

DISPOSITIONAL ESSENTIALISM AND THE POSSIBILITY OF A LAW-ABIDING MIRACLE

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I. AN OBJECTION TO DISPOSITIONAL ESSENTIALISM

Dispositional essentialists assert that at least some of the dispositions associated with a natural property are essential to that property.¹ On this view, for example, it might be a necessary truth that being positively charged entails having the disposition to attract negatively charged things. This has an important consequence for the modal force of the laws of nature.

Arguably, a law statement such as $F = Gm_1m_2/r^2$ is a compact formula for describing some dispositions of massive objects. For example, if I wish to know what disposition a 7 kg mass has to accelerate 80 tonne masses when they are separated by a distance of 1.2 metres, I need merely to plug in the values, and I shall get a result which tells me that the mass exerts an attractive force of so many newtons. An attractive force is simply a disposition to accelerate the other body to a certain degree.²

On this account of the semantic content of a law-statement, dispositional essentialists must concede the following as a consequence: if a law-statement is true, and describes dispositions which are *essentially* associated with a property, then that law-statement will be *necessarily* true. This is a consequence

¹ See S. Shoemaker, 'Causality and Properties', repr. in his *Identity, Cause, and Mind* (Cambridge UP, 1984), pp. 206–33; B.D. Ellis and C. Lierse, 'Dispositional Essentialism', *Australasian Journal of Philosophy*, 72 (1994), pp. 27–45; B.D. Ellis, 'Causal Powers and Laws of Nature', in H. Sankey (ed.), *Causation and Laws of Nature* (Dordrecht: Kluwer, 1999), pp. 19–34. There is some disagreement among dispositional essentialists as to which dispositions are essential and which not. C.B. Martin and John Heil are also dispositional essentialists of sorts: see their 'The Ontological Turn', *Midwest Studies in Philosophy*, 23 (1999), pp. 34–60, and references therein.

² Only some natural laws will fall under this sort of 'summarized disposition' conception. Ellis proposes to call these the 'causal laws', excluding such laws as principles of symmetry, relativity and conservation laws: 'Causal Powers and Laws of Nature', p. 21.

of dispositional essentialism which its proponents happily embrace,³ not least because it gives an account of the truth-makers of laws which have a certain degree of modal force built in. Laws tell us how properties *must* behave, in virtue of their essential natures. Thus the apparently normative force of laws is better accounted for, in the eyes of dispositional essentialists, than on Humean regularity analyses.

But the dispositional essentialist account is not without weaknesses of its own. Most glaringly, it strikes many philosophers as highly counter-intuitive to think that the laws of nature are not contingent. The dispositional essentialist can explain this reaction away, however, as a failure to preserve the true reference of the terms involved. Some situation phenomenally isomorphic to a world with different laws is indeed possible. For example, the suggestion that the law of gravity could have been an inverse cube law, rather than an inverse square law, can be accounted for by saying that in such a world there is no genuine mass, merely *schmass*, a similar stuff which instantiates the property of being schmassive, and has a disposition to attract all other schmasses with a force inversely proportional to the cube of the distance between the objects. No law of mass need be broken in such a world, and yet it would appear just like a world where (*per impossibile*) mass was obeying a different law.

We frequently persist in employing locutions that we know to be literally false, simply because it amounts to too much linguistic work to speak the literal truth. For instance, I often wonder if I should be so pedantic as to stop myself from asking the question 'Did you dream last night?', because I know that strictly speaking, the answer should almost always be 'Most probably!'. Of course I should be asking if others *remember* their dreams, because we almost always dream, regardless of whether we remember it. Presumably dispositional essentialists think that something similar occurs when we lazily conceive of things in terms that seem impossible to them. We *could* do our conceiving in correct terms, but the cognitive work involved is somewhat tedious.

