

## Grounding And The Formulation Of Physicalism

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There are many sciences, and each science, to the extent that it gets things right, uses its own characteristic theoretical vocabulary to describe a characteristic domain of entities. But how are the many sciences related to one another? And how is the domain of entities proprietary to each science related to the domains of entities proprietary to the others? To try to answer these questions is to address what I once called the problem of the many sciences (Melnyk 1994, 222-224; 2003, 1-2).

The problem of the many sciences looks like a promising candidate for the sort of philosophical problem that naturalistic metaphysics should address—where naturalistic metaphysics seeks to answer questions that (i) ask what the world is like, albeit at a very high level of abstraction, that (ii) apparently don't fall within the province of the sciences (as traditionally understood), but that (iii) creatures like us are capable in principle of answering (Melnyk 2013). Because I aspire to be a naturalistic metaphysician, I ask in this paper whether an appeal to the relation of *grounding* posited recently by certain philosophers might be useful in one kind of approach to the problem of the many sciences—a *physicalist* approach. Jonathan Schaffer has explicitly proposed appealing to grounding to formulate physicalism, albeit very briefly (Schaffer 2009, 364). Gideon Rosen has suggested formulating *naturalism*, a close relative of physicalism, by appeal to grounding (Rosen 2010, 111-112). And Shamik Dasgupta has recently tried to remove one obstacle to formulating physicalism by appeal to grounding (Dasgupta 2014).<sup>1</sup> The prospects of a grounding formulation of physicalism are also worth investigating simply because of the remarkable level of current philosophical interest in the putative relation of grounding.

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<sup>1</sup> Daniel Stoljar devotes a subsection of his *Stanford Encyclopedia of Philosophy* entry on physicalism to what he calls "grounding physicalism", as if it were a standard approach—which it isn't (Stoljar 2015, 10.3).

The putative grounding relation that my question concerns is not meant to be a generic relation under which such familiar relations as supervenience, realization, and composition fall as species. Rather, it is supposed to be a relation on a par with such relations; and it might be posited either in addition to, or as a replacement for, such relations and their kin (Wilson 2014, *passim*). It is also supposed, at least by three of its leading proponents, to be a *primitive* relation (Schaffer 2009, 364; Rosen 2010, 113–114; Fine 2012, 78-79).<sup>2</sup> Not all philosophers sympathetic to grounding take it to be primitive. Dasgupta, for example, identifies grounding with a certain sort of explanation: “to say that some facts ground another is just to say that the former explain the latter, in a particular sense of ‘explain’” (Dasgupta 2014, 558). He therefore leaves open the possibility that the “particular sense” of ‘explain’ could be spelled out, yielding an account of what grounding is; indeed, he states what is in effect a non-trivial sufficient condition for the grounding relation to hold.<sup>3</sup> In this paper, however, I shall only consider a supposedly primitive grounding relation.

If an appeal to grounding is to be useful in a physicalist approach to addressing the problem of the many sciences, then that will be because it can play the starring role in formulating physicalism, understood as a comprehensive doctrine about the world which accords to physics and the physical a certain descriptive and metaphysical primacy among the many sciences and their domains. How exactly to formulate physicalism in this sense is a hard question (see, e.g., Melnyk 2003, Chs. 1 and 2). But a formulation of physicalism must indisputably do at least the following two things. First, it must characterize a relatively narrow class of physical entities that are, as it were, physical in their own right; it might characterize them, for example, as those entities expressible in the proprietary vocabulary of physics (for elaboration and defense of this option, see Melnyk 2003, 11-20; 223-237; for a useful survey of other options, see Ney 2008). Call these entities *narrowly* physical. Second, it must specify a relation R such that, necessarily, if an entity which isn’t narrowly physical (e.g., a chair or a zebra) stands in R to an entity which is narrowly physical, then the former entity is nothing over and above the narrowly physical entity in the intuitive sense required for

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<sup>2</sup> Rosen says we must accept it as primitive “at least for now”.

<sup>3</sup> It is this: “It is essential to ground that for any Xs and any Y, if the Xs obtain and if a fact about the essence of a constituent of Y implies that the Xs are materially sufficient for Y, then the Xs ground Y” (Dasgupta 2014, 588).

physicalism. Call such an entity *broadly* physical. If an appeal to grounding is to be useful in formulating physicalism, it will be because grounding can be taken, and with advantages, to be relation R in the characterization of the broadly physical.<sup>4</sup> A rough statement of physicalism would then be that everything is either narrowly physical or broadly physical.

In this paper, I caution against a gadarene rush to a grounding formulation of physicalism; and I do so by giving three reasons why we should hesitate to take R in a formulation of physicalism to be grounding.<sup>5</sup> Each reason occupies its own section.

