How to Cause the Inevitable

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Causation does not require counterfactual dependence of any kind.

1. Socrates drinking poison caused an event, his death, which was bound to happen eventually.

2. Socrates’ death was inevitable. According to the *Phaedo*, it was caused by him drinking poison.

(1) and (2) are true.

\[ \therefore \text{The very same thing can both:} \]

- be inevitable and have a cause.
- Causation does not require any counterfactual dependence from the cause to the effect.

Why does causation relate event types?
Consider a scenario from Collins et al.:

A train rushes toward a fork in the tracks. If a switch is flipped, the train will take the shorter side track, and if the switch is in its original position, the train will take the main track. Further on, the left and the right tracks merge. The switch is flipped, the train takes the side track, converges with the main track and reaches its destination.

- Pulling the lever did not cause the train to reach its destination.
- But pulling the lever did change the token event; e.g. when it occurred.

Production without effect contingency

- \( C \) is sufficient for \( E \) given \( A \) iff for any \( A \)-world and time \( t \), if \( C \) occurs at \( t \) then \( E \) occurs at some later time.
- A token event is an event type (i.e. a proposition) located at a time.
- A chain of token events \( \{C_t\}_{t \in T} \) is dense iff for any times \( t, t' \in T \) and time \( t'' \), if \( t < t'' < t' \) then \( t'' \in T \).
- A chain of token events is sufficiency-preserving given \( A \) iff every token event on the chain is sufficient given \( A \) for every later event on the chain.
- \( C \) produced \( E \) just in case there was a dense, sufficiency-preserving chain of token events from \( C \) to \( E \).

Causation via production

\( C \) actually cause \( E \) just in case there is a set of actual facts \( A \) such that:
1. \( C \) produced \( E \) given \( A \), and
2. If \( C \) had not occurred, but \( A \) had still occurred, \( \neg C \) would not have produced \( E \) given \( A \).

(Based on a schema by Beckers (2016))

References

- [C (3) If and Pearl (2005); Halpern (2016); Beckers (2016) Lewis (1973); Paul (1998); Yablo (2002); Halpern 8284.00121.](https://limo.libis.be/primo-explore/fulldisplay?docid=LIRIAS1656621context=Lvid=Liriassearch)