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Defining "Physicalism"

Robert M. Francescotti

San Diego State University

Over the past three decades, non-reductionism has become a dominant position in the philosophy of mind. In its standard formulations, this position implies that mental properties are not identical with physical properties. Most non-reductionists, however, still pledge their allegiance to *physicalism* (or *materialism*) by insisting that mental properties *supervene on*, and are *realized by*, purely physical phenomena. I argue that the supervenience and realization theses are not strong enough to ensure physicalism regarding the mind unless they are taken to imply that mental properties are, in fact, identical with physical properties. I conclude by showing how my critique of non-reductive physicalism compares with that of Jaegwon Kim.

Identifying mental properties with neurological properties is one sure way for a philosopher of mind to earn the title "physicalist." Although neurological features are not in the domain of physics proper, they still seem sufficiently "material" to satisfy our physicalist intuitions. Functionalism, however, has long since cast doubt on mind–brain type-identity theories. If mental events are type-individuated in terms of their causal roles, and not in terms of their intrinsic neurological features, then it would seem that events differing in neurological type might instantiate, or realize, the same mental property. Moreover, if mentality is multiply realizable at the neurological level, then it is also multiply realizable, and to a far greater degree, at more basic levels of physical structure (e.g., the molecular, atomic, and sub-atomic levels). For this reason, considerations of multiple realizability have led many to believe that mental properties are not identical with any of the properties of the natural sciences. If this is true, then even if we construe the term "physical" loosely enough to apply not only to the properties of physics but

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to those of the natural sciences generally, we must concede that mental properties are not physical properties. In this sense, at least, mental properties are considered irreducible to physical properties.[1]

Ever since Putnam's (1967) early appeal to multiple realizability, non-reductionism has become the dominant view in the philosophy of mind. Few non-reductionists, however, are willing to embrace dualism, which naturally prompts the question: If mental properties are not physical properties, then in what sense can physicalism regarding the mind be true? Part of the answer is expressed by Davidson (1970):

> . . . mental characteristics are in some sense dependent, or supervenient, on physical characteristics. Such supervenience might be taken to mean that there cannot be two events alike in all physical respects but differing in some mental respects, or that an object cannot alter in some mental respects without altering in some physical respects. (p. 88)

So while mental properties differ from physical properties, the former are thought to depend upon the latter as follows: any two possible items that have all the same physical properties will necessarily have all the same mental properties. That is,

> (S) for any item x in any possible world w_1 and any item y in any possible world w_2, if x and y are physically indistinguishable, then x and y are mentally indistinguishable.

A supervenience claim along the lines of S is, as Kim (1993a, p. 168) puts it, "the minimal physicalist commitment," for if physically indistinguishable items could differ mentally, then mentality would be at least partly a function of something other than physical properties. Mentality, therefore, would not be purely physical. However, Kim and others have also recognized that while supervenience is necessary for the truth of physicalism, it is insufficient on its own. In this paper, I begin by reviewing why mind–body supervenience claims fail to ensure physicalism regarding mentality. I then consider attempts to supplement S with another minimal physicalist commitment — i.e., the belief that mental properties are *instantiated* or *realized* physically. By examining variants of the realization thesis, it will become clear that the only way a supervenience theorist can earn the title "physicalist" is to forfeit non-reductionism and *identify* mental properties with physical properties.

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[1]I say "at least" because those brands of reduction which entail property-identity are among the most stringent. For example, one might be a non-reductionist in the sense that one denies true biconditionals connecting the statements of psychological theory with those of the natural sciences (e.g., Fodor [1974]). Being a non-reductionist in this sense would also require denying that mental/psychological properties are identical with those of the natural sciences, since a statement of the form "M $\leftrightarrow$ P" is true only if the corresponding identity statement "M = P" is true.

