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# Antidotes all the way down?

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ABSTRACT. This paper concerns the relationship between dispositions and *ceteris paribus* laws. Dispositions are related to conditionals. Typically a fragile glass will break if struck with force. But possession of the disposition does not entail the corresponding simple (subjunctive or counterfactual) conditional. The phenomena of finks and antidotes show that an object may possess the disposition without the conditional being true. Finks and antidotes may be thought of as exceptions to the straightforward relation between disposition and conditional. The existence of these phenomena are easy to demonstrate at the macro-level. But do they exist at the fundamental level also? While fundamental finkish dispositions may be excluded fairly straightforwardly, the existence of fundamental antidotes is more open. Nonetheless I conclude that the phenomenon is likely to be less widespread than at the macro level and that fundamental antidotes may be eliminable. According to the dispositional essentialist, the laws of nature can be explained by taking natural properties to be essentially dispositional. This account can be extended to show that the existence of finks and antidotes explains *ceteris paribus laws*. Consequently the existence or otherwise of fundamental finks and antidotes sheds some light on the question of whether fundamental laws may also be *ceteris paribus laws*.

Keywords: dispositions, laws, finks, antidotes, finkish dispositions, ceteris paribus laws, dispositional essentialism.

## *1. Dispositions and conditionals*

It is natural to think that dispositions are closely related to propositions of a modal conditional form. To say that this glass is fragile is to say something very much like 'were this glass to be struck with moderate or greater force, it would break'. Similarly, to say that this piece of rubber was elastic, is to assert a proposition with content close to: had this piece of rubber been moderately stressed, it would have deformed in a non-permanent fashion. So dispositional claims seem to be close to subjunctive and counterfactual conditional claims, claims about how an object possessing the disposition would respond or would have responded to an appropriate stimulus.

The most straightforward relation is that of identity. According to this view the conditional statement gives the analysis of the disposition statement. This is the Simple Conditional Analysis of dispositions:

(CA) Where D is a dispositional property with characteristic stimulus S and manifestation M:

$x$ has the disposition D if and only if were $x$ to undergo stimulus S it would yield manifestation M.

(CA) is a biconditional. In this paper I shall concentrate on the left to right direction of the biconditional:

(CA→) Where D is a dispositional property with characteristic stimulus S and manifestation M:

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if $x$ has the disposition D then if were $x$ to undergo stimulus S it would yield manifestation M.

The Simple Conditional Analysis of dispositions is, however, false. As C.B. Martin and I have shown, (CA→) fails as (part of) an analysis of dispositional locutions. There are two kinds of exception that lead to the failure of (CA→): finks and antidotes.

*2. Finkish dispositions*

Charlie Martin's objection to (CA→) centres on the existence of *finkish* disposition.[1] The process whereby a disposition manifests itself typically takes time.[2] The poison ingested must interact with one's metabolism before it causes illness. The irascible man may be swift to anger but not literally instantaneously. A nuclear pile may be disposed to melt down if the boron moderating rods are removed, but the melt-down occurs only once the chain reaction has generated enough heat. Many such dispositions may be gained or lost. Some food may become infected with the bacterium *Clostridium botulinum* and thereby become poisonous. It can lose that disposition by cooking or irradiation. A person's moods change and they can become irascible having previously been placid and vice-versa.

Finkish dispositions arise because the time delay between stimulus and manifestation provides an opportunity for the disposition to go out of existence and so halt the process that would bring about the manifestation. More precisely an object $x$ has a finkish disposition D to yield manifestation M in response to stimulus S when the stimulus S also causes $x$ to lose D before M can occur and in such a way that consequently M does not occur. In Martin's example an electro-fink is a device that can make an electric wire live or dead. It also detects whether the wire is being touched by a conductor. Let us take 'live' to mean 'disposed to conduct a current when touched by a conductor'. Let the wire be live —it is properly connected to an electric generator. Let the electro-fink operate by making the wire dead (cutting the connection to the generator) whenever it is touched by a conductor. Thus the wire is live. But were the wire to touch a conductor, the electro-fink would cause it to become dead and it would not conduct a current. So something can be live (disposed to conduct a current when touched by a conductor) yet it is false that if it were touched by a conductor it would conduct a current. In a different example a sorcerer protects a fragile vase with a spell that, whenever the vase is struck, very swiftly changes the microstructure of the vase so that it is no longer fragile, in consequence of which the striking does not break the vase. Such cases show that an object can have a disposition without the corresponding conditional being true, that is (CA→) is false. Finkishness can also show that the reverse implication in (CA) is also false. In such a case the disposition D is absent, but its characteristic stimulus brings it into existence, and consequently brings its char-

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[1] Martin, C. B. (1994 ), "Dispositions and Conditionals", *Philosophical Quarterly* 44, 1-8.

