Goodbye, Humean Supervenience
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The March of the Causal

The 1960s witnessed a remarkable string of causal theories. Functionalism -- in essence a causal theory of *mental states* -- was first on the scene (Putnam 1960) followed by a causal theory of *perception* (Grice 1961), a causal theory of *action* (Davidson 1963), a causal theory of *knowing* (Goldman 1967), a causal theory of *events* (Davidson 1969), and finally in 1970, a causal theory of *reference* (Kripke 1980).[1][2] Though the most famous causal theories were already in play by the end of the decade, the trend had not run its course. In 1978, David Armstrong defended the Eleatic Principle, which might be characterized as a causal theory of *being* and followed it two years later with the somewhat less dramatic causal theory of *object persistence* (1978; 1980). It was in that same volume – *Time and Cause: Essays Presented to Richard Taylor* – that Sydney Shoemaker published his causal theory of *properties*, which is the focus of the present essay (1980).[3]

Why the causation fixation? Each of these causal theories, of course, had roots in its local dialectical history. Goldman was responding to the Gettier problem (1963), Kripke to the failures of descriptivism, and so on. But there's also no denying that causation was in the air like a fine mist. It was the default analysans, followed closely in popularity by related notions like counterfactual dependence, chance, and nomic necessitation. Thus, Nozick rejected the causal theory of knowing only to try a counterfactual theory of knowledge instead, and Armstrong did likewise with nomic necessitation (Nozick 1981; D. M. Armstrong 1973). But causation, counterfactuals, laws, and chance all belong to the same tightly-knit family. The question, suitably qualified, remains: why were *these* causal notions so popular?

One reason was the rise of naturalism in the period. Naturalism attempts to shoehorn all meaningful talk of action, knowledge, mind, reference, and the like into a non-primitively-mentalistic world. It's a tight fit. Most of the philosophical subjects up for naturalistic treatment involve relations between persons and their environments. To ground such relations appropriately, theorists had to find topic-neutral substitutes, relations that could apply univocally across the categories of mind and body, and of these there are precious few with any prospect of success: causation, counterfactual dependence, and nomic necessitation nearly fill out the roster. So, the ubiquity of causal analyses in philosophy during the rise of naturalism is

[1] Perhaps I should say the 1960's witnessed a "spike" in causal theories. I don't mean to suggest that these theories were without precedent; indeed, I believe *all* of them had precursors.
[2] It should probably be observed here that Kripke did not actually put forward any such theory in his lectures at Princeton, but merely gestured towards one. See Evans for a causal theory willing to call itself as such(1973).
[3] Though the heyday had passed, the next few years featured causal theories of *seeing* (Tye 1982) and *intending* (Davis 1984). In fact, new causal theories continue to appear, e.g., Richard Johns' causal theory of *chance* (2002).

no surprise. The surprise is how brilliantly philosophers managed (and still manage) with such crude implements.

In any case, naturalism did not halt its advance upon reaching causal theories of mind, knowledge, action, reference and the like, but turned upon its own devices, the very ideas like causation, law, chance, dispositions, and counterfactual dependence, which were *themselves* marked as spooky theological vestiges in need of some kind of reductive or eliminative treatment (Goodman 1983, 31-40). The modest strategy here was to pick the most central of these notions and use it to explain the others.[4] But the more popular tradition, tracing back, perhaps, to David Hume, and culminating in David Lewis, aimed for more. Throughout the 1970's, Lewis offered ingenious reductions for the entire family of causal notions to facts about the distribution of what he called "the perfectly natural properties". Lewis reduced the laws of nature to maximally simple and informative facts about the distribution of these properties (2001a, 73), reduced counterfactuals to complicated similarity relations (1979), and reduced causation to chains of counterfactual dependence (1973). Here is his purist vision in canonical form:

> Humean supervenience is named in honor of the greater denier of necessary connections. It is the doctrine that all there is to the world is a vast mosaic of local matters of particular fact, just one little thing and then another. (But it is no part of the thesis that these local matters are mental.) We have a geometry: a system of external relations of spatiotemporal distance between points. Maybe points of spacetime itself, maybe point-sized bits of matter or aether or fields, maybe both. And at those points we have local qualities: perfectly natural intrinsic properties which need nothing bigger than a point at which to be instantiated. For short: we have an arrangement of qualities. And that is all. There is no difference without difference in the arrangement of qualities. All else supervenes on that. (Lewis 1987, ix-x)

Lewis's conjecture holds undeniable "desert landscape" appeal: the distribution of point-sized qualities is a strikingly sparse ontological base. I think Shoemaker's causal theory of properties, however, was no less ambitious. Rather than trying to reduce away all of the causal notions to something else, Shoemaker instead anchored to the idea of a causal power itself. So far, this sounds like the modest strategy mentioned above, but Shoemaker *also* used causal powers to regiment something lying *outside* the small causal circle, *viz*., the notion of a natural property, which Lewis himself could only regard as an untamed primitive.[5] In this way, Shoemaker claimed equal rights, alongside Lewis, to the coveted title of "most naturalistic", and – perhaps along with Armstrong's Eleatic pronouncements – brought the sixties-era celebration of the causal to its climax.

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[4] For instance, one might start with the laws of nature and account for the rest in terms of the laws (Maudlin 2007, ch. 1; Carroll 1994).

[5] Note: I do not say that Shoemaker *identified* natural properties with powers, but rather, that he used powers to regiment them. The significance of this distinction will become apparent later in the paper.

I'm going to discuss Shoemaker's paper in this essay, but my goal is not intellectual history or critical exegesis. My goal, rather, is to offer a new argument for Shoemaker's theory. Like Shoemaker, I will argue that the intrinsic properties of concrete objects are each necessarily correlated with a unique causal power, i.e., that properties have dispositional shadows. But unlike Shoemaker, I will make no use of (even slightly) controversial premises in my argument. Furthermore, I will note that if we take necessarily co-extensive properties to be identical then it follows that the intrinsic properties of concrete objects are identical to powers, i.e., that properties are nothing distinct from their dispositional shadows, i.e., that *properties are dispositions*.

Though my argument is perfectly general, it's most instructive to consider it as a direct attack on Lewis's reductive project. If I am right, then though Lewis never saw this implication, his Humean accounts of the dispositions, laws, chances and the like, together with his theory of property identity commit him to saying that each of his beloved qualities-- his purely intrinsic, categorical, local properties -- is in fact a disposition. The famous "Humean supervenience" excerpt above would represent Lewis's metaphysics with equal veracity if it were to substitute "dispositions" for "qualities". (The horror!)

In order to resist my conclusion, Lewis must either abandon his *reductionism* about the dispositional/causal/nomic/subjunctive in favor of full-bore *eliminativism* or else abandon his modal criteria of property individuation and take refuge in hyperintensional distinctions, i.e., of cases where a disposition and a quality are necessarily co-extensive, Lewis would have to say those dispositions and qualities are nevertheless wholly distinct, and that only the qualities are perfectly natural. Either strategy would represent not only a departure from the letter of Lewis's metaphysics, but also a betrayal of its spirit.

