# Notes and Discussions

# On Physicalism, Physical Properties, and Panpsychism

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### Abstract

Many physicalists are vague about how defining 'physical property' fits in with characterizing physicalism. We determine the proper relation of these tasks. Employing panpsychism as a yardstick, we argue that defining 'physical property' and characterizing physicalism are subject to contradictory conditions of adequacy. We conclude that these tasks should be kept neatly apart. Exploiting this insight, we save physicalists from an apparently disastrous anti-physicalist argument, we propose and defend a viable definition of 'physical property', and we argue that the standard characterization of physicalism is flawed. We propose an improved account.

## 1. Physicalism and the Definition of 'Physical Property'

Physicalists share an egalitarian intuition. Concentrating on properties, as we will throughout this paper, physicalists maintain that every property instantiated in our world is a physical property. Modern physicalists add an elitist touch to this egalitarian persuasion. They believe that some properties are more fundamental than others. Taking this into account, we arrive at what has become a familiar characterization of contemporary physicalism (Pettit 1993, 214-217, Poland 1994, 191, Levine 2001, 12):

(Ph)    All properties instantiated in our world are fundamental properties or are realized by fundamental properties, and every fundamental property in our world is a physical property.

Given that they need to elaborate this claim in some detail, physicalists have to do three things. First of all, they have to spell out what it is for a property to be 'realized by' some property or properties. Physicalists have for the most part agreed on a perfectly general account of property-realization based on the following idea: a property $F$ is realized by properties $G_1,\ldots,G_n$ if and only if $F$ is instantiated in virtue of the instantiation of $G_1,\ldots,G_n$.[1] Their individual accounts mainly differ in how they spell out the pivotal

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phrase 'in virtue of' (e.g. Poland 1994, 15, 191, Tye 1999, 41, Beckermann 2001b, 59f). Secondly, physicalists have to explain what it is for a property to be fundamental. With an answer to the first question in hand, this seems easy to accomplish: a property is fundamental in some world $w$ if and only if it is instantiated yet not realized by any other property in $w$.[2] Thirdly, physicalists have to define what it is for a property to be physical. This task has not provoked much effort. If at all, it is mostly dealt with rather briefly (Jackson 1998, 6-8).

This is unfortunate. Any physicalist should rather carefully reflect on the task of defining 'physical property'. She should be especially careful to be clear about how this task fits in with the task of characterizing physicalism. Being clear on this will save her physicalist project from serious trouble. It will, moreover, lead her to an adequate definition of 'physical property', and it will make her see that the standard account of physicalism as given in (Ph) is flawed. This is what we are going to argue. Our argument proceeds in four steps. First of all, we put forth an apparently conclusive argument for the idea that none of the standard approaches to defining 'physical property' can possibly succeed. If true, this would wreak havoc for physicalism (sec. 2). Suspecting that the argument appears strong because we as yet lack a clear understanding of how defining 'physical property' fits in with characterizing physicalism, we secondly set out to determine their proper relation. Focusing on their respective distances to panpsychism, we argue that the two tasks are subject to contradictory conditions of adequacy and should be kept neatly apart (sec. 3). Thirdly, we review the anti-physicalist argument in this light and find a way to escape its conclusion. We go on to propose and defend what we deem to be a viable definition of 'physical property' (sec. 4). Finally, we employ the insights generated to point out that standard account of physicalism as given in (Ph) is flawed. We propose an improved account (sec. 5).

## 2. Varieties of Apparent Failure: Physicalist Definitions of 'Physical Property'

There appears to be a widespread consensus that if you are a physicalist, you can choose between three approaches to defining 'physical property' that rely on the following ideas:

(i)     A property is physical if and only if it plays an explanatory role within physics (Melnyk 1997, 623, Lewis 1983, 33f).

