Productive Causation: Against Causal Pluralism

Yuval Abrams

Abstract: I argue for a unified monistic notion of causation as production. This sets my position in opposition to many of the predominant views on causation in the current literature: against the view that causation is a matter of dependence (counterfactual, probabilistic, or otherwise) of the effect on the cause; against the related view that causation encompasses several distinct notions (causal pluralism); and against views that run causation and causal explanation too closely together. These three errors are related. My diagnosis of the tendency to analyze causation in terms of dependence is that it conflates the desiderata of explanation and causation.

1. Introduction

According to a popular view, causation has more than one nature. This approach is sometimes dubbed *causal pluralism*.[1] Pluralists argue that different relations in the world qualify as causal. One particularly influential view, following Hall (2004), attributes to causation *two* distinct natures: one of *production*, the other of *dependence*. The first involves a notion of bringing about, the second a notion of the difference made by the cause to the effect. The counterfactual theory of causation, for example, is a dependence-based account. Salmon and Dowe's Conserved Quantity theory (in which causation involves processes that involve possession and exchange of a conserved quantity and their interactions), is a productive account. Importantly, production and dependence may not be mutually compatible. Each, on Hall's view, is a different relation we deem causal, with no common analysis uniting them.

In this paper, I argue against pluralism for a unified, monistic notion of causation. Causation, is not many things. My claim is that causation is production. There is no need for a second concept of causation, one based on dependence or difference-making. It is not that one can reduce dependence to production. I don't deny that the two concepts are distinct. It is rather that dependence is not a causal concept at all. Dependence without production is not causation.

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[1] Hall (2004); Hitchcock (2007); Cartwright, (2004); Psillos (2010); Godfrey-Smith (2009); Illari & Russo (2014).

It is frequently assumed that an adequate theory of causation should account for causation's role in explanation, planning, and responsibility. In fact, the ability to account for causation's role in such domains is seen as an adequacy criterion by which to judge a theory of causation: if a theory posits causal links in cases in which, for example, we see no connection to explanation, we find fault with such a theory.[2] Alternatively, if a theory fails to find causal that which in explanatory or moral contexts we plainly do, this is deemed a fault as well.

The solution I advocate is to reverse each of these trends. As opposed to pluralism, I argue for a unified, monistic notion of causation. Causation, therefore, is not many things. To be sure, part of my task will be to account for the various roles that causation is said to have in terms of the actual core definition. Secondly, I argue that, the various conceptual roles that causation is said to have, for example in furnishing explanations, are related to causation, they must each be distinguished from causation itself, with their proper relation spelled out. These two tasks are linked. For it is precisely the confusion of these roles, and in particular, of explanation, with causation, that creates the illusion of a need for causal pluralism.

Once causation and explanation are divorced, we can better understand, both what causation and explanation each are, as well as how they link (in other words, when and how causation explains). A similar story will go for the attribution of responsibility, liability, and the role of causation in rational strategy. The temptation to identify causation with its role in these domains must be resisted. This is not because nothing of interest lies in their intersection – quite the contrary – but because causation's unique role in each needs to be properly understood and highlighted. The point is not merely semantic. It is not merely a matter of what, properly speaking, counts as a "cause". Rather, causation proper has a special role in the explanation of contingent

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[2] Menzies (1996).

events and in the acquisition of responsibility for action. Causality explains the occurrence of contingent events and the dependence of some events upon others. Causality creates a form of direct responsibility for an outcome (a causal notion). Causation of an outcome (prima facie, at least) acts as both a reason (ex ante) to (not) do something and (ex poste) as grounds for responsibility for having done it. This does not mean that all instances of explanation or dependence are instances of causation or that all instances of responsibility involve causation. But instances of these that are not directly causal need to be accounted for specially, and, as it turns out, will (often) need to incorporate information about that which *is* causal.

These roles, do in fact make use of dependence relations, but, as I argue, this has nothing to do with causation itself. Rather, this stems from the centrality of dependence relations to explanation more generally. Causal explanation, as a species of explanation, will trade on dependence relations, namely dependence relations that relate to causality itself in the appropriate manner.

Proponents of dependence accounts proclaim that causation is "difference making". Yet, that very idea is ambiguous between an emphasis on *difference* (a dependence view) and emphasis on *making* (production).

A satisfactory account of causation accounts for the difference via the making. Dependence accounts look merely at the differences themselves, leaving out what makes them: or, as I shall argue, what *causes* them. In other words, they leave out causation itself.

2. Hall's Arguments for Pluralism

Hall argues for two types of causation: one, *production*, involving an intrinsic, transitive, and spatio-temporally local relation between cause and effect; the other, *dependence*, such as a

simple counterfactual notion of causation, or more nuanced versions, in which the effect covaries with the cause.[3] Importantly, only on dependence, but not production, can omissions be causal. Productive causation emphasizes the bringing about of the effect by the cause, and, plausibly a physical or "oomphy" connection between cause and effect. Dependence involves identifying the *factors* that contribute to the effect or without which the effect would not have happened.[4]

Hall enumerates five truisms or theses about causation:

1. **Locality**: causes are connected to their effects by way of spatiotemporally continuous sequences of causal intermediaries.

