[*JOCR* 8.3 (2009) 277-293]
doi: 10.1558/jocr.v8i3.277
(print) ISSN 1476-7430
(online) ISSN 1572-5138

DOUBLE PREVENTION AND POWERS

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Abstract. Does A cause B simply if A prevents what would have prevented B? Such a case is known as double prevention: where we have the prevention of a prevention. One theory of causation is that A causes B when B counterfactually depends on A and, as there is such a dependence, proponents of the view must rule that double prevention is causation. However, if double prevention is causation, it means that causation can be an extrinsic matter, that the cause and effect need not be connected by a continuous chain of events, that there can be causation by absence, and that there can be causation at a distance. All of these implications jar with strong intuitions we have about the nature of causation. There is, on the other hand, a theory of causation based on an ontology of real dispositions, where causation involves the passing around of powers. This theory in contrast entails that double prevention is not causation and, on this issue, it can claim a victory over the counterfactual dependence account.

Keywords: causation, powers, prevention

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Introduction

Is A a cause of B simply in virtue of its preventing what would have been a preventer of B? Such cases are known as double preventions. They involve the prevention of a prevention. What is arguably the leading theory of causation among contemporary analytic metaphysicians – the counterfactual dependence view – rules that double prevention is causation.[2] The view has it that A is a cause of B when B counterfactually depends on A, including if it does so via a chain of counterfactual dependencies. This is offered as a reductive analysis. There is nothing more to causation than a counterfactual dependence between events (strictly, the ancestral of the relation of counterfactual dependence: a clause that we hereafter take for granted). Double prevention does seem to involve this kind of counterfactual dependence. Had the 'cause', A, not occurred, it would not have prevented something happening that would in turn have prevented the 'effect' B. If A had not been the case, B would not have been the case. Therefore, for Lewisian theories, double prevention counts as causation.

Notwithstanding the appeals of a counterfactual dependence theory of causation, our intuitions on double prevention cases are not so clear cut. There are some grounds on which we feel reluctant to grant double preventions as causes. In this paper, those grounds will be explored. It will be argued that, as we have no firm intuitions, it would be wrong to take it for granted that double prevention is causation. On the contrary, if there were to be a theory of causation that could deal with all the standard causal cases but without entailing that double prevention is causation, then we should prefer that. There is such a theory, it will be claimed; namely, a theory of causation based on an ontology of real dispositions or causal powers. What is presented here will not be a full argument for the powers view of causation, however. Instead, this paper has the more modest aim of showing that on the issue of double prevention, the powers view produces a more sensible verdict than does the counterfactual dependence view. The powers view rules that double prevention for various reasons does not count as causation and thus steers clear of the troublesome consequences that follow from it.

Some Examples

Lewis's own example is the simplest. It takes us back to the billiard table that Hume thought offered the 'perfect instance' of causation.[3] Billiard balls 1

[2] D. Lewis, 'Causation as influence', in *Causation and Counterfactuals*, eds J. Collins, N. Hall and L. A. Paul (Cambridge, MA: MIT Press, 2004), 75–106 (84).

[3] D. Hume, 'Abstract of a treatise of human nature' (1740), in *An Enquiry Concerning Human Understanding*, ed. P. Millican (Oxford: Oxford University Press, 2007), 133–45.

and 2 collide. Let us call this collision event A. Had they not collided, ball 1 would have continued its motion and collided instead with billiard ball 3, but such a collision did not happen: it was prevented. Given that the collision between 1 and 3 was prevented, 3 was able to continue on its way, where it met with billiard ball 4 in an event we can call collision B. The situation is depicted in Figure 1.[4]

