

## A METAPHYSICS FOR EXPLANATORY ECUMENISM<sup>1</sup>

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### 1. Introduction

Since the early days of physicalism higher-level explanations pose a perennial problem. It is easy to put the problem in a nutshell. For causal explanations it is necessary to invoke properties approved by our ontology as standing in proper causal relations. In this respect, physicalism bestows unique metaphysical standing on physics. In its ontology it allows only properties whose identity depends, in some specifiable way, on physical properties. The existence of seemingly not physical properties is precarious until vindicated by physics. Given that the special sciences invoke seemingly non-physical properties, they need a metaphysics that explain the possibility of true explanations.

An almost commonsensical part of the legacy of the "unity of science" movement is a hierarchical view of scientific disciplines that ensures the crucial dependency. On this traditional picture, physics is at the bottom of the stratification starting from which other disciplines, through chemistry, biology, psychology, etc., build upon one another, and culminate on the top in the sciences of society. This picture has immense intuitive force. First of all, the picture proceeds from the sciences of the simple to that of the complex. Thus it matches our mereological intuition that the increasing complexity of phenomena is a result of the combination of basic ingredients, whatever they may be. Moreover, it also enables us to explain fruitful theoretical interactions

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between neighbouring disciplines. It makes easy to explain why it is possible for psychology to be useful for sociology, and for neurology to be useful for psychology, and so forth.

Originally, this picture was designed to serve certain reductionist intentions. As Putnam and Oppenheim (1958) explicate this model, the sciences standing higher in this hierarchy are expected to reduce to lower level ones. The procedure of theory reduction for them can take various routes. One may try to define and thereby reduce the terms of a science in terms of another, reducing science, thereby providing a unified vocabulary. Or the laws of a science can reduce the laws of some other discipline resulting in explanatory unity. This would produce greater explanatory precision, would explain the dependency of inter-level phenomena, etc. This account satisfies the physicalist intention of granting unique standing to physics as eventually all the higher levels are reduced to physics. Therefore, if this reductive project succeeded, science would not commit us to a mysterious ontology that contains emergent properties, appearing on higher levels, inexplicable from the lower ones.

But this leaves us with an uncomfortable picture. Provided that special-science properties are approved by a physicalist ontology, this approval should not deprive these properties of explanatory powers of their own. If special-science properties are reduced to physical properties, then they surrender their causal powers to physical ones, and thus there will be no serious metaphysical background for the special sciences, no proper domain to be studied by them. The only reason for funding them is our limited capacity of dealing with complexity, and not some facts of the matter that we can gain explanatory knowledge of them. If we were better at dealing with complexity, i.e. if we were successful in our reductive ambitions, and for instance we could treat physical equations in explaining social phenomena, then we had better do so. The problem is that we are inclined to think about higher-level disciplines in a way that grants them more autonomy than this picture does. We do not think that sociology is just an imperfect and handicapped way of doing physics; rather, it gives us autonomous explanations that are not available in physics. The challenge for a physicalist sympathetic with the enterprise of the special sciences is to explain how it is possible.

The argument of this paper is on two stages. In the first two steps, I will argue that the standard non-reductive physicalist response to this challenge is inadequate. It relies on the concept *ceteris paribus* laws, but

the concept is not explicated in detail. Once we give a plausible construal of what *ceteris paribus* laws are, it turns out that they cannot support the proposed solution. Thirdly, I put forward a proposal that in order to establish the autonomy of special sciences we should get rid of the traditional hierarchical picture. It should be replaced by a metaphysics that allows explanatory ecumenism, and autonomous explanations in the special sciences. And finally, I will advocate a model of higher-level explanation that fits fairly well the proposed metaphysics.

