

Physicalism and sparse ontology

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Abstract A major stumbling block for non-reductive physicalism is Kim's disjunctive property objection. In this paper I bring certain issues in sparse ontology to bear on the objection, in particular the theses of *priority monism* and *priority pluralism*. Priority pluralism (or something close to it, anyway) is a common ontological background assumption, so in the first part of the paper I consider whether the disjunctive property objection applies with equal force to non-reductive physicalism on the assumption that priority monism is instead true. I ultimately conclude that non-reductive physicalism still faces a comparable problem. In the second part, I argue, surprisingly enough, that what I call 'fine-grained reductionism', a particular version of which Kim proposes as an alternative to non-reductive physicalism, may work better in the monist framework than the pluralist one. I conclude that issues in sparse ontology, therefore, are more relevant to the debate about physicalism than one may have thought.

Keywords Physicalism · Sparse ontology · Monism · Pluralism · Intrinsicity · Realization · Distribution · Ontological dependence

A longstanding objection to non-reductive physicalism is Kim's (1992) disjunctive property objection. The objection leads Kim to reject non-reductive physicalism and endorse a version of what I call 'fine-grained reductionism'. In this paper I show that the program of sparse ontology is relevant to how we should formulate fine-grained reductionism. What is sparse ontology? Central to sparse ontology is a *hierarchical view of reality*; the basic entities form the sparse structure of being, while the derivative entities form the abundant superstructure. *Priority pluralism*

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and *priority monism* (henceforth ‘pluralism’ and ‘monism’) are both theses of sparse ontology. Roughly speaking, the former says that parts and their properties are ontologically prior to wholes and their properties, while the latter says that it goes the other way around. More specifically, the pluralist says that (i) there are mereological atoms; (ii) for any complex object x , x exists in virtue of the existence of its proper parts; and (iii) the properties of x are instantiated in virtue of the properties and relations x ’s proper parts instantiate. The monist, on the other hand, says that, for any objects x and y , if x is a proper part of y , then (i) x exists in virtue of the existence of y ; and (ii) the properties of x are instantiated in virtue of the instantiation of y ’s properties.¹

Here is a brief outline of the paper. Pluralism (or something close to it, anyway) is a common ontological background assumption, so in the first part of the paper I consider whether the disjunctive property objection to non-reductive physicalism applies with equal force on the assumption that monism is instead true. I ultimately conclude that non-reductive physicalism still faces a substantial problem, or at least as much of a problem as it faces on the assumption that pluralism is true. In the second part I argue, surprisingly enough, that fine-grained reductionism, a particular version of which Kim proposes as an alternative to non-reductive physicalism, may work better in the monist framework than the pluralist one. I conclude that issues in sparse ontology, in particular the debate between the monist and the pluralist, therefore, are more relevant to the debate about physicalism than one may have thought.

1 Non-reductive physicalism and Kim’s objection

What is non-reductive physicalism? The version I will work with (at least initially) has three components. The first component, following Levine (2001, pp. 44–45), is that mental properties are *identical* to functional (causal-role) properties. Given that functional properties are distinct from physical properties, mental properties themselves are distinct from physical properties. The second component is that functional properties are always physically realized in the actual world, so mental properties are *nothing over and above* physical properties in the actual world. But how can one property be distinct from, yet nothing over and above, another? And

¹ What I have presented above as monism and pluralism Schaffer (2008) presents as *versions* of monism and pluralism, what he calls ‘droopy’ monism and pluralism. For reasons that I will not address here, I think that the ‘droopy’ versions of these theses are the most plausible versions, and this is why I present the droopy versions as *the* versions of monism and pluralism in the main text. Contrast monism and pluralism with what Schaffer (2007, 2008) calls ‘existence’ monism and pluralism. According to the former, there is only one object, the world, while, according to the latter, there are many objects, but they are all mereological atoms. See Schaffer (2007) for an argument that existence monism is preferable to existence pluralism. Returning to (priority) monism, Schaffer (2008) offers three arguments for the thesis. He argues that common sense (in particular the idea that the many parts are arbitrary portions of the world), considerations involving quantum entanglement (in particular the idea that the world is one vast entangled system), and the epistemic possibility of gunk (the epistemic possibility of matter every part of which has a proper part) each recommend monism over pluralism. See Sider (2007) for objections to both existence and priority monism, and Schaffer UM for responses. See also Trogon (2008) for a response to one of Sider’s objections to priority monism involving the notion of intrinsicity.

how can one property be nothing over and above another property in one possible world, say the actual world, but not in another?

First, a property Q is *actually* nothing over and above property R just in case the actual world is such that if Q is instantiated, it is instantiated in virtue of R .² Hence, if a physical property P is the one and only realizer for a mental property M in the actual world, then (on the assumption that realized properties are instantiated in virtue of their realizers) M is actually nothing over and above P . Second, Q is nothing over and above R *simpliciter* just in case every metaphysically possible world is such that if Q is instantiated, it is instantiated in virtue of R .³ Hence, one might claim that if D is the disjunctive property consisting of all the metaphysically possible realizers for M , M , though distinct from D , is nothing over and above D *simpliciter*. It is important to remember that non-reductive physicalism is supposed to be a *contingent* thesis. In other words, though it is not the case that mental properties are nothing over and above physical properties *simpliciter* given that there are metaphysically possible counterfactual worlds in which mental properties are implemented non-physically, mental properties are *actually* nothing over and above physical properties.⁴

The third component to the version of non-reductive physicalism I have in mind is the autonomy of psychological laws. The *locus classicus* of this position is, of course, Fodor's (1974) "Special Sciences". For Fodor a psychological law is reducible to a physical law only if the properties that figure in the former (mental properties) are nomologically coextensive with the properties that figure in the latter (physical properties, qua natural kinds). Fodor, qua non-reductive physicalist, claims that mental properties are multiply realizable, so they are nomologically coextensive

² The in-virtue-of relation plays an important role in this paper, as evidenced by my formulations of monism, pluralism, and non-reductive physicalism. How good of a grip do we have on the in-virtue-of relation? Good enough, I maintain, to proceed. It seems pretty clear that an individual instantiates a property Q in virtue of property R only if the instantiation of R asymmetrically necessitates the instantiation of Q . Mere asymmetric necessitation, however, is not sufficient, for conjunctive properties asymmetrically necessitate their conjuncts but intuitively the latter are not instantiated in virtue of the former. The reason we have this intuition, I maintain, is because we recognize that claims about in-virtue-of relations carry explanatory force, and the instantiation of conjunctive properties do not explain the instantiation of their conjuncts in the appropriate sense. To what degree do we have a facility with the in-virtue-of notion? Our facility with a notion concerns how confidently we apply it, whether we can reach agreement on its proper use in a reasonable range of cases, whether our judgments involving it are stable and not subject to inexplicable shifts, and so on. With respect to our facility with the notion, I think it is safe to say that our grasp of it is fairly secure. Philosophers and non-philosophers alike make frequent use of the 'in virtue of' locution, and there seems to be much agreement about its application in a broad range of uncontroversial cases, e.g. when we talk about rights, responsibilities, and powers one acquires through the social roles one plays, as in 'He has the right to vote in virtue of being a citizen.' See Witmer et al. (2005) and Trogon (2008) for more on the in-virtue-of relation.