Nomological Supervenience

S tells us that the physical properties one has guarantees which mental properties are had, but it does not say what type of guarantee this is. It is clear, however, that a *conceptual* guarantee is too much to require. Facts about which physical (e.g., neural, molecular, or atomic) properties yield which mental properties can hardly be revealed through mere conceptual analysis. Perhaps physical sameness ensures mental sameness as a matter of *metaphysical* necessity. Mental terms might be natural kind terms of the Kripkean variety.[2] The connotation of the term "water" is "that which is wet, clear, odorless, etc.," and it is by virtue of having this connotation, together with the fact that "water" denotes H_2O in the actual world, that "water" comes to denote H_2O in all metaphysically possible worlds. Likewise, it might be that the connotation of a mental predicate "M" is "that which plays F," where F is the causal role that underlies our ordinary attributions of M. Assuming that neural property N is what plays F in the actual world, "M" would denote N in all metaphysically possible worlds (just as "water" refers to H_20 in all metaphysically possible worlds). If this account of the reference of mental predicates were correct, then physicalism would automatically be true, since mental properties would be identical with physical properties. It is precisely for this reason, however, that the non-reductionist will deny that mental terms are Kripkean kind terms.

One might try to motivate metaphysical supervenience without implying that mental terms rigidly designate neural properties. Any such attempt, however, is likely to capture more than physicalism requires. Physicalists hold that mentality is purely physical, but they need not claim that this is true in *all* possible worlds. As Jack (1994) notes, "[m]aterialists can allow that it is *metaphysically* possible for mental particulars to be neither physical nor sums of physical particulars" (p. 432, emphasis added). However,

> If two things have no physical properties and no physical parts, there is no physical property such that one of them has it and the other does not and no physical property such that one of them has a part which has it and the other does not. They are physically indiscernible. So mental events which are neither physical nor sums of physical particulars are physically indistinguishable, even if they differ mentally. (pp. 432–433)

Jack concludes that being a materialist (or physicalist) does not require endorsing supervenience. Perhaps we should conclude, instead, that while being a physicalist requires believing in supervenience, it does not require believing something as strong as *metaphysical* supervenience.

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[2]See Kripke (1980).

The weaker alternative to metaphysical supervenience is that physical properties determine mental properties *nomologically* — i.e., by virtue of the causal laws that obtain. In worlds where the causal laws are the same as those of the actual world, my physical duplicates are mentally indistinguishable from me, but this need not be the case in worlds that have different causal laws. Thus,

> (S_2) for any item x in any *nomologically* possible world w_1 and any item y in any *nomologically* possible world w_2, if x and y are physically indistinguishable, then x and y are mentally indistinguishable.

On one very natural interpretation of S_2, the causal laws enable physical properties to determine mental properties because mental properties are *caused by* physical properties. However, we may wish to allow for causal *indeterminism*, and in particular that mental effects are causally underdetermined by their physical causes. If so, then a different interpretation of S_2 is required. Rather than viewing the relation between the physical and the mental as one of cause to effect, we should view the relation as one of *realizer* to *role*. Within a functionalist framework, the story would go as follows.

> Mental properties are realized (instantiated) by physical events. A physical event e realizes some mental property M, in some organism at some time, just in case e plays the functional role definitive of M in that organism at that time. What functional role an inner event plays depends upon the physical features had by e, the physical features of the events with which e interacts, and of course the laws governing those causal interactions. In this way, the physical features of an organism at a certain time, together with the causal laws, determine what mental features the organism has at that time.

This diagnosis makes the supervenience relation *synchronic* rather than diachronic. The physical features of an organism at a certain time guarantee, with the help of causal laws, the mental properties had *at that time*. This allows that the mental properties had at one time are causally underdetermined by the physical properties had at an earlier time. Thus, supervenience can obtain despite causal indeterminacy.[3]

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[3]Crane and Mellor (1990, p. 205) argue that requiring only synchronic supervenience does not avoid the problem. Suppose a physical property P_1 causes a mental property M indeterministically, and suppose that at t_1 many people share all of their physical properties, including P_1. At t_2, therefore, most but not all of them will have M. Thus, some pair of physical duplicates at t_1 will differ mentally at t_2. Consider some such pair: at t_2, individual *a* has M but individual *b* lacks M. If the causal laws are indeterministic, it is possible that *a* and *b* do not share all the same physical properties at t_2. However, Crane and Mellor note, it is also possible that a and b *do* share all the same physical properties at t_2, even though they differ mentally.