[1] These accounts are meant to work for all kinds of properties – functional and non-functional alike. Even though talk of 'realization' originated in functionalism, contemporary physicalists employ it across the board.
[2] For simplicity's sake, we throughout assume that there is a layer of absolute fundamental properties, thereby excluding the possibility that all properties are realized by further properties without end. If you want to account for this, you need to do two things. On the one hand, you need a slightly less simple definition of 'fundamental'. For instance, you can rule that $F$ is fundamental in $w$ if and only if $F$ belongs to a *nucleus* for $w$, where a nucleus for $w$ is a set $S$ of properties instantiated in $w$ such that all properties instantiated in $w$ are realized by properties in $S$, but no property in $S$ is realized in $w$ by a property not in $S$. (We assume that realization is transitive.) Since nuclei come, as it were, in different sizes, this yields a relative notion of *being fundamental*. Roughly, $F$ is more fundamental than $G$ if there is a nucleus that contains $F$ but not $G$. On the other hand, you need to be *very* careful about how to read the physicalist claim that 'every fundamental property in our world is a physical property'. You have to understand this part of (Ph) thus: *there is a nucleus for our world such that every property belonging to that nucleus is a physical property.*

(ii)     A property is physical if and only if it is of the same kind as some paradig-
matic physical property or other (Jackson 1998, 6-8, Papineau 1993, 30).

(iii)    A property is physical if and only if it is non-abstract as well as not mental
(Levine 2001, 20, Montero 1999, 194).

These accounts differ in the respective role they assign the science of physics in delin-
eating the physical. The first approach relies exclusively on physics. It implies that no
property that lacks an explanatory role within that science can be classed as physical.
The second approach does allow that there might be properties that are physical even
though they are not mentioned within physics. It might nevertheless be understood to
contain an implicit reference to contemporary physical theory, since it seems plausible
to hold that this is what provides our paradigmatic physical properties such as *having a
left spin.* However, the importance of physics to this approach should not be overesti-
mated, since common sense will do for picking out some paradigmatic physical proper-
ties such as *being extended* or *having velocity* (Jackson 1998, 7). The third account does
not even hint at physics. It marks off physical properties by setting them apart from the
denizens of two other eminent spheres: physical properties are those that are neither
abstract, nor mental.

For all their differences, one might wonder whether any of these approaches can pro-
vide an adequate definition. In fact, we believe that all three approaches are likely to
seem untenable unless one is *very* clear about how the desired definition fits in with the
task of characterizing physicalism. Since we won't be so clear about this before the next
section, a brief survey of the approaches is likely to land physicalists in utter despair.

To begin with the first approach, relying on the purported explanatory role in physics
gives rise to what has been aptly dubbed 'Hempel's dilemma' (Hempel 1980, 194f). One
horn of the dilemma is to rule that a property $F$ is physical if and only if it is included
in our present physics. That will not work. Some of our present physical theories will
most likely prove to be mistaken in the light of future insights; and there will of course
be physical properties that today's scientists have not even dreamt of. This is hard to
deny. To do so would commit you to the claim that today's physics already comprises a
complete inventory of the fundamental physical properties there are. This does not strike
us as a sensible position. Hence, relying on present physics in our definition will most
certainly yield an incorrect extension for 'physical property'. The other horn is to rule
that a property $F$ is physical if and only if it is included in the completed as well as ideal
physics. However, just imagine that physicalism is false. Imagine that among the fun-
damental properties that determine the processes in the micro-realm of our world, there
is some property $F$ intuitively to be classed as mental. Since an ideal physics will devise
a complete theory of the fundamental layer of our world, it will have to include the prop-
erty $F$. Hence, it might be that the ideal physics will include properties that are not phys-
ical properties. Consequently, we cannot define 'physical property' by reference to the
ideal physical theory, and therefore we cannot take physical properties to be those prop-
erties that play an explanatory role within physics.[3]

The second approach does not look that much better. Let us take some paradigmat-
ically physical property – say the property *having a left spin* – and decree that a prop-
erty $F$ is physical if and only if it is of the same kind as the property *having a left spin*

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[3] For reactions to Hempel's dilemma see Hellman 1985, Melnyk 1997, Montero 1999
and Levine 2001. See also the discussion in Poland 1994, ch. 3, esp. 157ff.

