The conceptual core of causal claims

Philosophical foundations of explanation

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January 10, 2024

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Plan

1. Introduction

2. On the semantics of *cause* and *because*
   - Sufficiency
   - Difference making
   - Production

(1) a. The employer did not hire Elisabeth Dekker **because** she is pregnant.

b. ChatGPT being trained on far-right Reddit posts **caused** it to output racist stereotypes.

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The modelling question. What information do we use when we judge that a causal claim holds? In other words, what information should a causal model contain?

(1) a. The employer did not hire Elisabeth Dekker **because** she is pregnant.

b. ChatGPT being trained on far-right Reddit posts **caused** it to output racist stereotypes.

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The meaning question. Under what conditions is a causal claim true or false? That is, what do causal claims mean?

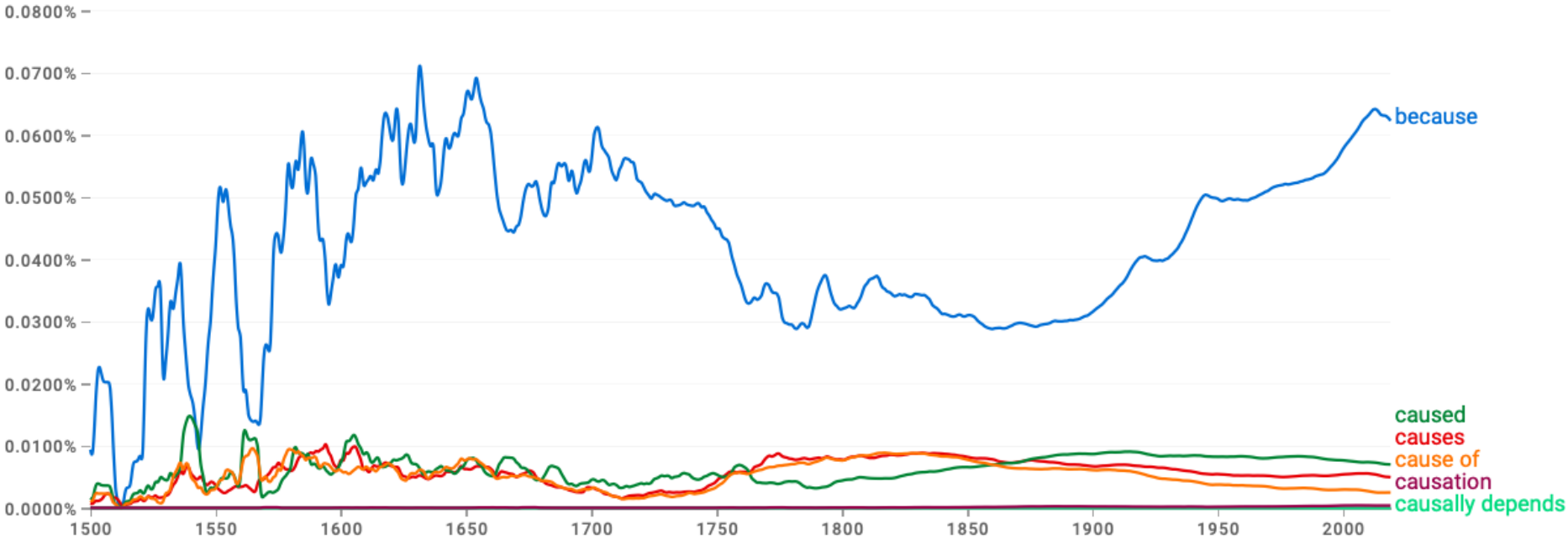
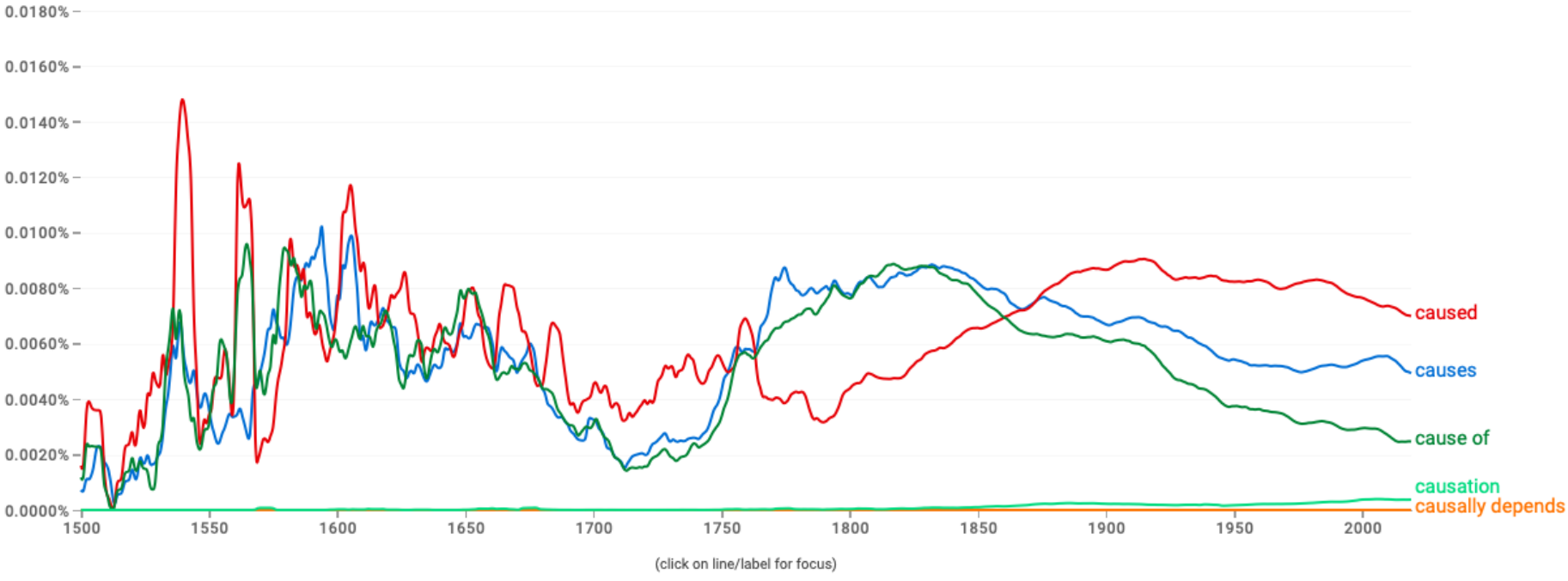


