

## Towards a Property Theoretic Account of Counterfactuals

W. Russ Payne Ph.D.

[wpayne@bcc.ctc.edu](mailto:wpayne@bcc.ctc.edu)

In this paper I consider a tension between dispositional essentialism and possible worlds semantics for counterfactuals. I take dispositional essentialism to be the view that properties have their causal powers essentially. A straightforward consequent of this view is that the laws of nature are metaphysically necessary. This poses a problem for possible worlds semantics for counterfactuals. If the laws of nature are deterministic, then the closest possible world where the antecedent of a counterfactual obtains will differ in its entire causal history. On standard possible worlds treatments of counterfactuals, this problem of backtracking is dealt with by allowing for minor miracles at antecedent worlds. As dispositional essentialism requires necessary laws, it appears to rule out the possibility of minor miracles as a means of avoiding backtracking. Here I argue that the dispositional essentialist should abandon possible worlds semantics for counterfactuals in favor of a property theoretic approach.

According to the widely accepted view offered by Prior, Pargetter and Jackson, a disposition is a relational property of having some distinct causal base property such that a manifestation of the disposition would be produced were its precipitating conditions to obtain. I will take dispositional essentialism to be the view that causal base properties are dispositional in the further sense of having their causal powers essentially. Causal base properties, on this view, ground the dispositions they ground as a matter of metaphysical necessity. Dispositional essentialism therefore entails that at least causal laws are metaphysically necessary. Necessary laws present a problem for standard possible worlds semantics for counterfactuals. According to possible worlds accounts, a counterfactual conditional of the form “If it were the case that Q, then it would be the case that P” is true if its consequent is true at the closest world or worlds where its antecedent is true. The difficulty emerges if our world is deterministic. In this case, it appears that the closest possible antecedent world must differ in its entire history. Lewis handles this problem of backtracking by allowing for the possibility of minor miracles at the closest

antecedent worlds. In taking the laws of nature to be metaphysically necessary, dispositional essentialism appears to rule out the option of appealing to minor miracles to handle the backtracking problem. Those who are committed to possible worlds semantics for counterfactuals may count this as a mark against dispositional essentialism. In this paper, I argue that the dispositional essentialist should abandon possible worlds semantics for counterfactuals in favor of a property theoretic semantics. The dispositional essentialist's ontology of properties with essential causal powers is well suited to such an alternative approach to counterfactuals.

I will begin by briefly motivating dispositional essentialism. Then I will spell out the backtracking problem faced by possible worlds semantics for counterfactuals if laws are accepted as metaphysical necessities. Finally, I will describe the property theoretic approach to counterfactuals that better suits dispositional essentialism.

### **Why Dispositional Essentialism is Attractive**

Space does not allow for consideration of Humean objections to dispositional essentialism. So I will assume that properties have causal powers and that causation involves some kind of necessary connection. This leaves open the question of whether properties have their causal powers contingently or essentially. Armstrong, Tooley and Dretske independently defend the view that properties have causal powers but have their causal powers contingently in virtue of the nomic relations they stand in. However, taking nomic relations between properties to be contingent leads to a proliferation of possible ways the world could be that is unparsimonious and counter-intuitive. The only differences we can posit as the essential distinguishing features of fundamental properties like charge or mass are differences in their causal powers. Armstrong is prepared to accept this result and take the identity of fundamental

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. For instance, there will be possible worlds where the property that has the causal powers associated with charge instead has the causal powers and instances had by gravitational mass and the property that has the causal powers associated with gravitational mass instead has the causal powers and instances had by 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. This is a real issue for modal realists. For others though, while perhaps unlovely, such a proliferation of possibilities is not so grave as a proliferation of entities. A more serious problem is that it’s hard to get over the feeling that the laws are really the same at global transubstantiations. Global transubstantiations of the actual world will be empirically indistinguishable from the actual world. 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.

I think the argument against indiscernible universals is cogent. But if properties have their causal powers essentially, then nomic relations between properties are fixed by these essential powers and causal laws are necessary. 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. However, properly understood, dispositional essentialism can nicely accommodate our apparent intuition that the laws are contingent. The view that properties have their causal powers essentially and that laws are hence necessary 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 alleged 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." I would suggest that while laws are necessarily true accounts of the essential nature of properties, such necessarily true accounts have the status of lawhood only contingent upon the instantiation of the analyzed property. This view accommodates our

apparent intuition that the laws are contingent while banning global transubstantiation. However, as we will now see, accepting laws as metaphysically necessary truths generates trouble for possible worlds semantics for counterfactuals.

