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12 For Facts as Causes and Effects

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1 Introduction

Philosophers of causation, including those who deny that there is any, need to say what they take it to be; just as atheists need to say what they disbelieve in. So, to avoid begging the question for or against gods or causation, we must start not with the debatable extensions but with the intensions of these concepts. That is, we must say what we think the existence of gods or of causation entails. Only then can we say whether and where they exist and what follows from that. In short, to reverse an overrated adage, we must start not with the use—the unreflective application—of these terms by believers but with the point of that use, that is, with their meaning.

But while semantics may have to have the first word here, it can hardly have the last, at least not in the case of causation. Only if what we must mean is demonstrably necessary or impossible, as in the case of gods it might be, can that fact settle the question. With causation, the question is more complex, since different people have taken 'causation' to mean too many vague, contentious, and conflicting things, not all of which we can have.[1] We must therefore be prepared to find that whatever in the world, if anything, deserves to be called 'causation' fails to live up to some of our ideas of it. Take the pre-Humean idea that we can know a priori what causes what. Now that we know that we cannot know this (with trivial exceptions, like 'the cause of *e*, if any, causes *e*'), most of us have dropped the idea rather than conclude that there is no causation.

Similarly with other erstwhile connotations of causation, such as determinism. By this I mean the idea that the presence and/or absence of causes somehow compels that of their effects: in other words, that causes must in some strong sense be sufficient and/or necessary for what they cause. This idea too has been challenged, by convincing cases of seemingly indeterministic causation ranging from medicine (people's smoking causing them to get cancer) to microphysics (the triggering of atomic explosions). But what makes these cases convincing, that is, what makes us want to keep them in causation's extension, is that they do meet other connotations of causation. For despite the indeterminism, these apparent causes still precede, explain, give grounds for predicting, and provide means to, their apparent effects (Mellor 1995, chs. 5-7). That is why we want to call them causes.

In short, the conflict of determinism with causation's apparent extension arises because it is not required by other, more important connotations. However, it is at least consistent with them, unlike the transitivity that Lewis (1973a, in 1986a, p. 167) and others have foisted on causation, by making it the ancestral of an otherwise credible but non-transitive relation *R*. This contradicts most of causation's other connotations, as such notorious causal chains as those from losing a nail to losing a kingdom (e.g., Lowe 1980), or from a butterfly wing's flapping to a tornado (Stewart 1989, p. 141), show. For while each member of such chains explains, gives grounds for predicting, and is a means to the next one, their first and last members stand in none of these

[1] By 'causation' here I mean singular causation, as in Fred's smoking causing him to get cancer, rather than general causation, as in smoking's causing cancer.

relations, which is why no one really thinks the first causes the last. So here too, but with far less excuse, a failure to fit causation's apparent extension arises from forgetting its principal connotations, that is, what we think follows from saying that one thing causes another. Still, at least in this case the question is simple—should we identify causation with the non-transitive *R* or its trivially transitive ancestral?—even if the answer usually given is wrong.

Determinism is of course a harder and tastier nut to crack than transitivity, being related in more complex and interesting ways to causation's other connotations. Here, however, having tried to crack it in my (1995), I merely note that cracking such nuts takes more than semantics, that is, more than specifying a relation and calling it 'causation'. We must also see if a real relation exists that both meets enough of the specification to count as causation and has a credible extension, that is, links most if not all of what we take to be causes and effects.[2] And to do that we need not only a semantics but a metaphysics, and in particular an ontology, to tell us first what relations there are that might serve our turn, and then how much of our turn they can serve.

It is of course no news that theories of causation need an ontology as well as a semantics, Davidson's well-known theory being an obvious case in point. For on the one hand in his (1967) he argues on semantic grounds that causation must relate particulars, in the sense of entities that first-order quantifiers range over, of the kinds that he calls 'events'.[3] And on the other he argues independently in his (1969) that there must be particulars of these kinds, as well as of the less contentious kinds exemplified by people, plants, and planets.