Figure: Frequency of *because*, *caused*, *causes*, *cause of*, *causation* and *causally depends* from the Google Books Ngram viewer. [Source].



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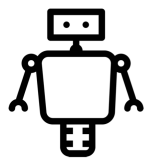
$$cause = difference\text{-}making + sufficiency + production$$



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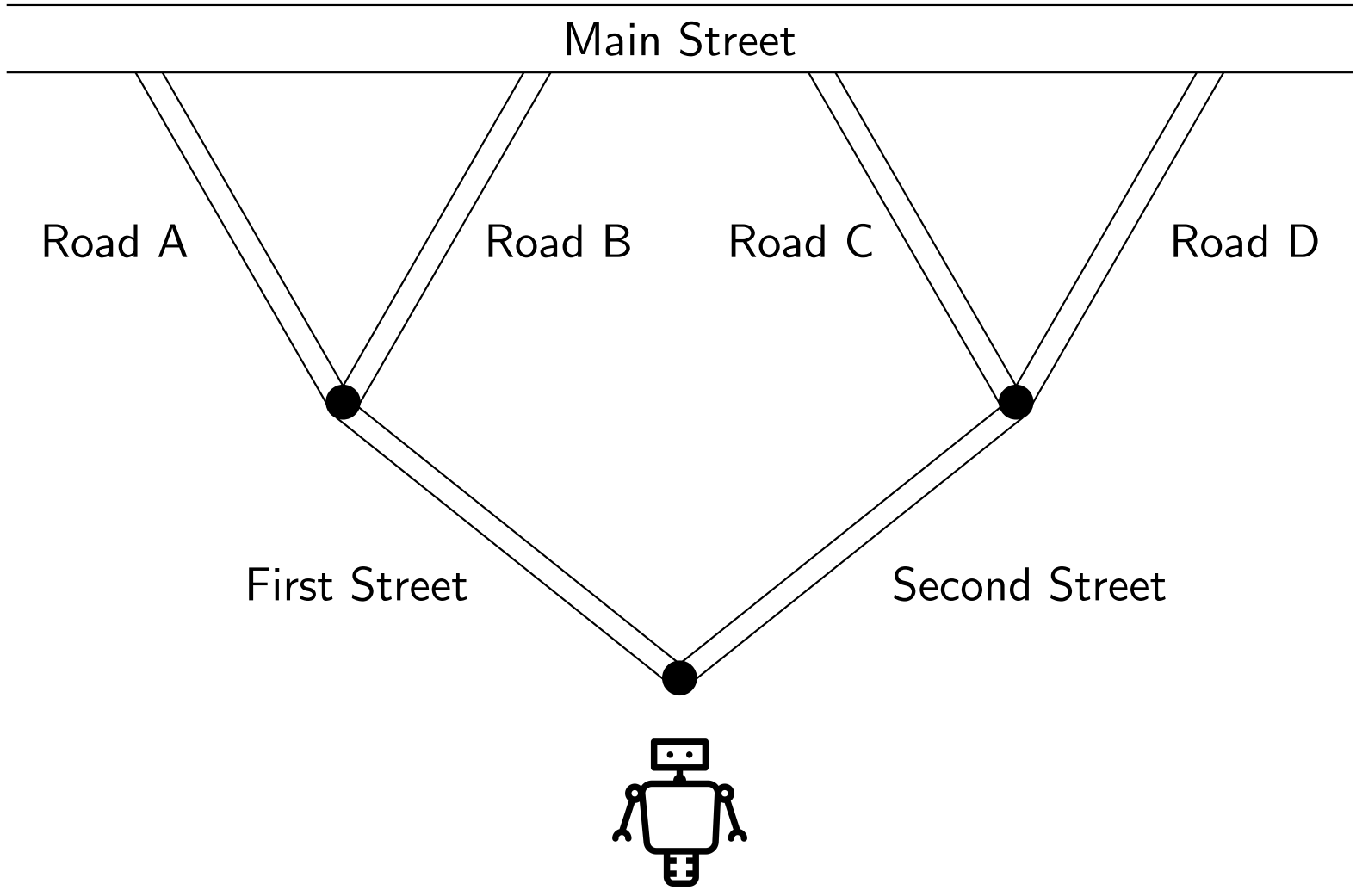
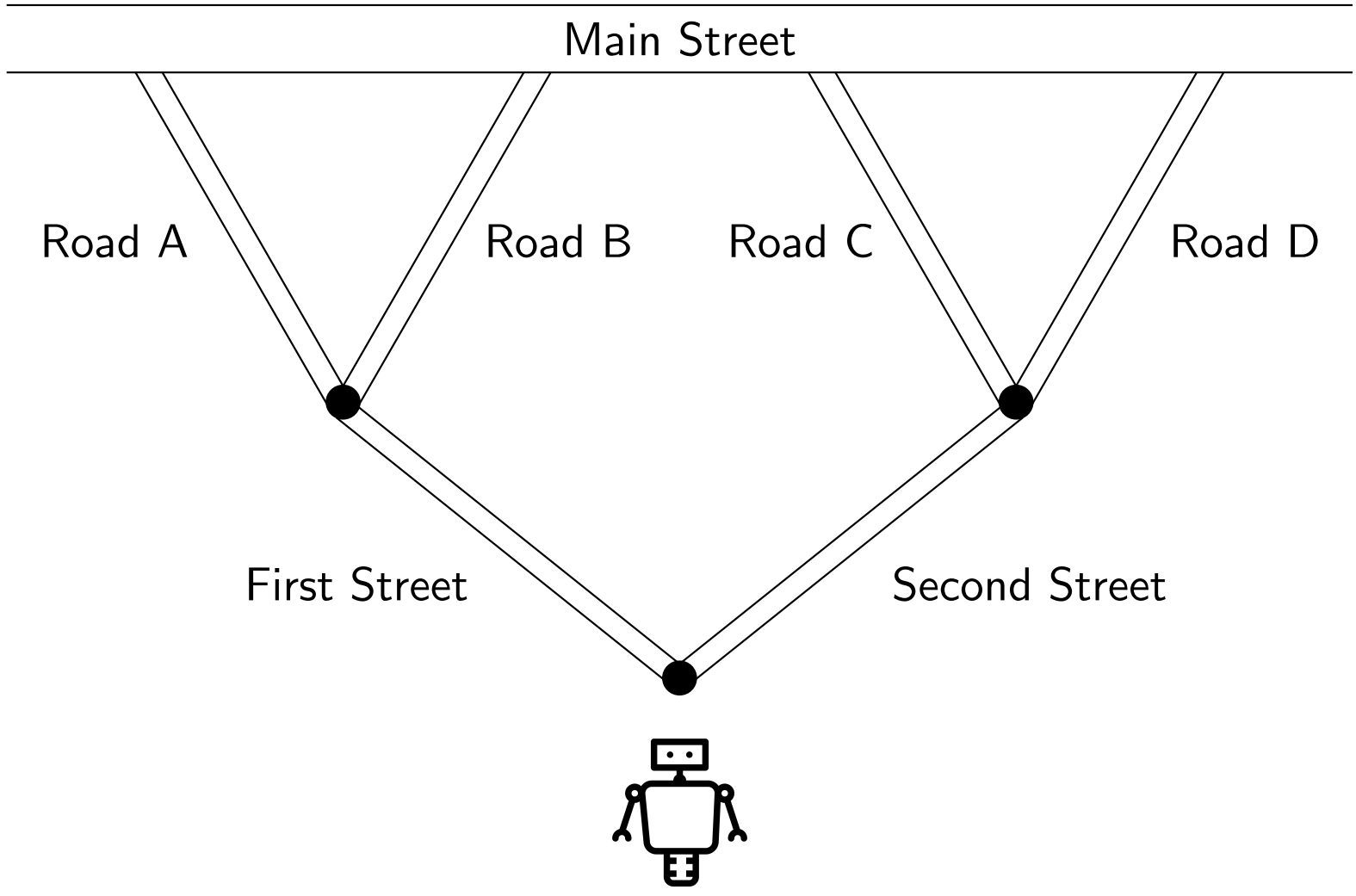
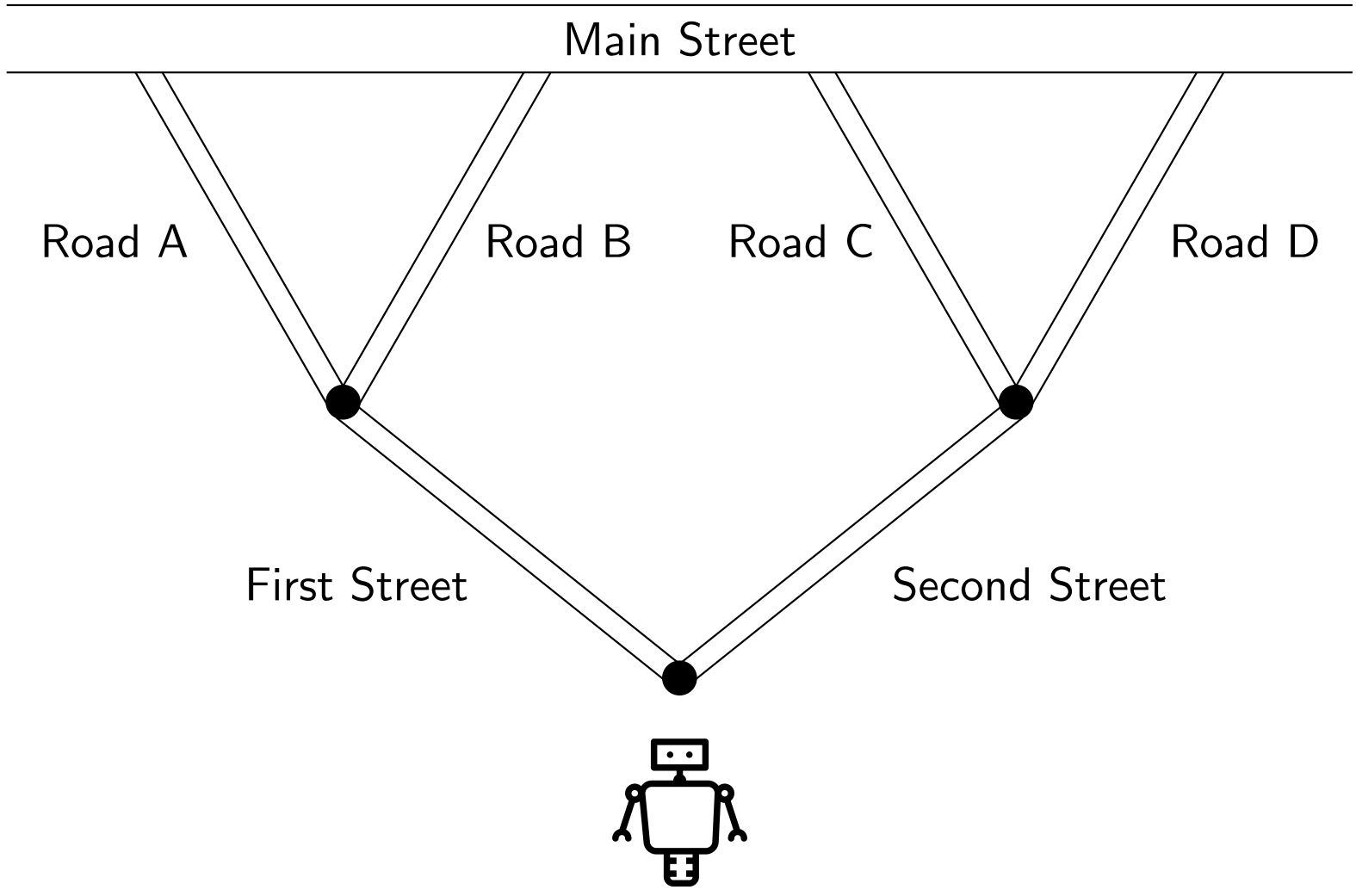