## 1. Grounding And The Broadly Physical

The first reason for hesitating to take R to be grounding concerns whether it is even capable of doing the job in a formulation of physicalism that proponents of a grounding formulation of physicalism need it to do. For it to do that job, the following conditional must be true: necessarily, if an entity which isn't narrowly physical is *grounded* in an entity which is narrowly physical, then the first entity is nothing over and above the second entity in the sense required for physicalism. I first want to argue that we have no warrant for thinking that this conditional is true. I will end this section by arguing that it is false.

Obviously it doesn't follow merely from one's *needing* grounding to do a certain job in a formulation of physicalism that it is capable of doing it. Nor is it at all obvious that it can do it: even if grounding is indeed "the primitive structuring conception of metaphysics" (Schaffer 2009, 364), it doesn't follow a priori that, necessarily, if X grounds Y, then Y is nothing over and above X in the sense required for physicalism: "the primitive structuring conception of metaphysics" might turn out just not to be like that. One might claim to know by intuition that, necessarily, if X grounds Y, then Y is nothing over and above X in the sense required for physicalism. But it is quite implausible to claim that one has reliable intuitions regarding a merely posited primitive relation—just as it would have been implausible, when the neutrino was first posited, for someone to claim to have reliable intuitions about the properties of neutrinos.

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<sup>4</sup> Here I follow Schaffer in taking concrete states of affairs to be possible relata of the grounding relation (Schaffer 2010, 36).

<sup>5</sup> For wide-ranging skepticism regarding the theoretical desirability of positing a relation of grounding, see Wilson 2014.

But what if one knew independently that, necessarily, if X grounds Y, then X metaphysically necessitates Y? Wouldn't that be enough to show that, necessarily, if X grounds Y, then Y is nothing over and above X in the sense required for physicalism? It wouldn't, for

being metaphysically necessitated by the narrowly physical  
does not entail

being nothing over and above the narrowly physical in the sense  
required for physicalism

—and not just because the metaphysical necessitation might result from bizarre possibilities like occasionalism. Here is a novel argument intended to demonstrate this failure of entailment; it invites us to consider a series of three cases.<sup>6</sup>

Suppose, first, that a state-token  $x$  of one state-type nomically necessitates a later state-token  $y$  of an entirely different state-type. For vividness, think of  $x$  as a neural state and  $y$  as a pain state:

(1)  $x$  at  $t_1$  nomically necessitates  $y$  at  $t_2$ .

Suppose also that this nomic necessitation is *brute*, not in the sense that it has no explanation at all (for it may have a theistic explanation in terms of a divine will), but in the sense that it has no explanation in terms of more basic nomic generalizations: it has no same-level explanation in terms of states of other types that intervene between  $x$  and  $y$ ; and it has no lower-level explanation in terms of underlying states that constitute  $x$  and  $y$ . Clearly the brute nomic necessitation of  $y$  by  $x$  does not entail that  $y$  is nothing over and above  $x$ .

Now consider a second case exactly similar to the first except that the necessitating state  $x$  and the necessitated state  $y$  are now simultaneous, so that the brute nomic necessitation of  $y$  by  $x$  is synchronic rather than diachronic:

(2)  $x$  at  $t_1$  nomically necessitates  $y$  at  $t_1$ .

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<sup>6</sup> For earlier arguments with the same goal, see (Melnik 2003, 57-70; Wilson 2005).

Surely the brute nomic necessitation of  $y$  by  $x$  still doesn't entail that  $y$  is nothing over and above  $x$ . For it didn't entail this in the first case, and the second case differs from the first only in the changed relation between the time of  $x$  and the time of  $y$ . It is very implausible to think that we could move the time of  $x$  arbitrarily close to the time of  $y$  while  $y$  continues to be something over and above  $x$ , but that the moment we make the times identical  $y$  becomes nothing over and above  $x$ . To think that would be to attribute magical powers to time.

Consider, finally, a third case which is exactly the same as the second, except that now the brute necessitation is not nomic but rather *metaphysical*:

(3)  $x$  at  $t_1$  metaphysically necessitates  $y$  at  $t_1$ .

Now, the *nomic* (brute, synchronic) necessitation of  $y$  by  $x$  didn't entail that  $y$  is nothing over and above  $x$ ; and there's no reason to think that the change from nomic (brute, synchronic) necessitation to *metaphysical* (brute, synchronic) necessitation could make any relevant difference. So the metaphysical (brute, synchronic) necessitation of  $y$  by  $x$  still doesn't entail that  $y$  is nothing over and above  $x$ . But, of course, brute, synchronic metaphysical necessitation is still metaphysical necessitation. So what this third case shows is that it can happen that  $x$  metaphysically necessitates  $y$  without  $y$ 's being nothing over and above  $x$ .