Shoemaker's Theory

Shoemaker's thesis in "Causality and Properties" is that the intrinsic[6] properties of concrete objects are uniquely and essentially correlated with the powers those properties bestow (1980). The view was not entirely novel, prefigured as it was in the work of Achinstein (1974), Harre and Madden (1975), Kneale (1952) Putnam (1970), Sellars (1948), and, indeed, perhaps in nearly every philosopher's work before the early occasionalists, al-Ghazali and Gabriel Biel,

[6] Strictly speaking, he says they are the non-mere-Cambridge properties, but as far as I can tell, those are just the intrinsic ones. Other parties to the dispute formulate the subject matter differently. For Lewis, it's the perfectly natural properties. For me, it's the terminal nodes of *in virtue of* dependence chains, if there are such. These difference are important, of course, and any such notion as "naturalness" or "intrinsic" or "in virtue of" is fraught. But for the narrow purposes of this paper, I'll ignore all such differences and difficulties.

wrested powers out of ordinary things and granted them to God alone (Freddoso 1986). But Shoemaker improves upon his predecessors in two noteworthy respects. First, he defines the view with a new measure of precision, identifying powers by appeal to a function from circumstances to effects, $<c_i,e_i>$ such that objects possessing the power and in c_i "have a certain effect": e_i, then claiming that every property necessarily and uniquely correlates with a function from *other properties* to these powers:

> Just as powers can be thought of as functions from circumstances to causal effects, so the properties on which powers depend can be thought of as functions from properties to powers or, better, as functions from sets of properties to sets of powers (Sydney Shoemaker 1980).

Since the function by which Shoemaker individuates properties itself takes properties as arguments, and the circumstances and effects are a matter of which properties are instantiated where, he is forced to acknowledge, and embrace, the non-well-foundedness of his proposal. Still, just as the individuation of sets by their elements and the individuation of ur-elements by the sets to which they belong is informative, though ultimately circular, Shoemaker's theory promises us a non-trivial, substantive constraint on the identity of properties.

(If we're willing to allow that circumstances are not merely extrinsic, but can include intrinsic components as well, we may simplify Shoemaker's formulation, neatly folding the "other properties" into the circumstances that identify a power. For example, if F is identified by the function from another property, G, to the power to bring about E in circumstances C, we can call the conjunction of C's holding, together with the object in question's having G, "C*". Now, F can be identified by appeal to the function from C* to E.)

The second notable advance in "Causality and Properties" is the bevy of arguments, both epistemic and semantic, that Shoemaker marshaled in support of the newly-clarified view. If properties were untethered from the powers of objects, he claimed, we could neither know much of anything nor successfully refer to the properties of things. Since we *do* have knowledge of the world, however, and also manage to refer to the properties of objects, properties are, in fact, tied to the causal powers they bestow in just the way his theory describes.

Though much discussed in the three decades since the publication of "Causality and Properties," Shoemaker's epistemic and semantic considerations have not fared as well as his articulation of the view itself. To the contemporary philosophical ear they manifest a peculiar, twentieth-century anxiety about individuation, knowledge, and reference. Thus, although the theory itself boasts many fans among contemporary metaphysicians, it is rare indeed to find an approving citation of Shoemaker's arguments for it (Bird 2007, 263).

I shall briefly discuss the arguments, and in the predictably disapproving manner. But recall that my purpose in so doing is not refutation. Rather, it is to expose a new and powerful line of

reasoning for Shoemaker's view.

Epistemic Arguments and Replies

Shoemaker's central argument in "Causality and Properties" is a sort of *reductio*. He first asks us to assume that properties are *not* tied to powers in the manner he proposes and then points out that all sorts of new skeptical scenarios are possible.

For instance, suppose there could be causally inert properties. Then two very similar-appearing objects—say, two ballpoint pens from the same package—may in fact be vastly dissimilar, because one is stacked with multitudes of inert properties that the other lacks. This may be the case despite the pens having exactly the same causal powers throughout their lifetimes. Likewise, two very dissimilar-appearing objects—say, a pen and a person—may in fact be highly similar, by virtue of sharing a multitude of inert properties. Further, if properties can endow different powers at different times, it may be that an object appearing to change—say, undergoing a pen-to-person transformation—actually isn't changing its intrinsic properties at all; the intrinsic properties are remaining fixed, while the property/power relation shifts. And finally, it may be that what appears to be unchanging is, in fact, undergoing radical change in its intrinsic properties while the relation between properties and powers evolves in a disguising, compensating fashion.

According to Shoemaker, if such skeptical scenarios were possible we could not have any knowledge of similarity and change. But we *do* have such knowledge. Therefore, the scenarios are impossible.

It's an odd way of doing modal metaphysics. After all, it's never argued that the envisioned scenarios embed any hidden *conceptual* confusion. So it's not clear how ruling them out metaphysically is supposed to do any epistemic work. Let me put the problem as a dilemma. Upon first considering the scenarios, we either know we're not in them or we don't know we're not in them. In the former case, we needn't worry about whether they're metaphysically possible, so long as they're not actual (or nearby). But in the latter case, it seems we also don't know Shoemaker's *metaphysics* is correct. That is to say, either Shoemaker's *ad hoc* modal surgery is unnecessary or else we lack the nerve to perform it. [7]

[7] To illustrate, let's imagine the response of the Moorean: «I know that my left hand resembles my right. Therefore, any skeptical scenario on which my left hand does not resemble my right – including Shoemaker's own – is not actual.» Is the Moorean any worse off here than in her better-known dismissal of the evil genius scenario? Isn't Shoemaker's own strategy just a kind of *modal* Mooreanism, and doubly guilty of any question-begging against the skeptic? Shoemaker's starting point is the same, i.e., «I know that my left hand resembles my right,» but from this starting point, Shoemaker draws an even stronger conclusion: «Not only is the envisioned scenario non-actual—as the standard Moorean would have it—but also metaphysically impossible!». It's difficult to imagine the target audience for Shoemaker's argument. One segment of the philosophical population already thinks the Moorean begs the question against the skeptic. This segment will surely think that Shoemaker also begs the question, since his conclusion is even stronger.

Fortunately, standard epistemology itself saves us from systematic ignorance, and without a modal metaphysics driven by wish fulfillment. As many have pointed out (Cross 2004; Hawthorne 2001; Schaffer 2004), standard anti-skeptical theories of knowledge, or of "knowledge", of the traditional fallibilist, reliabilist, subject-sensitive invariantist, contextualist, and relativist varieties, all address Shoemaker's skeptical challenge with exactly the same methods--and just as successfully (or unsuccessfully)--as they address Descartes' evil genius scenario. Epistemically speaking, there is nothing to see here, nothing new. Move along, everyone!