## 2. The standard solution

In order to maintain the physicalist hierarchy, one need not be committed to reduction. From a metaphysical angle this hierarchy is produced by supervenience relations. In its most general form a physicalist supervenience thesis says that there is no independent variation on higher levels without some variation on the physical level. This means a correlation between the physical level and higher levels, but correlations are less than a physicalist needs, as they fail to ensure the dependence of higher levels on the physical. In order to produce the required dependence, physical realization is required: in order to be admitted into a physicalist ontology any entity must be physically realized.<sup>2</sup> Now the question is whether realization relations are reductive or non-reductive relations.

Realization is not an exclusive but a multiple relation. A higher-level property can be realized by a set of lower-level properties. As the canonical example goes, the same belief can be realized by a variety of neural structures. Multiple realization can be defined as follows: A property *P* is multiply realizable if having this property *P* depends upon some other property *O* of the object to which they both belong, and *O* is member of a class of properties each member of which, if instantiated, realizes *P*.<sup>3</sup>

There are two interpretations of multiple realization on the

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<sup>2</sup> Jaegwon Kim (1998: ch.1) supports this point in a more detailed discussion of supervenience and realization.

<sup>3</sup> Cf. Heil, 1999.

philosophical scene today. The more influential one is essentially the same as Putnam (1973) and Fodor (1974) originally advertised. On this account, the realizer of a property does not influence the causal role it can occupy, as it is exclusively the causal role that matters. Even if we had knowledge about the realizers of a mental state we could not describe law-like regularities at the level of realizers for two reasons. First, the number of realizers is potentially infinite therefore the antecedent of the conditional should contain an infinite disjunction. Secondly, potential realizers cannot be grouped into a single kind. Neurons and silicon chips may also be realizers of mental states; still they can be subsumed under law-like regularities only at the level of the functional mental properties they realize. What they have in common is precisely at the level of functional properties, which are therefore equally irreducible to a token or a type of a realizer. Thus functional properties belong to a nomic kind and their causal potential provides a sufficient basis for subsuming them under causal generalisations because they are causally uniform enough to consider their instances as being only numerically, and not qualitatively, different from one another. On this picture, multiply realized properties are eligible to form nomic kinds, their causal potential provides sufficient grounds for subsuming them under nomic generalisations. This means that in spite of various realizers, a multiply realizable property is causally uniform enough to be treated as a single property, an instance of a nomic kind.

This seems to be problematic in two respects. First of all, this is an all too wide concept of realization as it fails to discriminate between interesting and uninteresting cases of multiple realization. If multiple realization results in causally uniform properties, this would not be a philosophically interesting phenomenon. As Shapiro put it recently:

Differently colored corkscrews, alike in every other respect, are not tokens of different realizations of a corkscrew because differences in color make no difference to their performance as a corkscrew. The moral of this example is that multiple realizations count truly as *multiple* realizations when they differ in causally relevant properties — in properties that make a difference to how they contribute to the capacity under investigation. (2000: 644)

The metaphysically interesting cases of multiple realization are the ones where the causal properties of potential realizers are different

considerably – like in the case of neurons and silicon chips, or corkscrews with different mechanics.

This problem is the less pregnant one, because on the other hand, the very idea of realization itself seems incompatible with the appearance of properties belonging to causally uniform kinds as a result of multiple realization. Consider then the case of causally different realizers. Higher-level properties depend exclusively on their realizers. Functional properties must have a realizer that occupies a given functional role, thereby realizing the functional property itself. The causal potential of a functional property is granted by its actual realizer: realization ensures that there are no mystically emergent causal powers at higher levels. Anything that appears on higher levels as causal potential must be present in the supervenience base, or more specifically, in the realizer. Kim formulates this requirement as the "principle of causal inheritance" saying that the actual causal power of a multiply realizable property is identical to, or a subset of the causal powers of its realizer.<sup>4</sup> If the causal power of a property differs from that of its realizer then we would not consider it as a case of realization. It follows that the causal powers of two properties are identical if and only if their realizers are identical too. This means that there is no invariant causal potential that could be associated with multiply realizable property kinds. Therefore, higher-level properties belong to causally heterogenous kinds consisting of infinitely long disjunctions of realizer properties. Setting aside the canonical worries about such disjunctions, the realizers cannot guarantee the indiscernibility of properties supervenient on them because they bestow their actual causal potential upon the properties they realize. This means that there is no invariant causal power to be associated with properties belonging to multiply realizable kinds, which makes dubious the possibility of their nomic subsumption.