³ Here I assume that properties are *hyperintensional*; i.e. there are distinct metaphysically coextensive properties. I should note that certain views of properties are inconsistent with this assumption. One might, inspired by Lewis' (1983) seminal discussion of properties, claim that properties are identical with sets of *possibilia* (i.e. sets of all their metaphysically possible instances) and thereby claim that properties are non-hyperintensional. Lewis' own view on this matter is nuanced. He claims that the "perfectly natural", i.e. fundamental, properties are non-hyperintensional, but there are non-perfectly natural properties, e.g. structural properties, that are hyperintensional. See Sober (1982) for an argument that properties are hyperintensional.

⁴ In Levine and Trogon UM, however, we argue that physicalism is a necessary thesis.

with certain disjunctive properties, in particular disjunctive properties consisting of all their nomologically possible realizers. Fodor claims that disjunctive properties, however, are not natural kinds, so we should conclude that psychological laws are autonomous.

Having set out a conception of non-reductive physicalism, we can now consider Kim's disjunctive property objection to it. Kim argues that Fodor's argument for the autonomy of psychological laws in the end is self-defeating, for Fodor's argument, Kim maintains, throws the very existence of psychological laws into question. In my estimation, this is the best way to interpret Kim's argument. If mental properties are multiply realizable, they are *metaphysically* coextensive with disjunctive properties consisting of all their metaphysically possible realizers. Hence, they are nothing over and above these disjunctive properties *simpliciter*, so mental properties *themselves* are disjunctive in nature. But if they are disjunctive in nature, they are nonomic in the sense that predicates that express them are not *projectible*. Projectible predicates are those that can occur in inductively strong inferences. 'Green', e.g., is projectible, given that "All observed emeralds are green" inductively supports "All emeralds are green." 'Grue', of course, is not projectible; from "All observed emeralds are grue" it is not legitimate to infer "All emeralds are grue." A generalization expresses a law only if all its predicates are projectible. If mental properties are disjunctive in nature, they are nonomic given that the predicates that express them are not projectible. Consider the psychological generalization "All observed *M*'s are *M**'s". The truth of this generalization is consistent with it turning out that the numerous situations in which we have observed instances of *M* are situations in which some but not all of the disjuncts constitutive of *M* are instantiated. Hence, it is not legitimate to infer "All *M*'s are *M**'s" from the generalization. Thus, psychological generalizations fail to express genuine laws.

It is worth noting that Kim does not actually present his argument in terms of metaphysical possibility as I have above. His first statement of the argument appeals to *nomological* possibility; he claims, "If pain is nomically equivalent to *N*, the property claimed to be wildly disjunctive and obviously nonomic, *why isn't pain itself equally heterogeneous and nonomic as a kind?*" (1992, p. 323) But later, in response to the non-reductive physicalist's claim that pain is a second-order, "well-behaved" property, Kim proposes that, if we are really committed to the idea that *being in pain* is a genuine property, we ought to *identify* it with the disjunctive property consisting of its *actual* realizers, so "mental properties will turn out to be disjunctions of their physical realization bases" (1992, p. 324).

In response to Kim's first statement of the argument, I do not think that if *M* is merely nomologically coextensive with disjunctive property *D*, then, since *D* is nonomic, *M* is nonomic as well. Recall that I set up Kim's argument like this. First, show that mental properties are really disjunctive in nature. Second, point out that predicates that express disjunctive properties are not projectible. Third, conclude that mental properties are therefore nonomic and thus there are no psychological laws. But if *M* is merely nomologically coextensive with *D*, then there are metaphysically possible worlds in which *M* is instantiated and *D* is not, so it is not the case that *M* is nothing over and above *D simpliciter*. Thus, it is hard to see why

we should think that M itself is really disjunctive in nature. Presumably *every* property instantiated in the actual world is coextensive with some disjunctive property in the space of nomologically possible worlds, but surely not every property instantiated in the actual world is disjunctive!

As for Kim's second statement of the argument, the identification of pain with the disjunctive property consisting of its actual realizers is just implausible. Kim's move here is supposed to follow from a general principle according to which second-order properties are identical to first-order properties, or at least disjunctive properties consisting of them. This principle, however, is not sufficiently motivated. For Kim's argument to work, he needs a way to plausibly maintain that mental properties really are disjunctive in nature and therefore nonomic. As we have seen, one way to motivate this claim is to argue that mental properties are nothing over and above disjunctive properties *simpliciter*, disjunctive properties consisting of all their metaphysically possible realizers. If Q is nothing over and above R *simpliciter*, then it seems reasonable to say that if R is disjunctive in nature, so too is Q .

Fodor (1997) responds to Kim's objection by claiming that multiply realizable properties are something over and above their corresponding disjunctive properties. He claims that *being jade*, to use Kim's example, is clearly a disjunctive property; it *just is* the property *being jadeite or nephrite*, and, as such, 'jade' is not projectible. Mental properties, on the other hand, are multiply realizable properties, so, though mental properties are metaphysically coextensive with certain disjunctive properties, they are not themselves disjunctive in nature. So consider again M and D , the disjunctive property consisting of all the properties the non-reductive physicalist identifies as the metaphysically possible realizers M . The conclusion of Fodor's argument is that M , though metaphysically coextensive with D , is not itself disjunctive in nature. Hence, there is no worry, according to Fodor, about the projectibility of psychological predicates. Though the details of Fodor's argument for the claim that M is not itself disjunctive in nature are quite interesting, let us set them to the side for now. Instead I would like to explore whether considerations in sparse ontology might justify this claim. In particular, I would like to examine whether it is plausible to maintain that M , despite its metaphysical coextension with D , is something over and above D if monism is true.