But apart from having to give slightly ungainly translations of this form for various sentences, the dispositional essentialist appears to have even greater difficulty in accounting for the semantics of certain counterfactual utterances. The contemporary version of the objection is due to John Bigelow, who attributes the genesis of the argument to Jonathan Bennett.⁴

³ Shoemaker, 'Causality and Properties', §8; Ellis and Lierse, 'Dispositional Essentialism', p. 40; Ellis, 'Causal Powers and Laws of Nature', p. 42.

⁴ J. Bigelow, 'Scientific Ellisianism', in Sankey (ed.), *Causation and Laws of Nature*, pp. 45–59, §6. The objection also appears in D.M. Armstrong, 'The Causal Theory of Properties', *Philosophical Topics*, 26 (1999), pp. 25–37, §5.

I shall call each state of an entire world w at a time a ‘global event’. Suppose that not much has happened in w . The chain of global events from the dawn of time to the present runs as follows:

a caused b caused c caused d caused e caused f .

We are interested in a counterfactual conditional, *viz* ‘If it had been the case that ϕ , then it would have been the case that ψ ’. Simplifying somewhat, in an orthodox possible-worlds treatment of counterfactuals the truth of this conditional will be determined by the states of affairs in a world w' which is similar in relevant respects to our w , and in which ϕ occurs.⁵ Supposing that ϕ occurs at t_e , then the global event at t_e in w' must not be e , for e does not include the occurrence of ϕ . I shall call the global event in w' at t_e ‘ e' ’.

As long as e' is an event which instantiates no properties alien to w , the laws of w' will be identical with those of w . This is simply a consequence of the dispositional essentialist doctrine that two worlds with the same properties must have the same laws. It is possible that the natural properties instantiated in w are governed by deterministic laws. Let us assume this to be the case. Now what will the history of w' be like, as compared with w ? Because the laws of nature determine the fact that global d -events bring about global e -events, w' cannot be a world in which d is a global event. So some other global event d' must have occurred in w' so as to bring about the consequent in a lawful fashion.

But exactly the same considerations apply to show that d' must have been brought about by c' ; which must have been brought about by b' ; which must have been brought about by a' . In other words, the entire world history of w' must be different from the history of w . I take it that this is not an adequate treatment of the conditional. For it would mean that, supposing determinism to be true, the truth of an apparently straightforward counterfactual like ‘If I had a beer here within reach, I’d drink it’ is determined by events in a world with a totally different world history from the big bang onwards.⁶ That is patently not what is meant by the above conditional. In other words, we do not permit backtracking counterfactuals (in normal circumstances).

Another even more vexing possibility is that there may be *no* possible world in which e' can come about in accordance with the laws. Perhaps there is no way in which I can tinker with the initial conditions at the big bang in order to bring about a world which contains human beings, beer and me, as well as my original thirst, and all in the right sort of configuration. Perhaps the only way the beer could have got here is if I had gone to

⁵ More properly, in a set of worlds, but my argument applies to any member w' of the set.

⁶ The example is Bigelow’s: ‘Scientific Ellipsisism’, p. 56.

the kitchen to get it. But if I had done that, I would have drunk it in the kitchen. In such a case the antecedent is necessarily false, so the counterfactual is vacuously true.

‘So much the worse for possible-worlds analyses of counterfactuals’, you might reply. And indeed, that is a response perfectly consistent with the spirit of dispositional essentialism. Possible-worlds analyses are the product of trying to get modal truths by having a large number of non-modal truths. If you have enough worlds which are not themselves intrinsically modal, then you get modality free. But dispositional essentialists are prepared to bring modally thick properties into the actual world, so arguably they need no supplementation from others. None the less I think that this objection is an interesting one, for the following reasons.

