All Else Being Equal

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Most laws are *ceteris paribus* (cp) laws. If we are being punctilious, what we say is not 'All Fs are G', but only 'All Fs are G, *all else being equal*'. Most laws are cp laws because the world is a messy place, and we need to invoke idealizations and approximations in order to describe it. In fact there are many different types of cp laws and many different reasons for invoking them. This essay does not venture any general account, but considers reasons for saying that some cp laws do not simply reflect the complexity of the world and the limitations of our minds. Correctly interpreted, some cp laws reveal the simplicity that underlies that complexity, a simplicity that it is within our cognitive powers to grasp.

Until relatively recently, philosophical work on laws of nature has focused primarily on strict laws: cp laws have been mostly ignored. The first section of this paper considers how the standard philosophical problems about laws change when we switch our attention from strict to cp laws and what special problems these laws raise. Section Two discusses the reasons philosophers of science have so often neglected cp laws. In Section Three, I will argue that, even if cp laws can always be converted in principle into strict generalizations, it is not always possible thereby to convert them into strict laws. Section Four considers the morals that ought to be drawn from this disability. In particular, I will argue that some cp laws are descriptions of stable underlying dispositions. On this view, these laws do not simply describe what actually happens under special situations, but rather describe dispositions or forces that are stably present whether or not all things are equal. By switching from occurrent to dispositional description, we move from seeing cp laws as giving an account of what happens under ideal conditions that may never be realized to seeing cp laws as giving an account of what is present as one real element in complex real conditions frequently realized. After extolling the virtues of this dispositional view, Section Five considers a serious challenge it must face.

1. Peculiarities and Problems

The standard philosophical problems about laws of nature arise from the observation that not all regularities in nature are laws.

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Thus the generalization that all the fruits in Jeremy's garden are apples, or that every article written by Michael Redhead is incisive, while true, are not laws of nature, not even specialized ones. If Michael attempted, perversely, to write a dull article, no force would prevent him from succeeding, though it might cause him some pain. Similarly, a pear pitched into Jeremy's garden would neither be repelled by some invisible force nor mysteriously transformed into an apple. Hence the standard problem of accounting for the distinction between lawlike and so-called accidental generalizations. 'Accidental', one might note, is here a misnomer, because it is no accident that all of Michael's articles are incisive, or indeed that all of Jeremy's produce are apples. The term just means not a law even if true, whether or not the truth would be a matter of mere coincidence. The problem is just that there are too many true generalizations for them all to be laws, and much of the philosophical work on laws considers how this problem is best solved.

That is the standard problem for strict laws. The philosophical scene shifts, however, if we focus on cp laws. Now the problem is not too many generalizations but too few. For to say that All Fs are G, cp clearly does not entail that All Fs are G. To say that taking aspirin cures headaches, 'all things being equal' does not mean that everyone who takes aspirin loses a headache; indeed it suggests if anything the opposite, namely that aspirin does not always work. We may need to make a distinction between cp statements that are laws and cp statements that are not, but this will not be because of a surplus of true generalizations.

We can also see the contrast between strict and cp laws by looking at the standard solutions to the standard problem about laws. Two familiar claims are that what distinguishes lawlike from accidental generalizations is that only lawlike generalizations support counterfactuals and that only lawlike statements are instance confirmable.[1] Even if all the people in the room happen to be blonde, it is not the case that, had I entered the room my hair would have lightened; nor is it the case that observing that some people in the room are blonde gives good reason to suppose that the others are. On the other hand, all polonium atoms have a half life of 138 days, and here it is the case that, had these uranium atoms in front of me been polonium, they would have had a half-life of 138 days, and that determining that some polonium atoms have this half-life is reason to believe that other polonium atoms are likewise.

The criteria of counterfactual support and instance confirmability appear to work pretty well in the context of strict laws.

[1] Cf. N. Goodman, *Fact, Fiction, and Forecast* (Indianapolis: Bobbs-Merrill, 1973), sec. I.3.

Admittedly they do not seem to classify quite every case correctly, and the two criteria do not in any case yield exactly the same extension, but they appear to give the right result over a large range of cases. A natural objection to these criteria is not that they are wrong, but that they are only symptoms of lawlikeness and so do not yield a satisfying metaphysical account of laws of nature. The problem, in Socratic terms, is that a generalization supports counterfactuals and is instance confirmable because it is a law, not conversely.

