

How to be Psychologically Relevant

Cynthia Macdonald and Graham Macdonald

How did I raise my arm? The simple answer is that I raised it as a consequence of intending to raise it. A slightly more complicated response would mention the absence of any factors which would inhibit the execution of the intention- and a more complicated one still would specify the intention in terms of a goal (say, drinking a beer) which requires arm-raising as a means towards that end. Whatever the complications, the simple answer appears to be on the right track.

The complexities already mentioned, however, indicate that the original question admits of two different types of answer. The first complexity requires certain causal conditions be satisfied; that there must be no circumstances which block the causal efficacy of the intention. This suggests that the type of explanation required is a causal explanation, and that the simple answer works by citing a causally efficacious feature of an event, one which was causally responsible for producing the result. Elaborating on this explanatory sketch would involve differentiating real from apparent causes, perhaps by delving deeper into the causally nomological features which underpin the causal citation of a causal state (the intention). The second complexity brings into play the goal of the action, and credits the agent with having a reason for the arm-raising. Here we are in the field of reason-giving explanations, an elaboration of which would yield yet further reasons for the particular action (the agent was thirsty or wanted to get drunk etc.). These explanations seem to compete, and one wants to know which is the correct one, the cause-citing one or the goal-citing one.

It has seemed obvious to many that the explanations need not conflict.¹ After all, the reason-giving explanation requires that the causal conditions be satisfied, so the reason must itself be a cause of the action, albeit one which specifies the cause in a reason-giving way. If reasons are causes, then the availability of the different explanations for the same effect need not trouble us. This resolution of the apparent clash fits neatly into a materialist ontology. Given that mental states are causes, identifying them with physical causes both avoids any problems of overdetermination and seems to be the best way of making their causal efficacy intelligible. The physical causal-nomological underpinnings, far from clashing with reason-giving, give respectability to the claim that the reasons are causes of the action. The position is further strengthened by denying that the same reasons are always identical with the same physical causes. Reduction is avoided, and so one avoids the redundancy of the mentalistic explanation. It appears that we can have both a causal cake and an explanatory feast. (The biologist and the sociologist will also want their share of the cake: the beer drinking was caused by a functional-biological state selected because of its progeny-producing effects, and it was the outcome of a ritual in which group identities were being affirmed.)

This harmony on monistic causation and pluralistic explanation has recently been disturbed. The criticisms come from different sources, but one in particular singles out non-reductive monism as its target (Honderich, 1982; Macdonald and Macdonald, 1986).² Here the claim is that the three premises of the argument for that position, viz. (a) the Principle of Causal Interaction (PCI); (b) the Principle of the Nomological Character of Causality (PNCC); and (c) the Principle of the Causal Anomalism of the Mental (PAM), plus the conclusion that each individual (token) mental event is a physical event, leads either to inconsistency or to epiphenomenalism given a proper construal of (a) and (b). That construal connects (a) and (b) by way of the claim that events interact causally in virtue of some but not all of their properties, the causally relevant ones, these being the properties that figure in causal laws governing the events causally related. Short of rejecting (c), it is claimed, non-reductive monism must accept mental epiphenomenalism.

We believe that non-reductive monism is the only viable position to be taken on the mind--body relation. We also agree with those who think that the problem of causal relevance is a real one that the non-reductive monist cannot sidestep by taking an instrumentalist or otherwise anti-realist attitude toward mental properties. Elsewhere we have argued that the problem of causal relevance concerns not one but two distinct issues (Macdonald and Macdonald, 1986). The first has to do with mental causation, a relation that holds between

token mental and physical events. The second has to do with intentional explanation, which relates mental and physical types or properties. Since the argument for non-reductive monism trades on the distinction between causation, a relation which holds between events in extension, and explanation, which relates events but only by virtue of their possession of certain properties and not others, the charge of epiphenomenalism can only be made to stick if this distinction is respected.³ The epiphenomenalist charge thus bifurcates into two distinct objections, responses to the first requiring work in the metaphysics of events, and responses to the second requiring work in the epistemology of explanation. Philosophers who have sought to solve the issue of mental causation by requiring it to be a four-place relation between two events and their respective 'causally relevant' properties simply confuse the one issue with the other (Horgan, 1989).⁴ The problem of mental causation is no different from the problem of causation generally, and if causation is an extensional relation between events, it is an extensional relation between mental *and* physical events. To require that a relation holds between events and certain of their properties in order for mental events to be causally efficacious is to make the causal relation intensional for *mental events that interact with any other event*. Similarly, philosophers who believe that the question of whether mental events are causally efficacious reduces to the question of whether mental properties figure in causal-nomological explanations fail to appreciate the explanatory space which is opened up by the type-token distinction, and so confuse causal tokens with explanatory types (Fodor, 1987).