That Davidson's semantics for causation needs an ontology that includes events is obvious, since without them he would have far too few particulars to provide all singular causes and effects. Suppose, for example, you do something because you decide to. Then if there are events, your decision (one particular) can cause your action (another particular). But if there are not, and the only relevant particular is you, the causation here must link not particulars but facts, namely the fact of your deciding to do something and the fact of your doing it. To yield an extensionally credible theory of causation, Davidson's semantics needs events.

Similarly for those who argue, as I do (1995, chs. 9–11), that most causes and effects are facts. We need a credible ontology of facts, defensible against among other things the so-called slingshot arguments of Davidson (1967) and others, which purport to show that if causation links any facts it links them all, which we know it does not do. Here too, having argued the matter in my (1995), I shall simply assume that these and other objections to facts can be met, and that neither facts nor events can be ruled out independently of the theories of causation that invoke them. How, then, are we to decide between these theories?

The answer, as in boxing and science, is that what cannot be settled by a knockout must be settled on points. What matters is which theory of causation does best overall, when rated not only for its semantics and ontology but also, and mainly, for how well it explains its subject matter, namely the connotations and apparent extension of causation. That is the question here, as it is for other philosophical theories, and as it is for scientific ones; and here, as there, the eventual answer may well alter some of our initial semantic and ontological assumptions.

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[2] By 'real relations' (hereafter 'relations') I mean the relational counterparts of what Lewis (l983b) calls 'natural' properties, and I and Alex Oliver (1997) just call 'properties': namely, those that entail an objective resemblance between the particulars that share them. Relations then are simply properties of ordered pairs, triples, etc. of particulars, i.e., respects in which the ordered n-tuples that share them objectively resemble each other. Whether these properties and relations are universals, resemblance classes of particulars or tropes, or something else again, is immaterial for present purposes.

[3] For clarity I too shall only use 'events' to mean certain kinds of particulars. The common habit of calling causes and effects 'events', whatever they may be, only causes confusion when, as here, we are trying to say what causes and effects are.

Compare, for example, an imaginary history of scientific theories of fish, that is, theories of —to start with—middle-sized self-propelled organisms living under water. Theories of fish can of course not alter this ontology or semantics too much, on pain of changing the subject: No theory of galaxies will ever be a theory of fish. Even so, our current theory of fish has changed our initial piscatory assumptions quite a lot. On it, many self-propelled underwater organisms are not fish: Some because they are not animals; others, like whales, because they are mammals, that is, they work differently and hence are only 'fools' fish.' [4]

Similarly, I say, with philosophical theories, including theories of causation. Some apparent cases of causation (such as the phenomena of non-locality in quantum physics) may, like whales, need excluding on theoretical grounds from what we end up calling causation. New distinctions, such as that between causing and affecting (see sec. 6), may also need drawing in our theory, just as shellfish may need distinguishing from other underwater animals.

This view of scientific theories is familiar enough in the philosophy of science. But it may still need selling to some philosophers of philosophy, for whom semantic analysis remains the be-all and end-all of the subject. I should say therefore that denying that this is what distinguishes philosophy from science is not to try and reduce the former to the latter. On the contrary, it is to try and restore to philosophy the serious ontological theorising that an unwarranted subservience to science and semantics has inhibited for too long, and which is only now reviving as metaphysicians shake off their scientific and semantic shackles.

2 Facts and Particulars

How, then, do facts and particulars compare as singular causes and effects? Particulars may indeed have a semantic head start: Even to me 'the spark caused the fire' sounds more natural, or at least more causal, than 'there was a fire because there was a spark.' But that of course is not the end of the matter. It certainly does not rule out causal truths of the form

(1) E because C,

where 'C' and 'E' are sentences and 'because' is a sentential connective, as opposed to

(2) *c* causes *e*,

where *c* and *e* are particulars and 'causes' is a two-place predicate. (1) may still, as l shall argue, win on points. But how?

