

*To what extent can the term 'causes'
usefully be replaced by the term 'is'?*

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I. Introductory

A. Where does the current debate on causation rest and why might there be any use in an alternative definition of it, whether by reference to being or otherwise?

The heading identifies the first question the author of any paper should be prepared to answer: is there a point in writing it? If matters appear settled, one could scarcely claim the attention of his reader if he proposed only to go over old ground; settled topics can only be unsettled by such as Mendeleev who had a hunch there might be rather more and different elements from the traditional five everyone had taken from Aristotle, and few of us can pretend to such insight. Luckily, causation is a deeply unsettled topic, or perhaps more precisely a topic that has settled seemingly intractably along two main, irreconcilable lines. There is useful work to be done there, and this paper therefore claims as its justification the attempt to bridge that divide.

Since it is worth setting out in a reasonable amount of detail what those opposing camps are to begin with, it will also be worth giving a very brief summary at this stage of where I propose to take matters. My position is that there is no such thing as causation, or more accurately that there is no such metaphysical entity as a causal link. I do, however, accept that it is not meaningless to talk about causation. Rather, I propose to reduce questions of causation to questions about identity. In some senses I therefore adopt a middle position between the two camps presently described: there is more to causation than mere regularity, but 'causation' is an unnecessary (albeit in everyday life helpful) term for something that can be explained using fewer and better concepts.

A view on causation does not necessarily commit one to a particular (or in some cases any) view of laws of nature. But the debates about causation and about laws of nature are so closely interwoven that it is sensible to devote at least some attention to the latter, if only to explain the effects of one's views on the former.

The scheme of this paper is therefore as follows. It situates the debate about causation within its present context, which it is at the very least very helpful to understand as background to what follows. It then sets out my own position on the matter, briefly sketched above, before spending some time considering the merits and potential drawbacks of that position. Finally, it considers the implications of that view of causation on the related question of laws of nature. The bulk of the paper consists in the second part.

B. Reductionist theories of causation

An exhaustive list of all theories of causation of any stripe would be tedious and fruitless. What therefore follows is a précis of those theories that underlie or are the object of discussion in the remainder of the paper. There are many ways these theories and their proponents might have been divided, but as reductionist versus non-reductionist arguably rests on the biggest disagreement (whether causation is an independent thing), that is the division that has been adopted.

1. Hume

Hume was by no means the first philosopher to consider the issue of causation, but since he turned his attention to it his views to it his treatment of the issue has dominated the scene, whether as a standard to rally to or as the forefather of all other antagonists. A famous quotation from the Abstract sets out his views eloquently and briefly:

Here is a billiard-ball lying on the table, and another ball moving towards it with rapidity. They strike; and the ball, which was formerly at rest, now acquires a motion. This is as perfect an instance of the relation of cause and effect as any which we know, either by sensation or by reflection. Let us therefore examine it. 'Tis evident, that the two balls touched one another before the motion was communicated, and that there was no interval betwixt the shock and the motion. *Contiguity* in time and place is therefore a requisite circumstance to the operation of all causes. 'Tis evident likewise, that the motion, which was the effect. *Priority* in time, is therefore another requisite circumstance in every cause. But this is not all. Let us try any other balls of the same kind in a like situation, and we shall always find, that the impulse of the one produces motion in the other. Here therefore is a *third* circumstance, *viz.*, that it is a *constant conjunction* between the cause and effect. Every object like the cause, produces always some object like the effect. Beyond these three circumstances of contiguity, priority, and constant conjunction, I can discover nothing in this cause. The first ball is in motion; when I try the experiment with the same or like balls, in the same or like circumstances, I find that upon the motion and touch of the one ball, motion

always follows in the other. In whatever shape I turn this matter, and however I examine it, I can find nothing farther.¹

It will be evident therefore that Hume's was the classical reductionist view. In other words, causation for Hume consisted chiefly in the constant conjunction we perceive between cause and effect rather than in any abstract or metaphysical relationship between them, provided the preconditions of contiguity and priority were satisfied.

At least, Hume did not consider that there was any such link that could be known to us. A recent vein of scholarship, led by Craig² and Strawson³ has attempted to recast Hume's views as being at most ambivalent about the metaphysics of causation, while retaining (indeed, focusing almost exclusively, it must be said) on his epistemological scepticism about it. Admittedly, Hume was, whether intentionally or not, somewhat ambiguous about his own views when he added mysteriously at one stage in the Enquiry, 'We may define a cause to be *an object followed by another, and where all the objects, similar to the first, are followed by objects similar to the second*. Or, in other words, *where, if the first object had not been, the second never had existed*.'⁴ In doing so, he appears to introduce a counterfactual view of causation (on which more to follow) that is not at all equivalent to what precedes it. Nonetheless, the most sensible view is that taken by Psillos, who points out that the most important thing is not ultimately what Hume meant, but rather the enormous contribution his views as interpreted have made to the debate about causation.⁵

In parting, it is worth observing that the simplicity of Hume's approach leaves it open to major criticisms. Most notably, it has the dual disadvantages of characterizing any constant conjunction as causal while failing to characterize one-off instances of causation as such for want of regularity.⁶ This is not an essay on Hume's or any theory other than the one proposed

¹ Hume, D., *An Abstract of a Treatise of Human Nature*, L. A. Selby-Bigge and P. H. Niddich eds (Oxford, 1974) 649 - 650

² Craig, E., *The Mind of God and the Works of Man* (Oxford, 1987)

³ Strawson, G., *The Secret Connexion* (Oxford, 1989); cf. Winkler, K. P., 'The New Hume' (1991) *The Philosophical Review* 100(4), 541 - 579

⁴ Hume, D., *An Enquiry Concerning Human Understanding*, P. Millican ed. (Oxford, 2007), 56

⁵ Psillos, S., *Causation & Explanation* (Chesham, 2002), 56

⁶ Of course, the objection proceeds from the incompatible premiss that there is such a thing as causation outside regularity to begin with

shortly, however, and so the treatment of objections such as this will be correspondingly cursory.

2. Mill

Mill in broad terms adopts Hume's 'regularity' view of causation⁷, but refines it in certain important ways. No disservice should be considered done to Mill if consideration of some of those refinements is postponed till the later section on laws of nature, where arguably they were most influential. For present purposes, i.e. from the point of view of causation proper and of what is necessary to acknowledge as laying the foundation for my own approach, the most significant insight Mill had was that a cause is rarely a single thing, but rather a web of things: 'It is seldom if ever between a consequent and the single antecedent that this invariable sequence subsists. It is usually between a consequent and the sum of several antecedents, the concurrence of all of them being requisite to produce, that is to be certain of being followed by the consequent.'⁸

3. Lewis

Where Mill took up what Hume seemed to regard as his official stance on causation, Lewis adopted the orphaned counterfactual account and developed it into a complex system of his own.⁹ This is not the occasion for much more than a brief outline of his philosophy. His fundamental view is that one event causally depends on another if and only if, if the cause did not occur then the event would not occur either. But he then develops an elaborate methodology for assessing that based on the concept of possible worlds. In very rough terms, the counterfactual condition is satisfied for cause *C* and effect *E* where there is at least one possible world where *E* is not the case and that is closer to our world than any where *C* is the case but *E* is not. Needless to say, it is not a straightforward matter for Lewis to explain how we are to assess the relative similarities of possible worlds, even accepting their existence for the sake of argument, to our own.¹⁰

⁷ 'The Law of Causation, the recognition of which is the main pillar of inductive science, is but the familiar truth that invariability of succession is found by observation to obtain between every fact in nature and some other fact which has preceded it.' Mill, J. S. *A System of Logic Ratiocinative and Inductive* (London, 1911), 213

⁸ Mill, J. S. *A System of Logic Ratiocinative and Inductive* (London, 1911), 214

⁹ See principally, inter alia, Lewis, D. *Counterfactuals* (Oxford, 1973)

¹⁰ Lewis, D. *Counterfactuals* (Oxford, 1973), 85

C. Non-reductionist theories of causation

Hume's theory in particular has proven unsatisfactory for many philosophers who consider that blunt coincidence does not adequately capture the necessity with which cause follows effect. Even allowing for a New Hume, there must be something to be said about causation at the metaphysical level. That has been the enterprise headed by Armstrong, Dretske, and Tooley, whose largely similar theories of causation are collectively known under the heading ADT. The ADT view is by no means the only alternative to the foregoing theories: Ducasse, Salmon, and Popper have all propounded quite different theories that have in fairness been less influential and so will be addressed as and when consideration of them is called for in relation to a particular point; they are not just as much part of the landscape as those included in this introduction.