### **Dispositional Essentialism's Problem with Possible Worlds**

John Bigelow offers an objection to dispositional essentialism (which he attributes originally to Jonathan Bennet) on the grounds that it is incompatible with the standard possible worlds semantics for counterfactuals. Consider a deterministic possible world  $w$  and a causally determined sequence of global events  $a, b, c, d$  and  $e$ . We can think of a global event, say  $a$ , as the instantiation in  $w$  of a complex of properties and relations at a time  $ta$  that includes all and only all those properties and non-temporal relations instantiated in  $w$  at the time of  $a$ 's occurrence. According to dispositional essentialism, the properties and relations that are constitutive of  $a$  include fundamentally dispositional properties that fix the laws at  $w$ . On this view, given that  $w$  is deterministic,  $b$  follows from  $a$  as a matter of metaphysical necessity. Likewise  $b$  metaphysically necessitates  $c$ ,  $c$  metaphysically necessitates  $d$ , and so forth. Now, let us evaluate at  $w$  an arbitrary causal counterfactual:

If it had been the case that  $P$  at  $td$ , then it would have been the case that  $Q$  at  $te$ .

Let's suppose that  $P$  being the case, while counterfactual at  $w$ , is consistent with the laws of  $w$ . That is, the truth of  $P$  does not involve the instantiation of any properties alien to  $w$ . Since  $P$  occurring at  $td$  is counterfactual at  $w$ , the nearest possible world at which  $P$  is true, call it  $w'$  does not contain a type  $d$  global event, but a type  $d'$  global event. Likewise, the truth of the

consequent  $Q$ , which we assume is also counterfactual at  $w$ , will require the occurrence of a type  $e'$  global event different from  $e$  at  $te$ . Here the trouble begins. Apparently, the nearest possible world at which  $d'$  occurs rather than  $d$  must differ from  $w$  in its entire history.  $d'$  could not be caused by  $c$  because  $c$  metaphysically necessitates  $d$  and not  $d'$ . So  $d'$  must have been caused by  $c'$ . But  $c'$  likewise could not result from  $b$ , because  $b$  metaphysically necessitates  $c$  and not  $c'$  and so forth. For deterministic worlds, this result makes all causal counterfactuals backtracking through the world's entire history. But in counterfactually supposing that I left the cat out last night I don't also suppose an entirely different world history prior to neglecting my cat.

The problem here is clearest in the case of worlds where determinism holds. But it is not limited to the deterministic case. The dispositional essentialist will also encounter the backtracking problem for indeterministic worlds where the laws are grounded by probabilistic dispositions, or propensities, so long as it is not possible for  $c$  to probabilistically give rise to  $d'$ , or for  $b$  to probabilistically give rise to  $c'$ , etc.

Standard possible worlds semantics for counterfactuals takes the closest possible world at which a counterfactual's antecedent is true to share the history of the world of evaluation up to the occurrence of the antecedent, at which time a small miracle is allowed to occur. For non-essentialists there is nothing incoherent in allowing that a small law-violating miracle occurs at the closest possible world where the antecedent of a counterfactual is true. While non-essentialists may attribute some kind of modal weight to laws, they needn't, and typically don't, attribute metaphysical necessity to laws. But since the dispositional essentialist is committed to metaphysically necessary laws and hence metaphysically necessary connections between causes and effects, positing small miracles does not appear to be an available option.

Toby Handfield argues that dispositional essentialists can have small *law abiding* miracles, and hence possible worlds semantics for counterfactuals, if they allow for the possibility of "space invaders" or spontaneously instantiated properties. For a space invading property  $X$  to provide an appropriate small miracle at the  $P$  world closest to  $w$ , it must do two things: First, it must inhibit the causal processes by which  $d$ -type global events would normally produce  $e$ -type global events. And second, in conjunction with those properties and relations constitutive of  $d$  type events but not inhibited by  $X$ ,  $X$  must cause an  $e'$  event which provides for the truth of  $Q$ .

There are two ways discussed in recent literature in which a space invading property might inhibit the manifestation of dispositions instantiated in  $d$ -type events. The space invading property may be an antidote, a property that prevents manifestation of the dispositions instantiated in  $d$ -type events. For instance, caffeine in anti-histamines is an antidote for the medication's disposition to cause drowsiness. Or the space invading property may render the dispositions instantiated in  $d$ -type events *finkish*, such that occurrences of their normal precipitating conditions would cause the loss of the disposition rather than a manifestation of it. For instance, a fast acting low wattage fuse may render a live wire's disposition to transmit current of some higher wattage when touched to a grounded conductor *finkish*. While the wire is live, touching it to a grounded conductor would cause it to lose the disposition of being live before it is manifested.