2 Monism and non-reductionism

The proposal I have in mind depends on the assumption that organisms qua wholes exemplify mental properties, while their proper parts exemplify those properties the non-reductive physicalist identifies as their realizers. Call this the 'mental mereology assumption'. Why might one think that it is true? Well, talk of levels in the philosophy of mind is quite familiar, and, as Kim (2002) points out, the idea that the mental is situated on a particular level(s) of reality, and that the part-whole relation has something to do with the individuation conditions of these levels, goes back at least as far as Lloyd's (1923) *Emergent Evolution* and culminates in Oppenheim and

Putnam's famous 1958 paper.⁵ More recently, Lycan (1987, p. 38) and Schaffer (2003) each have claimed that orders of properties and mereological levels comport. They seem to endorse something like this: if mental properties, qua n order properties, are realized by physical properties, qua $n - 1$ order properties, then there are two levels, L and $L - 1$, such that mental properties are instantiated by objects that occupy L , and the relevant physical properties are instantiated by objects that occupy level $L - 1$. If this thesis is correct, it seems that we thereby have good reason to believe that the mental mereological assumption is true.

Though the mental mereology assumption has a solid pedigree, it has not gone unchallenged. Kim (1998, p. 83), e.g., claims that realized properties and their realizers are instantiated *by the very same objects*, so the realization relation does not track mereological levels. Is he right about this? Well, recall Shoemaker's (1984) important distinction between *core* and *total* realizers. The difference between core and total realizers salient for our discussion is this: If C is a core realizer of functional property F , it is metaphysically possible for an object x to instantiate C while no object instantiates F , while if T is a total realizer of F , it is metaphysically necessary that if x instantiates T , some y instantiates F . We can think of *undergoing C-fiber firing*, e.g., as a core realizer of pain, so any disjunctive property that includes this property among its disjuncts is *not* metaphysically coextensive with *being in pain*. Hence, the realizers constitutive of the disjunctive properties metaphysically coextensive with mental properties are total realizers. The total realizer corresponding to *undergoing C-fiber firing* is something like *undergoing C-fiber firing that plays the causal role of pain*. The claim that total realizers are instantiated by proper parts of organisms instead of organisms qua wholes may be less tenable than the corresponding claim about core realizers, for the instantiation of the former involves more of the organism (perhaps all of it) compared to the instantiation of the latter. In fact, advocates of the fashionable extended mind thesis even claim that the realization base for mental properties extends beyond the organism into its environment.

I think this constitutes a real challenge to the mental mereology assumption, but let us put it to the side for now and grant the assumption for the sake of argument. With the mental mereology assumption in place, our question now is this: supposing that mental properties and their corresponding disjunctive properties, though metaphysically coextensive, are distinct, should we nonetheless think that the

⁵ On Lloyd's system of levels the mental is located on those levels occupied by humans and non-human animals, while for Oppenheim and Putnam the mental is located on the level occupied by multi-cellular organisms. It would take us too far off course to consider their proposals here. I will say, however, that I find Kim's (2002) objections to their conceptions of levels persuasive. But if their conceptions are off the mark, how *are* we to conceive of mereological levels? A simple conception of mereological levels is this: x and y occupy the same mereological level just in case x and y are composed of the same number of atoms. In a three-atom universe, e.g., there are three mereological levels: the three atoms occupy the first level; three molecules (two-atom fusions) occupy the second level, and the universe (a three-atom fusion) occupies the third. The third level, we can say, is "higher than" the first and second in the sense that its occupant is composed of more atoms than the occupants of the first and second levels. This conception of levels is, of course, much more fine-grained than what either Lloyd or Oppenheim and Putnam (or Kim for that matter) have in mind; here it is not the case, e.g., that each of the sciences corresponds to a specific level. If mereological levels are this fine-grained, then it is not the case that mental properties are instantiated by objects that occupy a single level of reality.

former are nothing over and above the latter *simpliciter*? Consider again M and D from above. What we want to know about is the relationship between M and D ; in particular, we want to know if we should conclude that M is nothing over and above D *simpliciter* given that M is metaphysically coextensive with D . Given the mental mereology assumption, we can say this much: the relation between M and D , whatever it is, spans mereological levels.

Enter sparse ontology. Suppose for the moment that pluralism is correct. In this case, which properties should we say M is nothing over and above *simpliciter*? Remember that the pluralist claims that the properties of wholes are instantiated in virtue of the properties and relations of their proper parts. Hence, it seems that any property P that is metaphysically coextensive with M , in the sense that an object instantiates M just in case a proper part of the object instantiates P , is a natural candidate. D is such a property, so on pluralism it is natural to say that M is nothing over and above D *simpliciter*. Hence, if pluralism is correct, it seems that Fodor may be wrong to say that M is something over and above D .

But now suppose that monism is instead correct. In this case, which properties should we say D is nothing over and above *simpliciter*? Remember that the monist claims that the properties of proper parts are instantiated in virtue of the properties of their respective wholes. Hence, any property P that is metaphysically coextensive with D , in the sense that an object instantiates D just in case it is a proper part of some object that instantiates P , is a natural candidate. M is such a property, so on monism it is natural to say that in any metaphysically possible world, if D is instantiated, it is instantiated in virtue of M . Hence, if monism is true it looks like D is nothing over and above M *simpliciter*, not vice versa! If D is distinct from yet nothing over and above M *simpliciter*, it seems to follow that M is something over and above D . One might, therefore, conclude that, since according to monism mental properties are something over and above their corresponding disjunctive properties, if monism is true Kim's disjunctive property objection to non-reductive physicalism fails. Call the view according to which mental properties are something over and above their corresponding disjunctive properties (for the reasons just outlined) 'monist non-reductionism'.

