

*Shoemaker's analysis of realization: a review*¹

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Abstract

Sydney Shoemaker has been arguing for more than a decade for an account of the mind–body problem in which the notion of realization takes centre stage. His aim is to provide a notion of realization that is consistent with the multiple realizability of mental properties or events, and which explains: (i) how the physical grounds the mental; and (ii) why the causal work of mental events is not screened off by that of physical events. Shoemaker's proposal consists of individuating properties in terms of causal powers, and defining realization as a relation of inclusion between sets of causal powers. Thus, as the causal powers that define a mental property are a subset of the causal powers that characterize a physical property, it can be said that physical properties realize mental properties. In this paper we examine the physicalist credentials of Shoemaker's mind–body theory in relation to three important issues: the direction of the relation of dependence that the theory is committed to; the possibility of mental properties existing without being anchored by physical properties; and the compatibility of the theory with the causal closure of the physical world. We argue that Shoemaker's theory is problematic in all three respects. After that we consider whether the theory should count as a mind–body theory at all, given that it seems to be committed to a distorted view of mental properties.

Keywords:

Shoemaker; causal powers; realization; physicalism; exclusion problem

1. Introduction

Sydney Shoemaker has been arguing for more than a decade for an account of the mind–body problem in which the notion of realization takes centre stage (see, e.g., Shoemaker, 2001; 2007; 2014). His aim is to provide a notion of realization that is consistent with the multiple realizability of mental properties or events (i.e., which does

¹ This paper is thoroughly collaborative. Order of authorship is arbitrary.

not entail type-identity between the physical and the mental), and which explains: (i) how the physical grounds the mental; and (ii) why the causal work of mental events is not screened off by that of physical events. Mind–body theories have to tell us what kind of relation there is between mental and physical properties (on the assumption that there are only physical substances). According to Shoemaker, the relation in question is one of realization: physical properties realize mental properties. This claim answers two questions: first, the relation between the mental and the physical is one of realization; and second, the direction of that relation is that physical properties realize mental ones.

Many other philosophers have also defended a realization account of the mind–body problem (e.g., Poland, 1994; Kim, 1998; Levine, 2001; Melnyk, 2006). However, an enduring problem for such accounts has been that of finding a good solution to the exclusion problem. For instance, a very popular realization account maintained that mental properties are second-order functional properties; i.e., properties which other properties have. First-order properties, i.e. the properties which instantiate the mental properties, were said to realize those mental properties. However, it was difficult to explain how the second-order properties could cause the effects that we know first-order properties to cause (see Prior et al., 1982; Kim, 1998). In fact, it seemed at some point that any account of realization was committed to accepting a principle that Kim (1993, 1998) called the ‘causal inheritance principle’ which states that:

“If mental property M is realized in a system at t in virtue of physical realization base P, the causal powers of this instance of M are identical with the causal powers of P.” (Kim; 1993: 326)

This principle was supposed to entail that realized properties had no causal powers of their own, and so that they were epiphenomenal. That is, it seemed that, to the extent that any realization account was committed to the causal inheritance principle, it was thereby committed to rendering mental properties epiphenomenal.

Shoemaker, however, proposed an account which could apparently sidestep this epiphenomenality of mental properties. He proposed that properties are individuated in terms of their causal powers, and observed that the causal powers that define a mental property are a subset of the causal powers that characterize a physical property. This allowed him to maintain that mental properties are not identical to physical properties, and made room for multiple realizability (i.e., the notion that a given mental property with a certain causal profile could be realized by different physical properties with

different causal profiles). What Shoemaker means informally by ‘realize’ is “make real”; so his view is that a certain mental property can be made real by different physical properties with different, but partially coinciding, causal profiles. Once mental properties are distinguished from physical properties in terms of their different causal profiles, it seems that it is also possible to maintain that the causal work of mental properties is not screened off by the causal work of physical properties. That is: if mental properties are defined by their causal powers, which form a subset of the powers of the corresponding physical properties, then—so the reasoning goes—we would not say that the powers of mental properties are inherited from the powers of those physical properties. In other words, mental properties can be said to cause certain effects just as much as physical properties can be.

This view of the individuation of properties makes it natural to explain the realization relation in terms of inclusion. If we want to say that mental properties are realized by physical properties, and we maintain that mental properties consist of sets of causal powers which are proper subsets of the causal powers of their realizers, then it seems we can characterize realization as follows:

“Property X realizes property Y just in case the conditional powers bestowed by Y are a subset of the conditional powers bestowed by X (and X is not a conjunctive property having Y as a conjunct).” (Shoemaker, 2001: 78)²

This apparently simple account is no doubt explanatorily powerful. Remember that we said that a mind–body theory has to explain what kind of relation there is between mental and physical properties. Moreover, a physicalist mind–body theory has to propose a metaphysical relation such that it can be said that physical properties ground, or are more basic than, mental properties; but that nonetheless mental properties have causal efficacy, and that they are multiply realizable. It seems that all these requirements are met by Shoemaker’s idea of realization. Firstly, it tells us that the relation between the mental and the physical is one of inclusion: physical properties, defined by their causal profiles, include mental properties, each of which is characterized as consisting of a subset of the causal powers characteristic of its realizers. Secondly, the account accords with the physicalist idea that the physical is more “basic” than the mental; all causal powers are physical powers, so the causal powers of a mental

²He continues: “Where the realized property is multiply realizable, the conditional powers bestowed by it will be a proper subset of the sets bestowed by each of the realizing properties”.

property (or whatever special-science property) do not go beyond the causal powers of physical properties, and are actually made up of powers that constitute physical properties. This gives us *prima facie* a metaphysical sense in which the physical level is the basic level; and the mental depends on the physical. Thirdly, the account is designed to meet the challenge of multiple realizability: if the constituting powers of mental properties are only a proper subset of the powers of physical properties, then a mental property can be realized by different physical properties (i.e. by all those properties that have the powers which constitute the mental property). Finally, this view of the realization relation does not have to face an exclusion problem; mental properties have their own powers, so they can be causally efficacious. While this could mean that mental and physical properties overdetermine their effects, a closer look at the relation between them may dispel such worries. In effect, the realization relation, as it is characterized here, casts mental properties as parts of physical properties (given that mental powers are a proper subset of physical powers), and it can therefore be effectively asserted here that parts do not compete with wholes in causal matters.