2. **Intrinsicness**: the causal structure of a process is determined by its intrinsic, non-causal character, together with the laws.[5]

3. **Transitivity**: If event c is a cause of d, and d is a cause of e, then c is a cause of e.

4. **Dependence**: Counterfactual dependence between wholly distinct events is sufficient for causation.[6]

5. **Omissions** can both cause and be caused.

The crux of Hall's argument is that no conceivable relation can fit all of 1-5.

Simple dependence theories (such as Counterfactual Dependence) fail to capture Preemption cases. The required fixes involve transitivity (for Early Preemption)[7] and intrinsicness

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[3] Such as Lewis's (2000) *Influence* account.

[4] As opposed, I'd argue, to the contribution itself, which is a productive notion.

[5] Hall's second formulation omits all mention of a process: "Suppose an event e occurs at some time t_0. Consider the structure of events S that consists of e, together with all of its causes back to some arbitrary earlier time t. Then any possible structure of events that exists in a world with the same laws, and that has the same intrinsic character as S, also has the same causal character, at least with respect to the causal generation of e." (2004, 244).

[6] As in Lewis (1973), Lewis (1986), Lewis (2000), & Lewis (2004). We should emphasize at the outset that Hall restricts this to non-backtracking counterfactuals.

[7] E.g. Suzy and Billy each aim a brick at a window. Suzy throws and shatters the window while Billy holds his throw on seeing Suzy in action. Had Suzy missed, Billy would have thrown the brick and shattered the window just the same.

(for Late Preemption)[8]. But these, along with Locality, fail in Double Prevention cases, even though Double Prevention[9] cases display counterfactual dependence (which, on dependence views, is sufficient for causation). Whatever causation is, therefore, if it is to satisfy all of these, must be fragmented: production covers three (intrinsicness, transitivity, and locality) whereas dependence captures the other two (the sufficiency of counterfactual dependence and omissions).

3. My Diagnosis

I do not dispute Hall's claims that dependence and production are distinct. I dispute their equal claim to the title of causation. This is not merely a verbal matter. Rather, the sort of dependence that causal dependence theorists are after, i.e. *causal* dependence, is not independent of production. While there can be dependence without production, *causal* dependence is narrower: what distinguishes causal dependence from mere dependence, is that causal dependences themselves relate to, are themselves downstream from, or in other words, are dependent on, a (causally) prior production relation. No two variables, events, or facts, stand in such dependence relations without a productive process occurring as well, and upon which they themselves depend. As such, causation is *not* dependence, but there are dependence relations (the causal dependences) with causal provenance.

Causal-dependence, depends, as it were, on production. The reverse is not true. Causation, strictly speaking, is just production. The standard purported shortcomings of production theories

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[8] E.g.: Billy and Suzy both throw rocks at a window. Suzy's rock arrives first, hitting the window and shattering it. Billy's rock flies through the now empty space where the window was standing.

[9] Here is Hall's example: Suzy is piloting a bomber on a mission to blow up an enemy target, and Billy is piloting a fighter as her lone escort. Along comes an enemy fighter plane, piloted by Enemy. Sharp-eyed Billy spots Enemy, zooms in, pulls the trigger, and Enemy's plane goes down in flames. Suzy's mission is undisturbed, and the bombing takes place as planned. If Billy hadn't pulled the trigger, Enemy would have eluded him and shot down Suzy, and the bombing would not have happened.

of causation, which are seen as evidence for the need for a dependence-based notion alongside production, are the task, properly speaking, of the theory of *explanation*, not of causation.

This distinction, between the work of a theory of causation and a theory of causal explanation has an illustrious history. Davidson argues that the logical form of causal explanations differs from that of causal statements.[10] In his version, causal statements relate events, whereas causal explanations relate facts. While my point does not rest on Davidson's distinction in the relata, it shares the Davidsonian emphasis on the distinction between these two very closely related concepts: causation and causal explanation. The former is a notion of production, the latter also involves the notion of dependence.

Productive theories come in many varieties. These include *physical connection* theories (process theories[11], conserved quantity[12], transference[13], and other mechanistic theories[14]), *primitivist* or *non-reductive[15]* theories, and *determining*, or *nomic sufficiency* theories (of a certain sort)[16]. These differ in terms of what is taken to be central to the notion of productive causation. Getting into these differences is beyond the scope of this paper, but, centrally, causation involves positive acts, entities, facts, or events, exhibiting the properties of locality*,* transitivity, and intrinsicness. More generally, productive theories seek the causal push or "oomph" between causes and effects, thereby ruling out omissions entirely. As Phil Dowe puts it, we have a strong "intuition of difference" between actual positive causing on the one hand and omissive allowing and failing to prevent.[17]

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[10] Davidson (1967)
[11] Salmon (1994)
[12] Dowe (2000).
[13] Fair, (1979)
[14] E.g. Glennon (2017)
[15] Anscombe (1971), Tooley (1987), Armstrong (2004)
[16] Hall suggests something like this with his 'Blueprint' strategy.
[17] Dowe infra note 43, 124-129.