Since being metaphysically necessitated by the narrowly physical doesn't entail being nothing over and above the narrowly physical in the sense required for physicalism, it seems that any possible warrant for thinking that an entity which is grounded in a narrowly physical entity must be nothing over and above the physical entity would have to arise from whatever it is that holds in *addition* to metaphysical necessitation when a narrowly physical entity grounds an entity that isn't narrowly physical. But, precisely because this additional factor is primitive, so that nothing can be said about its nature, we can't use premises about its nature to derive the conclusion that it ensures the acceptability to physicalism of whatever is grounded in the narrowly physical.

So far in this section I have been arguing that we have no warrant for believing the conditional claim that, necessarily, if an entity which isn't narrowly physical is grounded in an entity which is narrowly physical, then the first entity is nothing over and above the second entity in the sense required for physicalism. But proponents of

a grounding formulation of physicalism might respond that they don't need to provide any such warrant, because the conditional claim is true by *stipulation*: when they utter tokens of "grounding" they are to be understood as referring to a certain primitive relation that has the property of being such that, necessarily, if an entity which is narrowly physical stands in that relation to an entity which isn't narrowly physical, then the second entity is nothing over and above the first in the sense required for physicalism; and if a relation *lacks* this property, then it simply isn't what they are referring to when they utter tokens of "grounding". On this proposal, a first-pass formulation of physicalism would say that every entity is either narrowly physical or else stands in a certain relation, to be called "grounding", to an entity that is narrowly physical, where "grounding" is defined, as above, to be primitive and to have the property of being such that etc..

Now a stipulative definition, unlike a descriptive definition, cannot be faulted for being inaccurate; but it can be faulted for being inconsistent, and the stipulative definition of "grounding" mooted in the previous paragraph is, I shall now argue, defective in just this way.<sup>7</sup> To begin, let us briefly consider the relation of being taller than. It can only hold between relata that have a certain characteristic, viz., a height; it cannot possibly hold between items that cannot have heights. Why this restriction on the relation's possible relata? Plausibly, the restriction follows from the *nature* of being taller than, a nature into which height enters: for X to be taller than Y just is for X to have a certain height and for Y to have a certain (lesser) height. But the restriction can follow from the nature of being taller than only because that nature is complex. "Grounding", by contrast, is stipulated to refer to a relation that is primitive: when it holds between two items, it doesn't do so in virtue of anything else—it just holds. Because grounding has no complex nature, its nature places no restriction on what items it could (metaphysically) relate. So it could (metaphysically) hold between any two items, whatever their respective natures or features. It could hold, for instance, between a narrowly physical X and a Y that is a veritable paradigm of non-physicality—or, for that matter, a Y that is physical all right, but patently something over and above X. But this possibility entails that the relation cannot be such that, *necessarily*, if an entity which is narrowly physical stands in it to an entity which isn't narrowly physical, then the second entity is nothing over and above the first in the sense

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<sup>7</sup> Hence I think Wilson concedes too much when she writes that "A Grounding claim...effectively stipulates nothing over and above-ness." (Wilson 2014).

required for physicalism. The upshot, then, is that the stipulative definition of “grounding” mooted above is inconsistent: its stipulation of “grounding” as a primitive relation conflicts with its stipulation of “grounding” as a relation such that, necessarily, if an entity which is narrowly physical stands in it to an entity which isn’t narrowly physical, then the second entity is nothing over and above the first in the sense required for physicalism.

More importantly, however, the argument of the preceding paragraph also serves to show that it’s untrue (not just unwarranted) that anything that is grounded in a narrowly physical entity would be bound, metaphysically, to be nothing over and above that entity in the sense required for physicalism. For, precisely because the relation of grounding is primitive, and therefore not constituted even in part by facts about its relata, nothing rules out the metaphysical possibility of its holding between a narrowly physical entity, on the one hand, and, on the other, something that *isn’t* nothing over and above it in the sense required for physicalism. Grounding looks to be the wrong tool for doing the job that proponents of a grounding formulation of physicalism need it to do.

The official task of this section is now complete; but if it is indeed untrue that anything that is grounded in a narrowly physical entity would be bound, metaphysically, to be nothing over and above that entity in the sense required for physicalism, then this helps to support an important epistemological conclusion. The conclusion is that the broadly empirical methods of acquiring knowledge used in the sciences can’t be deployed to support claims that this grounds that.