Despite appearances, we think that Shoemaker's account has many problematic aspects; several of which have already been discussed in the literature (e.g., McLaughlin, 2007; Morris, 2011; Audi, 2012; Tiehen, 2014). In this paper we argue for general scepticism towards Shoemaker's account. We will assess some critical points already made by other authors and we will also raise problems which, to the best of our knowledge, have not been discussed before. However, before we develop our views, we want to be a bit more precise concerning just what kind of ideas we will scrutinize here.

The claim that the exclusion problem can be circumvented by showing that mental causal powers are proper subsets of the powers of physical properties has been defended by several authors. The idea that the exclusion problem is resolved via an inclusion relation between properties, as we mention above, also has a good number of defenders. In a series of papers, Jessica Wilson has defended a more liberal view involving the first claim, but not the second (e.g., Wilson, 2011). That liberal view maintains that a natural solution to the exclusion problem presents itself whenever the token causal powers of the higher-level property (the realizee) are identical to the powers of its realizer, even if

properties are not explained in terms of powers.³ That is, this view maintains that if the situation is the one that Kim thought to be problematic (see the causal inheritance principle above), then in fact we are in a position to claim that mental properties are causally efficacious.

We take it that offering this kind of solution to the exclusion problem is only part of what Shoemaker attempts to do. He also wants his account of realization in terms of power inclusion to characterize physicalism (e.g., Shoemaker, 2007: 2) in such a way that physicalism can be construed as (roughly) the claim that all properties are realized—in his sense—by physical properties. This means that his account does not presuppose, but indeed tries to explain, how the mental depends on the physical (in his words: how the physical makes the mental real). Most of the points we discuss below are related to this issue; we evaluate whether Shoemaker’s account of realization coheres with a broadly physicalist position regarding the mental.

In section 1, after sketching the skeleton of Shoemaker’s account, we summarize the evolution of his views concerning what kind of powers define properties. In sections 2 and 3, we focus on the issue of the apparent incompatibility of Shoemaker’s account of realization with some tenets of physicalism. In section 4, we consider to what extent Shoemaker’s more recent account (Shoemaker, 2010; 2014) can be considered a mind–body theory at all, given that it construes mental properties as forward-looking causal powers (see also Tiehen, 2014).

1. Shoemaker’s overall view and some preliminary problems

As Shoemaker (2007) explains, it was suggested to him (by Michael Watkins) that he could apply his theory of properties to the mind–body problem, and in particular, to the exclusion problem. Shoemaker had for a long time defended the view that properties are nothing but collections of causal powers: the collections of powers that they confer on the individuals that instantiate them. In Shoemaker (2001), he defended for the first time, the idea that if we adopt this view of properties, then we may have a solution to the exclusion problem. According to his “properties-are-powers” view, mental properties turn out to be literally and precisely parts of the physical properties that

³ Wilson (2011) takes it as possible to draw the type–token distinction at the level of causal powers, and argues that the exclusion problem can be solved insofar as the token causal powers of the realized property are numerically identical to the token causal powers of the realizer.

realize them: the set of causal powers that a mental property confers on the individual who instantiates it, is a proper subset of the powers conferred by its realizer. Now, whereas we have a clear intuition that there is an exclusion problem when we are told that both the instantiation of a physical and the instantiation of a mental property seem to cause a certain effect, we may not see so clearly that there is a problem when we are told that one of the properties is included in, or is a part of, the other. Shoemaker uses the example of a salvo of shots to accentuate the difference and motivate rejection of the initial intuition in the case of inclusion. The example is one in which a person, Smith, is killed after a firing squad shoots a salvo of shots. Only one shot, fired by Jones, actually hits Smith. However, we could say both that the salvo of shots killed Smith and that Jones's shot did. Shoemaker makes the point that we may think that this kind of overdetermination is benign, or alternatively, we would not say that there is overdetermination at all (see Morris, 2011 for discussion of this point).

Thus, it seems that the causal powers theory of properties has the resources to circumvent the exclusion problem. Shoemaker also observes that the causal powers theory can provide a new account of the realization relation. Extant accounts of realization maintained that the realization relation held between a functional, second-order, property, and a categorical property. According to Shoemaker, however, both kinds of properties can be fully explained in terms of their causal powers. As realizers always have more causal powers than the functional properties they realize, it can be argued that a property A realizes a property B if and only if the powers that define B are a proper subset of those that define property A. This characterization, however, does not apply just to functional properties and their alleged categorical bases; it includes relations such as the determinable/determinate relation within the notion of realization (maybe of a specific kind).

With all this in place, the time is now ripe to put forward the following mind–body theory applied to properties: the physical world of properties is the basis of all the other natural properties, and in particular of mental properties. Specifically, physical properties *realize* mental properties, in that the powers which individuate mental properties are a proper subset of the powers that are characteristic of certain physical properties (those mental properties correlate with). This theory is, on the face of it, a physicalist theory, it allows for multiple realizability, and it avoids the exclusion problem.

Below we discuss whether the theory actually deserves to be taken at face value in these aspects. First, however, in this section, we want to focus only on the issue of which causal powers are relevant to the individuation of properties; as this is an issue that has a major impact on the overall theory.

Shoemaker's views concerning what constitutes a property have not remained stable. He has experimented with two accounts of what sort of causal powers constitute a property: forward-looking only (Shoemaker, 2001); and both forward-looking and backward-looking (Shoemaker, 2007). His view of the realization relation has changed accordingly. Thus, whereas Shoemaker (2001) considered that P realizes M if and only if M's powers are a proper subset of P's; according to Shoemaker (2007), P realizes M if and only if the forward-looking powers of M are a proper subset of the forward-looking powers of P and the backward-looking powers of P are a proper subset of the backward-looking powers of M. The rationale for this view can be easily understood if one thinks of typical examples of determinable properties and their determinates, such as colours and shades of colours. It is indeed reasonable to hold that whatever is caused by red is also caused by any shade of red; and that whatever causes an instantiation of any shade of red also causes an instantiation of red.