First, to give (1) a chance, we must exclude its non-causal instances, such as those used to give non-causal explanations. This we can do by fiat, by restricting it to instances that are equivalent to 'the fact that C causes the fact that E'. This restriction begs no relevant questions, because it relies only on the uncontentious assumption that 'E because C' entails 'C' and 'E', just as '*c* causes *e*' entails the existence of *c* and *e*. For then, on the weak reading of 'fact' given by the principle that, for all sentences, statements or propositions 'P',

(3) 'P' is true iff it is a fact that P,

[4] Compare: 'Animals with the appearance of cats but reptilic internal structure .. . would not be cats; but "fools" cats.' (Kripke 1972, p. 321).

it follows that the facts that C and that E exist iff 'C' and 'E' are true. And this being so, we can simplify what follows by reading 'C' and 'E' not only as sentences but also as shorthand for 'the fact that C' and 'the fact that E', a usage in which we can then rewrite (l) as

(1′) C causes E,

where C and E are facts in the weak sense given by (3). It is in this sense that (1′) and hence (1) represent causes and effects as facts, just as (2) represents them as particulars.

The contentious assumptions here are not semantic but ontological. Do the facts that (1) and (1′) require, and the particulars that (2) requires, really exist? More precisely, do most if not all of the facts and particulars entailed by seemingly true instances of (1), (1′), and (2) exist?[5] This is not an easy or uncontentious thing to show. Some philosophers, for example, still reject the Davidsonian events needed for my doing something because I decide to (an instance of (1)) to yield an instance of (2), namely 'my decision causes my action'. Here, however, if only to keep (2) in the race, I shall take for granted the existence of the particular events, such as decisions, actions, sparks, and fires, that true instances of (2) need.

What of the facts that true instances of (1) and (1′) need? To these there are several objections, notably the slingshot mentioned above, an argument whose validity means we can reject it only by rejecting one of its assumptions. These assumptions are that we cannot falsify a true 'E because C' by replacing either

(i) 'C' or 'E' with a logical equivalent, or

(ii) a term referring to a particular with a co-referring term,

that is, with another term referring to the same particular. Of these two assumptions the one I reject is the transparency assumption, (ii). I reject it because it implies, for example, that if 'Tony Blair is the Prime Minister because he won the election' is true, so is 'Tony Blair is Tony Blair because he won the election', which is absurd. For if Tony Blair *is* the Prime Minister, 'Tony Blair' and 'the Prime Minister' refer to the same person. So for 'Tony Blair is Tony Blair because he won the election' to fail to follow, as it must, (ii) must fail in this case, no doubt because the fact that Tony Blair is Tony Blair differs from the fact that he is Prime Minister.

But what makes these facts differ? What, in general, individuates the facts that I say are causes or effects? My answer is the one that Davidson gave for events in his (1969), namely that any events *d* and *d*′ are identical iff they have all the same causes and effects, that is, iff replacing '*d*' by '*d*′' in any '*c* causes *d*' or '*d* causes *e*' would never change its truth value. Similarly, I say in my (1995, ch. 9.3), for facts that are causes or effects. Any such facts D and D′ are identical iff they have all the same causes and effects, that is, if replacing the sentence 'D' by 'D′' in any causal 'D because C' or 'E because D' would never change its truth value.[6]

From this the falsity of (ii) follows at once. For as Tony Blair's being Tony Blair does *not* have all the same causes and effects as his being the Prime Minister, 'Tony Blair is the Prime

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[5] I.e., exist in the past, present, or future of the actual world. In what follows, those who think that only the present exists should read my 'exists' as 'did, do, or will exist', whereas those who think that other possible worlds exist should read it as 'is actual'.

[6] Note that these criteria, being only of actual and not of counterfactual identity, do not require events or facts that have causes or effects to have them necessarily. Just because *d* and *d*′ or D and D′ are identical iff they have all the same *actual* causes and effects, it does not follow that the very same *d* (= *d*′) or D (= D′) *could* not have had any different causes and effects, and often it clearly could.

Minister because he won the election' can be, as it is, opaque, that is, *not* transparent. So some instances of 'E because C' are opaque.[7] But then why should they not be?

3 The Relata of Causation

The stock answer to this question relies on the seemingly innocuous assumption that causation is a *relation*. It relies on this assumption because, for any (e.g. two-term) relation *R*, we must be able to say transparently that it relates any entities *a* and *b*. For if what *R* relates are *a* and *b* themselves—as opposed to aspects of or facts about them—then to say so we must need only to refer to *a* and *b* and say that *R* relates *them*: *how* we refer to *a* and *b* must be irrelevant to the truth of what we say. This is why any simple relational statement of the form '*aRb*' must be transparent for *a* and *b*. Yet, as we have just seen, some instances of 'E because C' are opaque. Does this not show that causation does not relate facts, and hence that causes and effects are not facts but particulars?