One might wonder, however, whether monism is even compatible with non-reductive physicalism in the first place. Non-reductive physicalism as I presented it at the outset of the paper is formulated in terms of the realization relation. Realized properties, we will assume, are instantiated in virtue of their realizers. Suppose that the non-reductive physicalist claims that in the actual world physical property P is the one and only realizer for mental property M . Hence, she claims that M is actually nothing over and above P , given that in the actual world M is instantiated in virtue of P and P alone. Now, if monism is true, then if D from above is instantiated in any metaphysically possible world, it is instantiated in virtue of M . But if this is right, then for the monist it is not the case that in the actual world (or in any metaphysically possible world) M is instantiated in virtue of P (or any other property constitutive of D). So it seems that the monist is committed to the claim that, in any metaphysically possible world, whatever properties are candidate realizers for M in that world do not realize M . If the monist is committed to the claim that M has no metaphysically possible realizers, she will deny the claim that mental properties are actually nothing

over and above what the non-reductive physicalist takes to be their physical realizers in the actual world. But it would seem that to deny the latter claim is just to deny non-reductive physicalism. Are we, then, to conclude that monism and non-reductive physicalism are incompatible, so what I am calling ‘monist non-reductive physicalism’ does not count as a genuine version of non-reductive physicalism?

Although monism may be incompatible with non-reductive physicalism cast in terms of the realization relation, I propose that we weaken our conception of non-reductive physicalism, discharging its commitment to the claim that mental properties are realized by physical properties in the actual world. But what might a version of non-reductive physicalism look like that does not appeal to realization? In order to answer this question I first need to say something more about the in-virtue-of relation and then introduce Parsons’ (2004) notion of a distributional property. I consider each issue in turn.

First, consider the distinction between what I call ‘intra-virtue-of’ and ‘inter-virtue-of’ relations. The distinction is inspired by Kim’s claim we considered earlier that levels and orders do not comport. As we have seen, he claims both that n -order properties realize $n + 1$ order properties, and that realization is an intra-level phenomenon, in the sense that a property Q of an object x realizes property R of an object y only if x and y occupy the same mereological level. What I call the ‘intra-virtue-of’ relation is modeled after Kim’s conception of realization: x has some property intra-virtue-of y having some property only if x and y occupy the same level of aggregation/decomposition of the world. (If x and y are identical, then x and y , of course, occupy the same mereological level, so if x has Q in virtue of y having R and $x = y$, this relation is an intra-level in-virtue-of relation.) Put another way, the intra-virtue-of relation is ontological dependence between properties of objects that occupy the same mereological level. What I call the ‘inter-virtue-of’ relation, therefore, is just this: x has some property inter-virtue-of y having some property only if x and y occupy different mereological levels. Alternatively, the inter-virtue-of relation is ontological dependence between properties of objects that occupy different mereological levels.⁶

Second, let us consider what Parsons (2004) calls ‘distributional properties’, e.g. *being polka-dotted*, *being hot at one end and cold at the other*, etc. Intuitively, a distributional property is a way of *filling in* a spatially extended object with some property such as color, heat, density, and so on. Call the properties that are filled in ‘distributable’ properties.⁷ Parsons argues, to my mind persuasively, that distributional properties are something over and above *structural* properties, i.e. properties that are analyzable solely in terms of non-distributional properties.⁸ Intuitively,

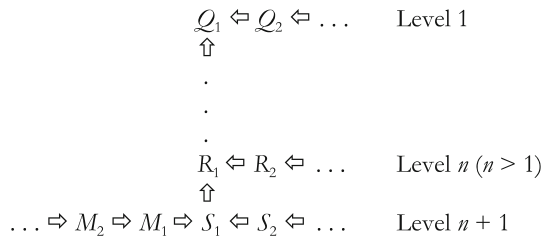
⁶ See Trogon (2008) for more on the distinction between the intra-virtue-of and inter-virtue-of relations.

⁷ Parsons claims that, *prima facie*, distributional and distributable properties are distinct: it is one thing, he suggests, to have a redness distribution (say, to be red in such-and-such places but not in others) and another to be just plain red.

⁸ One of Parsons’ arguments is as follows. Suppose that gunk (matter every proper part of which has a proper part) is possible. Consider a piece of gunk that instantiates the distributional property *being red polka-dotted on a white background*. This is no ordinary piece of gunk, however, for *every proper part* of the object also instantiates *being red polka-dotted on a white background*. Hence, there are no parts of the object that are just red and white, so the distributional property is something over and above any structural property analyzable in terms of *redness* and *whiteness*, understood as non-distributional properties, and various distance relations.

distributable properties can be instantiated intra-virtue-of as well as inter-virtue-of distributional properties. Consider, e.g., the distributable property *being just plain red*. The idea goes that if an object exemplifies this property as well as, e.g., the distributional property *having a redness distribution*, the former is instantiated intra-virtue-of the latter. Moreover, on the assumption that monism is true, if an object x exemplifies *being just plain red*, an object y exemplifies *having a redness distribution*, and x is a proper part of y , the former is instantiated inter-virtue-of the latter.⁹ It also seems that distributional properties can be instantiated intra-virtue-of as well as inter-virtue-of other distributional properties. Consider again the distributional property *having a redness distribution*. If an object exemplifies this property as well as the more specific distributional property *being red polka-dotted*, the former is instantiated intra-virtue-of the latter. Having considered the idea that some distributional properties are more specific than others, consider two *maximally* specific red polka-dot distributional properties, Q and R . These properties are maximally specific in that they completely specify the mereological structure of the objects that exemplify them as well as the color of all their parts. Here the monist will claim that if x exemplifies Q , y exemplifies R , and x is a proper part of y , then Q is instantiated inter-virtue-of R .

Now that we understand the distinction between the intra-virtue-of and inter-virtue-of relations, as well as the distinction between distributional and distributable properties and the in-virtue-of relations these properties can enter into, consider the figure below:



The various levels depicted in the figure are mereological levels. The world as a whole occupies level 1, and this level, according to the monist, is the fundamental level of reality. The Q 's are global distributional properties. The R 's and S 's, on the other hand, are non-global distributional properties, and the former are instantiated by objects that occupy mereological level n , while the latter are instantiated by objects that occupy mereological level $n + 1$, n 's adjacent more decomposed neighbor. The M 's are mental distributable properties. The subscripts indicate the

⁹ Another way to say that one property is instantiated in virtue of another is to say that an instance of the former exists in virtue of the existence of an instance of the latter. Suppose that an object x exemplifies *being just plain red*, and x instantiates this property intra-virtue-of it instantiating *having a redness distribution*. Suppose further that there is some y such that x is a proper part of and y and y exemplifies *having a redness distribution*. The monist will claim that in this case there are instances of *being just plain red* and *having a redness distribution*, r_1 and r_2 , respectively, that exist in virtue of the existence of a distinct instance of *having a redness distribution*, r_3 . So on this picture an instance of a property (r_2) can exist in virtue of the existence of a distinct instance of the very same property (r_3).