The inclusion of backward-looking powers in the account was motivated by Richard Boyd's observation that forward-looking powers alone cannot characterize a property: substance X and substance Y can share forward-looking causal powers, and yet be different substances because X results from the combination of A and B, and Y from the combination of C and D.

However, McLaughlin (2009) detected a really damning problem for this account. As we have said, Shoemaker wants the set-to-subset relation to explain the realization relation. Now, that P realizes Q implies that the instantiation of P is sufficient for the instantiation of Q. Yet, the backward-looking powers of a realized property are a proper superset of the powers of its realizer, and, while the instantiation of a set implies the instantiation of its subsets (whenever a set (of causal powers) is instantiated, then all of its subsets are also instantiated), the instantiation of a set does not imply the instantiation of any of its supersets. (For example, the instantiation of the set 'philosophy books' implies the instantiation of its subsets ('metaphysics books', 'philosophy of language books', etc.) but does not imply the instantiation of the superset

‘humanities books’.) That is, if P realizes Q, the instantiation of the backward-looking causal powers of P does not determine that the backward-looking powers of Q are instantiated. This means that the instantiation of P does not determine the instantiation of Q if P and Q are partly constituted by their backward-looking powers. *A fortiori*, it means that P does not realize Q, which means that we have a *reductio*.

The problem, however, is not just that the account of realization fails; more importantly, Shoemaker’s account seems to run counter to the idea that physical properties determine mental properties. That there is this sort of determination is one of the main tenets of physicalism. The inclusion of backward-looking powers within the characterization of properties seems to place physicalism in jeopardy. The inclusion of backward-looking powers is simply not compatible with the thesis that the instantiation of a realizing physical property is sufficient for the instantiation of a certain mental property.

One may also wonder whether McLaughlin’s argument represents a problem specifically for the solution to the exclusion problem Shoemaker seemed to be hoping for. The subset strategy coupled with the view that properties are nothing but causal powers offers a nice response to the exclusion problem, as it can be claimed that mental and physical properties do not have a separate existence after all. Once we include backward-looking powers, however, the picture becomes more complicated, and maybe the promised solution is compromised. Properties, according to this view, are constituted by two different sets: F(oward) and B(ackward). The F-set of the lower-level property is a superset of that of the higher-level property; but the B-set of the lower-level property is a subset of the B-set of the higher-level property. This ultimately seems to mean that the lower-level property and the higher-level property share a good number of powers (some from F, and some from B); but neither will the higher-level property be a part of the lower-level property (for it has some B-powers that the lower-level property does not have), nor will the lower-level property be a part of the higher-level property (for precisely the opposite reason: it has some F-powers that the higher-level property lacks). Thus, *prima facie*, the lower-level property and the higher-level property have to be considered to have separate existences; which apparently means that the exclusion problem might reappear.

However, it seems possible to deny that there is an exclusion problem in this case, since on second thought, the lower-level and the higher-level property might not be

considered to have separate existences after all. We think that this point can be elucidated by the following analogy. Suppose we have two segments: one stretching from 0 to 2 (included) along the line of the real numbers; the other from -1 to 1. That is, we have two open intervals: “]0,2[” and “]-1,1[”. Now, if we were asked whether the point represented by 1 belonged to the first segment or to the second, we take it that some would not even understand why the question was being asked. The point at 1 is a constituent of both segments: there is no issue as to whether it is part of one or of the other. If we move to properties (rather than segments) and causal powers (rather than points), our intuitions should be similar: given that causal powers constitute properties, if two properties, P and Q, share a certain causal power c , the question of whether c belongs to P or to Q could equally be regarded as misplaced. This response would require a defence in the form of a general principle that if powers constitute properties, then, if two properties share a given set of powers, it cannot be said that those two properties have separate existences.⁴ Admittedly, this sounds like a very strong principle; but we think that the subset theorist is left with no other option here. Still, the analogy with the two segments may again be useful here to motivate such a principle: many would say that the segment “]0,2[” and the segment “]-1,1[” do not have separate existences; rather, they would be regarded as partially identical.

In conclusion, individuating properties *also* by their backward-looking powers may not affect the solution to the exclusion problem proposed by the subset strategy. Our intuitions may not be clear concerning this point, for some might insist that this relation of partial identity is not enough to prevent exclusion. However, we think that the problem related specifically to exclusion is not obvious, to say the least. The real problem lies elsewhere: in the effect that this kind of individuation has upon the thesis that physical properties determine all other properties (including, of course, mental properties).

Shoemaker has recently returned to his original theory, in response to McLaughlin’s objection. He now once again defends the idea that properties can be fully characterized in terms of their forward-looking causal powers (Shoemaker, 2010; 2014). He has also changed his analysis of property realization accordingly; reverting to the original

⁴ We think there is a problem with saying that two properties, P and Q, which share causal powers have separate existences; for in that case, it can always be asked whether P or Q is responsible for the effects to be explained.

analysis in terms of forward-looking causal powers only. The reason why backward-looking causal powers were first included in the picture was that he thought there could be two different properties with identical forward-looking causal powers. In such a case, only backward-looking causal powers would be able to distinguish one property from the other. Yet Shoemaker no longer believes that there can be two different properties that share all of their forward-looking causal powers.⁵ Shoemaker's response (e.g., 2014: 7) to Boyd's challenge is that if X and Y actually share all (forward-looking) causal powers, then the property of being made of X has to be identical to the property of being made of Y, since X and Y cannot be differently decomposed into their alleged constituents (if they could be, they would not share all their causal powers).

2. Problems with parts and wholes?

We have seen that the inclusion of backward-looking powers in the individuation of properties had unexpected anti-physicalist consequences. In this section, we want to evaluate whether Shoemaker's account, as it is now, with only forward-looking causal powers being taken into account, still has problems meeting some of the demands of physicalism.