Consider a concrete case in which we are trying to decide whether some state X grounds a certain state Y. How could we come to *know* that the physical state grounds the mental state? What, in principle, would constitute *evidence* that the physical state grounds the mental state? That X grounds Y is surely a fact over and above the sheer spatio-temporal contiguity of X to Y, but—crucially—it makes no difference to the *causal powers* of either X or Y; and this makes it hard to see how the fact that X grounds Y could be known by direct observation. But could the claim that X grounds Y still be supported by an inference to the best explanation? Not in the obvious way, for if the fact that X grounds Y makes no difference to the causal powers of either X or Y, then it can play no *direct* role, at any rate, in explaining any observable feature of the world. Still, a claim can form part of the best explanation of certain observable facts, not because the claim itself explains those facts, but because it makes possible an increase in

*parsimony* that is relevant to the assessment of the hypothesis of which it is a part as the best available explanation of the facts in question. Suppose, then, that we observe that X's are sufficient for Y's. Could the hypothesis that the X's *ground* the Y's constitute a better explanation of the observed regularity than, say, the rival hypothesis that the X's are *lawfully* sufficient for the Y's, because it is more parsimonious than this rival? No. The hypothesis that the X's ground the Y's would be more parsimonious than the rival only if it entailed that the Y's were nothing over and above the X's. But, I have argued in this section, there is no reason to think that it does, and one reason to think that it does not.

## 2. The Dispensability Of Grounding

My second reason for hesitating to take relation R (in a formulation of physicalism) to be grounding is that, other things being equal, we should not formulate physicalism by positing a new primitive relation (e.g., grounding) if we can do so without positing a new primitive relation. And we *can* formulate physicalism without positing a new primitive relation—by appealing instead to a carefully spelled-out relation of realization. So, other things being equal, we should not formulate physicalism by positing the primitive relation of grounding.

I claim that physicalism can be formulated to a first approximation as the view that every entity (better: entity-token) is either narrowly physical or else is *realized*, in a carefully-defined sense of "realized", by some or other narrowly physical entity (for elaboration, see Melnyk 2003, 6-11; 20-32).<sup>8</sup> To make my claim plausible, I will have to explain in some detail what that sense is. So let "*p*" name a particular actual physical state-token, and "*m*" a particular actual mental state-token. Then *p* realizes *m* (in the intended sense) only if

- i) *m* is a token of a mental state-type *M* with a certain *higher-order essence*: for a token of *M* to exist *just is* for there to exist a token of some (lower-order) state-type such that tokens of

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<sup>8</sup> "To a first approximation" only, because the formulation leaves various questions unanswered. Should the entities quantified over include abstracta? Or necessary existents? To what categories should the entities belong—states, events, properties, objects, facts, truths? See Melnyk 2003, 6-11; 20-32.



that (lower-order) state-type play role  $R_M$ , the role distinctive of  $M$ ;

ii)  $p$  is a token of a physical state-type  $P$  such that, necessarily, given the physical laws and physical circumstances  $C$ , tokens of  $P$  play role  $R_M$ ; and

iii) the laws of physics hold and physical circumstances  $C$  obtain.

Claims i) through iii) are necessary for  $p$  to realize  $m$ , but they are not sufficient. They jointly entail that *some* token of mental state-type  $M$  exists. But they do *not* entail that this token of mental state-type  $M$  is one and the same as the particular token of mental state-type  $M$  that we have called " $m$ ". Hence, claims i) through iii) do not jointly entail that  $p$  realizes (not just any old token of  $M$  but)  $m$  in particular. However, if claims i) through iii) are conjoined with the further mental-to-mental (*not* mental-to-*physical*) identity claim that

iv) the token of mental state-type  $M$  whose existence is entailed by claims i) through iii) =  $m$ ,

then all four claims together *do* entail that  $p$  realizes  $m$  in particular. Thus,  $p$  realizes  $m$  (in the intended sense) if and only if claims i) through iv) are true.

Four glosses on claims i) through iv) are required for their full comprehension. First, the identity claim implicit in claim i)—that mental state type  $M$  = so-and-so higher-order state-type—is metaphysically necessary and, in almost all cases, a posteriori. Second, the word "necessarily" in claim ii) is meant to express the idea that the claim that tokens of  $P$  play role  $R_M$  is in principle *derivable* from statements of the laws of physics plus the claim that physical circumstances  $C$  obtain. Third, claim i) speaks of *playing a role* only for the sake of role-playing's familiarity; it would be better to speak, more broadly, of *meeting a condition*, where the condition could indeed be met by playing a causal role, but could also be met in other ways, e.g., by standing in certain spatio-temporal relations or having a certain history or having a certain bio-function (Melnyk 2003, 37-42). Finally, the term "higher-order" is used in claim i) instead of the standard "functional". This is partly because the connotations of "functional" are unnecessarily narrow (see the third gloss), but mostly because "higher-order" draws attention to the metaphysical heart of this definition of realization and its associated formulation of

physicalism: its construal of broadly physical state types as higher-order types.