There will be more to be said about ADT when we come to laws of nature – indeed, ADT is properly a theory about laws of nature that takes a certain view of causation. That happens not to fit altogether well with my own schema, which takes an understanding of the causation of individual situations as the starting point for generalizations and laws. For now, therefore, the focus is on its metaphysics of causation proper, so far as a congruent comparison can be made with that of the reductionists, and the consideration of ADT is split to accommodate that.

That quest for the quality or relationship that not only characterizes but explains why one thing causes another has been the principal feature of the ADT approach. It is fair to say that it has not been without its difficulties, or indeed its critics. Popper wrote trenchantly, 'I regard, unlike Kneale, 'necessary' as a mere word – as a label for distinguishing the *universality of laws* from 'accidental' universality ... I largely agree with the spirit of Wittgenstein's paraphrase of Hume: 'A necessity for one thing to happen because another has happened does not exist. There is only logical necessity.'¹¹

What, then, does the ADT theory tell us about this causal necessity? Firstly, the clue being in the heading, that it does not reside in anything extrinsic to causation; in Tooley's words, 'the

¹¹ Popper, K., *The Logic of Scientific Discovery* (London, 1959)

truth-values of causal statements are not, in general, logically determined by non-causal facts'.¹²

Furthermore, the nature of the relationship of necessitation is not between events but between properties, or universals. Where the necessity relationship holds between two universals, there is a necessary coinstantiation of one with the other. Since universals are properties, the relationship of necessity can therefore be described as a second order property, being a property of a property. Needless to say, one has to buy into a great deal of the underlying metaphysics of ADT before one can buy into the relationship of necessitation. Therefore, while it has the benefit in contrast to the regularity approach of – one might be justified in saying – not being obtusely sceptical about venturing to suppose what it is that guarantees those regularities, it demands of its adherents that their metaphysical outlook allow one to say firstly that there are such things as properties of objects that those objects instantiate, and secondly to class 'being a British post box' and 'being red' as the same sort of property.

However, much more explanation is called for than is provided when Armstrong in particular makes the leap from the necessitation of the property of one *object* (or particular) by another to the necessitation of one *event* by another.¹³

Beyond that, we would risk trespassing into the territory of laws of nature, with which ADT is principally concerned and to which we shall return.

¹² Tooley, M. *Causation: A Realist Approach* (Oxford, 1987), 246

¹³ Psillos, S., *Causation & Explanation* (Chesham, 2002), 169

II. Causation proper of individual situations

A. Definitional issues

1. Definition

I would propose the following definition of the causation of a single event:

A situation *C*, described completely in every respect, ‘causes’ situation *E*, itself described completely in every respect, to come about if and only if *C* becomes *E* with nothing more than the passage of time.

In short there is no such thing (in a metaphysical sense) as causation. So, for example, I might crudely say that by switching the kettle on I cause the water to boil. Leaving to one side what happens before I flick the switch, which opens onto questions of biology, psychology, and free will to mention just a few, we can break that down further to say that flicking the switch on the kettle completes a circuit; that the electrical current in it produces heat; that the heat is transferred to the water; and that the internal motion of the water molecules eventually overcomes the weak intermolecular force binding them. And that could be broken down still further – indeed, infinitely.

But instead of getting closer to an explanation of what the causal link was between my flicking the switch and the water is boiling, what we in fact end up with are an infinite series of redefinitions of one event as another: for example, ‘the heat is transferred to the water’ is simply a restatement of the proposition that the internal motion of the water increases (the limit of that increase being approximately its boiling point being due to the design of the kettle). This is the important point: the further one examines a supposedly causal sequence, one simply ends up with a sequence of redefinitions, so that one would be better to say that the effect simply *is* the cause.

That holds true whichever points, however far apart, we designate *C* and *E*; and subject to what follows the choice of which snapshots of the situation over time we designate as either is a matter entirely for our convenience. There is no practical difficulty with labelling the first half of a sequence ‘cause’ and the second half ‘effect’, but breaking the sequence down shows that those labels are arbitrary; that labelling things in that way leads inevitably to the paradox that supposed causes are both cause and effect themselves. That much in itself is not controversial, if one considers, for example, Lewis’s chains of counterfactually dependent

causes and effects. Cause and effect are therefore purely creatures of language and perception. One could make the sequence and its division into cause and effect as detailed or as crude as one wanted. But the whole setup of human perception and thought seems to militate against too detailed a conception of a sequence than is required in any given set of circumstances. That perceptual/psychological point is one dealt with in more detail later on, but consider for now that one might as easily say in one context that my flicking the switch caused the water to boil as in another, perhaps more technical context such as among product design engineers, one might instinctively talk about the causes of the water boiling as it does more in terms of the features of the kettle.

2. Identity over time

The first point to be made about the formal definition is that no sleight of hand is intended by the replacement of ‘is’ with ‘becomes’. My hypothesis entails a particular sort of identity over time, set out in the above definition, that when rendered longhand as above has its meaning made plainer by the verb ‘becomes’; but it will be seen that *E* simply is a version of *C* later in time. By either ‘is’, ‘becomes’, or any other parts of ‘be’ and ‘become’ in what follows the above definition is therefore to be understood as intended by whichever of the single words most naturally brings out the meaning in the particular context, unless otherwise specified. Indeed, it is the sense in which ‘become’ is used is simply that which refers to what the subject is at a later moment in time.¹⁴

I accept that this in itself begs significant questions about the meaning of identity, which there is insufficient room to explore here. To propose that ‘causes’ is synonymous with ‘is’ one has to assume certain things about identity in order to address the issues about causation, and vice versa. Since this paper concerns the latter, it will assume in this limited respect that it is reasonable to say that *C* and *E* are the same situation at different points in time with only the following brief defence from the perspective of the philosophy of identity. Nothing has been added to or taken from *C* to make *E*, except more time. So, for example, take *C* to be a sunny day with a snowman and *E* to be a puddle four hours later on the same sunny day in exactly the same spot.