In response, Menuge (1993, p. 229) correctly notes that their argument "tacitly assumes that the production of M is independent of the production of P_2 [where P_2 is the conjunction

Externalist intuitions introduce a concern. Externalism regarding mental content is the view that the content of our mental states is partly a function of factors that do not supervene on intrinsic bodily features. These factors include features of the external items toward which our mental states are causally connected. To use a familiar example,[4] suppose that Twin-Earth is just like Earth, except that what people drink, what fills the lakes, and what falls from the sky on Twin-Earth is XYZ instead of H_2O. Although Jill and her doppleganger on Twin-Earth are exactly the same physically and have the very same non-intentional mental histories, their "water"-thoughts are directed toward different natural kinds. As a result, their "water"-thoughts differ in truth-conditions, and therefore in content. Examples of this sort are taken to show that the content of a mental state does not supervene on intrinsic physical features. However, we can still endorse supervenience simply by including *relational* features in the supervenience base — especially relations that mental events bear to external items (e.g., being causally related to stuff that is H_2O instead of XYZ). If these relational features are reducible to (or at least supervene on) physical features, then the supervenience of the mental features they influence is preserved.

A larger concern is that S_2, by itself, does not distinguish physicalism from certain varieties of dualism. Consider the following theory.

> T: All creatures with mental states have immaterial souls, and their mental processes are among the events (perhaps there are others) that occur within these immaterial souls. Moreover, with the help of divine intervention, all nomologically possible worlds are constrained as follows: any two creatures that are physically indistinguishable will have all the same mental events occurring within their immaterial souls.

T is clearly a dualistic theory, though it does entail S_2. So S_2 does not ensure the truth of physicalism.

Pettit's (1993) definition of physicalism provides a clue about how to modify S_2 so as to preclude theory T. His definition includes the constraint that "[m]icrophysical regularities govern everything" — that is, macro-level laws "do not complement micro-level laws, taking up some degree of slack left by those laws" (p. 217). As far as physicalism regarding the mind is con-

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of the physical properties shared by *a* and *b* at t_2.] But this assumption may be false. For P_2 may contain a property P* which is produced only if M is as well. In that case, even though M and P_2 are both produced indeterministically, M would supervene on P*." Pettit (1993) notes the same flaw when he writes: "[p]ast non-mental causes can give rise indeterministically to different mental events, consistently with supervenience, provided that they do so — as all physicalists will surely say — through giving rise indeterministically to different non-mental subveners" (p. 218, fn. 6).

[4]See Putnam (1973).

cerned, we need not appeal to *micro*physical laws. One can avoid the charge of dualism equally well by requiring that mental regularities are determined entirely by *macro*physical (e.g., neurological) laws, leaving open the question of how these macrophysical laws relate to microphysical laws. It will suffice that the laws on which mental regularities depend are purely physical, where a "purely physical" law is one that ranges only over physical properties (micro- or macro-). Suitably modified, Pettit's constraint entails the following stronger version of S_2.

> (S_3) for any item x in any world w_1 and any item y in any world w_2, if x and y are physically indistinguishable and w_1 and w_2 are indistinguishable from the actual world in terms of *purely physical* causal laws, then x and y are mentally indistinguishable.

