Generic versus single-case causality: the case of autopsy

Federica Russo and Jon Williamson

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1   Causal Epistemologies

Three basic kinds of view as to epistemological relations between levels:

Top down.   From generic relations we infer the truth of single-case causal claims.

- e.g., Humean view.

- There may be ancillary single-case evidence:

    - striking a match causes it to light;
    - the match was struck and lit;
    - *the match was dry*
    - striking the match caused it to light.

Bottom up.   From single cases we generalise.

- Inductive approach:

    - striking match 1 caused it to light;
    - striking match 2 caused it to light;
    - . . .
    - striking match 10 caused it to light
    - ▸ striking a match causes it to light.

Independent levels.   Generic causal relations do not tell us about single case relations; neither does the single case inform the generic.

- Which view is right?

- Does an answer to the above question tell us anything about causality itself?

  – Should one level be taken as primitive and the other derivative?

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2 Metaphysics and Epistemology

Why do metaphysics?

- It helps us conceptualise and understand the world.

▸ In which case the following principle is natural:

Clarity: Other things being equal, one should only reduce X to Y in one's metaphysics if Y is more comprehensible, or more intelligible, or less problematic, than X.

- But intelligibility tends to go hand-in-hand with epistemic priority.

  – To take Y to be evidence for X, the truth of Y must be less problematic than the truth of X, in the sense that Y is easier to ascertain than X.

▸ If so, the direction of reduction should align with the direction of evidential support:

  – If one finds out about X by finding out about Y, and if one is to reduce one to the other, and if other things are equal, then X should be reduced to Y.

▸ Epistemology constrains metaphysics.

  – Benacerraf (1973) used a rather different argument to draw the same conclusion.

Doesn't the Principle of Clarity make metaphysics subject to psychological constraints, hence subjective?

    × Clarity is no more psychological than the ubiquitous

    Simplicity: Other things being equal, one should prefer the ontology that is simpler.

        × But Simplicity is arguably a guide to truth.

            × Maybe so, but different agents rightly disagree as to the notion of simplicity.

               · What is simple for a human may be complex for a machine and vice versa.

3   Causal Metaphysics

Under this view, the three basic causal epistemologies lead to three kinds of metaphysics:

Generic causal relations primitive.   Regularity (Hume, Mackie), and many probabilistic and agency accounts.

Single-case causal relations primitive.   Counterfactual (Lewis), process (Salmon, Dowe), dispositional (Cartwright) accounts. Carroll.

Independent levels.   A different account at each level: Eells, Weber.

4 Autopsy

Two main kinds of inference in autopsy:

Generic-to-Single-Case. *Forensic / medicolegal autopsy* ascertains the causes of death in a particular case.

- Single-case non-causal evidence tends to be used in conjunction with generic causal and mechanistic evidence to establish a single-case causal claim

- Fits top-down causal epistemology well but not bottom-up nor independent-levels.

Single-Case-to-Generic. *Clinical / academic autopsy*: contributes to generic medical or epidemiological knowledge by determining salient population-level causes.

- Single-case causal relations gleaned by forensic autopsy are generalised by induction to a new generic causal claim.

- Fits bottom-up epistemology but not the others.

Terrabuio Junior et al. (2007):

- looked at 558 autopsies of patients who died during a stay in hospital after secondary interstitial pneumonia,

- examined the cause of the pneumonia (and thence death),

- generalised to determine which potential causes of pneumonia actually made a significant difference to the risk of death and could thus be counted as a population-level cause.

'It is thus important to know the main causes of death in this population to establish correct prophylactic actions, which are the cheaper and more intelligent ways to prevent secondary interstitial pneumonia' (*p.*70).

Consequences.

- No single one of the three basic kinds of causal epistemology fits the case of autopsy.

    - Inferences go in either direction depending on the operating context.

- If metaphysics is to align with epistemology, none of the three metaphysics will be adequate.

5   Causal Metaphysics Revisited

- We need a metaphysics of causality that

  - is egalitarian in the sense that neither level is reduced to the other,
  - does not treat the levels as independent in the sense of requiring different analyses.

- The only metaphysics around that satisfies these requirements is the *epistemic theory*:

  - Causality is a map—a way of structuring the world that allows us to draw inferences and construct explanations.
  - There are no physical causal relationships to which the arrows in this map refers—they are just representational.
  - The causal relation is just the causal map of an ideally rational agent with total evidence.
  - ► Causal claims, be they generic or single-case, are claims about rational belief. The epistemic theory treats them in an egalitarian way. Neither level is reduced to the other.
  - ► The levels are not treated as requiring different analyses—the epistemic account covers both.

- ► Autopsy lends support to epistemic causality.

6 Summary

- The three basic kinds of causality epistemology are mutually exclusive.

- No one kind fits the full variety of autopsy inferences.

- Arguably, metaphysics should mirror epistemology.

- But then an epistemic theory of causality is more appropriate than one that reduces one level to another or treats the levels as independent.

Acknowledgements

References

Benacerraf, P. (1973). Mathematical truth. *The Journal of Philosophy*, 70(19):661–679.

Terrabuio Junior, A. A., Parra, E. R., Farhat, C., and Capelozzi, V. L. (2007). Autopsy-proven causes of death in lungs of patients immunocompromised by secondary interstitial pneumonia. *Clinical Sciences*, 62(1):69–76.