One might object that the above definition erroneously extends to situations where something is taken away or added not from outside *C* by the operation of one or more elements of *C*; a

¹⁴ 5. To come to be (something or in some state): ‘become, v.’. OED Online. June 2011. Oxford University Press. 17 August 2011 <<http://www.oed.com/viewdictionaryentry/Entry/16784>>.

good example would be where C is the combination of methane and oxygen, with E later lacking, among other things, a certain amount of oxygen, assuming the combustion to have been to some extent successful and no additional oxygen to have been added between C and E . As foreshadowed above, however, my response would be that nothing has in fact been taken away: rather, the oxygen consumed during the combustion reaction throughout it become part of a product compound. The objector, having a modicum of chemistry, might reprise the attack by saying that one could hardly claim O_2 was merely an earlier state of the resulting CO_2 , but that is not what is claimed. C and E are complete descriptions of their situations, not particular elements of them, and what is claimed is at the most skeletal that, say, ' $CO_2 + 2 H_2O + \text{heat (the flame)}$ ' is a description of what exists later than the starting point of, say, $CH_4 + 2 O_2$. To say that the methane and oxygen react is not to superimpose another process (reaction) on the situation, but rather simply to restate more explicitly or informatively in English what it means to have a combination of methane and oxygen (assuming favourable conditions for the reaction).

3. Discrete or continuous time

While time is under discussion, a very brief word is in order about whether this theory requires any particular view to be taken about the nature of time. The direction of time is dealt with in the next sub-section. Questions about the *timing* of causes (a quite separate set of issues, such as pre-emption and overdetermination) are dealt with thereafter as they arise. Finally in this respect, I am not aware that the theory would require any alteration depending on whether time were supposed to run continuously or in discrete packets. If it were quantized, there ought to be no greater difficulty than that discussed under 'probabilities' below. Indeed, even if time did run continuously it would be difficult to spot, given that the identity theory (as with most theories of causation) can only focus on comparisons of (usually two) slices of space-time at any given moment.

4. Backward causation

Does the above definition commit us to a particular view on backward causation? The question of backwards causation asks whether it is possible for E to precede C in time, and has been the focus of sustained and unresolved debate since the mid-twentieth century, beginning principally with Michael Dummett and Anthony Flew's debate in their 1954

symposium ‘Can an Effect Precede its Cause?’¹⁵. The debate, as many others, is too involved to benefit from more than this passing treatment here, but my provisional view is that this identity view of causation does not preclude backwards causation. ‘The passage of time’ is of course ambiguous as to the direction of that passage. In the world as we perceive it at the moment time progresses in one direction, which may be called the positive direction, as reflected in our manner of recording it. The recession of time may likewise be called the progress of time in the negative direction. If what is meant by causation is this special sort of identity over time in which the entirety of *C* entails the entirety of *E*, then there should be nothing except the actual possibilities of time in the physical world to prevent causation from being viewed in the opposite temporal direction. That is not, of course, to say that for backward causation to operate, we must all start travelling backwards in time; time-travel and backward causation are quite distinct¹⁶. Rather, it is simply to say that if this definition of causation is accepted then backward causation would require the possibility of time progressing in the negative direction.

That must be so since it follows from Leibniz’s law, that identity implies the indiscernability of the qualities¹⁷ of (in this case) *C* and *E*, identity is symmetrical¹⁸ and that symmetry should hold across time. Granted, it is difficult and unnatural to view the effect as preceding the cause, but no more difficult or unnatural than conceiving of time as actually running in the negative direction in the first place. Therefore, if it makes sense within a framework in which time appears only to run in the positive direction to view causation as being this sort of identity over time, then it makes no less sense to view causation *mutatis mutandis* where time runs in the negative direction.

5. Probabilities and propensities

So far as the classically-described world is concerned, the definition poses no major problems for situations where, in ordinary parlance, we should say our expectation of an effect is

¹⁵ Dummett, M. and Flew, A., ‘Can an Effect Precede its Cause?’, Proceedings of the Aristotelian Society, (1954) 28 (Supplement) 27–62

¹⁶ Fay, J., ‘Backward causation’, The Stanford Encyclopedia of Philosophy (2010 Edition), Edward Zalta (ed.), URL = < <http://plato.stanford.edu/entries/causation-backwards/> >

¹⁷ Leibniz, G, G. W. Leibniz: Philosophical Papers and Letters, 2nd ed., L. Loemker trans. & ed., (Dordrecht, 1969), 308

¹⁸ Gallois, A., ‘Identity over Time’, The Stanford Encyclopedia of Philosophy (2011 Edition), Edward Zalta (ed.), URL = < <http://plato.stanford.edu/entries/identity-time/> >

‘probable’ rather than certain, given a description of its causes in advance of its putative causes. We may, for example, be fairly sure that throwing a crumpled piece of paper into the bin across the room will result in the paper’s landing in the bin as it always has done, if it is thrown in the usual way; but we may not want to place money on it. The reason for the uncertainty – hence, the mere probability – of the outcome in these situations is that neither the cause nor the effect is completely described; and for the purposes of our definition an incomplete description is an inadequate one. A complete description of *C*, however, including the manner in which it is being thrown, the movements of the air particles, and so on, would on a classical view allow us to state with certainty the outcome *E*.

The same could be said about the example Christopher Hitchcock gives of smoking causing lung cancer, but not in every case¹⁹. One has to divide that statement into the specific and the general. In the specific case, the action of the smoking on the smoker’s body is the mutation of the cells in the lungs, which is lung cancer. Given a full description of the instant case, there is no doubt that smoking caused the lung cancer. The general position is altogether different, and addressed more fully below, but in broad terms one gets the probability from, at the most basic level, studying the number of smokers who do develop lung cancer and, at a more sophisticated level, identifying further factors that are implicated in its development to arrive at an estimated probability for a given case, in light of how much we are able to tell about it. Indeed, Mackie took the view that even Hume could not exclude probabilistic inference in even his most dogmatic passages.²⁰

That, of course, runs into the limitations imposed by quantum mechanics. In broad terms, it is not possible to give a ‘complete’ description of either *C* or *E*. In fact, our descriptions of either can only ever be stated to a probability to begin with. A possible reply might be that although one cannot *tell* where something is, it at least *is* somewhere, but that might be too strong a claim for quantum mechanics to support. The force of this objection must therefore be conceded. But the definition ought perhaps to remain unaltered, since ‘completely’ should not be required to mean more completely than is physically or theoretically possible; and to say ‘as completely as possible’ would invite an erroneous suspicion of subjectivity. To the extent that this identity theory of causation must therefore make concessions to a probabilistic reality, which may even be probabilistic so far as single events are concerned, it is at least at a fundamental level compatible with propensity or probabilistic accounts of causation such as

¹⁹ Hitchcock, C., ‘Probabilistic Causation’, *The Stanford Encyclopedia of Philosophy* (2010 Edition), Edward Zalta (ed.), URL = < <http://plato.stanford.edu/entries/causation-probabilistic/> >

²⁰ Mackie, J. L. *The Cement of the Universe: A Study of Causation* (Oxford, 1974), 17

those successively adopted by Popper, albeit that it bears little superficial resemblance to their mechanics.²¹

‘Becomes’ (and ‘is’), on the other hand, ought to be wide enough to encompass identity over time of *C* and *E* whether through certainty or mere probability.

6. Omniscience

It should be acknowledged as a point in itself at this stage, though it is addressed in greater detail below, that the definition requires omniscience if *C* and *E* are to be identified accurately. That would be problematic in practical terms if the matter rested there, but the related issues of projectability and generalization are addressed shortly. It is obvious, however, that the completeness of the definition is essential, given what is said above about guaranteeing (at least on a classical view) the outcome; otherwise, any *E* would be what became of *C* ‘only so long as...’