1. ‘One philosopher’s *modus ponens* is another’s *modus tollens*.’ Bigelow proposed the objection as a threat to dispositional essentialism. But if dispositional essentialism is correct, and the objection cannot be turned, then it must amount to a *reductio* of possible-worlds analyses of counterfactuals. Something is therefore at stake for both dispositional essentialists and possible-worlds theorists. Whether or not the objection stands is unclear, however, as it has not been properly pursued. While Shoemaker has been silent on the matter, Ellis had already developed a meta-linguistic account of counterfactuals before publishing on dispositional essentialism.⁷ On Ellis’ account, counterfactuals need not be true in order to be assertable, and assertability is not achieved through appropriate relations to events in nearby possible worlds. Thus the full range of escape-routes from the objection may not have been investigated, and the *reductio* (for either side) remains, therefore, a tantalizing possibility rather than a confirmed result.

2. The ontology of dispositional essentialism is relatively unexplored. Possible worlds, whether one is a realist about them or not, provide a very useful currency in which to articulate ontological positions. In pursuing a possible escape route from this objection, I hope to show that there is an ontological half-way house between the extremes of Humeanism and essentialism. This position accepts the core tenet of dispositional essentialism, but also permits properties to be instantiated *spontaneously*.

II. SPACE-INVADING PROPERTIES

In orthodox possible-worlds analyses, even if the actual world is deterministic, the antecedent is permitted to come about by means of a miracle. This

⁷ Ellis, *Rational Belief Systems* (Oxford: Blackwell, 1979). See also his ‘Bigelow’s Worries About Scientific Essentialism’, in Sankey (ed.), *Causation and Laws of Nature*, pp. 61–75.

is a viable option for Humeans such as David Lewis, because they advocate the contingency of the laws.⁸ Lewis can offer us a world w' in which the laws are different from those of this world, and an effect can come about in a way which would not be permissible here in w . It is a notable feature of this account that it does not require a miracle which breaks the laws of the world where it occurs. Rather a miracle is an event in another possible world which, *if* it occurred here, *would* be law-breaking.

Unfortunately this sort of technique is unavailable to dispositional essentialists, for they hold a necessitarian account of laws; therefore there are no neighbouring worlds where the same properties obey different laws. However, there may be worlds where the laws fail to 'exist', or be instantiated, because the properties concerned are not instantiated in that world.⁹ The argument still goes through, however, as a miracle requires not merely the absence of a law in a world, but that the very same properties should obey different laws in different worlds. Therefore a miracle in the normal sense of a law-breaker is ruled out as impossible. What the dispositional essentialist requires is something rather more exotic: a *law-abiding miracle*.

I once heard someone say that Newtonian mechanics is only deterministic under the assumption that there are no space invaders. Presumably there was some precise physical notion which the speaker had in mind, and to which I was never privy. But the rough meaning was fairly clear. A space invader is some sort of spontaneous event. I now introduce the concept of a *space-invading property-instance*: a property-instance which occurs spontaneously, without any preceding cause. Let X be a property which is instantiated spontaneously at the same time as event d . X has the following causal powers: (a) to inhibit the causal process through which the properties of d normally lead to e -events (there are at least two ways familiar from recent literature on dispositions in which this inhibition might occur: the space invader may be a *fink* for the disposition associated with d -events, i.e., it may act so as to change the properties of d -events to make them lose the disposition to cause e -events;¹⁰ alternatively, the space invader may be an *antidote* to the process whereby d -events lead to e -events, i.e., it may interfere with the causal chain between d -events and e -events¹¹); and (b) to cause, in conjunction with the properties of d , e' -events.

There is an ambiguity here in my formulation.¹² When X occurs, is the global event the mereological sum of d and X , or does the instantiation of X

⁸ D. Lewis, *Counterfactuals* (Oxford: Blackwell, 1973), §3.3.

⁹ I am grateful to an anonymous referee for emphasizing this point.

¹⁰ See Martin, 'Dispositions and Conditionals', *The Philosophical Quarterly*, 44 (1994), pp. 1–8, and Lewis, 'Finkish Dispositions', *The Philosophical Quarterly*, 47 (1997), pp. 143–58.