No; but to see why not we must first look not at (1) but at (1′), 'C causes E'. This is transparent for the *facts* C and E: Replacing the referring term 'C' or 'E' in (1′) by any other term for the same fact will never change its truth value. That follows at once from my causal criterion of identity for facts. For if replacing 'C' by 'C′' (or 'E' by 'E′') did change the truth value of 'C causes E', that criterion would automatically make C and C′ (or E and E′) different facts, so that 'C' and 'C′' (or 'E' and 'E′') would *not* refer to the same fact. But then this change in the truth value of 'C causes E' would not show it to be opaque.

All that the opacity in some 'E because C' shows is that, *within* a true sentence 'C' or 'E', substituting co-referring terms for a *particular* may make that sentence correspond to a different fact: as replacing 'the Prime Minister' by 'Tony Blair' does in 'Tony Blair is the Prime Minister'. But as this induces no opacity in sentences of the form 'C causes E', it does not show that causation cannot relate facts. Nor of course have we shown that causation cannot relate particulars: as causal relata, both facts and particulars are still in the ring. But facts still seem to win on points. For if there can be a fire because there is a spark, there can also *fail* to be a fire because there is *no* spark. Similarly, if I can act because I decide to, I can also *fail* to act because I do *not* decide to. In other words, just as 'E because C' can be true if 'E' and 'C' are true, so '~E because ~C' can be true if 'E' and 'C' are false. This poses no problem for facts, because the weak sense of 'fact' given by our principle (3) allows there to be negative facts.

For particulars, however, these cases do pose a problem. What particulars does causation relate when there *not* being a spark causes there *not* to be a fire? They cannot be negative ones—a *non*-spark and a *non*fire—as there are demonstrably no such entities. For suppose there is a *long* spark and a *hot* fire: This entails that there is a spark and a fire, since something that is both a spark and long must be a spark, just as something that is both a fire and hot must be a fire. In short, these entailments are, as Davidson (1969) says, just cases of conjunctions entailing their conjuncts. But with negative particulars, the entailments go the other way: if there is *no* spark, it follows that there is no long spark, and no short one either. But this cannot be because a non-spark exists and is both long and short, since nothing can be that; any more than a nonfire can be (as it would have to be) both hot and cold, to make its existence entail (as it would have to) that of both a hot nonfire and a cold nonfire.

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[7] 'C' and 'E' need not state identities, or be necessary truths, for 'E because C' to be opaque, as many cases of mental causation show. For example, seeing Jim win his race may cause you to believe that he does so without causing you to believe that the youngest runner (which he is) does so. For other opaque instances of 'E because C', see my (1995, ch. l2.4~5).

How, then, without negative particulars, can causation relate particulars when the cause or effect is that there is *no* particular of some kind-—a spark, a fire, a decision, an action? Here advocates of particular causes and effects face a dilemma, since they must either deny that there is causation in these cases or find some positive particulars for causation to relate. But the former restricts causation's extension too much, by ruling out too many obvious cases; and the latter is often made impossible by the lack of suitable particulars. For positive particulars in most of these cases are clearly either irrelevant (one need not decide not to act in order not to decide to act), inscrutable (what particulars does the nonexistence of sparks and fires entail that can make the former cause the latter?) or nonexistent, as in what Lewis (following Martin 1996) starts his second paper in this volume by calling 'the deadly void', that 'would cause you to die in just a few minutes. It would suck the air from your lungs. It would boil your blood…' Yet in all these cases, most of which lack any particular that is obviously capable of being the cause or effect, there is always an obviously capable fact: namely, the fact that there is *no* particular of a suitable kind.

4 Negative Causes

Semantically, then, facts in my weak sense can provide causes and effects in far more apparent cases of causation than particulars can, because they can be negative. But semantics, I have argued, is not enough: we also need a credible ontology, which we shall now see that negative facts may not provide. So as King Lear says to his silent daughter Cordelia: 'How? Nothing can come of nothing. Speak again.' And so, being more willing than Cordelia to heave my heart into my mouth, I shall.

