘cause’. Likewise, I will not assume any particular theory of causation. I assume that some statements of the form ‘A is a cause of B’ are true, and providing an account that lays out the conditions under which such statements are true is outside my remit. Whereas some discussions of the issue of epiphenomenal properties in the special sciences offer particular theories of causation, some do not. This paper belongs to latter group.

3. Powers of Properties

Some have thought that within a broadly physicalist framework, higher-level properties must be identical with (reducible to) physical properties in order to keep their causal efficacy. For example, Kim [1998] has argued that if higher-level properties are not identical with physical properties, then *either* (i) they are epiphenomenal because, barring systematic causal overdetermination, all the causal work they are meant to do is already carried out by physical properties, *or* (ii) their causal powers imply the failure of the causal closure of the physical, i.e., the thesis that every physical effect has a physical cause. The problem with (i) is that it is counterintuitive, as it implies that the causal explanations we find in the sciences that invoke higher-level properties as causes are systematically mistaken. The problem with (ii) is that it is in tension with the broadly physicalist framework that is assumed from the outset. It particularly suggests that higher-level properties are ‘emergent’ properties with novel causal powers. So, the argument goes, higher-level properties must be identified with physical properties.

One of the many responses to this line of reasoning has been to suggest that if higher-level properties have only *some* of the causal powers of the lower-level physical properties that underlie them, then they can be shown to be non-epiphenomenal without thereby being identified with physical properties or rendered emergent [Wilson 1999; Shoemaker 2001; Clapp 2001]. This is known as ‘the subset strategy’ for suggesting that any physically acceptable higher-level property has a subset of the causal powers of the lower-level physical property it depends on for its instantiation.

I will offer my own solution to the problem of epiphenomenal properties in section 6. For now, I only want to stress the role of the relationship between properties and causal powers in the forgoing discussion. Epiphenomenal properties are thought to be problematic in not *having* causal powers. Emergent properties are said to be distinctive because of *having* novel causal powers. Physically acceptable higher-level properties are claimed to *have* a subset of the causal powers of their physical base properties. What is common to these claims is the apparent presupposition that it is admissible to talk as if a property is the sort of entity that may *have* causal powers.

4. Powers of Bearers

What is it for a property to have a causal power? A very quick answer to this is that properties are abstract entities, hence they don't have causal powers. As explained in section 2, I take properties to be either universals or sets of particulars. Since both universals and sets are abstract entities, it is uncontroversial that, in my use of 'property', properties are abstract entities. So, are all properties epiphenomenal? Surely, this is not the sense in which a property should count as epiphenomenal; something must have gone wrong. My diagnosis is that the claim that properties don't have causal powers can be weakened to allow for a real-derivative distinction regarding the uses of 'have'. According to this diagnosis, properties don't *really* have causal powers, but there is a *derivative* sense in which they do.² Consider the following two statements:

Red-red (RR): *Being red* has the causal power to generate reddish visual experiences (in normal perceivers under normal viewing conditions).³

Green-red (GR): *Being green* has the causal power to generate reddish visual experiences.

Although, both RR and GR are strictly speaking false (because properties don't really have causal powers), there is a sense in which RR is acceptable and GR is not. There is some relation that relates *being red* to things that really have the said power, and that relation doesn't relate *being green* to things that really have that power. This relation is the bearing relation. Regarding RR: *being red* doesn't really have the power to generate reddish visual experiences, but the bearers of *being red* have this power. Regarding GR: neither *being green* nor the bearers of *being green* have this power. These considerations support what I shall call the *Bearers Thesis* (BT):

(BT): Properties don't really have causal powers; their bearers do. In a derivative sense, we can say that a property *F* has a causal power *C* insofar as *C* can be rightly attributed to bearers of *F*.

What BT offers is in line with the common understanding that property instances (not properties themselves) are the *relata* of causal relations. A property can be a cause derivatively on its instances' being really causes. Given that property instances have property bearers as constituents, in cases where property instances are causes, the bearers in question

² As also suggested, though without an argument, in Baysan [2016: 386].

