

Can Psychology Be a Unified Science?

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Jaegwon Kim has argued that if psychological kinds are multiply realizable then no single psychological theory can describe regularities ranging over psychological states. Instead, psychology must be fractured, with human psychology covering states realized in the human way, martian psychology covering states realized in the martian way, and so on. I show that even if one accepts the principles that motivate Kim's argument, his conclusion does not follow. I then offer a dilemma that forces Kim to concede the possibility of a unified psychology. I close with a discussion of what, according to Jerry Fodor, is "really bugging" Kim.

1. Introduction. Jaegwon Kim (1992) has argued that if psychological kinds are multiply realized, then they are not truly causal kinds, and if they are not truly causal kinds then they are not proper scientific kinds. Consequently, there cannot be psychological laws, and so there cannot be psychological theory. The best one can hope for, Kim thinks, are a plethora of distinct and local psychological theories. There will be one kind of psychology, Ψ_h , for human beings, another kind, Ψ_m , for martians, and so on for all those things to which it makes sense to attribute psychological states. In short, if $\{R_1, R_2, \dots, R_n\}$ is the set of all possible realizations of a given psychological state, then there will be a psychological theory that corresponds to each such member of this set, but no single psychological theory that ranges over all, or even some subset, of this set.

Although Kim's argument plays out in the context of psychology, he intends for it to have bite with respect to any special science. Only laws of physics, Kim would contend, apply universally. Biology, sociology, economics, and, even, chemistry must suffer the same fractured fate as psychology. Thus, it seems, a response to Kim carries implications for a

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wide range of sciences, as well as for a wide range of philosophical issues involving reduction, property identity, and multiple realization.

In this paper I present the metaphysical assumptions that bring Kim to his startling conclusions, revealing a flaw in the argument that leads Kim to recommend localized rather than a unified psychology. I then develop a counter-argument to Kim's position that seems available to the functionalist. I close with a discussion of what, according to Jerry Fodor, is really "bugging Kim" (1997, 161).

2. Kim's Master Argument. Kim's argument rests on two metaphysical principles.

Causal Individuation of Kinds: Kinds in science are individuated on the basis of causal powers, i.e. objects share a property insofar as they have similar causal powers (1992, 17).

Causal Inheritance: If mental property M is realized in a system at t in virtue of physical realization base P , the causal powers of this instance of M are identical with the causal powers of P (1992, 18).

The first principle, Kim thinks, is "plausible," and, "in any case, widely accepted," (1992, 17). And one denies the second principle, Kim notes, only at the cost of admitting into one's ontology "causal powers that magically emerge at a higher-level and of which there is no accounting in terms of lower-level properties and their causal powers and nomic connections" (1992, 18). I am prepared to grant Kim both of his principles. My interest is whether acceptance of them leads to the disintegration of psychology into a collection of individual, species-local, psychological theories.

The argument that proceeds from the principles to the denial of a unified psychology, which I shall call the *Master Argument*, begins with the assumption that multiple realization is possible. This assumption is tantamount to the possibility of a unified psychology, for the claim that mental kinds are multiply realizable is simply the claim that the same mental kinds may span species and thus may be subject to the same psychological laws. So, now for the argument:

1. Mental kind M is multiply realized by distinct physical kinds P_h and P_m .
2. By Causal Individuation of Kinds, the causal powers of P_h must differ from the causal powers of P_m .
3. By Causal Inheritance, the mental state P_h realizes cannot have all the same causal powers as the mental state P_m realizes.
4. Thus, again by Causal Individuation of Kinds, P_h and P_m cannot realize the same mental state.

5. Therefore, “[e]ach mental kind is sundered into as many kinds as there are physical realization bases for it, and psychology as a science with disciplinary unity turns out to be an impossible project” (1992, 18).
6. Hence, *M* cannot be multiply realized (from the contradiction between 1 and 5).