This problem leads us to the second conception of multiple realization, advocated mostly by Kim (1992). If we take it in the philosophically interesting sense as Shapiro proposes, and accept that multiple realization entails difference in the causal powers, then we are forced to accept the idea of causally heterogenous kinds: instances of multiply realizable properties represent different causal powers. Kim uses

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<sup>4</sup> Kim, 1992: 326.

this idea to question the possibility of the nomic subsumption of mental kinds and to argue for the compatibility of multiple realization and reduction. If due to causal heterogeneity it is impossible to formulate autonomous causal laws for mental phenomena then mental kinds are not scientifically legitimate kinds. This does not prevent local reduction, as every instance of a mental property has causal powers identical to the causal powers of its realizer, therefore any instance of a mental property is easily reducible to its own realizer. Therefore mental properties cannot be reduced as a kind, but individually, as instances, they are reducible to their actual realizers. This entails that we should give up the idea of mental properties having invariant causal powers, and therefore they should not be treated analogously with scientific kinds. It is not clear, however, that once we realize that multiple realization cannot mean 'invariance in effect under variation in realization', why should we retain the talk about *properties*. On the plausible assumption that properties are to be individuated in virtue of their causal powers,<sup>5</sup> the lack of invariance in causal powers suggests that multiply realizable properties fail to be properties in the end. Once we are unable to associate a well-specified causal power to a property, it does not make sense any more to call it a property.

### 3. An escape route: *ceteris paribus*

Or perhaps it does. *Ceteris paribus* clauses, in general, are intended to treat the exceptions from generalisations that invoke multiply realized properties. On Fodor's picture these exceptions can arise, for example, from the co-instantiation of two mental properties one of which overrides the causal effects of the other. In this case an intentional law may fail without losing its law-like status that is saved by the *ceteris paribus* clause, simply because in this case *cetera* are not *paria*. It does not really matter that kinds of multiply realized properties do not subsume under strict laws because we can subsume them under "hedged laws" that describe the required regularities and we can treat these kinds as perfectly

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<sup>5</sup> Shoemaker (1980) makes a strong case to this conclusion, as well as Armstrong (1980: 19-23).

legitimate kinds. These laws are as useful as any other laws for our explanations and predictions.

However, Kim's picture of multiple realizability is more convincing than that of Fodor. Realization conceptually entails causal inheritance. If a property is realized by another then there is no way of getting different causal powers in the property realized than those in the realizer. Given that realizers are causally different from one another, instances of the realized property will be causally different as well. The problem is this: a *ceteris paribus* clause is intended to secure the lack of disturbing circumstances, and does not concern the causal heterogeneity of a property that figures in the law. If a property is unreliable as to how it behaves under variation of realization then it cannot be nomic, even its status as a property becomes questionable.<sup>6</sup>

If we take a look at a fine-grained analysis of the sufficient conditions of a non-vacuous *ceteris paribus* law by Pietroski and Rey (1995), we can understand this at once. Putting aside the technicalities of their definition a law

$$CP (F \rightarrow G)$$

is non vacuous if the following three conditions hold:

- (i)  $F$  and  $G$  are nomologically permissible.
- (ii)  $F \rightarrow G$  or  $(\exists H)(H \text{ is independent of } F \ \& \ H \text{ explains } \sim G \text{ or } H \text{ together with } (F \rightarrow G) \text{ explains } \sim G)$ .
- (iii)  $(F \rightarrow G)$  does explain actual occurrences and  $H$  is not invoked only to explain exceptions to the law-like conditional.