Our earlier solution to the two epiphenomenalist objections, which we briefly outline in the section 'Causal Efficacy' below, is relevant to the work we do in the remaining sections of the chapter. However, we now think that more needs to be said about mental epiphenomenalism if non-reductive monism is to be finally free of various charges of leading to causal or explanatory irrelevance of the mental. Recent literature suggests that 'causal relevance' is intended as elliptical for 'causal-explanatory relevance', and that, as such, the problem for non-reductive monism concerns the explanatory redundancy of mental *properties* (Pettit and Jackson, 1988; Dretske, 1989; Fodor, 1989; Horgan, 1989; Kim, chapter 7 of this volume). However, the issue of explanatory relevance is intimately connected to the question of whether mental properties have some kind of causal autonomy; whether the (rationalistic) pattern, or network of relations between properties, they produce in virtue of having the causal powers they do is significantly different from the (causal) pattern produced by physical properties in virtue of their having the causal powers they do. If there is such a pattern to be discerned, then mental properties have causal powers distinct from any physical property or properties upon which they are generally assumed to supervene. If not, then non-reductive monism leads to the causal redundancy of mental properties. (That this is compatible -with the causal efficacy, of mental events can be seen from the section 'Causal Efficacy' below.) This causal redundancy leads immediately to the explanatory redundancy of mental properties, since, if there is no distinctive pattern at the psychological level, then there is nothing for the psychological properties to explain. We shall argue that mental properties do have causal powers distinct from any physical property or properties, so that mental properties are explanatorily relevant, though not *causal*-explanatorily relevant.

There are thus three distinct claims that go under the name of 'the epiphenomenalist charge' that non-reductive monism must effectively deal with:

1. That mental *events* are causally inefficacious.
2. That mental *properties* are causally irrelevant.
3. That mental *properties* are *explanatorily* redundant.

We believe all three to be false. Our principal aim in what follows is to deal with (1) and (2), although what we have to say about these will have ramifications for (3). We can set out the problems before us and our position on them schematically in the following way.

Suppose that events are construed along the lines of the property exemplification account as instantings of act or event properties in objects at times, and suppose that, in a given case, an instance of a mental property (M_i) causes an instancing of an action property (A_i) (i.e. that a mental event causes an action). Suppose also that non-reductive monism is true and that M_i is identical with an instance of a physical property, P_i , and further, that A_i is identical with an

instance of a behavioural property, B_i . Call this latter event E . Finally, suppose that P_i causes B_i . Since $M_i = P_i$, the causal efficacy of M_i is not at issue, for reasons which we briefly set out in the next section. However, there is still a question of the causal relevance of the mental property (MP), whose instancing is identical with the instancing of the physical property (PP). On a very intuitive test of causal relevance, a counterfactual test, it can be argued that the mental property in this case is causally irrelevant. Version One of the argument goes like this:

- a) If MP hadn't been instanced, then E would still have occurred.
- b) If PP hadn't been instanced, then E would not have occurred.
- c) Therefore, PP is causally relevant whereas MP is not.

Our reply to this version is that (a) is false. E , by hypothesis, is an instance of both the action property (A) and the behavioural property (B). And if MP hadn't been instanced, A would not have been instanced. So E would not have occurred.

However, this response easily leads to a variant, Version Two, of the argument, which goes like this:

- a') If PP hadn't been instanced, B would not have been instanced.
- b') If MP hadn't been instanced, A would not have been instanced.
- c') But (b') is true only because (a') is true, and PP is instanced, and B is instanced; and this, given the plausible assumption that MP supervenes on PP and A supervenes on B, is sufficient for the causal irrelevance of MP.

Our reply to this is that, for (c') to be true, the following must be true:

- (d) If PP hadn't been instanced, A would not have been instanced.

But (d) is false because of the variable realizability of mental properties by physical events, an issue we address in the section 'Causal Relevance' below.⁵ And if (d) is false, it is false that MP is causally irrelevant to A's being instanced.

In the next section on 'Causal Efficacy' we briefly outline our earlier solution to (1) and (3), partly to expose the reasoning that leads to (2) and partly to indicate where our response leaves work still to be done on (3). In the later section on 'Causal Relevance' we deal with (2). Although we do not consider (3) explicitly, our solution to (2) provides the resources for an effective response to it.

Causal Efficacy

The argument for non-reductive monists if it works, works because of the extensionality of the causal relation and the intensionality of nomologicality. If two events are causally related, they are so irrespective of how they are described (or what properties they instance). Nomologicality, however, is another matter: whether a pair of events instantiates a (causal) law depends crucially on which properties they instantiate. Non-reductive monism reconciles the requirement that causality entail nomologicality with causal anomalism of the mental by adopting the further thesis that each event with a mental property has a physical property and so is a physical event. Mental events that interact causally with other events instantiate physical properties, properties in virtue of which they are covered by causal laws.

The issue of the *causal* efficacy of mental events can easily be confused with that of the *explanatory* efficacy of mentalistic explanations, and it is not surprising to find critics of non-reductive monism who begin their charge of epiphenomenalism by speaking of causal efficacy and finish by accusing that position of leading to explanatory inefficacy (Honderich, 1982; Horgan, 1989). One obvious source of such confusion can be traced to the dual function that the PNCC often plays with regard to causation and explanation. On the one hand, it figures in the nomological conception of causality, a conception which stands opposed to a singularist account (Armstrong, 1983; G. Macdonald, 1986; C. Macdonald,

1989). On the other hand, it figures in the familiar deductive-nomological account of causal explanation (Hempel, 1965). The fact that the PNCC plays this dual role makes it easy to suppose that, because mental properties (according to PAM) do not figure in causal laws, both the causal efficacy of mental events *and* the explanatory efficacy of mentalistic explanations are ruled out by non-reductive monism.' So the PNCC, in fact, provides two separate sources for two distinct charges of epiphenomenalism.