Let us consider the issue of parts and wholes, discussed recently by Morris (2011) and Audi (2012). Physicalism entails the thesis that all entities in the world metaphysically depend on physical entities. In particular, physicalism claims that higher-level properties, such as mental properties, depend on fundamental physical properties. Now, if we have an account such as Shoemaker's subset power strategy, which tells us that mental properties are parts of physical properties, do we have a physicalist account? *Prima facie*, we do not, because, as a general rule, parts do not depend on wholes; but rather, vice versa.⁶ Even though one may consider that parts may be partially dependent

⁵ In fact, appealing to backward-looking powers as such seems suspicious, as it seems that we do not need backward-looking powers in our ontology at all—except, as we will see, to account for mental properties. The distribution of backward-looking powers can be fully explained in terms of the distribution of forward-looking powers: P has the backward-looking powers it has (being caused by Q and R) because Q and R have the forward-looking powers that they have. In short, backward-looking powers are ontologically redundant.

⁶ Currently, some emergentists hold that parts also depend on wholes (while they do not deny that wholes depend on parts, given that parts constitute wholes). However, in their picture, wholes are higher-level entities, with physical entities being their constitutive parts. In the picture we are now considering (i.e., the subset view), physical properties play the role of wholes and mental properties that of parts. To our

on wholes (as some philosophers recommend these days), physicalism requires that mental properties are fully determined by physical properties; so the subset theorist's claim would be that parts can be fully determined by wholes. However, this looks counterintuitive, and it is not easy to find analogies to support the claim.

For instance, any theory that applies the genus–species schema in some way or another to explain the relationship between properties which stand in a part–whole relation, will make it look as if wholes depend on parts. Thus, if it is claimed that determinates are determinables plus a difference, then ultimate determinates not only seem to depend on determinables, they are also defined in terms of them. That is, the ontological primitives seem to be not determinates, but determinables. In a genus–species classification, we might take the most abstract genera as primitives and work through a process of specification. If we want to read off our ontology from our genus–species definitions, then we seem to have to commit ourselves to genera being ontologically more basic than species. That is, definitional priority seems to entail ontological priority (though see below for further discussion).

Morris (2011) and Audi (2012) discuss this question at length and make use of another analogy provided by Shoemaker himself (2007: 64): the case of the salvo of shots already mentioned. The example, as we have said, is one where a person, Smith, is killed after a firing squad shoots a salvo of shots. Only one shot, coming from Jones, hits Smith. However, we could say both that the salvo of shots killed Smith and that Jones's shot did. The analogy is supposed to help sceptics see that there is in fact no causal competition between parts and wholes. However, as Morris and Audi show, the analogy reinforces the idea that Shoemaker's account may not be compatible with physicalism. As Morris says (2011: 6): “for the subset view to retain its physicalist credentials, it should not take subset-realized properties to be parts of physical realizer properties in the same way in which a particular shot is part of an entire salvo of shots”. His idea is that, in the case of the salvo of shots, we would say that the salvo killed Smith in virtue of Jones's shot doing so. That is, the causal efficacy of the whole depends on the causal efficacy of one of its parts. To this we should add that this kind of dependence is also observed in the metaphysics of the example; so that the existence of the salvo of shots depends on the existence of Jones's shot together with that of the

knowledge, nobody has ever defended the notion that “mental properties as parts” depend on “physical properties as wholes”.

other shots (see Audi, 2012). Actually, using the terminology of realization, it can be said that the individual shots realize the salvo of shots in the sense that they make the salvo real. Thus, Shoemaker's analogy of the salvo of shots seems to divorce his subset account of realization from the idea of realization as that which makes something real. But this latter idea is at the very core of the notion of realization (e.g., Shoemaker, 2014). So we had better not take the analogy at face value. Yet without the analogy, we are deprived of any clear sense in which the mental and the physical do not enter into causal competition. It is even possible to wonder, along these lines, whether the subset approach may turn out to be a reductive account, although one which reverses the order of reduction: reducing not mental properties to physical properties, but physical properties to mental properties. The approach holds that realizers/physical properties are formed of parts. Now, suppose that a physical property is defined by its having the powers P, Q, and R. Then it seems to follow from the subset strategy that this physical property has the property of causing P (property **P**), the property of causing Q (property **Q**), and the property of causing R (property **R**) as parts. That is, we have three parts that exhaust the property. So it seems that we can rightly say that the physical property is *nothing but P, Q, and R*. That is, physical properties would reduce to their parts, *inter alia*, to mental properties.

Some physicalists (e.g., Melnyk, 2006) have held that it is not ultimately problematic to claim that mental properties are parts of physical properties, because all essential parts of physical properties have to be physical as well. However, taken as a general principle, the claim is dubious; or should we say that any essential part of a biological entity (e.g., a cell) is itself biological? So, we need to know why what is not true in general nonetheless is true in the case of physical properties. However, the main problem with Melnyk's response is that it does not remove the problem of reversing the order of fundamentality: fundamental physical properties have to be at the basis of dependence relations. However, if fundamental physical properties are sets of powers which have proper subsets as parts, then even if those subsets are physical as well, fundamental physical properties cannot be considered to be actually fundamental, for they would depend on their parts.

3. The need for realizers

Let us now turn to another problem which, as far as we know, has not been discussed in the literature. We think that the response to this new problem is related to an eventual response to the part–whole problem which concerned us in the last section. The problem can be set out as follows. Shoemaker’s account maintains that the “set to proper subset” relation is one of realization. In order for this account to be properly physicalist, it must have the following implications:

- (a) The instantiation of the realizer is sufficient for the instantiation of the realizee.
- (b) The instantiation of the realizee can be accounted for by the instantiation of the realizer.
- (c) The instantiation of the realizee requires the instantiation of one of its realizers.

Conditions (a), (b) and (c) try to capture the idea that the realizee is instantiated “in virtue of” the instantiation of the realizer. This perhaps vague idea has three consequences which serve to make it more precise, two metaphysical and one epistemic: those expressed by (a), (b) and (c). The sufficiency claim is the claim that in every possible world w , and for every object O , if P realizes Q in w , then, in w , if O has P , then it follows, from that alone, that O has Q as well. The epistemic claim, in turn, simply tells us that the instantiation of a realizer by O is sufficient to explain why O instantiates the realized property it instantiates. Finally, the necessity claim simply establishes that the realizee cannot be instantiated on its own: it requires one of its realizers in order to be instantiated. As we say, these three conditions are explicitations of the basic, but somewhat vague, idea that realizees are instantiated in virtue of the instantiation of realizers.