The Master Argument is thus a reductio: from the assumption that *M* is multiply realized, it follows (having accepted Causal Individuation of Kinds and Causal Inheritance), that *M* cannot be multiply realized. However, it is possible to accept both of Kim’s principles and reject the Master Argument. The error in the argument occurs in premise (4). By way of sneaking up on the problem, think back to the debate in the 1980s and 1990s between content internalists and content externalists. Although I cannot remember who won this debate, or whether there even was a winner, I do remember one moral of the dispute: There are good reasons to distinguish between the intrinsic and extrinsic causal powers of an object. A dollar bill and its counterfeited molecular duplicate have different extrinsic causal powers in the following sense: Spending the former buys you a roll of twenty nickels, but spending the latter gets you arrested. However, they have identical intrinsic causal powers insofar as they combust at the same temperature, cause a scale to display the same weight, reflect the same wavelength frequencies, and so on. As far as a physicist or chemist is concerned, dollar bills and their counterfeited molecular duplicates are the same causal kinds. As far as the FBI is concerned, they are different causal kinds.

Of course, dollar bills may not be scientific kinds, but this does not blunt the point I have just made. There are kinds in ecology, like *predator*, and in astronomy, like *planet*, that seem to depend on extrinsic features for their individuation. Predators are what they are because they cause the death of prey. It is conceivable that a molecular duplicate of a tiger might, on some other planet, not be a predator, despite the difficulty one might have in accounting for its large canines and sharp claws (perhaps they are the product of an artificial selection program for organisms that look like predators).

These observations suggest at least that Causal Individuation of Kinds may not have the result that premise (4) attributes to it. Thinking some more about tigers, it is plausible that they count as predators, i.e. share the property *predator*, with other objects, like wolves and crocodiles, in a science like ecology. One can imagine an ecologist claiming that predators, in virtue of being predators, observe the Lotka-Volterra equations that describe fluctuations in predator and prey populations. Because tigers are predators (or, perhaps, they are predators because . . .), they will

cause the kind of depletion in a prey population that will eventually cause a decrease in their own population, which will in turn cause an increase in the prey population, and so on.

However, despite having causal powers that, from the perspective of ecology, make tigers the same kind as wolves and crocodiles, tigers will not be the same kind from the perspective of other sciences. Systematists will certainly distinguish tigers from crocodiles, not just on cladistic grounds, but for the simpler reason that, whereas tigers cause other tigers, crocodiles do not. Anatomists and physiologists are also very likely to think of tigers and crocodiles as different kinds of things.

To be sure, Kim might not think much of this point, noting that systematists, anatomists, physiologists, and others are not identifying tigers on the basis of a tiger's causal powers. Rather, they are relying on extrinsic properties of the tiger—its phylogenetic history, its possession of certain kinds of parts or organs, and so on, that should not be allowed to determine scientific kinds.¹ However, this response invites many questions that I doubt Kim would want tied to Causal Individuation of Kinds. First, it seems clear that tigers are the ecological kind that they are—predators—in virtue of an extrinsic but nonetheless causal power: they kill prey. So, being extrinsic and being causal are not mutually exclusive properties. Second, even if Kim were right that the sorts of properties that systematists, anatomists, and physiologists identify are not causal properties, to deny for this reason that systematics, anatomy, and physiology are sciences will strike many as a good reason to reject instead Causal Individuation of Kinds.

But, rather than trying to sort all this out, it suffices for the point I am making about Causal Individuation of Kinds to note that different sciences will assign different properties to the same objects even when these properties are intrinsic to the object. To the chemist, DNA is an acid because (on the Lewis definition of acids) it is electron deficient. To a geneticist, DNA is the unit of heredity, because of its causal role in reproductive processes. The chemist need not deny that DNA is the unit of heredity, nor need the geneticist deny that DNA is an acid. Nevertheless, a chemist interested in the properties of acid might not even *know* that DNA is the stuff of genes, and a geneticist curious about how genes replicate themselves might not even *know* that DNA is an acid. The point is that the causal powers of DNA, *qua* acid, do not matter to the geneticist, and the causal powers of DNA, *qua* gene, might hold no interest for the chemist.

If I am right about this, Causal Individuation of Kinds does not entail

1. Here I am assuming species to be kinds rather than individuals. Whether it is correct to do so does not matter for the point I am making here.

what Kim thinks it does. In particular, it does not entail that the causal powers that make something a kind in one science will make it a kind in all sciences. The causal powers that make DNA an acid pretty clearly do not make DNA a gene, for if they did then sulfuric acid, hydrochloric acid, and so on, would all be capable of doing what genes do, which they are not.