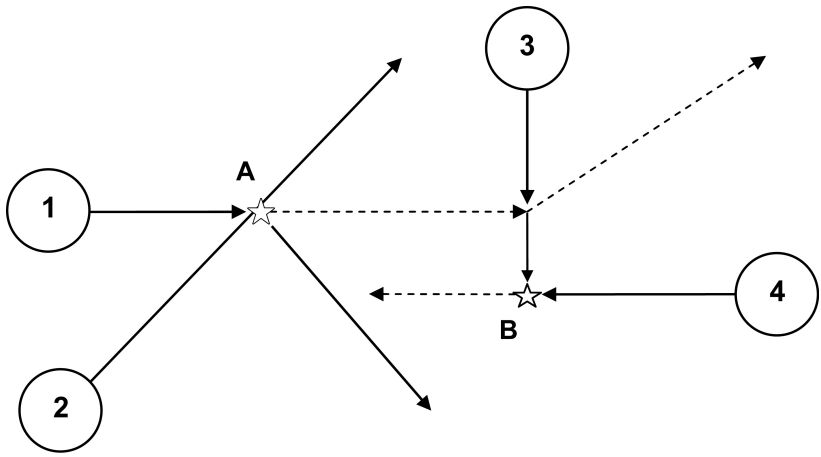

Figure 1: Standard double prevention case

Collision A, Lewis concludes, is a cause of collision B because B counterfactually depends on A. A prevents a preventer of B and thus B counterfactually depends on A. There are other examples of double prevention, away from Hume's billiard table, that may seem less contrived.

Ned Hall gives the example of a bomber that has an escort fighter plane.[5] An interceptor is sent to shoot down the bomber but it is prevented from doing so when the fighter gets it first. The bomber is then able successfully to complete its mission and it is arguable that a cause of its doing so was the fighter's double prevention. The fighter prevented the interceptor from preventing the bombing.

A third example concerns the causes of a fire. One possible cause is arguably a double prevention. A sprinkler system corrodes, let us assume, and because it does so, it can no longer spray water. A small fire then starts and, because the sprinkler system does not work, the building burns down.[6]

[4] From Lewis, 'Causation as influence', 84.

[5] N. Hall, 'Two concepts of causation', in *Causation and Counterfactuals*, eds J. Collins, N. Hall and L. A. Paul (Cambridge, MA: MIT Press, 2004), 225–76.

[6] D. Davidson, 'Causal relations', *Journal of Philosophy* 64 (1967): 691–703.

Couldn't one say that the corrosion in the sprinkler system caused the building to burn down? The corrosion prevented something that could have prevented the fire taking hold.

Once one starts thinking of examples, one can see that double prevention cases are never hard to find. I may know that I am forgetful, for instance, or just in the middle of a very busy day. I ask someone to remind me of a job I must do if I haven't already done it by lunch. I am thus, as a safety measure, ensuring that my forgetfulness cannot prevent me from performing the task. I am taking steps to prevent a preventer of a task. If as simple a task as requesting a reminder works through double prevention, then clearly it is a very widespread phenomenon.

If Double Prevention is Causation

Lewis accepts that double prevention cases are cases of causation. Hence the reminder is a cause of me completing my task, shooting down the interceptor is a cause of the bombing, the sprinkler's corrosion causes the building to burn down and collision A is a cause of collision B. It has to be conceded that there is at least some initial intuitive plausibility to such causal claims. If we probe deeper, however, we see that there are some consequences for causation if we include within it cases of double prevention. Lewis accepts these consequences: that causation need not be an intrinsic matter, that there need be no continuous chain from cause to effect, that there can be causation by absence, and that there can be causation at a distance. It shall be argued that none of these are features we should want in genuine causation and that, if they follow from granting that double prevention is causation, then we should not do so.

Why would each of these consequences follow? It is easiest to see why if we consider Lewis's original billiard table example.

In the first place, such causation would not be an intrinsic matter. There is an intuition that whether ϕ causes φ is a matter that concerns only ϕ and φ. Nothing at other times and places should determine whether ϕ caused φ. But now it seems we could have many counterexamples to that. Whether A caused B, in this case, depends on other things. Suppose, for instance, there had been an obstruction on the table between collision A and where billiard ball 1 would have met ball 3. Ball 1 could never, in any case, have collided with 3. Hence we could have collision A occur, and collision B occur, just as before, but now A would not be a cause of B. Because of the obstruction, collision A is now no longer a preventer of a preventer of collision B. Ball 1 could never have done any preventing because the obstruction was in the way.