[2] Arguably it always does, but I do not wish to exclude, e.g. instantaneous action at a distance.

acteristic manifestation into existence. Hence, at some particular time the proposition '*x* has D' may be false; nonetheless the proposition 'were *x* to undergo S, it would yield manifestation M' is true.

*3. Antidotes*

As we have seen, finkishness occurs because in the relevant cases the causal basis of the disposition is removed. The electro-fink disconnects the wire from the generator; the sorcerer changes the microstructure of the vase to make it non-fragile. David Lewis argues that finkishness could not occur, therefore, if the causal basis underlying the object's disposition remains in place for a sufficiently long time.[3] Thus (CA→) can be repaired by adding an additional condition:

(CA→) Where D is a dispositional property with characteristic stimulus S and manifestation M:

if *x* has the disposition D then if *x* were to undergo stimulus S while retaining the causal basis of D for a sufficiently long time it would yield manifestation M.[4]

Consider the vase protected by the sorcerer. Lewis argues that it is true in this case, that were the vase struck *and* the causal basis remains in place for a sufficiently long time, it would break.

Not all counterexamples to (CA→) may be eliminated by excluding finks. For the operation of a disposition in bringing about its manifestation may involve features of the world extrinsic to the causal basis of the disposition; indeed they may be extrinsic to the bearer of the disposition. Let us understand 'fatally poisonous' to mean 'disposed to kill if ingested'. It is possible to ingest a dose of a fatal poison yet survive if one has also taken an antidote. One way an antidote might work is to change the body's physiology in such a way that the poison does not have the effect it would normally have. The poison is left unchanged, and *a fortiori* the causal basis of the poison's disposition to kill is left unchanged. Therefore this is not the case of a finkish disposition. Rather, the environmental conditions are not appropriate for the poison to have the effect it would normally have. In such a case the antidote to the poison is an *antidote* in the philosophical sense, viz. something that interferes with the conditions that are normally appropriate to the functioning of the disposition. When an antidote is present an object can have a disposition to M when S yet fail to yield M when given stimulus S, because the conditions that, in conjunction with the disposition's causal basis, would normally bring M about, have been interfered with.[5] Thus we have another kind of counterexample to (CA→).

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[3] Lewis, D. (1997), "Finkish Dispositions", *Philosophical Quarterly* 47, 143-158.

[4] Lewis' repair is more detailed but less immediately perspicuous than this simpler presentation.

[5] Bird, A.J. (1998), "Dispositions and Antidotes", *Philosophical Quarterly* 48, 227-234.

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More generally, we can see how the exceptions to (CA→) may arise. Let X have the disposition D to yield manifestation M in response to stimulus S. On normal occasions, when X does yield that manifestation in response to that stimulus, this occurs because of the combined operation of (i) the properties of X that constitute the causal basis of D and (ii) certain additional, typically environmental conditions. The exceptions to (CA→) arise when one or other of these is absent. If (i) is made to be absent, then the disposition suffers from a fink; when (ii) is absent it suffers from an antidote. It may not always be clear whether an exception is a fink or an antidote. An irascible man is disposed to get angry at small provocations. Yet he believes that anger is a sin and so wishes to prevent himself from manifesting his irascibility. We can control our emotions and their display. Let him be in an irascible state. Some minor irritation stimulates his irascibility and he is about to become angry. Yet, knowing himself, he exerts self-control and does not become angry. Is this a fink or an antidote? It may be difficult to tell and the answer may depend on the technique he uses. One extreme would be this: as soon as he receives a stimulus that he knows will rouse him to anger, he takes a fast-acting drug that changes his mood to one of placidity. Since the drug changes the neurophysiology underlying his irascibility, we can say that his irascibility is finkish. On the other hand, if he controls himself by biting his tongue, we might regard this as an antidote. He is irascible throughout but he interferes with the normal display of that irascibility.

