

REALIZATION, DETERMINATION AND MENTAL CAUSATION†

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ABSTRACT: The by now famous exclusion problem for mental causation admits only one possible solution, as far as I can see, namely: that mental and physical properties are linked by a vertical relation. In this paper, starting from what I take to be sensible premises about properties, I will be visiting some general relations between them, in order to see whether, first, it is true that some vertical relationship, other than identity, makes different sorts of causation compatible and second, whether physical and mental properties can be pairs of such relationship.

Keywords: problem of causal exclusion; properties; relationships between properties; supervenience; realization; genus-species; determination.

CONTENTS

Introduction

1. Supervenience

2. Realization

3. Determination and the Genus-Species Relation

3.1. Determination, the Genus-Species Relation and Realization

3.2. Genera, Species and the Exclusion Problem

3.3. Physical Properties as Determinates of Mental Properties

4. Conclusion

Bibliography

Introduction

Contemporary philosophy presents Descartes' problem of mental causation -i.e. how the thinking thing can causally interact with the extended thing- as a problem of exclusion consisting in the following three conflicting ideas:

- (i) principle of the causal closure of the physical: every physical effect has a complete cause that is also physical;
- (ii) causal efficacy of the mental: mental events produce changes in the physical world;
- (iii) principle of the causal-explanatory exclusion (PEE): there cannot be two causes/causal explanations that are both complete and independent for one event, except in cases of overdetermination.

Physics, or at least some reasonable readings of physics¹, backs our first claim; the way we live ourselves and our most common experiences is the background for the second, and the third claim, the principle of causal-explanatory exclusion, is a summary of some of our explanatory practices and intuitions.

Some philosophers -emergentists, for example- have rejected (i), and some others have denied (ii), either on the grounds that mental events do not cause anything at all -epiphenomenalists- or because they claim that mental events do not cause physical events but "action events" -defenders of the "dual-explanandum" approach-. Finally, there are also those, such as Tyler Burge (1993) and Terence Horgan (1997) who think that (iii) is false, at least in what regards to causes or causal explanations that belong to different levels.

What I propose in this paper is to explore possible solutions to the problem of exclusion provided we accept the truth of all three statements. In particular, I will concentrate on what can be called the "relation hypothesis": The principle of causal-explanatory exclusion allows us to have two different causes or causal explanations if we discover that one completes the other, or that one depends on the other². The "relation hypothesis" says the problem of mental-physical exclusion is solved by means of a relationship that establishes a dependency between the two causal stories, mental and physical.

This relation hypothesis is further constrained by the fact that such relation can only be "vertical". Otherwise, it would imply the rejection of our principle (i) above, for it would mean either that the physical cause was caused by the instantiation of a mental property, or that the instantiation of this mental property, although caused by the instantiation of a physical property, was the immediate antecedent of the physical effect. The first situation straight-away implies the rejection of the principle of the causal closure of the physical world, as stated above. The second, on the other hand, implies the rejection of a perhaps stronger principle that we would also subscribe, namely, that all physical effects have an immediate complete causal antecedent that is also physical.

Thus, we can claim that the (vertical) relation hypothesis is nothing but the conclusion of an argument that has (i), (ii) and (iii) as basic premises, completed by further secondary claims such as the assumption that mind-body causation is not a case of overdetermination. If all three premises are true, then the mental must be dependent on the physical, or vice versa.

In what follows I will make some further assumptions, some plausible as they stand and others more controversial. First, I will understand that events are complexes of particulars, properties and times, that is, an event is the in-

stantiation of a property by a particular at a given time. Properties, on the other hand, will be taken as universals, though I hope this one is not a substantial assumption. Further, I will take properties to be entities with an internal nature or structure and detachable from their causal powers, that is, properties, on this account, are not causal powers, and do not have such powers either essentially or necessarily³.

Finally, I will be assuming, along with many others, that particulars with very different physical properties can nevertheless instantiate the same mental properties. This is the phenomenon usually called 'multiple realizability'. However, I prefer not to use that expression because I will restrict the meaning of 'realization' later on. In any case, I assume that this fact is indeed a fact and that it counts decisively against identity theories. Of course, this last assumption is as substantial as one could possibly imagine and still very controversial. But it is part of the game I will be playing, the most fashionable game in town these days.

1. Supervenience

For about a decade, philosophers have thought they had found the relation they needed to confirm the relation hypothesis. This relation was called 'supervenience', and was defined as follows:

- (1) One level of properties *strongly supervenes* on another if and only if, necessarily, for every x and every higher level property M , if x has M , then there is a property F of a lower level, such that x has F , and necessarily if any y has F , then it has M .

In fact, this is just one out of a family of definitions of supervenience that differ from one another in two parameters: modal force (necessity in their various ways versus no modal force at all) and the subject of instantiation (particulars or entire worlds).