Thus we can have two cases exactly the same in respect of the occurrence of A and B, but in one A causes B and in the other it doesn't. In these two situations, A and B are intrinsic duplicates[7] and in the first situation A causes B but in the second situation it doesn't.[8]

Second, causation does not require a continuous chain of events from cause to effect. There is a gap between collisions A and B. The first preventer ensures that the second preventer *doesn't* happen. It interrupts a chain of events and thus relies upon a non-event. The collision between balls 1 and 3 is merely possible. It doesn't occur. If it had done so, ball 3 would have been knocked off course and would not have made contact with ball 4. The event that is collision A thus prevents an event occurring that would have been the collision of 1 and 3. And had that non-event been an actual event, it would have prevented collision B.

This point draws attention to the third and fourth consequences. Third, there can be causation by absence. Balls 3 and 4 collide because of the absence of their preventer. But are absences the sort of 'things' that we would want to allow as causal relata? In what way can an absence be causally powerful? There are some who defend causation by absence, taking it to be as good as any other case of causation.[9] After all, don't we say that plants can die through absence of water and that lack of vitamin C causes scurvy? This means that causation by absence is something every theory of causation must address: either denying that it is real causation or accommodating it. Lewis can maintain, therefore, that having it entailed by one's theory does not automatically wreck that theory.

Fourth, causation at a distance becomes a possibility. Collision A occurs at some spatiotemporal distance to collision B yet nevertheless is a cause of it. Cases could be imagined where the double prevention involves a gap of vast distance. The fighter plane could shoot down the interceptor just as it takes off, for instance, hundreds of miles from the point where it would have intercepted the bomber. A cause of the successful bombing thus occurred hundreds of miles and, let us assume, an hour before, with no chain of adjacent events connecting the cause and effect.

All four of these consequences are, in varying degrees, counterintuitive and for that reason undesirable in a theory of causation. It cannot be claimed

[7] On intrinsic duplicates, see R. Langton and D. Lewis, 'Defining intrinsic', *Philosophy and Phenomenological Research* 58 (1998): 333–45.

[8] This is what we take Lewis to be arguing in a compressed passage in his 'Causation as influence', 84.

[9] R. Bhaskar, *Dialectic: The Pulse of Freedom* (London: Verso, 1993); J. Shaffer, 'Causes need not be physically connected to their effects: the case for negative causation', in *Contemporary Debates in Philosophy of Science*, ed. C. Hitchcock (Oxford: Blackwell, 2004), 197–216.

that any of this is clear cut, however. To some, double prevention as causation may seem intuitively plausible, when considered on its own, prima facie. Yet some of those same people, who at first think double prevention is perfectly acceptable as causation, may well revise that view upon further reflection, such as when the four consequences described above are brought to their attention. Their intuitions may, therefore, be in tension. Something that seems intuitive can nevertheless be shown to have counterintuitive consequences and one thus has to face a judgement of the relative strengths of all these intuitions.

Added to all this uncertainty, the role of intuitions in philosophy generally is a controversial matter. In the Socratic tradition, philosophy is an antidote to common sense, whose job it is to challenge preconceptions such as the intuitions that are often invoked. Others, whom we may call naturalists, argue instead that our intuitions are all that we have to go on ultimately. Even Socrates, it could be argued, overturned certain intuitions merely by showing that they could clash with other stronger intuitions. Causation in particular seems to be a case where appeal to intuitions is of importance. The best theory seems to be one that can accommodate most of our intuitions in as coherent a way possible. Where the theory clashes with the intuitions, it is seen as a problem. John Collins, Ned Hall and L. A. Paul set out all the possible options we face when we encounter such a clash.[10]

It is beyond the scope of this paper to resolve such major methodological issues. We will proceed on the following assumptions, however, based on the review of the issues thus far. First, it seems safe to conclude that there are no very firm intuitions either way about whether double prevention should prima facie count as causation. When presented with such cases, some people seem to think it is causation, and some seem to think it isn't. However, when we look deeper into the consequences if double prevention were causation, there is rather more unease. That causation can be extrinsic, that it can occur without an intermediate chain, that absences are causes and that causation can occur over a distance are all likely to seem in some degree counterintuitive. One may well then try to resolve any conflict of intuitions that remains. That will not be the way forward in the present paper. Instead, the aim is to introduce an alternative theory of causation, based on an ontology of real causal powers or dispositions, that does not have to face such consequences. In such a theory, double prevention does not come out as

[10] J. Collins, N. Hall and L. A. Paul, 'Counterfactuals and causation: history, problems and prospects', in *Causation and Counterfactuals*, eds J. Collins, N. Hall and L. A. Paul (Cambridge, MA: MIT Press, 2004), 1–57 (32–9).

causation and thus there are no dangers for that theory from those same counterintuitive consequences.