A few features of realization understood in this way deserve emphasis in the context of the present paper. First, realization, unlike grounding, is not a primitive relation, for the holding of the realization relation between  $p$  and  $m$  just *is* the holding of the four conditions described by claims i) through iv). Second, and for the same reason, realization is an *internal* relation in the sense that its holding is the holding of certain conditions regarding  $p$  and  $m$  none of which is the holding of a *relation* between  $p$  and  $m$ . (Being non-primitive is a necessary condition for a relation to be internal but not a sufficient one: a relation constituted by the holding of other, simpler relations between its relata would on that account not be primitive, but neither would it be internal.) Third, to say that a physical state-token realizes a mental state-token in the sense defined is to say more than that a certain modal correlation holds between a type of physical state and a type of mental state—which is all that claims of mental-on-physical supervenience do. Realization is in fact a hyperintensional relation, at least in the sense that it slices more finely than metaphysical necessitation:  $p$  might metaphysically necessitate  $m$  (given the physical facts) but not realize it—or it might metaphysically necessitate  $m$  (given the physical facts) *because* it realizes it. This feature of realization ought to appeal to fans of grounding, who object to supervenience claims precisely on the ground that they merely report modal correlations, and who claim that grounding has the advantage over supervenience of being a hyperintensional relation (e.g., Schaffer 2009, 364). Finally, to claim that a physical state-token realizes a mental state-token in the sense defined is to commit oneself to a particular view about the *nature* of the mental state-type of which the mental state-token is a token: the view that the mental state-type has what I have called a higher-order essence. In this regard, realization contrasts sharply with grounding, which, as we saw at the end of section 1, imposes no constraint upon the nature of its relata. Indeed, I conjecture that any relation fit to serve as relation R in a formulation of physicalism must take *some* stand on the nature of broadly physical state-types—which is to say that no relation could make tokens of absolutely *any* kind of state-type physicalistically acceptable.

The possibility of formulating physicalism by appeal to the relation of realization as defined above shows that we can formulate physicalism without positing a new primitive relation of grounding, and hence that, other things being equal, we should not formulate

physicalism by positing grounding. *Are other things equal?* Here I can only assert that realization physicalism can claim several virtues: it keeps faith with certain intuitions about the content of physicalism; it entails, and arguably explains, the supervenience of the non-narrowly physical on the narrowly physical and the (closely-related) necessitation of the non-narrowly physical by the narrowly physical; and it helps to solve the various problems of (generalized) mental causation (see Melnyk 2003, 33; 59-60; 49-70; 123-174, esp. 134-139 and 159-164).

### 3. The Consistency Of Grounding With Physicalism Itself

My third reason for hesitating to take relation R in a formulation of physicalism to be grounding is that it is hard to see how instances of grounding could *themselves* be consistent with physicalism (when formulated in terms of grounding). Thus grounding apparently falls foul of a requirement on formulating physicalism that was first clearly articulated by Michael Lynch and Joshua Glasgow in 2003: any candidate for R must be a relation whose instantiation is *itself* consistent with physicalism (Lynch and Glasgow 2003).<sup>9</sup> To see why, let us consider the possible ways in which instances of grounding could be rendered consistent with physicalism (formulated in terms of grounding).

Might instances of grounding be consistent with physicalism because they are broadly physical—broadly physical because themselves grounded in narrowly physical entities (*pace* the contention of section 1 that an entity's being grounded in something narrowly physical doesn't suffice to make it broadly physical)? I think not. First, grounding is meant to be a primitive relation, and it seems that

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<sup>9</sup> In a recent paper, Dasgupta appears to raise exactly the same problem for a grounding formulation for physicalism (Dasgupta 2014, 561-562). But a careful reading reveals that in fact he doesn't. The appearance arises because he raises his problem by presenting an argument that X's grounding Y "has no purely physical ground" (Dasgupta 2014, 571). But the *reason* X's grounding Y has no purely physical ground, for Dasgupta, is that it "is partly grounded in some ungrounded connection between" X's and Y's (Dasgupta 2014, 569); the reason is *not* that the grounding relation *itself* is problematically non-physical—a possibility, indeed, that the paper nowhere mentions. And Dasgupta's solution to his problem is to argue that physicalism can allow the sort of connection between X's and Y's that he has in mind to have no ground at all, and hence no physical ground (Dasgupta 2014, 575).

nothing primitive is even a candidate to be grounded. For anything primitive is fundamental, and nothing fundamental is grounded (save perhaps in itself, but clearly self-grounding is no help here). Secondly, whenever an instance of grounding is itself grounded in something physical, there must then be a second instance of grounding—the first instance’s itself being grounded—which also has to be grounded in something physical; and so on. Such a series of groundings cannot terminate, since the final instance of grounding would in that case fail to be grounded in something narrowly physical and hence would not be consistent with physicalism.<sup>10</sup> Neither is it plausible, however, that the series should continue indefinitely, since this would require infinitely many physical entities for the infinitely many instances of grounding to be grounded in.<sup>11</sup>

If instances of grounding do not achieve consistency with physicalism because they are broadly physical, might they do so because they are narrowly physical? But obviously grounding is not a physical relation in the sense of a relation expressed by a simple two-place predicate of physics. Nor can grounding be a relation expressed by some complex construction of physical terms, or of physical plus topic-neutral terms, because that would make grounding analyzable and hence not primitive.