In the context of cp laws, however, counterfactual support and instance confirmability do not even provide reliable symptoms of lawlikeness. 'All Fs are G, cp' may be a law yet not entail that if something had been an F it would have been a G, nor will observed Fs that are G always provide reason to believe that the next F will be a G as well, since we may have no reason to believe that all things will be equal, the next time. Pairs of playing cards that are placed together to form an isosceles triangle with the table will stand, cp, but it does not follow that if I had put those two cards from the deck together, they would have stood. Nor is it the case that observing some standing pairs gives one good reason to suppose that the next pair will stand: perhaps I will find my next pair of cards outside, on a windy day, or inside, on a slippery surface. More seriously, the great difficulty scientists often have in replicating experiments shows how cp laws fall short of instance confirmability and counterfactual support.

Our understanding of cp laws thus seems even more partial than our understanding of strict laws, since we seem not to have even rough symptoms of lawlikeness for them. Cp laws raise two further and particularly recalcitrant difficulties. One is the *problem of instantiation*. Many cp laws appear to have no instances at all, because things are never 'equal' in the requisite respect. The planets may move in ellipses, cp, but no planet actually does move in an ellipse, because of the influence of other planets and of non-gravitational forces. The other is the *problem of content*, the problem of seeing how cp law sentences succeed in saying anything at all. The trouble is that the cp clause in a cp law seems tantamount to a blank in the antecedent. To say 'All Fs are G, cp' seems tantamount to saying either 'Everything that is F and ____ is G' which is not a proper statement at all,[2] or to saying 'All Fs are G, except those that are not', which is a tautology[3].

[2] S. Schiffer, 'Ceteris Paribus Laws', *Mind* **100**, No. 397 (January 1991), 1–17.

[3] J. A. Fodor, You Can Fool Some of the People All of the Time, Everything Else Being Equal: Hedged Laws and Psychological Explanation', *Mind* **100**, No. 397 (January 1991), 19–34.

2. A Tale of Neglect

The situation appears fairly desperate, but is it serious? Everyone should agree that cp laws raise real issues in semantics and epistemology: there are genuine questions of what cp law sentences mean and, assuming they have a determinate meaning, how we can know whether they are true. What is more controversial is whether cp laws raise any deep metaphysical issues not raised by strict laws. On a Humean view of laws, the answer is no. All nature supplies is a pattern of events, and laws describe that pattern. On this view, cp laws are incomplete descriptions, universal generalizations with incomplete antecedents. These antecedents can be completed in principle if not in practice and, when completed, they are just pattern descriptions like any other law. The fact that the antecedent is not actually completed may raise interesting semantic and epistemic issues, on this view, but the metaphysics remains austere. Indeed on this view it is probably even a misnomer to talk about cp *laws* at all: there are cp *sentences*, but the only laws there could be are strict.

At the other extreme, there is the view that cp laws have radical metaphysical consequences, because the antecedents of these laws are not just incomplete in fact, but incompletable in principle. I want however to focus on a third view, intermediate between the Humean and radical views. On this modest metaphysical view, cp laws can be shown to have important metaphysical consequences even if we assume that their antecedents are always completable in principle. For the completability of a cp sentence entails neither that there are no genuine cp laws nor, as we shall see, that the completed sentence would be a genuine strict law.

Given the various difficulties in the interpretation of cp laws, it is perhaps surprising that philosophers of science in general, and Humeans in particular, have on the whole been so little concerned with them. There are a number of factors that may help to explain this neglect, though I want to suggest that none of them excuse it. Firstly, many philosophers have I think treated strict laws as a useful idealization for laws in general. On this view, cp laws are messy and, just as the astronomer may wisely invoke the idealization that the only forces in a certain situation are gravitational, so the philosopher of science should work, at least at first, with the idealization that all laws are strict. This is the view, strangely enough, that all laws are strict, cp. Far be it for me to criticize simplification and idealization in general, and perhaps even this particular idealization may have some philosophical benefits, but we will find that this no-idealization idealization also obscures some important features of the laws of nature.