The notion that an accurate appreciation of causation is of course by no means new in itself; it traces at least as far back as Mill, who observed, ‘[I]t is seldom if ever between a consequent and the single antecedent that this invariable sequence subsists. It is usually between a consequent and the sum of several antecedents, the concurrence of all of them being requisite to produce, that is to be certain of being followed by the consequent.’²²

A related issue that may cause consternation is that the required comprehensive description of *C* allows nothing to be added or subtracted during the process. Kitcher pointed out in relation to Salmon’s ‘mark transmission theory’ (the details of MT being unimportant for this point) that it is impossible for no additional interventions to occur.²³ That is the obvious truth. The obvious consequence, lately alluded to, is that it is impossible in practical terms to know all of either *C* or *E*. We must simply get on as best we can in light of the means we have of acquiring scientific knowledge, and I turn to that issue below.

²¹ For a summary, see Gillies, D., ‘Varieties of Propensities’ (2000) *British Journal for the Philosophy of Science* 51, 807 - 835

²² Mill, J. S. *A System of Logic Ratiocinative and Inductive* (London, 1911) 214

²³ Kitcher, P. ‘Explanatory Unification and the Causal Structure of the World’ in P. Kitcher and W. Salmon (eds), *Minnesota Studies in the Philosophy of Science Volume XIII* (Minneapolis, 1989), 410 – 505, at 464.

7. *Situations*

In preference to more standard ‘events’, or exotic ‘tropes’²⁴, I consider it best to describe the *relata* of causation as ‘situations’, since the term connotes a full picture of all that it contains, whether static or in motion, and does not isolate any occurrence from its background. Indeed, the distinction between foreground ‘events’ and their surroundings perhaps implied by taking the *relata* as events is precisely what I wish to avoid, by stressing the completeness that is required in describing *C* and *E*. ‘State of affairs’ might have done just as well; no particular magic, and nothing technical, are intended by the term.

8. *Singularism*

A final point to be made about the definition itself is that it seems inevitably to commit to a singularist notion of causation, which is to say one that views causation as principally a question about individual situations from which one then generalizes²⁵. It seems (and so far as I can tell is) inevitable that that should be the case because there could be no two causal explanations adequate according to my definition that related the same *C* and *E* without describing the same thing (since the descriptions would be identical in every respect). That is not, however, expected to be problematic since I discuss in a later section how generalizations can usefully be made.

B. Advantages of the identity theory

The identity theory having been fairly comprehensively set out, it now falls to be assessed in the following two sections in terms of its major strengths and weaknesses to see how far it succeeds as a philosophical explanation of causation. Those sections therefore take the straightforward structure of firstly addressing its advantages and secondly attempting to anticipate and meet objections to it. Section III then follows immediately on from that to explore the related issues of generalization from particular causation and of the practical applications of a theory that appears to be usable only by the omniscient.

1. *Accommodation of desirable features of a theory of causation*

²⁴ As adopted in Campbell, K. *Abstract Particulars* (Oxford, 1990)

²⁵ Psillos, S., *Causation & Explanation* (Chesham, 2002), 127

One immediately obvious advantage of this approach to causation is that, in contrast to, for example, the regularity view of causation, it satisfies our intuition that there should be something beyond inscrutable coincidence to connect *C* and *E*. Moreover, it has the advantage over non-reductivist theories that are forced to make the metaphysical appeal to an unknown – and one suspects unknowable – species of relationship between *C* and *E* that guarantees causal necessity. By being able to explain causation in terms of a special sort of identity, something that can be grasped and understood within the framework of what we already know, it guarantees the necessity of *E*'s following from *C* without any of the tortured and dubious metaphysics of, for example, the ADT school. Rather, much more simply, the identity theory entails that it would be impossible for *E* not to follow on from *C*, since that is inherent in the concept of identity.

It has the further advantage of guaranteeing the truth of counterfactual conditions, while restricting the difficulties that arise when the satisfaction of a counterfactual is taken as the defining feature of a causal relationship, rather than merely a feature of it. All causal relationships conceived as above satisfy the condition that if *C* had not been as it was, *E* would not have been as it was either. But the problems that have plagued Lewis's theory, notably of defining the means of assessing the closeness of one possible world to the actual world, are no longer in play since nothing turns on whether the counterfactual condition is satisfied; it merely happens to be true. Nonetheless, from the scientific, or epistemological, point of view, counterfactuals remain a useful means of thinking about the causal relationship, and that is dealt with below.

The identity theory also explains not merely what links *C* and *E*, but every point in between: in other words, what has been described as a causal chain²⁶. The frame of reference can be taken from marking any valid candidates *C* and *E* respectively, and every point in between will be linked by being identical save in the amount of time that has elapsed. Each point in between could be marked *C'*, *C''* and so on (or *D*, according to taste), or could quite equally be renamed *C* and *E* to reset the frame of reference.

It may be questioned, though, whether this conception of the causal chain is as useful as, say Lewis's. The answer is that it is not, but simply because it is not required to perform any function. Lewis's causal chain analysis allows him to respond to the problem of pre-

²⁶ Notably by Lewis: Lewis, D., 'Causation' (1973) *The Journal of Philosophy*, Vol. 70, No. 17, Seventieth Annual Meeting of the American Philosophical Association Eastern Division, 556-567, at 563

emption²⁷. Given an example such as that of two hitmen *A* and *B* aiming to kill the same target²⁸, where only because *A* fires and kills first does *B* desist, Lewis's addition of the causal chain condition to his counterfactual theory to addresses the apparent problem if *A* had not fired the target would nonetheless have died (because *B* would have shot him), so that on a purely counterfactual analysis *A*'s shooting him would paradoxically not be the cause of his death. Lewis therefore insists that every link in the causal chain be causally dependent on its antecedent. In this example, therefore, the target's death is traced back in a more detailed fashion via the bullet that was fired from *A*'s gun, rather than *B*'s.

The identity approach has the benefit of being more illuminating for explaining the nature of that causal dependence, but in an apparently redundant way since the requirement for complete descriptions meets the problem of pre-emption from a different angle. So, for example, the identity theory identifies *A*'s shooting against the background of *B*'s flight as the cause of the target's death *as it happened*.²⁹ The complete description requirement also carries over into the derivative counterfactual analysis so that likewise it is not true that the target would have died *as he did* if *A* had not fired.

The identity theory equally avoids the problem of 'late' pre-emption, which arises where both putative causes begin even though only one appears to reach a conclusion, such as in the following example of Lewis's: 'Billy and Suzy throw rocks at a bottle. Suzy throws first, or maybe she throws harder. Her rock arrives first. The bottle shatters. When Billy's rock gets where the bottle used to be, there is nothing there but flying shards of glass. Without Suzy's throw, the impact of Billy's rock on the intact bottle would have been one of the final steps in the causal chain from Billy's throw to the shattering of the bottle. But thanks to Suzy's pre-empting throw, that impact never happens.'³⁰ Here, Lewis's chain of (counterfactual) causal dependence leads neither to Billy nor Suzy, since if either had failed to throw, the other still

²⁷ In fact, he introduces the causal chain theory shortly before turning to pre-emption, so he pre-empts it.

²⁸ Menzies, P., 'Counterfactual Theories of Causation', The Stanford Encyclopedia of Philosophy (2008 Edition), Edward Zalta (ed.), URL = < <http://plato.stanford.edu/entries/causation-probabilistic/> >

²⁹ Compare the distinction Davidson draws between the description of an event and the event itself: 'What is partial in the sentence "The cause of this match's lighting was that it was struck" is the *description* of the cause; as we add to the description of the cause we may approach the point where we can deduce, from this description and laws, that an effect of the kind would follow.' - Davidson, D., 'Causal Relations' (1967) *Journal of Philosophy* 64, 691 – 703, 697

³⁰ Lewis, D., 'Causation as Influence' (2000) *Journal of Philosophy* 97, 182 – 197, 184

would have. By contrast, the identity theory can rely on the same response to both sorts of pre-emption.