Since these charges *are* distinct, however, different strategies are needed to deal with them. Let us first look more closely at the issue of causal efficacy. Suppose that a cause-effect relation between events entails that those events have properties by which they are subsumed under a causal law⁷. It is then tempting to think that the only causally relevant properties of events are those which figure in the causal laws, and that the only causally efficacious instances are those which are instances of nomological properties, where this is taken to have the consequence that no instance of any non-nomological property can be causally efficacious. If we assume that all the nomological properties are 'lower-order' properties, then the conclusion will be that all higher-order properties are causally irrelevant, and so none of their properties is causally efficacious.⁸

Our position can be briefly stated: we agree that all instances which are causally efficacious are instances of nomological properties, and that properties which are causally relevant must have causally efficacious instances (this being a necessary condition for causal relevance). But it does not follow that there can be no instances of non-nomological properties which are causally efficacious. And so it does not follow that only nomological properties are causally relevant. The crux of our argument is that the claim, central to non-reductive monism, that each individual mental event is identical with a physical event, must be interpreted as the claim that two distinct properties, one mental, and one physical, can be jointly instanced in a *single* instance (i.e. in an individual event). If, as seems evident from cases of determinate properties and their determinables, this is possible, then an instance of a non-nomological mental property (i.e. a mental event), M_i , can be co-instanced with (i.e. can be identical with) an instance of a nomological physical property (i.e. a physical event), P_i ⁹. The mental property will then have an instance which *is* (i.e. is identical with) an instance of a nomological property. This single instance will be causally efficacious, and so the mental property will have met the necessary condition on causal relevance. (Whether it meets what we will call the pattern condition will be considered in the next section of this chapter).

That two properties *can* be jointly instanced in a single instance is well illustrated by cases of determinate properties and their associated determinables. Consider two such properties, one of which supervenes on the other, viz. the property of being red, and that of being coloured. No one would suppose that, in order for an object to possess both properties, it must first instance the former property, and *then*, in addition, instance the second. An object's instancing of the former property just is its instancing of the latter: nothing further is required, once the former is instanced, for the latter to be instanced, despite the distinctness of the properties themselves. But if this is so, then any case in which an instance of the property of being red is causally efficacious is one in which an instance of the property of being coloured is also causally efficacious, by the extensionality of the causal relation.

Similarly, we maintain, with mental and physical properties.¹⁰ It is almost certain that non-reductive monism cannot escape commitment to some kind of supervenience thesis if it is to retain allegiance to its physicalist commitments. Given some such thesis, there is no a priori reason to assume that mental and physical properties of events cannot be jointly instanced in a single instance. To the objection that the mental/physical case is not like the colour/redness one, since in the latter but not in the former, the properties are logically related, our response is that the explanation of the nature of the supervenience relation may well vary from case to case (i.e. in some cases the relation will be best understood as logical, in others it will be best understood as metaphysical or physical), and that in the absence of an argument to the effect that properties that are logically or conceptually distinct cannot be jointly instanced, the move will not work.¹¹

Such an argument will not be easy to come by. Consider a dispositional property such as that of dormitivity. The virtue of such a property is that it can be variably realized in different

chemical bases. On some interpretations of this variable realizability claim, dormitivity is a higher-order property whose causal efficacy is usurped by its lower-order chemical properties.¹² But we claim that causal efficacy is a matter pertaining to property-instances, and when the lower-order property is instanced, so is the higher-order property. And if the base property-instance is causally efficacious, then so is the higher-order property-instance.

Is this simply a consequence of the peculiarities of dispositional properties? We think not. Consider biological properties. A defensible, and in our opinion correct, view of how they arise or come into existence is that they result from the process of natural selection operating on instances of physico-chemical properties. The instances of some of these properties have effects which favour the reproductive capacity of those organisms which are the subjects of the instantiations. Given the transmission of the properties to descendants, the outcome of natural selection is a property, or set of properties, whose instances then proliferate among the species because of the favourable reproductive effects their instances have had in ancestors. This outcome just is the production of functional properties, and the view is that biological properties are these functional properties.¹³ On this story, biological properties are physico-chemical properties whose instances have proliferated. More specifically, they are physico-chemical properties whose instances have a certain history and are biologically co-typed because of the types of effect those instances have.

Consider the property of having aposematic colouring, which is a distinctive colouring produced in order to warn predators that the putative prey is inedible, or at least unpalatable. Suppose that three butterflies have bottle-green wings. The first has the colouring because it warns the predator of its awful taste, so it has the property of being aposematic. The second has the colouring because it has enabled predecessors with that colouring to avoid predators, given the bottle-green environment they inhabited. The third just has the colouring, which has no biological effect either for it or its ancestors. The second will not instance the property of having aposematic colouring, but will instance the biological property of having a camouflaging colouring. The third will not instance any biological property simply by virtue of its having that colouring. The most plausible account of the metaphysics of the situation is to say that to instance the property of having aposematic colouring just is to instance the bottle-green property, given that this instance has the history it has. It seems simply perverse to deny that instances of biological properties are at the same time instances of physical properties. This is a particularly interesting case, for, like the mental/physical property relation, biological properties are logically distinct from physical ones.

There seems, then, to be no reasonable objection to the idea that instances of mental properties can be identical with instances of physical properties (i.e. that an event can be a single instance of both a mental and a physical property), and we stand by this response to the charge that mental events are causally efficacious. However, we no longer believe that it will suffice to dispel the charge of causal irrelevance of mental properties, an issue to which we now turn.