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A second explanation for the tendency to ignore cp laws is the prevalence of the view that they do not exist. On this view, all laws are strict, although there are undoubtedly cp *sentences*. The existence of those sentences are a sign of our ignorance, not of a distinctive sort of law. Even if this view were correct, however, it would not excuse the neglect of the semantics and epistemology of cp sentences, issues that are particularly pressing in light of the problem of content.

A solution commonly proposed to the problem of content may provide yet another partial explanation for the neglect of cp laws. According to this solution, 'All Fs are G, cp' means '*Most* Fs are G'. The advantage of this view is that 'Most Fs are G' is semantically relatively untroubling, but it is the wrong solution for many cp laws or cp law sentences. This is clear from the problem of instantiation. Many cp laws have no instances, and it cannot be the case that most Fs are G if none are. The problem of instantiation, or a near relative, also threatens another tempting gloss, according to which the cp sentence means 'All Fs are *approximately* G'. This may work for some cases, but clearly does not work for others, where Fs are G when all else is equal, but all bets are off when all else is not equal. To say that satellites move in elliptical orbits, cp, clearly does not entail that the trajectory of a satellite that enters the earth's atmosphere (or that collides with another satellite) maintains an orbit that is approximately elliptical. Combining these two proposals, so that 'Most Fs are G, cp' would mean 'Most Fs are approximately G' doesn't work either, but showing this is left as an exercise for the reader.

Faced with the failure of these glosses, there is another proposal that naturally suggests itself. Perhaps to say that all Fs are G, cp, is to make an existential claim, namely that there exists some unknown completion of the antecedent that yields a strict law. It is to say that there exists a set of factors C, such that everything that is at once F and C is also G. This solution has the merit of combining the Humean intuition that all laws are strict with the frank acknowledgement that we do not know in the cp cases what the strict laws are. Nevertheless, this solution has many weaknesses. First of all, it is not clear how it helps with the semantic problem of the content of cp sentences. The main difficulty here is indeterminacy. A cp sentence may of course be false, so to say that 'All Fs are G, cp' means 'All (F&C) are G', for some unspecified C makes no semantic advance, since C is completely undetermined. Moreover, even if we limit our attention to true cp sentences, C remains undetermined, since there are many different completions that would make the conditional true. This is obvious, since the conditional will

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be true for any (F&C) combination that has no instances. Nor can we rule out such vacuous cases by fiat since, as the problem of instantiation shows, the cp laws are themselves often only vacuously true. In any event, even if the cp law in question does have instances, indeterminacy rules. There will then be a certain number of Fs that are G, and we can complete by any antecedent that has just those Fs as its extension—there will be many such antecedents—and also by any antecedent that has any subset of those Fs as its extension.

3. Strict Accidents

The problem thus appears to be not that the antecedent of cp laws is incompletable, but it is completable in too many different ways. Let us ignore this problem for the moment, however, and assume that there is some privileged completion. Intuitively, the idea is that a cp law typically has the form 'All Fs are G, unless there is some interfering force', and the privileged completion would be a C that listed all the possible forms of interference and maintained that none of them is in play. We cannot actually produce such a list, which is one of the reasons that we use cp clauses, but I wish to adopt a God's eye perspective for the moment, supposing Him to have the list. Even from that perspective we would not have a strict law, because the completed antecedent would yield a universal conditional that is true but not a law, only an *accidental generalization*. At least this is so if, in a Humean spirit, we restrict our predicates to those that describe occurrent even if unobservable events. We will see what happens once we allow dispositions and forces officially in the picture; but for now the cases under investigation should be taken to be generalizations couched entirely in non-dispositional terms, even if I slip in dispositional talk to elucidate the situation—as I have already done in this paragraph.

Before considering the consequences of this claim that completing the antecedent of a cp law couched entirely in occurrent predicates will not in general yield a law, I should give some reasons for supposing it true. The difficulty in doing this is firstly that there is of course no consensus on just how the lawlike/accidental distinction ought to be drawn, and secondly that I have already suggested that the two most familiar symptoms of lawlikeness—counterfactual support and instance confirmability—do not apply to cp laws. Nevertheless, the claim is relatively secure, because the completed conditionals count as accidental on all major approaches to lawfulness, as I will now try to show. These approaches can be organized

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into three groups, according to whether they require that lawlike statements have projectible predicates, form part of the 'best system' of generalizations, or enjoy some sort of necessity. Let us consider how each of these approaches rates the status of completed conditionals.