Powers as Causal Truthmakers

It has long been suggested that an ontology of real dispositions or powers can deliver a theory of causation.[11] We still await the detail. In this section, some of the basics of such a theory will be presented and, in the next section, that theory will be applied to the question of whether double prevention is causation.

Those who are realists about powers think that there are natural kinds of processes in the world that involve one thing disposing towards another. One view is based on Sydney Shoemaker's theory that properties are clusters of powers.[12] A particular having one property can then naturally dispose it towards having another. Being fragile, for instance, naturally disposes towards breakage. Pandispositionalism is the view that all properties are clusters of powers. In that case, when one power manifests itself in another property, that is effectively the gaining of a new cluster of powers. Fragility manifests itself in breaking and being broken, for the pandispositionalist, means having a new set of powers. The broken pieces, for instance, might have the power to cut, which the fragile object did not have before the breakage occurred. This presents a model of causation as the passing around of powers. Such a model was originally used by David Armstrong[13] as a criticism of pandispositionalism but, on reflection, it provides an attractive view of causation.[14] I sit by the fire, for instance. That the fire is hot means that it has various powers, one of which is to make my body hot. When it becomes hot, the fire has passed on that power to me: my body now has the power to make something else hot. This is a case where it is the very same power that is passed on, from cause to

[11] R. Harré and E. H. Madden, *Causal Powers: A Theory of Natural Necessity* (Oxford: Blackwell, 1975); R. Bhaskar, *A Realist Theory of Science* (Leeds: Leeds Books, 1975); N. Cartwright, *Nature's Capacities and their Measurement* (Oxford: Oxford University Press, 1989); B. Ellis, *Scientific Essentialism* (Cambridge: Cambridge University Press, 2001); G. Molnar, *Powers: A Study in Metaphysics*, ed. S. Mumford (Oxford: Oxford University Press, 2003), ch. 12.

[12] S. Shoemaker, 'Causality and properties', in *Identity Cause and Mind*, expanded edn (Oxford: Oxford University Press, 2003), 206–33. Shoemaker has subsequently abandoned this view but for a defence of it see S. Mumford, 'Powers, dispositions, properties, or: a causal realist manifesto', in *Revitalizing Causality: Realism about Causality in Philosophy and Social Science*, ed. R. Groff (London: Routledge, 2008), 139–51.

[13] D. Armstrong, 'Four disputes about properties', *Synthese* 144 (2004): 309–20.

[14] S. Mumford, 'Passing powers around', *The Monist* 92 (2009): 94–111.

effect, but there are cases where it is different powers that are passed on. The fragile glass, for instance, has powers when it is broken that it did not have before, and vice versa.

A cause can then be understood as a power that disposes towards an effect and, in token cases, succeeds in producing it. The powers story is particularly effective in explaining a feature known as polygeny,[15] which is elsewhere called the composition of causes.[16] This is the idea that an effect has multiple causes, each contributing to the whole additively, or sometimes subtractively. Since Lewis's theory appeared,[17] it has become standard to represent causal situations in neuron diagrams where one node or neuron is said to counterfactually depend on another. This, however, is always shown to be a one-to-one relation (partly because counterfactual dependence is threatened if there are multiple causes: if two or more are each sufficient, then the effect counterfactually depends on neither). In the powers view, however, it is important to show that each power only disposes towards a certain effect and what actually happens will be a result of what other powers are also operating. Striking a match only disposes it towards lighting, for instance: its lighting may fail to happen because a gust of wind comes at just the wrong moment. Causes do not necessitate their effects, therefore, even when they succeed in producing them. If A necessitates B, then whenever A occurs, B must occur, but causation does not seem to work this way. Any cause can be prevented, and even if it succeeded in producing its effect, it could have been prevented.[18]

In order to clearly represent these important features of causation, as far as the realist about powers is concerned, it is suggested that causal situations be modelled by vectors rather than in neuron diagrams.[19] To do this in the simplest way possible, we can start with a one-dimensional quality space that has properties F and G as the two end points of the dimension. A central line depicts the starting point in our causal situation and then vectors can be plotted. These represent any powers that are operative, disposing either towards F or towards G (see Figure 2).