specificity of the properties; ‘1’ indicates that the property in question is maximally specific, so Q_1 , e.g., is more specific than Q_2 , and so on. Both ‘ \Rightarrow ’ and ‘ \Leftarrow ’ stand for intra-virtue-of relations. ‘ $Q_2 \Rightarrow Q_1$ ’, e.g., means that the Q_2 is instantiated intra-virtue-of Q_1 , and ‘ $Q_1 \Leftarrow Q_2$ ’ means the same thing. ‘ \hat{u} ’ stands for the inter-virtue-of relation, so when, e.g., ‘ S_1 ’ is placed below ‘ \hat{u} ’ and ‘ R_1 ’ is placed above it, this means that S_1 is instantiated inter-virtue-of R_1 .

Now we can finally return to the idea that monist non-reductive physicalism should count as a genuine version of non-reductive physicalism even though it is not cast in terms of the realization relation. Consider the mental property M_1 in the figure above. M_1 , according to the monist, is a distributable property, and there are various more general mental distributable properties, e.g. M_2 , that are instantiated intra-virtue-of its instantiation. M_1 , however, is itself instantiated intra-virtue-of a distributional property, S_1 . According to the figure, there are other more general distributional properties, e.g. S_2 , that are instantiated intra-virtue-of its instantiation. S_1 is instantiated inter-virtue-of the distributional property R_1 , and there are other more general distributional properties, e.g. R_2 , that are instantiated intra-virtue-of its instantiation. R_1 is instantiated ultimately inter-virtue-of Q_1 , a global distributional property. There are other more general global distributional properties, e.g. Q_2 , that are instantiated intra-virtue of its instantiation. The monist non-reductive physicalist claims that Q_1 is a physical property, and there is a chain of in-virtue-of relations connecting M_1 and this physical property. If mental properties are always instantiated in virtue of physical global distributional properties in the actual world, mental properties are actually nothing over and above physical properties. So the monist non-reductive physicalist’s overall claim is this: the world instantiates physical global distributional properties, and they are the ultimate distributors of the mental properties. In particular, she claims that the mental properties, qua distributable properties, are instantiated intra-virtue-of various non-global distributional properties which in turn are instantiated ultimately inter-virtue-of various physical global distributional properties.

The monist non-reductive physicalist can hold on to the idea that mental properties are causal-role properties, for she can make sense of the idea that causal-role properties, like categorical properties, can be distributed. Also, assuming that global distributional properties figure in laws, and it is nomologically possible for mental properties to be distributed by different global properties, Fodor’s argument we reviewed earlier suggests that the psychological laws are not reducible to the laws governing global distributional properties. (The same considerations apply to the relationship between mental properties, qua distributable properties, and the non-global distributional properties they are instantiated intra-virtue-of and inter-virtue-of.) I conclude that what I call ‘monist non-reductive physicalism’ should be counted as a genuine form of non-reductive physicalism, given that the monist can trade in talk of “realization” for talk of “distribution” in the manner I have suggested. Recall, then, the second component of my initial characterization of non-reductive physicalism: mental properties are physically realized in the actual world, so they are nothing over and above physical properties in the actual world. Given our discussion above, we should recast this condition, making it more general: mental properties stand in some asymmetric relation to physical properties in the

actual world (be this relation realization, distribution, or something else) such that the former are nothing over and above the latter in the actual world.¹⁰

So much for the claim that monism is incompatible with non-reductive physicalism. Having defended the coherence of monist non-reductionism, what of its plausibility? Unfortunately, the monist non-reductionist faces a serious and familiar problem, one you might already have guessed: the monist non-reductive physicalist also faces a problem about the projectibility of psychological predicates! Suppose for the moment that monism is true, and the actual world's maximally specific global distributional properties are all physical. As I said above, in this case the monist can claim that in the actual world, any mental property M is actually nothing over and above some physical property. But now consider the *disjunctive* property, D^* , consisting of all the metaphysically possible maximally specific global distributors of M . Since M is nothing over and above D^* *simpliciter*, it would seem that psychological generalizations inherit the nonomicity of the generalizations in which properties like D^* figure, generalizations involving disjunctions of predicates expressing particular global distributional properties. Here we have Kim's problem all over again.

3 Fine-grained reduction and intrinsicity

So it looks like the disjunctive property objection applies with equal force to non-reductive physicalism on the assumption that monism is true. Are we to conclude that sparse ontology is irrelevant to physicalism and the disjunctive property objection? I think not. I will argue that what I call 'fine-grained reductionism' may work better in the monist framework than the pluralist one. Kim himself presents a version of fine-grained reductionism as an alternative to non-reductive physicalism, so let us begin by briefly reviewing Kim's version of the thesis.

The non-reductive physicalist, be the thesis at issue the realization conception of non-reductive physicalism or monist non-reductive physicalism, endorses what I call the 'one-to-many claim': mental and physical properties stand in a special one-to-many relation in the sense that it is metaphysically possible for any one of the former to be instantiated in virtue of the instantiation of more than one of the latter. Suppose that an advocate of the one-to-many claim maintains that it is metaphysically possible for mental property M to be instantiated in virtue of n number of physical properties, P_1, P_2, \dots, P_n . One way to be a reductionist is to deny the one-to-many claim and maintain instead that, though there is no mental property

¹⁰ Another concern one might have about monist non-reductive physicalism concerns the status of D on the proposal. We have a pretty firm grip on what it would be for M to be nothing over and above D *simpliciter*. In this case M , despite first appearances, would turn out to be disjunctive in nature. But what would it be for D to be nothing over and above M *simpliciter*? Considerations of symmetry suggest that, on the assumption that M is monadic, D , despite first appearances, would turn out not to be disjunctive after all. Is this a genuine epistemic possibility? I think so. Assuming that property realism is true, we need not think that the structure of a property can be read off the logical structure of the predicates that express the property. Hence, just because ' $D_1, \dots \vee D_n$ ' expresses D , it does not follow from this fact alone that D is itself disjunctive in nature.

M tout court, there are many mental properties in the vicinity, for each of the *P*'s is identical to some mental property. Let us call this 'fine-grained reductionism'.