So, what happens to the Master Argument once we recognize that the same object may instantiate a property in the domain of one science but not another (e.g. sulfuric acid counts as a kind in chemistry but not in genetics) and that the same object may count as one kind in one science but a different kind in another (DNA is an acid in chemistry but not a gene, and it is a gene in genetics but not an acid)? Recall that step (4) of the Master Argument moves from Causal Individuation of Kinds to the claim that kinds with distinct causal powers cannot realize the same higher-level (mental, in this case) kind. But there is now plenty of reason to doubt this premise. Sulfuric acid and deoxyribonucleic acid differ in their causal powers. One has the causal powers of a gene and the other does not. However, it does not follow from this difference that they do not share a scientific property—they are both acids after all. This shows that Causal Individuation of Kinds cannot take Kim to his desired conclusion. He thinks it does because, by Causal Individuation of Kinds, P_h and P_m must be different kinds, and, by Causal Inheritance, this means that the kinds *they* realize will differ in their causal powers, and so, by Causal Individuation of Kinds again, the realized kinds cannot be the same kind. However, I have just argued that this is a fallacy. It *is* true in virtue of Kim's two principles that P_h and P_m are not the same kind from the perspective of *all* sciences. However, Kim has not shown that, relative to psychology, P_h and P_m are different kinds.

Given that (4) is false, (6) does not follow. Perhaps, relative to psychology, the set of realizations $\{R_1, R_2, \dots, R_n\}$ constitutes a set of identical mental kinds. Whether this is so, not surprisingly, turns out to be an empirical matter, just as it is an empirical matter that sulfuric acid and DNA are not the same kind of thing from the perspective of genetics but are from the perspective of chemistry. So, even though Kim's Master Argument is fallacious, his conclusion might be right—this all depends on whether different realizers of the same psychological state are properly described as the same psychological state relative to the psychologist's criteria of individuation for psychological states.

Before exploring the consequences of this last point a bit further, I want to consider one response that is available to Kim at this time. Kim might object that my discussion of acids begs a crucial question, and so the lesson I draw from this discussion about the possibility of a unified psychology does not follow. Here is what I have in mind. Sulfuric acid and

DNA, Kim might say, are not the same kind of thing. One is sulfuric acid and the other is DNA. Sulfuric acid is the kind it is because it is realized by sulfur, among other things, and DNA is the kind it is because it is realized by guanine, among other things. By Causal Inheritance, they must differ in their causal powers. Hence, by Causal Individuation of Kinds, they are not the same scientific kind. To assert otherwise is simply to deny his principles.

I have two responses. First, I am not denying his principles. I am denying that his principles lead to the conclusion he wishes to draw. It is consistent with his principles, I have argued, that different sciences might attribute the same properties to different objects. The chemist attributes the property *acid* to both sulfuric acid and DNA; the molecular biologist, however, assigns the property *gene* to DNA but not sulfuric acid. Kim needs to show that his principles prohibit this, but he does not show this. It is Kim who is begging the question when he assumes that his principles imply that every difference in a kind's physical substrates implies a difference in kind.

But second, even if Kim shouts louder than I do and is able to make this exchange of question begging stick to me, he must live up to the following consequence. It would follow from his view that *acid* is not a kind. Because acids can be multiply realized, the reasoning of the Master Argument leads to the rejection of chemistry as a unified science. There must, it turns out, be at best *local* chemistries: a chemistry in which sulfuric acid is an acid; a chemistry in which hydrochloric acid is an acid; a chemistry in which DNA is an acid. There will be as many chemistries as there are, not just actual acids, but nomologically possible acids. I was pretty good at chemistry in high school, but of course those were the days when there was only one chemistry.

This second response is an incarnation of what has come to be called the generalization problem (see Kim 1998; Block 2003). Whereas the generalization problem attempts to reduce to absurdity Kim's arguments about the causal powers of psychological properties, here I am suggesting that Kim's Master Argument reduces to absurdity if it entails that nothing but (perhaps!) physics is unified. I hate to rest on reductio arguments, because there is a disturbing trend among philosophers not always to agree with me about what is absurd, but this will have to do for now.

