

Some Good and Some Not so Good Arguments for Necessary Laws

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The view that properties have their causal powers essentially, which I will here call property essentialism, has advocates in Chris Swoyer Sydney Shoemaker, Alan Chalmers, Brian Ellis and Caroline Lierse among a few other authors in recent literature. I am partial to this view as well and I will shortly explain the grounds I find compelling in favor of it. However, we will also see that the essentialist view of properties and laws does not adequately do quite so much as might be hoped. Property essentialism has the straightforward result that at least causal laws are metaphysically necessary. A natural view of such laws is that they are analyses of the essential nature of basic properties in terms of their essential causal powers. Brian Ellis proposes that conservation laws and other laws that may not be exactly causal are best thought of as characterizing the essential properties of worlds. But this further essentialist thesis is not directly relevant to the issues I want to address here.

We can see what is attractive about the property essentialist's view that causal laws are necessary by considering how it handles a few of the major shortcomings of accounts that take laws to be contingent. We will not have time for a thorough review of the difficulties faced by regularity accounts of laws. But one perennial objection to regularity accounts has been that they lack the resources to distinguish law-like from accidental regularities. This problem is adequately addressed in the "realist" accounts of laws offered (independently) by David Armstrong, Michael Tooley and Fred Dretske. According to these accounts, laws are nomic relations that hold among universals contingently. On this view, laws themselves are not general but rather singular facts involving particular relations holding among real universals. These

singular facts entail our law-like generalizations. But over and above this, statements of law assert nomic connections between universals. The matter of distinguishing law-like from accidental regularities is equally well addressed if we take properties to have their causal powers essentially and nomic relations to thereby hold of necessity. On this issue, property essentialism is not favored over a version of realism about laws with contingent nomic relations. But we will now look at a difficulty for the later view that does make property essentialism look attractive.

On the realist views offered by Armstrong, Tooley and Dretske, properties do have causal powers. But properties do not differ intrinsically with respect to their causal powers. Rather, they have their causal powers contingently in virtue of the nomic relations they stand in. But this leads to a proliferation of possible ways the world could be that is counter-intuitive as well as unparsimonious. The only differences we can posit as the essential distinguishing features of fundamental types are differences in their causal powers. Armstrong is prepared to accept this result and take the identity of basic properties as primitive. But accepting “indiscernable universals” as I will call such properties leads to some peculiar possibilities. Specifically, it opens up the possibility of what Brian Ellis calls a “global transubstantiation,” an empirically indistinguishable world containing different kinds of things and processes. Ellis describes a global transubstantiation as,

a world which, by every test that we could possibly make, is identical to this world, but which contains none of the same kinds of things. Such a world would be a law-governed world, and, as far as we were able to tell, the laws would be identical to the laws in this world. But it would still be a radically different kind of world from ours - one which contains none of the same substances, and is governed by completely different causal laws.

To employ the metaphor of possible worlds, there will be a multitude of possible worlds differing from the actual world only with respect to which properties stand in which nomic relations. For instance, there will be possible worlds where the property that has the

causal powers associated with charge instead has the causal powers associated with gravitational mass and the property that has the causal powers associated with gravitational mass and instead has the causal powers associated with charge. There will be another such world that is exactly like the actual world except with regard to which properties have which causal powers for every possible assignment of basic properties as causal bases for basic dispositions.

There is something unparsimonious about global transubstantiations. Though, while perhaps unlovely, such a proliferation of possibilities is not so grave as a proliferation of entities. What is harder to accept about global transubstantiation is that it's hard to get over feeling the laws are really the same at such worlds. Global transubstantiations of the actual world will be empirically indistinguishable. The differences between such worlds have nothing to do with how we understand, confirm, investigate, or express laws. Worlds that differ only with regard to which properties have which powers will be exactly like the actual world with respect to what (non-nomic) counterfactuals are true, what dispositions things have and which inductive inferences are correct. For all of these reasons we should like to hold that the laws in each such world are the same. We want to say, for instance, that Coulomb's law really holds at global transubstantiations of the actual world. But on Armstrong's view, since nomic relations hold among different properties in such worlds, the laws will be different. The laws in these worlds may be precise analogues to Coulomb's law in the sense that they relate different indiscernable universals in precisely the same ways. But they will be different in virtue of having different indiscernable universals as their relata.

Assuming properties have causal powers, they have their causal powers either essentially or accidentally. I think the argument against indiscernible universals is a strong one. But might the results of property essentialism be even less palatable than the

counterintuitive modal consequences of the contingent nomic relations view of laws? If properties have their causal powers essentially, then nomic relations between properties are fixed by these essential powers. So accepting causal powers as essential to properties requires recognizing causal laws as necessary. But this appears to violate a strong intuition to the contrary. Intuitively, it seems that the basic forces, for instance, might have been a bit stronger or a bit weaker and hence that the laws regarding these forces might have differed. We might conclude that the laws must therefore be contingent.