Kim endorses a version of fine-grained reductionism, what he calls 'local reductionism'. Suppose that the advocate of the realization conception of non-reductive physicalism claims that the *P*'s from above are all the metaphysically possible realizers of *M*. In response, Kim (1992, 1998, pp. 94–95) would say that, though there is no *M* as such, each of the *P*'s is identical to a mental property. Consider, e.g., the property *being in pain*. Suppose that the advocate of the realization conception claims that the realizers for this property are type-distinct in, say, humans, dogs, and Martians. Kim's proposal is that, though there may be no *being in pain tout court*, there is *being in human pain*, *being in canine pain*, and *being in Martian pain*. On this proposal strictly speaking there are no realizers for mental properties, for the "realizers" in question *just are* the mental properties.¹¹

The monist non-reductive physicalist and the local reductionist, therefore, each claim that mental properties are not realized by physical properties, but for different reasons. The former eschews talk of realization because she claims that the relevant asymmetric relation between the mental and the physical is instead that of distribution. By contrast, the latter eschews talk of realization because she claims that candidate physical realizers for mental properties, rather than realizing mental properties like *being in pain*, are identical to mental properties like *being in human pain*.

Now that we have a grip on fine-grained reductionism and Kim's version of it, we should consider whether fine-grained reductionism is plausible. A familiar criticism of local reductionism in particular is that intuitively there *is* something to be in pain *tout court* in the sense that when creatures are in pain, they have something *intrinsic* in common. Call this the 'intrinsicity objection' to local reductionism.¹² I take this objection quite seriously—it seems obvious that humans and Martians are phenomenally, intrinsically similar in having human pain and Martian pain, respectively—so I maintain that any form of fine-grained reductionism, be it local reductionism or some other version, is viable only if the objection can somehow be met. Below I argue that if monism is true, then another form of fine-grained reductionism avails itself, what I call 'global reductionism', and this thesis is consistent with the claim that humans and Martians do have something intrinsic in

¹¹ See, however, Kim (2005), for here he qualifies his position in an important way: he claims that the proposal outlined above works for non-phenomenal mental properties, but not for phenomenal ones. As a consequence, Kim goes on to reject physicalism. To simplify our discussion, however, I will not address this issue in the main text.

¹² A familiar related objection to non-reductive physicalism is that mental properties are intrinsic, so, given that causal-role properties are non-intrinsic, mental properties are distinct from causal-role properties. Formulated in this way, the objection does not work because causal-role properties, *qua* dispositional properties, are arguably intrinsic. It seems that the property of meeting a certain functional specification is intrinsic as well. Both *being in human pain* and *being in Martian pain*, e.g., presumably meet a common functional specification, so are we therefore to conclude that humans and Martians *do* have something intrinsic in common when they are in human pain and Martian pain, respectively? If so, does the intrinsicity objection fail? I think the thing to say here is that, though in this case the human and Martian would have an intrinsic similarity, they would not have the type of intrinsic similarity relevant to the intrinsicity objection. The relevant intrinsic similarity, so the idea goes, is not that they tend to be caused by similar things and cause similar things, but rather that they are *phenomenally* similar. I conclude, therefore, that the intrinsicity objection still stands.

common in undergoing human pain and Martian pain respectively. My ultimate conclusion will be that, since it seems that global but not local reductionism can meet the intrinsicity objection, the fine-grained reductionist, *ceteris paribus*, should be a monist rather than a pluralist.

4 Global reductionism

How does global reductionism work? Let us return to the notion of a distributional property. The monist non-reductive physicalist claims that mental properties are distributable properties instantiated by proper parts of the world; these properties are instantiated intra-virtue-of various non-global distributional properties; these properties in turn are instantiated inter-virtue-of further non-global distributional properties; and the latter are instantiated ultimately inter-virtue-of various physical global distributional properties. Recall that, on local reductionism, mental properties, instead of being realized by various properties, are identical to their “realizers”. This suggests a corresponding move for the monist sympathetic with fine-grained reduction: she can endorse global reductionism, the thesis that mental properties, instead of being instantiated intra-virtue-of what the monist non-reductive physicalist calls their non-global “distributors”, are identical to them. Let me explain.

Consider again the bottom portion of the figure we discussed above:

$$\begin{array}{c} \uparrow \\ \dots \Rightarrow M_2 \Rightarrow M_1 \Rightarrow S_1 \Leftarrow S_2 \Leftarrow \dots \quad \text{Level } n + 1 \end{array}$$

The global reductionist claims that M_1 , instead of being instantiated intra-virtue-of S_1 , is identical to S_1 , and S_1 , like the global distributional property it is instantiated ultimately inter-virtue-of, is physical. Notice that when the local reductionist claims that a mental property M is identical to the physical property P that the advocate of the realization conception of non-reductive physicalism claims is a realizer of M , she is not committed to the claim that $P(M)$ does not realize any property. Supposing that $P(M)$ does realize some property Q , her claim is merely that M and Q are distinct. Likewise, when the global reductionist claims that M is identical to the property P that the monist non-reductive physicalist claims is a distributor of M , she is not committed to the claim that $P(M)$ does not distribute any property. Supposing that $P(M)$ does distribute some property T , her claim is merely that M and T are distinct. With these thoughts in mind, the global reductionist might revise the bottom portion of the figure as follows:

$$\begin{array}{c} \uparrow \\ \dots \Rightarrow T_2 \Rightarrow T_1 \Rightarrow S_1 (= M_1) \Leftarrow S_2 (= M_2) \Leftarrow \dots \quad \text{Level } n + 1 \end{array}$$

Notice that if M_1 is identical to S_1 , the more general ways an object can be M_1 are identical to the more general ways in which an object can be S_1 , so M_2 is identical to

S_2 , and so on. To repeat, for the local reductionist, “realized” mental properties, rather than being instantiated in virtue of physical “realizers”, are identical to them. For the global reductionist, mental “distributed” properties, rather than being instantiated intra-virtue-of physical “distributors”, are identical to them. If the advocate of the realization conception of non-reductive physicalism were to claim that a mental predicate expresses a causal-role property, the local reductionist would respond that either the predicate fails to express any property whatsoever, or it expresses the categorical property wrongly believed to be the role-filler for the property she claims is expressed by the predicate. If the monist non-reductive physicalist were to claim that a mental predicate expresses a distributable property, the global reductionist would respond that either the predicate fails to express any property whatsoever, or it expresses a physical distributional property the misguided monist claims the property expressed by the predicate is instantiated intra-virtue-of. Just as the local reductionist claims that there are no mental properties as the advocate of the realization conception of non-reductive physicalism conceives of them, the global reductionist claims that there are no mental properties as the monist non-reductive physicalist conceives of them.

