Lecture 11: Causation 2

1. Recap of Previous Lecture
2. Redundant Causation (II)
2.1 Quasi-dependence
2.2 Influence
3. Spurious Causation
4. Transitivity (II)

Lecture 11: Causation 2

1. Recap of Previous Lecture

- Last week, I introduced the idea that the notion of a causal relation between events (or facts) could be understood in terms of counterfactuals.
- We went over some of the main points of the lecture on counterfactuals, noting that counterfactual implication is widely thought to be non-transitive, non-monotonic and non-contraposable.
- I then introduced a simple counterfactual account of causation (CTC_1), which, I argued, needed patching up because of problems with self-causation or part-to-whole-causation.
- CTC_2 added a requirement that cause and effect be entirely distinct.
- I then raised a potential problem for CTC_2 - the problem of 'effects': there are some contexts in which it seems ok to assert that $\sim e \ \Box\!\!\rightarrow \sim c$.

Lecture 11: Causation 2

1. Recap of Previous Lecture

- I suggested requiring that causes precede their effects (CTC_3), but then outlined another possible problem that CTC_3 couldn't handle: the problem of 'epiphenomena', in which a counterfactual dependence seems to obtain between two effects *d* and *e* of a common cause *c*, such that *d* precedes *e* (the light and the bomb example).
- I then pointed out that the problematic counterfactuals were grammatically marked ('backtracking' counterfactuals) and had different truth conditions from the kinds of counterfactuals that we have seen so far (non-backtracking counterfactuals).
- After outlining a procedure for evaluating non-backtracking counterfactuals, I suggested that the problems of effects and epiphenomena doesn't arise for CTC_2 if we take the counterfactuals relevant to the evaluation of causal statement to be of the non-backtracking variety.
- We then moved on to the issue of redundant causation, highlighting two difficult cases for CTC_2: overdetermination and early preemption.

Lecture 11: Causation 2

1. Recap of Previous Lecture

- This led to a discussion of Lewis' 'ancestral of counterfactual dependence' account (CTC_4), which I showed to be capable of handling the early preemption cases.
- I then pointed out that CTC_4 had the nice feature of entailing that the causal relation is transitive (which previous accounts failed to entail).
- Finally, and perhaps surprisingly, I showed you two apparent counterexamples to the transitivity of causation (the White/Black chess game example and the Agent Smith & Neo scenario).
- This week I want to say a little more about redundant causation and suggest further problems for Lewis.
- We'll see that these further problems have lead Lewis to revise his account *twice*, landing him each time in further trouble of some sort.

Lecture 11: Causation 2

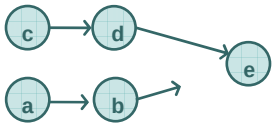
1. Recap of Previous Lecture

- I will finish off with two further issues:
  - I will present a counterexample to CTC_4 that suggests that the account is insufficiently strict (i.e. that it counts various non-causal relations as causal)
  - I will briefly discuss Lewis' stand on the transitivity issue and suggest that his response to the Neo case is unsatisfactory.

Lecture 11: Causation 2

2. Redundant Causation (II)

- Problem (3): Late Preemption.



- Susan and Billy have decided to break the school window. Susan aims (*c*), and so does Billy (*a*). Susan throws her rock (*d*), as does Billy (*b*). Susan however, throws harder than Billy does and her rock hits the window first, breaking it (*e*). Billy's stone goes through the newly-created hole in the window a split-second later.
- Common intuition: Susan broke the window, but Billy didn't..
- Late preemption poses the same problems for CTC_2 as early preemption did: according to CTC_2, neither Susan's throwing her rock nor Billy's throwing his caused the window to break, because (i) $\sim c \; \Box\!\!\not\!\!\rightarrow_{fb} e$ and $\sim a \; \Box\!\!\not\!\!\rightarrow_{fb} e$.

Lecture 11: Causation 2

2. Redundant Causation (II)

- In addition, however, late preemption poses problems for CTC_4.
- The reason why is that the counterfactualist can't pull off the same move here as she did for the early preemption case.
- Remember the case of early preemption: what allowed Lewis to have the effect counterfactually depend on an intermediate link in the causal chain leading from the cause was the fact that the chain leading from the preempted non-cause was interrupted somewhere along the line, leaving the intermediate link in question without a backup.
- Here, however, at *no* point in time is the preempted process (i.e. the process emanating from Susan's throwing her rock) cut short, so at no point does the preempting process (i.e. the process emanating from Billy's throwing his) find itself without a 'backup'.
- In other words, there is no event *d* in the process leading from *c* to *e* such that $\sim d \; \Box\!\!\rightarrow_{nb} \sim e$: condition (iv) of CTC_4 simply isn't met.
- What to do?