The definition stated in (1) has been philosophers' favorite for two basic reasons: it can be read as a dependency relation -the contrast here is with weak supervenience-, and it takes a supervenience base that is not too wide and heterogeneous -as contrasted with global supervenience, that takes entire worlds-.

As I say, the problem of exclusion was thought to have been solved by means of the supervenience relation: if mental properties strongly supervene on physical properties, then they can be causally efficacious, because they have been shown to be dependent on physical causes.

This model, first proposed by Kim (1984), had some problems, some internal and some external. One external problem is the so-called problem of externalism: as a matter of fact, this problem says, mental properties do not

supervene on the physical properties whose instantiation is causally responsible for the instantiation of behaviors; that is, the antecedent in the conditional above is false and hence the model can't be applied.

One internal problem, on the other hand, is that supervenience cannot be a sufficient condition for causal efficacy; otherwise all the properties that supervene on a certain neurological property would have to be regarded as causes of the behavior that is an effect of the instantiation of that property⁴.

However, hard these problems may seem, there is one, or rather, a family of them, that are even harder. Kim (1993) complains about these problems thus:

[S]upervenience itself is not an explanatory relation. It is not a "deep" metaphysical relation; rather, it is a "surface" relation that reports a pattern of property covariation, suggesting the presence of an interesting dependency relation that might explain it (...) It is a "phenomenological" claim, not a theoretical explanation (p. 167).

We can say that the "hard problem" for the supervenience account of mental causation lies in the fact that the definition stated in (1) is too coarse-grained. It is compatible with a set of situations that do not solve the problem of mental causation, such as emergentism, type-epiphenomenalism and identity. That is, it does not discern the relation we are after -i.e. a vertical relationship that makes mental and physical causation compatible- out of a set of relations that exclude one or the other.

In short, the defender of the relation hypothesis must abandon supervenience and look for a relation that adjusts to the profile drawn by definition (1) -i.e. is a dependency relation- but is metaphysically deeper, requires no further explanation and makes physical and mental causation compatible.

2. Realization

Ever since functionalism was first stated, physical and functional properties were said to be related by a relationship called 'realization'. Functional properties are properties individualized by their causal roles, that is, they are dispositions; however, it was functionalism's great improvement over behaviorism to say that these causal roles have a "categorical basis", also called 'realizer'.

A functional property, furthermore, depends asymmetrically on its realizer in the sense that a particular *x* cannot instantiate a functional property if it does not instantiate one of its realizers, and, if any particular *x* instantiates a certain realizer *R*, then for every *y* that shares context and laws of nature with *x*, if it instantiates *R*, it must instantiate the functional property *R* realizes. That is, the realization relation, parametrized to context and laws of nature, falls under the supervenience pattern⁵.

The interpretation of functionalism and therefore of the realization relation, however, was a matter of dispute when it was first proposed. Some

(paradigmatically, David Lewis) understood it as a reductive theory, while others (for instance, H. Putnam) maintained an antireductionist view. The difference lay in the account of functional predicates advanced by one party and the other. Reductionists held functional predicates were nothing but descriptions of the realizer - 'the property that has such and such causal powers' - whereas antireductionists claimed functional predicates referred to second order properties, being 'second order property' defined as follows (Kim 1998, p. 20): "F is a second order property over the set of base (or first order) properties B iff F is the property of having some property P in B such that D(P), where D specifies a condition in the members of B". (That specification being by causal roles in the case of functional properties).

The reason behind this idea of second order properties is that these are multiply realizable, whereas first order properties aren't. As the fact that mental properties are multiply realizable was one of the strongest motivations for rejecting identity theories, the functionalist orthodoxy was easily fixed in this point: mental properties are second order functional properties related to physical properties by an anti-reductive relation of realization.

Now, can functionalism be a good theory of mental causation? In what follows, I will argue that it cannot, giving two reasons that can be found, the first in Block (1990), and the second in Kim (1998)⁶.

What Block claims is that functional properties do not cause the effects they are supposed to cause because they are conceptually connected to such effects. They are defined in terms of those effects, and that should make them suspicious. It is true that the existence of a conceptual connection does not exclude the presence of a nomic connection. However, these do not come together except in rare occasions. That is, in principle possessing *virtus dormitiva* could cause (be nomically connected to) sleep, but, as a matter of fact, those properties are connected only conceptually. The coincidence of conceptual and nomic connections is really scarce, and only due to "special" and exterior reasons. In Block's words: "it would be amazing if there was *always* some special reason why a second-order property was nomologically related to the effects in terms of which it is defined" (Block 1990, p. 158).

The second (Kim's) reason against the causal efficacy of functional properties amounts to the claim that what he calls 'realizationism' is, in fact, a reductive theory. As we have just said that functional properties are second order properties, and as such, that they cannot be identified with their realizers, this point will require some argument.