Looking back at preemption: the preempting cause will be ruled as causal because of the physical connection between the cause and the effect. That connection is incomplete, in the case of the preempted cause. The rock that hit the window travelled with force across a trajectory from the toss until the window, where a causal interaction occurred. The preempted rock that arrived moments later bears no such physical continuity with the crash.

4. Rejecting Pluralism

That production and dependence are distinct causal concepts, would explain, if correct, why we get conflicting verdicts about causation in certain cases: we are employing two distinct concepts which do not perfectly overlap. Still, the account leaves open the question what, if anything, the two concepts have in common that makes them both species of the same type, causation?[18]

At issue is not merely the meaning of a word or a concept, but the metaphysical analysis of a natural phenomenon. Causation is a natural relation, one that picks out something in objective reality. A disjunctive version, such as Hall's, seems undesirable and somewhat puzzling for such a natural relation. Additionally, if causation is to have the role it is said to have in explanation, prediction, responsibility, and so on, it would be strange if two distinct concepts with no obvious relation to one another each played an equal role in each domain.

Ultimately, however, the reason a pluralistic account, such as Hall's, is not necessary, is that a solely production-based analysis of causation (though not a dependence account) is adequate to the task.

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[18] This concern is also raised in Psillos (2008).

Before going further, I will discuss an alternative approach to discarding pluralism: rejecting production. This approach is favored by many who work in the Interventionist or Causal Modelling framework. One argument given for this is that de-facto dependence can handle preemption cases.[19] One serious problem with this proposal, is that token or actual causation on this view becomes contextual and/or normative. If causation is a natural relation, this is undesirable. On Halpern and Hitchcock's solution to Late Preemption cases, the successful isolation of the actual cause involves holding fixed certain facts. When certain facts are held fixed (for instance Billy's rock not hitting the window), the dependence between the cause (Suzy's throw) and the effect obtains. The answer to which factors are causal becomes framework relative.[20]

To be fair, advocates of this view take this as a feature, not a bug. Hitchcock and Knobe, for example, argue that token or actual causation (as opposed to causal structure) is inherently normative.[21] Others have pointed out this feature, particularly in omission cases.

Take the famous *Queen of England* puzzle: if the gardener failed to water the plants and they died, did his failure to water them (an omission) cause the death? If it did, can the same be said for the Queen of England who also failed to water them?[22] The death can be said to be counterfactually dependent on both the gardener's and the Queen's omission. What distinguishes them?

McGrath argues that what distinguishes them is a normative feature (the gardener's duty to water the plants) and concludes from this that causation itself is downstream from duty: the gardener's failure to water the plant caused the plant to die, because he was responsible for watering it. The facts of causation are inherently normative.

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[19] Yablo (1992) and (2002).
[20] Halpern and Hitchcock (2010).
[21] Hitchcock and Knobe (2009).
[22] Menzies (1996), Beebee (2004).

This is precisely the sort of conclusion I am resisting. On my telling, neither the gardener nor the Queen has caused the death of the plant (omissions are not productive). The answer to the question why the gardener is *responsible* does depend on duties. It is normative. But responsibility's being a normative notion is not surprising. Causation is another matter. Omissive responsibility, as I argue elsewhere, is not causal responsibility. When I omit to do my duty, I am responsible for what has happened, not because I've caused it to happen (which I have not) but because I had a duty to prevent it from happening. I am responsible to make good on what, had I done my duty, would have happened.

Hitchcock and Knobe argue that this phenomenon is not limited to cases of omissions.[23] They discuss a case in which only some employees have the right to take pens from the office. If both, those employees that do, and those that do not have the right to take a pen, take one anyway, such that the pens run out, it is those who had no right to take the pen (and not the ones that did) that properly caused the pens to run out. Or so they argue.

This conclusion is both unattractive and unnecessary. My response to these cases is the same as in omission cases. While physically, the faculty's and the administrators' contribution is the same, normative considerations fill-in the explanatory details. This normative consideration extends to cases in which we need to hold fixed various background conditions. The *Pens* case is hardly a straightforwardly causal one. The question, "who is causally responsible?" contains two elements: a causal question and a normative question. Causally, both the faculty member and the administrator took a pen. They jointly caused a state of affairs in which there are n-2 pens available. On the other hand, the faculty member, and not the administrator, was not permitted to take the

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[23] Hitccock and Knobe (2009).

pen. For this reason (his norm violation), we blame him, and not the administrator, for the outcome. Had the norm been upheld, there would have been another pen.