According to theory T, it is nomologically impossible for physical duplicates to differ mentally. However, this dependency relation is not the result of laws ranging only over physical properties. If mental events belong to immaterial substances, as T states, then psycho-physical laws will range over non-physical properties as well. Thus, according to T, holding the purely physical laws constant does not entail holding all the relevant laws constant, and therefore does not guarantee that physical duplicates are mentally indistinguishable — contrary to S_3. In fact, S_3 automatically rules out all forms of dualism, for if psycho-physical laws range only over physical properties, it follows that mental properties themselves are physical. For this reason, S_3 may actually be too strong as a definition of physicalism. To allow the coherence of non-reductive physicalism, we need to supplement S_2 in a way that precludes theory T without entailing that mental properties are physical properties.

The Realization Thesis

On behalf of functionalism, Van Gulick (1992) reminds us that "the relation between mental and physical properties is said to be one of instantiation or realization not one of identity" (p. 164). By denying property-identity, Van Gulick qualifies as a non-reductionist; however, by insisting that mental properties are instantiated physically, he aims to secure physicalism as well. After all, if mental events instantiate physical properties, then mental events are identical with physical events, which seems to be what only a physicalist would allow. So perhaps we can arrive at an adequate definition simply by adding to S_2 the following realization thesis:

> (R) it is nomologically necessary that for any mental property M, and any event e such that e is an instance of M (for some organism x at a time t), there is a physical property P such that e is an instance of P (for x at t).

Assuming that mental properties are not identical with physical properties, thesis R entails that every mental event is an instance of two distinct properties — one physical and one non-physical. There is nothing problematic with the idea that an event might instantiate more than one property. As MacDonald and MacDonald (1986) note, "Susan's desire for a drink . . . may not only be an instance of the property, being a desire for a drink; it may be an instance of the *distinct* property, being a desire for some water" and "John's shooting of Joe is an instance of the property, being a shooting; but it may well also be an instance of the property, being a movement of a finger, and of the property, being a pulling of a trigger" (p. 148). Likewise, there is no reason to deny that a mental event may simultaneously instantiate two distinct properties.[5]

However, while this assumption is not only crucial to non-reductive physicalism but also independently plausible, it presents a problem for defining physicalism in terms of theses S_2 and R. The mere fact that an event instantiates a physical property does not prevent it from also instantiating a physicalistically unacceptable property. Consider, for instance, the property Q: *having as a component an event which occurs in a disembodied soul.* One might deny that such a property is ever instantiated, but the important point is that believing it could be, and sometimes is instantiated, automatically prevents one from being a physicalist. However, the belief that mental events instantiate Q is perfectly compatible with both S_2 and R. It might be that any instance of Q has a component e which instantiates a physical property, thereby honoring R. And it might also be that the "immaterial" component of any Q-instance is constantly conjoined with e, in which case supervenience is also preserved. Since S_2 and R allow that mental events instantiate Q, they do not guarantee the truth of physicalism even when conjoined.

One easy way to avoid the instantiation of properties like Q is to require that mental events instantiate *only* physical properties. That is,

> (R_2) it is nomologically necessary that for any mental property M, and any event e such that e is an instance of M (for an organism x at time t), there is a physical property P such that e is an instance of P (for x at t), *and there is no non-physical property Q such that e is an instance of Q (for x at t).*

Unfortunately, while R_2 might qualify as a physicalist conception of mind, it is incompatible with non-reductionism. If mental events were instances of

[5]The MacDonalds are trying to reconcile mental–physical causal interaction with the *anomalism* of the mental, which prohibits strict laws linking mental events with physical events. For the Davidsonian, causation relates events *in extension* and laws relate events only *under a description*. So if an event can be an instance of both a mental and a physical property, then a mental event can causally relate to a physical event despite the anomalism of the mental.

only physical properties, then since every mental event is an instance of a mental property, every mental property would have to be a physical property.

To sum up: appealing to supervenience does not ensure physicalism regarding the mind unless we assume something about the way that mental properties are instantiated or realized (thesis R). But since an event can instantiate more than one property, R allows mental events to instantiate properties, such as Q, that are unacceptable by physicalist standards. On the other hand, if we insist that mental events instantiate *only* physical properties (thesis R_2), we secure physicalism but only by forfeiting non-reductionism.