There is of course an innocuous reading of Lear's maxim, namely that only actual causes can have actual effects. This I accommodated in section **2** by requiring 'C causes E' to entail the existence of the facts C and E. However, this reading is not strong enough to make the present point, since in my weak sense of 'fact' all it means is that 'E because C' entails 'C' and 'E'. But when, as here, 'C' or 'E' is a negative existential sentence, all this means is that no particular satisfies some description. That is the kind of absence that many philosophers find it hard to credit with any efficacy.

Yet why should absences not have effects? Perhaps it is because causes need to come in kinds to enable laws of nature to fix the kinds of effects they have: making forces cause accelerations, sparks fires, decisions actions, and so on. But then how can nothing, being of no specific kind, have specific kinds of effects? The answer is of course that absences can come in as many kinds as presences can. A lack of force causes a lack of acceleration; an absence of sparks causes an absence of fire; indecision causes inaction; and so on. These are all well-defined kinds of absence, with well-defined kinds of effects; and the presence of nothing is merely the conjunction of all such absences. Why then should we deny that absences in general, and a void in particular, can have effects of specific kinds?

I can think of three sources of this denial. First, there is the contingency of most and perhaps all causation, which may make the efficacy of even negative causes contingent on the existence of something else. That I grant: but then this 'something else' may also be a negative fact, as when the absence of one force will cause an object not to accelerate only in the absence of other forces. So although some negative facts will certainly lack their normal effects in Lewis's void, it does not follow that they will have *no* effects, still less that the void itself will have none.

Next, there is the idea of causal efficacy as an intrinsic property of causes, in some sense of 'intrinsic' that would stop absences having such properties. But what can this sense be? It cannot be the usual one, of failing to entail the existence of other things. For in that sense the absence of

a force, a spark, or a decision is as intrinsic as its presence; and so therefore may its efficacy be. And yet in this sense, of course, efficacy can *never* be intrinsic, since being a cause always means having, that is, entailing the existence of, a distinct effect. So either way negative causes are no worse off than positive ones.

This is why few if any philosophers now think that having effects is a property of causes, as opposed to the *relation* between causes and effects discussed in section **3**. That relation may indeed depend on its relata having—or, if its relata are facts, containing—the properties that make them instantiate the laws that fix the kinds of effects that given kinds of causes have; and I agree with most philosophers that causation does depend in this way on laws and hence on the properties of causes. But as laws can and often do include negations—as in the law that bodies acted on by *no* forces will *not* accelerate—this still gives us no reason to deny that negative facts can be causes or effects.

What does give us a reason to deny this is the very idea of causation as a relation in the sense of note **2**, the reason being that real relations need real relata, which negative facts cannot be. Let us see why not. The objection here is not that the opacity of 'E because C' stops it reporting a relation, since it does not, as we saw in section **2**: 'C causes E' is as transparent for C and E as '*c* causes *e*' is for *c* and *e*. The real objection to negative causes and effects is, as I hinted at the start of this section, not semantic but ontological.

To see the objection, let us look again at the principle used in section **2** to generate all the facts I needed to supply my factual causes and effects, namely that for all 'P', including negative existential ones,

(3) 'P' is true iff it is a fact that P.

Together with the uncontentious principle that, for all 'P',

'P' is true iff P,

(3) entails that, for all P,

P iff it is a fact that P.

This reading of 'fact' thus makes it trivially true that, for example,

murder is wrong iff it is a fact that murder is wrong;

Jim will probably win tonight iff it is a fact that Jim will probably win tonight; and

quarks have spin iff it is a fact that quarks have spin.

Yet it cannot follow from this that, for murder to be wrong, Jim to probably win tonight, and quarks to have spin, the world must contain objective values, probabilities, future-tensed facts, and theoretical entities. Theories of value, probability, time, and the nature of scientific theory that deny this are not so easily refuted.