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.1. Quasi-dependence

- Option (1): Quasi-dependence. This is Lewis's first suggestion (see Lewis 1986: 205-207).
- Consider the sequence of events that obtains between Susan's aiming and the window shattering: Susan's aims, the stone leaves Susan's hand, the stone reaching, in succession, various points on its trajectory and the stone eventually making contact with the window (*c*, *d*, … *e)*.
- Lewis remarks that had if we consider a scenario in which an intrinsic duplicate of this very sequence of events obtains, but in which the process initiated by Billy has been removed from the picture we find ourselves with a process in which *c* and *e are* connected by a chain of counterfactually dependent events and are thus causally related according to CTC_4.

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.1. Quasi-dependence

- Lewis then makes use of this intuition to put forward the following suggestion, which bears some obvious similarities to CTC_4:

  CTC_5: *c* caused *e* iff (i) *c*, (ii) *e*, (iii) *c* and *e* are entirely distinct, and (iv) there is an actual finite chain of either (a) counterfactually dependent or (b) *quasi-dependent* events leading from *c* to *e*.

- Quasi-dependence is then (very) roughly defined as follows:

  e quasi-depends on *c* iff the vast majority of intrinsically similar pairs of events $\{c_i, e_i\}$ (i.e. pairs of events that involve the same intrinsic properties and which stand in the same spatiotemporal relations) obtaining in other regions of spacetime, in which the same laws of nature obtain, are such that $\sim c_i \ \Box\!\!\rightarrow \sim e_i$.

Lecture 11: Causation 2

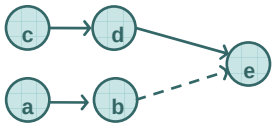
2. Redundant Causation (II) > 2.1. Quasi-dependence

- According to Lewis, the idea then is that Susan broke the window because, when we look at the majority of *other* sequences of events that are intrinsically identical to the series *c*, *d*, … *e* (e.g. sequences in which there is no Backup Billy and Susan makes the very same kind of throw), we find a chain of counterfactual dependence of the required sort.
- But surely that's only half the desired result! What about Billy's throw? We need *that* to come out as a non-cause.
- Well no-one, Lewis included, seems to be worried about Billy.
- Thankfully, I think we get the right result: Billy *didn't* break the window because, if we look at other sequences of events that are intrinsically identical to the series *a*, *b*, … (e.g. sequences in which Billy chucks a stone through an empty window-frame), we *don't* find the right chain of counterfactual dependence between *a* and *e*.
- However, there are *many* difficulties surrounding Lewis' suggestion. I will just mention one of these, which I believe to be sufficiently damaging: 'trumping' preemption.

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.1. Intrinsicness

- Problem (4): Trumping Preemption.



- The major orders the soldier to advance (c). At the same time, the sergeant does the same thing (a). The signals from the major and the sergeant reach the soldier's ears simultaneously, causing him to advance (e). The major's orders trump the sergeant's in the sense that were the major's and sergeant's orders to conflict, the major's orders would take precedence. (this is represented on the diagram by the full vs dotted arrows).
- Common intuition: the soldier advanced because of the major's orders and not because of the sergeant's.

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.1. Intrinsicness

- Trumping preemption poses the same problems for CTC_2 as early preemption did: according to CTC_2, neither the major's ordering the soldier to fire nor the sergeant's ordering the soldier to fire caused the soldier to fire, because: (i) $\sim c \; \Box\!\!\rightarrow_{nb} e$ and $\sim a \; \Box\!\!\rightarrow_{nb} e$.
- We also get the same problems for CTC_4 as those posed by late preemption: condition (iv) of CTC_4 isn't met by the process initiated by the major's order because there is, at any point in time prior to the soldier's advancing, a backup process running its course (the process initiated by the sergeant's order).
- Finally, and crucially, we get problems for CTC_5: intrinsic duplicates of the process initiated by the sergeant's orders exhibit the right kind of counterfactual dependence between their members (imagine a scenario in the same process occurs and in which the major is absent). Therefore CTC_5 wrongly yields the verdict that both the major and the sergeant brought about the soldier's advancing.