According to the first approach, lawlike statements are generalizations couched exclusively in projectible predicates.[4] Some Humeans have analysed projectibility in terms of the 'positionality' of the predicate, so that a projectible predicate is one that makes no reference to a particular time, place or object. Others have relied on use to make the demarcation, so that for example a predicate that is actually used in hypotheses becomes for that very reason projectible. Non-Humeans who account for lawlikeness in terms of projectibility have tended unsurprisingly to be more direct in linking projectibility to the notion of metaphysical kinds. For them, projectible predicates are those that refer to natural kinds, genuine properties, or the like. These differences among the projectionists are important in other contexts, but seem to not matter much so far as the present issue is concerned, since the antecedent predicate (F&C) of the completed conditional will sometimes be unprojectible on any view. Certainly it will not be a predicate that has become entrenched through frequent past projection, since we, unlike God, cannot even specify the predicate. Nor is it at all plausible to claim that these conjunctive predicates will in general pick our natural kinds, and this is not just because they will often have a null extension. The predicate 'F' may pick out a natural kind, but predicates that pick out subkinds will not generally pick out natural kinds. This is illustrated by the relationship between 'coloured' and 'grue'. And this will be the situation for the sub-kind (F&C). The class of Fs where things just happen to be equal, where there happen to be no interfering factors, will often yield a subset of Fs that is, from a cosmic point of view, quite contingent.

According to the second general approach to lawfulness, what makes a generalization a law of nature is that it would form part of the best system of truths, where the best system is the set of statements providing the best compromise between strength and simplicity.[5] Thus adding Newton's laws (or their true successors) to a system of statements would yield a great gain in power with great economy, whereas adding an accidental truth, such as the statement that all gold spheres have a diameter of less than 10 miles would

[4] Cf. Op. Cit. Note 1.

[5] Cf. D. Lewis, *Counterfactuals* (Oxford: Basil Blackwell, 1973), sec. 3.3.

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complicate the system for virtually no gain in power. Will completed generalizations from cp laws all earn a place within the best system of truths? Clearly not. Vacuous generalizations are not promising additions to the system, since they add no strength, and the many vacuous generalizations among the class of completed generalizations will not in general follow from other statements that have independently earned their place in the system, as do genuine vacuous laws, if the best-system approach is correct. In any event, as David Lewis has observed,[6] the best-system account of lawfulness can only work with some restriction on permissible predicates, lest one generate factitious simplicity with factitious predicates. The restriction on predicates that Lewis suggests is that they refer to natural properties, and we have already seen in our discussion of projectibility approaches that (F&C) will not in general meet this condition.

That leaves the necessity approach to laws, according to which what distinguishes lawlike from accidental generalizations is that the former, are if true necessarily true, while the latter are at best only contingent truths.[7] There are many different versions of the necessity approach, varying in the strength of necessity required and the nature of its source, but here again we need not dwell on the differences. If there is any contingency in the world at all, as there must be for the necessity approach to work, then some completed cp laws will be only contingently true. For the absence of disturbing factors depends utterly on initial conditions—on which way the wind happens to be blowing. Had contingent things been slightly different, the completions would have been different as well, for the subset of Fs that would have been G would have been different. The strict generalization is thus not a law, because the question of just which of the Fs are G is contingent, where the predicates used to construct the antecedent refer only to occurrent properties. If we could characterize the antecedent properties in terms of forces or other non-occurrent properties the situation might be different, since what would be contingent might then be the extension of the complex predicate, not the predicate itself. If

[6] D. Lewis, 'New Work for a Theory of Universals', *Australasian Journal of Philosophy* **61**, No. 4 (December 1983), 368–9, reprinted in *Properties*, D. H. Mellor and A. Oliver (eds.) (Oxford University Press, 1997), 188–227.