What we have seen so far are reasons to wonder whether the subset account can comply with conditions (a) and (b). Now we want to turn the focus to the third condition, because it may also appear to be problematic:

- (c) The instantiation of the realizee requires the instantiation of one of its realizers.

We have said above that one of the physicalist tenets is that realizees cannot exist on their own: every instantiation of a realized property requires the instantiation of a physical realizer. Now, the issue can be formulated as: is there any reason to hold that a certain set of causal powers needs, in order for it to be tokened, the tokening of one of

its proper supersets? The theory of realization in terms of subsets does not seem to entail that the instantiation of a subset requires the instantiation of a superset, in the way a supervenience theory explicitly requires that supervenient properties cannot be tokened without the tokening of some property of the subvenient family (Kim, 1984)⁷; or maybe more relevantly, in the way that a theory of realization which appeals to functional and categorical properties requires that functional properties have occupiers/realizers. So there is a concern as to whether Shoemaker's view really fulfils the aforementioned physicalist condition.

Notice that it would not do, in order to solve this problem, to hold that it is in the nature of proper subsets that they require the sets they are part of (otherwise, one might argue, they would cease to be proper subsets). This seems to be the wrong way to understand the theory. A collection of causal powers cannot be, in virtue of the essence of those causal powers, a subset of another collection of powers, unless those first powers, for one reason or another, require the instantiation of some other powers. That is, the issue is not whether a certain set is essentially a proper subset, but whether the elements in the set require the instantiation of other, additional, elements, which would constitute the larger set. Thus, if we want to comply with physicalism, we should hold that the powers which constitute mental properties require some other powers: those powers of the realizers that are not shared by the mental properties. But we do not seem to have any reason to believe, *unless we assume physicalism*, that, e.g., the power to move a body in a certain direction requires, for instance, the power of weighing some amount or other. If physicalism is assumed, then the theory of realization passes muster. Yet the issue is whether the theory of realization entails physicalism. Remember that we said at the beginning that Shoemaker wants to provide a mind–body theory, using the notion of realization, that can be summarized by the claim that mental properties are realized (in the “proper subset-to-set” sense) by physical properties. That is, Shoemaker wants to argue for a mind–body theory according to which mental properties are realized by physical properties in the sense that the set of causal powers that characterize mental properties is properly included in the set of causal powers that characterize physical properties. Now we wonder whether this mind–body theory is actually a physicalist theory. The issue of parts and wholes suggests that it may be anti-physicalist. The

⁷ This is the case of those notions of supervenience that use modal operators, in that they diverge from those definitions that quantify over possible worlds (McLaughlin, 1995).

question we have been discussing here, as to whether anything in the theory entails that some sets of causal powers cannot be tokened in isolation, and so they require the tokening of some additional causal powers, eventually shows that the theory does not entail physicalism. It may turn out that mental properties are realized by physical properties, i.e., that the causal powers that characterize mental properties are, as a matter of fact, never tokened in isolation, but this is neither predicted nor explained by the theory. Explaining the realization relation in terms of the relation between subsets and sets of causal powers does not imply that the existence of mental properties somehow depends on the existence of physical properties.

We think that these two arguments show that realization as elucidated by the subset view cannot be seen as the sort of metaphysical relation of dependence between properties that physicalism requires. That is to say, it is simply not true that the realized property depends on or requires any realizer, by virtue of merely instantiating the realization relation as elucidated by the subset view. In fact, as we have shown, the instantiation of the realization relation as the subset theorist understands it, actually suggests a relation of dependence in the opposite direction.

We also think that this important point is not by itself a knock-down argument against the subset view. The option is still open to the subset theorist to propose a physicalist view involving two different relations of metaphysical dependence. The first of these relations of dependence would be the subset theorist's realization relation; and its job would be to overcome the causal exclusion problem, by employing the sort of argument involved in the salvo of shots analogy. A second relation of dependence would then perform the job of rendering the overall view a physicalist view⁸.

⁸ An anonymous referee suggests that, instead of resorting to an extra metaphysical relation of dependence, Shoemaker could respond to the challenge by saying that "we can see, as a matter of empirical fact, that the tokening of mental properties always requires, in our world, the tokening of a physical realizer; and this fact entails physicalism". However, as we have said, this would be a fact that the theory would be unable to explain, and we take it that a physicalist theory has to be able to explain why mental properties always require, in our world, physical properties. On the other hand, the difference between the move we propose to discuss (i.e., postulating a second metaphysical relation) and that recommended by the reviewer is not profound. The latter move is not a stipulation, but it equally smuggles in an element which is alien to the theory. Shoemaker's mind-body theory is not more physicalist if it so happens that mental causal powers are always accompanied by some extra, typically physical, powers. The empirical claim, which could ground a generalization of the sort "no mental property without a physical realizer", is as much a complement to Shoemaker's theory as the brute metaphysical claim we are about to consider (with the difference that the metaphysical claim would leave no doubt as to whether we finally have a physicalist theory: see below).

We will presently suggest just such an option on behalf of the subset theorist, and argue that it will not work. Before that, however, we would like to stress that even though this version of the subset view is in principle coherent, it involves a very significant departure from Shoemaker's original project. His original goal, shared with many other authors, was to lay out a plausible understanding of (non-reductive) physicalism by virtue of defining a relation of realization between physical properties and other properties. From the very beginning of his *Physical Realization*, Shoemaker makes it clear that he sees his important work on realization as an attempt to carry through this project:

“The notion of realization figures prominently in recent discussions of physicalism (...) it is arguable that this notion provides the most revealing characterization of physicalism itself: physicalism, we can say, is the view that all states and properties of things, of whatever kind, are physical or physically realized.” (Shoemaker, 2007: 1)⁹

Yet our conclusion so far is that Shoemaker's subset analysis of realization falls short of complying with this project. As has been argued, it is not the case that the claim that all properties are physical or physically realized entails the claim that all properties are physical or dependent on physical properties, or *a fortiori* that it entails physicalism, if by realization we understand Shoemaker's definition of it. However, we will not leave the matter here as we think it is worth exploring the sort of possibility suggested above. So, granted that realization as defined by the subset theorist cannot do the double job of dispelling the causal exclusion problem and accounting for the physicalist relation of dependence between properties, perhaps we could supplement the theory through the postulation of a different relation of dependence between properties which would render the overall view a physicalist theory.