It may be, however, that the category of the narrowly physical should be expanded, and that grounding belongs to the expanded category. We might, that is, also want to count something as narrowly physical if (i) it is topic-neutral in the sense of being no more associated with any one branch of science than any other, and (ii) its existence is presupposed by a complete physical description of the world—a description of the world that tells us everything about the world that physics has to tell. And, though the matter is highly controversial, it may be that, e.g., causation would count as narrowly physical by meeting conditions (i) and (ii). But what about grounding? Alas (for the prospects of grounding physicalism), a complete physical description of the world seems not to be committed to the grounding

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<sup>10</sup> The “hence” is justified because in this paragraph I am assuming that every instance of grounding would be made consistent with physicalism in the same way, by being grounded in something narrowly physical.

<sup>11</sup> Dasgupta argues that an infinite series of grounded grounding facts is harmless (Dasgupta 2014, 587-589). But he is not talking about an infinite series of *physically*-grounded grounding facts, as I am; and in any case an infinite series of grounded grounding facts is harmless on his account only if grounding is not primitive.

relation.<sup>12</sup> For the one place where one might suspect such a commitment is in what physics says about the relationship between large physical systems and small ones—say, between gross matter and molecules. But physicists seem to think that the orthodox language of physics has the expressive power in principle to characterize any physical system whatsoever, no matter how large or complex; and if they are right, as I assume they are, then a complete physical description of the world is not committed to grounding.

So far I have been assuming that the requirement proposed by Lynch and Glasgow (that tokens of R be consistent with physicalism) is a genuine requirement on formulating physicalism. But Tom Polger has recently argued that it is not, on the grounds that it cannot in principle be met by *any* view, physicalist or not, according to which all things exist solely in virtue of certain other things (Polger 2013, 84-85). Now I certainly agree that one can make the mistake of formulating physicalism too strongly.<sup>13</sup> But I deny that the Lynch-Glasgow requirement cannot be met. It can be met, when R in a formulation of physicalism is taken to be the relation of realization as I defined it above. The existence of instances of realization is consistent with physicalism, because realization's holding between physical state-token *p* and mental state-token *m* just is the holding of the four conditions described by claims i) through iv), as we saw in section 2; and the holding of each of these four conditions is consistent with physicalism, as the following paragraphs will show.

Claims ii) and iii) are consistent with physicalism because they describe only narrowly physical conditions. Claims i) and iv) are (metaphysically) necessary identity claims. So they are committed to

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<sup>12</sup> "Committed to the grounding relation" cannot just mean the same as "logically entails that the grounding relation has instances". In the sense I intend, a complete physical description of the world is *committed* to grounding iff (i) the complete physical description is possibly true, (ii) the claim that there exist instances of grounding is possibly false, and (iii) it is logically necessary that, if the complete physical description is true, then there exist instances of grounding. Conditions (i) and (ii) serve to rule out degenerate cases of entailment, in which the complete physical description is necessarily false or the conclusion necessarily true.

<sup>13</sup> For example, physicalism is formulated too strongly if it is formulated as saying that all facts or truths hold in virtue of physical facts or truths. This formulation is too strong because, if physicalism is true, then it's a fact that physicalism is true; but the fact that physicalism is true—the fact that nothing exists that is neither narrowly nor broadly physical—doesn't hold in virtue of physical facts alone. See Melnyk 2003, 25-26; 97 n.17.

the relation of identity, and to the entities they claim to be (self-)identical.<sup>14</sup> That identity (i.e., metaphysically necessary self-identity) is consistent with physicalism can be argued for in two ways, of which the first is this. So long as a complete physical description of the world says that anything at all exists, whether it be a particle, a field, spacetime, or even the physical universe as a whole, the physical description is thereby committed to the claim that the thing is metaphysically necessarily self-identical. Hence identity is something to which a complete physical description of the world is itself committed. Given the suggestion made two paragraphs ago, that something counts as narrowly physical if (i) it is topic-neutral, and (ii) its existence is presupposed by a complete physical description of the world, it follows that identity is consistent with physicalism.

The second way to argue that identity is consistent with physicalism restricts the scope of physicalism to *contingent* reality. In line with this restriction, it claims that realization physicalism requires that only instances of relations (or properties) that are *contingent* must be either narrowly physical or else realized by something narrowly physical. An instance of a relation is contingent in the intended sense iff there is a possible world at which, though its actual-world relata exist there, it fails to hold between them.<sup>15</sup> Instances of identity in the actual world, however, are not contingent in this sense: if  $a=b$ , then in no possible world do  $a$  and  $b$  exist but  $a \neq b$ , i.e., identity is necessary in Kripke's sense (Kripke 1980, 109). Since this is so, realization physicalism does not have to require that instances of identity be narrowly physical or realized by something narrowly physical; and so instances of identity are consistent with physicalism *even if* they are neither narrowly physical nor realized by something narrowly physical.