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[15] Molnar, *Powers*, 194.

[16] J. S. Mill, *A System of Logic* (London: Parker, 1843), III, ch. vi.

[17] D. Lewis, 'Causation', *Journal of Philosophy* 70 (1973): 556–67.

[18] This is a now familiar point, but for some recent statements of it see Collins, Hall and Paul, 'Counterfactuals and causation', 18; M. Schrenk, 'The powerlessness of necessity', *Noûs*, forthcoming; R. L. Anjum and S. Mumford, 'The metaphysics of powers: their grounding and their manifestations', in *Powers: Their Groundings and their Realizations*, ed. A. Marmadoro (London: Routledge, forthcoming 2010).

[19] As in S. Mumford and R. L. Anjum, *Getting Causes from Powers* (Oxford: Oxford University Press, forthcoming).

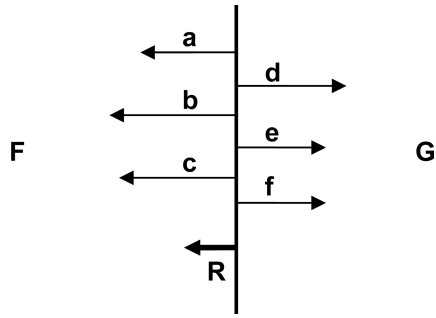

Figure 2: Powers at work

Vectors are used to represent dispositions because they share two features. They have a direction, in this case either towards F or towards G, and they have an intensity. One disposition can dispose towards F to a higher degree than another. The intensity of a vector is indicated by its length. In Figure 2, the component powers *a*, *b* and *c* all dispose towards F. At the same time, however, there are countervailing powers *d*, *e* and *f* disposing away from F and towards G. The situation could represent various powers disposing towards the heating of a room (sunshine, radiator, etc.) and other powers disposing towards the cooling of the room (draft, heat loss through ceiling, etc.). Added and subtracted together, the situation depicted is one in which overall there is a disposition towards F, indicated by the resultant vector *R*.[20] The room gets warmer because the sum of *a*, *b* and *c* are greater than the sum of *d*, *e* and *f*. Still the situation only disposes towards F, however. Were another power to be added in the direction of G, the overall situation might no longer dispose towards F.

Unlike Lewis's counterfactual dependence account, this is not intended as an analysis of causation. Counterfactual dependence between events is constitutive of causation, on Lewis's theory. There is nothing more to causation than this. The powers view, however, would be best thought of as a kind of causal primitivism. Causation is not being analysed in terms of powers but only explicated by them. The notion of power and cause are so closely con-

[20] Addition and subtraction are the simplest modes of composition for powers, as in the case of addition of forces. In some cases, however, powers will compose by more complex functions, which would explain non-linear cases. The resultant power of two drugs taken together, for instance, which may individually dispose towards health, need not itself be a healthy one. Taken in conjunction, they may dispose towards an unhealthy reaction. More complex modes of composition than addition and subtraction have to be permitted therefore. Composition could be multiplicative, inversely multiplicative, or determined by any number of other complex functions.

nected that it is very hard to see that you could have one without the other. It is arguable, however, that powers can have explanatory priority and thus can explicate the theory of causation, rather than the other way round. According to some powers theorists, power is a broader category that can also be the basis for a theory of properties,[21] laws[22] and modality[23] as well as causation.

Regarding counterfactual dependence, the powers theories may accept that there are some true counterfactuals connecting A and B when A causes B. But, if there are, there is still a Euthyphro question to answer about whether A causes B because B counterfactually depends on A; or B counterfactually depends on A because A causes B. While Lewisians opt for the former, realists opt for the latter. Any such counterfactuals are made true by the powers at work, whereas for Lewis the counterfactuals are made true by facts at other concrete worlds that are spatiotemporally disconnected from ours. But there are also reasons to think that in some cases of causation, there is no such counterfactual dependence anyway. There can be trumping late prevention for some instances of causation.[24] Two footballers go to kick off the game, for instance. Player *a* is the captain of the team so when player *b* sees that he also has started his kick, he pulls out and allows the captain to perform the honours. The captain caused the ball to move but had he not done so, we can suppose that the ball would have been kicked at just the same time and in the same way by player *b*. While the captain's kick caused the ball to move, therefore, the ball's movement did not counterfactually depend on his kick because it would have occurred even without it. Lewis's latest theory[25] was an attempt to overcome such problems but even supposing he was successful, he must still face the same Euthyphro question.