Now multiply realizable properties, if understood according to Kim's version, cannot be saved in the proposed way, as they are in conflict at least with the first two conditions.

The first trouble arises from the well-known problems of disjunctive properties. The disjunctive nature of multiply realizable properties threatens the nomological permissibility of  $F$  and  $G$  if either one is a multiply realizable property.  $F$  as a multiply realizable property may be realized by  $B_1$  or  $B_2$  ... or  $B_n$ , and given our imperfect knowledge of

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<sup>6</sup> Kim (1998: ch.4) also moves in this direction when he proposes not to treat these properties as properties but as concepts.

realizers, this disjunction may as well be open. How can we formulate a lawlike conditional if we do not know its antecedent? An incomplete disjunction cannot figure in the antecedent or the consequent of lawlike conditionals: due to the incompleteness of the disjunction, the conditional will be incomplete as well, it cannot be assigned truth-value. Furthermore, we could not even judge whether the relevant conditional is a law or not. It is a good test of lawlikeness to ask if a conditional supports counterfactuals. But how could it support counterfactuals if its content is indeterminate?

But, for the sake of argument, let's suppose that we try to live with open disjunctions in laws. Then multiply realizable properties will fail to be nomic by the standards set by (ii). Since multiply realizable properties belong to causally heterogeneous kinds,  $H$  as an interfering factor may not be distinct from  $F$ , or more precisely it may not exist at all. Causal heterogeneity itself can serve as a sufficient explanation of  $\sim G$  because it is inherent in  $F$ :  $F$ 's causal powers depend on its actual realizer whose heterogeneous causal powers can account for  $\sim G$  on some occasions, without any interference from outside the set of realizer properties. Two different instances of a multiply realizable property can have different causal powers only because their realizers are different. And this fact is sufficient to account for the breakdown of the conditional, but not sufficient for a non-vacuous *ceteris paribus* law. In this case there is no interfering factor strictly speaking, only different realizers: it is the different causal power of  $F$ 's realizer that is responsible for  $\sim G$ .

Let me clarify this point by an example borrowed from David Lewis:<sup>7</sup> certain higher-order properties of metals, e.g. conductivity, opacity, ductility, metallic lustre, etc., have the same categorical base, namely the configuration of free electrons in a given piece of metal. This means that in any given piece of metal all instances of these dispositional properties supervene on, and are realized by the same constellation of lower-order properties. The case is the same with the relation between connectionist networks and mental properties: a variety of mental properties can supervene on one and the same neural basis. Now if I have a desire to return the book to the library, it induces me, *ceteris paribus*,

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<sup>7</sup> The example is quoted by Peter Menzies (1988: 566f), and subsequently by Jackson (1996: 397).



to take the relevant course of action. But if I also believe that it is raining and I do not want to get wet then I decide to return the book tomorrow. Now if the connectionist picture is right, then there is only one realizer of these belief and desires, namely the relevant neural network, therefore the action is not prevented by some interfering factor from outside the realizer property, but by the causally heterogenous nature of the realizer itself. If the realizer changes so as not to realize either the desire to remain dry or the belief that it is raining, then I bring the book back to the library.

The lesson is that although my desire to return the book is multiply realizable by various neural networks, its effects are not invariant under variation of realization. It may or may not result in an action, but its failure to do so is not necessarily a result of some interfering factor, as it is required by (ii), but may be a consequence of its realizer: the causal power of my desire varies according to its actual realizer.