The sense of 'fact' given by (3) is thus far too weak to show that causation relates facts, since (3) does not tell us what in the world, if anything, by making 'P' true, makes P a fact in this

weak sense.[8] So in particular, (3) does not show that a negative existential 'P' is made true by the existence of something which a causal (or any other) relation could link to anything else. And indeed it is obvious that it is not, since by definition what makes any such 'P' true is that no particular of some kind exists. But then facts can no more supply all the relata that causation seems to need than particulars can: Negative facts cannot have effects by being related to them. So what does causation relate?

5 Non-relational Causation

To answer this question we need to apply Ramsey's 'heuristic maxim', that in such stalemates 'the truth lies not in one of the two disputed views but in some third possibility which has not yet been thought of, which we can only discover by rejecting something assumed as obvious by both the disputants' (Ramsey 1925, pp. 11–l2). Here the assumption I propose to reject is that *causation is a relation*. It is not, and the idea that it is—like the idea that it is transitive—is a mere formal prejudice, unwarranted by any of its substantive connotations.

To see this, we must note first that, for causation to be a relation, statements of it, like

(1′) 'C causes E', and

(2) '*c* causes *e*',

must do more than meet the semantic criteria for relational statements by

(a) entailing (the existence of) the facts C and E and the particulars *c* and *e*, and

(b) being transparent for them.

They must also be made true by a relation holding between C and E or *c* and *e*. It is this ontological assumption that I say the lack of relata in many apparent cases of causation should make us reject, to prevent an implausible restriction on causation's extension.

To show how this can work, I start with my innocuous reading of King Lear's maxim that nothing can come of nothing, namely that only actual causes can have actual effects. This, as we saw in section **2**, requires 'E because C' to entail 'C' and 'E', and hence the facts C and E, and '*c* causes *e*' to entail *c* and *e*. So for C and *c* to be causes, and for E and *e* to be effects, these entities must exist, whether or not they are the relata of any relation. Of course if causation does relate C and E, or *c* and *e*, this will indeed entail that the entities it relates exist. But if they must exist in any case to satisfy Lear's maxim, that entailment is superfluous. In other words, the fact that causes and effects meet the merely semantic existential criterion (a) is no reason to think that causation really *is* a relation, since they must meet this criterion anyway.

Nor should we be impressed by the fact that causes and effects meet the transparency criterion (b). For as we saw in section **2**, the transparency for C and E of 'C causes E', and for *c* and *e* of '*c* causes *e*', will follow from a causal criterion of identity for C and E, and for *c* and *e*, whether causation is a relation or not.

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[8] By a truthmaker for 'P' I mean something whose existence entails 'P': see, e.g., Restall (1996). Disputes about which 'P' needs truthmakers need not concern us here, except that I take it for granted that if 'P' does, '~P' does not, since all it takes to make '~P' true is that the truthmaker for 'P' does not exist. (This distinction is not syntactic or semantic: however 'P' and its negation may be represented in thought or language, I take the positive one—'P'—to be the one that has a truthmaker.) This is why I deny that negative existential instances of 'C' and 'E' in 'E because C' have truthmakers that could be the relata of a causal relation.

If these criteria are neutral, others, notably criteria for what factual properties and relations there are, imply that causation is *not* a relation.[9] Take Shoemaker's (1980) criterion, that the factual properties that exist are those that combine to fix the causal powers of particulars—as when having the properties of being steel and of being sharp-edged combine to give a knife the power to cut. By that criterion causation itself will obviously not be a property in this world or any other. Nor will causation meet my (1997) criterion, that the factual properties and relations that exist are those that occur in laws of nature, since in my view no such law includes causation itself as a property or relation.

Nor do substantive theories of what makes 'C causes E' or '*c* causes *e*' true support the idea of causation as a relation, as we shall now see. There are of course many such theories, but for present purposes we may divide all the serious ones into just two kinds: those that require causes and effects to instantiate laws of nature, and those that require causation to imply something about an effect's prospects without its cause. Let us take these in turn.