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.2. Influence

- Cases like trumping preemption led Lewis, in his final days, to once more change his account (see Lewis 2000).
- His intuition is that the causal asymmetry between the major's order and the sergeant's has something to do with the fact that had the major ordered something different, the soldier would have altered his behaviour accordingly but had the sergeant's order been different, there would have been no impact on the soldier's behaviour (because the major's wishes trump the sergeant's).
- Similarly, in the late preemption case, had Susan thrown her rock in a slightly different way (e.g. along a slightly different trajectory), the window would have shattered in a slightly different manner. Things, it seems, are different for Billy.
- This doesn't seem like a bad idea, but how can we translate this intuition into a formal account?

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.2. Influence

- Lewis's account makes use of the notion of an '*alteration*' of an event, which is simply a variation on that event in terms of time or manner of occurrence (e.g. the variant of the major's utterance in which he says 'retreat!' rather than 'advance!')
- He then uses this concept in the definition of what he calls counterfactual '*influence*' (note the obvious parallel with CTC_2):

  c influenced *e* iff (i) *c*, (ii) *e*, (iii) *c* and *e* are completely distinct and (iv) there is a range c_1, c_2, ... of not-too-distant alterations of *c* and a range e_1, e_2, ... of alterations of *e* such that had $c_1 \ \Box\!\!\rightarrow_{\wedge b} e_1$, $c_2 \ \Box\!\!\rightarrow_{\wedge b} e_2$ etc.

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.2. Influence

- Finally, in the same way that he defined causation as the ancestral of counterfactual dependence (see CTC_4), he then defines causation as the ancestral of counterfactual influence (again, he takes the ancestral in order to ensure transitivity):

  CTC_6: *c* caused *e* iff (i) *c*, (ii) *e*, (iii) *c* and *e* are entirely distinct, and (iv) there is an actual finite chain of events $\{d_1, \ldots, d_n\}$, leading from *c* to *e*, such that *c* influenced d_1, d_1 influenced d_2… and d_n influenced *e*.

- This seems to take care of our problematic cases of late and trumping preemption.
- But CTC_6 faces a number of serious objections…

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.2. Influence

- Objection (1): the account is circular.
- Notice the crucial requirement in CTC_6 that the alterations be 'not-too-distant'…
- Why does Lewis need this caveat? Because if we don't somehow restrict the permissible alterations of the preempted non-cause *a* (i.e. Billy's throw and the sergeant's order), we end up with *a* causing e, which is bad news. Consider:
  - an alteration of Billy's throw which involves him throwing the stone 3-4 seconds earlier, or throwing the stone a little harder (leading to the window breaking a little earlier, and preempting Susan's throw)
  - an alteration of the sergeant's order which involves him shouting the order before the major does so (leading to the soldier advancing earlier, preempting the major's order).

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.2. Influence

- But what exactly counts as 'not-too-distant'? In particular, why do some seemingly small alterations (e.g. Billy throwing slightly earlier) qualify as too distant, but apparently comparable alterations don't (e.g. Susan throwing slightly harder)?
- The critic will suggest that Lewis has made up an ad hoc metric tailored to rule out those alterations of the preempted non-cause that would pose problems for his account.

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.2. Influence

- Objection (2): the account is too lenient (counting non-causes as causes).
- Here are some salient cases, taken from Dowe (unpublished):
  - Delayers: It rained heavily in June, pushing back until late August a forest fire that would have otherwise occurred in July. The rainfall influenced the fire, but one can't claim that it caused it (although one can certainly claim that it caused the *belatedness* of the fire)
  - Hasteners: I write a letter to the department asking them to bring forward my class visit. My letter influenced my class visit, but one can't claim that it caused it (although one can claim that it caused it to occur earlier than it would have otherwise done).
  - Alleviators: I have a bad headache at t-1, and decide to take a neurofen at t, which leaves me at t+1 with a somewhat milder headache. My taking the neurofen at t influences my having a headache at t+1 but cannot be said to cause it (although it could be said to cause my headache being less sever than it would have otherwise been)

Lecture 11: Causation 2

2. Redundant Causation (II) > 2.2. Influence

- So it seems that neither $CTC_{5,}$ nor CTC_6 are viable options (CTC_5 because of trumping and CTC_6 because of possible circularity issues and spurious causation).
- In my view, our best bet will be a variant on the somewhat unsatisfactory CTC_4, which will need to somehow be weakened so as to deal with late and trumping preemption.
- To finish the lecture off, I would just like to mention two further objections to CTC_4.
- What we have seen so far are cases in which CTC_4 counts genuine causal relations as non-causal. This would seem to suggest that CTC_4 *is too strict*.
- The cases that follow are cases in which CTC_4 counts non-causal relations as genuinely causal, in other words, cases which suggest that CTC_4 *isn't strict enough*.