Although the foregoing replies deflect Shoemaker's argument, the most satisfying is a *tu quoque*. Analogous skeptical worries about similarity and change arise even if properties *are* linked to powers in exactly the way that Shoemaker suggests. To see how this is so, first observe that one of the central motivations for dispositionalism is the thought that dispositional differences between objects need *never* be manifest in the actual world. Moreover, these dispositions might contain wholly novel manifestations, alien to the actual world. For example, two fundamental particles might never actually meet, but if they did, their collision would result in a brand new kind of fundamental particle, an "alien" property (C.B. Martin 1993; C.B. Martin 1997). Of course, this alien property *itself* would have powers, perhaps powers that would be manifest only upon reacting with other fundamental kinds of particles in the actual world, perhaps powers to produce *further* fundamental alien properties, and so on.[8]

Thus, actual properties may be sensitive to aliens; the actual world may contain any number of properties with potential effects that would be manifest only in the company of an alien. Call such properties "alien-sensitive powers", and call their triggers "alien catalysts". Now we're in a position to mirror Shoemaker's skeptical scenarios.[9]

Suppose a property is sensitive only to an alien catalyst. While not strictly speaking inert, it is

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Another segment of the philosophical population will think the Moorean does *not* beg the question against the skeptic. For this group of philosophers, Shoemaker's scenarios pose no threat to our knowledge, for there is a ready anti-skeptical rejoinder independent of Shoemaker's metaphysics. Parallel considerations apply, *mutatis mutandis*, to other anti-skeptical strategies like externalism, contextualism, subject-sensitive invariantism, relativism. In no case are Shoemaker's scenarios uniquely problematic.

[8] A dispositionalist could argue that the only alien sensitivities of actual properties are ultimately traceable to sensitivities to possible interactions of non-alien properties. That is, we begin with the set of actual properties, call it "0" and form set 1 by adding to the membership of 0 all properties resulting from possible interactions of members of 0. Set 2 is formed by adding to set 1 all possible interactions of elements of 1, and so on. We can then say all grounded alien sensitivities, then, are sensitivities to elements of some member of the series: 0, 1, 2,..., and hold that the only alien sensitivities are the grounded ones.
The technique is appealing but unduly provincial. Suppose the actual world has three fundamental properties, F, G, and H, and that the only law is that whenever F and G are co-instantiated, H follows. By this doctrine, together with Shoemaker's general theory, there couldn't be a "shrunken" world, w, where things are F, but nothing is ever G or H, because relative to w, F's sensitivity to G would be a sensitivity to an ungrounded alien.

[9] The technique was discovered independently by John Hawthorne and by me, though his exposition is considerably more elegant (Cross 2004; Hawthorne 2001).

for all *practical* purposes undetectable, requiring, as it does, an alien trigger. Call such properties "quasi-inert". Now we can load up one ballpoint pen, but not the other, with multitudes of these quasi-inert properties, each of which has different alien sensitivities. The two pens will seem, under any actual test, to be exactly alike, while in fact being vastly dissimilar. Quasi-inert properties can also make a pen and person more alike than a pen and another pen, by the same means, *mutatis mutandis*.

We can also mimic property/power swapping, as follows. Let F and F' differ only with respect to (actual) catalysts C and C'. In the presence of C, F endows power P but F' does not. In the presence of C', F' endows power P but F does not. Imagine that at time t, everything F switches to F' and everything C switches to C'. Though everything will change, no change will be detected. Likewise for the case of objects seeming to change (pen-to-person, say) when they are in fact static, which could be the result of the introduction of new catalysts, rather than an actual intrinsic change.

Though Shoemaker's envisioned skeptical scenarios and the analogues that arise from within dispositionalism itself are subtly different, standard epistemologies will not draw a bright line between them. Shoemaker may have called our attention to a new and devastating species of skeptical argument, but he has failed to make a convincing case for dispositionalism.

The argument that Lewis's local qualities satisfy Shoemaker's conditions

The purpose of the previous section was not primarily to review Shoemaker's epistemic arguments, but to introduce and motivate the notion of *alien sensitivity*, the idea that dispositions may have radically non-actual activation conditions. Once we see that Shoemaker's criterion distinguishes properties whose dispositional differences are only revealed under alien circumstances, we are very close to recognizing that even paradigmatically categorical properties are powers.

Begin by asking yourself whether Lewis thinks there are possible conditions such that, for arbitrary perfectly natural property F, F endows some power to objects in those conditions.

The answer, quite clearly, is *yes*. Lewis's view is *not* that perfectly natural properties *cannot* endow powers. Rather, it is that they endow *different* powers in *different* circumstances. Exactly how the powers granted by F vary with circumstances is a complicated matter. A nomic theory of powers would say something like the following: in worlds where it follows from the laws of nature that Fs become Gs, F endows the power to become a G. And in general, in worlds where it is nomically necessary that Fs do something, then F endows the power to do that thing. There is reason to think Lewis does *not* hold the nomic theory of powers, but it is nevertheless very close to his view, and helpful to bear in mind.[10]

[10] If I had dropped this cup, it would have fallen to the ground. But, on Lewis's account of counterfactuals,

But we needn't worry about precisely which conditions are required for F to endow the power to become G. What matters is that there *are* possible conditions in which F disposes things to become Gs. These conditions may be states of the whole world, as on the nomic theory of powers, or states of subregions of a world, if, for instance, F disposes things to become Gs in one part of the world but not in another. The important thing is that the regions of modal space at which F disposes things to become G are not random, but a matter of how powers generally supervene on the distribution of Humean facts.

Let "C" name the set of conditions under which F endows the disposition to become G, (or the conditions under which F-ness disposes things to become G).[11] Lewis should accept the following without objection:

(1) In C, F disposes things to become Gs.

Now to the substantive claim. Having said (1), I think Lewis must also say that:

(2) F disposes things to become G in C.

The step from (1) to (2) seems to add metaphysically weight, because (1) contingently correlates F with a disposition, while (2) pushes that contingency into the very specification of the disposition itself, yielding a necessary connection between F and a disposition. While, according to (1) there are certain conditions under which F disposes things to become G, according to (2), F, *everywhere* in modal space, disposes things in a certain way: to become G under conditions C.[12]

The transition is hard to resist. When someone says, "In the Sun, ice is disposed to melt", we

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what if I had dropped it in the first nanosecond of the history of the universe? Who knows! That event may have steered an entirely different world history and thereby underwritten a different set of laws. The laws are one factor in the similarity ranking that determines the truth conditions for counterfactuals, but they are not the only such factor (Lewis 1979). Not that we should think that the powers that a property would endow corresponds precisely to some counterfactual either. Lewis himself thought that the subjunctive conditional analysis of disposition ascriptions had to be suitably qualified and made one effort in that direction (Lewis 1997). The literature in that area has exploded ever since, and remains on ongoing field of controversy. My goal here is to frame the problem in such a way that it *does not matter* how the Humean arrangement of properties underwrites powers, only that properties do, in fact, endow objects with powers to act in certain ways in certain circumstances. And, if those circumstances are entirely specifiable, down to the last global detail, it is extremely hard to deny that there are any such circumstances.

[11] Note: it may be indeterminate whether F disposes things to become G in many circumstances. But that's not a problem: the relevant function from circumstances to effects can be partial, and needn't cover the indeterminate circumstances.

[12] We can see more specifically how this works by thinking about the nomic theory of powers entertained above. On the nomic theory, F endows the power to become G in the circumstances in which it's a law that Fs become Gs. The move from (1) to (2) takes us from the fact that in worlds where it's a law that Fs become Gs, F endows the power to become G to the fact that F endows the power to become G in worlds where it's a law that Fs become Gs.

paraphrase them seamlessly as saying that ice is disposed to melt in the Sun. The same can be said for the *habitual*, e.g., ice *melts* in the Sun. Here it is even clearer. One does not hesitate in the inference from "In the Sun, ice melts," to "Ice melts in the Sun". Yet, on at least some theories of dispositions, the habituals are true only if being in the Sun ice is disposed to melt, and ice is disposed to melt in the Sun, respectively (Fara 2005).