Therefore multiple realization does not seem to be sufficient for characterising relations between instances of nomic properties, as the very idea is suspicious of collapse. If special-science properties are multiply realizable then they cannot be expressed by nomologically permissible predicates because the identity of properties is at least partly given by its causal powers. A similar causal identity criterion of being a property is advertised by Sydney Shoemaker who argues that we can talk about different properties if and only if we are facing distinct causal powers.<sup>8</sup> And it makes dubious, at least in two respects, whether multiply realizable properties can figure in any kind of law-like generalisation. First, given that their causal powers are entirely inherited from their realizers, there is no causal contribution on their part that could support their identification. Secondly, due to the infinitely long disjunction of possible realizers, it is impossible to determine unambiguously the derived causal potential. The impossibility of nomic subsumption seem to question whether the realizationist picture can give a good metaphysical background for an ecumenical view of explanation in general, and special-science explanations in particular.

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<sup>8</sup> Shoemaker, 1980.

#### 4. A global supervenience alternative

Given the failure of the standard response, what picture can we find that satisfies our metaphysical curiosity? I will propose a global supervenience thesis that avoids the pitfalls of a realizationist metaphysics, and makes concessions to a more pragmatic concept of explanation.

Most global supervenience theses are formulated in a domain-specific way. Being domain-specific means that the supervenience thesis is formulated with respect to some specific domain of properties. Sometimes it is said that if two worlds are identical in physical respects then they are identical in psychological respects too, or in another context, if two worlds are identical in individual respects then they are identical in social respects. If formulated in this domain-specific manner, a global supervenience thesis seems to be committed to a notion of realization as well, but this is a harmless version.

Generally speaking, global supervenience (*GS* in the following) can be usefully understood as expressing a minimal physicalist commitment as to the composition of our world, saying that *G*s globally supervene on *F*s iff *F*-indiscernibility of two worlds entails their *G*-indiscernibility. In particular, *GS* is frequently thought to be the appropriate supervenience thesis to be associated with both the relation of social and individual,<sup>9</sup> and of physical and mental phenomena.<sup>10</sup> As to the mental, it expresses that if two worlds are physically indiscernible, then they are mentally indiscernible as well. As to the social, it takes the following form: if two worlds are indiscernible with respect to their individual histories, then they are indiscernible with respect to their social states. The core idea in both cases is that indiscernibility of two worlds in one respect entails indiscernibility in some other aspect. Let's consider some important features of *GS* in general which will prove to be crucial in what follows.

Let *w* and *w*<sup>\*</sup> be two worlds each containing just two individuals  $\langle x, y \rangle$  and  $\langle x^*, y^* \rangle$  respectively. Suppose that *G*s (e.g. psychological properties) supervene on *F*s (e.g. physical properties) in the sense stated above, and suppose that in *w* the case is the following: ( $Fx \rightarrow Gx$ ) and ( $Fy \rightarrow \sim Gy$ ); while in *w*<sup>\*</sup> the case is that ( $Fx^* \rightarrow \sim Gx^*$ ) and ( $\sim Fy^* \rightarrow \sim Gy^*$ ).

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<sup>9</sup> cf. e.g. Currie, 1984; Bhargava, 1992: 64ff.

<sup>10</sup> cf. e.g. Petrie, 1987; Paull & Sider, 1992.

$w$  and  $w^*$  are clearly not physical duplicates, so their difference is consistent with *GS*, but their difference is intuitively inconsistent with supervening *G*s on *F*s. For  $x$  and  $y$  are indiscernible in terms of *F* in  $w$ , but in  $w^*$  there is an individual  $x^*$  that is *F*-indiscernible from  $x$ , and another  $y^*$  that is *F*-discernible from  $y$ . Then the psychological difference between the situations could not be due to some physical difference between the individuals, since in the second case one was different and the other was not if compared to the original situation. We see then that it is possible to have worlds in which an individual's *F*-nature does not necessitate its *G*-nature, without logically confronting *GS*. This amounts to saying that on *GS* an individual's *F*-nature alone is not sufficient to determine its *G*. The lesson we should learn now is that *GS* concerns whole worlds and has nothing to say about individuals within the worlds concerned.