Main Street
Road A
Road B
Road C
Road D
First Street
Second Street



(2) *Context: The robot turns at random.*

a. The robot taking First Street caused it to take Road B.

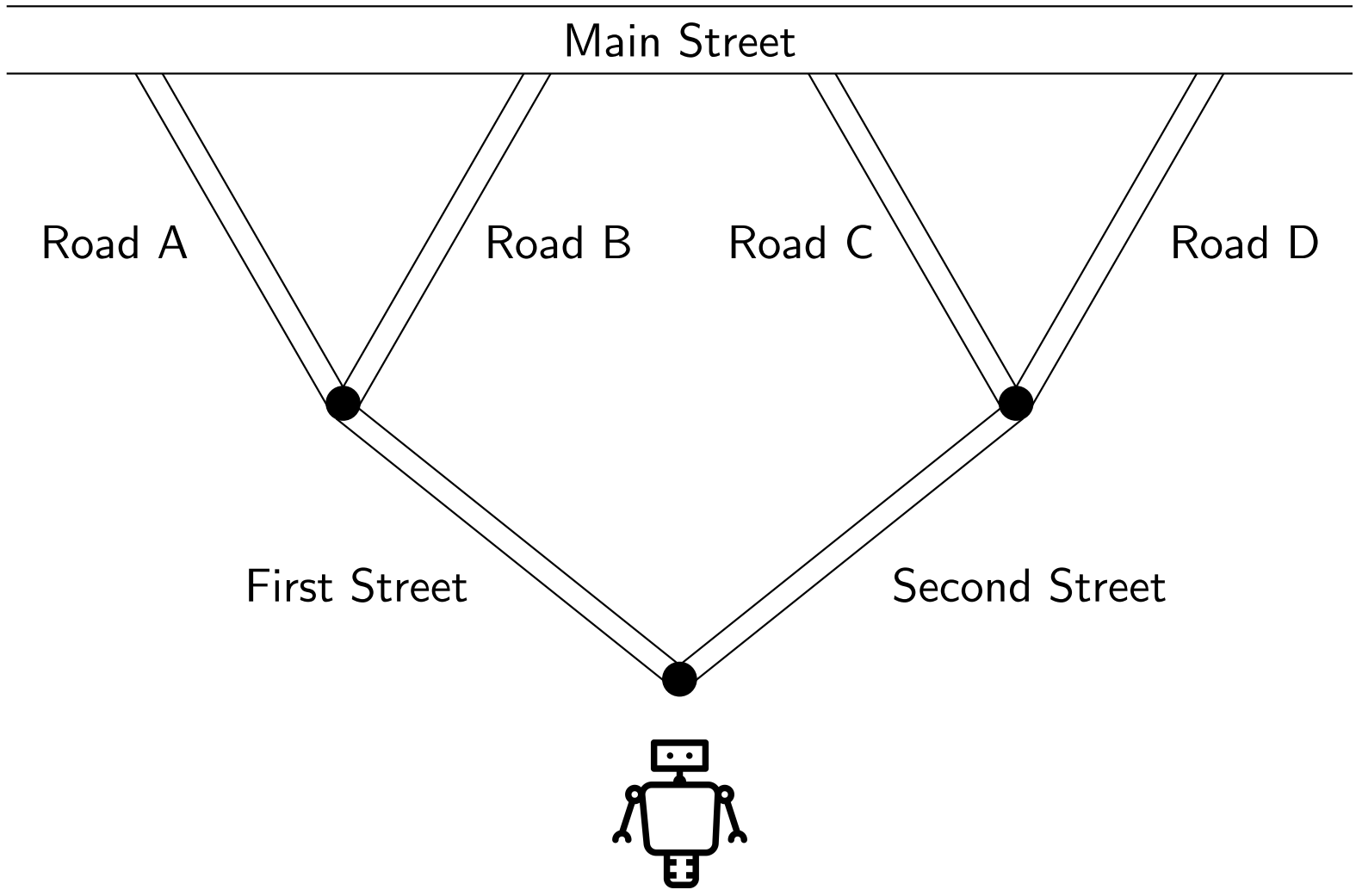
b. The robot took Road B because it took First Street.