What Kim holds is that second order functional properties are identical to their realizers in each case of instantiation. A second order predicate like 'the

property of having a property that has such and such causal powers', he says, does not pick up a second order property, but a first order property. The subordinate description, 'the property that has such and such causal powers' refers to an intrinsic property, say, F. Now, is the property of having F different from F? Kim says it's not.

Existential quantification over properties does not bring in new properties, in the same way that existential quantification over individuals does not bring in new individuals. Otherwise, the world would be incredibly overpopulated.

Kim says that the relation between predicates or even concepts and properties is not one-to-one; not every predicate refers to one different property. The criterion for the ascription of references to predicates cannot be merely linguistic, or even conceptual, such that for each different concept expressed there is one different denotation. This idea enables us to retain second order concepts -and it can be useful to retain them- whilst rejecting second order properties. These latter, therefore, do not exist as something distinct from their realizers; in Kim's words, they are "nothing but" their realizers: in each instantiation, the second order property is identical to the property that realizes it.

This approach to the relation of realization, therefore, gives us the explicative relation we were after, but at the cost of a reductionism that is even worse than classical identity theories, for there the reducing relation was "global" -reduced properties have always, in every case of instantiation, the same reducing properties- whereas what we have now are *reducens* that are extremely fine-grained. In other words, multiple realization amounts to multiple reduction, and so realizationism comes to the denial of the second premise of our exclusion problem, namely, the causal efficacy of mental properties.

Now, what is the reason behind Kim's claim that there is not a one-to-one relationship between predicates and properties? He says the criterion for the ascription of a distinguished reference to a predicate cannot be linguistic. What is the criterion, then?

Let's put the question in this way. Kim holds that the realization relation gives us a reductive mind-body theory provided that:

- (i) mental properties are second-order functional properties with physical realizers;
- (ii) second order properties, given a system and some natural law, are "nothing but" their realizers;

and (ii) is true if:

- (iii) it is not the case that each predicate of a different meaning refers to a distinguished property;

in our case:

(iii') it is not the case that the predicates that express second order concepts refer to properties different from the realizing properties.

The question, then, is: what backs (iii')?

It is plausible to say that the answer is:

(iv) properties that lack causal efficacy lack existence,

plus

(v) second order properties lack causal efficacy, over and above the causal efficacy their realizers have.

Now, (v) seems to beg the question. We are exploring the chances that a relation such as the realization relation has to make room for mental causation, so we cannot use the causal inefficacy of second order functional properties as the basic premise for our reductive conclusions. We must argue for it.

However, Kim (1993) does provide an argument. Mental properties construed as functional properties, he says, fall prey to the following principle:

(*) principle of the causal inheritance: if mental property M is realized in one system in t in virtue of physical property P, then the causal powers of this token of M are identical to the causal powers of P.

The acceptance of this principle, together with the plausible argument above yields Kim's desired reductive conclusion. And it seems as though functionalism lacks arguments to reject principle (*).

What one can see here is that the appeal to the realization relation does not weaken the force of the exclusion problem. The claim that mental properties and physical properties are related by a relation called 'realization' does not stop us from asking: are the events to be explained caused by the realizer or by the realizee? The answer is: by the realizer; the realizee does not cause anything, over and above what the realizer causes. And if this is so, that is, if all the causal efficacy a second order functional property can have is due to its realizer, then that functional property is identical to the realizer. Some would say that functional properties are identical to their core realizers given adequate contexts, and some would argue that the identity is to be established between functional properties and total realizers, but, be it as it may, second order functional properties collapse into first order physical properties.

This objection, by the way, can be put to all models of vertical dependencies: it is not enough to say that one property depends on another. One might ask: what is the relation between the causal powers of mental properties (higher level properties in general) and of physical, or lower level, properties? If the relation is of what Kim calls inheritance, like in the realization case, then mental properties are nothing but physical properties; and if there is no relation, but just difference, then we have not solved the exclusion problem at all.

3. Determination and the Genus-Species Relation

Many philosophers seem to think that realization is the only possible relation that falls under the supervenience pattern, and thus they say that the properties that form a disjunctive subvenient base of another property are "its realizers"; and, correspondingly, that this latter property is "multiply realizable" by any one of the former properties.

In this vein, we find Fodor (1994, p. 27) characterizing realization as follows:

You get multiple realization [of P_L] whenever there is a disjunction of L-1 level properties, such that

- i. the instantiation of any of the disjuncts is sufficient for the instantiation of P_L , and
- ii. the instantiation of P_L is sufficient for the instantiation of the disjunction but not for the instantiation of any of its disjuncts.

It is easy to see that what Fodor is defining here is nothing but supervenience, that is, he is identifying realization and supervenience. This means that according to Fodor a property like *red* and properties like *scarlet* and *fire*, etc. are related by the realization relation, since the instantiation of *scarlet* is sufficient for the instantiation of *red*, and the instantiation of *red* is sufficient for the instantiation of *scarlet v fire v...*, though not for the instantiation of one disjunct in particular. Hence, we would have to say that *red* is a multiply realizable property, and its determinates are its realizers.