At the beginning of the paper, we mentioned that the subset view gives us a sense in which the physical is metaphysically basic: it claims that all causal powers are physical causal powers and also that for every property, the causal powers that constitute the property are also causal powers that constitute physical properties. Yet this way of suggesting that the physical is basic is not enough to substantiate the claim that all

⁹ As noted above, there are many other philosophers who have advanced definitions of physicalism in terms of realization (e.g., Poland, 1994; Kim, 1998; Levine, 2001; Melnyk, 2006).

properties metaphysically depend on physical properties. In order to do so, we would need some sort of principle that states that the instantiation of a non-physical property constituted by a certain set of causal powers, *C*, metaphysically entails the instantiation of a physical property constituted by a superset of *C*. This is something we already hinted at above, when discussing the objection that the realizee requires a realizer. In other words, we would require a principle such as the following:

(S) No property constituted by a set of causal powers *C* can be tokened in isolation if there is another property constituted by a set of causal powers *C'* such that *C* is a subset of *C'*.¹⁰

With (S) in place, we have a straightforward solution to the “realizees require realizers” problem discussed above. Moreover, we can also make headway against the metaphysical parts–wholes problem; it can be claimed, first, that mental properties depend on physical properties and second, that mental properties cannot exist in isolation, and so they cannot be ontologically prior with respect to physical properties. If it is the case that realizees require realizers, then realizees depend on realizers: realizees cannot exist in isolation nor can realizees be ontologically prior to realizers. This has the effect of ensuring that parts cannot be but parts. This is quite interesting in itself, since it shows that these two problems are intimately related, as they can in principle be addressed by the same theoretical move.

¹⁰ Here the option offered by the referee (see fn. 8 above) becomes especially relevant. For it can be said that a principle such as (S) is too strong. All we need to ensure physicalism is a weaker principle such as (S'): No property constituted by a set of causal powers, *C*, is actually tokened in isolation whenever there is another property constituted by a set of causal powers *C'* such that *C* is a subset of *C'*. As can be seen, in (S') we substitute a modal “can” claim for the flat “is” claim. However, a principle such as (S') is too weak in several ways. First of all, it would not explain why all mental properties require physical realizers: it just states that this is a brute fact of the world. Physicalism, however, is usually taken to be an explanatory thesis. It holds not only that mental properties are not tokened alone, but also that they cannot be tokened alone because mental properties depend on physical properties: mental properties are instantiated by virtue of the instantiation of physical properties. Secondly, and related to this first point: (S') looks like a weak supervenience claim, which has always been taken as being too weak to express physicalism. Thirdly, (S') would be grounded on the putative observation that mental causal powers never come alone. However, we seem to need stronger reasons than this putative observation to defend physicalism (to begin with, emergentists could easily dispute that we have actually observed that mental causal powers are always subsets of physical causal powers). Notice also, in this regard, that if this empirical fact were to be backed up by a general law, then, given Shoemaker's views on the necessity of laws, holding (S') would amount to defending our stronger (S). Finally, a claim such as (S') would not solve the other problems that (S) seems to solve. For instance, while, as we say in the main text, (S) provides a promising solution to the parts–wholes problem, (S') is unable to guarantee that mental properties cannot be but parts of physical properties. In our world, mental properties are parts of physical properties, but this does not mean that mental properties are ontologically dependent on physical properties. For mental properties to be regarded as dependent on physical properties it is necessary that they *cannot* be tokened in isolation.

Thus, we can say that there is a clear difference between the relation between physical and mental properties, and the relation between Jones's shot and the salvo of shots: Jones's shot is a part of the salvo of shots, but it is not essentially a part of anything; whereas mental properties, according to this construal, are essentially parts of physical properties. This responds to Morris's concern, which he expressed by saying: "Perhaps we could salvage the physicalist credentials of subset realization by insisting that the way in which subset-realized properties are 'parts' of physical realizers is not analogous to more familiar parthood relations in which there is an asymmetric dependence of the whole on its parts." (Morris, 2011: 368)

Stipulation (S) also helps solve the problem that the strategy runs the risk of having physical properties reduce to, *inter alia*, mental properties. If we stipulate that parts cannot be but parts, that risk seems to be avoided: we can think that a physical property is reduced to its constitutive parts only if those parts are independent properties; otherwise, it seems that the whole takes ontological precedence over its parts, and it is more difficult to say that the whole is nothing but its parts.

However, this very useful stipulation is just that: a stipulation. Even if it solves some problems, it sounds totally ad hoc, as its only motivation is to overcome the two problems that, as we argued, plague the original subset account.¹¹ There is also the lingering worry that, although it helps to demarcate the salvo example from the mental-physical case, it may not satisfy our physicalist hopes completely. Before presenting the salvo case, we briefly discussed another possible analogy that was chosen to enlighten how parts are supposed to relate to wholes in the subset account: the relation between genera and species. In that case, it is possible to defend the claim that genera cannot be tokened alone (i.e., just as *red* requires a determinate shade, so *animal* requires a differentia, and so a species) In fact, Aristotle himself in the *Categories* holds that were primary substances not to exist, then no other entity would exist (*Categories*, 2b6). In his view, primary substances take precedence, in contrast with the Platonic credo that the abstract is more real than material particulars. Primary substances make things real, according to Aristotle (a claim which is echoed by Shoemaker's claim that physical

¹¹ Notice also that endorsing (S) amounts to rejecting the existence of conjunctive properties. To see why, suppose that C is the conjunctive property of having both property P and property Q. By definition, C has all the causal powers of P and all the causal powers of Q. Still, it seems that P can be tokened in isolation, without the conjunctive property C, in cases where Q is not tokened. So, if one accepts (S), one needs to claim that conjunctive properties such as C do not exist.

properties make mental properties real). Yet, Aristotle also holds that the genus plus the differentia gives the essence of the species; which suggests that genera take ontological precedence over species. This is the view taken for instance, by Porphyry: “[Genera and species] differ in that the genus contains the species, while the species are contained by and do not contain the genera. For the genus covers more than the species does. Again, genera must be posited in advance and, when informed by specific differences, complete the species. Hence genera are prior by nature”. (*Isagoge*, 13, in Spade, 1994).