*4. Finks at the fundamental level?*

We have seen finkishness at work at the macro-physical level. Is it possible that finks operate at the most fundamental level of disposition? By 'fundamental (level of) disposition' I mean dispositions (or the level of dispositions) that have no causal basis. Whether such dispositions exist is contentious. But there are two reasons for working with the supposition that they do. First, science seems to suggest they do or might — basic properties such as charge, inertial mass etc. seem to be dispositional properties with no further causal basis. Secondly, according to dispositional essentialists, the properties of science are essentially dispositional and furthermore this fact can account for the laws of nature. Consequently the dispositional essentialist requires that if a property has a causal basis then that basis is itself made up of dispositions. Thus if there are any fundamental properties at all, they will be dispositions. In this section I ask whether such dispositions can be finkish. In the next section I ask whether they can suffer from antidotes.

The standard cases of finkish dispositions are those where the causal basis of a disposition is removed before it can complete its causal work that would otherwise lead to the manifestation of the disposition. In the case of a fundamental disposition there is no distinct causal basis. Hence there can be no cases of finks of this sort.

However, objects can be caused to acquire or lose dispositions not only by causing them to gain or lose distinct causal bases. It must be possible for an entity to gain a fundamental dispositional property directly. For example, electrons can be spin-up or

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spin-down and they can be caused to change from one to the other. If these are fundamental properties then the interactions that result in a change of spin direction will act by bringing about this change directly rather than indirectly by causing a change of some more yet deeper level of property.

Thus it does look as if there might be room for finkishness for fundamental properties. Consider some such property D which is the disposition to yield manifestation M in response to stimulus S. A case of finkishness would have to operate like this. An object $x$ with D receives stimulus S. However, before $x$ can manifest M, $x$ is caused by a finkish intervention to lose D and so fails to manifest M. Now for this circumstance to arise, the following must be true:

(i) The manifestation of a fundamental disposition must not be instantaneous. If it were, then there would be no time for the finkish intervention to work before M occurs. The intervention must occur before M would have occurred, which requires M to happen after S, not simultaneously with S.

(ii) Furthermore, the manifestation of a fundamental disposition must require the continued existence of D for some period of time. The existence of the time gap in (i) is not enough to permit finks. One could imagine a disposition operating thus. The occurrence of S at time $t$ while D exists, is sufficient to produce M at a later time $t'$. It is not required that D continue to exist. In which case the fact that an intervention after the occurrence of S removes D is irrelevant to the occurrence of M. That occurrence is already guaranteed. So for an intervention to be finkish and prevent M by removing D, it must be that D is required to persist for M to occur.

The existence of a fundamental disposition with these characteristics raises interesting questions, primary among which is, are such properties really possible? It is easy to see how a non-fundamental property might have such characteristics. For in such cases the manifestation of the disposition will be the result of a process involving its more-or-less complex causal basis —when for example the breaking of the vase is the outcome of forces, stresses, and cracks spreading throughout the vase. But in the case of a fundamental property which by definition has no causal basis, it becomes mysterious why there should be a time gap between stimulus and manifestation and why the persistence of the disposition itself should be necessary. Let us consider a set of states of affairs starting with the stimulation of D by S at time $t$. Let it be that D must remain until $t + \delta t$ in order for M to be manifested. Let it be that D does indeed remain until $t + \delta t$. Further assume for simplicity that M is manifested at $t + \delta t$. There is no difference between any of the states of affairs between $t$ and $t + \delta t$. There is nothing intrinsic to any of these sates that distinguishes it from any other. Consequently there is nothing that acts as a clock (such as an unfolding process in the causal basis of an object with a non-fundamental property). So what is the difference between the state at $t + \delta t$ and the state at $t + 0.5\ \delta t$ which accounts for the fact that the occurrence of the former permits M to occur, but the occurrence of the latter does not?

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The conclusion I draw is that because there is no intrinsic difference between the states of affairs, one cannot have a consequence that the other does not have, and so the assumption that the occurrence of M depends on the occurrence of one of these states in a way that it does not depend on the other is erroneous. This leads to the following. Either the manifestation of a fundamental disposition is instantaneous. Or the supposed intermediate states, such as the state at $t + 0.5\ \delta t$ do not exist. That is, the first state-of-affairs to occur after that occurring at $t$ is in fact that occurring at $t + \delta t$. This exclusion of temporally intermediate states-of-affairs would be the case, for example, if time is quantised.

If so, then finkishness is not after all possible for fundamental dispositions. For if the manifestation is instantaneous, then, as we have already seen, there is no opportunity for the finkish intervention to occur. If, on the other hand, time is quantised, and the manifestation occurs at the next possible moment, there is no intervening possible moment at which the finkish intervention can occur.