³ Henceforth, I will drop this qualification in parentheses, but it remains implied.

have, and manifest, causal powers. So, the right way to make sense of power attributions to properties is by means of understanding them as power attributions to the bearers of these properties. An important issue here is to decide which bearers of a property we should take into account, and for this, we must consider more specific versions of BT.

Before examining different versions of BT, I should mention two alternative strategies which I will not endorse. The first one is to appeal to the *conferral* relation that is supposed to relate properties, objects and causal powers.⁴ Properties don't have causal powers; they confer causal powers on objects. Although I can be persuaded that 'confer' is a better verb than 'have' for this usage, what is problematic with this strategy is that appealing to conferral doesn't explain anything. We are trying to explain what underlies the connection between properties and the causal powers that are rightly associated with them. Saying that properties confer these causal powers is nothing but giving a name to what needs to be explained. The second alternative strategy is to say that properties don't have powers but they *are* powers [Mumford 2008]. If all properties in one's ontology are dispositional properties, then one can use this strategy. I am searching for a more neutral way of explaining the relationship between properties and the causal powers that are associated with them, so I will not appeal to this strategy. Nevertheless, what I will offer is compatible with the view that properties are powers.

Now let's start exploring variations on BT. If the proposal is that properties don't really have causal powers but they do so derivatively on the powers of their bearers, then the next step is to decide which bearers we must consider. Remember the example about the property of *being red* and the causal power of generating reddish visual experiences (henceforth, the power to look red). What we might say is that *being red* has the power to look red because the bearers of this property (i.e., red objects) have the power to look red in virtue of *being red*. More generally:

The Bearers Thesis – 'in virtue of' (BTV): A property *F* has a causal power *C* if and only if all bearers of *F* (that have *C*) have *C* in virtue of having *F*.

I anticipate that BTV will win the hearts of many, in particular those who are moved by the theoretical benefits of using the locution 'in virtue of'. But there are two reasons why I don't find BTV very satisfying. First, by making this 'in virtue of' claim, we are explaining only very little of what needs to be explained. We are only saying that if a property *F* has some causal power, there is some explanation of this which involves *F*'s bearers and their causal powers. Put this way, there isn't much to disagree with BTV, but I am hoping to make better progress and fill in what that explanation might be.

Second, BTV presupposes that objects have their causal powers in virtue of their properties. If this is read one way, it implies that a property is a more fundamental entity than a causal power. This is a substantial metaphysical claim about properties and causal powers which can be contested. For example, some hold that properties are constituted by causal powers [Shoemaker 1980], which would indicate that a property is less fundamental than the causal powers that are associated with it. In such a view, it is more natural to think that an object has

⁴ See Contessa [2015] for a recent example of the use of 'confer'. Also, sometimes 'bestow' and 'contribute' are used to convey the same idea (see Shoemaker [1980]).

its properties in virtue of its causal powers.⁵ In response to this, it can be argued that the ‘in virtue of’ locution can be read in a way that doesn’t indicate a direction of fundamentality. In a sense, my car’s steering wheel is in the garage in virtue of my car’s being in the garage, but this doesn’t imply that my car’s presence is more fundamental than its steering wheel’s presence.⁶ I agree that there is a sensible way of reading some ‘in virtue of’ claims this way. However, if BTV is meant to give a metaphysical explanation of how properties have causal powers, arguably, the ‘in virtue of’ locution it invokes should be understood in a more restricted sense. In any case, the fact that there is this ambiguity about the use of ‘in virtue of’ adds to my scepticism about the usefulness of BTV.

Maybe we should drop the in-virtue-of claim and say that the property of *being red* has the causal power to look red because *all* red objects have this power. On this proposal, we are supposed to consider the extension of a property in order to identify a property’s causal powers. If everything in *being red*’s extension has the power to look red, then (and only then) the property can be said to have this power. More generally:

The Extensional Bearers Thesis (EBT): A property *F* has a causal power *C* if and only if all bearers of *F* have *C*.