¹¹ See A. Bird, 'Dispositions and Antidotes', *The Philosophical Quarterly*, 48 (1998), pp. 227–34.

¹² This was pointed out to me by an anonymous referee.

change the nature of the world so that d does not occur at all? The answer depends upon the metaphysics of global events. The symbol ' d ' refers to an event in w which happens to be a global event. It is not immediately apparent whether d is *essentially* a global event or whether it could be less than global. The former answer would be supported by, for example, those who favour negative facts or facts of totality.¹³ If d contains a fact of totality, for example, then it would entail not- X . It would be part of d 's nature that it is 'all that there is' at that time, and it would be incompatible with any space invasions. For those who reject the claim that d is essentially global, there would be no difficulty in admitting the compossibility of d and X . Mercifully, I do not need to decide this issue in the current context. I can call the event that occurs when X is instantiated d' , and leave it to future metaphysicians to inform us whether or not d' includes the occurrence of d .

The occurrence of global event d' brings about the 'miraculous' result of e' . But this is a completely law-abiding miracle. This instance of X is a space invader, which occurs spontaneously; but that is not incompatible with the laws which govern X . The laws make no mention of how instances of X must be brought into being. Moreover, when X is instantiated as a component of a global d' -event, the law-governed effect is to bring about e' -events.

The concept of a space-invading property is perfectly consistent with the core tenet of dispositional essentialism. That tenet asserts that the causal powers of a property are essential to it. It does not, however, assert anything about the causal *means* by which a property can come to be instantiated.¹⁴ Presumably, therefore, all of the actual properties could have space-invading instances. Being a space invader, then, is an entirely accidental feature of a property-instance.

Although a space-invading property-instance is metaphysically respectable, it is not amenable to investigation by scientific methods, and might reasonably be deemed 'supernatural'. For instance, Schlesinger's criterion of connectivity is violated by a space invader, in that two systems can be identical in every other respect and yet differ with respect to that property.¹⁵ This amounts to a difficulty for physicists, but not for metaphysicians.

¹³ The inclusion of negative or totality facts in one's ontology is frequently a symptom of holding the thesis which Josh Parsons, in 'There is No "Truth-maker" Argument against Nominalism', *Australasian Journal of Philosophy*, 77 (1999), pp. 325–34, has described as 'truth-maker essentialism'.

¹⁴ Shoemaker has recently dissented from this view, in that he does place restrictions upon the means by which a property-instance is brought about, in 'Causal and Metaphysical Necessity', *Pacific Philosophical Quarterly*, 79 (1998), pp. 59–77, at p. 64. For the purposes of this paper I am ignoring Shoemaker's later position.

¹⁵ G. Schlesinger, *Method in the Physical Sciences* (London: Routledge & Kegan Paul; New York: Humanities Press, 1963), p. 73.

A space invasion strikes us as frustratingly inexplicable, but that is a desirable result for the properties which are capable of bringing about miracles, which are, after all, supposed to be inexplicable in naturalistic terms.

The space invader solution does involve a little backtracking, but only by ‘one event’ – or, properly speaking, only by the smallest amount of time required for the space invader to bring about the antecedent. If instantaneous causation is possible, this may be no time at all.

III. CAN DETERMINISM BE A LAW?

The astute reader is of course unsatisfied. ‘I thought you granted that the laws could be deterministic. But by allowing space invaders you have contradicted your initial supposition!’, you exclaim. Well, in the strong sense in which it is usually meant, I am suggesting that it is open to the dispositional essentialist simply to *deny* the supposition that determinism is possible. This does not mean that dispositional essentialists cannot endorse some weakened sense of determinism. That sense would be that a world might be such that no space invaders and no chancy properties are ever instantiated. For example, a Newton-world might exist, and it might have no space invaders instantiated in it. This world would satisfy the most hard-core Laplacean variety of determinism, but this fact about the world would not be a *law* in and of itself. It would be a contingent *de facto* regularity that no determinism-disrupting properties were ever instantiated in the world. That does not amount to determinism *de jure*.