The same spirit beats under the following example that Jackson and Pettit (1990) use to introduce their "program explanation" model. Smith and Jones, they say, take ten grains of arsenic and die ten minutes after. When asked about the cause of the simultaneous death, we can answer either that they died at the same time because they took the same amount of arsenic or that they died because they both took ten grains. If we give the first explanation, we will be using a multiply realizable property, whilst when providing the second we are invoking a realizer of that property.

Jackson and Pettit put that example as if it fell under the same category as instances of the relation between functional properties and their realizers, and as if the same considerations that apply to causal explanations that make use of functional predicates applied to it; that is, they claim the first explanation above is a programming explanation that invokes a property that is causally inert, though informative and counterfactual-supporting⁷.

Now, my point will be, first of all, that *red* and *scarlet*, and *an amount of arsenic* and *ten grains of arsenic* are not related by the realization relation, at least not in the sense we understand it here. Then, I will hold that it is not true that the considerations that apply to realizer/realized also apply to these pairs.

And finally, I will consider the chances for the relation between mental and physical properties to be an instance of this other relation.

To make a start, I propose to distinguish realization from other vertical asymmetric relations such as genus-species, or determinable-determinate (determination, from now on). This part is somewhat terminological: I will understand the realization relation in the way characterized in the last section, that is, as a relation that holds between second order causal roles and the occupants of those roles, a relation, furthermore, that is subjected to the principle of causal inheritance. Of course, it is possible to use 'realization' as synonymous with 'supervenience', but my claim is that, no matter what words you use, the distinction between kinds of relations -genus-species, or determination, on the one hand, and Kim-realization, on the other- must be drawn.

3.1. Determination, the Genus-Species Relation and Realization

Stephen Yablo has published a couple of influential papers defending (a) that mental and physical properties are related as determinables to determinates, and (b) that, by being so related, they do not exclude each other in matters of causality. What I will do in what immediately follows is explain how the determination relation can be understood. Then, as I have just said, I will move on to see whether there is in fact a difference in its behavior *vis a vis* realization concerning problems of exclusion, in particular, whether such relation can avoid Kim's principle of the inheritance of causal powers. Finally, I will evaluate Yablo's first claim, i.e. that mental properties can be considered as determinables whose determinates are physical properties.

Yablo (1992) proposes to understand determination in the following way:

(#) P determines Q iff: for a thing to be P is for it to be Q, not *simpliciter*, but in a specific way.

This broad definition seems to make the determination relation a case of the genus-species relation, that is, determinates, on this account, become species of their determinables. (According to Aristotelian medievalism, the doctrine of predicables, a property is a species of a given genus iff it is composed of that genus plus a difference). However, this approach to the relation of determination is neither evident nor universal. Typical cases of the determination relation, such as those of a color and its shades or a general property like mass and the different values such property can take, are governed by some principles W.E. Johnson (1921) developed in a logic. Some of these principles apply to other vertical relations, but there are two that make determination different and intriguing. These are the principle of ordering and the principle of difference⁸.

1. Principle of ordering: If P_1, \dots, P_n is a complete set of determinates of one level of Q , then for any set of objects such that each instantiates one determinate, these objects can be ordered with respect to Q (or some determinable of Q) in virtue of differences existing between the determinates.
2. Principle of difference: different determinates of one level of one determinable Q differ from one another with respect to Q (i.e. are different Q s).

David Armstrong (1978, 1997) has tried to give an account of these principles without being committed to the existence of determinables. Bigelow and Pargetter (1990) make a similar case. These accounts, however, are still in need of big and I suspect difficult developments. It looks more promising and natural to take the determination relation to be a special sort of the genus-species relation, such that the determinates of a determinable are seen as complex properties composed of the determinable and a difference, it being this difference that brings in the order in the determinate-spectrum.

As I have said, this seems to be Yablo's approach, and is also Evan Fales' (see Fales 1982). I myself think that both kinds of relations should not be kept separate, above all, if what we are interested in is the exclusion problem: determination can only count (hypothetically) as a solution if it is taken as a case of the genus-species relation. The really interesting relation here, I think, is this latter relation, and determination will only be of some help if it is not distinguished, at least in the relevant aspects, from it⁹.

This will be, then, my basic idea. In the introduction of this paper, I said I was going to make some assumptions, one of which was to take properties as entities with an internal nature or structure. Given that, we can explain similarities between properties by saying that they have a part in common. That is what we do when we say that two properties A and B belong to the same genus or are species of the same genus. A given genus, it can be said, forms part of its species. Cannot we, in the light of this, say that the species of a genus have some causal powers in common precisely because they have that genus as a part? If the answer is affirmative, then we would be saying that genera have some genuine causal powers.