This means that even after adding (S) to the mind–body theory which Shoemaker’s realization account supports, it is possible to interpret the result in a non-physicalist-friendly way.

To sum up, we have made a number of points in these two sections. First, we have argued (partly following arguments by Audi and Morris) that Shoemaker’s subset analysis of realization falls short of offering a physicalist relation of the dependence between mental and physical properties. Second, we have considered supplementing Shoemaker’s analysis with a metaphysical principle, (S), in order to build up a physicalist mind–body theory, with (S) grounding a physicalist relation of dependence between properties and Shoemaker’s analysis of realization offering a response to the causal exclusion problem. Third, we have argued against this mind–body theory on the grounds that (S) appears unmotivated.

We will finish this section by arguing a fourth and final point. We have discussed the possibility of offering an overall physicalist view of properties consisting of Shoemaker’s analysis of realization together with (S). As we explained, the idea of such a view is that the two parts would work in tandem: the subset account of realization would deal with the exclusion problem; while (S) would help to define a physicalist relation of dependence between properties, something that we have argued the analysis of realization offered by Shoemaker cannot do all by itself. Now our fourth point is that in spite of this division of labour, the subset analysis of realization itself may be incompatible with a physicalist worldview, irrespective of the addition of principle (S). Let us make this point clear.

A physicalist thinks that the physical world is causally closed: whenever a physical event has a cause at some time t , it has a complete physical cause at t . This idea is

sometimes formulated as the principle of Causal Closure of the Physical (CCP).¹² The accurate formulation of this principle is a tricky issue. Sometimes it is stated as the claim that whenever a physical event (i.e., the instantiation of a physical property) has a cause at t it has a sufficient physical cause at t . Yet this formulation seems to presuppose that causes are sufficient for their effects; which may not be the case if the basic laws of physics are not deterministic. Since physicalism does not seem to prejudge the issue of determinism, it is better to avoid such characterization of CCP as a physicalist principle. In fact, the motivation for the principle is that if it were false, if physical causes were not complete, then there would be a basic empirical fact, one involving the bringing about of a physical effect by its cause, such that it would not be an utterly physical fact. This would indeed be so if part of what made up the complete cause of the physical effect were something non-physical. Yet a core element of a physicalist worldview is the claim that all basic empirical facts are utterly physical (all other facts depend on physical facts).

Our point is that if we understand CCP along these lines, Shoemaker's analysis of realization appears to be incompatible with it. The reason for this is that Shoemaker's view of realization entails that mental (i.e., non-physical) properties are *necessary* proper parts of physical properties. If this were indeed so, then there would be physical effects (for instance, certain bodily movements) whose complete causes would include non-physical parts.

Precisely because mental properties are parts of physical properties, one could object to this reasoning that the complete cause does turn out to be physical after all, and utterly physical, since the physical cause would have the mental property as a necessary part. Although this is indeed true, we do not think it is enough to dispel the present worry. The fact remains that without the mental, non-physical property, we would not have a complete cause. So the mental property is necessary in order to have a complete cause of the physical effect; and that would seem to run counter to our reading of CCP and, in any case, a physicalist view of the world. This seems to us to be a part-whole problem that persists even after the addition of (S).

We now turn to a different issue.

¹² As is well known, the CCP is a crucial premise in Kim's formulation of the problem of causal exclusion (e.g., Kim, 2005: chapter 2). See Pineda (2002) and Vicente (2006) for discussion.

4. A *Mind–body* theory?

As explained above, Shoemaker now defends his original claims that: (i) only forward-looking causal powers individuate properties, and consequently (ii) realization is a relation between forward-looking powers. Tiehen (2014) points out that this move may not be wise, given that mental properties are *not* individuated in terms of their forward-looking causal powers. According to him, pain is not simply a state which, inter alia, causes us to scream and seek relief. For something to be pain it is necessary for it to have a certain aetiology. If the state which causes you to scream and seek for relief is caused by someone tickling you, then such a state does not count as pain. This is, at least, what a functionalist account of phenomenological states would maintain, which is the account Shoemaker has defended for a long time. This shows that not all properties can be individuated in terms of forward-looking causal powers. However, it also means that realizers cannot be forward-looking causal powers either; for realizers play causal roles that are defined in terms of effects *and* of causes. That is, something is not a realizer only in virtue of causing certain effects, but also in virtue of being caused by certain causes.

Tiehen proposes to amend Shoemaker's account so that it can accommodate functionalism. We will not evaluate his solution here, because we think that the fundamental problem is not exactly the problem Tiehen raises. We agree that there is a general problem with Shoemaker's view on properties, which putting it in its crudest form is that, insofar as properties are individuated in terms of forward-looking causal powers, the resulting theory cannot be a mind–body theory and/or a theory of *mental* causation. The reason for this is that mental properties cannot be fully individuated in terms of forward-looking powers. However, we feel somewhat ambivalent with respect to the particular problem that Tiehen raises. It is true that it is inconsistent to be a functionalist and then to individuate properties and explicate realization only in terms of forward-looking causal powers. However, we are not sure what we would actually say if someone screamed and sought relief after been tickled. Wouldn't we say that the person felt pain, after all? Wouldn't we say of whatever physical property was responsible for that reaction that such a property counts as a realizer of pain?

We think we are, however, on firmer ground in this respect if we think about what makes an intentional, mental property what it is. We think that it will become clear that we cannot capture the essence of mental properties only in terms of what they cause. That is, if we try to do only with forward-looking powers and we maintain that properties are wholly constituted by causal powers, then we will not be able to account for mental properties in the first place. Then, *a fortiori*, we will not be able to solve the problem of causal exclusion for *mental* causation by resorting to Shoemaker's notion of realization.