2. Avoidance of overdetermination

Another related problem that the identity theory addresses is that of overdetermination, where an overabundance of sufficient causes means that none of them is necessary. Mackie was especially alive to this and gave the illustrative example of a desert traveller whose water-can has been poisoned by one foe and punctured by another; he happens to die of thirst because the poisoned water leaked before he could drink any, but would have died of poisoning if he had drunk the water.³¹ Mackie gets into bother because his theory of counterfactuals seems to commit him to saying that in order for the puncturing of the watering can to be the cause of the death by thirst it was counterfactually necessary for the traveller to die of thirst; in other words, the effect caused the cause to be the cause.³² In response, Mackie falls back on a theory of causal priority, which need not be dealt with for our purposes.

The point is rather that the identity theory avoids the problem altogether, while still yielding a sensible answer: the whole preceding circumstances of the death, including the combined assassination attempts, caused the death, properly described (i.e. most notably as death through thirst).

C. Difficulties with the identity theory

1. Question-begging?

A preliminary objection might be raised to the identity theory that it presupposes the existence and truth of certain laws of nature in order to prove them. In particular, laws such as the conservation of energy might be invoked to argue that a tyre rolling along a road at v_1 (C) is the precursor in time, without further interference, to the same tyre slightly further along the road, slightly warmer, at the lower speed v_2 (E). But in praying such an example in aid of an argument in favour of a certain view of singular causation, when we have not yet begun to

³¹ Mackie, J. L. *The Cement of the Universe: A Study of Causation* (Oxford, 1974), 44

³² Psillos characterizes this as entailing that the effect caused the cause *simpliciter*, but it seems fairer, more accurate, and less problematic to say that it caused the cause to be the cause: Psillos, S., *Causation & Explanation* (Chesham, 2002), 86

attempt to generalize from it to formulate any such law of nature, is there not a risk of circularity?

The best solution appears to be to bear in mind the separate ontological and epistemological tracks on which things run. It is true that in order for the example to work, one has to assume that the heat energy is the successor to the kinetic energy, and that certain laws govern the relationship between the two. But the assumption is one about how things really are, not a claim about the derivation of the laws. If the laws were false, then the example would be false, but another could be given; and the same is true of any other example that could be given. Nothing we claim to know about the world³³ can be with certainty shielded from the possibility of its being wrong. In any such example, the truth of a law is assumed quite separately from, and without a view to proving, its truth later on when we come to laws of nature.

2. *Counter-intuitiveness*

‘Isn’t this wrong, though? Isn’t there such a thing as causation that we intuitively understand?’ Such is likely to be the sentiment most persistently underpinning objections. And if the near-uniform perception is that we do have an intuitive appreciation of something causative, then that must be taken seriously.

The difficulty in addressing the objection adequately is that it is grounded as much in psychology as in philosophy, and we are only equipped to deal with the latter. Nonetheless, it is arguable much in the way Kant argued³⁴ that our view of space-time is an inescapable product of the way our minds are equipped to perceive things, that human beings are naturally programmed to perceive causes whether or not there is such a thing in metaphysics.

A few reasons could be suggested for that. Firstly, it would make sense in a world in which mankind has created and adapted new technologies throughout its existence that its focus should be on isolating the particular aspect of any given *C* that, even if everything else about *C* changed, would still bring about the desired aspects of its corresponding *E*. We have often got that wrong, of course. What causes bubonic plague to stay away? Not, it transpires, a nosegay. An inbuilt instinct to look for, and to continue to look for, those things that bring

³³ Speaking very broadly for these purposes

³⁴ In Kant, I., *Critique of Pure Reason* (N. Kemp Smith trans.), (Basingstoke, 1929)

about the particular things we want is therefore invaluable to a technological species. It also underpins Ducasse's philosophy of the single difference³⁵ (taking his 'rough' definition, since I do not propose to deal with it in detail, 'we may say that the cause of a particular change *K* was such particular change *C* as alone occurred in the immediate environment of *K* immediately before.')

Related to that, mankind has no capacity for omniscience.³⁶ Nobody could ever hope to know *all* of *C*. Nor, I suspect, would one want to. The limited processing power we have at our disposal would be overloaded by the infinite detail to be perceived in the most infinitesimal object. This paper would still be occupied with setting out its first example. Mankind needs therefore to perceive only those details of a situation evolution suggests are salient. But that fact, and the intuition of causation based on the perceived salience it entails, are by no means irrefutable proof that there is any such thing as causation to be found. In fact, as the nosegay example (together with the whole miasma theory of disease) illustrates, there is nothing special or privileged about the events we pick out as candidate causes in the first place.

Our perception of cause, moreover, varies greatly with the context. In a dining room the failure of a match to light might most readily be attributed to the side of the matchbox's having worn away. That is what is most in the mind's eye in that setting. In the laboratory, the scientist might have a matchbox just as worn but look for causes in the amount of oxygen that has been allowed into the room; perhaps not enough.³⁷ My intention here is simply to illustrate that the presence of a human intuition of causation is explicable perhaps more readily by its serving a useful practical and evolutionary function than by its pointing to the existence of any such thing in metaphysics. In that sense the debate is not altogether dissimilar to that about arguments to the existence of God from religious experience.³⁸

Furthermore, the layperson's view of causation (if that is what is being appealed to) might in any event be argued to be fixed not on metaphysical objects but on moral ones. That is

³⁵ Ducasse, C. J. *Truth, Knowledge and Causation* (New York, 1968), 3-4

³⁶ I observed just now that I was not equipped to deal with psychology, so I hope I am sticking to uncontroversial observations

³⁷ This example bears an unintended but sufficiently great similarity to one used by Hart and Honoré in *Causation in the Law* to merit acknowledgment of their parallel discussion: Hart, H. L. A. and Honoré, T. *Causation in the Law* 2nd edn (Oxford, 1985), 11

³⁸ See generally James, W. *The Varieties of Religious Experience* (London, 1902), originally delivered at the University of Edinburgh as the Gifford Lectures on Natural Religion, for an account of religious intuition

arguably what legal (as an approximation of ethical) causation is ultimately concerned with³⁹ (although Wright's position was that 'the causal relationship [is] dependent upon the concept of human action'⁴⁰) In other words, the layperson's instinct look for as the cause of a state of affairs may very well direct him to seek somebody to blame rather than a cause in the sense we mean it here. That is not to belittle the layperson. In fact, a human being's instinct to look for another human being as a cause might conceivably underpin the anthropomorphism that pervades colloquial scientific explanations: we talk, for example, of forces acting on things so that the cause of the billiard ball's motion was that the lateral force acted on it, as if the force had any say in the matter.

3. *Weakness*

A major objection of a different sort may be that the proposed definition of causation is too weak because it fails to distinguish between situations where we are naturally inclined to say there has been an instance of causation and others where we should never think to say so. The objection is difficult to disentangle from a premiss that the identity theory implicitly rejects, namely that there is such a thing as causation to be looking for. Nonetheless, it is worth supposing for the sake of argument that there are some areas where the identity theory intrudes without adding anything meaningful.