In fact I think this objection is fairly easily dispatched. But the correct response is not yet widely recognized. Alexander Bird argues that we have grounds for rejecting the intuition that the laws are contingent by appealing to Kripke's widely recognized cases of a-posteriori metaphysically necessary identity claims. Intuitively, one might think that metaphysical necessities cannot be known a-posteriori. However, though known a-posteriori, many now accept that it is metaphysically necessary that water is H₂O. Bird concludes that we should therefore reject our modal intuitions as unreliable guides to what is necessary and what is contingent.

I think Bird too lightly casts off an intuition that deserves to be respected. But I do not think the intuition at issue is really the intuition that the laws of nature are contingent truths. The view that properties have their causal powers essentially and that laws are hence necessary still allows that the world might have been different in a variety of respects. Specifically, the world might have differed with respect to what its basic properties are. What essentialists ought to say about the intuition that the laws are contingent is that this is really just the intuition that things in the world might have had different properties with different essential causal powers. Essentialists can deny that the charge of an electron could have been stronger or weaker

and yet allow that electron like particles might have had properties similar to but stronger or weaker than charge. Had things instantiated different properties, events might have been governed by different but still necessarily true laws. Given that things might have been differently disposed, the laws that govern events in this world, while necessarily true, might have been "not in effect." This suggests that while laws may be necessarily true accounts of the essential nature of properties, such accounts may have the property of being a law only contingently. Analyses of properties are necessary truths. But at least one further condition on a property analysis being a law of nature is that it must analyze a property that is actually instantiated. I like this view and I think it handles our apparent intuition that the laws are contingent quite nicely while banning global transubstantiation. But this view will create some difficulty for the attempt to employ necessary laws in resolving issues of support for counterfactuals. These issues will be the focus of the not so good argument for necessary laws to which I will now turn.

A further alleged problem for regularity accounts of laws is that they fail to account for the manner in which laws support counterfactuals. We think that had the baseball struck the window, the window would have shattered. We accept this in part because we believe that had the baseball struck the window, the laws would still have been as they are. Laws appear to be given a privileged position over other truths in our counterfactual reasoning. Because it's raining, I think it's true that if my cat were outside, he'd be wet. In assessing the counterfactual supposition of the antecedent, certain truths are preserved while others are not. Obviously, the truth that my cat is curled up by the fireplace is not preserved. But the closest possible world in which the antecedent is true does not differ from the actual world only in this respect. Other actual truths must also be false in this possible world. Contrary to fact, either I opened certain

doors or windows this morning, or my cat never came in last night, or I installed a pet door at some point in the past, or the laws of nature are different in ways that allow my cat to pass through shut windows and doors. We are happy to allow one or another of the first three of these counterfactual suppositions as describing the closest possible world where my cat is outside this morning, but not the last.

The obtaining of a mere regularity gives us no grounds for expecting that regularity to obtain under counterfactual circumstances. Armstrong raises this issue against regularity theories of law.

Suppose it to be a mere uniformity that everybody in a certain room at a certain time is wearing a wristwatch. There will be no particular reason to assert that if A, who was not in the room at the time, had been in the room, then A would have been wearing a wristwatch. Statements of Humean uniformity, however, are nothing more than statements of unrestricted or cosmic uniformity. How can this difference in scope, this setting the scene in the largest room of all, contribute anything to the support of counterfactuals? Laws, therefore, cannot be identified with mere uniformities.

Armstrong insists that an adequate account of laws must account for the special role laws play in connection with counterfactuals. Yet if laws are contingent nomic relations between universals, as Armstrong holds, then it is hard to say just why we should expect that the laws would remain invariant had the antecedents of (non-counterlegal) counterfactuals obtained when we do not expect other contingent truths to remain invariant. Armstrong's demand that an account of laws explain how laws support counterfactuals is a demand for some explanation of the special modal status afforded to laws in our counterfactual reasoning.

Armstrong and Tooley each assert that their contingent nomic relations hold under counterfactual antecedents. As Tooley puts the matter,

This view of the truth conditions of nomological statements explains the relation between counterfactuals and different types of generalizations. Suppose that it is a law that $(x)(Px \rightarrow Qx)$. This will be so if the relevant universals stand in the appropriate relation. Let us

now ask what would be the case if some object, *b*, which presently lacks property *P*, were to have that property. In particular, is it reasonable to assume that it would still be a law that $(x)(Px \rightarrow Qx)$? It seems reasonable to reply that the supposition about the particular object, *b*, does not give one any reason for concluding that properties *P* and *Q* no longer stand in the relation of nomic necessitation. If this is right, then one can justifiably conjoin the supposition that *B* has property *P* with the proposition that the nomological relation in question holds between properties, *P* and *Q*, from which it will follow that *b* has property *Q*. And this is why one is justified in asserting the counterfactual: if *b* were to have property *P*, it would also have property *Q*.