Now that we know what global reductionism is, we can return to the intrinsicity objection to fine-grained reductionism. Suppose that Gary and Albert exemplify the mental properties M and M^* , respectively, and we are inclined to say that they are both in pain by virtue of exemplifying them. On global reductionism, it seems that M and M^* are distinct. Remember that on global reductionism mental properties are identical to maximally specific non-global physical distributional properties, and any maximally specific distributional property Gary instantiates is likely to be type-distinct from any maximally specific distributional property Albert instantiates and vice versa, given the likelihood that the number and properties of their parts differ. But the global reductionist can claim that Gary and Albert do have something intrinsic in common with respect to instantiating M and M^* : in instantiating these properties, they both figure in the instantiation of a common intrinsic maximally specific global distributional property. That is, M and M^* both are instantiated ultimately inter-virtue-of a common intrinsic global distributional property. But why think that the relevant global distributional properties are intrinsic?

The answer is this: maximally specific global distributional properties are fundamental, and all fundamental properties are intrinsic. The fundamental properties, roughly speaking, are those properties that, though not themselves instantiated intra-virtue-of or inter-virtue-of any properties, are such that all other properties are either instantiated intra-virtue-of or inter-virtue-of their instantiation.¹³ But why think that fundamental properties are intrinsic?

¹³ This rough gloss of fundamentality is not intended as a serious account. How we are to precisely characterize fundamentality is a difficult matter. Not being instantiated intra-virtue-of or inter-virtue-of any property is a necessary but not a sufficient condition for being fundamental, given that non-qualitative non-fundamental properties like *being identical to Kelly* arguably are not instantiated in virtue of any properties. Assuming that there are non-fundamental properties that are not instantiated in virtue of any properties, we need to modify our initial characterizations of monism and pluralism. In this case, clause (iii) of the characterization of pluralism should read ‘the properties of x , if instantiated in virtue of any properties, are instantiated in virtue of properties and relations x ’s proper parts instantiate’, and a modification of the same sort is necessary for clause (ii) of the characterization of monism.

Here is one consideration.¹⁴ If Q is a fundamental property, Q is not instantiated in virtue of the instantiation of any other property. From this it trivially follows that Q is not instantiated in virtue of how any wholly distinct contingent object is. (Objects x and y are wholly distinct from one another just in case they share no parts.) Hence Q , qua fundamental property, conforms to a condition that is constitutive of one of our central intuitions about intrinsicity: an intrinsic property is one such that an object having it does not depend on how other contingent objects are. So given that fundamental properties are not instantiated in virtue of the instantiation of other properties, their instantiation does not depend on the instantiation of other properties (of wholly distinct contingent objects), so it seems that they are not non-intrinsic.

I also think that a common motivation for thinking that at least some fundamental properties are non-intrinsic is not convincing. One might think that *relational* non-intrinsic properties in particular could turn out to be fundamental. For suppose that pluralism is true. Consider those relations instantiated by mereological atoms that are not instantiated in virtue of the intrinsic properties of the atoms themselves. Are these relations not fundamental and non-intrinsic? Following Lewis (1986, p. 62), we can say the following. Consider the (arguably) fundamental relation of distance. Suppose that the distance between mereological atoms x and y is R . Though R is not instantiated in virtue of any of the properties of x and y taken individually, R is instantiated in virtue of the intrinsic properties of the *fusion* of x and y . In Lewis' terminology, distance is an 'external relation', and external relations (according to Lewis, anyway) are intrinsic.¹⁵

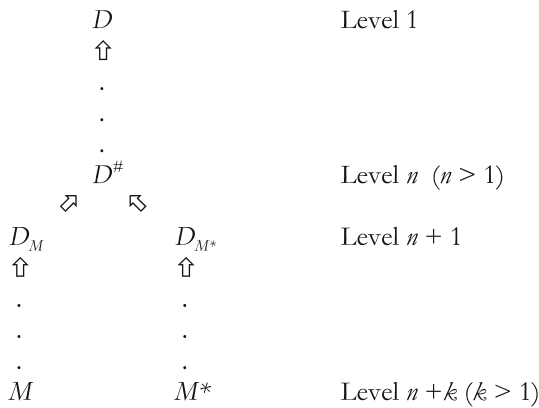
Assuming that fundamental properties are intrinsic, Gary and Albert, in instantiating M and M^* respectively, do have an intrinsic feature in common in the sense that they both are involved in the instantiation of a certain intrinsic property. Thus, it seems that global reductionism is consistent with intuition that Gary and Albert are intrinsically alike mentally.

As we have discussed, it is intuitive that creatures are intrinsically alike in being in pain. But it seems equally obvious that creatures, qua subjects in pain, can be different as well; Gary's pain (M), e.g., might be a throbbing pain, while Albert's pain (M^*) is dull and constant. One might object that the global reductionist might be able to account for the relevant intrinsic similarities only at the cost of not being able to account for the relevant differences. Here the idea is that, though the intrinsic fundamental physical global distributional property D that M and M^* are instantiated ultimately inter-virtue-of may ground the intrinsic similarity between Gary and Albert qua subjects in pain, it does not account for the relevant differences between them qua subjects in pain.

¹⁴ The following considerations in favor of the intrinsicity of fundamental properties are reproduced from Trogdon (2008).

¹⁵ One might argue that certain vector properties, e.g. *having velocity* v (where v is some vector) are both fundamental and non-intrinsic. I do not have the space here to pursue this issue in any detail, but I can say that I think this is a difficult matter and that it is certainly not obvious that fundamental vector properties are non-intrinsic. As evidence of this, recall Weatherston's (2006) interesting discussion of what he calls the 'asymmetric magnets problem'. He claims that we are to conclude that fundamental vector features are intrinsic in one important sense (they conform to a modified version of Lewis' duplication thesis) but not in another (changing their direction does not change the intuitively intrinsic properties of objects).