This is easier to understand, I think, if we take a bit of time to make the contrast between realization and genus-species as explicit as possible. Admittedly, all the realizing properties of a given functional property may well resemble each other internally, and therefore be species of one and the same genus. Functional classifications, however, do not take that into account: a given property P realizes another Q just insofar as it has the causal powers Q speci-

fies, and regardless of whether P is internally similar to other realizers of Q. So this external criterion of classification does not have any consequence, or shows anything whatever, as to what the constituents of a given property are. But if you ignore internal similarities, then there is no way in which you can say that the subvenient property is the supervenient -functional, in this case-property plus a difference. And then, there is no way to explain the common causal powers of a family of subvenient properties that avoids the inheritance principle.

This difference between one relation and the other reveals itself very nicely when subjecting pairs of genus-species, on the one hand, and of functional properties-realizers, on the other, to the counterfactual test.

Let's think about a bull charging against the cape of a bullfighter, conveniently forgetting stories about the colorblindness of bulls. The bull charges against a red cape, and we would say that he charges precisely *because* it is red. Now, as it happens, the cape is of a specific shade of red: it is, let's say, scarlet. Which is then the cause of the charge, the red color of the cape, or its scarlet shade? Here we have the counterfactuals:

- (1) if the cape had not been scarlet, the bull would not have charged;
- (2) if the cape had not been red, the bull would not have charged.

The first counterfactual is false: in the nearest worlds in which the cape is not scarlet, the bull still charges against it. He does so in all those worlds in which the cape is of one shade or another of red. That is, it is the relationship between the redness of the cape and the charging of the bull that passes the counterfactual test. It is the determinable, so to speak, what is saying which counterfactuals are true¹⁰.

Now, what happens with functional properties and realizers? Let's take one typical example:

- (1') if A. had not ingested the complex microphysical property $P_1+P_2+\dots+P_n$, he would not have fallen asleep.
- (2') if A. had not ingested the sleeping pill, he would not have fallen asleep.

It can be said that (1') is false because it is too fine-grained or, in Yablo's words, incommensurate; in effect, it is plausible to assume that if one removes P_j from a complex microphysical property $P_1+P_2+\dots+P_j+\dots+P_n$, the resultant property will cause the same things that the former property was causing.

(2'), on the other hand, seems true¹¹. However, the truth of (2') does not explain the falsity of (1'): the realized functional property cannot tell us -non circularly- which counterfactuals are true and which are not. A genus can tell us whether some given property is going to causally antecede certain effects: it

will antecede them insofar as it is a species of that genus (supposing the genus is nomically connected to the effects, of course). A realized property, nonetheless, cannot provide that piece of information; it can only tell us: the instantiation of that property, given such and such circumstances, will (presumably) cause such and such effects if it has such and such causal powers, that is, if it normally causes them.

The basic difference between the two sorts of relation, then, comes to this: species are complexes of genera plus differences, being this common structure of the species of a genus what explains their common causal powers; realizers, on the other hand, though also internally structured, do not have functional properties as parts, and thus functional properties cannot be used as *explanantia* for the causal powers of realizing properties.

Before going back to the exclusion problem, I want to make one last consideration. It could be thought that some realizers are compounds of a functional property plus a difference. A certain frying pan might be thought of as formed by the general property *frying pan* plus something else: a specific way of being a frying pan. In the same fashion, one example Yablo (1992) presents (*Socrates' guzzling hemlock*, *Socrates' drinking hemlock*) might be thought to be, together with an instance of the determination relation, a case of the realizing relation: after all, *drinking hemlock* is a functional property. If this were true, then there would be no distinction between realization and the determination or genus-species relation.

However, *being such and such frying pan*¹² is not a realizer but a determinate of *being a frying pan*, and *guzzling hemlock* is not a realizer but a determinate of *drinking hemlock*. Both subvenient properties (*being such and such frying pan*, and *guzzling hemlock*) are functional properties, characterized extrinsically by their causal roles. Realizers are quite another thing: they are intrinsic properties that occupy some given causal roles. That is, functional properties can be genera (or species) of other functional properties, since functional properties also come in specific ways, but these specific ways of instantiation are not their realizers.

3.2. Genera, Species and the Exclusion Problem

I have been saying that by putting genera into species we can avoid Kim's inheritance principle. Do we then have the solution to the exclusion problem? Let's take the question in two parts: first, the general question, namely, do genera and species exclude each other in causal matters? Second, are mental and physical properties related as genera to species? I leave the second question for the next section, and will concentrate here on the first.

What I have been trying to say is this: a species is its genus plus something else. Species, so to speak, are what we meet in the world. We do not meet red colors, but scarlets, fires, etc. So species are the things that, apparently, at least, enter into causal relations. Now, since species are complexes, then we can say that they enter into some of these causal relations because of one of their components; in particular, that they enter into those causal relations common to all the species of one genus because of having the genus as a part. That enables us to say that genera have causal powers of their own, genuine powers not inherited from below.