(Jackson 1998, 6-8, Papineau 1993, 30).[4] Even if we charitably assume that we can come up with a plausible account of what it takes for two properties to be of the same kind, our definition will still appear to be deficient. The reason is simple: it quite evidently is useless for a physicalist. Imagine that some peculiar anti-physicalist stance proves right; imagine, say, that panpsychism is correct (Chalmers 1996, 298). We of course do not think that this is the case, but reflecting on this or other eccentric positions will sharpen one's understanding of what an adequate explication must accomplish. So let us imagine that every property there is has an intrinsic mental essence. This of course entails that every physical property there is has a mental essence. (We take panpsychists to acknowledge that there are physical properties.) If that is so, we could not possibly single out the physical properties by relying on a sample property such as *having a left spin.* For any sample property would have a mental essence, too. Our term 'physical property' thus defined would cover properties that are physical as well as mental. Assuming the account given above, this would seriously undermine physicalism. Physicalism is false if panpsychism is true. Yet if 'physical property' applies to a property $F$ even if $F$ has a hidden mental essence, the physicalist idea that every fundamental property instantiated in our world is a physical property turns out to be compatible with the panpsychist idea that every fundamental property instantiated here is a mental property. Consequently, it appears that we cannot take physical properties to be those properties that are of the same kind as some paradigmatically physical property or other.

The third approach apparently provides an idea to cope with this problem. We can simply rule that we do not want properties with mental essences to count as physical properties. That is, we can define 'physical property' thus: a property $F$ is physical if and only if it is of the same kind as the property *having a left spin* and if $F$ is not mental. This still will not work. For it straightforwardly implies that panpsychism is false. Panpsychists believe that every physical property there is has an intrinsic mental essence. On the definition of 'physical property' under scrutiny, however, this is an inconsistent proposition. Defining 'physical property' in this third approach, then, comes down to rendering panpsychism false by stipulation. But we cannot simply stipulate panpsychism to be false; we at least need an argument to show that it is. Very much the same holds for any other definition of 'physical property' relying on the presumed fact that physical properties are essentially non-mental (Levine 2001, 20, Montero 1999, 194). While it is true that we seem to have a better direct grasp of 'mental' than of 'physical' – taking the term in a wide sense, we are quite sure that a property $F$ is mental if and only if it is intentional or phenomenal[5] – we cannot draw on this insight to define 'physical property', since any definition whose definiens contains the phrase '$F$ is not mental' will entail that panpsychism is incoherent. And this violates the idea that we are not allowed to discard panpsychism by stipulation. Consequently, we cannot take physical properties to be those (non-abstract) properties that are not mental.

Since none of these approaches appears to be tenable for a physicalist, we seem forced into the conclusion that physicalists cannot come up with an adequate definition of 'physical property'. But if physicalists cannot provide such a definition, they won't

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[4] We here construe Jackson's and Papineau's idea in terms of properties.

[5] Physicalism is most certainly false if the fundamental properties of our world are in any way mental. We thus want a definition that captures everything even slightly tainted by the mental. We hence can take *being intentional* and *being phenomenal* to apply to any form of proto-intentionality or proto-phenomenality as well.

be able to provide a precise account of physicalism. And if they cannot say precisely what they believe, why should we believe what they say? Physicalism thus seems to founder on the presumably trivial task of defining 'physical property'.

### 3. How Defining 'Physical Property' Fits in With Characterizing Physicalism

We think that there is no need for the adherents of physicalism to lose heart, though. The case made above has taken us in for one simple fact: we have not been sufficiently clear about how defining 'physical property' fits in with characterizing physicalism. Once we are clear about this, we will see how to devise an adequate definition of 'physical property'. In order to get matters straight, we propose to, as it were, triangulate the respective positions of the two tasks by using panpsychism as the common point of reference. So let us ponder two questions: how is the task of defining 'physical property' related to panpsychism? And how is the project of characterizing physicalism related to panpsychism?

It is evident that an adequate definition of 'physical property' must be compatible with the truth of panpsychism, since we cannot rule out panpsychism by definition. We might believe that panpsychism is mistaken; in fact, we might even believe that defending this view is a preposterous endeavour. But we cannot simply stipulate that it is false; our definition must be thoroughly impartial on this issue. This has an important consequence. Since panpsychists hold that every property has a mental essence, it follows that it is a condition of adequacy on a definition of 'physical property' that it respects the following proposition:

(*)        If $F$ is a physical property, it might still be a mental property.

This line of thought carries over to every other account of the mental. An adequate definition of 'physical property' will have to be neutral with respect to parallelism, epiphenomenalism, and all the rest. Rejecting these ideas is a matter of philosophical argument. It is not a matter of stipulation.

