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Jennifer McKittrick

*University of Nebraska-Lincoln*, [jmckitrick2@unl.edu](mailto:jmckitrick2@unl.edu)

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## Response to Kadri Vihvelin's "counterfactuals and dispositions"

Jennifer McKittrick

University of Nebraska–Lincoln, Lincoln, NE, USA

Email [jmckitrick2@unlnotes.unl.edu](mailto:jmckitrick2@unlnotes.unl.edu)

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By incorporating David Lewis' conditional analysis (LCA), Vihvelin's LCA-PROP inherits some of its problems.

Recall:

LCA –  $x$  is disposed at time  $t$  to give response  $R$  to stimulus  $S$  iff, for some intrinsic property  $B$  that  $x$  has at  $t$ , for some time  $t'$  after  $t$ , if  $x$  were to undergo stimulus  $S$  at time  $t$  and retain property  $B$  until time  $t'$ ,  $S$  and  $x$ 's having of  $B$  would jointly be an  $x$ -complete cause of  $x$ 's giving response  $R$ .

Vihvelin amends this by adding "for some suitable proportion of the test cases" to deal with problematic masking cases, resulting in:

LCA-PROP –  $x$  is disposed at time  $t$  to give response  $R$  to stimulus  $S$  iff, for some intrinsic property  $B$  that  $x$  has at  $t$ , for some time  $t'$  after  $t$ , *and for some suitable proportion of test-cases*, if  $x$  were in a test-case at  $t$  and retained property  $B$  until time  $t'$ ,  $S$  and  $x$ 's having of  $B$  would be an  $x$ -complete cause of  $x$ 's giving response  $R$ .

I have three issues with LCA that apply equally to LCA-PROP.

The first is perhaps a trivial issue regarding a lack of clarity of the analysis, though it may amount to something more significant, depending on the clarification. It concerns the phrase " $x$ -complete cause." According to the analysis: " $S$  and  $x$ 's having of  $B$  would jointly be an  $x$ -complete cause of  $x$ 's giving response  $R$ ." Now, what is an " $x$ -complete cause"? Lewis tells us that an  $x$ -complete cause of  $R$  is a complete cause of  $R$ , in so far as the properties of  $x$  are concerned. Likewise, in a footnote, Vihvelin ex-

plains "A Joe-complete cause is a cause, that is complete, so far as Joe's intrinsic properties are concerned, of Joe's walking. "This might suggest that the x-complete cause is the contribution that x's properties make to the manifestation. But look at the wording of the analysis. It says that *the stimulus S* and the base property B would *jointly* be an x-complete cause of response R. That entails that the stimulus and the base property would jointly be a complete cause of the manifestation as far as the properties of x are concerned. But what does that mean?

One way to read this is as saying that the stimulus and the causal basis are both properties of x. It's plausible, and is in fact stipulated by the analysis, that the base property B is a property of x, but what about the stimulus? Typical stimuli, such as striking, dropping, and submerging in water, don't seem like properties of x. They don't even seem like properties. Even if we focus on properties that are instantiated by the stimulus event, it's not clear that they would typically be properties of the disposed object. Often, a disposition's stimulus is extrinsic to the disposed object. The striking that stimulates the glass's fragility is extrinsic to the glass. The striking may have certain properties, such as happening at a certain time, in a certain place, with a certain force, and the hammer is hard, made of steel, etc. But these are not properties of the glass. Perhaps the glass has related relational properties, such as being in a certain proximity to a steel hammer moving at a certain velocity, and so on. But if "stimulus S" is supposed to refer to these relational properties of x, that is not made clear. Furthermore, Vihvelin's analysis claims that the "Joe-complete cause" consists of *intrinsic* properties of Joe. If the stimulus and the base properties are a Joe-complete cause, then the properties that trigger Joe's disposition must be intrinsic to Joe. In Vihvelin's example, it's something about Joe that stimulates his walking. But isn't it possible for Joe to be stimulated to walk by some event extrinsic to Joe, such as someone saying "Hey Joe, could you come here for sec?"

Another way to read the expression 'complete as far as the properties of x are concerned' is that nothing further is needed from x to cause the manifestation. But what does this add to simply saying that the stimulus and the causal basis "would cause," or "would be causally sufficient" for the manifestation? Perhaps it is meant to rule out the possibility that some property of x other than B could also contribute to causing the manifestation. But it's not clear why anyone would want to rule that out. It means that a response can never be over-determined by multiple dispositions. Perhaps my conversing with people at the reception is over-determined by my being professionally ambitious and by my being sociable. The account would say that, in order for my sociability to count as a disposition, I must have some intrinsic property that serves as the causal basis of my sociability, such that it alone, and none of my other properties, would causally contribute to my engaging in conversation at the reception. If this is the proper way to understand "x-complete cause," it rules out the possibility over-determining dispositions by definition. Lewis is not concerned to make room for over-determination in his theory of causation, and on this interpretation of LCA, he seems to go out of his way to rule out the possibility of over-determination. But do we have any good reason to retain this feature of his view? I don't see any.