[7] Cf. S. Kripke, *Naming and Necessity* (Oxford: Basil Blackwell, 1980), Lecture III; S. Shoemaker, 'Causality and Properties', *Time and Cause*, P. V. Inwagen (ed.) (Dordrecht: D. Reidel, 1980), 109–35, reprinted in Mellor and Oliver Op. cit. note 6, 228–54; R. Harré, *Laws of Nature* (London: Duckworth, 1993), ch. 4.

we restrict ourselves to occurrent terms, however, it is the predicate itself that is contingent, so the generalization itself would be false in nearby worlds, not merely true but with a different number of instances.

I take it, then, that the strict completions of cp laws using occurrent properties will not in general be lawlike. From a certain point of view, this is surprising. If cp statements are approximations or idealizations, then one would expect that while they might not qualify as laws, the strict if unknowable generalizations that arise from what is in effect eliminating the idealization ought to be laws. I think the moral, for some cp laws though certainly not all, is that they are more than idealizations: they point to the simpler reality that sometimes underlies the complexity of the phenomena. To see how this might be, we need now to shift our focus from occurrent to dispositional properties.

4. Dispositions to the Rescue

Descartes' wax argument in the Second Meditation might serve as inspiration. A piece of wax changes many of its observable properties as it is kneaded and melted, yet we judge it to remain the same wax. The lesson Descartes draws is that we conceive of the wax in non-imagistic terms; the lesson I draw is that we conceive it in *dispositional* terms, in terms of flexibility, the capacity to melt and to harden, and so on. These dispositions may remain constant across the varied, visible changes that are their manifestations. Similarly, I want to suggest that some cp laws draw our attention to the stable dispositions and forces that underlie the flux of behaviour, and that this accounts for the fact that the cp laws may be genuine laws, while their strict completions are not.

Dispositions and forces are linked to their displays yet transcend them. Thus to say that something is flexible is to say, roughly speaking, that if a force is applied it will bend, yet something may of course be flexible at times when it is not bending. The binary distinction for occurrent properties—either an object has the property or it does not—is for dispositions replaced by a tripartite distinction: displaying, present-but-not-displaying, or absent. A second obvious but important feature of dispositions is that although the disposition may be present continuously as displays come and go, dispositions are themselves also mutable: something may be flexible at one time but not at another. Some dispositions are more stable than others. The suggestion I want now to explore (a suggestion that is hardly original) is that we can make some progress on the

problems of cp laws I have canvassed if we understand cp laws, as referring to stable dispositions.[8]

What does it mean to say that a cp law attributes a stable disposition? It means, for example, that to say that glass breaks when dropped, cp, is to say that glass is fragile and that this feature is not readily lost. To say that iron filings will arrange themselves around a bar magnet in a specified pattern, cp, is to say that magnets exert a certain sort of force on iron filings, a disposition magnets do not lose while remaining magnets. In these sorts of cases, we may use a cp law in occurrent terms to get at the underlying disposition. We describe what happens in a pure case to get at what is present but perhaps invisible in real, impure cases.

How does seeing some cp laws as attributing stable dispositions or forces help with the problems we have considered? Consider first the problem of instantiation, the problem that many cp laws appear not to have any instances. This problem more or less disappears as we shift our perspective from a cp law as a description of occurrent behaviour under conditions that may never be realized, to a description of a stable disposition which is present even when not manifesting, or not manifesting in isolation. This is why the distinction between the presence of a disposition and its manifestation is crucial. Instead of seeing a cp law as a description of what happens when there are no interfering forces, the suggestion is that we see some cp laws as descriptions of one force that is present even in situations where many other forces are in play, and even if there is no situation where the first force acts alone. Thus cp laws are not descriptions only of what never happens or only of what occurs under highly artificial laboratory environments; rather they refer to stable dispositions that may be widely present even if only rarely directly manifested.