At this point, enthusiasts for a grounding formulation of physicalism might ask whether what I have just said about identity is true also of grounding, so that grounding too is consistent with physicalism (contrary to my earlier contention). The answer to this question is affirmative, of course, only if it's true that, if  $X$  actually grounds  $Y$ , then there's no possible world in which  $X$  and  $Y$  exist but  $X$  does not ground  $Y$ . But I see no reason to think that this is true. The two standard arguments for the necessity of identity, which appeal, respectively, to the necessity of self-identity and to the claim that non-

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<sup>14</sup> All claims of identity are claims of self-identity, of course.

<sup>15</sup> So it's not enough for contingency that there be a possible world at which " $a=b$ " is not true.

descriptive referring expressions are rigid designators (Kripke 1980, 104), look most unlikely to carry over to support an analogous thesis of the necessity of grounding. Also, as noted in section 1, the grounding relation, because it is primitive, doesn't hold between two items in virtue of any other facts; a fortiori, it doesn't hold in virtue of other facts *about the relata*; a fortiori again, it doesn't hold *solely* in virtue of other facts about the relata. So we cannot reason that, just because in some world  $w$  the relata exist, in  $w$  the grounding relation must hold between them. Finally, even if it is granted that grounding is a species of metaphysical necessitation—in a sense which implies that, necessarily, if  $X$  grounds  $Y$ , then  $X$  metaphysically necessitates  $Y$ —it doesn't follow that in every world in which  $X$  and  $Y$  exist  $X$  grounds  $Y$ . It does indeed follow that in every such world  $X$  metaphysically necessitates  $Y$ , given the transitivity of inter-world accessibility; but there is (we are assured) *more* to grounding than metaphysical necessitation.<sup>16</sup>

What about the *entities* said by claims i) and iv) to be (self-)identical? Claim iv) speaks of mental state-token  $m$ , which is by hypothesis physically realized and therefore consistent with physicalism. Claim i) speaks of the mental state-type  $M$ . But because (one might reasonably suppose) there are no untokened types, the existence of state-type  $M$  just is the existence of its state-tokens. So for  $M$  to be consistent with physicalism, it is enough if each of its tokens is physically realized—which they are if realization physicalism is true. In short, realization physicalism says that every contingent entity-token is either narrowly physical or realized by something narrowly physical, and tokens of realization are consistent with physicalism because they are in part narrowly physical and in part realized by something narrowly physical.

My argument that the existence of instances of realization is consistent with physicalism relies on the tacit premise that the existence of  $X$  is consistent with physicalism *if* (i) the existence of  $X$  just is (i.e., =) the existence of  $Y_1, Y_2, Y_3, \dots, Y_n$ , and (ii) each of the  $Y_i$  is narrowly physical or realized by something narrowly physical. It might therefore seem as if I have modified the formulation of realization

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<sup>16</sup> Might what I said about identity be true also of realization? Not if the first relatum is taken to be physical state-token  $p$ , or  $p$  plus physical conditions  $C$ . For the actual world's laws of physics don't hold in all possible worlds in which  $p$ , or  $p$  plus  $C$ , exists. But if the first relatum is taken to be  $p$  plus  $C$  *and* the holding of the actual world's laws of physics, then perhaps yes. I don't know which view of the first relatum is correct.

physicalism by introducing a *new* way in which—a new *relation* in virtue of which—an instance of a property (or relation) that isn't, or isn't wholly, narrowly physical can be rendered consistent with physicalism—which would then immediately prompt the same question that we asked about instances of realization, *mutatis mutandis*, namely, the question of how instances of this new relation can be rendered consistent with physicalism. But this appearance is illusory. To be sure, one *could* express realization physicalism as follows:

Every contingent instance of a property (or relation) is  
*either* narrowly physical  
*or* realized by something narrowly physical  
*or* is one and the same as the existence of instances  $I_1, I_2, I_3, \dots, I_n$   
(of properties or relations  $P_1, P_2, P_3, \dots, P_n$ , respectively), every one  
of which is either narrowly physical or realized by something  
narrowly physical.<sup>17</sup>

But such a formulation is unnecessary and misleading. It obscures the fact that, if the existence of  $X$  just is (i.e., =) the existence of  $Y_1, Y_2, Y_3, \dots, Y_n$ , then realization physicalists may stop speaking of  $X$  as such without reducing their ontological commitments; and if they may do so, and the existence of  $Y_1, Y_2, Y_3, \dots, Y_n$  is consistent with physicalism for independent reasons, then they do not need a third disjunct in their formulation of physicalism to handle  $X$ . In the case at hand, if realization's holding between physical state-token  $p$  and mental state-token  $m$  just is the holding of the four conditions described by claims i) through iv) in section 2, then it is open to realization physicalists to acknowledge the existence of those four conditions but then to shut up—or at least to utter nothing containing the term “realize”. And since each of the four conditions is consistent with physicalism, no further problem remains for realization physicalists. You might worry that, if this move is possible, realization can't be much of a relation.<sup>18</sup> And I would entirely agree; but it gets the job done.