Causal Relevance

Why is the causal efficacy of property instances insufficient for the causal relevance of those properties? We have suggested that those who are suspicious of our view of causal efficacy have in mind objections which have more to do with explanation than with causation. On the other hand, we have conceded that causal relevance is intimately connected to explanation. There are two related objections which will reveal the connection and show what, in addition to the causal efficacy of instances of properties, is required for the causal relevance of the properties themselves.

First, consider an example used by Ned Block (in chapter 2).¹⁴ Apparently the rising velocity of the same free electrons is the basis for both the rise in thermal conductivity and the rise in electrical conductivity of an object. Suppose that on a particular occasion the rise in thermal conductivity of an object causes an explosion. It is tempting and intuitive to say that the rise in electrical conductivity was epiphenomenal to the explosion. However, on the co-instantiation

hypothesis, the rise in electrical conductivity (being identical with the rise in thermal conductivity) must be held to have caused the explosion. That is, this *instance* of a rise in electrical conductivity was causally efficacious.

Consider another example which has been used explicitly against the co-instantiation theory of causal efficacy. A piece of putty, resting on a metal mesh, changes shape and falls through the mesh. Suppose that, at a lower level, it is the change in the arrangement of its microphysical parts that is responsible for both the change in shape and for the change in the volume, or expansion, of the putty, with which the change in shape is co-temporaneous. On the co-instantiation model it looks as though the change in shape and the expansion in volume will be co-instantiated, so that if the one is causally efficacious, then so is the other. But if this is so, then we are forced to the conclusion that the expansion of the putty must be held to be causally responsible for the putty's falling through the mesh. This has been deemed to be 'outlandish'.¹⁵

These two examples, though significantly different, have the same moral. The moral is that the co-instantiation view is committed to allowing intuitively causally inert properties to have causally efficacious instances. Note, however, that neither of the examples uses properties related to each other as higher to lower-order properties. And the significant difference between them is that the first example appears to exploit a type-type correlation between one kind of change, a change in electrical conductivity, and another, a change in thermal conductivity, which the second example lacks. In that example the change in shape and the expansion in volume are accidentally connected; there is no suggestion that every such change in shape must be accompanied by the same, or indeed any, expansion in volume.

Secondly, a slightly different objection to our model of causal efficacy insists that if we allow any property to be causally relevant because its instance is causally efficacious, then we are committed to the causal relevance of an infinite number of properties.¹⁶ If a cricket ball instances the property of travelling at 20 miles per hour, then that ball also instances the property of travelling at less than 30 miles per hour, and instances the property of travelling at less than 35 miles per hour, and so on. All of these properties seem to be co-instantiated with the ball's travelling at 20 miles an hour. Suppose that the cricket ball's travelling at 20 miles per hour is causally responsible for its smashing a window. If the property of travelling at 20 miles per hour is causally relevant because its instance is causally efficacious, then so too are all the other, infinite number, of properties causally relevant. Again, the conclusion is thought to be a *reductio* of the co-instantiation hypothesis.

We accept all the apparently counter-intuitive conclusions *which pertain to instances*, but deny that this tells against our model. The reason is that all of these examples equivocate between concerns about causation and concerns about explanation. The counter-intuitiveness of the conclusions results from the, in itself, *correct* view that many of the properties whose instances are causally efficacious would not be adequate to a *general* explanation of the effects produced." But the examples themselves equivocate between the irrelevance of an explanatory 'because' and the irrelevance of a causal 'because'. This equivocation can be traced to the dual role that nomologicality is often viewed as playing with regard to both causation and explanation. Given this dual function, it is easy to reason that if a property fails to figure in a causal law, and so to figure as part of a causal explanation, it cannot be causally relevant because its instances are not causally efficacious.

We have already indicated that we reject this line of reasoning and the assumptions that lie behind it. In particular, we reject the *specific* connection between nomologicality and causality that the assumptions reveal, since we allow non-nomological properties to have causally efficacious instances. We also, as it happens, reject the connection between nomologicality and explanation, since we believe that non-nomological properties can be explanatory, but we will return to this topic shortly. What is important in assessing the force of the counter-examples is whether non-explanatory properties can have causally efficacious instances, and for reasons previously stated it is clear to us that they can. What is driving the counter-examples is the thought that in a counterfactual situation the exemplification of the suspect property would not have the required effect, so that, on a counterfactual test of causal relevance, the suspect property would fail to be causally relevant. So, for example, the shape

of the putty is causally relevant because, if that shape were to be re-instantiated, the putty would fall through the mesh again. That is to say, *however the micro-particles arranged themselves*, as long as that shape recurred, the effect would follow. The claim must be that this need not happen with another expansion of the putty; *this* expansion just so happened to occur in a way that the micro-particle arrangement instantiating this expansion caused the putty to fall through the mesh. On another occasion this could not be expected to occur. Similarly with the cricket ball case: another instantiation of the property of travelling at under 30 miles per hour may be one of travelling at 1 mile per hour, and in that case the window would not have smashed.¹⁸