So perhaps we can save supervenient causation in this case. But what about subvenient causation? It seems as though we have become committed to a new version of the inheritance principle: species, though sometimes causally efficacious on their own -this would save them from being eliminated- inherit, in the cases relevant to our concern, their powers from the powers of the genera they are species of. That is, some occurrences of, e.g. scarlet, are causally efficacious as scarlet-events, while some others are efficacious just in virtue of scarlet being a species of red. Thus, when the bull charges against the cape of the bull-fighter its scarlet color is to be held responsible for the charge just because it is a shade of red. It is the red-event, not the scarlet-event, what made the causal work.

Now, it is hard to settle intuitions here. Some people have intuitions that grant privileges to all that looks very concrete, and so won't even accept my description of the problem. For them, what *really* happened in the world, the only thing that was there, was the scarlet-event, so it was that event which entered the causal relation. Some other people are more moved by the counterfactual-supporting character of causal relations. From this point of view, it is the redness of the cape that caused the charge: otherwise, counterfactuals do not come out right¹³. Yet there are those who see no exclusion problem between genera and species: exclusion problems take place between properties and powers that are different, not between properties and powers that are either identical or partially identical. My own intuitions sway between this last position and the second: According to what I have said, the first type of intuition can get a response, namely, that just as it is true that what was there is a scarlet-event, so is it that scarlet occurrences are red occurrences, being scarlet red plus a difference.

So, my final position is disjunctive: either there is no exclusion problem affecting two properties that are related as genus to species, given that one -the genus- is included in the other, or there is a problem, and some of the powers of the species are inherited from the genus.

3.3. *Physical Properties as Determinates of Mental Properties*

Let us finally move then to the second part of the question, that is, whether mental properties and physical properties can be pairs of the genus-species relation. As said above, Stephen Yablo has written a couple of influential papers defending an affirmative answer to this question. Mental and physical events, he says, are related as determinables to determinates. However, he does not give any argument supporting this claim. Is it so obvious that mental and physical properties are linked by the determination relation, or something very similar? I would say it is not. If properties A and B -elephant and whale, for instance- are different, and are species of property X -mammal-, then A and B cannot be exactly similar when viewed from X. That is, they cannot be the same kind of X: otherwise, they would be the same species. I think that is obvious. However, different physical properties can be exactly the same kind of mental property, as arguments for multiple instantiability have shown. That is, from M's viewpoint physical properties P and Q may look exactly similar, even when physics tells us that they are different.

So it is surprising not to find arguments in Yablo's papers. The surprise nonetheless is strengthened if we understand that in his (1992) Yablo is concerned, more than anything, with narrow mental properties, whereas in his (1997) he is explicitly defending the determination relation between physical and *wide*, that is, relational, mental properties. I think it is this feeling of uneasiness that makes Kim put, in his last book, the determination attempt together with the strong and also the mereological supervenience (defended by Segal and Sober 1991) attempts and claim that all of them lack explanatory power.

All this can be said to be unfair, for, as a matter of fact, Yablo (1992) devotes several pages to the defence of mental *events* being determined by physical *events*. Yet, a close look at what he says there should reaffirm us in our position. Mental events, he basically claims, are determinables whose determinates are physical events because the essence of mental events is included in the essence of physical events. Now, conceded that view on determination¹⁴, it is legitimate to ask how come the essence of physical events contain the essence of mental events. It does seem as though physical events (specially, if we are speaking of neurological events) do not have intentional (or qualitative) properties in their essential pool, while it is essential to mental events to have intentional (or qualitative) properties.

Yablo's response to this query is quite disenchanting: he says we can be sure of mental events having their essences included in the essences of physical events because mental properties supervene on physical properties, so that if a

certain property M is essential to a mental event m , as M depends on a certain physical property P , then, P is going to be essential to the physical event p that subvenes m and, hence, M will also be essential to p (given that P necessitates M). I say this response is disenchanting because it makes Yablo's ingenious first claim -the determination claim- rely on the doubtful property supervenience thesis that we have discarded before.

4. Conclusion

My intention in this paper was to see how far we could go, starting from sensible premises, to an equally sensible solution of the mind-body exclusion problem. I have, first of all, tried to show that the only hypothesis available is what I have labeled "the vertical relation hypothesis". Then, I have explored three candidate relations and their prospects for a solution. Of course, this way of proceeding does not allow big claims in case of failure of all three examined candidates, as it is always possible for a new candidate to come along and adjust to the profile better than they do. However, I am highly skeptical that any other relation, such as composition, could help us out. I have developed different objections to the different relations considered in this paper; my idea is that any conceivable candidate will fall prey to one of such objections if not to the others. That is, if the relation is not too unconstrained -like supervenience-, then it will have no defense against Kim's principle of inheritance -like realization-, or it will not hold between mental and physical properties -like determination-, etc. As a matter of fact, I do not see how any relation could improve over the determination/ genus-species relation.