Double Prevention is Not Causation

Equipped with the basics of the powers theory of causation, let us now return to the issue of double prevention. What would the powers theory say about it? It seems clear that the powers theory offers good reason to reject the thesis that cases of double prevention are causation. The theory is about the passing around of powers, where causation occurs when powers are exercised in such

[21] Shoemaker, 'Causality and properties'.

[22] Bhaskar, *A Realist Theory of Science*; S. Mumford, *Laws in Nature* (London: Routledge, 2004).

[23] Molnar, *Powers*, ch. 12.

[24] J. Schaffer, 'Trumping preemption', in *Causation and Counterfactuals*, eds J. Collins, N. Hall and L. A. Paul (Cambridge, MA: MIT Press, 2004), 59–73.

[25] Lewis, 'Causation as influence'.

a passing. Double prevention concerns the non-exercise of powers: twice over. A power is prevented from exercising when another also fails to exercise. We have, therefore, two failures of causation. Just as two wrongs do not make a right, two failures of causation do not make a cause.

When we get to the consequences of double prevention, we see more clearly why the powers theory cannot accept that it is causation. Let us take these consequences in reverse order. In the first place, the powers theory would not want to allow that causation can occur at a distance. Something that happens miles and hours away cannot cause an effect here and now immediately, without an intermediary. The passing of powers requires, where it is immediate, spatiotemporal proximity. Cause and effect are to be understood as power and manifestation where one merges into another in a continuous process. There would seem to be something conceptually absurd in the idea of power and its manifestation being radically disjointed. Suppose it was asserted, for instance, that the cause of the match lighting was not its striking but, rather, it was the striking of the previous match, wherever in the world that occurred. Certainly there could be a constant conjunction there, but the claim would be too absurd to be taken seriously. The previous match to have been struck may have been in some far off city, thousands of miles from the lighting of my match. As Hume already noted, contiguity seems an essential part of our notion of cause.

As Lewis points out, there are some examples in modern physics that may invoke the notion of causation at a distance.[26] Whether these are true or false, it at least seems possible to entertain the possibility without absurdity, it is claimed. But extreme caution is recommended in the handling of such cases. Their features are almost always taken on authority by philosophers who little understand the details. It would be perilous, in that case, to alter one's philosophical theory to accommodate an ill-understood example. And as Lewis concedes, the causation at a distance that would be involved in his double prevention cases is not within this special domain of micro-phenomena where so little of our ordinary thinking applies. If double prevention is causation, there are commonplace macro-examples of causation at a distance. Collision A causes collision B directly, with no intermediaries, over a spatiotemporal gap. Core cases of causation involve contiguity and the only motivation we would have for dropping such a requirement from our ordinary, macroscopic concept of causation would be to accommodate double prevention. This, on its own, does not seem motivation enough.

In contrast, there is at least some reason to take claims of causation by absence seriously. Plants die through lack of water and a horseshoe can

[26] Lewis, 'Causation as influence', 85.

come loose through want of a nail. If double prevention involves causation by absence, then can that really be held against it? But there are also some good reasons to resist causation by absence, especially for a powers theorist. Causation occurs in the exercise of powers but an absence of something – a nothingness – cannot be a bearer of powers. Absence causation would therefore be an exception to the thesis that causation is the exercise of power. Even if one did not have an ontology of powers, however, there are reasons to feel uneasy about allowing absences to be causal relata. Suppose everyone in the room but me drinks poison and dies. It may well be said that I lived because of an absence of poison in my body. But lots of other things could have killed me. Did I also survive because of the absence of a man-eating tiger in the room, or because of the absence of a nuclear explosion? And is my continuing life ordinarily caused by an absence of poison in my body, even though I have never been in a room full of other poisoned people? It seems that once one allows absences as causes, it allows for an escalation of causes most of which seem entirely superfluous to the effect in question. It would be far better, therefore, if we could explain such cases away. To do so, we would have to show why some absences but not others are reasonable to invoke in relation to a particular effect but, at the same time, show why it is only the existing things – the presences – that do the causal work.