The problem with EBT is that it makes the relationship between properties and causal powers too contingent. Suppose that somehow all red objects are either destroyed or discoloured with one exception: a fire extinguisher Fred.⁷ As a fire extinguisher, Fred has the causal power to put out fire. Given that Fred is the only bearer of *being red*, EBT has the undesirable consequence that *being red* has the causal power to put out fire. But it shouldn’t be contingent on the destruction or discolouring of all red objects except one for the property of *being red* to acquire a new power. So, EBT needs fixing.

If too much contingency is the problem, then the solution must be to make the right-hand side of the biconditional a modal claim. We could say that the property of *being red* has the causal power to look red because it is necessary that all bearers of *being red* have this power. Even in the scenario where Fred is the only red object, *being red* doesn’t have the power to put out fire because it is not necessary that all bearers of *being red* have this power; there could have been a highly flammable red blanket which wouldn’t have the power to put out fire. So, consider:

⁵ It might be proposed that we can modify BTV as follows: a property *F* has a causal power *C* if and only if either (i) bearers of *F* (that have *C*) have *C* in virtue of having *F* or (ii) bearers of *F* (that have *C*) have *F* in virtue of having *C*. The purpose of this disjunction is to accommodate both views about the direction of fundamentality considered above. However, this won’t work, as there are views according to which properties *are* powers, and assuming that *in-virtue-of* relations are asymmetric, on such views, this modified version of BTV will not be adequate. Can we add yet another subclause to the right-hand side to accommodate this option? Perhaps we can, at the sacrifice of elegance. But this still wouldn’t address the first problem that in-virtue-of claims explain only so much.

⁶ Thanks to an anonymous referee for this example.

⁷ Assume that Fred is red but it doesn’t have any red proper parts.

The Modal Bearers Thesis (MBT): A property *F* has a causal power *C* if and only if, necessarily, all bearers of *F* have *C*.

MBT doesn't suffer from Fred-like counterexamples. However, the problem with MBT is that it presupposes a specific view about the relationship between properties and causal powers, and arguably about the modal status of laws of nature. Assuming that the strength of the modal operator in MBT is metaphysical necessity, MBT seems to require the truth of dispositionalism, according to which properties have their causal profiles as a matter of metaphysical necessity [Shoemaker 1980; Swoyer 1982; Bird 2007]. Dispositionalism, coupled with realism about laws of nature, implies that laws of nature hold with metaphysical necessity: if laws of nature govern the causal relationships that properties may enter into, then the impossibility of a property to change its causal profile across worlds suggests that laws of nature hold with metaphysically necessity. Dispositionalism contrasts with categoricalism, according to which no property is essentially dispositional [Armstrong 1997]. On this view, properties have their causal roles contingently, and this suggests that laws of nature hold only contingently. As far as my methodology in this paper is concerned, the explanation of what it is for a property to have a causal power shouldn't presuppose any of these views. Hence, the search for a neutral explanation continues.

We can modify MBT so that it accommodates either of the views mentioned in the previous paragraph. To do that, we can take the necessity in question to be *nomological* necessity: necessity as a matter of laws of nature. Note that this would leave open whether the actual laws of nature are contingent or not. If the actual laws are *not* contingent, then nomological necessity and metaphysical necessity would be equivalent, so this modification doesn't rule out necessitarian views of laws of nature. However, if the actual laws are contingent, then nomological necessity is weaker than metaphysical necessity, hence this modification would be required.

According to the modified version, *being red* has the causal power to look red insofar as every bearer of *being red* in every nomologically possible world has the causal power to look red.⁸ More generally, I propose the following:

The Nomic Bearers Thesis (NBT): A property *F* has a causal power *C* if and only if, as a matter of nomological necessity, all bearers of *F* have *C*.

I propose NBT as a reductive thesis: it reduces a property's causal powers to the causal powers of its bearers in nomologically possible worlds. If NBT is true, we have an explanation of what it is for a property to 'confer' a causal power on its bearers: conferring a power is a matter of there being (at least) a nomological necessity that anything that has the power-conferring property must have the conferred power. If the governing conception of laws of nature is true, then such nomological necessities will be ultimately grounded in laws, hence the relationship between properties and causal powers will be underwritten by laws. That said, NBT presupposes neither the reality of laws of nature nor a governing conception of laws, because there might be no laws and what we take to be nomologically necessary

⁸ In the case of this particular example, even if were to go outside the sphere of nomologically possible worlds, the result wouldn't change, as it is arguably necessary that all red objects have the power to look red. On an understanding whereby colour properties are nothing over and above dispositions to generate colour experiences, this point becomes very clear. As with other issues, I remain neutral on this.

might just be necessary *simpliciter*. However, I anticipate that NBT will be closer to the hearts of those who wish to give laws of nature a central role in metaphysics. In any case, when responding to an objection in section 5 and presenting my main argument in section 6, I will presuppose a realist conception of laws of nature.