In this example I assumed that M is manifested as soon as the minimum time, $\delta t$ for D's retention has elapsed. The requirements (i) and (ii) also allow for cases where there is a further time lapse before M is manifested. Clearly such cases are not materially different, as far as my argument is concerned, from the simple case where there is no additional time lapse. Indeed they just add an additional mystery of the same sort as far as the states during the second time lapse are concerned.

The conclusion of this section is that finkishness cannot occur at the fundamental level. The next section considers whether there can be antidotes to fundamental properties. This is a more important question, since antidotes are more common than finks, and, as we shall, a more difficult question also.

### *5. Antidotes at the fundamental level*

Antidotes present a kind of case that is in principle rather different from finks. For here the failure of a disposition to manifest itself is due to interference not with the disposition itself but rather with the additional conditions that are required. In which case there is no requirement, as there is with finks, that the antidote act after the occurrence of the stimulus but before the manifestation would have occurred. The antidote might have been in play long before the stimulus. One can take an antidote for a poison before ingesting it. Hence the considerations that allowed us to exclude finks at the fundamental level are not relevant to antidotes.

A superficially plausible route to eliminating antidotes at any level is to recast the disposition under consideration. If A is an antidote to the disposition D to yield M in response to S, then we could replace D by the disposition D* which is the disposition to yield M in response to (S in the absence of A). Thus we could say that arsenic does not have the disposition to kill when ingested but rather the disposition to kill when ingested by someone who has not or will not soon take dimercaprol. To have a disposition that suffers from no antidotes we would require a disposition of the form: dis-

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position D** to yield M in response to (S in the absence of ($A_1$ or $A_2$ or $A_3$ or...) where {$A_1$, $A_2$, $A_3$,...} is the set that includes every possible antidote to the original D.

This approach has several problems. I shall consider the two most serious. First, it is widely accepted that a disposition might be realised by a variety of different causal bases. So a lot of different substances might be poisonous and poisonous for different reasons. Some might be neurotoxins, some might interfere with a crucial metabolic pathway or cause a malfunction in any of the body's vital organs. And a poison might do any one of these things in a wide variety of different ways. So although dimercaprol is an antidote to poisoning by arsenic or by another heavy metal, it is not an antidote to most other poisons. Now let us consider D** which is the disposition to kill when ingested in the absence of any antidote to any poison. Does this satisfactorily replace the original D? No it does not. Consider someone who has taken a large dose of dimercaprol, but is then bitten by a coral snake or cobra with a neurotoxic venom. It is clear that the snake venom is poisonous and will kill the unfortunate victim, despite the dimercaprol, which has no effect on neurotoxins. So the subsequent death of the victim may certainly be explained by reference to the fact that the venom possesses the disposition D. On the other hand the death cannot be explained by reference to D**. For although the venom does possess D** (it is disposed to kill those who have the snake bite but have no antidote to any poison), it cannot explain anything in this case, since the relevant stimulus condition (ingesting without any of $A_1$, $A_2$, $A_3$,...) is not met —the subject has taken dimercaprol.

So, an antidote-sensitive disposition that may be multiply realised cannot be replaced without loss by an antidote-free disposition. The second reason for not wanting to make this replacement is the oft-cited fact that the replacement is just not possible. It is not possible because it is not possible to know what all the antidotes are. This objection needs to be handled with care, since it is an epistemic objection to a metaphysical proposal. The metaphysical proposal we are considering is, in effect, that whenever there is an antidote-sensitive disposition, there is always an antidote-free disposition and that furthermore the latter is just as respectable a natural property as the former. The response of the preceding paragraph was that the fact that an antidote-free disposition will be less explanatorily powerful suggests that it is a less respectable natural property. This conclusion is reinforced by the epistemic consideration. The unknowability of the disjunction ($A_1$ or $A_2$ or $A_3$ or...) suggests that it is not a natural property —there is no unifying factor, other than being the disjunction of all possible antidotes to D. Since ($A_1$ or $A_2$ or $A_3$ or...) is not a natural property the stimulus condition (S in the absence of ($A_1$ or $A_2$ or $A_3$ or...)) is not a natural property either. In which case the disposition D** will also not be a natural property.

David Armstrong holds the view that multiple-realisability does not really occur and that for each realiser there is a distinct disposition. This would ameliorate the first problem mentioned, but it would still permit the second to be raised. On this view there is no property of being poisonous, but only distinct properties of being a neurotoxin, being a-poison-that-attacks-the-kidneys and so forth. But even if we restrict our attention to any one of these, the conditions required for the poison to operate, even

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if entirely normal and to be expected, may be complex. There may thus be a large number of ways in which an antidote might operate, and it might well be very difficult or even impossible to identify them all.