Mental properties are characterized by their content, i.e., what they are about, or what they represent. However, it seems that content cannot be explained in terms of forward-looking powers.¹³ Rather, the content that individuates a mental property is, to a first approximation, the environmental, distal causes which are responsible for its instantiation. As is well known, this initial view has to be modified in order to make room for representational error; we cannot simply say that a mental property represents whatever causes its instantiation. The rough result of such a modification is that the content of a mental property is that environmental entity which *should* trigger its instantiation. How we have to understand this claim is a matter of controversy. However, the first relevant point for our current interests is that it seems that backward-looking powers must figure somehow in the characterization of a certain mental property. It seems to be the case that the backward-looking powers that a certain mental property actually has, do not serve to characterize it (what characterizes the property are the backward-looking powers it should have). However, this does not mean that the mental property can be characterized without mentioning backward-looking powers at all. If we say that the content of a certain mental property is given by the entities that should cause its instantiation, we are still referring to backward-looking powers.

The general point that (at least) some backward-looking powers individuate mental properties can be strengthened by looking at the different theories of content that have been proposed: from functional-role theories to informational and teleological accounts. All of them maintain that it is impossible to individuate a mental property only in terms of its forward-looking powers. Functional roles include causes as well as effects;

¹³ Some authors hold that some mental states (qualia, moods, feelings) lack content. We will not discuss these views here, for it is enough that some mental properties and states are characterized by their content for the forward-looking powers strategy to fail.

informational theories are very precisely about causes; and teleological theories, though some are more cautious than others in their use of causal talk,¹⁴ all individuate mental properties partly by their selected backward-looking powers. As is well known, both functional-role theories and informational theories have severe problems when it comes to accounting for error. This means that we are eventually left with asymmetric dependence theories (Fodor, 1990) and teleological theories. All of these arrive at the conclusion that (all of) the backward-looking powers of a mental property do not individuate it either; only some backward-looking powers are relevant for explaining content.

Let us focus on teleological theories. The sort of historical properties typically appealed to by such theories do not supervene on simple backward-looking causal powers. The only backward-looking powers relevant to the determination of the content of a mental property are the *selected* backward-looking powers, i.e., those backward-looking powers the property had before it was selected and which were relevant to its being selected. Burge (2010) has objected to teleological theories, in part because, as he claims, natural selection can only “see” effects. His point, in a nutshell, is that there cannot be a biological function to indicate or to represent certain content—i.e., a biological function defined only in terms of backward-looking powers—because biological functions are only about forward-looking causal powers, i.e., effects which turned out to be adaptive. However, we think that his arguments can be resisted, and that it is legitimate to maintain that certain entities can also be selected on the basis of their backward-looking causes (e.g., Schulte, 2015, Vicente 2012).

The point we want to make here is the well-known point that intentionality/representationality entails the possibility of error or misrepresentation, i.e., a state could not be representing x if it were not possible for it to misrepresent x . A good account of how it is that states can misrepresent involves their having certain functions, for instance the function of being triggered by some entities and not others. We find it plausible, despite Burge’s criticisms, to maintain that the notion of a representational function has to be explained in terms of recruitment: a certain state has the function of being triggered by some entity if that state was recruited to be triggered by such an entity. Recruitment does not necessarily signify natural selection; there are

¹⁴ Dretske (1988) makes use of the notion of information; while Millikan (1993) prefers to talk of co-variation.

different recruitment mechanisms: natural selection, design, and learning. It seems plausible to hold that mental states have the content they have as a result either of natural selection or of learning.

Thus, explaining mental properties requires that we explain their content properties which in turn requires explaining what they have been recruited to do, and in particular what they have been recruited to “react” to. Teleological theories try to provide a naturalistic account of mental/intentional properties in terms of natural selection and/or some non-problematic account of learning (i.e., one which is fully naturalistic). These attempts show that it is not easy to explain the nature of the mental in physicalist-friendly ways. They show that mental properties are related to or grounded by physical properties in complicated ways. This is in sharp contrast with the view that we could explain mental properties just by looking at their forward-looking causal powers. Accounting for content, and thus for misrepresentation, should move us beyond the notion that mental properties can be exhausted by their causal powers (forward-looking and backward-looking).

Conclusions

In this paper we have critically assessed Shoemaker’s subset analysis of the realization of properties as a physicalist mind–body theory capable of dealing with the causal exclusion problem. That is, we have first examined whether a physicalist mind–body theory follows from the claim that mental properties are realized by physical properties—when one understands by realization the subset analysis and assumes Shoemaker’s causal account of properties. We have then considered whether the account deals successfully with the causal exclusion problem.

We have concluded that the subset analysis of realization cannot provide us with a relation of metaphysical dependence between mental and physical properties such that a physicalist mind–body theory can be formulated in its terms. We have offered two reasons for this first conclusion: the parts–wholes argument (already partially discussed in the literature); and an argument based on the physicalist requirement that the instantiation of a realized property requires the instantiation of one of its physical realizers. Given this conclusion, and assuming that Shoemaker’s account of realization

offers an interesting response to the problem of causal exclusion, we have explored ways to improve the original theory with the postulation of a further metaphysical relation of dependence between properties—our principle (S)—in order to meet the two objections just mentioned. Interestingly, we have noticed that these two problems are closely connected, since they seem amenable to the same sort of theoretical solution: postulation of (S). Still, we have found this theoretical possibility wanting, as principle (S) appears unmotivated. We have also argued that this theoretical amendment may be useless in the end, as the subset analysis of realization might conflict with the principle of Causal Closure of the Physical (CCP).

Finally, serious doubts have also been raised as to whether Shoemaker's account is in effect an account of the relation between the mental and the physical. Mental properties (at the very least most of them) are individuated by their content and it seems that one cannot account for content only in terms of forward-looking causal powers. In fact, given that intentionality requires the possibility of error, it can be claimed that not even the addition of the actual backward-looking causal powers of properties is enough.

Therefore, even though Shoemaker's work represents a remarkable contribution to the debate concerning realization and offers an interesting way of circumventing the problem of causal exclusion, we think that overall there are serious reasons to suspect that it is not a satisfactory physicalist theory.¹⁵

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