In both of these types of counter-example the failure of the effect of a certain type to occur in the counterfactual situation is held to be sufficient to deny the property instance causal efficacy in the actual situation. That is, the failure of the property to be *generally* efficacious (in the relevant respect of each of its instance's causing an instance of this type of effect) is thought to be sufficient to disqualify it from being *particularly* efficacious (in this instance). But there seems to us to be no good reason to disallow such particular efficacy. Why should what happens elsewhere, with other instances, be relevant to whether *this* instance is efficacious? The principle which the objectors seem to assume is one we will call 'supergen': whenever an instance is causally efficacious, every property of which it is an instance must be generally linked to any property co-instantiated in the effect and caused by that instance.¹⁹ This is an exceptionally strong claim, which few would wish to make. It has the consequence that if an instance of MP (a mental property) is causally efficacious and co-instantiated with PP (a physical property), *both* MP and PP must be generally linked, not just to B (the behavioural property of the effect), but to A (an action property of that effect which, on our view and on non-reductive monism generally, is co-instantiated with B). This will make an instance of PP inefficacious for an instance of A. One can reject an outright singularism with respect to causality (a view which claims that there need not be any general connection between cause and effect instances) without endorsing supergen. The position we have outlined above seems to be the best compromise. Causal connections do entail nomologicality, but it is not required that every property co-instantiated with a nomological property must itself be nomological.²⁰ If the connection between efficacy and nomologicality is understood in this way, and if an instance can be an instance of both a nomological and non-nomological property, then the non-nomological property will have an efficacious instance in this case, but such efficacy *may* not hold in general. That is to say, there may be no general relation between the non-nomological property and the nomological property of the effect. When this happens the property-instance will be causally efficacious; but the property will not be causally relevant to the nomological *type* of effect.

This response makes it look as though the only way for a property to be causally relevant, and so meet what we earlier called the pattern condition on causal relevance, is for it to be nomological, where this means that it figures in causal laws. On this reading, a causally relevant property is one which (a) has causally efficacious instances; and (b) figures in causal laws. We have said that (a) is a necessary condition for causal relevance, and we agree that in general the combination of (a) and (b) will provide sufficiency (but not necessity, because we do not think that (b) is necessary for causal relevance). However, even for those cases where the pattern condition is met by nomologicality, the *caveat*, 'in general', is required, in order to take into account counter-examples such as Block's. Here we have an effect - an explosion - which is best explained as due to the rising thermal conductivity, rather than as due to the rising electrical conductivity, of an object. But, according to our model, the rise in electrical conductivity satisfies both (a) and (b). It satisfies (a) because this instance of rising electrical conductivity, being identical with this instance of rising thermal conductivity, is causally efficacious. And it satisfies (b) because rising electrical conductivity figures in law-like explanations. Shock-type effects are thereby explained. However, it is evident that rising electrical conductivity is irrelevant to the explosion. The crucial lesson to be learned is that the causal relevance of a property is *type*-relevant: a given property will be causally relevant to some types of effects and not others. What is required, in addition to (a) and (b) is (c): the nomological property must be nomological for a *certain type of effect*. The generality which causally relevant properties display must be of the right type for a given type of effect: otherwise we will have electrical conduction causally relevant to, and so explaining, heating effects.

Is this the end of the story of causal relevance? Not quite. When we said that what was needed to be added to the causal efficacy condition to get causal relevance was a 'pattern' condition, we meant that the generality which the causal relevance of properties must capture depends upon there being a pattern, or network of relations between properties, in nature which the generality reflects. If there is no such pattern, then the connection between the properties instanced in the cause and effect will not be generalizable. In these cases there can be causal efficacy without causal relevance. In the cases where the properties are nomologically connected there will be the required pattern, and this is captured by (b) above. However, given our allegiance to causal anomalism of the mental, it is an essential part of our theory that this is not the only pattern to be found. If (b) were the only way in which generality could be purchased, then we would agree with the critics of non-reductive monism who say that it is committed to the causal irrelevance of mental properties. The pattern condition, if it is to be met by mental properties, must therefore be met in some other way than by meeting condition (b).

The validity of functional explanations in biology is a useful reminder that there can be other patterns in nature, in this case that of the design resulting from natural selection.²¹ Here the operation of 'normal' (physical) causation has resulted in a new pattern emerging, one which is produced by, but which does not just replicate, the regularity of the physical causal connections. Natural selection, in producing the pattern, underwrites the causal relevance of biological properties to their effects. What selection requires is that in the world as we find it there are certain effects *reliably* produced by the instances of some physico-chemical properties, and the consequence of selection is the spread of instances of reproductively advantageous properties. What is crucial in this case is that the 'reliability' of the connections is relative to the reproductive advantage of the effects in comparison with the reproductive effects of other properties, and so does not require the stricter reliability associated with nomologicality. For example, the fertilizing effect of sperm may be seldom realized, but it is so *often enough* (in comparison with other items) for fertilization to be its function. So here we can have the generality required for causal relevance, one which is dependent upon nomological connections but which does not just reflect those connections. If we were to provide only a statistical-cum-causal account of what sperm do, it would be impossible to see why one type of effect (fertilizing eggs), which only an incredibly small number of sperm cause, is singled out as being the function of sperm. In the case where a sperm fertilizes an egg, there will be an instance of both a nomological and a functional pattern. Our explanation of what is happening in any such case will depend on which aspect of the effect (what *type* of effect) we want explained.²² This is why (b) must be relaxed to allow for patterns other than the nomological. The biological case also reinforces the need for (c), since it shows that any instance of a cause-effect relation can be an instance of more than one pattern.