Furthermore, the identification of all the antidotes would require knowledge of the mechanism by which the disposition operates, which will be at a deeper level. Thus identification of D** will typically require knowledge of deeper level of science than D. Those who favour eliminativism might favour the view that D** should supersede D scientifically, replacing it in an improved science. But those who resist eliminativism elsewhere will prefer to conclude that the success of higher-level science shows that it does identify genuine properties, even if there is no reduction of these to lower level properties that does just as well.

The conclusion that we should draw is that we have no reason to suppose that antidote-sensitive dispositions can and should be replaced by antidote-free dispositions. On the contrary the latter would be scientifically less respectable and less likely to be genuine properties.

What is the upshot of all this for the existence of antidotes at the fundamental level? On the face of it, these considerations make it more plausible that we should expect to find antidotes at the fundamental level. If we were able to replace every antidote-sensitive disposition with an antidote-free disposition, then we could do this with fundamental properties also. And so we could in effect do science with just the latter, ignoring or eliminating antidote-sensitive dispositions. the arguments given suggest that in general we may not make such replacements.

Nonetheless, I believe that the grounds against elimination in the general case have rather less purchase at the fundamental level.

We saw first that the possibility of multiple realizability meant that the replacing antidote-free disposition had less explanatory power than the antidote-sensitive disposition it was replacing. However, when it comes to fundamental dispositions these have no realizers distinct from themselves. So the multiple realizability problem cannot arise.

Consequently the obstacle to regarding fundamental properties as replaceable by antidote-free dispositions comes from the possible complexity of the manner of their manifestation. The most obvious source of complexity came, in the general case, from the fact that there a higher level disposition manifests itself by relying on a mechanism that operates at a lower level. Even though the effect of a quick-acting poison may look straightforward at the macro-level, the process by which it kills its victim might well depend upon a complex lower-level biochemical process. Again this does not apply to the case of fundamental properties. They cannot bring about their manifestations through a mechanism operating at a lower level, since they are at the lowest level themselves.

This does still leave open two remaining possibilities.

(a) That there is a mechanism involving just properties at the fundamental level;

(b) That there is no mechanism bringing about the manifestation M —it is brought about by D and S together directly. However, there is a further possible condition, A, such that D and S, in the presence of A, will not bring about M.

Regarding (a), one might suppose that the mechanism might break down into intermediate steps. Consider a row of one hundred dominos standing next to one another. It may be true to say that the first domino is disposed, given the stimulus of being knocked over, to bring abut the fall of the 100th domino. We can describe and understand this mechanism without descending to a lower level (unlike the poisoning case). But for that very reason it seems natural to break down this process into one involving ninety-nine dispositions all operating at the same level. Thus while the original disposition has an antidote at the same level (for example, removing the 29th domino) the constituent single-step dispositions do not have such an antidote. If so, then at the fundamental level one might expect antidote-sensitive dispositions to be regarded as made up on a sequence of antidote-free dispositions.

Regarding (b) it is less clear that the antidote-sensitive disposition can be replaced by an antidote-free one. However, one might be less sceptical about the eliminativist route considered above. Since we are dealing with the fundamental level, and have already removed the problem of multiple realizability, it might reasonable to expect that any dispositions of this sort will suffer from relatively few antidotes. In which case their incorporation into an antidote-free disposition will not look so gerrymandered. Thus in this case it will be up to our fundamental science to decide whether there are antidote-sensitive dispositions and ceteris-paribus laws. But the direction of the development of physics with ever fewer fundamental properties and corresponding forces indicates that the prospects for antidote-free fundamental properties and thus strict laws only at the fundamental level are promising.

*6. Dispositional essentialism and laws*

Dispositional essentialists hold the following:

(DE) natural properties have their dispositional character essentially.

Such a view has its antecedent in Shoemaker's causal account of properties.[6] One guiding idea that leads to (DE) is that a property just is its dispositional powers. Alternatively one could hold that identity for *fundamental* properties and regard *non-fundamental* properties as identical with structures or combinations of more fundamental properties. Either way (DE) holds.

(DE) may account for the laws of nature. For if a natural property is essentially dispositional, then objects that have that property and which receive the relevant stimulus will typically yield the appropriate manifestation. That much is built into the essence of the property so we get a set of relations among properties from the essence of properties alone without involving laws as an independent factor. One might regard this as eliminativism about laws, or alternatively as an explanation of what laws are. Here I take the latter view.