I would have preferred to provide a general argument against (or for) the relation hypothesis, but I do not have one, so I had to proceed in this piecemeal and open-ended way. Therefore, I am not allowed to provide anything more than a provisional conclusion, which could be that any optimism about a solution to the exclusion problem is unmotivated.

Notes

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¹ Scott Sturgeon (1998) registers one possible reading of quantum mechanics in the light of which the mental would have an inescapable causal role inside the physical world. In what follows, I will be ignoring this interpretation, which most physicists do not find plausible.

- 2 Unless there is overdetermination. I cannot revise that solution to the problem of exclusion, though I can offer two basic problems for such an account. First, one becomes committed to postulating massive coincidences. Second, this account violates the principle of the causal closure of the physical world (provided such principle has some modal force) and has to make plausible that "I would still have gone to the cupboard for an aspirin even if I hadn't had the pain" (Tim Crane 1995).
- 3 This is not to say that properties might have no causal powers attached. They must have causal powers, in order to exist at all. But the causal powers they endow particulars with in the actual world may be substituted by others in another possible world.
- 4 This is a problem that, as far as I know, McLaughlin (1984) raises for the first time. Lynn Rudder Baker (1993) makes quite a lot of use of it (too much, I would say). The idea is that there are some properties that supervene on a given one that we would not want to render as causally efficacious for the effects of that property. For example, the red color of mumps, though supervenient on them, does not have anything to do with impotence (this is Rudder Baker's example). McLaughlin tries to patch up this problem by adding a further constraint for the causal efficacy of higher level properties: in order for one higher level property to be causally efficacious it is necessary not only that it supervenes on a lower level property, but also that the causal process higher level property-causes-effect supervenes on the causal process lower level property-causes-effect. I guess this solution begs the question, for it assumes there is a causal nexus between the higher level property and the effect.
- 5 This claim, as it stands, is somewhat tricky, because that way (almost) everything supervenes on intrinsic physical properties; in particular, wide contents do, and hence there is no "problem of externalism" for the model of supervenient causation. I think one must distinguish one case -that of functional properties- from the other. The distinction can be made in the following way: It is crucial for mental properties to supervene on the intrinsic physical properties, instead of supervening on those physical properties-plus-context, because it is these (intrinsic) physical properties that they are in causal competition with, and therefore which they have to be shown to depend on. However, when mental properties are construed as functional the causal competition is not established only against intrinsic properties, since the context also intervenes. Therefore, the dependency relation in this second case has to hold not between functional properties and intrinsic properties, but between the former and intrinsic-plus-context properties. That this is so becomes manifest when thinking about possible worlds in which (a) we change the context relevant to wide contents, and (b) we change the functional context. In the first case, that of Putnamian twins, we observe no difference in the output, i.e. behavior; in the second, we do observe such a difference: take a given structure: it can become a choke, that is, give some outputs provided some inputs, in a determinate context, change the context and you can get a throttle, and therefore a different output. That is, context in this second scenario -and not in the former- has an important causal role. In order to do justice to this fact, Antony and Levine (1997) have proposed to understand that the realization relation takes place between functional properties and total realizers, that is, core realizers plus the relevant functional context. (I have to mention that they attach a great antireductive significance to this change, but I think they are not right in doing so).
- 6 In its most explicit form; the critique can also be found in Block's paper.
- 7 Jackson and Pettit's "program explanation model" tries to account for the fact that we do make use of functional predicates in causal explanations, even though functional properties are causally inert. The reason is that a functional predicate informs us (i) about the presence of one of the realizers of the functional property (and the absence of any other property) in the production of the effect, and (ii) about the causal path that realizer fol-

lowed. Thus, functional predicates have a very important epistemic role that guarantees their presence in our causal counterfactual supporting explanations.

⁸ These are the rest of the principles:

3. Principle of the asymmetric necessitation: determinates need their determinables, but a determinable does not need any particular determinate.
4. Downward necessitation: If P_1, \dots, P_n is a complete set of determinates of one level of Q, then if x has Q, then x has one of the determinates.
5. Non-conjunctive determinates: no determinate of Q is a conjunctive property $P \& P'$ such that P is Q or some determinate of Q and P' is some property that does not need Q.
6. Non-disjunctive determinables: no determinable of Q is a disjunctive property $P \vee P'$ such that P is Q or some determinable of Q and P' is some property not needed by Q.
7. Exclusion: If P_1, \dots, P_n is a complete set of determinates of one level of Q, then if x has Q, then x has only one of the determinates.
8. Principle of incomplete determination: if P has a determinate S and there is a Q, determinable of P and S, then P is not a full determinate of Q.

⁹ It can be added that for obvious reasons, because the other approaches are reductionist.