Physicalism and panpsychism are related in a quite different manner. Physicalism cannot possibly be compatible with panpsychism being true. Physicalists might very well acknowledge that there are some non-fundamental properties – say, *feeling pain* – that are physical as well as mental. In fact, all physicalists not swayed by eliminativist ideas do so. But no physicalist can accept the idea that even the fundamental properties around here are mental. A world alive with fundamental mental properties can hardly count as complying with the physicalist's vision. In fact, any adequate characterization of physicalism has to imply that its truth entails the falsity of all its metaphysical rivals. This has an important consequence. For it follows that it is a condition of adequacy on any account of physicalism that it respects the following proposition:

(**)       If $F$ is a fundamental physical property, it cannot be a mental property.

A stance fails to satisfy this constraint only if you hold that amongst those properties that are fundamental in that their being instantiated is not at all anchored in the instantiation of other properties, at least one is essentially mental. Hence, if your stance does not satisfy this constraint, it evidently won't be physicalist. You might still label it thus. But you will look very much like the self-professed nominalist who grants that numbers are abstract objects.

Our triangulation thus yields a striking result: adequate definitions of 'physical property' and accurate accounts of physicalism *are subject to conflicting conditions of ade-*

*quacy.* The former are not allowed to rule out panpsychism, whilst the latter are bound to do so. We thus have to conclude that defining 'physical property' is one thing, and spelling out what physicalism amounts to is quite another. Hence, we should keep both tasks neatly apart. That is to say, we should take great care not to slip from pursuing the one into pursuing the other.[6] If we take this point to our heart, we will manage to escape the anti-physicalist case, and we will see that coming up with a correct definition of 'physical property' is not too hard. Moreover, we will see that the standard account of physicalism as given in (Ph) is defective.

### 4. How to Properly Define 'Physical Property'

Going back to the case made in section 2, we have to admit that the argument against the third way has even been strengthened. Defining 'physical' via 'not mental' cannot work. For any such definition will violate the condition of adequacy put forth in (*). What is more, if we distinguish clearly between defining 'physical property' and characterizing physicalism, we do see that our grounds for rejecting the second approach were flawed. There is no reason to discard an otherwise impeccable definition of 'physical property' just because it does not square with the standard account of physicalism. This leaves Hempel's dilemma. The first horn still stands tall. Taking those and only those properties that play an explanatory role within present physics to be the physical properties will yield an incorrect extension for 'physical property'. However, our triangulation has seriously undermined the second horn of the dilemma. To see this, let us once more decree that a property $F$ is physical if and only if it is included in the completed as well as ideal physics. Now assume again that an ideal and completed physics, devising a complete account of the fundamental layer of our world, comprises a property $F$ that happens to be mental. By (**), this will entail that *physicalism* is mistaken. But it won't imply that the respective *definition of physical property* is defective, since the relevant condition of adequacy (*) explicitly allows physical properties to be mental as well. The definition devised will be flawed only if ideal physics happens to comprise a property that is (intuitively speaking) mental *but not at all physical.* However, it is hard to envisage that completed and ideal physics will contain such a property, although we have to admit that it might. Hence, getting clear about how the definition of 'physical property' fits in with the task of characterizing physicalism severely limits the force of Hempel's dilemma. You might even think that our triangulation allows us to reject it as seriously flawed.[7]

Consequently, there appears to be a viable way to define 'physical property' after all. We can rule thus: a property $F$ is physical if and only if it is included in the completed as well as ideal physics. This definition might very well yield a correct extension for 'physical property'. It does have its drawbacks, though. For one, it turns the claim that an ideal and completed physics won't comprise a property that is non-physical into a tautology. For ideal physics of course won't comprise a property it won't comprise. But the claim that ideal physics won't include a non-physical fundamental property strikes us as a non-trifling prediction. Secondly, the definition relies on a prior understanding of 'ideal physics'. But what is ideal physics? The natural answer is, very roughly, this:

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[6] This very clearly happens to Levine 2001, 17-21. He invariably slips from pursuing the one task into pursuing the other.

[7] It is instructive here to compare Jackson's 1998, 6f construal of Hempel's dilemma, for it disregards the conflicting conditions of adequacy spelled out in sec. 3.

ideal physics is that finished science that deals comprehensively with all physical objects, properties, and laws there are. On the definition assumed, this answer becomes vacuous. Since we take it for granted that it won't do to characterize ideal physics as the institutional predecessor of present physics, we consider this lamentable. Finally, our current application of 'physical property' is most certainly not guided by concerns about future physics. We would welcome a definition that mirrored this fact.