For there to be strong determinism of the sort that would cause a problem for possible-worlds semantics, there would need to be some sort of modal truth-maker for a ‘no space invaders’ clause. And there is no obvious account of what sort of truth-maker such a truth would have.¹⁶ So the dispositional essentialist need not be committed to determinism being anything more than a Humean regularity.

For those who hold that there are laws governing the behaviour of properties that are uninstantiated in a world, there is an even quicker route to the conclusion that determinism cannot be anything more than a contingent feature of a world.¹⁷ In such a case, the possibility of space invasion entails that the laws of every world must take into account that possibility

¹⁶ Presumably Ellis could give an account in terms of a ‘world essence’. See J. Bigelow, B.D. Ellis and C. Lierse, ‘The World as One of a Kind: Natural Necessity and Laws of Nature’, *British Journal for the Philosophy of Science*, 43 (1992), pp. 371–88. But this world-essence theory of laws is an optional extra which not all dispositional essentialists need purchase.

¹⁷ I am grateful to an anonymous referee of this journal for this point.

(whether space invasion occurs there or not). Therefore no world will have deterministic laws.

IV. REFORMING THE LAWS

Of course, if the operation of *any* deterministic process can be interfered with by a space invader, one might wonder about the logical form of the 'deterministic' laws I spoke of earlier. One might have thought, for instance, that the law governing *c*-events claimed that *c*-events deterministically cause *d*-events. But this cannot be so, for in the example discussed *c* was followed by *d'*. So the law relating *c*-events to *d*-events must have a *ceteris paribus* clause to take account of the possibility of space invaders.

C.B. Martin, in discussing attempts to give a reductive conditional analysis of dispositions, rejects the use of a *ceteris paribus* clause, on pain of circularity. He alleges that any such clause will effectively render the conditional as 'If the stimulus occurs, *and nothing happens to make it false that the object possesses the disposition*, and other things are equal, then the response will occur'. In a similar vein, Stephen Mumford persists in attempting to give a conditional analysis of dispositions, but with a rider that 'ideal' conditions obtain; and Alexander Bird claims that we must appeal to 'normal' conditions in our conception of dispositions.¹⁸ This is clearly no advance in analysing a disposition. Is the same criticism applicable in the case of laws?

I believe that some sort of non-circular formulation of the laws is possible, but requires very strong restrictions on the possible interference occurrences. Law-statements will consequently refer only to highly idealized situations, which almost never obtain in actual practice.¹⁹ In order to illustrate how such conditions can be formulated, it is worth examining the sorts of cases which divide the dispositional essentialists from contingency theorists.

Here are three cases, assuming for convenience that electrons are classical charged particles:

- w_1 . Two electrons, with all the properties normally attendant upon being electrons, are separated by one nanometre at t_0 . Nothing else exists. The electrons move away from each other, in accordance with the electromagnetic forces between them.
- w_2 . Two electrons, as above, are separated by one nanometre. At t_1 and subsequent times, however, they are still separated by one nanometre. A

¹⁸ Martin, 'Dispositions and Conditionals', p. 6; S. Mumford, *Dispositions* (Oxford UP, 1998), ch. 4; Bird, 'Dispositions and Antidotes'.

¹⁹ Obviously this account could be further refined to achieve a degree of synthesis with the work of Nancy Cartwright, *How the Laws of Physics Lie* (Oxford: Clarendon Press, 1983).

constant bombardment of space-invading forces keeps the electrons stationary, even though their charges are exerting force which would normally push them apart.

w_3 . Two electrons remain one nanometre apart, as in w_2 , except that in this world there are no space invaders – they just stay together. The particles are charged, but in this world the property of being charged lacks the causal powers normally associated with it.