The objector might therefore say that the identity theory would lead us to the absurd situation of saying that, for example, the meadow today causes the meadow tomorrow⁴¹. Or, just as absurdly and in general, that anything presenting no change over a period of time, whether because the time interval is very short or because the object of our inquiry is relatively unchanging, is the cause of itself. Separately, there might be the related attack that there has been nothing to cause, if there is no change (assuming for the sake of argument that there is any such thing as no change over any interval of time).

It has to be acknowledged that there is a great deal of force in the objection in both guises. No doubt many people would regard such statements as curious, and there is no obvious way of showing that the identity theory would not lead one to make them. However, it ought to be

³⁹ This is referred to merely for illustration, lest we venture outside the scope of the topic. For a more thorough treatment see Hart, H. L. A. and Honoré, T. *Causation in the Law* 2nd edn (Oxford, 1985)

⁴⁰ Wright, J. P. *The Sceptical Realism of David Hume* (Manchester, 1973), 117

⁴¹ A particularly fair charge if 'meadow' is allowed to be a synecdoche for the meadow and all it contains and that surrounds it, in other words a tolerably complete description of a *C* and an *E*

argued that it mischaracterizes the theory to describe it as weak. Even taking it to be common ground that it would be weak if it tended to yield uninformative statements, it is not the case that any of the examples given is uninformative. True one tends not to think of causation as applying to cases of no change, but it is by no means out of the ordinary. Take as an example the testing of a preservative substance: if the thing sought to be preserved remains unchanged⁴² then it is indeed highly informative that nothing has changed, and eminently sensible to say that the situation of the preservation of the object has caused the situation where it remains unchanged.

The apparent alienness of some applications of the theory is likely due rather to the psychological phenomenon hypothesized above, that the instinct for supposing a cause to be present or not is an unreliable but useful guide to picking out practically useful features of the world. There is no difference, in philosophical terms, between the preservative example and the meadow. The difference is psychological: in the case of the preservative we see the relevance of the lack of change, and look for something to explain it; in the case of the meadow we simply see what we saw the day before⁴³ since we have no reason to do otherwise.

That is not to put it quite as strongly as Ayer did in saying, ‘In nature one thing just happens after another. Cause and effect have their place only in our imaginative arrangements and extensions of these primary facts.’⁴⁴ Aside from the obvious point that Ayer was proceeding from a regularity view of causation, I would at least allow that there are such things as cause and effect, albeit they have no privileged status other than as the particular endpoints of a string of time through space that we wish to observe.⁴⁵

⁴² Again making due concession to the not uncontroversial nature of the claim

⁴³ No doubt missing an infinitely rich difference in the underlying ecosystem

⁴⁴ Ayer, A. J. ‘What is a Law of Nature?’ in A. J. Ayer, *The Concept of a Person and Other Essays* (London, 1963), 183

⁴⁵ Hume was characteristically forceful in his own way of impressing on the reader that ‘causation’ is all in the mind: ‘Before we are reconcil’d to this doctrine, how often must we repeat to ourselves, *that* the simple view of any two objects or actions, however related, can never give us any idea of power, or of a connexion betwixt them: *that* this idea arises from the repetition of their union: *that* the repetition neither discovers nor causes any thing in the objects, but has an influence only on the mind, by that customary transition it produces: *that* this customary transition is, therefore, the same with the power and necessity; which are consequently qualities of perceptions, not of objects, and are internally felt by the soul, and not perceiv’d externally in bodies?’ (Hume, D., *A Treatise of Human Nature*, L. A. Selby-Bigge and P. H. Nidditch eds (Oxford, 1978), 166). One imagines Hume must have been rather conscious in his use of ‘produces’ rather than ‘causes’.

An interesting variant of this objection can be adapted from an objection that was raised to the regularity view, namely where a regular conjunction between two events is obviously brought about by a common cause, rather than the prior event. Mill gives, in rather difficult language, the example of night and day: ‘There are sequences, as uniform in past experience as any others whatever, which yet we do not regard as cases of causation, but as conjunctions in some sort accidental. Such, to an accurate thinker, is that of day and night. The one might have existed for any length of time, and the other not have followed the sooner for its existence; it follows only if certain other antecedents exist; and where those antecedents existed it would follow in any case.’⁴⁶

It might be said that the identity theory would have day be the cause of night., and that it is incorrect to do so since that change is caused by the motion of the sun, moon, and earth. But again, as in many other instances, the best way to meet the objection seems to be from the requirement of a complete description: what are day and night but shorthand for the relative positions of celestial bodies in motion? Therefore, properly conceived of in this way, it is in fact correct to say that ‘day’ causes ‘night’: if one can exclude everything else so that the skeletal model describable here is the complete picture, the positions and velocities of those celestial bodies during the day simply resolves into their positions and velocities at night without any further interference.

4. *Escaped effects*

A minor difficulty – perhaps not even a difficulty, but certainly an issue worth noting – is that of whether any effects of *C* can escape *E*, and if so whether we are OK with that. The philosophically rigorous answers are ‘no’ and ‘n/a’, respectively. Hitherto *C* and *E* have been presented as something like the beginning and end of a cartoon flip-book, where the scope of change between *C* and *E* is relatively confined.

However, both the logic of the theory and a consideration of principles such as the conservation of momentum or of energy compel us to allow that bits of *C* may break off and scatter far and wide, and that a complete description of where and what they have become requires a correspondingly larger (so as to be complete) description of *E*. In the tyre friction example in the previous section the heat was simplistically viewed as part of the immediate vicinity of the tyre. But what about the cliché of the butterfly who flaps its wings and creates

⁴⁶ Mill, J. S. *A System of Logic Ratiocinative and Inductive* (London, 1911), 222

winds in all directions, in all corners of the earth? Do we have to chart those infinite effects? The frank answer has to be ‘yes’. In strict theory, a complete ‘mapping’ of *C* through time would require that we do so. All the same, however, this is best viewed as nothing more than a particular emanation of the omniscience point addressed above.

5. *All-encompassing?*

The problems raised in subsections 3 and 4 foreshadows another issue that might be claimed to pose fundamental difficulties for the identity theory: allowing the reply to objection 3 to be valid, isn’t it impossible to restrict *C* and *E* to anything less than the whole universe, since everything is so interlinked?

This is perhaps the most difficult objection to meet; it is difficult in particular to reconcile the strict requirement for the completeness of a description with permission to restrict it without being arbitrary; and it does appear that the theory has to be capable of being restricted to situations narrower than the entire universe if it is to be at all informative (as opposed to being merely true). One line of response may be to allow the completeness requirement to a restricted spatial zone for *C* (provided, as discussed under subsection 4 above, that the spatial scope of *E* is unrestricted); and that could be argued not to require any modification of the theory, but rather to be implicit in the notion of a particular ‘situation’, the choice of which allows us to restrict the scope of our inquiry as necessary. A better and more nuanced solution might be to restrict the situation not spatially but in terms of its content, to those events and objects that we wish to investigate.

That in turn raises two further difficulties, though. The first is that it might be seen as illegitimate to introduce such a subjective, epistemological element at this objective, metaphysical stage of the process; the aims of scientific inquiry and identification of causes in practice is a separate issue altogether. The second is that it appears seriously to undermine the strictness of the completeness requirement, where that strictness has been insisted on precisely as a response to several other objections.

Taking the second first, that difficulty can be resolved by ensuring that the objects of our inquiry are identified *both* at *C* and at *E*. So, for example, in one of the pre-emption or overdetermination cases, if we could not trace a procession of identity through time from every aspect of *C* under inquiry to every such aspect of *E*, *and vice versa*, we would be falling foul of the completeness requirement; but not otherwise. To give a more concrete example, it would be permissible to take as situation *E* the target’s death by a particular bullet. What

caused the difficulty, because it was impermissible, was simply taking as *E* the target's death and leaving the identity trail from the particular gunshots at *C* dangling untethered to any counterpart at *E*. But it is permissible to take *E* as being the death by a particular bullet without reference to the position of the stars in the sky overhead at the time, assuming those are of no interest.