Compare also: (a) This joke is funny in England. (b) In England, this joke is funny. Very hard to see the difference. Suppose (a) and (b) are uttered in the US. (a) directly attributes a power to the joke: it has the power to make people laugh in England. (b) does not directly attribute a power, but says that the joke has a power under *other* conditions: being in England. Yet, it would be *absurd* to halt the inference from (a) to (b) or vice versa. "Yes, of course, if the joke is told *in England*, then it has the power to amuse audiences. But don't go thinking that means that here in the US, the joke has any power to amuse audiences *in England*!" Bizarre.[13]

I think this is just a general feature of power and disposition talk. *F disposes things to become G in C* iff *in C, F disposes things to become G*. And it is easiest to see for habituals: *Fs G in C* iff *in C, Fs G*.

It is worth asking why the analogous inference is invalid for subjunctive conditionals. At least according to the standard semantics for subjunctives, it does *not* follow from $(x)(Fx >_{cf} (Gx >_{cf} Hx))$ that $(x)(Gx >_{cf} (Fx >_{cf} Hx))$. It may be *true* that all soluble things are such that if they were immersed in water, they would dissolve, but *false* that all things actually immersed in water would dissolve if they were soluble. Suppose the only soluble things are not in water, and that nothing would prevent their dissolving if put in water, but that objects in the water are such that if they were to become soluble, they would be prevented from dissolving. Perhaps a sorcerer guards over all of the immersed objects, and would cast a spell instantly removing them from water, or else in some way interfering with the dissolution process in some way at the microphysical level, should they become soluble. This sorcerer, however, may be perfectly content to let soluble objects that are not actually immersed dissolve, should they be put in water. He watches over *only* the immersed objects.

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[13] I am not endorsing all instances of the following linguistic schema: *If it's the case that if x were in C, x would be disposed to E, then x is disposed to E in C*. John Hawthorne, in conversation, offered the following kind of counterexample to such a schema. Suppose that if in Alaska, I would be driven to homicidal madness by the interminable darkness, gubanatorial politics, and vast expanses of wilderness. It does not follow that I am, right now, even conditionally disposed to kill-in-Alaska. I am a (potentially) long-range or at least interstate killer. If I were, in fact, homicidal in Alaska, I would only victimize *non*-Alaskans, say by mailing poisoned fruit baskets to prominent head-rearing Russians across the strait. Thus, while it's true that if I were in Alaska, I would be disposed to kill, it doesn't follow that I am disposed to kill-in-Alasaka.

The case plays on an ambiguity in «kill in Alaska». There is a sense in which I am disposed to kill in Alaska. That is, I am disposed to kill someone under the condition of my living in Alaska. But I am not disposed to kill-in-Alaska, where «in Alaska» modifies the manifestation of the disposition itself, rather than the conditions under which that manifestation happens. The solution, then, is to insist on a reading of «in conditions C» that does not modify the manifestation itself, does not change the nature of the manifestation of the disposition, but merely specifies the conditions under which the dispositions would be manifested.

So in general, it would be a bad idea to infer from the fact that if something were F, then if it were G, it would be H to the fact that if something were G, then if it were F, it would be H. Given the undeniably close relation between disposition attributions and subjunctive conditionals, we must take care to avoid that fallacious inference in another guise. Yet it seems undeniable that if in water, soluble objects are disposed to dissolve, then soluble objects are disposed to dissolve in water, and also that if in water, soluble objects dissolve, then soluble objects dissolve in water.

Why is this so? I think the cases where the relevant inference fails for subjunctives are *precisely* those cases where disposition ascriptions succeed and counterfactual or subjunctive analyses appear to falter. So-called "finkish" dispositions are dispositions that disappear in their stimulus conditions (C.B. Martin 1994). Lewis imagines a sorcerer guarding a fragile chalice, poised to cast a spell making it not fragile if it is going to be dropped (1997). The chalice's disposition is finkish, vanishing exactly when called upon. It's fragile, intuitively, but would not break if dropped. Relatedly, Bird notes that "antidotes" are external factors that disrupt and prevent the manifestation of dispositions in the stimulus conditions, e.g., the antidote to a poisonous venom (1998). Here the venom has a disposition to kill when ingested, even though it may be ingested without causing death because of the interference of the antidote. Finally, we can generate the reverse phenomenon, where a certain subjunctive conditional holds without the associated disposition, by appealing to what Mark Johnston calls "mimics" (1992). Imagine a non-fragile piece of clay attached to a motion-sensing machine that, if it detects jarring or dropping of the clay, will instantly stream liquid nitrogen over the clay, causing it to shatter.[14]

This is my claim: *all counterexamples to the pattern of subjunctive inference above are also cases of finks, antidotes, or mimics*.[15] That is why the analogous form of reasoning is permissible in the case of powers, dispositions, and habituals.

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[14] Lewis himself tried to deal with the problem of finkishness by dictating that if x is disposed to E in C, then the relevant subjunctive must hold x's intrinsic character fixed up through the onset of the stimulus conditions (1997). But as Bird points out, this failed to deal adequately with the case of antidotes (1998). Of course, discussions of the relations between dispositions and conditionals have advanced considerably since Lewis's article (see, e.g., Manley and Wasserman 2008).

[15] In mimic cases, recall, we have a lack of a disposition, but a true counterfactual, e.g., the non-fragile piece of clay next to the liquid-nitrogen spraying machine: it would break if dropped, even though it lacks fragility. One might think this is a model for Lewis. Even though the clay would acquire the disposition to break when dropped, were it dropped, it does not, prior to the dropping, possess that disposition. In parallel fashion, Lewis wants to say properties would endow powers in various conditions, but when not in those conditions, don't endow any powers. But consider the non-fragile piece of clay. Though it may lack the disposition to break if dropped, it still has *the disposition to break if dropped in the presence of the liquid-nitrogen-spraying machine*. Building the fink or the mimic into the conditions simply gives us *another* disposition. To follow out the parallel further, my claim is *not* that an arbitrary natural property F *is* the power to become G. It is that it is the power to become G *in certain circumstances*. What Lewis needs is a dispositional *lack*, in spite of the fact that properties do impart dispositions under certain conditions, and mimics do not provide that kind of case.

I do not have a *proof* that all of the cases in which the relevant inference pattern for subjunctive conditionals fails are cases of finks, masks, or mimics, but you're invited to submit counterexamples.[16] My only goal is to explain away the threat that swapping the conditions in and out of the scope of the power operator inherits the danger of the analoguous operation for subjunctives. To dismiss this threat, it's enough to have strong initial intuitions about the legitimacy of the inference and a plausible explanation of the difference between the good case (dispositions) and the bad case (subjunctives), and that much, I think we have.