Given the possibility of space invaders, when we evaluate the conditional "Had  $P$  been the case at  $td$ , then  $Q$  would have been the case at  $te$ ," the  $P$  world nearest to  $w$  need not be one with an entirely different history, but instead it can be one where a small law abiding miracle occurs at  $td$  in the form of a space invading spontaneous property instance which yields  $d'$  rather

than *d*. Handfield argues that, given the possibility of space invaders, dispositional essentialism can be reconciled with possible world semantics.

I do not think Handfield has saved possible worlds for the dispositional essentialist. Perhaps a great many dispositions admit of finkish instances or antidotes. But Handfield's solution requires that all dispositions admit of finks or antidotes and it is not at all clear that all dispositions do. Even if all actually instantiated dispositions admit of either finkishness or antidotes, Handfield's solution would be undermined by the very possibility of a disposition that does not admit of either. To hold otherwise would be to allow the adequacy of our semantics of counterfactuals to depend on accidental truths about what properties are instantiated in the actual world. And this will not do.

While there may be nothing incoherent in allowing that many dispositions admit of space invaders via finks or antidotes, there also appears to be nothing incoherent in there being dispositions that are impermeable to space invaders. For instance, there could be a single-track fundamental disposition of simple particles of a certain kind to self-destruct immediately upon being brought within a millimeter of a carbon atom (full stop, no *ceteris paribus* clause). It's hard to see what could count as a fink or antidote for such a disposition. Given the possibility of dispositions that are impermeable to space invaders, there is no guarantee that a law abiding miracle will be available at the closest possible antecedent world. Thus, the threat of possible worlds semantics making simple causal counterfactuals backtracking remains for the dispositional essentialist who wants to think of counterfactuals in terms of possible worlds. In the remainder of this paper, I will suggest how the resources of dispositional essentialism can be developed into an alternative to possible worlds semantics for counterfactuals.

## **The Property Theoretic Approach to Counterfactuals**

Possible worlds theorists say that counterfactuals make claims about the actual world. But this must be understood in a nuanced way. On the possible worlds approach, counterfactuals are assertions about the actual world with respect to how it is situated in a broader range of possible worlds. The property theoretic alternative I want to propose takes counterfactuals to be concerned with the actual world only and how it is intrinsically, not how it is in relation to other ways the world could have been. On this view, what is communicated by a counterfactual, when true, is made true by a complex of instantiated properties and relations, including properties that ground dispositions essentially. In conjunction with further conditions, including those explicitly cited in the counterfactual's antecedent, this complex of properties metaphysically necessitates the conditions given in the counterfactual's consequent. So, for instance, the counterfactual "had the match been struck it would have lit" is made true by the match having a causal base for flammability, having a surface that will generate enough heat to initiate combustion when subjected to appropriate friction, being dry, being in the presence of oxygen, etc. Of course the counterfactual does not make explicit reference to these truth making conditions. Rather, it describes a metaphysically necessary consequent of them. Given that the match and its surrounding environment instantiates this complex of properties, including certain dispositional properties, it follows as a matter of metaphysical necessity that if it were struck it would light. For every disposition, there is an associated strict conditional - a metaphysically necessary conditional - to the effect that if a thing has that disposition and the dispositions precipitating conditions obtain then a manifestation will occur (or will to some degree be likely to occur in the case of propensities). A counterfactuals antecedent identifies some of the non-obtaining antecedent conditions of such a strict conditional. The consequent of a counterfactual

refers to a condition that is entailed by. The resulting conditional is made true by the obtaining of the balance of the antecedent conditions of the relevant strict conditional.

I've proposed that what we communicate with the successful use of a counterfactual conditional is that a complex dispositional state of affairs obtains which satisfies some, but not all of the antecedent conditions of a complex strict metaphysically necessary conditional. Of course, nothing so complex is literally expressed by typical counterfactual sentences. Rather, I would suggest that counterfactuals are relatively crude linguistic instruments, which can be successfully used to convey highly complex truths. This seems right when we consider the nature of the contents of the beliefs we use counterfactuals to convey. When I say, "had the match been struck, it would have lit," I mean to communicate a belief about a *flammable*, well-made, dry match struck against an appropriately abrasive surface in the presence of oxygen and in the absence of strong breezes, etc. My belief is not a belief merely about a match being struck; without regard to the presence or absence of gales, tidal waves or space suits. There is a significant gap between what is explicitly expressed by a typical counterfactual conditional and what its use in a context conveys. This gap allows us to account for Lewis' view that counterfactuals are not strict, but variably strict conditionals. Specifically, we can allow that typical counterfactual conditional expressions are variably strict in the sense that they can be used to communicate propositions involving different strict conditionals in different contexts.

A preliminary sketch of an alternative to possible worlds semantics for counterfactuals is all I can hope to offer in this context. But I hope I've shown that dispositional essentialism affords promising prospects for such an alternative.

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