That leads us to the first new objection: isn't this suddenly getting very subjective? The answer is no, or, at least, no more subjective than at the outset, since by the very process of defining causation in terms of a particular chunk of reality we are already committed to selecting an area of inquiry. It is quite true that the whole universe's being as it is today causes it to be as it is the next – and that is to make no assertion about free will – but the definition relied on for this identity theory is all the stronger for being able to be applied to situations more specific than the entirety of the universe, and could not reasonably be described as subjective for that reason alone.

6. Simply a less refined version of mark transmission?

One might say, 'This is all well and good. But isn't this simply a more primitive version of one of the theories that describes causation not as the wholesale equiparation of one whole situation with another, but more accurately in terms of transmission of certain qualities, properties, or quantities?'

A number of theories have taken an approach along these lines without sharing any great similarity in any other respect. Russell's was perhaps the most similar: 'A causal line may always be regarded as a persistence of something, a person, a table, a photon, or what not. Throughout a given causal line, there may be constancy of quality, constancy of structure, or gradual changes in either, but not sudden change of any considerable magnitude.' And further, 'The law of quasi-permanence as I intend it ... is designed to explain the success of the common-sense notion of "things" and the physical notion of "matter" (in classical physics). ... a "thing" or a piece of matter is not to be regarded as a single persistent substantial entity, but as a string of events having a certain kind of causal connection with each other. This kind is what I call "quasi-permanence". The causal law that I suggest may be enunciated as follows: "Given an event at a certain time, then at any slightly earlier or slightly later time there is, at some neighbouring place, a closely similar event". I do not assert that this happens always, but only that it happens very often – sufficiently often to give a high probability to an induction confirming it in a particular case. When "substance" is abandoned,

the identity, for commonsense, of a thing or a person at different times must be explained as consisting in what may be called a “causal line”.⁴⁷

Yet for all its greater degree of specificity with what it is that persists, Russell’s theory lacks what is more important, namely the completeness requirement, which can be seen to be so important from its role in repelling objections elsewhere. One may also ask whether the enumeration of things that might persist but change slightly adds anything, or whether it is as empty as qualifying the theory ‘on days such as Mondays, Tuesdays, Wednesdays, and so on.’ What else would persist but those things, after all? That is not to attack Russell’s theory itself, but rather to dispel any notion that this identity theory lacks anything for not having incorporated a similar catalogue into its definition. It goes without saying that some aspects, such as energy, will morph over time, whereas others – say, substance in the broad sense – will remain static. In the latter case there is obvious identity over time and it is therefore to such changes as the former that the theory is targeted.

The same might be said, *mutatis mutandis*, of Mackie’s persistence of qualities⁴⁸, Salmon’s mark transmission⁴⁹, and Dowe’s conserved quantities⁵⁰.

D. Summary of section II

So far we have adopted an approach to causation that allows us to answer the question posed in the title with something like a yes. It would be stretching things to replace ‘causes’ with ‘is’ and leave it at that. We have a fairly well threshed out definition that entails a particular species of identity over time. Put loosely but vividly, *C* causes *E* if left to run its course it melts into it.

That definition solves, or avoids, some of the more pressing problems besetting both the Humean and the non-Humean camps, and is useful for that alone. It explains causation in terms of things we can be sure of (thereby being an improvement on the baroque metaphysics of some non-Humean theories), while improving on the Humean (regularity) view by explaining *why* an effect happens, in terms of its causes.

⁴⁷ Russell, B., *Human Knowledge: Its Scope and Limits* (New York, 1948), 475

⁴⁸ Mackie, J. L. *The Cement of the Universe: A Study of Causation* (Oxford, 1974), 218 et seq.

⁴⁹ Salmon, W., *Scientific Explanation and the Causal Structure of the World* (Princeton, 1984), 148

⁵⁰ Dowe, P., *Physical Causation* (Cambridge, 2000), 89

But the theory also forces us to live with some difficulties that, if unaddressed, would leave it interesting though unworkable. Most pressingly, it has not yet been explained how it can account for general causation or for causal laws. That is the work which the following section now takes up.

III. Generalizations and laws

A. Introduction

What tells us about the causation of types of events? Here again ADT diverges from Mill and Lewis, who with the addition of Ramsay complete the competing MRL camp in the debate about laws of nature. As before, a brief introduction to the issue will be followed by an outline of the current debate and then my own analysis. And, again as before, no attempt will be made to introduce every theory of laws of nature: only those that are too important to omit or that my own identity theory calls for engagement with.

Laws of nature, and in a wider sense generalizations about types of causes⁵¹, vary in significance depending on the perspective one takes on causation. If one starts from a species of the regularity view, laws of nature help distinguish coincidental regularities from those that can be rationalized in terms of a rule. The MRL approach comes from this angle, and is chiefly concerned with identifying the best means of determining what counts as a law and what doesn't.

From the ADT perspective, laws underpin causation much more directly, being for Armstrong at least the very thing by virtue of which causation comes about.

So far as the identity theory is concerned, it is necessary to have some means of investigating the causes of particular events so as to generalize to predictions about future events. Those may take the form of laws of nature, such as the laws of Newtonian mechanics; or they may be altogether more mundane and less general, such as that if I sit the very temperamental aerial in my room on top of a particular thickness of textbook and angle it just so, I can get a good enough signal to watch most channels. Philosophers appear by and large to have neglected the latter sort of generalization in favour of the more glamorous former, but its importance in daily life is inestimable.

B. The debate at present

1. Mill, Ramsay, and Lewis

⁵¹ Though laws of nature will be used as a shorthand for both, unless the context demands otherwise

As noted above, the concern of the MRL view of laws could fairly be classed as a methodological one. Thus Mill puts it, ‘According to one mode of expression, the question, What are the laws of nature? may be stated thus: What are the fewest and simplest assumptions, which being granted, the whole existing order of nature would result? Another mode of stating it would be thus: What are the fewest general propositions from which all the uniformities which exist in the universe might be deductively inferred?’⁵² and on the following page, ‘For the expression, Laws of Nature, *means* nothing but the uniformities which exist among natural phenomena ... when reduced to their simplest expression.’⁵³

Lewis rescue’s Mill’s focus on simplicity from a bear trap by adding the requirement of strength: ‘A contingent generalisation is a law if and only if it appears as a theorem (or axiom) in each of the deductive systems that achieves a best combination of simplicity and strength.’ He continues, ‘The virtues of simplicity and strength tend to conflict. Simplicity without strength can be had from pure logic, strength without simplicity from (the deductive closure of) an almanac. ... What we value in a deductive system is a properly balanced combination of simplicity and strength – and as much of both as truth and our way of balancing permit.’⁵⁴ Note that Lewis’s theory of laws of nature is quite distinct from his counterfactual theory of causation, basing it instead on a regularity view. Note also that the process of identifying laws by reference to the interrelationships between candidates for the status is not in addition to but instead of an attempt to deduce them from particular regularities.⁵⁵ Much like the Humean approach to causation, much of MRL’s application lies more in the hands of the user than in objective reality⁵⁶

One notable critique of the MRL view was Tooley’s, that it leaves open the possibility of underived laws, of stones unturned:

⁵² Mill, J. S. *A System of Logic Ratiocinative and Inductive* (London, 1911), 207

⁵³ Mill, J. S. *A System of Logic Ratiocinative and Inductive* (London, 1911), 208

⁵⁴ Lewis, D. *Counterfactuals* (Oxford, 1973)

⁵⁵ Psillos, S., *Causation & Explanation* (Chesham, 2002), 149

⁵⁶ *Pace* Ramsay, who claimed, ‘What is asserted is simply something about the whole world, namely that the true general propositions are of such forms that they form a system of the required sort with the given proposition in the required place; it is facts that form the system in virtue of internal relations, not people’s beliefs in them in virtue of spatiotemporal ones.’ Ramsay, F. P. *Universals of Law and Fact* in D. H. Mellor ed. *F. P. Ramsay, Foundations: Essays in Philosophy, Logic, Mathematics, and Economics* (London, 1978), 132

Imagine a world containing ten different types of fundamental particles. Suppose further the behaviour of particles in interaction depends on the types of the interacting particles. Considering interactions involving two particles, there are 55 possibilities with respect to the types of the two particles. Suppose that 54 of these interactions have been discovered, one for each case, which are not interrelated in any way. Suppose finally that the world is sufficiently deterministic that, given the way particles of types X and Y are currently distributed, it is impossible for them to ever interact at any time, past, present or future. In such a situation it would be very reasonable to believe that there is some *underived* law dealing with the interaction of particles of types X and Y.⁵⁷

There is certainly force in the charge that if there is an isolated and *prima facie* lawlike relationship, uninstantiated and unrelated to any other, MRL would appear to be incapable of detecting it. On the other hand, what hope has ADT of detecting it? In addition, one would have to query whether either simplicity or strength would be served by including in the canon of laws of nature a rule about two particles that will never interact ‘at any time, past, present or future’!

2. *Armstrong, Dretske, and Tooley*

Dretske encapsulates the ADT position, beginning with his caution that there is ‘an *intrinsic* difference between laws and universal truths. Laws imply universal truths, but universal truths do not imply laws. Laws are (expressed by) singular statements describing the relationships that exist between universal qualities and quantities; they are not universal statements about the particular objects and situations that exemplify these qualities and quantities. Universal truths are not transformed into laws by acquiring some of the extrinsic properties of laws, by being used in explanation or prediction, by being made to support counterfactuals, or by becoming well-established.’⁵⁸

Still, though, we are left in the dark about what that relationship is. As good a working definition as any, notwithstanding Armstrong’s later claim that ‘The required relation is the

⁵⁷ Tooley, M., ‘The Nature of Laws’ (1977) *Canadian Journal of Philosophy* 7, 667 – 98, 669

⁵⁸ Dretske, F. ‘Laws of Nature’ (1977) *Philosophy of Science* 44, 248 – 68, 253 - 4

causal relation, ... now hypothesized to relate types not tokens'⁵⁹ is 'what ADT needs to survive as a theory'; the unresolved mystery of causation's relationship with necessity was mentioned in section I.

C. Laws under the identity theory

1. Metaphysics

From the purely metaphysical point of view, the identity theory ought to be able to be able to explain laws of nature fairly unproblematically, borrowing methodological aspects of the MRL theory along the way. In the first instance, it is straightforward to make general predictions by saying that whatever properties of *C* and *E* can be traced along a string of identity over time are found again, the same pattern will be replicated.

Granting the practical usefulness of identifying simple and widely applicable generalizations that might qualify as laws of nature by virtue of those qualities⁶⁰, identity theory has no difficulty with generalized causation.

2. Epistemology

On the epistemological level, however, it is obvious that it will be difficult to establish the truth about a single cause, let alone deduce laws of nature. If ADT is altogether too mystical, and in any event relies on a metaphysics having no real overlap with that of the identity theory, the options appear to be to embrace MRL or something else altogether.

Embracing MRL is by no means precluded. The mere unknowability of singular causation is no barrier to scientific investigation, about which I make no particular prescriptions. What would be entailed would be to reject the Humean account of causation⁶¹, but to allow

⁵⁹ Armstrong, D. M., 'The Identification Problem and the Inference Problem', (1993) *Philosophy and Phenomenological Research* 53, 421–422, 422

⁶⁰ But not Ramsay's claim that there is any valid associated claim about the world, which seems unwarranted.

⁶¹ In particular the following assertions of Hume's: 'Let men be once fully perswaded of these two principles, *That there is nothing in any object, consider'd in itself, which can afford us a reason for drawing a conclusion beyond it; and, That even after the observation of the frequent or constant conjunction of objects, we have no reason to draw any inference concerning any object beyond those of which we have had experience.*' Hume, D., *A Treatise of Human Nature*, L. A. Selby-Bigge and P. H. Niddich eds (Oxford, 1978), 139

scientific method to investigate reliable regularities and accept at least the methodological component of MRL.

As I alluded to earlier, however, I would be disinclined to adhere to a view (MRL) of such restricted focus, not at least without something additional in place to provide a means of identifying and predicting causal relationships more generally. I have in mind straightforward scientific method, and although philosophy has a pivotal role to play in its development, it is undoubtedly beyond the scope of this dissertation even to begin to dictate what methods of inference ought to be appealed to. Take my aerial again. I get on fine moving it up and down and to the side a bit. It would probably be easier if I understood the principles of the waves involved, but in terms of the philosophical application of that to this problem we would have to discuss the yet further related questions not only of how we know how waves work, but of how – say, by the deductive-nomological model – I would go about applying the relevant rules to the circumstances of my television set. My point is simply that I do not consider that anything very special is called for to make a go of exploring causal relationships in practice. And whatever method is used cannot pierce the veil of metaphysics to upset the theoretical rigour of the identity view of causation.

IV. Conclusion

To what extent can the term ‘causes’ therefore usefully be replaced by the term ‘is’? We have seen that that depends first of all upon whether one considers there is any meaning in the term ‘causation’ to begin with, and their response would no doubt be ‘just as usefully as by anything else’. But I also hope to have shown that the identity theory proposed above has shown in the first instance that identity is at least a candidate means of bridging the gap between reduction and non-reduction, by satisfying the justifiable instincts of both sides: that there is nothing magical about causation on the one hand, but that there is at least something that explains – indeed, guarantees – the correct truth values for counterfactual conditions.

So much for identity as a *prima facie* candidate. I then attempted to show in detail how it solved those problems, and to address some likely objections to it. None of the objections seemed insurmountable, and so it seems fair to claim a reasonable amount of success in replacing the term ‘causes’ with the term ‘is’ at least in cases of singular causation.

Moving on to laws of nature and other generalizations, matters may become slightly more complicated. In fact, they are just about as complicated as we wish them to be. The objections raised in that section went not to anything inherent in the proposed scheme, but rather were informed by extrinsic considerations about what would be workable in practice. It is trite to say that merely because a theory leaves one high and dry without a means of implementing it, it is not by that fact alone a wrong or bad theory.

The question is therefore whether something can be done, if we wish it, to support and supplement the identity theory’s operation in those spheres, and the answer we arrived at was that some features of MRL and/or the usual methods of scientific inference (even in an informal, everyday setting) could quite comfortably be relied on to teach us something about the nature of the underlying cause without impinging on the logic of the identity theory.

In summary, therefore, it is hoped that this paper has been successful in showing that the identity theory is a useful and viable theory of causation. Of course, the identity theory is not just the same as the word ‘is’, and we had to rely on a species of identity over time in our definition, and so the answer is ultimately a slightly qualified ‘yes’.

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