I believe that NBT does the job it is supposed to do: it explains what it is for a property to have a causal power. In so doing, it doesn't suffer from the problems that other versions of BT face. The case for NBT will become stronger once I respond to a foreseeable objection (section 5) and show its successful application to the issue of epiphenomenal properties (section 6).

5. Nomologically Coextensional Properties

One way of arguing against NBT follows the following strategy: find an example where all bearers of a property *F* have a given causal power as a matter of nomological necessity, and then stress that it is implausible that this power can be a power of *F*. This objection can be developed in various ways; here, I focus on one such way.

Consider the case of *nomologically coextensional* properties. (Properties *F* and *G* are nomologically coextensional just in case it is a nomological necessity that all and only *F*s are *G*s.) If NBT is true, then two properties must have exactly the same causal powers if they are nomologically coextensional; however, there are some cases of nomological coextension where this leads to counterintuitive results. Or so goes the objection.⁹

Nomological coextension is a very strong relation that can easily be underestimated, so it is difficult to find plausible examples of non-identical properties which are nevertheless nomologically coextensional. To get such an example, assume that the Wiedemann-Franz law actually holds,¹⁰ so *electrical conductivity* (EC) and *thermal conductivity* (TC) are proportional in metals. If these parameters are proportional, then we should expect that, for some range of values of *EC*, there is some range of values of *TC* that a metal must have if it has the former. So, some determinates of *EC* must be nomologically coextensional with some determinates of *TC*. Let's say that *EC_I* and *TC_I* are two such determinate properties. So, as a matter of nomological necessity, all and only bearers of *EC_I* are also bearers of *TC_I*. Assume that Jarvis — a piece of metal — has *EC_I* (and thereby has *TC_I*). When Jarvis conducts electricity, it does so because of having *EC_I*, not *TC_I*. So, this manifested power to conduct electricity must be a power of *EC_I*, not of *TC_I*. NBT implies it must be a power of both of these properties. Therefore, the objection concludes, NBT should be rejected.

In responding to this objection, we must consider what it is for a statement to be true as a matter of nomological necessity. Assuming a broadly realist position about laws of nature, I think it must be either a statement of a law of nature or a consequence of some laws of nature.

⁹ Nomological coextension is a case of nomological necessitation. Other versions of this objection involve cases of nomological necessitation. If everything has mass as a matter of nomological necessity, then will the causal powers of *having mass* be included in any property's powers? I discuss a similar case at the end of section 6: the case of *being nomologically possible*, a property that is nomologically necessitated by any nomologically possible property.

¹⁰ I am not qualified to have an authoritative opinion on this matter, but as far as I understand, this is actually not a law. I will assume otherwise for the sake of presenting this objection.

If it is either a law of nature or a consequence of some laws of nature that all bearers of TC_I must be capable of conducting electricity, then it should be acceptable that TC_I has the power to conduct electricity. So, if it is indeed either a law of nature or a consequence of some laws of nature that EC_I and TC_I must be coextensional, then there should be nothing wrong with suggesting that these two determinate properties have identical powers. Pushing further and arguing that the exercised power in question is a power of EC_I , not TC_I , because Jarvis can manifest this power in virtue of EC_I , not in virtue of TC_I , would take us back to BTV, and in section 4, I have expressed my dissatisfaction with BTV.¹¹

Cases of nomological coextension are then clear examples where powers of different properties can be identical. This raises the question of whether properties are individuated by their causal powers. If there are non-identical properties that are nomologically coextensional, then, given NBT, the said individuation must fail. But since NBT is not committed to non-identical but nomologically coextensional properties, NBT itself doesn't imply the failure of individuation of properties by causal powers.