Even on a pure subjunctive conditionals account of dispositions, Lewis is in trouble. While, in general, the form of inference with subjunctives noted above is invalid, it may still be valid for a subset of cases. For instance, suppose something is an F-detector iff it is disposed to register "1" if in a world with an F. Now, we can make this disposition to register "1" if in a world with an F as strong as we like. So let's make it a full-strength, deterministic, unconditional power. Lewis *might* argue that there couldn't be any such power. But I don't see why he would say

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[16] This is Cian Dorr's case (from conversation). Suppose I am a doctor who works in a country where doctors are poorly paid. I'm averse to wealth, and only took up medicine because it was the most selfless, humanitarian occupation I could pursue. Now, it's a truism that in countries that pay doctors handsomely, being a doctor disposes one to wealth. But it does *not* follow that being a doctor disposes *me* to wealth in countries that pays doctors handsomely. If I were in such a country, I would do something other than medicine, given my humanitarian impulses and aversion to remuneration. Thus, though I am a doctor, and doctors are disposed to wealth in countries that pay doctors well, *I* am indisposed to be wealthy in countries that pay doctors well.

It may be that the "Doctor Dogooder" case is one of a finkish disposition. Let us focus on this one fact about me: I am a doctor. My claim is this: *that fact* disposes me towards wealth in countries that pay doctors well. Now, I have *other* dispositions too. I dislike money. And in a contest between the two dispositions, there's a clear winner: the latter. In fact, my distaste for wealth would actually prevent me from practicing medicine, thereby eliminating the doctor-ly disposition altogether. Does that mean that right now, I do not have a property that disposes me to become wealthy where doctors are highly paid? It's not clear that it does. On the contrary, he fact that being a doctor disposes me towards wealth in certain countries explains many things about me that are not true of non-doctors. It explains, ironically, why I wouldn't practice medicine in certain countries, why I would become wealthy if I lost my altruistic tendencies and moved to one of those countries, and so on. If I weren't so disposed, or, more precisely, if I didn't have a property that so disposes me, these explanations wouldn't make any sense. If being a doctor does not dispose me to be wealthy in certain countries, why would I stop practicing medicine there?

The very question at issue here -- whether there can be intrinsic finks and masks -- is the subject of heated debate in the current literature. In favor are Ashwell (2010), Clarke (2010), and Everett (2009), while Bird and Handfield (2008), and Choi (forthcoming) are opposed. If there can be intrinsically finkable dispositions, then Dorr's case looks like an example. Fans of intrinsic finks would argue that my disposition towards wealth in certain countries is intrinsically finked by my wealth aversion. Opponents will argue, with Dorr, that I lack the disposition.

Let's suppose the philosophical consensus turns against intrinsically finkable dispositions. A form of my argument will still go through, because I can restrict it to dispositions that are immune to mimicking, masking, and finking by virtue of their infinite specificity. Whatever we say about Dorr's case, it's undeniable that being a doctor does dispose one towards wealth in the following circumstances: one is in a country that pays doctors well, one is free from (or loses one's) altruistic impulses, allergies to money, etc., where "etc." indicates that every possible interferer, extrinsic and intrinsic, has been listed. Nevermind that we cannot actually do the listing; all that matters for my argument is that such a list exists. And how could it fail to exist? If there were no such list, then there would be two properties that underwrite precisely the same subjunctive conditionals. (See the following section on subjunctives for more on this point.)

that. For him, it would just be a highly non-natural property. Now, isn't every F such that, if it *were* in a world with an F detector, the F detector *would* register "1"? If so, then F underwrites a non-trivial subjunctive conditional. So, on a subjunctive conditional account of dispositions, F underwrites a disposition.

But perhaps we can deny that F entails the conditional. Perhaps some Fs are guarded over by F-detector-averse sorcerers waiting to cast spells should an F detector threaten. If this supposition is coherent, what we have here is a paradox equivalent to the existence of two omnipotent beings: the F-detector and the F-detector-averting-sorcerer: they aren't jointly possible. But now consider the conditions of *being alone in a world with an F-detector*. If an F were in those conditions, it wouldn't have its protective sorcerer with it, and the F detector would register "1".[17]

Let's recap. If there are possible conditions, C, under which a "categorical" property F disposes things to become G, then throughout modal space, F disposes things to become G in C. The conditions may be strange. They may involve non-actual laws. But dispositions may have alien triggers, as we have seen, so this is nothing distinctive. Some parts of the pluriverse are poised to send the property into action. By the same token, the property, wherever instantiated, is poised to go into action in those parts of the pluriverse, and not in others. In this way, categorical properties, far from the inert, modally innocent creatures they purport to be, are in some sense *modal monads*, representing the full range of possible conditions (but unlike monads, causally interacting as well).

That was the first question: do properties endow powers? It seems they do. In fact, it is difficult to see how one could offer any theory of how powers supervene on properties without giving us a recipe for such endowment. Now comes the second question: is there a *unique* power endowed by each natural property? After the last question, this should be relatively easy. Suppose we start with two arbitrary properties, F and F*. Would Lewis think there are any conditions under which F and F* would endow *different* powers? Of course. Again, the nomic account of powers would say that in worlds where it's a law that Fs become Gs and F*s do not, F endows the power to become G and F* does not. Lewis's theory may be a bit subtler than that, but it doesn't matter. Given the wealth of the pluriverse, he will have such distinguishing conditions, for any two properties. Thus, we can find a single power that is both *necessarily* correlated with F and *unique* to it by taking the union of each of the powers (sets of pairs of circumstances and effects) that distinguishes F from F*, F from F**, and so on.

For rhetorical purposes, my discussion has meandered through some of the specifics of Lewisian reductive metaphysics, but it must be noted that my central claim in this section – that natural properties can be paired one-to-one with powers – depends on none of the implementational detail. It depends only on each perfectly natural property making a potential

[17] Or, if one is resistant to the idea F detectors, then it will suffice to think about counterfactuals and dispositions that are so specific they avoid finkish, masking, and mimicry entirely. (See Handfield, 2008).

difference to the powers of things of things instantiating that property, and on no two perfectly natural properties making all the same potential differences. I simply note a general feature of powers, viz., that whatever the *potential* differences in powers that a natural property contributes to its bearers, those *potential differences* are also *actual differences in potential*. This is simply what powers do: they code potential differences as actual ones.

Since Lewis aims to explain, rather than eliminate, causal powers, it should be uncontroversial that for him, every natural property *potentially* contributes to the powers of things, and that no two perfectly natural properties make all the same *potential* contributions. If one simply attends to what powers are, one can see that every perfectly natural property is shadowed by a unique power, i.e., Shoemaker's thesis from "Causality and Properties" is true.

Anti-Hyperintesionality

Observe that for Lewis, the perfectly natural properties, like all other properties, are sets of possibilia: "... the property of being donkey comes out as the set of all donkeys, the donkeys of other worlds along with the donkeys of ours" (Lewis 2001b).[18] The natural properties may be specially marked by perfectly resembling tropes, universals, or simply primitive naturalness, but properties, whether natural are not, are *sets*, and sets are, by the axiom of extensionality, individuated by their membership. Thus if a perfectly natural property P and a power P', which is endowed by P, are necessarily co-extensive, then P=P'.

Given the argument above for Shoemaker's thesis, it follows that for Lewis the perfectly natural properties – all of them – are powers. And if the perfectly natural properties, the local qualities of which Lewis speaks, are all powers, then Humean Supervenience isn't worthy of its name. Lewis might as well have said that everything supervenes on powers, or that there is just one little disposition and then another.