If this is right, we shouldn't be surprised if the verdict shifts when the norm shifts. Furthermore, in the absence of a governing and clear norm (perhaps what is appropriate and what is statistically common diverge), there is no reason to expect a clear answer as to which taking of the pen caused the lack of pens. Strictly speaking there is no fact of the matter: one person took one, the other took the other. What each caused is what they caused. The rest is about responsibility.

Therefore, the move to de-facto dependence as a means of solving Late-Preemption both fails and unnecessarily rests on a normative, rather than natural causal relation. The argument that such a normative relation is unavoidable fails as well. Production as an account of Late Preemption remains compelling. The question is whether we need more than this. Pluralists say 'yes', I am asking 'why?'

5. The Two Problems with the Productive Account

Hall anticipates the move I am advocating. He writes:

> I think there is something right about this objection, in that production does seem, in some sense, to be the more "central" causal notion…But I think it goes too far to deny that counterfactual dependence between wholly distinct events is not a kind of causal relation. … dependence plays the appropriate sort of roles in, for example, explanation and decision…And…I do not see how to accommodate causation of and by omissions (as we should) as a species of production; counterfactual dependence seems the only appropriate causal relation for such "negative events" to stand in.[24]

We find two kinds of objections: one that dependence plays a special role in explanation and decision, and, on the other hand, that causation requires an account of omission.

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[24] Hall (2004, 256).

Briefly, however, my response is as follows: I grant that dependence plays a special role in explanation and decision, but that is due to the role dependence itself (rather than causation) plays in those domains. Both explanation and decision-making appeal to criteria of difference making. That does not mean that causation does. Causal dependence is a form of dependence, but it is distinct from causation, upon which it itself depends.[25] As for omissions, the correct response, as discussed above, is that indeed they are not causal.

6. In Favor of Production

Production is a blatantly causal notion whereas dependence can come in other, non-causal forms. If we take the examples of production without dependence and vice versa, no case of production seems to have questionable causal provenance (production is sufficient for causation). Dependence, while argued by Lewis as sufficient for causation, is not necessary and, in cases in which it exists without production (i.e. double prevention and omissions) can be reasonably doubted as delivering causation.[26]

Where there is a direct productive process between cause and effect, we attribute causation without qualms; whereas, in cases in which there is mere dependence, we perceive what Dowe calls an "intuition of difference".[27] We understand that not watering the plant is involved in the death of the plant, but we hesitate in deciding whether that's really a cause, especially when we ask ourselves to compare that particular non-watering (say, by Suzy) to the non-watering of the plant by everybody else (taken jointly or severally). On the other hand, no such hesitation exists

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[25] The role of decision is more complicated. Decision theory is always forward looking and outcome maximizing. As such, it is sensitive to causal dependence but, arguably, not to production or to any considerations of actual causation (See Hitchcock (2013)).

[26] Recall Hall's concession as much above.

[27] Dowe (2000, 134-5).

concerning someone who pulls the plant by the roots out of the pot. This is the intuition of difference. The challenge will be to show that taking this intuition seriously can account for what we need from dependence.[28]

This itself, of course, is not the whole story. While causation is production, dependence is the key to explanation, or at least *a* key to it. Dependence is important to establishing relevance. Relevance is an explanatory notion. To show that one thing depends on another, therefore, can play an important role in explaining that thing. Thus, the diagnosis of Hall's two concepts is that it mistakenly runs together causation and (causal) explanation.

My claim is that the productive form is primary: differences in the world are made along the nexus of productive causality. With the production or process in place, the various dependencies are determined. The converse does not hold. In other words, the dependences supervene on the production relations.

Following Strevens[29], we can distinguish between two levels: the web of causation, reality's bedrock, and the higher-level relations of difference-making that depend upon it, and assertions of which are assertions concerning the web.

The web consists of fundamental-level facts, which causally bring about other fundamental facts, via the causal laws. The higher-level assertions, which depend on the web, are what is involved in causal explanation. The web relates concrete events (events in all their specificity),[30] whereas in many endeavors what we are often concerned with are more abstract events at a higher level of generality. We care what caused the *death* or the *breaking of the vase*, not the specific

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[28] Such as omissions and explanations, as mentioned by Hall.

[29] (2008)

[30] Or, if not events, whatever the essential basic relata of causation turn out to be.

trajectories of the particles involved therein (i.e. the concrete event in the web). But, it still is the case that it is only via the movement of those particles that the death or the breaking transpire:

> Facts about difference-making stand to facts about influence in the same way that facts about centers of mass stand to facts about mass: just as a fact about a center of mass summarizes certain physically pertinent information about the underlying distribution of mass, so a fact about difference-making summarizes pertinent information about the fundamental stuff of causation, the network of relations of influence.[31]

I'm happy to grant that we sometimes use "caused" to mean "explains" or "is what e depends on", but, when pressed, we can understand the distinction between "really caused" and the other form, and we understand the other form in virtue of its relation to the "real", productive cause.