If we have two worlds and *GS* as a true description of the property relations in them, then simultaneous changes in the subvenient domain will result in the same changes in both supervenient domains. As supervenience means the lack of independent variation between the sub- and the supervenient domains, and as the supervenience base that ensures the indiscernibility of the worlds on higher levels is the totality of physical properties it follows that physical changes are responsible for the changes on higher levels in both worlds even in isolation. Therefore domain-specific *GS* gives ground to global realization: the totality of subvenient properties realizes the totality of supervenient ones. This kind of realization is consistent with any possible form of physicalism. If we admit this case, then whole domains at higher-levels will reduce to whole domains at lower ones, as opposed to reducing property instances to other property instances.

Now take the series of *GS* theses that describe truly the relations of property-domains. Then we get something like the social globally supervening on the individual, the mental globally supervening on the physical, and so on, i.e. a series of global supervenience theses descending to the physical level. In order to cover all these domain-specific supervenience theses under a general, non-domain specific one, we can accept also that:

If two worlds are identical physically then they are identical *simpliciter*.<sup>11</sup>

This thesis provides background for non-reductivist arguments. It makes reduction impossible because no explanatory benefit arises from reducing complete domains to other complete domains. Higher-level properties simply dissolve among physical properties and relations. The “joints” of higher levels disappear without getting more explanatory power in return; therefore reduction is pointless.

Furthermore, once we arrived at this non-domain-specific thesis we can get rid of all domain-specific supervenience theses without threatening the fundamental physical identity of any ingredients of our world. The ladder can be kicked off eventually. This entails, however, that having this supervenience thesis at hand does not provide us with a ready-made internal structure of property and domain relations. Someone with strong nominalist or conceptualist inclinations may be delighted by the possibility of furnishing the world with whatever properties and domains one sees fit. The only but strong constraint this supervenience thesis puts on properties is that they must fit into a fundamentally physical world. And here domain-specific supervenience theses can serve us well: they can connect the various layers of the picture ensuring their dependence on the physical domain.

What does this entail as far as higher-level explanations are concerned? First of all, explanations will not be reducible. Now it should not come as a surprise, as the predicates express globally-supervenient and therefore irreducible properties. This ensures the autonomy of higher-level explanations. Secondly, and more interestingly, the metaphysics of explanation will be replaced mostly by pragmatics. As the general form of our *GS* thesis does not prescribe intra-world property relations apart from expressing the metaphysical priority of the physical, it is possible to carve up the internal property domain structure so as to satisfy our explanatory curiosity.

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<sup>11</sup> Cf. Jackson, 1998: 12.

## 5. Programme explanation

What picture of explanation could fit this fairly liberal metaphysics? I propose to accept the "programme model" of higher-level explanation, as developed by Frank Jackson and Philip Pettit. The primary question that Jackson and Pettit seek to answer concerns the problem of the role that broad psychological states (i.e. ones that are, at least partly, rooted outside the mind) play in mentalistic explanations. How is it possible for broad mental states to have a specific causal role in bringing about behaviour, and how can they figure legitimately in causal explanations? As Jackson and Pettit argue,<sup>12</sup> it is appropriate to distinguish between two kinds of property invoked in causal explanations, and analogously, between two kinds of causal explanation that explain in virtue of these properties. Programme explanations (*PE*) refer to properties that are not causally *efficacious* with respect to a given event, but causally *relevant* to it.

Psychological explanations refer to mental states; they explain behaviour, as is commonly put, by reference to the agent's beliefs and desires. Mental states are frequently defined functionally, in virtue of the causal role they occupy in bringing about a certain action, or another mental state. In this sense, being in a mental state means being in a certain neurological (realizer) state under relational characterisation. However, since Putnam's argument,<sup>13</sup> it became common wisdom in philosophy that some mental states have broad content, since they are related to the state of affairs in the world in a way that has a significant role to play in determining their content. This entails that mental states cannot be internal neurological states under some specific relational characterisation as functionalists argue. They must be more than that, since they are not exclusively in the head. Mental states do not supervene exclusively on the internal neurological structure, but on this internal physical structure *plus* some physical facts about the environment. Even if two persons are in the same physical state, the content of their thoughts, as one can conclude from Putnam's well-known Twin Earth example, may nevertheless be different, provided that there are

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<sup>12</sup> Jackson and Pettit, 1988.