Perhaps a more philosophically significant issue with LCA-PROP is its implication that every disposition must have a causal basis. Some philosophers argue that

dispositions do not necessarily have causal bases; there can be pure, ungrounded or 'bare' dispositions. It's not a conceptual truth that dispositions have causal bases. If scientists found a certain particle that was disposed to behave in a certain way, and they could not identify any property of that particle to serve as the causal basis of that disposition, then they might conclude that there must be a basis there, and they just haven't found it yet. But if our best scientific research indicates that there is no "hidden variable," then it seems reasonable to conclude that they found a disposition that has no causal basis. If such a scenario makes sense, the existence of a causal basis for every disposition is not a conceptual matter, but an empirical one.

Furthermore, it seems that the answer to the empirical question does not favor ubiquitous causal bases. The natures of fundamental properties, such as mass and charge, seem to be exhausted by their dispositionality, and further study reveals no deeper structure to serve as the intrinsic properties to ground these dispositions. LCA-PROP would seem, therefore, to be inapplicable to the most fundamental properties of the physical world.

One might argue that, if there are such cases where something has a disposition but has no other property that grounds the disposition, that is compatible with the analysis. The analysis states that when  $x$  has a disposition, there is "some intrinsic property  $B$  that  $x$  has at  $t$ ." It doesn't stipulate that  $B$  must be a distinct property. It's compatible with that claim that the intrinsic property is the disposition itself. A disposition that has no *distinct* causal basis could be its own causal basis.

I have some sympathy with this response. However, notice that it might fail as an analysis, since reference to the disposition would appear on the analysans side of the bi-conditional. Furthermore, if the disposition itself could be "property  $B$ " in the analysis, that is, if a disposition could causally contribute to its own manifestation, then the motivation to introduce an additional property into the analysis becomes unclear, and the suggestion that only the causal basis and not the disposition itself can be causally relevant becomes more doubtful.

The third issue I have with this analysis is its insistence that the causal basis of the disposition must be intrinsic to the disposed object. Dispositions are not necessarily intrinsic to the objects that have them, and when they are not, it's plausible that those dispositions have extrinsic causal bases. Contrary to Lewis, perfect duplicates could differ with respect to having certain dispositions; a thing can lose or acquire dispositions without changing intrinsically. Weight, for example, may be dispositional, but it's not intrinsic. The weight of an object is relative to the object's gravitational field. So, the causal basis of an object's weight is not limited to the intrinsic properties of the object, but must also include some of its extrinsic properties, such as the object's spatial relations to massive bodies.

One might object that being subject to a certain gravitational field is part of the circumstances of manifestation of having a certain weight, or not part of the "test-case" for attributing that weight to something. However, this is not in accord with the meaning of 'weight,' if ordinary usage is any guide. A visit to the "Your Weight on Other Worlds" website amply demonstrates this. The site asks "Ever wonder what you might weigh on Mars or the Moon? Here's your chance to find out." If the test case for your weight included being in the Earth's gravitational field, there would be no cause to wonder what you weigh on the moon.

One might argue that the real disposition here is mass, and that is intrinsic. I'm not sure if such an objection means to deny that weight is a disposition, too. If it does, on what grounds does it do so? Perhaps the thought is that an object's weight is derived from its mass, and that mass is more fundamental. But if that's the reason why weight is being dismissed as a real disposition, then Joe's dispositions to walk and do math will be in trouble, for it is doubtful that they are fundamental in a way that weight is not. (I'm not saying Joe's dispositions to walk and do math are extrinsically based, just that they are dispositions, and that the purported reason for thinking that weight is not a real disposition proves too much.) Furthermore, it can be argued that mass is extrinsically grounded as well. Theoretically, a particle has the mass that it does because of relations to other things in the universe, such as, perhaps, the Higgs field. If that's right, then the causal basis of an object's mass is not intrinsic to the object itself.

But we need not delve into theoretical physics to find extrinsic dispositions. Vulnerability, marketability, visibility, humorousness, decipherability, and recognizability are all dispositions a thing could gain or lose without intrinsic change. That suggests that these are extrinsic dispositions, and if these dispositions have causal bases, they must be at least partially extrinsic to the disposed object.

To summarize, I have three objections to LCA-PROP:

1. As far as I can understand what an x-complete cause is, the analysis is mistaken in claiming that a disposition's stimulus and its causal basis would jointly be an x-complete cause of its manifestation.
2. The analysis is mistaken if it assumes that dispositions necessarily have distinct causal bases.
3. The analysis is mistaken in assuming that the causal basis of a disposition must be an intrinsic property of the disposed object.