I agree that it seems that D does not ground the relevant difference between Gary and Albert. This would be a problem for the global reductionist only if there were not other non-global distributional properties that do ground the relevant difference. Happily, it seems that for the global reductionist there are such properties. To see why this is so, recall the revised figure we discussed above. According to the revised figure, $S_1(M_1)$ is instantiated inter-virtue-of R_1 , which in turn is instantiated ultimately inter-virtue-of Q_1 . The idea is that R_1 is one among many properties that form links in a chain of inter-virtue-of relations that connects $S_1(M_1)$ and Q_1 . So, getting back to M and M^* , there are many non-global distributional properties that form links in a chain of inter-virtue-of relations that connects M to D , and the same holds for M^* . The two chains at issue here may converge on some non-global distributional property before they reach D , but they will contain distinct non-global distributional properties as links. Consider the following figure:



According to the figure, M is instantiated inter-virtue-of the non-global distributional property D_M , and M^* is instantiated inter-virtue-of the distinct non-global distributional property D_{M^*} . Here the idea is that a proper part of the world including Gary but not Albert as a proper part instantiates D_M , while another proper part of the world including Albert but not Gary as a proper part instantiates D_{M^*} . D_M and D_{M^*} , however, are each instantiated inter-virtue-of the non-global distributional property $D^\#$, which in turn is instantiated ultimately inter-virtue-of the global distributional property D . So the global reductionist can claim the difference between M and M^* vis-à-vis D_M and D_{M^*} accounts for the relevant difference between Gary and Albert.

One might respond that it is in particular the relevant *intrinsic* difference between Gary and Albert that needs accounting for, given that presumably the throbbing aspect to Gary’s pain is intrinsic to Gary, and the dull, constant aspect to Albert’s pain is intrinsic to Albert. This would be a problem for the global reductionist only if D_M and D_{M^*} from above are non-intrinsic. Though I argued for the intrinsicity of maximally specific physical global distributional properties by appealing to their fundamentality, I, of course, do not wish to deny that there are non-global intrinsic distributional properties.

Why think that D_M and D_{M^*} in particular are intrinsic? As I have already stated, the notion of intrinsicity has something to do with the notion of independence. An intrinsic property, it is said, is had in a way that is independent of the way wholly distinct contingent individuals are. Moreover, it is thought that whether an individual instantiates an intrinsic property is independent of whether there are any wholly distinct contingent individuals in the first place. Langton and Lewis (1998) may have this intuition in mind in claiming that intrinsic properties are *independent of accompaniment*. Let an *accompanied* individual be one that coexists with some contingent individual wholly distinct from it and a *lonely* individual be one that is not accompanied. We can then say that a property Q is independent of accompaniment just in case each of the following four situations is possible: a lonely individual has Q ; a lonely individual lacks Q ; an accompanied individual has Q ; and an accompanied individual lacks Q .

Suppose that a proper part of the world instantiates the paradigmatic distributional property *being hot at one end and cold at the other*. So long as the distributable properties *being hot* and *being cold* are independent of accompaniment, it seems that the distributional property in question is independent of accompaniment as well. More generally, for any non-global distributional property R where R can be glossed as ‘having such-and-such distribution of F -ness’, it seems that if F itself is independent of accompaniment, so too is R . So as long as the distributable properties that D_M and D_{M^*} distribute are independent of accompaniment, it looks like D_M and D_{M^*} are also independent of accompaniment. Let us suppose for the sake of argument that D_M and D_{M^*} are independent of accompaniment. A property being independent of accompaniment, though not a sufficient condition for intrinsicity, is a *prima facie* indication of it.¹⁶ Assuming that D_M and D_{M^*} are indeed intrinsic, the global reductionist can explain the relevant intrinsic difference between Gary and Albert.¹⁷

¹⁶ As Langton and Lewis (1998) point out, independence of accompaniment is not sufficient for intrinsicity. Consider, e.g., the disjunctive property *being cubical and lonely or non-cubical and accompanied*. This property is intuitively non-intrinsic but nonetheless independent of accompaniment. It is independent of accompaniment because a lonely individual can have it by being a cube that is lonely, a lonely individual can lack it by being a non-cube that is lonely, an accompanied individual can have it by being a non-cube and accompanied, and an accompanied individual can lack it by being a cube and accompanied.

¹⁷ I have argued that whether a distributional property is independent of accompaniment depends on whether the distributable properties that are instantiated either intra-virtue-of or inter-virtue-of its instantiation are independent of accompaniment. Recall that in the modified version of our first figure, T_1 and T_2 are distributable properties instantiated intra-virtue-of $S_1(M_1)$:

$$\begin{array}{c} \uparrow \\ \dots \Leftrightarrow T_2 \Leftrightarrow T_1 \Leftrightarrow S_1 (= M_1) \Leftrightarrow S_2 (= M_2) \Leftrightarrow \dots \end{array} \quad \text{Level } n + 1$$

But what are T_1 and T_2 like? I must confess that I am not quite sure. So in arguing that M_1 is itself intrinsic, it turns out that whether T_1 and T_2 are independent of accompaniment is not as straightforward a matter as one might have thought. (It is worth noting that if the local reductionist claims that M is identical to its “realizer” P , and $P(M)$ does genuinely realize some distinct property Q , it is also unclear how we are to think about Q .) Not knowing exactly how to proceed here, I set this issue to the side for now.

5 Is global reductionism true?

Let us sum things up. If monism is true, then what many have taken to be the direction of reduction is turned on its head. Such a change in thinking is bound to open up new possibilities, and let us see all too familiar issues in a new light. The goal of this paper is to show that the debate surrounding the disjunctive property objection and physicalism is such an issue. I have argued that, *ceteris paribus*, fine-grained reductionism fares better on monism than pluralism. The intrinsicity objection to fine-grained reductionism, I maintain, has teeth if pluralism is true, but perhaps not if monism instead is true.

Supposing that monism is true and my diagnosis of the intrinsicity objection is correct, should we endorse global reductionism? This, for me anyway, is a difficult matter. Assuming that we have good reason to believe that physicalism is true (as I am inclined to think), if monism is true, then at the very least I have shown that we have one reason to prefer a reductionist conception of physicalism to a non-reductionist one. But no matter how we formulate physicalism, we still face what Levine (2001) calls the ‘explanatory gap’. With respect to physicalism, I find myself in a position much like Levine’s—I think that physicalism is probably true, but for the life of me I cannot comprehend *how* it could be true. This issue, however, is best saved for another day.¹⁸

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