So far we have only considered constraints on the type of property a mental event might instantiate. Perhaps we can arrive at an adequate definition by also constraining how those property instances are *comprised*.

Constraining Composition

One way that constraints on composition might help characterize physicalism is by figuring in the supervenience relation itself. For example, what Kim (1984a) calls "mereological supervenience" requires "the supervenience of the characteristics of wholes on the properties and relationships characterizing their proper parts" (p. 264). Applied to the relation between mind and body, mereological supervenience requires that

> (S_4) for any item x in any nomologically possible world w_1 and any item y in any nomologically possible world w_2, if x and y have physically indistinguishable proper parts, then x and y are mentally indistinguishable.

The plausibility of S_4 depends largely on which properties we allow in the supervenience base. The properties must include, as Kim notes, "relationships" and among these will obviously be relations that the parts bear to one another. However, as noted earlier, to accommodate externalism we must also include relations that the parts bear to items external to the whole. Suitably refined, S_4 should be acceptable to most, if not all, physicalists.

Unfortunately, for the purpose of defining physicalism, S_4 does little to improve upon S_2. As noted above, even if our mental properties are determined entirely by the physical features of our proper parts, it is still possible that those mental properties are instantiated by radically non-physical events — events of the sort mentioned in theory T, for instance. However, S_4 does suggest how to modify the realization thesis: we should require not only that our mental properties supervene on our physical proper parts, but also that *all* of our proper parts are ultimately physical. Pettit (1993) has something like this in mind when he proposes that "[e]verything in the empirical world is composed in some way — composed without remainder — out of (subatomic) entities of the kind that microphysics posits, or it is itself uncom-

posed and microphysical" (p. 215). In an earlier paper, Hellman and Thompson (1975) express the same idea with their "Principle of Physical Exhaustion," a principle which "enables one to say, without begging any questions, that everything concrete is *exhausted* by basic physical objects, without thereby implying that everything is in the extension of a basic physical predicate" (p. 555). As far as physicalism regarding the mind is concerned, we need not require that mentality is exhausted by items of the sort that microphysics, or even physics in general, posits. It is enough to believe that organisms with minds are exhausted by items of the sort posited by, for example, molecular biology or biochemistry. It would be a further question how items at these higher levels of physical structure depend upon microphysical items.

So we should interpret the principle of physical exhaustion as stating that organisms with mentality are comprised entirely by items that are physical — i.e., items of the sort mentioned by the natural sciences. However, to ensure that non-reductive physicalism is a coherent position, we cannot require that *all* of our proper parts are physical items. If some of our proper parts are mental items and if these cannot be reduced to physical items, then some of our proper parts will not be physical. It is enough that *at some level of decomposition* we are comprised of proper parts all of which are physical. The decomposition, of course, must be *complete*. For any level of internal structure L, a decomposition D at level L of an organism x is complete just in case D includes all of x's parts that operate at L. If we possess a complete decomposition into proper parts all of which are physical, it follows that we are ultimately comprised of nothing other than physical parts. Thus,

> (R_3) it is nomologically necessary that for every item x with mental properties, there is some complete decomposition D of x into proper parts all of which are physical (i.e., all of which are items of the sort mentioned by the natural sciences).

Since R_3 requires that our parts are physical only at *some* level of organization (not necessarily all), it allows that mental properties themselves are not physical. Assuming that one can be both a non-reductionist and a physicalist, R_3 thereby improves on R_2. R_3 also improves on R_1 by ruling out the possibility that some of our parts are radically non-physical in nature (as implied by theory T, for example).