These reasons encourage us to propose a more ecumenical definition of 'physical property'. In order to do so, we would like to take a fresh look at the recently acquitted second approach: a property $F$ is physical if and only if $F$ is of the same kind as some paradigmatic property, say, the property *having a left spin*.[8] This of course is a somewhat tendentious definition. For it might be understood to define '*micro*-physical property' rather than 'physical property' *simpliciter,* but that is easy to change. We simply have to enlarge our set of paradigmatically physical properties. Doing this yields the following proposal:

(p)          A property $F$ is physical if and only if $F$ is of the same kind as the properties we singled out as paradigms such as *having a left spin* or *being extended.*

We hold that this definition of 'physical property' has three virtues. For one, it is not even slightly tainted by any physicalist idea. Even die-hard panpsychists and dogmatic dualists can accept it, and so it does not run the risk of being invalidated by ruling out even some of the more eccentric non-physicalist metaphysics we have not dealt with so far. In order to see how important this strict neutrality is, just consider the following close companion of our proposed definition: a property $F$ is physical if and only if $F$ is of the same kind as the property *having a left spin* or $F$ is exclusively realized by properties of this kind. This definition is more sophisticated than the one we have devised. Yet its physicalist overtones might render it problematic. For on a parochial reading of 'being of the same kind', which we do not want to rule out, in tandem with a demanding understanding of realization as propounded, for instance, by Beckermann (2001b, 59), which we do not want to rule out either, it entails that emergentism with respect to physical macro-properties – transparency, liquidity etc. – is mistaken. Emergentists of this brand propound the idea that some macro-properties that are physical in the broad sense we have been trying to define are *not* realized by micro-properties – where 'realized by' is again to be understood in the demanding sense mentioned.[9] On the alternative definition of 'physical property', this idea becomes incoherent. Yet again, the falsity of emergentism should on *no* defensible reading of 'realized by' be a consequence of our definition.

The second virtue of our definition concerns, as it were, its logical form: our definition of 'physical property' fits in with a prominent idea as to how natural kind predicates receive their intensions, *viz.* the Putnam-Kripke semantics. On this account, terms like 'water' or 'gold' get their interpretation via the samples we use in introducing them.

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[8] Even though contemporary physics might be wrong about which properties do in fact belong to the basic furniture of our universe, we hold that we have every reason to believe that it is not wrong about the respective kinds of properties. Hence the property of *having a left spin* might not in fact belong to the basic layer of reality. Yet it still is of the right kind – and hence suited to do the requisite job. See Jackson 1998, 7.

[9] Some believe that rebutting emergentism must lie at the heart of any physicalist position, see Beckermann 2001a, 260. However, nothing in the present argument hinges on whether this brand of emergentism is a physicalist rather than a non-physicalist position.

All we have to do is to pick out the relevant sample, the rest is done, as it were, by objective relations of sameness and difference embedded in the fabric of the world. Hence, if we want to state what, say, 'water' means, we employ the very same samples we used in introducing the term: 'water' applies to $x$ if and only if $x$ is the same kind of liquid as our water samples. That is the best we can do by way of 'defining' a term denoting some species or other. Now there are reasons to believe that roughly the same is true for terms such as 'biological' or 'physical'. We have no problem sorting properties into physical or biological ones, yet when it comes to explaining *why* we sort them that way, we resort to examples, assuming that we have thereby given the class. There is, we maintain, nothing more of interest to say (even though we might hasten to add that physical properties are typically investigated by physicists). If that is so, it appears reasonable to hold that the predicates 'physical' and 'biological' function similar to natural kind terms such as 'water' or 'gold'. Our definition of 'physical property' proceeds precisely along the lines laid out by the Putnam-Kripke account: it states what 'physical property' applies to by relying on samples and an objective relations of sameness of kind. This seems about as good as we can do.