3. A Dilemma. In the course of presenting my response to Kim, I have talked about multiple realizations of a kind. In doing so, I am using the same jargon that many others, including Kim, use. But there is something peculiar about this way of speaking if one takes at face value the Master Argument. Exactly what is the kind that is multiply realized in premise (1) of the Master Argument if Kim is right that distinct kinds of physical

realizations are distinct “all the way up?” If P_n and P_m are distinct physical kinds, and thus have distinct causal powers, and thus are distinct scientific kinds, how can one hold that they are different realizations of the same kind?

This question brings us to a consideration of functionalism. As I shall understand functionalism—and this is surely the received view—functional properties are second-order properties, in the sense that they are the properties of having a (first-order) property that satisfies a particular causal role description. Sticking with the classic examples, *pain* is a functional property because it is the property of having some property that satisfies causal role P , where P describes a network of stimulus inputs, connections to other mental states, and behavioral outputs definitive of pain. Because there may be many distinct physical properties that have the causal profile definitive of pain, pain is multiply realizable.

Given this account of functionalism, multiple realizability seems to present us with two options.

Option One: Agree with Kim that functional properties cannot be nomic properties and so agree with his conclusion that there cannot be a science that ranges over them. This follows, Kim thinks, because the various realizers of a functional property will, in virtue of their different physical properties, have different causal properties and, given Causal Individuation of Kinds, this means that they cannot be the same functional kind.

Option Two: Deny that the physically distinct realizers of a functional property are distinct in a sense that matters to their functional identity and thereby preserve the possibility of a science that quantifies over functional kinds.

I like Option Two. Option One basically re-states the Master Argument and so suffers from the same deficiencies. Causal Individuation of Kinds does not imply that different physical realizations constitute different scientific kinds for all sciences. This, in my view, makes Option One unfounded. But this leaves us with the task of developing Option Two.

Here is one way to distinguish differences between realizations that matter to their functional identity from differences that do not. The functionalist is committed to specifications of causal roles as the means by which to define functional kinds. Supposing P to be a specification of the causal role that defines pain, if two physically distinct substrates R_1 and R_2 cannot both satisfy a given causal role P , then they cannot both be realizations of pain. Two physically distinct substrates R_1 and R_2 can realize pain only if they can both satisfy specification P . In such a case,

pain is multiply realized.² It is, of course, an open question whether a given functional kind can be multiply realized, i.e., whether there are distinct physical substances capable of satisfying the causal specification that defines a single functional kind.

So, a given physical substrate is a realizer of some functional property just in case it satisfies the causal description definitive of that functional property. This point about the individuation of realizers *qua* functional kinds is obvious enough, but it devastates Kim's argument for localizing psychology. Here is a dilemma Kim faces:

- A. Suppose R_1 and R_2 are physically distinct.
- B. Either both R_1 and R_2 satisfy specification P , in virtue of which both are instances of functional property P , or they do not.
- C. If both R_1 and R_2 instantiate P , then laws about P that are true of R_1 are also true of R_2 and so there is no need for localized psychologies, one with laws that apply only to R_1 and another with laws that apply only to R_2 .
- D. If R_1 and R_2 do not both instantiate P , then P is not multiply realizable and so there is no need for localized psychologies to treat the different realizations of P .
- E. Hence, a need for localized psychologies does not follow from the fact that functional kinds are multiply realizable.

It is interesting that Kim does not see this argument. He intones:

The important moral of MR we need to keep in mind is this: *if psychological properties are multiply realized, so is psychology itself*. If physical realizations of psychological properties are a "wildly heterogeneous" and "unsystematic" lot, psychological theory itself must be realized by an equally heterogeneous and unsystematic lot of physical theories. (1992, 20, his italics)

But why think that if the physical realizations of a psychological property are heterogeneous (even wildly so!) that this bodes ill for a unified psychology? Why think that there must be a distinct psychology of pain for every different kind of realization of pain? From the perspective of the dilemma I just presented, it seems on the one hand that if distinct realizers of pain are all realizers of *pain*, then whatever laws are true of one realizer of pain in virtue of its instantiation of pain will be true of other realizers of pain in virtue of their instantiation of pain. On the other hand, if the

2. Shapiro (2000, 2004) has argued that not simply any physical difference between two physically distinct realizations of a functional kind suffice to make them different *realizations* of the kind. For my purposes here, I will overlook this point. However, I believe the point can be made consistent with everything I say here.

distinct realizers cannot, because of their different physical properties, all realize pain, the sort of multiple realizability that drives Kim to recommend localized psychologies is not present.