The powers theory can perform these tasks in one go. Let us take the dead plant as an example. When it is healthy, numerous powers are operating on it and keeping it in equilibrium, with not too much water, which will kill it by drowning, and not too little water, which will kill it by dehydration. The surrounding atmosphere has a power to suck moisture out of the plant leaves and out of the soil. This must be counterbalanced by the addition of new water from time to time in the right quantity to preserve the equilibrium. This is illustrated in Figure 3, where F stands for death by drowning and G stands for death by dehydration.

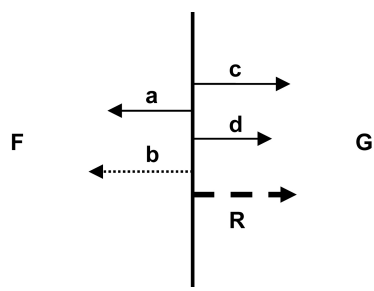

Figure 3: 'Causation' by absence

The dotted vector *b* represents a power that is removed from the situation. This could be the withdrawal of the hydrating power of additional water. When that happens, the situation no longer is in equilibrium but now overall disposes towards death by dehydration, represented by the broken resultant vector *R*. This would be the sort of case that would usually be offered as an example of causation by absence. But note that it is not, in this case, the absence of anything that is doing the causal work. It is the remaining vectors, *c* and *d*, that bring about the plant's death. They do that causal work. The power of the atmosphere to suck moisture from the plant is the main power that kills it. Before, this power was counterbalanced by the addition of new water, but is no longer. Such a solution avoids the thorny metaphysical ground in which absences, lacks and nothingnesses are reified. A genuine absence really is nothing at all and so not something that bears causal powers. And in addition to that concern, there is another that if we allow absences to be causes, they would proliferate without end. I am alive because of the presence of air, nourishing food, sunlight and so on. But if absences are causes, I am also alive because of the absence of every possible thing that would kill me, which is a practically limitless number of things.

Why then do we tend to invoke just some absences as causes and not others? The answer has to be a pragmatic one. It is the context of the situation that makes the absences of some things relevant while the absences of others are not. Water had the power to counterbalance the dehydration, and it was formerly present. This is the absence that is contextually most relevant to the plant's death as it was something previously there that would have disposed towards plant health had it remained. Similarly, if everyone but me has drunk poison, the fact that I have not done so is most contextually relevant to my survival. But what actually causes my health is a good diet, exercise, sunshine, and so on. Lack of poison just explains through contrast why my neighbours died while I did not.

Addressing the case of double prevention, we can see that it is plausibly causation only if at least one absence is causally efficacious. Collision A prevents something from happening: another collision between balls 1 and 3 that, had it happened, would have prevented the collision of 3 and 4. Collision A causes collision B, therefore, only if there is a third 'collision' that does not happen, and its non-happening is one of the causes of collision B. Our non-collision was a possible preventer of collision B, so its non-occurrence has to be one of the causes of B, or at least so if one thinks causation consists just in counterfactual dependence. For those of us who do not believe that, something else has to be said.

Here is a suggestion, therefore. The cause of the collision between balls 3 and 4 is just their own movements, trajectories and momentums. If one wants

to go back in their causal histories, one might find further causally relevant events, such as their being struck separately and heading for the same place at the same time. That is all one needs, however, and it is a story that can be told easily in terms of powers. Momentum is seen as a power to move, and it was passed, in this case, from the billiard cues to the two balls, and then earlier stages of those balls passed on that same power of momentum to later stages. These are the most significant powers involved in their collision. What about the absent preventer? On the powers theory, it had no role in collision B. There might be a true counterfactual that had ball 1 collided with ball 3, ball 3 would never have been involved in collision B. This counterfactual could be made true by the momentum and direction ball 1 initially had at the outset. This counterfactual could be made true by the powers, therefore, but as any such counterfactual does not constitute causation, it is not enough to make this absent collision a cause of B. Ball 1's trajectory, that could have led to its collision with 3, was in the example interrupted by an actual collision with ball 2. This is a real enough case of causation, with again a story possible in terms of powers and it plays an essential part in the explanation of why ball 1 didn't partake in the non-actual collision. It too, therefore, has an explanatory role to play with respect to collision B, even if it was not properly one of its causes. The same account of this could be given as was invoked in the case of the absent poison. It is contextual, contrastive and pragmatic considerations that make it useful to refer to such factors, but that does not mean that they thereby have causal powers that are relevant to the final effect in question.