But this is not enough. We also lack reason for thinking that regularities would not obtain under counterfactual circumstances. What we require is some positive reason for thinking nomic relations would remain invariant. If nomic relations hold contingently, we must face the question of whether the law $N(FG)$ would still hold under the counterfactual supposition that *x* is *F*. So long as laws are not modally favored over other contingent truths in evaluating counterfactuals, we lack grounds for supposing them to hold at the worlds relevant to the counterfactuals we accept.

Contingent nomic relation theories must posit laws as having some special modal status that accounts for their invariance under counterfactual antecedents while other merely contingent truths are not held invariant. This requires attributing some “modal force” to laws. Armstrong does so in the following passage:

In a counterfactual supported by laws, the laws call the tune. Why is this? I take it that it is because the laws involve something which the regularity theory denies them to have, and which particular states of affairs do not have: a certain necessity (which need not be logical). They say what must happen, and so they have authority in counterfactual reasoning.

But Armstrong offers no account of the nature of nomic necessitation that would give us non-question begging grounds for thinking laws remain invariant at the relevant antecedent worlds. Rather, we have something like an assertion that laws are a little bit necessary but not really necessary. If we are to recognize some grade of necessity intermediate between metaphysical necessity and mere accident, then we ought to be able to give some non-circular

account of it. This must go some ways towards a demarkation of just what worlds are invariant with respect to the laws. This is required for our having grounds to expect that the laws remain true at the relevant counterfactual antecedent worlds.

If the laws of nature are metaphysically necessary accounts of the causal powers essential to properties, then there is no question as to why they remain true at every possible world. They are maximally modally strengthened and their truth can be invoked at any world. So at first glance, the property essentialist might appear to have a handy answer to Armstrong's demand for an account of the role of laws in supporting counterfactuals. However, the property essentialist's necessarily true laws also fail to satisfy Armstrong's demand that an account of laws explain their invariance under counterfactual antecedents.

Property essentialism can account for some counterfactuals better than its rivals. The property essentialist has no problem with counterfactuals like "If this water were heated to 100C it would boil." Here the counterfactual antecedent invokes the property of being water, which has the power to boil at 100C essentially. But many counterfactual antecedents do not explicitly invoke properties with law fixing causal powers. For instance, "If this stuff were heated to 100C it would boil." That this stuff is water may yet be contingent. The matter in question might have had properties other than charge and gravitational mass that are essential to its being H₂O. So a familiar question arises. What grounds do we have for supposing that at the same basic properties would remain instantiated by this stuff had it been heated to 100C?

Earlier I took property essentialism to accommodate our apparent intuition that the laws are contingent by taking laws to be necessarily truths that have the status of law-hood only contingently. And this leaves the problem of supporting counterfactuals unresolved. Property essentialism faces no problem of explaining invariance in the truth of laws. But there remains an issue regarding invariance in their law-hood. That is, we still require grounds for thinking that had a counterfactual's antecedent obtained, things would still have had the same basic properties. Property essentialism does not solve Goodman's problem of law, but instead dissolves it into the problem of relevant conditions.

The conclusion we can draw at this point is that while property essentialism can accommodate our apparent intuition that the laws of nature are contingent, it can't do so and provide an adequate solution to the problem of support for counterfactuals. Since problems of support for counterfactuals remain for a variety of ways of modally strengthening laws also suggests the problem of law for supporting counterfactuals may not really be a problem for the philosophy of laws. It may instead be a problem with how we understand counterfactuals. But addressing this issue will take another paper.

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See David Armstrong, What is a Law of Nature, (Cambridge: Cambridge University Press, 1983), Chapters 2 and 3 for a detailed critique of regularity views.

Perhaps Lewis' account of laws as regularities across ranges of appropriately similar possible worlds escapes this specific criticism. But this approach invokes modal realism and raises difficult questions about how to identify appropriately similar worlds in a non-question begging way. The later problem will re-occur in connection with Armstrong's view of laws.

Armstrong, What is a Law of Nature
Michael Tooley, "The Nature of Laws," Canadian Journal of Philosophy, (1977).
Fred Dretske, "Laws of Nature," Philosophy of Science, 44 (1977): 248-68.
Armstrong, What is a Law of Nature, p.160.

Brian Ellis, "Bigelow's Worries about Scientific Essentialism," in Causation and Laws of Nature, ed. Howard Sankey, (Kluwer Academic Publishers, 1999), 66.

Alexander Bird, "The Dispositionalist Conception of Laws," in Foundations of Science 2003.

I find it doubtful that Kripke would approve. He writes, "I think [intuitive content] is very heavy evidence in favor of anything, myself. I really don't know, in a way, what more conclusive evidence one can have about anything, ultimately speaking." (Naming and Necessity, 42).

Here we can see why Goodman recognizes two problems of counterfactuals, a problem of relevant conditions and a problem of law, in his well known discussion in Fact Fiction and Forecast.

Armstrong, What is a Law of Nature, 46-7.
Michael Tooley, Causation: A Realist Approach (Oxford: Clarendon Press, 1978), 138.

Armstrong, What is a Law of Nature, 50.