

# Woodward 3

## Actual Causation

(pp. 74–86)

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## What causal relations may hold between

- *Variables*. E.g., “ $X$  causes  $Y$ .”
- *Event types*. E.g., “Smoking causes lung cancer.”
- *Event tokens*. E.g., “Jones’s smoking caused his lung cancer.”  
This is called **actual causation**.

An event token is represented as a variable taking a particular value (e.g.,  $X$  taking the value  $x$ ) on a particular occasion.

Woodward now uses his account of causation between variables to give an account of actual causation.

### Definition (AC) (p. 77)

$X$  taking the value  $x$  is an *actual cause* of  $Y$  taking the value  $y$  iff:

- 1  $x$  and  $y$  are the actual values of  $X$  and  $Y$ , respectively;
- 2 there is a path of direct causal relationships from  $X$  to  $Y$ ; and
- 3 there is some intervention on  $X$  that will change the value of  $Y$  when the direct causes of  $Y$  that are not on this path are fixed at their actual values.

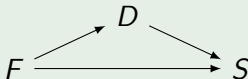
- Similar to the definition of contributing cause for variables.
- Main difference: The variables not on the route from  $X$  to  $Y$  are here fixed at their *actual* values; for a contributing cause they can be fixed at *any* value.
- Woodward only proposes this for deterministic causation; he doesn't give an analysis of probabilistic actual causation.

(p. 75)

## Boulder example (pp. 79–80)

*A boulder falls, causing a hiker to duck. If he had not ducked, he would not have survived.*

Let  $F$  = whether the boulder falls,  $D$  = whether the hiker ducks,  $S$  = whether the hiker survives.



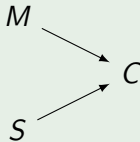
- The boulder falling is an actual cause of the hiker ducking.
  - These are the actual values of the variables.
  - There is a path of direct causal relationships from  $F$  to  $D$ .
  - Changing  $F$  would change  $D$  (and there are no direct causes of  $D$  not on this path).
- The hiker ducking is an actual cause of the hiker surviving.
- The boulder falling is not an actual cause of the hiker surviving.

## Trumping example (p. 81)

*The sergeant and the major give orders to the corporal. The major's orders always trump the sergeant's, in the sense that the corporal always does what the major orders, regardless of the sergeant's orders. But when the major gives no orders, the corporal always follows the sergeant's orders. Suppose that the major and the sergeant order "Advance" and the corporal advances. A common judgment is that the major's ordering "Advance" causes the corporal to advance and that the sergeant's orders do not cause the corporal to advance . . . Several writers claim that this is a case of causation without counterfactual dependence, on the grounds that although the major's order causes the advance, if the major had given no order, the corporal still would have advanced.*

## Application of (AC) to the trumping example (p. 82)

Let  $M$  = the major's order; possible values include "Advance," "Retreat," and no order. Let  $S$  = the sergeant's order; same possible values. Let  $C$  = the corporal's response.



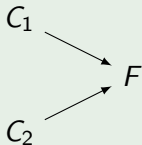
According to (AC):

- The major's order caused the corporal to advance.
  - There is a path of direct causation from  $M$  to  $C$ .
  - Changing  $M$  from "Advance" to "Retreat" would change the value of  $C$  (regardless of the value of  $S$ ).
- The sergeant's order didn't cause the corporal to advance.
  - Changing  $S$  can't change the value of  $C$ , given that  $M$  is fixed at its actual value of "Advance."

## Symmetric overdetermination example (p. 82)

*Each of two campers throws a lighted cigarette into the forest, where each cigarette on its own would have produced a forest fire, and a fire follows.*

Let  $C_i$  = whether camper  $i$  throws a lighted cigarette into the forest,  $F$  = whether there is a forest fire.



According to (AC):

- Camper 1 did not cause the fire, because changing  $C_1$  would not change  $F$ , given that  $C_2$  is fixed at its actual value.
- Similarly, camper 2 did not cause the fire.

Woodward says intuitively both are causes, so he revises (AC).

Woodward replaces (AC) with a revised definition (AC\*) which implies that  $C_1$  and  $C_2$  are both causes of  $F$ . I won't describe this because it is complex and I think it is a retrograde step.

### My objections to (AC\*)

- In the trumping example, (AC\*) implies that the sergeant's order causes the soldier to advance. Woodward acknowledges that this doesn't agree with his "preanalytic assessment" (p. 382 n. 44).
- (AC\*) is more complex than (AC).
- (AC) has a clear rationale: Actual causes make a difference in the actual situation. (AC\*) lacks such a rationale.

With (AC), symmetric overdetermination can be dealt with by saying the two factors cause the effect jointly but not separately.



# Questions

- 1 State Woodward's definition (AC) of actual causation.
- 2 Is actual causation, as defined by (AC), transitive? Justify your answer.
- 3 A sergeant and a major give orders to a corporal. The major's orders always trump the sergeant's, in the sense that the corporal always does what the major orders, regardless of the sergeant's orders. But when the major gives no orders, the corporal always follows the sergeant's orders. Suppose that the major and the sergeant order "Advance" and the corporal advances. According to (AC), does the major's order cause the corporal to advance? Does the sergeant's? Justify your answers.
- 4 Each of two campers throws a lighted cigarette into the forest, where each cigarette on its own would have produced a forest fire, and a fire follows. Was the action of either camper a cause of the fire, according to (AC)? Justify your answer.