Once we reject causation by absence, we also see no good reason to posit gappy causation: that is, causal chains in which some of the links do not occur or are non-events. Lewis, in contrast, is happy to allow that events or the absence of events can comprise a single causal chain[27] but this commitment seems driven only by the prior acceptance of double prevention as causation. Aside from that issue, there seems little reason to accept that causation could work that way. This is not, however, to assert *a priori* that causal processes cannot proceed in a gappy way. The metaphysics of space–time might be such that there are discrete space–time points instead of a continuum. In that case, a causal process might occur through adjacent space–time points that nevertheless have a gap between them. Although this raises perplexing puzzles, concerning how such gaps are crossed, it might nevertheless be a less perplexing world than if we instead have a continuum, which would mean that there is no such thing as adjacent space–time points because between any two there will always be a third. What is key in the case of causation, however, is that

[27] Lewis, 'Causation as influence', 85.

although processes may be gappy in this sense, they are not gappy in the way that Lewis's theory allows. A natural process that involves powers at work will occur over a stretch of space–time and fill it completely. Hence, if it develops through a series of space–time points p_a to p_z, it must also be occurring at each one of the intervening points. Lewis, on the other hand, allows that causation could occur through p_a to p_z but have a gap at some of the points in between: p_m, for instance. But, on the contrary, there seems no good reason to say that such a case would be one of a single process that connects the first event at p_a with the last event at p_z. If there is a gap at p_m, then it seems we have two distinct causal processes: one running from p_a to p_l, and the other from p_n to p_z. This is what should be said, for instance, of Lewis's double prevention example. There is one causal process involving collision A and another involving collision B. The conclusion, therefore, is that non-events are not enough to preserve the integrity and unity of a causal chain. Quite the opposite: it seems far more intuitive to say that they break such a chain.

That brings us back to the first counterintuitive consequence of Lewis's account, namely that causation becomes an extrinsic matter because pairs of intrinsic duplicates can differ as to whether or not they are causally related. Lewis's argument for this depends of course crucially on the claim that collision A is a cause of collision B, even though there is such a large gap between them, in which place a barrier could be positioned. The intuition that the causal relation is an intrinsic one is strong, and is a reason many would choose to reject a constant conjunction theory. Whether A causes B should not depend on things at other times and places, such as other things like A and like B.

Lewis raises another consideration: causation might be an extrinsic matter anyway. Lewis wants a theory of what causation is in any world, not just this one. In some worlds occasionalism is true and in those worlds it is therefore an extrinsic matter. Whether A is a cause of B is a matter not just between A and B but also of whether God's will connects A and B. This only highlights a further difference between Lewis's theory and the powers theory of causation, however. The powers theory is a naturalistic one, based on the assumption that ours is the only world. That the theory of causation offered is one (only) for this world is not thereby seen as a disadvantage. This is our concept of cause, made for our world, so why should it also accommodate causation under very different and sometimes far-fetched cases?

Taking Stock

If double prevention is causation it has a number of implications for what counts as causation. Such implications, we argue, are far more significant

than double prevention itself because they are claims that should be near the centre of any account of causation: whether it is intrinsic, whether absences can be causes, and so on. The argument then was that there is enough intuitive unease about accepting these claims that it would count as an advantage over Lewis's theory if an alternative did not require such commitments. That is the claim of this paper: that on these issues the powers theory gains a victory. That our intuitions about double prevention itself are unclear ought really to be outweighed by what its acceptance as causation would entail. These are things we should not need or want in our theory of causation so the powers theory seems preferable in ruling against them and, by *modus tollens*, against double prevention.

It is not claimed that other theories of causation cannot also deal more sensibly with putative cases of double prevention than does the counterfactual dependence view. We are convinced they can. The task here, however, has been only to compare the powers view with the counterfactual view, which is still a very popular philosophical theory of causation. On the issue of double prevention, the powers view emerges from that comparison in good light.

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