It is for this reason that the pluralist hypothesis is false: it is not that we have two equally good concepts, but rather, one primary concept (production) and one secondary concept (dependence) that we use to explain via the first. Satisfying the stricter, productive notion plays an important role in orienting the secondary, dependence notion. It is because c caused e, that one thing depends on another; it is because c caused e that the doer of c is responsible for e, etc.

Suppose Suzy leaves work, not realizing that Billy is still in the office. She turns off the lights. Charlie enters the dark office and stabs and wounds Billy, who cannot see him. Charlie clearly caused the wound. What about Suzy? Turning off the lights enabled the attack in some sense: had she left them on, Billy would have more likely seen Charlie. Perhaps this would have prevented the assault (suppose it would have).

Suzy's action is a *component* in the chain of events that led to the assault. It can serve as part of the explanation of the assault: how it happened, why it happened (Billy failed to see it

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[31] Strevens (2013, 314).

coming). The assault is counterfactually dependent on her turning off the lights (at least on some plausible assumptions). Her action raised the probability of the assault's success. Intervening on her turning off the lights (i.e. preventing it) would have lowered the chance of this success, etc.

Yet, there is a clear difference between Suzy's action and Charlie's. Charlie's action is a cause, whereas Suzy's is merely a would-be preventer.[32] Suzy could have prevented the occurrence (but she didn't); Charlie caused it. It's true that Charlie could have prevented the occurrence too (for example, by not stabbing Billy), but that's just to say that Charlie could have prevented the occurrence by *failing to cause it*. Suzy's action is relevant, but not productive.

The intuition is even clearer if we change Suzy's action to an omission. Suppose the story is that Suzy failed to turn on the lights on her way out. Is it not clear now that there is an important distinction between Charlie's and Suzy's contribution?[33]

Capturing the heart of this distinction is what sets apart productive theories, but I think that any productive theory should capture it one way or the other. Charlie's action is physically connected to the death in a manner that Suzy's is not. What Suzy "caused" by either shutting the lights or by not turning them on, is an absence rather than an active set of conditions. We can specify the chain of events between Charlie's action and Billy's death without mentioning Suzy, and Charlie's action will still look potent, relevant, and the like. The same cannot be said for Suzy. Her action (or inaction) is only relevant if we add Charlie's action as well.

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[32] As a matter of language, we would clearly call Charlie the assailant, but not Suzy. Suzy may have been negligent, but, at most, is an accomplice. Whether to stab is the same as "caused to be stabbed", is a bit more controversial. The general equivalence is asserted in Bennett (1988) and Moore (2009.) It is denied by Lewis (1986, 185), though in service of a counterfactual dependence account. If the verb "stab" is means-specific (i.e. one cannot stab with a light switch), this might not preclude an ascription of causation, just of a stabbing.

[33] The difference between the two cases is captured in Foot's distinction between *enabling* (the removal of an obstacle) and *forbearing to prevent*. While the latter is clearly non-productive, I think that enabling is still of questionable productive provenance.

This distinction, between a cause and a mere component in an explanation, is sometimes lost when it is conflated with the Millian point about causes and conditions. Mill maintained that there is no metaphysical hierarchy between the various conditions that jointly cause an effect.[34] Both the striking of the match and the presence of the oxygen have equal entitlement to the honorific "cause" of the burning of the house. Pragmatic considerations alone differentiate between causes and conditions, resulting in our calling one (the striking of the match) a "cause" and the other (the presence of oxygen) a mere "condition".

I am not denying this Millian point. What I am denying is that among these "conditions" are all the potential preventers that failed to materialize or to prevent the cause. Here Mill and I part ways. The oxygen and the striking of the match are causal; the failure of rain (or the failure of the timely arrival of the fire department) is not. For Mill, this distinction, too, is pragmatic (perhaps a function of what is taken for granted as normal). I am arguing that this distinction is metaphysical. The active causes (or active-conditions) produce the effect, the others are mere *potential preventers*. Their role is secondary.

There is an important sense in which anything upon which the effect depends is a *component* of the complete explanation of the effect. It played a role, at least in the sense that its having turned out differently could have prevented the effect. As such, its presence is necessary for *inferring* the effect from the set of causes. On the other hand, are the events (or facts) which *actively brought* about the effect. These are the productive causes.[35]

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[34] Actually, Mill equivocates on this point, differentiating between positive and negative conditions, but ultimately seeming to side with the equalizing intuition. Mackie and Lewis are far more explicit in this regard. Still, each in their own way stumbled across the production/dependence distinction.