Non-Nomic, Non-Global Conditions

The heart of my strategy is to take global states of the world such as possible laws of nature and treat them as circumstances which, together with the original property, would trigger an effect. Just as placing salt in water or dropping a glass reveals its disposition to dissolve, or to break, so the laws of nature reveal the causal powers inherent in so-called categorical properties.

One might think that this is cheating. It is certainly unorthodox. One might think that laws of nature are of an entirely different category from standard activation conditions such as *being put in water* or *being dropped*. Laws concern the relations between ordinary properties, and

[18] Lewis does entertain the idea that properties are, for instance, structured out of sets of possibilia in a certain way that allows necessary coextension. But he does this only to explain the nontriviality of certain thought and talk. He doesn't think such properties are useful for *ontology* (Lewis 2001b, 56).

being in a world with such-and-such laws is itself a property only in a highly attenuated, highly derivative sense. (So goes the objection.) Standard categoricalist opposition to Shoemaker's individuation and essence claims rested on everyone tacitly ignoring my strategy – which certainly *would* explain why no one has called attention to it – and so a repair should be easy enough. All we have to do is make that tacit assumption explicit.

Very well. Let's admit that Shoemaker is correct *if* we allow that the triggering circumstance in the specification of a power can be any sort of state, but contend that his view is only *interesting* if we restrict the relevant circumstances to exclude nomic facts, facts about what the laws are. The proposal, then, is that for Shoemaker, but not Lewis, property possession entails having a power to bring about certain effects under certain *non-nomic* conditions.[19] And remember: this is supposed to be no substantial departure from Shoemaker's or Lewis's intentions, but rather a matter of noting a previously tacit restriction.

To my mind, the proposed revision is grossly *ad hoc*. The power to bring about a G in a world where it's a law that Gs follow Fs is still a power, and it's a power that characterizes F in particular, and not properties generally. But I won't presume my audience shares that immediate judgment of arbitrariness. The "non-nomic conditions" restriction has a more blatant flaw. Since Shoemaker thinks the laws of nature are necessary, *every* circumstance is in a sense nomic: it entails the laws of nature, simply because everything does. So Shoemaker, on this proposal, would end up agreeing with Lewis that properties do *not* necessarily endow powers with non-nomic activation conditions, because on Shoemaker's view, there *aren't* any non-nomic conditions.

Nor is it useful to stipulate that the circumstances identifying the relevant powers cannot "mention" the laws, even if they entail them. This is a debate about *properties* and not *predicates*. The circumstances are a matter of which things have which properties. They don't "mention" anything. And remember that we are working in an anti-hyperintensional environment. Any attempt to get fine-grained enough to block the entailment of the laws by Shoemaker-envisioned circumstances will likely require distinctions too medieval for Lewis. If Lewis cannot distinguish his view of the nature of properties from Shoemaker's without recourse to hyperintensionality, the game is already over.

A related strategy would be to forbid the use of triggering circumstances that are temporally later than the effect in the specification of powers. Since the Humean conditions for F's endowing the power to become G will undoubtedly involve large swathes of the future, this would rule out the troublemaking powers. But this is overly restrictive, particularly for someone of Lewis's methodological bent.[20] The recent theory that the Large Hadron Collider's many failures and delays are due to time travel and the universe's "hatred of the Higgs" should be

[19] The proposal should rule out nomic effects as well. Otherwise, it would be easy enough to show that some categorical property F in circumstances C brings about the following effect: if in a world where the laws say that F&C is followed by H, then H will follow.

[20] Lewis is on record as being open to backward causation (1987).

ruled out on physical, not metaphysical grounds (Nielsen and Ninomiya 2008).[21]

Dlewis

Before we try in earnest to engineer a better restriction on the conditions, or to find some way to block the inference pattern, let's look ahead to the end game. The problem is not with formulating a proper version of the restriction, or with blocking a pattern of inference for that matter. The problem is deeper.

Consider the following fictional philosopher: David K. Dlewis. Dlewis is much like Lewis. He thinks that all of the possible worlds exist as spatiotemporally disconnected concreta. He thinks properties are sets of possibilia. He endorses counterpart theory with table-banging glee. He strokes his beard. He likes trains. He inspires students. He writes beautifully. And he's really *really* smart.

Dlewis agrees with Lewis about *which* properties are the perfectly natural ones. That is, when Lewis and Dlewis survey the pluriverse from their God-like pedestals, there is never an occasion on which Lewis says some set of possibilia, S, is natural and Dlewis does not, or vice versa. They also agree on principles of recombination. They even agree on *counterfactuals*.[22]

There are notable differences in their metaphysics, however. Dlewis says that all of the natural properties are *dispositions* to have certain effects, conditional on global states of the world. Which global states? Precisely the ones Lewis says are the conditions in which the perfectly natural properties endow the powers to bring about those effects. In other words, Dlewis does not fight the general inference I was trying to draw earlier, but embraces it.

Lewis's actual views are a bit more complex, but if we think about the (very nearby) nomic theory of powers discussed earlier, we can simplify and say that F endows the power to become G just in the circumstances in which it is nomically necessary that Fs become Gs. Thus, for Dlewis, F-ness is (in part) the power to become G if in the following condition: the global state of the world is such that the simplest and most informative axiomatic description of that world entails that Fs become Gs (i.e., it's a Lewis-law that Fs become Gs).

For Dlewis, such global states of the world do not constitute *laws*. He thinks, like a typical

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[21] Likewise, one may wish to rule out stimulus conditions that involve F itself, on grounds of circularity. But a circularity stricture would rule out, for instance, the disposition of masses to attract other masses, i.e., gravitation.

[22] Dlewis, then, seems to pose a counterexample, albeit a particularly outlandish one, to Antony Eagle's claim that we cannot individuate properties by their causal roles, while at the same time explaining natural necessity by appeal to dispositional essences (2009). For Dlewis, properties are, indeed, individuated by their causal roles, and natural necessity is metaphysical necessity, explained by appeal to dispositional essences, even though he agrees precisely with Lewis on the truth values of counterfactuals, the semantics for which is supposedly the trouble for combining the two views.

dispositionalist, that laws reflect the dispositional essences of properties. He thinks laws are necessary truths and that (deterministic) dispositions metaphysically necessitate their effects. Yet, he agrees with Lewis that there are worlds where Fs do not become Gs. As Dlewis sees it, those are worlds where the crucial (global) activation conditions, *e.g.*, the supervenience basis for its being a "Lewis law" that Fs become Gs, are absent, and thus fail to trigger the disposition into action.

What Lewis sees as contingency in *which powers* are granted by F, Dlewis sees as contingency in the existence of the *activation conditions* for various F-involving dispositions. For Dlewis, that contingency in no way counts against the metaphysical necessity of the relation between a disposition, its activation conditions, and its manifestation.[23] And Lewis agrees that each connection Dlewis thinks is necessary *is indeed necessary*.

Suppose Lewis somehow resists my earlier argument. Dlewis's metaphysics still looks coherent, and, when it comes to the characterization of natural properties, only nominally different from Lewis's own. The differences between Lewis and Dlewis are *not* differences in the modal behavior of the fundamental properties. So it's hard to see what Lewis's insistence that his properties are "genuinely" non-dispositional, his disavowals of Dlewisian metaphysics, amount to.