Lecture 11: Causation 2

3. Spurious causation

- I own two hats: a grey hat and a red hat. My girlfriend borrows the red hat. I decide to go out and, seeing that it is cold outside, I grab a hat, the remaining grey hat.
- On Lewis' account, we should say that my seeing that it is cold outside is a cause of my wearing the grey hat (the closest world in which I don't test the temperature is a world in which I don't wear a grey hat - indeed, a world in which I don't wear a hat at all).
- But this seems wrong: surely my having seen that it is cold outside explains why I am wearing a hat, not why I am wearing a *grey* hat.
- The conjunction of my owning only a red hat and a grey hat + my girlfriend's having borrowed the red one, on the other hand, *does* explain why I am wearing a grey hat.
- CTC_4 seems to be in trouble here.

Lecture 11: Causation 2

4. Transitivity (II)

- Remember the following case that I raised in the previous lecture:
- Smith & Neo: Agent Smith pulls the trigger at Neo at time t-1. Neo ducks at time t, avoiding the bullet. Neo is alive at t+1.
- Our intuitions:
  - (i) Agent Smith's pulling the trigger at t-1 caused Neo to duck at t,
  - (ii) Neo's ducking at t caused Neo's being alive at t+1, but
  - (iii) Agent Smith's pulling the trigger at t-1 didn't cause Neo's being alive at t+1.
- Conclusion: causation isn't transitive, in spite of what you may have always assumed…
- This, of course, is a conclusion that Lewis cannot endorse, as it is a consequence of *all* his analyses (i.e. CTC_4, CTC_5 and CTC_6) that causation is a transitive relation.

Lecture 11: Causation 2

4. Transitivity (II)

- So what does Lewis say here?
- Well Lewis (2000: 194-195) bites the bullet and claims that Agent Smith's pulling the trigger at t-1 *did* cause Neo's being alive at t+1.
- He does however try to offer a number of diagnostics as to why we might (mistakenly in his view) feel inclined to think otherwise. Amongst these:
  - (a) Smith's shot belongs to a type of event that generally puts an end to the life of the victim. Perhaps we are mixing up questions of what is *generally* conducive to what with what caused what *in particular circumstances*.
  - (b) We know that Neo would have lived at t+1 *whether or not* Agent Smith had pulled the trigger. This fact may suggest that Agent Smith's actions didn't make a difference and hence weren't a cause. However, Lewis says, surely the lesson from redundant causation cases is that sometimes, in the given circumstances, events can cause without making a difference.

Lecture 11: Causation 2

4. Transitivity (II)

- Neither of these answers strike me as convincing:

  (a) It is simply untrue, as a matter of psychological fact, that when the occurrence of an event of type X generally prevents the occurrence of an event of type Y, we have difficulty in granting, in a particular instance, causation of a specific instance Y by a specific instance of X.

  Example: We know that, *in general*, increasing the price of a product puts customers off buying that product. However, we have no trouble in understanding that a specific instance of price-increase (say the increase of the price of, say, a particular luxury handbag in a certain exclusive shop), may actually cause a particular customer to purchase the item (because of an associated increase in prestige).

Lecture 11: Causation 2

4. Transitivity (II)

(b) The lesson from redundant causation cases is surely that we *aren't* prone to rule out events as causes, merely on the basis that they don't make a difference to the occurrence vs non-occurrence of their effects. That's precisely why we weren't happy with CTC_2: we had cases (e.g. early preemption) in which what we felt to be a genuine cause didn't exhibit the required counterfactual dependency.

- Although, Lewis' arguments are bad, I have some sympathies with his views.
- It strikes me that:
  - We are deeply committed to the claim that causation is transitive.
  - The Neo counterexample seems to have something fishy about it.
- So what's going on?
- I'll leave you guys to puzzle over that….

Lecture 11: Causation 2

Reference

- Dowe, P. (unpublished) 'Is Causation Influence?'
- Lewis, D. (1986) 'Postscripts to 'Causation', in his *Philosophical Papers: Volume II*. Oxford: Oxford University Press.
- Lewis, D. (2000) 'Causation as Influence', *Journal of Philosophy* 97: 182-97.

Lecture 11: Causation 2

Next week... Dispositions

- Set reading: Mumford, S. (2005). Dispositions. In E. Craig (Ed.), *Routledge Encyclopedia of Philosophy*. London: Routledge.