In the next section, I will use NBT to derive an account of epiphenomenal properties and then argue that the relevant target properties in the special sciences are not epiphenomenal.

6. Epiphenomenal Properties

The issue that prompted me to explore what it is for a property to have some causal power is the problem of epiphenomenal properties in the special sciences. As clarified earlier, in the literal sense of 'having' a causal power, no property has a causal power. So, are all properties epiphenomenal? Surely, the issue of epiphenomenal properties must be more interesting than this. My first task here is to offer a more interesting account of epiphenomenal properties. Then I will argue that physically realized higher-level properties are not epiphenomenal.

In short, an epiphenomenal property is a property that doesn't have any causal powers. According to NBT, the conditions under which a property may have a causal power are as follows: as a matter of nomological necessity, all bearers of that property must have that power. This gives us the following understanding of epiphenomenal properties:

(EP) A property F is epiphenomenal if and only if there is no causal power C such that, as a matter of nomological necessity, all bearers of F have C .

According to EP, if it is nomologically possible for different bearers of the same property to fail to share any causal powers, then that property is epiphenomenal. Having explained the locution of 'power of a property' in the way NBT does, this is how we should understand the locution of 'property without a power'. If properties are to be somehow associated with sets of causal powers and an epiphenomenal property is to be associated with the empty set, then given NBT, epiphenomenal properties should be understood along the lines of EP.

¹¹ Admittedly, my reasons for finding BTV unsuccessful in section 4 weren't demonstratively conclusive against BTV. There, I argued that BTV is either not explanatory enough or controversial. This doesn't mean that BTV is *false*. At any rate, this objection is as powerful as the case for BTV, and I hope that the reader who finds BTV more promising than NBT can still find the latter sufficiently plausible to be worth seeing where it leads.

Now, if this is what an epiphenomenal property is, are the higher-level properties that are invoked in the special sciences epiphenomenal? In section 3, we saw Kim's reasoning that if we are to resist the identification of higher-level properties with physical properties and still hold on to the causal closure of the physical, then, barring systematic causal overdetermination, higher-level properties must be epiphenomenal. The reason for resisting the identification of higher-level properties with the physical ones is that higher-level properties are multiply realizable by different physical properties [Putnam 1967]. That is, the very same higher-level property *H* could be instantiated by different objects in virtue of different physical properties, so *H* can't be identified with any of these physical properties.

Next, I want to show that such higher-level properties are not epiphenomenal even if they are not themselves physical properties. Although I accept the nomological possibility of multiple realization, I believe that the realization relation that is supposed to hold between a higher-level property and its lower-level base properties puts some constraints on which properties could realize what others. In order to see this, we don't need to endorse a particular theory of realization.¹² We can understand 'realization' to refer to some dependence relation between higher-level properties and lower-level properties whereby the instantiations of the latter, together with the right background conditions, synchronically bring about the instantiations of the former, with (at least) nomological necessity. Whereas some lower-level properties are suitable to bring about certain higher-level properties, some are not. This point is nicely illustrated by Ned Block in a passage where he introduces what he calls 'the Disney Principle' [1997: 120]:

In Walt Disney movies, teacups think and talk, but in the real world, anything that can do those things needs more structure than a teacup. We might call this the Disney Principle: ... laws of nature impose constraints on ways of making something that satisfies a certain description. There may be many ways of making such a thing, but not just any old structure will do.

How should we understand the constraints that laws impose on the satisfaction of a higher-level description? First, like Block, I find it plausible that if laws impose constraints on how to satisfy a description, those that satisfy it are likely to have similarities, precisely because they meet those constraints [ibid.: 121]. As Block also points out, one (quite unsurprising) similarity among those that satisfy the description 'is a thinker' is similarity with respect to *having a structure different from that of a teacup*. From my armchair, I can't tell you what the further constraints will be; but there will be more, and with each new constraint comes a new dimension along which the objects meeting those constraints are similar to one another. For example, any two objects that meet the description 'aquatic mammal' are likely to have more in common than at least some pair of objects that meet the description 'mammal' since the former have the property of *being aquatic* in common, and some pair that meets the latter will not.¹³ So, it seems fair to assume that the extent of similarity between two objects that satisfy the description 'is a thinker' will be greater than that of a teacup and a philosopher.¹⁴ Second,

¹² See Polger [2004], Morris [2010], Baysan [2015] and Wilson [2015] for discussions of theories of realization.