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[6] Shoemaker, S. (1980), "Causality and Properties", in *Identity, Cause, and Mind*. Cambridge: Cambridge University Press.

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Let us see how this works out in more detail. Let D be some natural property. By (DE) D has a dispositional character, that is, for some S and M:

(1) $\forall x$ (D$x \rightarrow x$ is disposed to yield M when S)

Now let us employ (CA→). This allows the substitution:

(2) $\forall x$ (D$x \rightarrow$ were $x$ to be S then $x$ would be M)

(3) $\forall x$ ((were $x$ to be S then $x$ would be M) & S$x$) → M$x$) (from (2))

(4) $\forall x$ ((D$x$ & S$x$) → M$x$) (from (3))

(Note that because (DE) asserts that the dispositional character is essential and because (CA→) is true analytically (if true at all), (4) is necessarily true.)

Thus from (DE) we have derived a universally quantified, necessarily true proposition. The dispositional essentialist claim is that (DE) has thereby explained a law of nature, and furthermore that all laws of nature may be explained in the same way.

However, the above depends on (CA→), which we have already seen to be false, thanks to finks and antidotes. If these are the only sources of exception to (CA→), then the following is true:

(CA→*) Where D is a dispositional property with characteristic stimulus S and manifestation M:

if $x$ has the disposition D then, then if $x$ were subjected to S *and finks and antidotes to* D *are absent* then $x$ would manifest M;

If we employ (CA→*) in place of (CA→) our conclusion becomes:

(4*) $\forall x$ ((D$x$ & S$x$ & finks and antidotes to D are absent) → M$x$)

We may consider (4*) to be a version of (4) that admits exceptions —in this case the exceptions being instances of finks and antidotes. Laws that admit of exceptions are *ceteris paribus* laws, hence:

(4**) $\forall x$ (ceteris paribus (D$x$ & S$x$) → M$x$))

So (DE) explains not only strict laws —(4)— but also *ceteris paribus* laws —(4*).[7]

This relationship between finks, antidotes and *ceteris paribus* laws allows us to address the question, are *ceteris paribus* laws a macro-only phenomenon? Or might even the fundamental laws be *ceteris paribus* laws, as Nancy Cartwright thinks?[8] Since *ceteris paribus* laws arise when the dispositions that generate the laws suffer from finks and antidotes, these questions may be answered by considering whether fundamental dispositions also suffer

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[7] Strictly these ceteris paribus laws are those, in Joseph's terminology that are ceteris absentibus laws. Cf. Joseph, G. (1980), "The Many Sciences and the One World", *Journal of Philosophy* 77, 773-790.

[8] Cartwright, N. (1995), "Précis of Nature's Capacities and their Measurement", in *Philosophy and Phenomenological Research* 55, 153-6.

from finks and antidotes. I have shown that fundamental dispositions are always non-finkish. Although I have not been able to give a conclusive argument for the absence of fundamental finks and antidotes, I have argued that the opportunities for them to arise are constrained and may indeed not arise in the actual world.

### *7. Conclusion*

Dispositions do not entail non-trivial counterfactual or subjunctive conditionals. This is because dispositions typically suffer from finks and antidotes. The dispositional essentialist may account for laws in general by holding that natural properties have their dispositional characters essentially. *Ceteris paribus* laws in particular my be accounted for by this route, since finks and antidotes are precisely conditions that need to be excluded by the *ceteris paribus* clauses in *ceteris paribus* laws.

Thus if we want to know whether there are *ceteris paribus* laws at the most fundamental level, we need to ask whether the most fundamental properties are antidote-sensitive dispositions or antidote-free dispositions. One route to answering this question is something of a blunt instrument. It argues that all antidote-sensitive dispositions should be replaced by antidote-free ones. However, the arguments for this reductivist or eliminativist programme are weak for a variety of related reasons, which may be summed up as showing that the proposed replacements are explanatorily weaker and less natural.

Nonetheless, we also find that the reasons for resisting reductionism/eliminativism have rather less purchase when it comes to fundamental properties, since they arise primarily in those cases where the disposition supervenes on a deeper level structure and mechanism. While I do not regard my arguments as conclusive, it has been shown that it is at least plausible to suppose that antidotes may be a purely macro-level phenomenon and so are not to be found at the fundamental level. If so the same may be said for *ceteris paribus* laws also.

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