Is Dlewis's view somehow conceptually confused? How so? The position isn't terribly attractive, but it *does* seem coherent. The incoherent-seeming position is Lewis's. It is just very hard to imagine, of all people, David Lewis, insisting that although he and Dlewis agree about the modal extension of all the natural properties, all of the necessities, and all of the counterfactuals, that *in fact*, their views about the nature of fundamental reality are radically

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[23] John Hawthorne identifies the best argument for Shoemaker's view as a methodological one: why invoke what you don't need (2001, 368)? Quiddities are not required for science; we can make do with just properties identified by their causal roles. This might lead one to think of Shoemaker's view as somehow *simpler* than its rival. Indeed, Jonathan Schaffer represents the set of Shoemaker worlds as a proper subset of the set of Lewis worlds (2004).

But let's consider this simplicity argument in the light of Dlewis. Each theorist—Lewis, Shoemaker, and Dlewis--posits infinitely many worlds, so comparisons in terms of size are dicey. Hawthorne, Schaffer, and others would already admit that there are isomorphisms between them all. But it will be helpful to follow out some intuitive reasoning about their relative sizes.

Because in an obvious sense they agree about which exactly sets of possibilia exist, not only is there an isomorphism between the worlds of Dlewis and the worlds of Lewis, it also seems wrong to say either is a proper subset of the other. Arguably, the isomorophism is underwritten by *identity*. Their disagreement is about which properties to call "the laws of nature", where to apply the word "power" and so on. But in any case, Dlewis, intuitively, posits fewer worlds than Shoemaker. Shoemaker doesn't talk about what kinds of powers are possible, but presumably he could allow globally sensitive powers such as Dlewis's as possibilities. Since Dlewis explictily rules out locally sensitive powers of the sort that Shoemaker envisions, Dlewis posits only a tiny range of the sorts of possible powers that Shoemaker posits. Thus Dlewis's set of worlds is a proper subset of Shoemaker's. Since, in terms of possible worlds, Lewis = Dlewis, it seems we should also say *Lewis* posits fewer worlds than Shoemaker, which would make *Lewis's* theory the simpler one. This is not to offer a simplicity argument for Lewis's view, but to say that we should be wary of such arguments.

different, that Humeanism amounts to refusing the label "dispositional" to something that behaves, modally, just like a disposition.

Intuitively, what Lewis should say to Dlewis is this:

> You're right that the perfectly natural properties, in some sense, correspond to these funny powers with highly non-local activation conditions. But the perfectly natural properties are not themselves powers. Rather, they are perfectly qualitative, intrinsic features of point-sized things. Any powers to which they correspond are, in the end, a matter of how these purely qualitative intrinsic features are globally distributed. Powers are not primitive. They are highly unnatural, and exist only *in virtue of* the distributions of qualities, which are wholly non-dispositional in character. The purely qualitative properties do all of the deep explanatory work. They lie at the bottom of things. And they do not have dispositional *essences*.

Well and good. Except that for Lewis to say such a thing, he would also have to say that properties can be non-identical even if they're necessarily co-extensive. That would mean that properties are *not* sets of possibilia, that naturalness is neither a primitive feature of sets, nor a matter of whether sets have members instantiating a single universal nor perfectly resembling tropes (Lewis 1983).

Hyperintensionalism, then, is a perfectly acceptable counter to my argument, and I would be content if it were widely recognized as a presupposition of categoricalism. But there is reason to assume that Lewis himself would not abandon his set-based theory of properties. One reason, though certainly not the only one, is that the concession would undermine part of Lewis's argument for modal realism, namely, his objection to building a semantics for modal talk, ala Robert Stalnaker, on an ontology of properties rather than on concrete, spatiotemporally disconnected *things* (Lewis 2001b, 3.4; Stalnaker 1976). If properties are individuated primitively, rather than by their trans-world extensions, they could achieve the theoretical payoff of possible worlds, without a plentitude of spatio-temporally disconnected concreta.[24]

If hyperintensionalism is not an option, though, how can Lewis meet the challenge of my argument? Only, so far as I can see, to trade his reductivism for expressivism or eliminativism

[24] More specifically, Lewis criticizes Stalnaker's property-theoretic approach, as well as like-minded proposals by Plantinga and Adams, on the grounds that properties, considered not as sets of possibilia but abstract objects, must code for consistency and incompatibility relations in a primitive way, and further, that the way they represent possibilities is mysterious (2001b, sec. 3.4). For this reason, Lewis takes the opposite approach, rendering properties in terms of sets of possible objects, which he thinks allows a reduction of the modal to the existent and unmysterious. But if properties are hyperintensionally individuated, their non-identity, exclusion, and necessitation relations are no longer the mere inheritance of set theory, but rather, primitive, as is the way in which they represent possibilities.

about powers. Suppose Lewis were to say that there is only *really* the Humean base – just a spread of qualities – and that all talk of powers, dispositions, potentialities, chances, and the like, while perhaps permissible or impermissible, felicitous or infelicitous, is either false or non-truth-evaluable (Ward 2002). Then he could deny the central premise of my argument. He could say that different properties do *not* make different potential contributions to the powers of objects, because objects are all – whatever their qualities – impotent, speaking strictly. However, this would trade his somewhat plausible supervenience claim for a far more controversial eliminativism.

Objections and Replies

1. Significance

Some philosophers have granted the central argument of this paper, but charged it with triviality. According to this objection, the Humean should simply accept my conclusion – that natural properties are all powers – without batting an eyelash. After all, the powers identified with Lewisian natural properties are highly unusual, and easily screened off from the powers endorsed by mystery-mongering dispositionalists: the Lewisian is commited only to perfectly local powers, instantiated by point-sized objects, and sensitive only to global states of the world. What's wrong – so goes the objection – with saying that qualities are, in fact, identical to these kinds of powers? Yes, ontologically speaking, Lewis *is* Dlewis, but so what?

We can resolve the matter by careful attention to the dispositionalist/categoricalist dialectic. The expressions "quality" or "categorical property" are typically used by categoricalists to mark something that is *not* a disposition, and typically in order to analyze away the latter in terms of the former.[25] In particular, Lewis's iconic statement of Humean supervenience, quoted above, makes no sense if we allow that qualities can be dispositions. Lewis seems to be claiming that everything supervenes on *non*-dispositional properties, i.e., that the dispositional, nomic, chancy, subjunctive, and the like, are all fixed by the non-dispositional, non-nomic, non-chancey, non-subjunctive, and the like. But according to the present objection, Lewis would happily gloss his doctrine as saying merely that some dispositions fix others, which is hardly visionary.