¹⁰ It is possible for the reductionist to claim that what happens is that we are facing a pre-emption case. That is, statement (1) above does have modal force, as any other causal statement; what occurs is that the effect would be instantiated just the same because there is another possible cause (e.g. that the cape is of the fire shade of red), such that if one cause does not take place, the other will. However, this is not a standard case of pre-emption, and the reductionist would have to explain in his terms why there is such a pre-emption.

¹¹ The counterfactual test, however, cannot be taken as a sufficient condition for causal efficacy, as Kim and Jackson and Pettit have shown.

¹² The 'such and such' locution is intended to stand for a functional specification, not for an intrinsic property. I do not want to be dealing here with hybrid properties like *being an iron frying pan*. The fact that Yablo's loose definition of determination may well admit this property as a determinate of *being a frying pan* only counts against such definition. One may wonder, on the other hand, whether a "pure" realizer like *being such and such structure made of iron* could be, at the same time, a determinate of *being a frying pan*: again, a reading of Yablo's definition could perhaps allow this claim. My response, if not clear by now, is that for something to be a determinate of a given property, it must include such property, something which does not hold for pairs of realizers and functional properties. Another possible answer consists in going back to principle (ii) above (principle of difference) and claim that while two species of one genus cannot be different and yet exactly similar with respect to the genus (they cannot be a genus of the same kind), it can happen that two realizers of a given functional property can be different one from the other and yet be the same as far as the functional property is concerned: very different intrinsic properties can occupy the same functional role.

¹³ Yablo, for instance, (1992, 1997) has introduced the notion of commensurability as a necessary condition for causal efficacy, being one property commensurate with its effects if "it incorporates a good amount of material that is causally important, but not too much that is causally unimportant".

¹⁴ Which I think should not be conceded, for it allows conjunctions to be determinates of their conjuncts, against principle 5 above. Moreover, I do not think this view is equivalent to his own definition of determination (P determines Q iff: for a thing to be P is for it to be Q, not *simpliciter*, but in a specific way).

BIBLIOGRAPHY

- Antony, Louise and Levine, Joseph: 1997, 'Reduction with Autonomy', *Philosophical Perspectives* 11, 83-107.
- Armstrong, David: 1978, *A Theory of Universals* (Vol. 2 of *Universals and Scientific Realism*), Cambridge, Cambridge University Press.
- Armstrong, David: 1997, *A World of States of Affairs*, Cambridge, Cambridge University Press.
- Baker, Lynne Rudder: 1993, 'Metaphysics and Mental Causation', in Heil and Mele (1993).
- Bigelow, John and Pargetter, Robert: 1990, *Science and Necessity*, Cambridge, Cambridge University Press.
- Block, Ned: 1990, 'Can the Mind Change the World?', in Boolos (ed.): *Meaning and Method: Essays in Honor of Hilary Putnam*, Cambridge, Cambridge University Press.
- Burge, Tyler: 1993, 'Mind-Body Causation and Explanatory Practice', in Heil and Mele (1993).
- Crane, Tim: 1995, 'Mental Causation', *Proceedings of the Aristotelian Society* 69, 211-36.
- Fales, Evan: 1982, 'Generic Universals', *Australasian Journal of Philosophy* 60, 29-39.
- Fodor, Jerry: 1994, *The Elm and the Expert*, Cambridge, MIT Press.
- Heil, John and Mele, Alfred (eds.): 1993, *Mental Causation*, Oxford, Clarendon Press.
- Horgan, Terence: 1997, 'Kim on Mental Causation and Causal Exclusion', *Philosophical Perspectives* 11, 164-181.
- Jackson, Frank and Pettit, Philip: 1990a, 'Program Explanation: A General Perspective', *Analysis* 50, 107-117.
- Jackson, Frank and Pettit, Philip: 1990b, 'Causation in the Philosophy of Mind', *Philosophy and Phenomenological Research* 50, 195-214.
- Johnson, W.E.: 1964, *Logic: Part 1*, 3, New York, Dover Publications.
- Kim, Jaegwon: 1984, 'Supervenience and Supervenient Causation', *The Southern Journal of Philosophy* XXII, Supp., 45-57.
- Kim, Jaegwon: 1993, *Supervenience and Mind*, Cambridge, Cambridge University Press.
- Kim, Jaegwon: 1998, *Mind in a Physical World*, Cambridge, MA., MIT Press.
- McLaughlin, Brian: 1984, 'Event Supervenience and Supervenient Causation', *The Southern Journal of Philosophy* XXII, Supp., 71-93.
- Segal, Gabriel and Sober, Elliott: 1991, 'The Causal Efficacy of Content', *Philosophical Studies* 63, 1-30.
- Sturgeon, Scott: 1998, 'Physicalism and Overdetermination', *Mind* 107, 411-433.
- Yablo, Stephen: 1992, 'Mental Causation', *The Philosophical Review* 101/2, 245-280.
- Yablo, Stephen: 1997, 'Wide Causation', *Philosophical Perspectives* 11, 251-281.

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