As it stands, however, the definition is not complete. We have been using the term "physical" to refer to those features that figure in the natural sciences. So, by definition, the entities of the natural sciences have physical features. However, they also possess features that do not qualify as physical. A neuron, for example, has a host of relational properties that do not figure in the natural sciences — e.g., being smaller than a dollar bill, being located x inches from the base of the Eiffel Tower, and weighing less than a bottle of

Budweiser. These relational features are not physical features (i.e., they do not figure in the natural sciences), but they can be had by physical items. So we need to modify R_3 and require not only that (i) our parts are physical, but also that (ii) our mentality is had solely by virtue of the physical features of those parts. Satisfying condition (ii) requires some type of supervenience constraint. Borrowing from S_4 (Kim's mereological supervenience), we might add to R_3 the condition that

> (S_5) for any item x in any nomologically possible world w_1 and any item y in any nomologically possible world w_2, if x and y share a complete decomposition D into proper parts all of which are physical *and if the D-parts had by x are physically indistinguishable from the D-parts had by* y, then x and y are mentally indistinguishable.

S_5 rules out the possibility that two items differ mentally even though they have all the same physical parts with all the same physical features. Satisfying condition (ii), however, takes a bit more than that. The fact that a feature F supervenes on a feature G does not guarantee that F is had *solely by virtue of* G, since G might necessitate F only because it necessitates some additional feature H. Thus, it may be that at some level of decomposition all of our parts are physical, and it may also be that the physical features of those parts determine our mental features — but only by way of determining features that do not qualify as physical. Consider, for example, a modified version of theory T.

> T*: Contrary to T, no organisms have immaterial soul as parts. However, there does exist an immaterial soul S, and every organism with mentality is associated with this external soul as follows: for every mental state M, and any organism x with M, there is a physical state of x, and a state Q of S such that
>
> (1) "x has P → x has M" is nomologically necessary, and
>
> (2) condition (1) obtains because "x has P → x has Q" and "x has Q → x has M" are nomologically necessary.

(1) entails that if two organisms have all the same physical properties, then they have all the same mental properties.[6] However, according to (2), this supervenience relation obtains by virtue of how our physical states causally relate to states of the immaterial soul. Since physical states would not give rise to mental states without causally interacting with states of the immaterial soul, mentality is not had solely by virtue of physical properties. Theory T* also tells us that all of our parts are purely physical; the non-physical item

[6](1) and (2) more directly entail what Kim (1984b) calls "strong supervenience." Mental properties *strongly supervene* on physical properties $=_{df}$ necessarily, for any mental property M, and any item x that has M, there is a physical property P such that x has P and necessarily any item y with P has M. If mental properties strongly supervene on physical properties, then any two items that are physically indistinguishable will also be mentally indistinguishable.

with which our physical parts interact to produce mentality is itself not a part of us. Thus, T* entails both R_4 and S_5. But T* certainly does not qualify as a physicalist theory. Thus, physicalism cannot be defined solely in terms of R_4 and S_5.

We can rule out theory T* by modifying S_5 to require that mental properties supervene *only* on physical properties. However, this option is not available if non-reductionism is true (i.e., if mental properties are not identical with physical properties). The presence of some mental properties logically necessitates, and therefore nomologically necessitates, the presence of other mental properties — e.g., the conjunction of two mental properties logically entails each of the conjuncts. So each of the conjuncts supervenes on the conjunction. Moreover, since every mental property logically entails the presence of itself, it is trivially true that every mental property supervenes on itself.

Perhaps further modifications of the realization and supervenience theses would yield an adequate definition of physicalism. The difficulties we have already encountered, however, suggest that these modifications will not suffice unless they imply that mental properties are identical with physical properties, for the formulations considered above that are designed to accommodate non-reductionism do so only by allowing the truth of theories (such as T and T*) that clearly run counter to physicalistic intuitions. Whether there is some other formulation that allows for non-reductionism without violating physicalist intuitions remains to be seen. Until then, the coherence of non-reductive physicalism is dubious at best.

The charge of incoherence has been made before, most notably by Kim (e.g., 1989 and 1993b). It will be instructive to note, in closing, how my objection to non-reductive physicalism compares with his.