The problem is not that Lewis's ontology is filled with dispositions. That is not disturbing, so long as the dispositions all supervene on a purely Humean base. The problem is rather that we've show that there are no *non*-dispositional grounds for the supervenient dispositions; it's dispositions "all the way down". Even though, strictly speaking, if we read "quality" as compatible with "disposition", dispositions will supervene on qualities (and vice versa), the lack

[25] See, for instance, the entire literature on why dispositions must have categorical bases, e.g., (Prior, Pargetter, and Jackson 1982).

of a non-dispositional base should be troubling to committed Humeans.[26]

In any case, suppose we take the non-standard reading on which "quality" is taken to be compatible with "dispositional". Lewis's view then looks to be in broad agreement with C.B. Martin and John Heil's (Martin 1997; Heil 2005; Martin and Heil 1998), on which the natural properties are all *both* dispositional and categorical. Martin and Heil would only take issue with Lewis about *which* dispositions are perfectly natural. This is, at the very least, *news*.[27]

Moreover, once the disagreement is recast as about *which* dispositions are perfectly natural, the Martin-Heil view seems to have a clear advantage over Lewis's. The powers that shadow – and are in fact identical to – Lewis's qualities are an odd choice for fundamentalia. They are, if you recall, globally-sensitive, dispositions that specify how an object possessing the property would be poised to act under every possible circumstance, even the counter-nomic ones. Why would a metaphysician start *here*, rather than with the fundamental properties of physics, understood as dispositions to resist acceleration, warp spacetime, alter electro-magnetic fields, and such, with no reference to other possible laws? Note that Lewis cannot answer this question by appealing to the spookiness of dispositions generally, or the need to reduce the dispositional to the non-dispositional. Once we have admitted that the world is, indeed, composed of dispositions all the way down, it's unclear why those dispositions would have only point-sized instances, and why they would all be globally-sensitive, and never purely locally-sensitive, why they would always vary so radically when embedded in non-actual global patterns in the way that Lewis prefers. Given that the global distribution of (non-dispositional) qualities does not explain the powers of objects, Lewis's view looks highly idiosyncratic and lacks its standard atomistic, anti-modalist motivations.

2. Symmetry

Another objection charges me with favoritism. The Lewis/Dlewis scenario, as depicted, has no obvious asymmetries, so if Lewis is in trouble, then so, it seems, is Dlewis. In particular, Dlewis, as a fellow anti-hyperintensionalist, is just as incapable of distinguishing himself from Lewis as Lewis is incapable of distinguishing himself from Dlewis. So, why shouldn't we conclude by extension that dispositionalists generally, at least if they are anti-hyperintensionalists, are in the same boat as categoricalists?

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[26] Compare the threat of panpsychism to physicalism. Physicalists are happy to identify mental properties with complex physical ones. Indeed, it would be a grand physicalist success to achieve such identifications. But suppose that each fundamental physical property were identified with a unique fundamental mental property, and vice versa. Then physicalists would hardly be claiming a victory, for the resulting view could equally be called mentalism. What makes identity theory a physicalist, rather than a mentalist, theory, is that the physical complexes identified with mental properties are ontologically derivative: they depend on more fundamental non-mental, purely physical properties.

[27] See, for instance, the long debate between Martin and categoricalist standard bearer, David Armstrong (1996).

The objection has a grain of truth: anti-hyperintensionalism can create a problem for categoricalists and dispositionalists alike. Dlewis is a case in point. However, actual dispositionalist philosophers differ from Dlewis in at least three respects.

First, they tend not to be anti-hyperintensionalist, at least not explicitly.[28] Perhaps this is because anti-hyperintensionalism is a remnant of nominalism and dispositionalists tend to be less squeamish about property realism, but the literature simply does not hold any loudly anti-hyperintensionalist dispositionalists.

Second, dispositionalists do not attempt to reduce or explain the categorical in terms of a purely dispositional, non-categorical base. Rather, they are often friendly to the idea that dispositions are themselves categorical. It is categoricalists, historically, who have insisted on the non-categoricity of dispositions, in an effort to banish them from ontology along with the rest of the merely possible.[29] If anything, dispositionalists tend to applaud C.B. Martin's insistence that dispositions are as actual, as categorical, as anything else (1993, 75; 1996). Though there is a literature on the plausibility of pure dispositionalism (Bird 2007, 6; Holton 1999; McKitrick 2003), it is difficult to find actual advocates of the view. Shoemaker, to whom the pure dispositionalist theory is often attributed, originally held that the dispositional/categorical distinction applies to predicates, and not to properties, thus leaving it open that a dispositional predicate and a categorical predicate might share the very same semantic value (1984).[30]

Third, Dlewis's dispositional properties are tailored precisely to fit Lewis's pure qualities and his reductive account of powers. Even setting aside the two disanalogies listed above, to force Dlewis's problem on actual dispositionalists we would have to find a categoricalist who has a unique and necessarily correlated purely non-dispositional quality for each of the dispositionalist's fundamental dispositions. It is not clear to me that this can be done. Say we are searching for a categorical property to match the modal profile of the disposition to resist acceleration, where that disposition is *not* taken to be conditional on the laws or the global state of the world. What is the categorical shadow of this disposition? How does it not violate categoricalist principles of recombination? (Remember: this power is not conditional on laws or global regularities of any kind.) As such, how can it be a candidate for a perfectly natural categorical property?

At the very least, the search for a categoricalist shadow for every disposition is a different project from the one going in the other direction, and it is not obvious that it will be successful. This should not be surprising. Lewis's account of dispositions in terms of the distribution of

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[28] See, for instance, Alexander Bird's Finean distinction between general entailments and essential ones, which would allow two properties with identical entailments but different essences (2007, 187).

[29] For a brief review of the history of the distinction, see e.g., (Cross 2005).

[30] Shoemaker later affirmed the "categoricity" of properties, while continuing to argue that properties are uniquely and necessarily associated with powers (1998). This latter claim should probably be read as once again affirming that properties can be the semantic values of both dispositional and categorical predicates.

qualities allows us to easily locate the dispositional shadows of his properties and conjure up a philosopher who takes just those dispositional shadows to be fundamental: Dlewis. But dispositionalists do not give us the analogous conjuring recipe.

As I said, the symmetry objection has some genuine import. Though Dlewis thinks of his view as a radically different ontology from Lewis's, he is mistaken, by his own lights. Just like Lewis. But Dlewis is a very peculiar dispositionalist, purpose-built as a foil. He thinks dispositions cannot also be categorical, he is anti-hyperintensionalist, and his fundamental powers, oddly enough, all share modal profiles with Lewis's local qualities. Actual dispositionalist theories lack some or all of these features, and are therefore immune from the parallel criticism.

Conclusion

When a property potentially make a difference to its bearers, it makes an actual difference to the potential of its bearers. This simple observation dooms Lewis's grand vision of resting all dispositions upon a foundation of pure qualities. For it is easy enough to see, given Lewis's own reductive theories, that for arbitrary quality F, being an F makes a difference to the powers of objects across the modal pluriverse. These potential differences in powers are, in fact, powers that F *actually* endows, and when the powers are considered collectively, powers that *only* F endows. That is enough to establish Shoemaker's thesis in "Causality and Properties". If, like Lewis, we then identify necessarily co-extensive properties, it follows that Lewis's qualities are, one and all, dispositions.

The small story here is that Shoemaker, not Lewis, turns out to be the hero of the naturalistic mini-epic recounted in the introduction of this essay. But there is a larger story too. My argument is easiest to process as a direct attack on Lewis, but it poses a perfectly general dilemma for realists about dispositions: either the world is dispositional at its fundamental level or else it is hyperintensional.[31]

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