Some theories make laws, and hence general causation (such as smoking causing cancer), a relation between the properties and relations involved (Armstrong 1983). But this, even if true (which I doubt), does not make the singular causation that concerns us relational. For suppose it is a law that all *F*s are, in certain circumstances, followed by *G*s.[10] How does this help to make (the fact that there is) an *F* cause (there to be) a *G*? The answer, on almost any view, is that it does so by making a certain non-truth-functional conditional true (or assertible),[11] namely that, in any relevant circumstances, if there *were* an *F*, it *would* be followed by a *G*. But as this conditional entails neither its antecedent nor its consequent, it does not entail that any such particulars exist. So whatever makes it true need not—and clearly does not —entail the existence of the *F* and the *G* (or of the facts that there is an *F* and is a *G*) that are thereby shown to be cause and effect. In short, far from law-based theories of causation requiring it to be a relation, they imply that it is not.

Similarly for theories that invoke an effect's prospects without its cause: these too require causation only to entail conditionals, for example, that if in the circumstances there were *no F*, there would also be no *G*.[12] But as this does not entail the *falsity* of either its antecedent or its consequent, the existence of its truthmaker also need not—and again clearly does not—entail the existence of either the cause or the effect, and so cannot be a relation between them.

So far so good for the idea that causes and effects need not be relata and can therefore include negative facts. But not yet good enough, for even if causation itself is not a relation, it may still require causes and effects to be related in space and time. It may, for example, require that causes precede their effects, be contiguous to any immediate effects, and be linked to others by dense sequences of intermediate causes and effects. Does this not require causes and effects to be the relata, if not of causal then at least of temporal and spatial relations, which we have seen that negative facts cannot be?

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[9] By 'factual properties and relations' I mean non-evaluative and non-identity ones whose instances are not provable a priori, as opposed to such apparent properties and relations as being *good*, *better than*, or *identical to Fred*, and such properties and relations of numbers as being *prime* or *less than*. If causation is a relation at all, it is certainly factual.

[10] By '*F*s' and '*G*s' I mean particulars satisfying the predicates '*F*' and '*G*', whether or not *F* or *G* is a property by my or Shoemaker's criteria. In particular, to cover indeterministic laws, '*G*' may mean having a certain chance of satisfying another predicate '*H*'.

[11] This is just to cater for those who think these conditionals lack truth values; it makes no odds to the ensuing argument.

[12] Or, in indeterministic cases, that the chance of a *G* would be such-and-such, e.g., less than it would have been with an *F*; again, it makes no odds to the argument.

To see why it does not require this, consider first the temporal analogue of (1), namely 'E *after* C', as in 'There was a fire after there was a spark', 'I did it after I decided to do it', and so on. There are also spatial analogues, as in 'there was a fire above where there was a spark' and 'I did it where I decided to do it'. In short, spatial and temporal relations can relate facts as easily as particulars. But then what about negative facts: how can the nonexistence of a spark or a fire, or my *not* deciding or *not* doing something, be the relata of such relations?

The answer is that they need not be. For all these negative facts have locations, just as positive ones do: there is always a time and place at which there is no spark, fire, decision, action, and so on. So even if these are negative facts about things or events, they are positive facts about times and places. But then whatever spacetime relations causation entails need not relate these causes and effects but only their spatiotemporal locations.[13] Causes and effects themselves need not be relata at all.

6 Particular Causes and Effects

By denying that causation is a relation, and thus enabling negative facts to be causes and effects, we can match causation's apparent extension far better than any theory that limits causes and effects to particulars. But on the other hand, we need not limit causes and effects to facts. For since our causes and effects need not be truthmaking facts, they need not be facts at all. As well as the non-truthmaking facts C and E entailed by true instances of 'E because C', our causes and effects can include all the particulars referred to in true instances of '*c* causes *e*'.

But then, since many truths of these forms come in pairs that clearly stand or fall together—as 'I acted because I decided to' does with 'My decision caused my action'—we must ask which comes first: the factual causes and effects or the particular ones? In my (1995, ch. 11.3), I show how facts can come first, by instances of 'E because C' entailing all true instances of '*c* causes *e*', as follows: *c* causes e only if, in a suitably restricted region of spacetime, for some *F* and *G*,

(i) there is a *G* because there is an *F*,

(ii) *c* is the *F*, and

(iii) e is the *G*.[14]

This is what makes facts the primary singular causes and effects, since what makes particulars causes or effects is that facts about them are, not that a causal relation holds between them.

