Part 2, Paper 1 Metaphysics | Lent 2017

Causation

Lecture 4: Causal Powers

1. Causal Relata: Events vs Substances

(Neo-)Humeans conceive of causation as a relation between events. Events can juxtapose in time, and so we can describe regularities or necessary connections. If we assume events are changes, then causation is a relation between changes.

Alternative: causation relates the things that change (substances). A causes B *to change*.

> We might say, for instance, that the explosion of the stick of dynamite caused the collapse of the building. But really, in my view, this is just an elaborate way of saying that the stick of dynamite, by exploding, caused the building to collapse. It is the dynamite that literally possesses the destructive power, not the explosion. (Lowe 2013, 158)

A powers theory conceives of causing as a kind of acting (cf. Gasking's doing). Only substances act, events (or properties) do not.

2. What are Powers?

Substances can only cause changes if they have a causal power. What are powers?

Aristotelian idea: An efficient cause is a substance (agent) that operates on another substance (patient), thereby changing the latter (*Physics* III). The agent has a power (*dunamis*) to act, and the patient has a power to change by being acted upon. A substance has a power to Q if she Q-s potentially, and the realization of the power (*energeia*) is her Q-ing. Powers are individuated (at least in part) by their characteristic type of manifestation.

Can powers be reduced? Nelson Goodman's hope: analyse dispositional terms in categorical terms using counterfactual conditionals (*Fact, Fiction, and Forecast*, 40).

1. O has a power to bend at time t
2. If O had been under suitable pressure at time t, then O would have bent

However, this replaces one controversial picture with another.

3. Causal Powers, Active and Passive

Lowe's framework: "powers—both token powers and power types—may be distinguished in two ways. Some are causal, some non-causal. And some are

active, some passive. Moreover, these two distinctions are mutually independent, generating a fourfold division of powers" (156).

	Causal	*Non-causal*
Active	E.g. matter's gravitational power of attraction	E.g. radium's power of spontaneous radioactive decay
Passive	E.g. water's power to dissolve salt	E.g. a sphere's power to roll down an inclined plane

Figure 1: Four kinds of powers

Causal power: one whose manifestation consists in its bearer's acting on one or more other individual substances so as to bring about a certain kind of change in them. (Active causal powers do not depend on something else, passive ones do.)

4. The Asymmetry of Agent-Patient Relations

If the manifestation of an active causal power is always at the same time the manifestation of a passive causal power, then can we still make sense of causation's having a direction?

> Perhaps the water possesses an 'active power' to dissolve salt, and salt, a complementary 'passive power' to be dissolved by water. But look more closely at what happens when you stir salt into a glass of water. Certain chemical features of the salt interact with certain chemical features of the water [...]. This interaction is, or appears to be, continuous, not sequential; it is, or appears to be, symmetrical. (Heil, quoted in Marmodoro, forthcoming)

Marmodoro tries to account for the direction of causation by distinguishing two events. When two causal partner powers are mutually activated, their two manifestations are two different types of activity, even though they occur simultaneously in one event.

> It is not true that what the water does to the salt and what the salt does to the water are actions of the same type. In the causal interaction of water and salt, polarized water molecules break the bond between the negative chloride ions and the positive sodium ions; whereas salt does not break the water molecules. This is what makes the chemical reaction asymmetrical. [...] The fact that water dissolves salt, but not vice versa, is scientifically informative. It expresses a law of nature.(Marmodoro)

Does this make the asymmetry of causation a contingent or empirical fact? Doesn't it all depend on how we describe the causal process?

And what about causation's alignment with the temporal arrow? Can it be captured by the causal powers theory?

Maarten Steenhagen (ms2416@cam.ac.uk) | February 2017