It is helpful to recall the point of Section 1 to understand where Kim has taken a wrong turn. Kim relies on Causal Inheritance to reason that different realizers of *P* will have different causal powers. He then applies Causal Individuation of Kinds to argue that if different realizers of *P* have different causal powers then they cannot satisfy the same causal specifications and so they cannot realize the same psychological kind. But, once more, the fallacy is evident. Causal Individuation suffices to show that different realizers of *P* will not have *all* the same causal powers, but it does not show that they cannot share some of their causal powers. Causal Individuation shows that different realizers cannot be realizers of the same kinds from the perspective of *all* sciences, but it does not show that they cannot realize the same kind from the perspective of *some* sciences.

Perhaps Kim misses these points because he fails to notice that not just any difference between the realizers of a functional kind are differences that matter. Because, by hypothesis, the multiple realizations of pain are physically distinct, they will differ in some of their properties, viz. the properties that suffice to make them physically distinct. Perhaps one realizer of pain has mass *x* and the other has mass *y*; perhaps one realizer of pain has boiling point *s* and the other boiling point *t*, and so on. The reason that these differences between *R*₁ and *R*₂ do not matter to psychological theory of pain is that *R*₁ and *R*₂ are not realizers of pain in virtue of their masses or boiling points. Mass and boiling point (suppose) are not properties that make a difference to whether *R*₁ and *R*₂ can satisfy the causal role that is definitive of pain. So, whereas the realizers must differ in some respects if they are to count as multiple realizations of a functional property, they need not and indeed will not differ in respect to those properties that enable them to satisfy the causal role that defines the functional property.

4. What's Bugging Kim? Jerry Fodor (1997) has a diagnosis for Kim's blindness to the point with which I closed the previous section:

He just doesn't see why there should be (how there could be) macro-level regularities *at all* in a world where, by common consent, macro-level stabilities have to supervene on a buzzing, blooming confusion of microlevel interactions. Or rather, he doesn't see why there should be (how there could be) unless, at a minimum, macrolevel kinds are *homogenous* in respect of their microlevel constitution. (1997, 161, his italics)

Fodor too admits that the existence of macrolevel regularities over functional kinds given differences in the microlevel realizers of these kinds is at least surprising. In fact, he thinks that the existence of such regularities “really is entirely mysterious” (1997, 161) and that he does not “even know *how to think about why*” (1997, 161, his italics) there should be anything other than the regularities physics describes. Other philosophers of science have agreed that this is a mystery, with some, e.g., Robert Batterman (2000), attempting solutions to it.

Yet, I think that a deeper mystery is why one should find mysterious the possibility of macrolevel regularities over functional kinds. There is no mystery here at all. Take a simple case. How might we explain the fact that both wooden toothpicks and plastic cocktail spears serve admirably as olive skewers? Can Fodor and Kim really think, given that toothpicks are realized one way and cocktail spears another, that it is a complete mystery how both should be able to skewer olives? Can Fodor not even know *how to think about why* this can be? Here is my suggestion about how to think about it. Toothpicks and cocktail spears are both rigid and sharp on the end. Owing to these properties, both can satisfy the following causal specification, in virtue of which they share a functional property: given an olive as input, produce a skewered olive as output.

This is of course flippant, and I think I understand what Fodor is getting at. Why should things composed of wood and things composed of plastic both have properties that make them suited to skewering olives? I suppose one *might* think of this as “entirely mysterious.” But one gets to choose what one finds mysterious. Here is something that I would find mysterious. Suppose it were true that different microlevel properties and organizations of microlevel properties were never able to exhibit any of the same macrolevel behavior. Wooden toothpicks could not skewer olives because plastic cocktail spears had already claimed that functional role. Double-lever corkscrews would not work if composed of aluminum because steel ones had already claimed that functional role. Martian brains could not feel pain because human brains beat them to it.

It seems to me that I have just described a world more mysterious than the actual world. I would not even know *how to think about* a world in which it would be impossible for two different microlevel properties to share a macrolevel property. I suppose this shows that there is at least this much to Fodor’s bewilderment: the world has to be one way or another and why it is one way rather than another has perhaps no answer. However, it *is* one way, and the way it is makes the special sciences a valuable tool for understanding it.

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