¹³ Thanks to Neil McDonnell for this example.

¹⁴ As an anonymous referee points out, the possibility of disjunctive constraints raises a difficulty here. Suppose I authoritatively impose that anyone who is allowed in my house must wear either orange socks or a green hat. Call this rule 'Socks-Hats'. Does imposing Socks-Hats guarantee any similarity

if the entities that are responsible for the satisfaction of a higher-level description (e.g., ‘is a vending machine’) are physical realizers of the higher-level property in question (e.g., *being a vending machine*), then similarities will be similarities of the physical properties that realize the higher-level property. Third, as far as properties with causal powers are concerned, similarities of properties will mirror the similarities of (at least some of) their causal powers (at least in worlds that are nomologically alike). These three observations suggest that different nomologically possible realizers of a given higher-level property will have similarities, to some extent, with respect to their causal powers. Thus, the Disney Principle leads me to suspect what I shall call *realizer similarity* (RS) is true:

(RS) Different nomologically possible realizers of a higher-level property share some causal powers.¹⁵

Before presenting my argument, there is one last point I should note about realization. If a property in the actual world is a higher-level property that requires a realizer (in order to be instantiated), then it requires a realizer in any nomologically possible world. In other words, it is *not* nomologically contingent for a property to be a realized property. Just to borrow an example from the philosophy of mind literature, if, in the actual world, *being in pain* is a higher-level property which can’t be instantiated unless its bearer instantiates some physical realizer of it, this is so in other nomologically possible worlds — i.e., there are no nomologically possible worlds in which *being in pain* is a fundamental property. So, realized properties (nomologically) require realizers in order to be instantiated. Call this *realizer requirement* (REQ).

(REQ) If a property F is a realized property and S is the set of all nomologically possible realizers of F , then, as a matter of nomological necessity, any bearer of F is a bearer of some property from S .

among my guests (other than their guest-like features)? If not, the idea that constraints lead to similarities can be resisted. I think this difficulty can be overcome, at least in the case of natural laws. Either (i) there are disjunctive similarities or (ii) there are none. If (i), then there are reasons to think that there are disjunctive properties, so in the Socks-Hats case, my guests will be similar with respect to *being orange-socked or green-hatted*. Likewise, if natural laws impose disjunctive constraints, then this can lead to similarities with respect to disjunctive properties. If (ii), then there will be reasons to think that there are no disjunctive properties, in which case, we would expect natural laws not to impose disjunctive constraints. (On this option, any apparent disjunctive constraint in a law would have to be somehow explained away.) So, even if Socks-Hats imposes a disjunctive constraint, there are reasons to think that the analogy will not extend to the domain of natural laws.

¹⁵ RS has a noteworthy implication: it rules out the nomological possibility of epiphenomenal *realizers* — i.e., epiphenomenal properties that realize other properties. For those who think that determinable properties are realized by their determinates (e.g., Shoemaker [2001] and Wilson [2009]), this indicates that no determinate property is epiphenomenal. The two cited authors here shouldn’t be worried about this, given their scepticism about epiphenomenal properties. But suppose we hold that there are epiphenomenal properties and some of them are determinates of determinable properties. Then we have two options: either reject that determinables are realized by their determinates [Funkhouser 2006], or hold that determinables are realized by their determinates only when the determinates are not epiphenomenal. Thanks to an anonymous referee for pointing out this implication.

Now I can present the argument that physically realized higher-level properties are *not* epiphenomenal. Suppose:

- (1) H is a higher-level property and S is the (non-empty) set of physical properties that realize H .

From RS and (1), we have the following:

- (2) There is some causal power C_I such that any member of S has C_I .

From REQ and (1), we get:

- (3) As a matter of nomological necessity, any bearer of H has some property from S .