[35] Both Mill and Mackie make this very distinction, yet deny its metaphysical significance. For Mill the importance of this point seems to be merely epistemic or descriptive, since for him, the cause must be the totality of sufficient conditions, and, no condition is sufficient without reference to these omissions. For Mackie the problem is different. The productive cause merely produces the concrete event. It merely says how the cause occurred, which is separate from the INUS account itself. For a different gloss on the Mackie account, which incorporates the concrete realizer into sufficiency, see Strevens (2007).

Causation itself only occurs along an *active* route, upon which the propagation of causal influence travels. The components along *this* route are actively causal. The other components (the potential preventers) contribute, at best, in a secondary manner: they can be cited as part of an explanation.

Whatever the cause of some effect might be, that cause will only entail the occurrence of the effect, on the assumption that nothing interfered with its efficacy.[36] In this sense, causes only cause if they are not interfered with. But it would be a mistake to equate the causal status of the cause with that of the failed interference. This for three reasons of asymmetry:

The *first reason* is due to the *asymmetry in the role of positive and negative factors*. Any interfering factor can only interfere if:

(a) there was a potential (actual) cause to interfere with, and

(b) the interference caused (in the active sense)[37] some change in the causal process.

Additionally, (b) can only happen if the interference *itself* is not interfered with.

The omnibus clause of "no further factors interfered" is *always* required. But this is true, even after all the failed preventers are listed.[38] Listing the failure of negative factors, therefore, adds nothing, over and above the positive factors. It is only in virtue of the active causes, that the preventers can be preventers. These preventers can only prevent by *doing* something. And this, only if that doing, itself, is not further prevented by other preventers.

The *second reason* is the *one-many asymmetry* between active and passive conditions. For any active route of causes there are many (perhaps infinitely many) possible preventers.[39] There is

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[36] By entail here I mean necessitate. This can be read as causal entailment (see Strevens (2013)) or just entailment given the laws in Hempel's fashion of D-N explanation. This lack of entailment without ceteris paribus clauses or the enumeration of all other conditions is an important feature in sufficiency accounts of causation.

[37] Or would have caused, in the counterfactual sense.

[38] Unless we add a "no further fact" clause.

[39] This relates to the "problem of profligate omissions" (Menzies (2004)).

a fundamental asymmetry between the definitive identification pertaining to which actual processes produced the result and the indefinite nature of which preventers actually prevented it or failed to prevent it. The contribution of the actual process to the effect is readily apparent, without mention of the preventer: all we need do is cite the active causal process, even if we happily amend to it a ceteris paribus clause along the lines of "in the absence of a preventer", and the apparent causal connection between cause and effect is clear. In normal preemption cases, for example, it is clear which process is causal.

This cannot be done with the potential preventers. Any potential preventer is only a preventer, given an actual process. Otherwise there is nothing to prevent. Furthermore, it is only a contributing preventer, on the assumption that other preventers have not preempted *it*, beating it to the punch. When such preventative overdetermination occurs (as in McDermott's Preemptive Preemption cases)[40] our intuition as to which preventer prevented the effect is murky. Often, it is only with normative considerations that we can successfully untangle such cases. For example, by invoking who was under an obligation or was expected to prevent the outcome.

Thus, the real, active causal relation is a natural relation, whereas the mere potential preventer is a normative one. They are not of the same metaphysical nature. One is causal, the other is not.

The *third reason* is one of *ontological asymmetry* between the active and passive conditions. All causal influence is propagated along the active route. The rest supervenes on this route. As such, there is no need for a dualism that includes both as causal. Fix that which causes along the active route, and you get the rest for free. The story of components is grounded in the

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[40] For example, if A catches a ball headed for a brick wall that stands between that ball and a window, did A or the wall prevent the ball from hitting the window? See McDermott (1995).

story of active causal routes. These are not two independent metaphysical causings. One (the productive route) is metaphysically primary. The other depends on the primary route.

Causation along the active route is causation proper. The rest: the potential preventers and enablers, are components of a complete explanation, but are derivative of that privileged active route. The causal route (what Strevens calls "causal influence") is causality itself.[41]

This distinction, between *active* causal routes and *components* of "what ifs", is the distinction between production and dependence. In this sense, the account can be stated, conceptually at least, without any reference to powers or other non-Humean connections.

7. Dependence

I have argued that production is the fundamental causal notion. What about dependence? Dependence misses the target of causal analysis: supposing *e* depends on *c*, why, how, and in virtue of what does *e* depend on *c*? On pain of circularity, dependence views of causation cannot base dependence on *c*'s *causing e*. While this objection is not devastating, it motivates the thought that dependence is merely a *symptom* of causation.[42]

Hall and others ask: if dependence is not a form of causation why does it have all the markings of causation? Why does it explain, predict, guide action? Here is Schaffer challenging Dowe on a related point:

> Suppose that Dowe's [productive account] is the best solution to the "universal problem" of negative causation. Then Dowe would have explicated one relation, R1 [the productive one], with none of the epistemic, practical, conceptual, intuitive, theoretical, or scientific markings of being the causal relation, and a second relation, R2 [the non-causal one, i.e. dependence], with all of the epistemic, practical, conceptual, intuitive, theoretical, and

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[41] Strevens (2008).