The third and most important virtue of our definition is its ecumenical character: our definition straightforwardly combines what is appealing about the two approaches that are compatible with the condition of adequacy (*). On the one hand, (p) is rooted in the way we apply the term 'physical property', and it accommodates the idea that if we are to explain what we mean by this term, we are inevitably drawn to ostensively single out paradigmatic instances. Hence, it captures the appeal of the second approach to defining 'physical property'. On the other hand, (p) is poised to elucidate how defining 'physical property' is entwined with physics – present and ideal – and thus encompasses what appears to be right about the first approach. As for present physics, we have already acknowledged that it most likely provides some paradigmatic physical properties such as *having a left spin.* We can nevertheless acknowledge that present physics is neither as yet complete, nor correct in all its parts, and we can hold on to the idea that physics is the science that is concerned with the physical objects, properties, and laws. As for ideal and completed physics, even though our definition specifies a correct intension for 'physical property', you won't be able to tell the intension of 'physical property' from the definition as long as you do not know which properties are of the same kind as the paradigmatically physical properties mentioned. What you need to determine is, then, the nature and intension of the sameness-relation referred to in the definition. We hold that this job falls to physical research, just as the job of determining the nature and intension of the relation that constitutes the intension of 'water' fell to chemical research. In the end, it will fall to ideal and completed physics to tell us *which* properties are the physical ones. To hold this is of course to maintain that an ideal as well as completed physics will comprise all physical objects, properties, and laws there are. Given our definition, this is not simply to hold that an ideal physics will comprise what it comprises.

### 5. How to Properly Characterize Physicalism

We have argued that the task of defining 'physical property' and the task of characterizing physicalism are to be kept neatly apart, since the former is not allowed to rule out panpsychism, whilst the latter is bound to do so. From this it follows that the standard account of physicalism as given in (Ph) is flawed. According to (Ph), physicalism claims

that all instantiated properties are fundamental properties or realized by those, and that all fundamental properties are physical properties. Given that 'physical property' is to be defined in a way that is compatible with panpsychism (or indeed any other eccentric metaphysics of mind), (Ph) simply does not articulate the physicalist conviction that no mental property is fundamental. We rather have to conclude that the truth of (Ph) as it stands is compatible with panpsychism being true.

Alleviating this difficulty is not much of a challenge, though. For we can take up an idea sketched above. We want our account to capture the physicalist idea that no fundamental property is mental, and the most straightforward way to ensure this is simply to add this requirement to the standard account. We thus arrive at the following proposition:

(Ph*)     All properties instantiated in our world are fundamental properties or are realized by fundamental properties, and every fundamental property in our world is a physical property *but not a mental property.*

We believe that (Ph*) provides a perfectly accurate account of physicalism.[10] It does not require the definition of 'physical property' to entail that a physical property is not mental as well – and yet it obviously is still incompatible with panpsychism. If physicalism is true, panpsychism is false (and vice versa). This (among others) is precisely what everyone wants an accurate account of physicalism to ensure.

One might feel a bit uneasy about including talk of 'mental properties' into an account of physicalism. But that is nothing to worry about. For one, the account in question is not meant to be a definition of 'physical property'. It rather presupposes such a definition. Including talk of 'mental', therefore, does not render our account circular. What is more, we have already pointed out that we do have a rather firm grasp on what – again taking the term in a wide sense – a mental property is: a mental property is one that is intentional or phenomenal. If you think that defining 'mental property' directly by means of a list of essential features is too rigid, you can try to define it in strict analogy to 'physical property'. That is to say, you can try to define it thus:

(m)     A property *F* is mental if and only if *F* is of the same kind as the paradigmatically mental properties *feeling pain* or *believing that Rome is nice.*[11]

We very much suspect that if you commence to spell out what it is for two properties both to be, as it were, of the mental kind, you will have to draw on the very features we employed in the initial definition, *viz. being intentional and being phenomenal.* In any case, there is no reason at all to avoid talking of 'mental properties' in an account of physicalism. To the contrary, it appears that a suitable characterization of physicalism cannot avoid drawing on a prior understanding of the mental.[12]

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    [10]    So apparently does Levine 2001, 21 despite the fact that his understanding of 'physical property' as 'non-mental property' (Levine 2001, 20) is evidently flawed. Cf. footnote 6. – Again, if you don't want to rule out that realization never stops, you have to understand (Ph*) as claiming that there is a nucleus for our world such that every property belonging to that nucleus is a physical *yet not a mental* property. Cf. footnote 2.
    [11]    We owe this proposal to an anonymous referee.
    [12]    We would like to thank Ansgar Beckermann, Matthias Adam, James Wilberding, Phillip Keller and two anonymous referees for helpful comments and suggestions.

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