Can the derivation also go the other way, from particulars to facts? Yes, but only up to a point, and then only by making particulars too fact-like. Take Lewis's (l973a) analysis of '*c* causes *e*', using conditionals like 'If *c* did not occur (i.e., exist), *e* would not'. This does yield some instances of 'E because C', but only of the form '*e* exists because *c* does', which fits far too few cases, and not only because it cannot cope with negative causes and effects. It also cannot cope with the many cases in which *c* does not *cause e*, but only *affects* it, by causing an *e* to be *G* that would exist even if it were not *G*:[15] as when an injection affects a dentist's drilling of a tooth, by making it painless, without causing it, that is, without causing there to be a

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[13] For more details, see my (1998), chs. 8.6 and 10.4.

[14] (i)-(iii) are necessary, not sufficient, since they only entail that *c* causes or affects *e*: causing it if being *G* is essential to *e*, affecting it is not. See my (1995), ch. 12.

[15] See note 14.

drilling. Similarly, different facts about *c* may affect *e* in different ways, as when an unwelcome content 'P' of my speech (*c*) causes you (*e*) to believe 'P' while its quiet tone causes you to react calmly to that news.

All these cases yield natural instances of '*e* is *G* because *c* is *F*', true for some *F* and *G* and false for others. It is far harder to fit them into the Procrustean form of '*e* exists because c does'. That requires distinguishing the event of a drilling from the event of its being painless, the event of my saying something from the event of my saying it quietly, and so on. But this multiplies particulars beyond all necessity and sense, destroying in particular Davidson's (1969) obviously correct explanation, endorsed in section **3** above, of why, for example, a painless drilling must be a drilling and a quiet speech a speech. The plain fact is that these so-called events are not particulars at all but facts: the fact that there is a drilling, and the fact that it is painless; that I say something, and that I say it quietly; and so on. To call these entities 'events' just to preserve the claim that causation relates particulars is to evacuate that claim of almost all its content: a sure sign in philosophy, as in science, of a degenerating research program.

7 The Positive Facts of Causation

I conclude that causation is not only not a relation, but that most causes and effects are not particulars but facts, in the non-truthmaking sense of 'fact' given by the principle that 'P' is true iff it is a fact that P. But how then is causation embodied? What must our world contain, besides whatever is needed to make 'C' and 'E' true, to make 'E because C' true'?

We saw in section **5** that most if not all theories make causation entail one or two conditionals, about an effect's prospects with and without its cause. For 'E because C' we may for present purposes write these conditionals as 'C⇒E' and '~C⇒~E', where '⇒' is a connective that we may assume has something like Lewis's (l973b) possible-world semantics. This is of course contentious, but that does not matter here. Whatever their semantics, as these conditionals are contingent, and incomplete truth-functions of 'C' and 'E', at least one of them will need something in this world besides C and E to make it true. And whatever that is will be what embodies causation. All the other apparent consequences of C's causing E are either also causal (if causation is dense) or spatiotemporal (C's preceding or being contiguous to E) or not ontological at all: for example, that C explains E, gives grounds for predicting E, and provides a means to E. It is the truthmakers for conditionals like 'C⇒E' and '~C⇒~E' that add causation to a world of spatiotemporally ordered facts.

And what those truthmakers are we already know from section **5**. They are particulars having those properties discussed in my (1997) or Shoemaker (1980), namely those that make particulars instantiate laws, or combine to give particulars their causal powers. In either case, the way they do this is by being truthmakers for conditionals: as when any thing of mass *m*, if acted on by any net force *f*, would accelerate in the direction of *f* at *f* /*m*.[16] And similarly for temperatures, pressures, the strengths of fields across spacetime, and so on. It is particular things, events, and spacetime points having properties like these that are the positive facts that embody the world's causation. Hence the causal limitations of the void. The problem is not that a void cannot contain causes and effects: it can, since its negative facts can make just as good causes and effects as positive facts. The problem is that it lacks the positive facts, the instances of properties, that such negative facts need in order to make them causes and effects. It is our properties, not the void's, that make it deadly to us.

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[16] Provided *f* does not alter *m*, a proviso needed to enable so-called finkish properties to provide truth-makers for conditionals: See Lewis (1997) and Mellor (2000).