The existence of two patterns here, the physical and the biological, accounts for the different explanations we can give for what is happening when functional behaviour is explained. One can explain what is happening when a particular chameleon changes colour by noting that it is responding to a difference in the colour of its environment, where this can in turn be explained in terms of a physico-chemical response to changes in light. We can also say that the chameleon is camouflaging itself in order to make itself less visible to predators. The important point is that one could not say this of another animal, a possible world twin chameleon, which may undergo exactly the same physico-chemical changes in response to the same environmental changes, but which lacked the relevant biological history of this chameleon. The twin's behaviour would be explained by the same physico-chemical laws as that of our actual chameleon; it would be an indiscernible twin from the perspective of the nomological pattern, but not from the biological perspective. Although subsumed under the same causal laws, the behaviour of only one of the chameleons exemplifies biological design. Of only that chameleon can be it said that its behaviour has a biological aspect, and it is because of this difference in the effect that one can say that the biological property instanced in the cause will have a causal relevance different from that of the co-instantiated physico-chemical property. It will have a different causal 'shape' as a consequence of the difference in the effects its instances produce.

In the above example we have a case of different cause, from the biological perspective, of behaviour which would be typed as identical from the physical perspective. In one case we have a biological cause of camouflaging behaviour (a biological effect), whereas in the other there is no biological cause, and no functional aspect to the effect. The behaviour is not camouflaging behaviour. (The animal may be camouflaged, but it does not exhibit camouflaging behaviour. Its being camouflaged is a biological, but not a physical, accident.) It is worth noting that the biological cause can also malfunction, producing effects rather different from those which nature intended. In such a case, the same biological cause (the same as in the functional case) will produce effects which are typed differently for the purposes of physics and chemistry.²³ The same biological cause will be invoked to explain behaviour which falls under different causal laws. Depending on the reason for the malfunction, the cause may also be physically type-different from the physical causes of functional behaviour.

The biological case illustrates nicely what is needed for mental properties to be causally relevant. First, they need to meet condition (a): they must have causally efficacious instances. We have argued that they can meet this condition without disturbing the pattern of physical causality (a point that was important to establish given our physicalism). They do not disturb the pattern of physical causality because they are co-instantiated with physical properties. But, secondly, they need to meet some analogue of condition (b), since there must be a distinctive pattern in nature which secures the generality required for causal relevance. It is evident to us that the distinctive pattern exemplified, and which mental properties display, is that of rationality. The connections which provide the generality are, in the main, rational connections between mental properties.²⁴ What explains a particular effect under *its 'action' aspect* is a mental property; the instance of that property is causally efficacious and citing it under that aspect renders the action *intelligible* (this, of course, ensures that an analogue of condition (c) is met). If the effect were to be explained only via nomologicality, this intelligibility would vanish. It is the rational connections which underwrite the counterfactual which we endorsed earlier: if MP (the mental property) had not been instantiated, then A (the action) would not have occurred.

A full justification of the existence of a rational pattern in nature is beyond the scope of this chapter. What is important for present purposes, however, is that connection between actions and the rational pattern be noted. The problem of mental causation arises if we look at the effect under only one aspect, its physical aspect, and ignore the fact that it is also an action. One consequence of overlooking action-properties is that mental and physical properties appear to compete for causal relevance; relevance to the same type of effect (see Kim, chapter 7). If they do so compete, the mental property will inevitably lose out. However, this appearance is misleading and fails to take seriously the occurrence of actions in nature.²⁵ The causal relevance of the mental property instantiated in the antecedent cause must therefore be a relevance to the action aspect of the effect. The occurrence of actions in nature goes hand in hand with the existence of a rational pattern. Were there no instances of action-properties, there would be no rational pattern; but, equally, were there no rational pattern, there would be no actions. Because the rational pattern is distinctive - not just a mirror of the physical pattern described in physical causal laws - different counterfactuals involving mental properties will be licensed. In particular, the falsity of

(d) If PP (the physical property) had not been instantiated, A (the action) would not have occurred

is due to the difference between the generality exemplified in physical property causal relevance and mental property causal relevance. This difference is dependent upon there being a mental aspect to the effects produced, *irrespective* of their physical 'realizers', so that the effects are not just bodily movements, but are also actions. The fact that action properties are variably realizable by different physical properties is explicable in terms of this difference in generality between physical property causal relevance and mental property causal relevance. The epiphenomenalist charge of causal irrelevance of mental properties will only get a foothold if one thinks that there are no actions, and that there is no rational pattern. But here the onus of argument lies with the epiphenomenalist.