But if the last five paragraphs are correct, what in that case is wrong with Polger's argument for thinking that the Lynch-Glasgow requirement on a formulation of physicalism (that tokens of  $R$  be consistent with physicalism) can't in principle be met? Polger's argument is dilemmatic, and the relevant portion is this:

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<sup>17</sup> This rough formulation is good enough, I hope, for the present purpose.

<sup>18</sup> By the light of day.



If the R-relation linking the Ps [physical entities] and the Ms [non-narrowly physical, e.g., mental entities] is among the Ms, then either it depends on and is determined by the Ps or it does not. If it does not, then the claim that all Ms depend on and are determined by the Ps is falsified... But if it is so dependent, then we will need to know by what R-relation it so depends, and we are off and running on a regress. So it seems that the R-relation cannot be among the Ms. (2013, 84)

When the R-relation is realization, I have tried to divide and conquer, taking it to be partly among the Ps and partly among the Ms. To the extent that it is among the Ms, I have accepted—of course—that it “depends on and is determined by the Ps”, and have said specifically that it is realized by the Ps. Polger thinks that a regress must now ensue, but does not say why. He may think a regress inevitable because we need a *second* R-relation to make the first R-relation consistent with physicalism, and a third to make the second consistent with physicalism, and so forth. And in response to the contrary suggestion that further R-relations are not needed because the first R-relation could make *itself* consistent with physicalism, he may mean to object that, even so, there would still ensue a regress of *tokens* of the first R-relation.

What should we make of Polger’s charge of regress? Here, for convenience, are the four crucial claims from above that together define realization in my sense:

i) *m* is a token of a mental state-type *M* with a certain *higher-order essence*: for a token of *M* to exist *just is* for there to exist a token of some (lower-order) state-type such that tokens of that (lower-order) state-type play role  $R_M$ , the role distinctive of *M*;

ii) *p* is a token of a physical state-type *P* such that, necessarily, given the physical laws and physical circumstances *C*, tokens of *P* play role  $R_M$ ; and

iii) the laws of physics hold and physical circumstances *C* obtain.

iv) the token of mental state-type *M* whose existence is entailed by claims i) through iii) = *m*.

I have claimed two things: (1) the holding of the realization relation between physical state-token *p* and mental state-token *m* just is the

holding of the four conditions described by claims i) through iv); and (2) everything required for claims i) through iv) to be true is physical or physically realized, hence consistent with physicalism (when formulated by appeal to realization). But in so claiming, have I appealed to a second R-relation? *If* I have, then it is with (1), and the second R-relation is identity; but I have already argued, in two ways, that identity is consistent with physicalism—and neither way appeals to a *third* R-relation. In fact, however, I need not be construed as having appealed, in (1), to identity as a second R-relation. For, as noted two paragraphs ago, I am at liberty simply to cease speaking of realization as such, while retaining the substance of my realization physicalism—to replace “*p* realizes *m*” with the claim that the four conditions described by claims i) through iv) hold.

So much for appealing to a second R-relation. It remains to ask whether, in endorsing (1) and (2), I am committed to a regress of *tokens* of realization. Clearly not in (1). In (2)? No. The claim, made by (2), that everything required for claims i) through iv) to be true is physical or physically realized entails a single claim of physical realization: the claim that *m* is physically realized. But *m*, of course, is the state-token whose physical realization we were originally concerned with. So (2) doesn't introduce even a *second* token of realization, let alone an infinite series of them. And there is no *circularity* here either: the claim that *p* realizes *m* is no part of the analysis of the claim that *p* realizes *m*. For the conjunction of (1) and (2) makes a *meta*-claim, a claim *about* *p*'s realizing *m*; it doesn't purport to *define* *p*'s realizing *m*.

I tentatively conclude that, as Lynch and Glasgow claimed, any candidate for R in a formulation of physicalism must be a relation whose instantiation is itself consistent with physicalism; and that a grounding formulation of physicalism does not meet this requirement. The conclusion of this section, together with those of sections 1 and 2, make a strong case that much philosophical work remains to be done if physicalism is to be formulated by appeal to grounding.<sup>19</sup>

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