The dispositional view of cp laws also helps to explain why cp laws appear to turn into accidental generalizations if they were converted into strict generalizations by 'completing' their antecedents. On the dispositional view, cp laws typically describe the presence of a disposition or force that would manifest itself in the absence of interference. This is a lawlike claim, because of the stability of the disposition. Completing the antecedent, *in dispositional terms*, would be tantamount to specifying precisely under what circumstances the disposition displays, where these circumstances are

[8] Cf. J. Woodward, 'Realism About Laws', *Erkenntnis* **36**, No. 2 (March 1992) 181–218, esp. 191–8; N. Cartwright, *How the Laws of Physics Lie* (Oxford: Oxford University Press, 1983), esp. Essay 2; N. Cartwright, *Nature's Capacities and their Measurement* (Oxford University Press, 1989), esp 185–91; A. Chalmers, 'Is a Law Reasonable to a Hume?', *Cogito* **6**, No. 3 (1992), 125–9.

themselves given in dispositional terms, a specification of all the possible interfering forces. It seems to me a nice question whether this strict statement would generally be lawlike. What is clear, however, is why a strict antecedent purely in occurrent terms would fail to be lawlike. Such an antecedent would specify the cases where the interfering forces are absent. When and where interference occurs is however generally a contingent matter, in contrast to what happens when interference occurs, which may be a matter of law, even if one unknown to us.

In the first section of this essay, I suggested that cp laws may lack the two commonly-cited symptoms of lawlikeness—counterfactual support and instance confirmability. Here too this is just what we would expect on the dispositional view. The counterfactual claim that if this were an F it would also be a G corresponds to the claim that the disposition would manifest itself whether or not there were interfering factors present, which is obviously false. Similarly, it is unsurprising from the dispositional point of view that the condition of instance confirmability should fail, since the fact that a disposition manifests itself in one situation does not in general provide evidence that it will manifest itself in another.

This leaves the large question of just how the lawlike/accidental distinction should be drawn in dispositional terms. I have already suggested[9] that what counts is the stability of the disposition, but there is obviously much more work to be done here. For example, we may want to distinguish among the class of accidental generalizations between those that correspond to relatively unstable dispositions and those that correspond to no dispositions at all. Thus the generalization that everyone in the room has blonde hair intuitively corresponds to no disposition at all, whereas the generalization that all the fruits in Jeremy's garden are apples may correspond to a real but insufficiently stable disposition, brought into existence by Jeremy's agricultural policy. Thus the dispositional approach may help to provide a useful distinction between those 'accidental' generalization that are genuine coincidences from those that, while not lawlike, are not really accidents either. It also suggests that we might replace the law/accident dichotomy by a continuum, since stability is a matter of degree.

Finally, we have the hard problem of content. For much of this essay, I have focussed on the situation for cp laws even if we take that God's eye view from which the cp clause could be replaced by a full specification of just which Fs are G. In fact, however, we can virtually never properly or strictly cash out the clause, and I now want to consider whether the dispositional view helps with the

[9] Following Woodward, Op. cit. note 8.

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semantic problem that ignorance creates. That problem, you will recall, is the threat that the statement that all Fs are G, cp, reduces to the trivial 'All Fs are G, except those that are not'. The dispositional view seems neatly to solve this problem. We don't know when all things are equal, but the whole point of the dispositional view is in a sense that we do not need to know, since the disposition is present regardless. Of course some idea of when all things are equal (or equal enough) might be essential to applying the law to predict the manifestation of the underlying disposition, but the basic dispositional attribution seems safe. Thus, to specify the force of gravity is to make a quite specific claim, even if one has no idea what other sorts of force may affect the actual motion of the masses. This is in sharp contrast to the situation where we confine our description to occurrent properties, where to say nothing determinate about the motion is to say nothing at all.

This feature of the dispositional view seems to me potentially its greatest advantage. The dispositional attribution may still leave some semantic indeterminacy, for example in the question of the precise range of cases over which the disposition is present, but it would go a long way towards filling the semantic gap that the problem of content reveals. The dispositional view would also have an important bearing on a number of other issues in the philosophy of science. Realism is an obvious example. The dispositional view would not of course secure the actual existence of entities or structures, or the truth of scientific statements: many forms of instrumentalism would remain options. But it would seem to show that only a realist semantics that makes robust appeal to the unobservable can make sense of scientific discourse and practice. The semantic aspect of the dispositional view also bears on the role of abstract models in science, the structure of scientific explanations, and much else. Before we get too excited, however, we need to face up to an objection to the dispositionalist's claim to have solved the problem of content, an objection which we might call the Humean's revenge.