Notes

1. The locus classicus for this response is Davidson (1963).
2. Another, very general, line of thought begins by assuming that meanings, or the contents of propositional attitudes, aren't in the head, but that the physical states that are causative of behaviour are in the head, and concludes that propositional content (or something in the head's having propositional content) is causally irrelevant to behaviour. This is discussed by Fred Dretske (1989).
3. Unless, of course, independent argument is forthcoming.
4. Ned Block agrees that mental states or events can be causes of behaviour, and says that the epiphenomenalist accusation is that they are not causes of their behavioural effects in virtue of their mental properties (see Block, chapter 2 of this volume). This is what we call the issue of the causal relevance of mental properties.
5. By 'mental properties' we mean both intentional properties of mental causes and intentional properties of action effects.
6. Of course, this assumes that all mentalistic explanation is causal explanation (Stich, 1983; Fodor, 1989). We take this issue up in the following section.
7. This need not involve any Humean reduction of causality to nomologicality. We think that the nature of causality is such that it involves nomologicality, not that nomologicality is all that causality consists in.
8. This is the position partially defended by Block in chapter 2. ('Partially' because he allows that some second-order properties can be causally relevant, but only when special conditions obtain, and in most cases which concern us these conditions do not obtain. He allows mental events to be causes, but this leaves it unclear whether they are causes because instances of mental properties are efficacious.) The obvious rejoinder, that higher-order properties also figure in causal laws, is defended by Fodor (1987, 1989). Given our commitment to causal anomalism of the mental, this position is not open to us, but see also Block's criticism. The higher-order/lower-order property distinction can be explicated in a number of ways. On one account, a higher-order property is a property of having a lower-order property that stands in certain causal relations to other lower-order properties. (Block favours this characterization of the first-order/second-order property distinction.) On another account, a higher-order property is a determinable, of which lower-order properties are determinates (so that, e.g. being coloured is a higher-order property and being red is lower-ordered). On still another account, a higher-order property is a property of a property (so that, e.g. being a colour is a higher-order property of being red). We do not think that the relation between mental and physical properties easily fits any of these characterizations. Rather, the relation between mental and physical properties seems best described as one of supervenience, where this relation is distinct from the three just characterized. In particular, it is a more general relation than the relation determinates bear to their determinables.
9. This should make it clear that, by 'instance of a property', we do not mean 'trope of that property'. The view of events being presumed here is a version of the property exemplification account (Kim, 1976; Lombard, 1986; Macdonald, 1989). This is not, on our reading, a trope view of events. Nor do we wish to endorse any such view. The crucial difference between the property exemplification account and a trope view for present purposes is that tropes, unlike mere property instances, are essentially typed. On the property exemplification account, events are exemplifications of act or event properties at (or during periods of) times in objects. The account is not committed to any particular view as to which properties are constitutive of events. Nor, for this reason, is it committed to any view as to which properties of events are essences of them. This makes it possible to hold that mental and physical properties (a) can be jointly instanced in a single instance, but (b) are distinct properties. And this is just what non-reductive monism requires: a dualism of properties combined with a monism of instances.
10. But only similarly. We do not believe that the mental property, M, is a determinable of a physical property, P (see n. 8). The analogy is intended to show that it is possible for the two properties to be co-instanced in a single instance. Stephen Yablo takes the stronger line, arguing that the mental/physical property relation is one of determinable to determinate (Yablo, 1992).

11. Stephen Yablo (1992) claims that the fact that many properties related as determinate to determinable are logically related doesn't tell against the view that mental and physical properties are literally related as determinate to determinable, since things that are conceptually related can also be metaphysically related, and it is the metaphysical relation that matters. We agree with his reason, but since we do not think that mental properties are examples of the determinate/determinable property relation, but rather, of a more general supervenience relation, the lack of a logical relation between mental and physical properties does not worry us. For us, cases that satisfy the determinate/determinable property relation will also satisfy the supervenience relation, but not all cases that satisfy the supervenience relation will satisfy the determinate/determinable relation.
12. See Block's discussion of the causal inefficacy of dormitivity (chapter 2 of this volume).
13. This view is ably defended in a number of places: see especially Ruth Garrett Millikan's discussion (1984). It is a non-reductive conception of biological properties (G. Macdonald, 1992).
14. The same example is used by Pettit and Jackson (1990).
15. See Pettit (1992), especially pp. 257-8. (The argument was directed against Graham Macdonald's contribution to the same volume.)
16. Block (chapter 2) suggests this as an objection, but thinks that it is a price that can be paid for avoiding epiphenomenalism. Yablo (1992) uses it as an objection to our view. Yablo's position is quite close to ours, but he raises issues about the identity of events which go beyond the scope of the present discussion.
17. Block (chapter 2) notes that explanation and causation are often confused, but does so in order to draw a different conclusion from ours. He holds that one can mistakenly infer from the causal-explanatory relevance of second-order properties to the conclusion that they are causally efficacious (see the final section of chapter 2). In fact, our reasoning is the reverse: we hold that a property can only be causally explanatorily relevant if it is causally efficacious (i.e. that causal efficacy of the instance is a necessary condition of the causal relevance of the property instanced). The confusion we detect here is not in the move from causal relevance to causal efficacy, but in the slide from the causal irrelevance of the property to the inefficiency of its instance.
18. There is an aspect of this counter-example we do not directly address, and that is the profligacy attaching to there being an infinite number of properties which have a causally efficacious instance. But note that the counter-example appears to be even more profligate. For us, there is only one instance. The objector seems unable to deny that these infinite number of properties are instanced. When the cricket ball travels at 20 miles per hour, it travels at under 30 miles per hour, and so on. So if co-instancing is denied, then the objector is committed to there being an infinite number of instances whenever there is one. We see no need for this profligacy.
19. An alternative would be to deny that an instance could be an instance of more than one property. We have already indicated why this is an unattractive option, but in any case this is not an alternative available here, since the counter-examples assume that (at least) two properties are co-instanced.
20. 'Nomological' throughout this chapter is to be understood as 'causal-nomological', and is to be given whatever strength is required for physical cause-effect relations. This will allow for probabilistic laws. Commitment to the view that such (causal) law-like connections are involved in all cause-effect relations reflects both our understanding of causality and our physicalism, by which we hold that all causal connections involve physical events.
21. We are thus in agreement with Ruth Garrett Millikan's claim that biological explanation is non-nomological (Millikan, 1986, 1993). Where we disagree is with her further claim that the functional pattern is to be found in psychological matters.
22. The use of 'aspect' here is deliberate, as it connects our topic with that of contrastive explanation, where one explains why something happens rather than something else. Why did a purple fire occur? The choice of explanation (a choice of what is causally relevant to a type of effect) will depend upon whether we want to know why a fire occurred (rather than no fire), or whether we want to know why the fire was purple rather than red. Note that in these examples the fact that we have such a choice of