[42] Many, including Lewis (1973), have claimed causal dependence sufficient (but not necessary) for causation. For doubts about this sufficiency, see Hall (2004). Another way of putting this is that Dependence is good evidence of causation. For a recent defense of this position, see Kment (2010).

scientific markings of being the causal relation. In short, it would be R2 that paddles, waddles, and quacks like causation.[43]

The answer to this has two parts.

First, dependence, more generally, is not necessarily a causal notion. There are different types of dependence: counterfactual, probabilistic, inferential, logical, metaphysical, even moral dependence. In each, one thing obtains because of that upon which it depends. Causal dependence is one form of dependence. What is it that makes causal dependence, causal? For the counterfactualist on causation, it is counterfactual dependence (although, even then, with qualifications and with bells and whistles). But this might be too quick: after all, in virtue of what are counterfactual statements true? One view, Lewis' view, is that the Humean mosaic determines the laws which determine counterfactual truths. Causation, then, is downstream from the mosaic and determined by the best system of laws describing which regularities are true of this world. Another view is that the order is reversed: which counterfactuals are true is a function of what causes what.[44] In other words, on this view, causation is prior to counterfactuals.

What then is causal dependence? Presumably, dependence that is in virtue of causation, where causation is production. This is not necessarily a relation of productive cause to effect. As we have seen, there can be cases of causation with no dependence (and hence with no causal dependence),[45] and cases of dependence, even causal dependence, with no production.[46] Rather, causal dependence just is the dependence (presumably counterfactual) that holds in virtue of a causal relation: in virtue of one thing producing another. This could be a supervenience relation, for example. In the standard omission case, Suzy's omission to water the plants explains their

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[43] Schaffer (2004, 213).

[44] Edgington (2011); Hiddleston (2005).

[45] Overdetermination, Late Preemption, and arguably Early Preemption as well, depending on the version of dependence.

[46] Such as preventions, omissions and double preventions.

death, but only because there was a biochemical process that produced that death, which Suzy failed to prevent (and which she could have prevented had she tried). Suzy's omission explains the plant's death, but it didn't cause it. It is a causal explanation, without being a cause.

This shows that we can have causal dependence, without causation between the linked variables.[47] This can include dependence on an omission: if the omission was a difference maker to the result, then, even though it didn't properly "cause" it, the result depends on it. So far so good.

The *second* part of the answer is to understand what dependence, and in particular causal dependence is. My claim is that dependence is an essentially explanatory notion. Explanation involves notions of relevance and difference-making that appeal to the idea of dependence.

Whatever rightful interest we have in dependence is better seen as concerned with accounting for explanation itself, rather than causation. To explain something is (at least in part) to show that upon which it depends in a manner that renders that which is explained non-coincidental. This is true, both on the Epistemic, argument notion of explanation found in Hempel,[48] as well as in more Ontic notions of explanation (such as Salmon's).[49] Furthermore, it is even true of more pragmatic-centered notions of explanation, such as Van Fraassen's.[50] Even on the most subjective reading of an explanation, where an explanation is entirely mind-dependent

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[47] A similar view to mine, expressly stating that we can have causal explanations without the linked variables being cause and effect, is Beebee (2004). Beebee argues that causal explanations simply give information about the causal history (where following Lewis (1986b) the causal history is the chain and causes to effects). Strevens'(2008) Kairetic account also functions this way. Strevens claims that the word "cause" best picks out causal explanations, which are higher level difference-making claims about the parts of the productive causal web. Also, Jackson's and Pettit's (1990) distinction between Process and Program explanations captures this idea. A Process explanation would explain in terms of underlying physical processes, picking out only the causes. A Program explanation (of the sort appealed to in special sciences) states that certain processes satisfy a particular functional or dispositional higher order description. Multiply realizable properties, therefore, can figure in causal explanations, without being efficacious themselves.
[48] Hempel (1965).
[49] Salmon (1984).
[50] Van Fraassen (1980).

and interest driven, there must be some constraint on what counts as explanatory. Even if explanations are merely an appeal to relieve an itch of curiosity, not just any relief will do: Hydrocortisone is not an explanation. What is the minimal requirement for an explanation? I claim: some sort of difference-making or dependence. When the explanandum is shown to depend, somehow,[51] on the explanans, an explanation has been offered

If this is right, then it is no surprise that we invoke dependence relations in causal explanations. This is because *all* explanations invoke dependence relations. This is a feature of explanation, not of causality.

Of course, this is too quick. We don't just invoke dependence relations, we invoke *causal* dependence. It is in virtue of causal dependence that we can explain events. When we do this, we are explaining an event in virtue of the causal structure of the world, although not necessarily in virtue of the event's causes (for that we need to invoke the event's producers).