Non-Reductive Physicalism and the Exclusion Argument

Suppose that we explain some behavior B by citing a mental property M as the cause of B. This psychological explanation appears unproblematic, until we realize that there is also a perfectly good neurological explanation of B which appeals to some neural property N as the cause. In this case, N vies with M as the cause of B. Moreover, there is reason to believe in the *causal closure of the physical domain* — i.e., that for any physical phenomenon x, there is a complete causal account of x which appeals only to other physical phenomena. Thus, N not only vies with but threatens to exclude M as the cause of B. This problem, which Kim calls "the problem of causal-explanatory exclusion" (e.g., 1989, sec. V), is easily avoided if we *identify* M with N. There is no worry that M's causal powers are excluded by those of a physical property if M itself is a physical property. But since this line is not available

to the non-reductionist, there is a potential inconsistency for those non-reductionists who believe that mental properties are causally efficacious.

While Kim has clearly placed a burden of proof on the non-reductionist, it is not clear that this burden cannot be met. Many non-reductionists have noted that if the problem of causal-explanatory exclusion were a real threat to mental causation, then it would also threaten causation at lower levels of structure. As Van Gulick (1992) puts it, if the exclusion argument were sound,

> [n]ot only would many mental properties turn out to be noncausal, but all the properties of the special (or less than strictly physical) sciences such as geology, biology and chemistry would also turn out to be causally inefficacious, expect in those cases in which special science properties were identical with strictly physical properties. (p. 173)

Since there is no worry that neural causation is excluded by molecular causation or that molecular causation is excluded by processes at the atomic level, there should be no worry, the reply goes, about mental causation in particular. To make this line of response fully convincing, the non-reductionist also needs to show exactly where the exclusion argument fails. Baker (1993), for example, argues against the casual closure of the physical domain. There are paradigm cases of explanation in the science of psychology as well as in everyday life which regard mental properties as causally relevant to behavior. So if "we take our ontological cue from our successful explanatory and predictive practices" (pp. 93–94), as we should, then we must reject the idea that every instance of a physical property has a complete physical cause. Alternatively, the non-reductionist might accept the principle of causal closure, but deny that this principle threatens mental causation. Van Gulick (1993), for instance, notes that

> higher-order patterns [such as those picked out by explanations in the special sciences] can have a degree of independence from their underlying physical realizations and can exert what might be called downward causal influences without requiring any objectionable form of emergentism by which higher-order properties would alter the underlying laws of physics. Higher-order properties act by the *selective activation* of physical powers not by their *alteration*. (p. 252)

Whether either of these responses succeed I leave for another occasion. The fact that such responses do exist and are initially plausible is enough to show that the exclusion argument poses no obvious threat to non-reductive physicalism, since the argument rests on highly controversial assumptions about the causal closure of the physical domain, the nature of causation itself, and what these imply regarding mental causation. The worries for non-reductive physicalism described earlier, on the other hand, do not rest on any

of these controversial assumptions. We can deny the causal closure of the physical domain, we can even deny that mental properties are causally efficacious, and the worry remains that supervenience and realization do not imply physicalism unless they imply reduction. Thus, my argument uncovers a tension that is more *internal* to non-reductive physicalism.

The tension is also more *basic* than the exclusion problem. I have argued that to be a physicalist regarding the mind one must believe that mental properties are identical with (and therefore reducible to) physical properties. If this is right, then there is every reason to wonder whether a non-reductionist can accommodate mental causation, though the concern is less fundamentally about mental causation itself as it is about the existence of non-physical properties (causally efficacious or not). The concern underlying the exclusion argument, i.e., that

> (i) if mental properties are causes, and if non-reductionism is true, then the physical domain is not causally closed,

is just a symptom of the more general worry that

> (ii) if mental properties exist, and if non-reductionism is true, then not everything is physical,

for (i) is a concern only for the non-reductive physicalist who believes that mental properties are genuine causes. While this belief is highly plausible, it is not essential to either non-reductionism or physicalism per se. However, since all non-reductive physicalists believe that mental properties exist, the worry expressed by (ii) would remain even if (i) were resolved.

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