<sup>13</sup> Putnam, 1975.

differences in their environments. Now the original challenge for Jackson and Pettit was to solve the puzzle arising from the tension of the functionalist view, and the reality of broad content of psychological states appealed to in psychological explanations. This they did by making a distinction between causal relevance and efficacy, claiming that mental states have the former but not the latter. The presence of a causally relevant mental state ensures, or programmes for, the presence of a causally efficacious property, which is in charge of the real causal work.

*PE* thus rests on a distinction between efficacious and merely relevant properties, and explanations formulated in their terms. The traditional formulation of causal explanation appeals to properties causally effective in a process. *PEs*, however, do not refer to an element of a causal history construed in terms of this process. Instead, it appeals to functional, disjunctive, or relational properties, whose presence ensures, or programmes for the presence of efficacious properties that bring about the effect. The realization of these higher-level properties ensures that there is an efficacious property, while the higher-level property itself does not figure in the efficacious process. Causal relevance does not belong to higher-level properties on their own right: it derives exclusively from the fact that the causal work is done by a property in its supervenience base. In other cases, *PEs* can give modal information when they cover a range of possible situations, each of which could have produced the actual result, and one of them actually did.

According to *PE*, the realization of a higher-level, programming property ensures that there is an efficacious property, which performs the causal work, while the programming property does not figure in the efficacious process itself. If the programming/efficacious distinction is taken in the absolute sense, then efficacious properties and, correspondingly, causal explanations in terms of efficacious properties can be located presumably only on the fundamental physical level. However, for pragmatic reasons, Jackson and Pettit allow for a relativistic interpretation of the distinction.<sup>14</sup> As we are rarely in the position to identify the causally efficacious microphysical properties, "most of the explanations we are ever likely to offer will be of the

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<sup>14</sup> Jackson and Pettit (1988, 1990, 1992) provide a variety of examples.

programme variety."<sup>15</sup> But *PEs* presuppose the presence of an efficacious property, therefore we need to locate the efficacious properties relative to the programming properties. In this sense mental properties can be taken to be efficacious in relation to social properties; neurological properties in relation to mental properties; biochemical properties in relation to neurological properties, and so on. The distinction can always be drawn, and re-drawn, with an eye to the explanation we want to have.

This picture of higher-level explanations supported by the metaphysics of higher-level properties sketched above suffices for their autonomy and also fits them into a physicalist worldview. It avoids the pitfalls of reductionism on the one hand, and on the other it also avoids a suspicious pluralistic metaphysics by ensuring the dependence of higher-level properties on physical ones. It does not help in deciding which ontological commitments to prefer. But it is hardly an accomplishment that we should expect from a metaphysics of higher-level explanations.

## 6. Conclusion

Let me summarize the argument of this paper in a nutshell. First, I argued that the traditional metaphysics supporting special-science explanations could not be maintained. The reason is that this metaphysics relies on the concept of multiple realizability of higher-level properties. Given that these properties fall short of forming nomic kinds, multiple realizability fails as a feasible account of special-science properties. Secondly, I sketched a physicalist metaphysics that avoids this problem in virtue of relying on a non-domain-specific global supervenience thesis. The idea is a kind of 'physicalist nominalism' that grants a special ontological status to the physical but remains neutral about higher levels. In the final third step I advertise the 'programme model' of special-science explanation that fits this metaphysics fairly well: it allows us to draw and re-draw the boundaries between subvenient and supervenient properties so as to satisfy our explanatory curiosity.

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<sup>15</sup> Jackson and Pettit, 1990: 116.

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