It is not always best to invoke the producers themselves. This depends on what we are trying to explain. Still, proper causal connections constrain our explanations in that they may not violate the principles of causality or be inconsistent with what causes what. Furthermore, perhaps there is a depth to causal explanation that suggests that, all else equal, we do better in explaining by invoking proper causes. The omission might explain the death of the plant, but it does so, in virtue of the biochemical process which actually killed the plant, and which the omission failed to prevent. In some contexts, we might be more interested in the omission than in the process (for example, contexts that seek responsible agents, or in contexts in which we are surprised that Suzy didn't water the plants as she normally does). But we cannot understand *that* (and thus cannot truly

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[51] This qualification is in order. Whether the dependence is best understood in terms of counterfactuals, probabilities, nomic-sufficiency or other relations is an outstanding issue. My point is just to relegate difference-making considerations to the explanatory domain.

understand *why*) failure to water the plants explains the death of the plants without understanding that some actual causal process killed the plants. The reverse, is not true: we are not left in the dark about the biochemical process if we don't know that or why Suzy failed to water the plants. The process's efficacy explains itself. This is a feature of the process being the cause, upon which the dependence of other explanatory factors depend.

Any true events or facts are either linked or coincidental. What does it mean for them to be linked? In other words what does it take for them to not be coincidental? When two events (or facts, etc) are non-coincidentally linked, this is because one depends on the other, or they both depend on some further fact.

Explanation can take many forms. One form that it can take involves showing how one particular fact or event depends upon another fact or event, which explains that very fact or event. Arguably, all explanations share a common structure, that relays dependence relations of this sort. Two facts or events are shown to depend on each other, and that dependence itself is further explained by, i.e. is further dependent on, some further feature that explains.[52] In causal explanation, this further feature is causal production itself.[53]

When $a = b$, the co-incidence is explained by the law of identity; when a logically entails b, it is explained by that entailment: in either case the laws of logic explain. On the other hand, when there is no entailment between the facts, when the relationship between two covarying variables seems logically (or metaphysically) contingent, something else (other than the laws of logic) must explain it. The same goes for explanations in morality or mathematics.[54] Plausibly, all

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[52] What Kim (1993: 167) calls deep relations.
[53] Contra Reutlinger (2018), who suggests that a monistic counterfactual account of explanation presupposes a counterfactual account of causation.
[54] See Lange (2016). Metaphysical explanation is complicated by the question of grounding. If Grounding is (as Bennett (2017) argues) a building relation, then the sort of difference-making will look more like productive relations and will take on sufficiency or determining relations

contingent links are either explained causally or not explained at all (i.e. true coincidences or chance events). If so, any dependence between events (which are contingent) is causal dependence.

But it would be a mistake to conclude from this that the definition of "causal dependence", *just is* dependence between contingent events.[55] Rather, this is a *substantive* thesis. The thesis is that only causality explains such dependences. That's not the same as claiming that the dependences *themselves* are causality. This, I think, is the key error made by dependence theories of causation. Causality, which is something other than the fact of dependence or covariation, is supposed to underlie that covariation. It is because there is causality (i.e. production) that we can explain (i.e. show dependences) one event by reference to another. Dependences like these are causal dependences. Causal dependences are causal explanations. It is in this manner that we get causal explanation from causation, without causal explanation being identical to causation.

With that distinction in mind, much of the confusion regarding so-called causation by dependence disappears. Cases in which we are tempted to assert that *a* caused *b*, because *b* depended on *a*, even though there is no meaningful sense in which *a* produced *b*, are cases in which we are explaining *b* in terms of *a*. Explanation is not causation. Dependence is explanation, but causation is production.

Conclusion

I have argued that that causal pluralism rests on a mistake. The mistake is based on a more pervasive error than mere pluralism: the conflation of explanation with causation. It is true that causation explains. In fact, perhaps all contingent natural phenomena are explained by causation, if they are to be explained at all. But that causation explains doesn't mean that causation is an

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[55] Compare Shaheen (2017) arguing that for a unified causal sense of 'because'.

explanatory notion. Explanation has a logic of its own, and that logic incorporates dependence as a key component. Causal explanation, as a form of explanation, appeals to dependence relations, namely the ones made true in virtue of causal production.

To cause is to make something happen, i.e. to produce. This is an intrinsic, local, and transitive relation. It relates positive events or happenings only. On the basis of such causes, we can construct an elaborate web of counterfactual and probabilistic claims. These allow us to explain what happens and why. But they are not the same as causation itself.

This is important, because the account leaves causation unified, natural, and non-normative. Understanding the relation between causation and causal explanation also helps make sense of non-causal explanation. Finally, this distinction vindicates our intuition of difference between causation and omissions; a distinction that does important work in other spheres, such as ethics.

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