- explanation (of causally relevant properties) does not seem to force us to the conclusion that the effect, the purple fire, must have had two different causes (causally efficacious instances). Those who insist that a mental property can have causal relevance only if its instance has 'separate' causal efficacy, i.e. is not co-instantiated with a physical property instance, must apply the same principle to the examples alluded to in the discussions of contrastive explanation. The result is not appealing. For further discussion; see Peter Thon's discussion (1990).
23. The causes in the functional and malfunctioning cases will be biologically type identical because they share (enough of) the same history. We realize that we are here asserting what needs defence, but for this see the arguments and examples provided by Millikan (1984, 1986, 1993).
 24. 'In the main' because we are leaving it open whether there can be non-rational mental connectivity. The obvious candidates would be causation by sentient (as opposed to sapient) properties, and mental causation which does not surface in consciousness. If there are these connections, then it may be that the first will be nomological, and the second functional. The query will then be: why are these mental properties? And the answer will have to be that they essentially interact with the central cases of mental properties.
 25. Our strategy for solving the problem of causal (hence explanatory) exclusion (Kim, chapter 7), understood as a problem of how both mental and physical properties can be causally relevant, is thus a version of the 'two-explananda' strategy. Dretske (1988, 1989, chapter 6 of this volume) invokes a version of this strategy to solve a related problem (see n. 2 above). However, we do not intend here to be endorsing his version of the strategy.

References

- Armstrong, D. (1983) *What is a Law of Nature?* Cambridge, Cambridge University Press.
- Davidson, D. (1963) Actions, Reasons, and Causes. *Journal of Philosophy* 60, 685-700. Reprinted in *Essays on Actions and Events*. Oxford, Oxford University Press, 1980.
- Dretske, F. (1988) *Explaining Behavior: Reasons in a World of Causes*. Cambridge, Mass., MIT Press.
- Dretske, F. (1989) Reasons and causes. In J. Tomberlin (ed.), *Philosophical Perspectives*, vol. 3, pp. 1-16. California, Ridgeview.
- Fodor, J. (1987) *Psychosemantics*. Cambridge, Mass., MIT Press.
- Fodor, J. (1989) Making mind matter more. *Philosophical Topics* 17, 59-79.
- Hempel, Ce (1965) *Aspects of Scientific Explanation*. New York, Free Press.
- Honderich, T. (1982) The argument for anomalous monism. *Analysis* 42, 59-64.
- Horgan, T. (1989) Mental quasation. In J. Tomberlin (ed.), *Philosophical Perspectives*, vol 3, pp. 47--76. California, Ridgeview.
- Kim, J. (1976) Events as property exemplifications. In M. Brand and D. Walton (eds), *Action Theory*, pp. 159-77. Dordrecht, D. Reidel.
- Lipton, P. (1990) Contrastive explanation. In D. Knowles (ed.), *Explanation and its Limits*, pp. 247-66. Cambridge, Cambridge University Press.
- Lombard, L. (1986) *Events: a Metaphysical Study*. London, Routledge and Kegan Paul.
- Macdonald, C. (1989) *Mind-Body Identity Theories*. London, Routledge.

- Macdonald, C. and Macdonald, G. (1986) Mental causation and explanation of action. *Philosophical Quarterly* 36, 145-58.
- Macdonald, G. (1986) The possibility of the disunity of science. In G. Macdonald and C. Wright (eds), *Fact, Science, and Morality*, pp. 219-46. Oxford, Blackwell.
- Macdonald, G. (1992) Reduction and evolutionary biology. In D. Charles and K. Lennon (eds), *Explanation, Reduction, and Realism*, pp. 69-96. Oxford, Oxford University Press.
- Millikan, R. (1984) *Language, Thought, and Other Biological Categories*. Cambridge, Mass, MIT Press.
- Millikan, R. (1986) Thoughts without laws: cognitive science with content. *Philosophical Review* 95, 47-80.
- Millikan, R. (1993) Explanation in biopsychology. In J. Heil and A. Mele (eds), *Mental Causation*, pp. 211-32. Oxford, Oxford University Press.
- Pettit, P. (1992) The nature of naturalism. *Proceedings of the Aristotelian Society* suppl. vol. 66, 245-66.
- Pettit, P. and Jackson, F. (1988) *Functionalism and broad content*. *Mind* 97, 381-400.
- Pettit, P. and Jackson, F. (1990) Causation in the philosophy of mind. *Philosophy and Phenomenological Research* suppl. vol. 50, 195-214.
- Stich, S. (1983) *From Folk Psychology to Cognitive Science*. Cambridge, Mass, MIT Press.
- Yablo, S. (1992) Mental causation. *Philosophical Review* 101, 245-80.