The dispositional essentialist does not believe in cases like w_3 . The contingency theorist accepts them. This is the crucial difference in ontological commitment between the positions. Anyone with verificationist scruples will dismiss the difference between w_2 and w_3 as meaningless, but this is no surprise, and is not an objection for those who reject verificationism.

So there is a secure difference in the ontology which each of these positions countenances, and with that secure ontological difference we can attempt to formulate the law statements which dispositional essentialists endorse as necessarily true, so as to render cases like w_3 impossible.

First, the law will require a *no space invaders* clause. At best, this clause will stipulate that no spontaneous events are to occur between the antecedent time and the consequent time. If action at a distance is possible, however, the clause must ban space invaders for the entire world history.

Secondly, the law will require some sort of *global* formulation. This is for the simple reason that otherwise factors extrinsic to the antecedent could always get in the way and prevent the consequent from coming about. If the formulation covers the entire world, then there are no extrinsic factors. (This is the same sort of assumption as is being employed when scientists refer to closed systems. A closed system is, effectively, an entire world, closed off from causal influence by anything else.)

Finally, these sorts of law will only work for *non-chancy dispositional properties*. Chancy dispositions will reintroduce the very same problems as space invaders raised. Presumably if chancy properties exist we shall need to admit statistical laws.²⁰

With all these requirements in place, the antecedent will strictly entail the consequent, and the laws will be necessarily true.

V. METAPHYSICAL GAIN: EPISTEMIC PAIN?

Shoemaker's original argument for dispositional essentialism was driven by epistemic concerns. He argued that certain logically possible cases, if they

²⁰ As Ellis and Lierse do: see their 'Dispositional Essentialism', §7.2.

were metaphysically possible, would make knowledge impossible, or at least implausibly difficult to obtain.²¹ This raises the worry, however, as to whether or not the possibility of space invaders will not also make knowledge enormously difficult to obtain. I am not here concerned to evaluate the merits of Shoemaker's argument, but merely to see whether there is an *ad hominem* objection to Shoemaker on this basis.²² We may compare world w_2 with a new case:

w_4 . Two particles of the same size as electrons, which have no charge, and no dispositions to interact except merely to remain where they are, are one nanometre apart. They remain there for all time.

This case is phenomenally identical to w_2 . If such cases are possible, is that going to undermine our epistemic warrant in the very same way as Shoemaker originally feared? Arguably not. Shoemaker was particularly concerned about the following two types of case:

- A. Two objects which are qualitatively identical, i.e., share all their intrinsic properties, might be totally different in their causal powers
- B. Two objects which are qualitatively very different might be identical in their causal powers.

It seems clear that space invaders cannot contribute to either type of case. If two qualitatively distinct objects are phenomenally identical because of the interference of *extrinsic* space invaders, this does nothing to suggest that the objects have the same causal powers. Rather the causal powers of the objects are being interfered with, and we need to make further investigation to find out what is going on. This is no more a problem for epistemology than Descartes' demon, and that is a menace Shoemaker never claimed to have eliminated. If, on the other hand, two objects which are qualitatively identical come to have different causal powers as a result of the instantiation of an *intrinsic* space invader by one of them, then we have contradicted our initial supposition – the objects are no longer qualitatively identical.

VI. CONCLUSION

Whether or not dispositional essentialists wish to adopt a possible-worlds account of counterfactual semantics, this paper brings to the fore a question of ontology which dispositional essentialists need to address: *can things happen*

²¹ Shoemaker, 'Causality and Properties', §5. Ellis and Lierse's reasons for adopting dispositional essentialism appear to be different.

²² This line of objection was raised by Stephen Barker.

*spontaneously?*²³ If so, then the conclusions of this paper on the formulation of laws, the semantics of counterfactuals and the status of determinism will hold. If not, then not only will the Bigelovian objection stand, but in addition we shall need both some reason to accept this ontological restriction and also a corresponding dispositional essentialist treatment of counterfactuals, determinism and laws.²³

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