5. Hume's Revenge

The Humean challenges us to say how we give semantic content to dispositional terms themselves. What does it mean to say that something is 'fragile'? The meaning must it seems be given through a corresponding conditional, in this case, roughly speaking, 'if it were to drop, it would break'. Our semantic grip on the dispositional term will, on this natural view, only be as good as our semantic grip

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on the corresponding conditional. In the case of cp laws, however, this is no good at all, precisely because we cannot specify under what conditions the disposition will manifest itself. In short, the Humean's revenge is to claim, plausibly enough, that the detour through the disposition has made absolutely no difference so far as the problem of content is concerned. That problem for the occurrent view of cp laws is that we cannot give cp laws determinate content because we cannot specify the antecedent of the law; the problem for the dispositional view is that we cannot give the dispositional attribution determinate content because we cannot specify the antecedent of the corresponding conditional that would give the dispositional term its meaning. So we have made no advance. Both problems can be seen as a blank papered over by a cp clause. This is explicit in the case of cp laws, but it is only just beneath the surface of dispositional terms, since to say, for example, that something is fragile, is just to say that it would break if dropped, *cp*.

The Humean's revenge hurts, but I will end by briefly suggesting how the dispositionalist might respond. The first thing for the dispositionalist to say is that this is a problem that must have a solution, since it applies not just to cp laws, where it is just possible that we do not know what we are talking about, but to virtually every dispositional attribution we make. It certainly applies to everyday terms like 'fragile': we are quite unable to specify a precise and complete antecedent to the corresponding conditional. So how is semantic content secured? Here as elsewhere in the philosophy of language, a situation where there is a combination of semantic determinacy and a lack of articulate knowledge about the extension or referent provides a strong argument for some form of semantic externalism.[10] The idea, in roughest outline, would be that dispositional terms are natural kind terms that get their content by a combination of exemplary cases, theoretical knowledge and the actual kind structure of the world, not simply in virtue of what is in users' heads.

However the semantic details of this externalist response are filled in, the Humean will not take this response lying down. He will insist that the symmetry remains, because in so far as externalist mechanisms can fix the extension of disposition terms, so can they fix the extension of the full antecedent of an occurrent generalization. But here it seems to me that the Humean is wrong, for several reasons: the situation for the complete antecedent of the occurrent law is quite different than the situation for a dispositional term. First, the antecedent of the strict occurrent generalization is a mess, as we saw earlier when we saw that these strict generalizations would not be lawlike. It does not pick out a natural kind and so could not

[10] Cf Kripke, Op. cit. note 7, esp. Lecture II.

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have its extension fixed by the externalist mechanism that works for dispositional terms. Secondly, it is agreed on all sides that the terms of this antecedent are unknown, so in fact the extension is fixed neither by internal nor by external factors. Actually, and this is the third reason, as the problem of instantiation showed, we often do know what the extension of this imaginary antecedent would be: empty.

The extension of the complete antecedent is thus unfixed and often empty, and when not empty a hodge-podge, not a natural kind, and so not something the externalist mechanism of reference could determine. The disposition, by contrast, present as it is even when the terms of the imaginary antecedent are not met, does have a non-empty extension and, in the case of dispositions that underlie cp laws, that extension will pick out a natural kind. Here again, what is crucial is the difference between the 'binary' occurrent properties and the 'tripartite' dispositions which may be present without displaying.

What makes this response to the Humean's revenge possible is that one can refer to a disposition, with the help of externalism, without referring to the class of cases where all else is equal. The dispositionalist can however also claim a semantic advantage 'within' the cp clause. To say that all things are equal is often to say that there are no other forces in operation, no interference. This is a kind of specification that, though negative, has content even though we cannot give a catalogue of every force that might interfere. The specification, however, is one that we can only give at the level of dispositions, otherwise we would not have needed an unredeemed cp clause in the first place. The best one could do on the occurrent level would be to say that this is one of those Fs that is G, which returns us to a tautology: All Fs that are G, are G.

Dispositions thus hold out the hope of helping with the problem of content at two levels, by giving content to the body of the law, and content to the cp clause. Given the natural way the dispositional view also accounts for the other features of cp laws we have canvassed, the view appears to have a great deal to recommend it. So far as the comparison between the occurrent and dispositional views of laws of nature goes, not everything is equal.[11]

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