

Causation Lecture 3

1 A ROLE FOR COUNTERFACTUALS?

- **Problem:** Mackie's notion of a **causal field** seems **interest-relative** and thus **mind-dependent**. Hence, causal claims might be mind-dependent.
- **Alternative:** We have the context **mind-independently fix** the causal field. We take seriously the idea that causes are **necessary** for their effects in the context in which they occur: that **if the cause had not happened, the effect would not have happened**.

2 COUNTERFACTUALS AND POSSIBLE WORLDS

Indicative Conditionals	Counterfactual (Subjunctive) Conditionals
Represented by 'A \rightarrow C'	Represented by 'A $\square\rightarrow$ C'
Controversially symbolized by the material conditional .	Not symbolized by the material conditional, as the antecedent is typically counterpossible .
e.g. 'if it rains, then I will take an umbrella'	e.g. 'if it had rained, then I would have taken an umbrella'

- David Lewis (1986) provides **truth-conditions** for counterfactuals in terms of **possible worlds**.
- There is a possible world for **each way the world could be**. Lewis thinks that possible worlds are **concrete**, being **maximal collections** of **connected entities**. Plantinga (1974) argues that possible worlds are **abstract**, being **maximal consistent sentences**.
- We inhabit **actuality**. For Lewis, actuality (or @) is the possible world that we happen to be in.
- Some worlds are **closer** to actuality than others. A world w_1 is closer to actuality than world w_2 iff w_1 is **more similar** to actuality than w_2 .
- From there, 'A $\square\rightarrow$ C' is true iff:
 1. The closest **A-worlds** are **C-worlds**; OR
 2. @ is both an A-world and a C-world (a special case of 1); OR
 3. There are no A-worlds (in which case the counterfactual is **vacuously true**).
- **Problem** (Fine 1975): Truth-conditions in terms of closeness intuitively gives the wrong result on some counterexamples, i.e. 'if Nixon had pressed the red button, there would have been nuclear war'.
 - **Response** (Lewis 1979): Appeal to the direction of time.
- **Problem** (Quine 1960): The analysis makes the truth-conditions of counterfactuals **vague**. For example, 'if the lectures had been cancelled, you would not have come to the lecture hall.'
 - **Response** (Lewis 1986): The analysis **reflects** the genuine vagueness in the truth-conditions of counterfactuals.

3 COUNTERFACTUAL AND CAUSAL DEPENDENCE

- $A \Box \rightarrow C$ iff C **counterfactually depends** on A, when A and C are **propositions**.
 - **Example:** ‘The liquid is transparent’ counterfactually depends on ‘the liquid is water’, because ‘the liquid is water $\Box \rightarrow$ the liquid is transparent’.
- C **causally depends** on A iff:
 1. C counterfactually depends on A; AND
 2. $\neg C$ counterfactually depends on $\neg A$.
 - i.e. iff $(A \Box \rightarrow C) \ \& \ (\neg A \Box \rightarrow \neg C)$
- Counterfactual and causal dependence sometimes come together. Sometimes they come apart. It depends on the **context** given by actuality.
 - **Example:** When actuality is such that the liquid is tar, it follows that ‘the liquid is transparent’ causally depends on ‘the liquid is water’.
 - **Example:** However, when actuality is such that the liquid is lemonade, it **does not** follow that ‘the liquid is transparent’ causally depends on ‘the liquid is water’.
- **Example:** The house fire causally depends on the short circuit, because:
 1. ‘The occurrence of the short circuit $\Box \rightarrow$ the occurrence of the house fire’; AND
 2. ‘ \neg (The occurrence of the short circuit) $\Box \rightarrow \neg$ (the occurrence of the house fire)’.

4 FROM TOKENS TO TYPES

- We have been talking about **individual propositions** and thus **event tokens**. Sometimes we want to talk about **types** of events standing in the relation of causal dependence.
- We therefore talk about **families of propositions**.
 - **Example:** ‘the alarm went off at 8.00am’, ‘the alarm went off at 8.01am’ ...
 - The family of propositions C consists of propositions C_1, C_2, \dots
- A family of propositions C counterfactually depends on a family of propositions A iff:
 - C_1 counterfactually depends on A_1 (i.e. $A_1 \Box \rightarrow C_1$); AND
 - C_2 counterfactually depends on A_2 (i.e. $A_2 \Box \rightarrow C_2$); AND
 - ... so on.
- A family of propositions C causally depends on a family of propositions A iff:
 - C_1 causally depends on A_1 (i.e. $A_1 \Box \rightarrow C_1$); AND
 - C_2 causally depends on A_2 (i.e. $A_2 \Box \rightarrow C_2$); AND
 - ... so on.

5 WHY ISN'T CAUSAL DEPENDENCE JUST CAUSATION?

- The short answer: causal dependence is **intransitive**, whilst causation is **transitive**.
- This means that causal dependence is **unnecessary** for causation. If A causes B, and B causes C, it follows that A causes C even if C is not causally dependent on A.
- However, causal dependence is **sufficient** for causation. If C is causally dependent on A, then A causes C.

6 CAUSAL DEPENDENCE AND DISTINCT EVENTS

- **Problem:** It is not the case that my drawing a figure with three sides **causes** my drawing of a triangle. However, 'drawing a triangle' is **causally dependent** on 'drawing a figure with three sides'.
 - **Response:** One proposition C is causally dependent on another proposition A **only if** the events corresponding to A and C are **distinct**.
- Consequently, C **causally depends** on A iff:
 - C counterfactually depends on A; AND
 - $\neg C$ counterfactually depends on $\neg A$; AND
 - The events corresponding to A and C are distinct.

7 CONCLUSION

- There is a conceptual **structure** to Lewis' analysis:
 1. We analyse the **truth-conditions** of **counterfactuals** in terms of **possible worlds**.
 2. We analyse **counterfactual dependence** in terms of **counterfactuals**.
 3. We analyse **causal dependence** in terms of **counterfactual dependence**.
 4. (Next time) we analyse **causation** in terms of **causal dependence**.

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