Now recall NBT; from NBT and (2), we have the following result:

- (4) As a matter of nomological necessity, any bearer of any property from S has C_I .

From (3) and (4), we get:

- (5) As a matter of nomological necessity, any bearer of H has C_I .

Using existential generalisation on (5), we have:

- (6) There is some causal power C such that, as a matter of nomological necessity, any bearer of H has C .

If EP is true, from (6) we get the following conclusion:

- (7) H is *not* an epiphenomenal property.

This conclusion generalises from H to all physically realized higher-level properties. EP says that a property is epiphenomenal insofar as there is no causal power whose possession is nomologically necessitated by having that property. I have argued that whenever a given higher-level property is realized, there is at least one causal power that is had by all of its realizer properties, and thereby had by all of its bearers, as a matter of nomological necessity. So, for any physically realized higher-level property, there is some causal power that is nomologically necessitated by having that property. Therefore, no physically realized higher-level property is epiphenomenal. This shows that a higher-level property needn't be type-identified with what appears to be its physical realizer to save its causal efficacy. Whether Kim's opponents (i.e., *non-reductive* physicalists) will find this solution 'non-reductive' enough to take it on board remains to be seen. For what it is worth, the argument shows that multiply realized higher-level properties have causal efficacy.

Before closing, let me mention a worry that one might raise in response to the argument just presented. The conclusion seems to generalise from physically realized higher-level properties to *any* property of any nomologically possible concrete particular. Being nomologically possible will put some constraints which will be reflected in some causal powers (for example those powers we would associate with *having mass*), and therefore there will be causal powers that are shared by any bearer of any property, as a matter of nomological necessity.

Then no property of a nomologically possible concrete particular will be epiphenomenal. The worry is that my argument appears to overgeneralise. Even if one wants to dispense with epiphenomenal properties, this is not the right way of doing so. For example, philosophers of mind will not be content that *being in pain* is non-epiphenomenal just because it nomologically necessitates having some causal powers that are associated with *having mass*.

In response to this worry, we can treat some powers of properties as *second-class* and hold that having only second-class powers doesn't make a property non-epiphenomenal. Powers that are not-second class powers will be *first-class* powers. Powers that are had by all nomologically possible concrete particulars can be counted as second-class powers; they don't indicate any privileges because anything has them. An implication of this is that the property of *being nomologically possible* may count as epiphenomenal because it will not have any power which is not second-class. We should expect the same for properties like *being a physical object* and even *having mass*, but arguably not for their determinates. But this is a fair price to pay; after all, these are in no way distinctive properties; but their determinates are.

This response has a desirable consequence: 'wildly' disjunctive properties, namely those disjunctive properties whose disjuncts have no first-class powers in common, may be epiphenomenal. Consider the disjunctive property *being red or being non-red*. The only causal powers its disjuncts (*being red* and *being non-red*) have in common are second-class powers. This is in fact reminiscent of Armstrong's [1989: 82-83] argument that there are no disjunctive properties because if there were, then there would be no guarantee that their instances resemble each other. Whereas that argument mistakes all disjunctive properties to be wildly disjunctive, what I have said does not.¹⁶ Once we separate wildly disjunctive properties from those that are non-wildly disjunctive, we can even have some grounds to argue that the former can be eliminated without thereby touching the latter.

7. Conclusion

I investigated what it is for a property to have some causal power, and motivated the view that a property has a causal power if and only if it is nomologically necessitated that all bearers of that property have that power. This clarifies what it is for a property not to have any causal power. So, I took an epiphenomenal property to be a property whose instantiation doesn't nomologically necessitate having some given causal power. I argued that this way of understanding epiphenomenal properties shows that physically realized higher-level properties are not epiphenomenal, thanks to the further observation that laws of nature impose causal similarities on the bearers of such properties; these similarities figure as powers in the causal profiles of these properties, which makes such properties non-epiphenomenal by this paper's rights.¹⁷

¹⁶ See also Clapp [2001] and Antony [2003] for arguments that disjunctive properties don't have to be wildly disjunctive.

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opinions expressed are those of the author and do not necessarily reflect the views of the John Templeton Foundation.

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