(2) *Context: The robot turns at random.*

a. The robot taking First Street caused it to take Road B. ✗

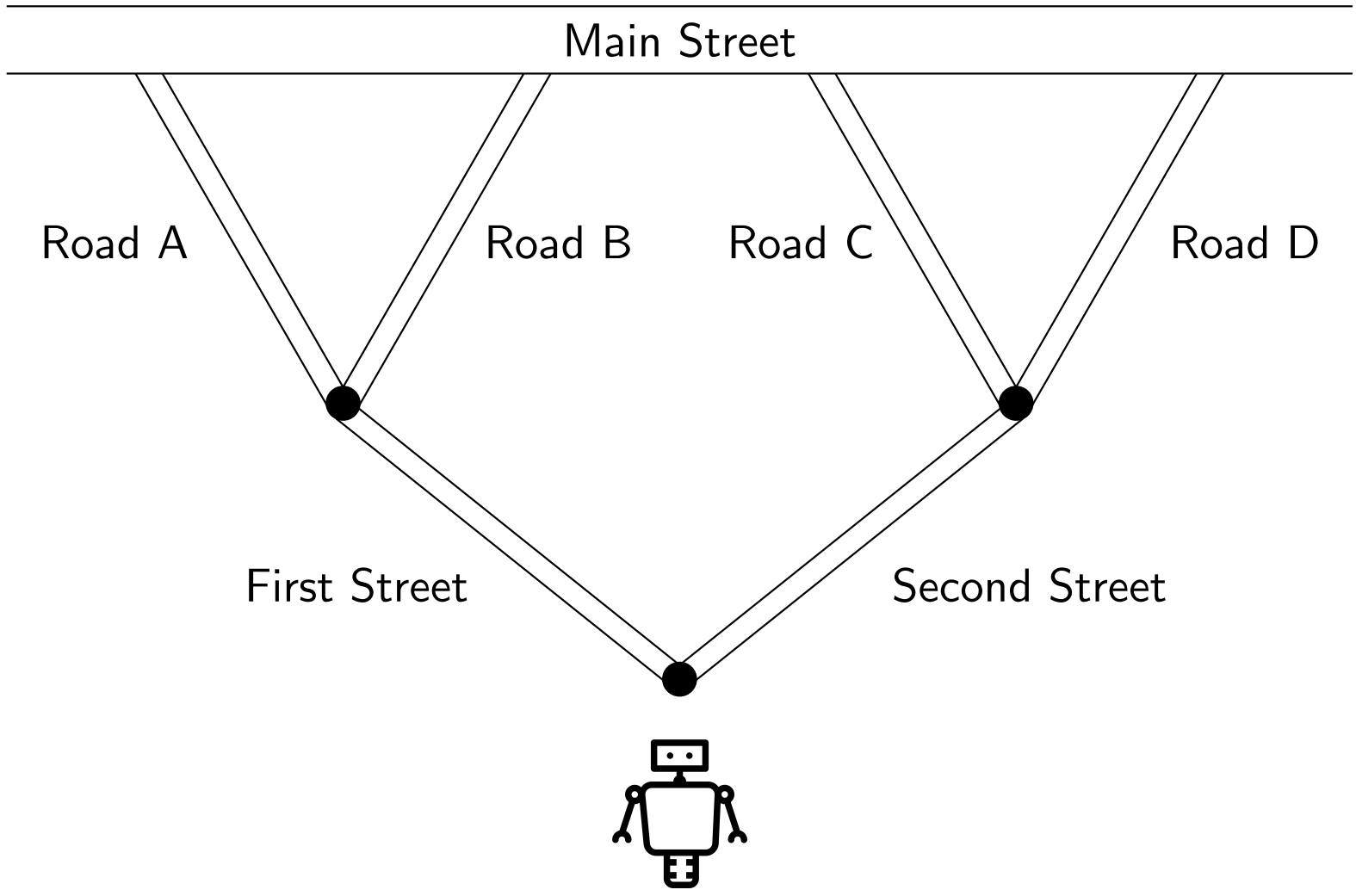
b. The robot took Road B because it took First Street. ✗



(3) *Context: The robot always changes direction.*

a. The robot taking First Street caused it to take Road B.

b. The robot took Road B because it took First Street.



(3) *Context: The robot always changes direction.*

a. The robot taking First Street caused it to take Road B. ✓

b. The robot took Road B because it took First Street. ✓

Sufficiency as univeral quantification over worlds

C is sufficient for E just in case every world in the modal horizon given by w and A where A is true, C is true.

(4) a. Ali has an Irish passport because he was born in Ireland.
b. Ali has an Irish passport because he was born in Europe.

(5) a. Being born in Ireland caused Ali to get an Irish passport.
b. Being born in Europe caused Ali to get an Irish passport.

Context: Sally is 25 years old. The legal drinking age is 18.

(6) a. Sally was allowed to buy alcohol because she is over 18.
b. Sally was allowed to buy alcohol because she is over 12.

(7) a. The fact that Sally is over 18 caused the cashier to allow her to buy alcohol.
b. The fact that Sally is over 12 caused the cashier to allow her to buy alcohol.

(8) a. Given that the robot turned at random, nothing caused it to take Road B.

b. Given that the robot turned at random, it did not take Road B because of anything.

(8) a. Given that the robot turned at random, nothing caused it to take Road B.

b. Given that the robot turned at random, it did not take Road B because of anything.

(9) Nothing exists of which it cannot be asked, what is the cause (or reason) [*causa (sive ratio)*], why it exists.

— Spinoza
Principles of Cartesian Philosophy
Part I, Axiom 11

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An engineer is standing by a switch in the railroad tracks. A train approaches in the distance. She flips the switch, so that the train travels down the right-hand track, instead of the left. Since the tracks reconverge up ahead, the train arrives at its destination all the same.

(Hall 2000, p. 205)

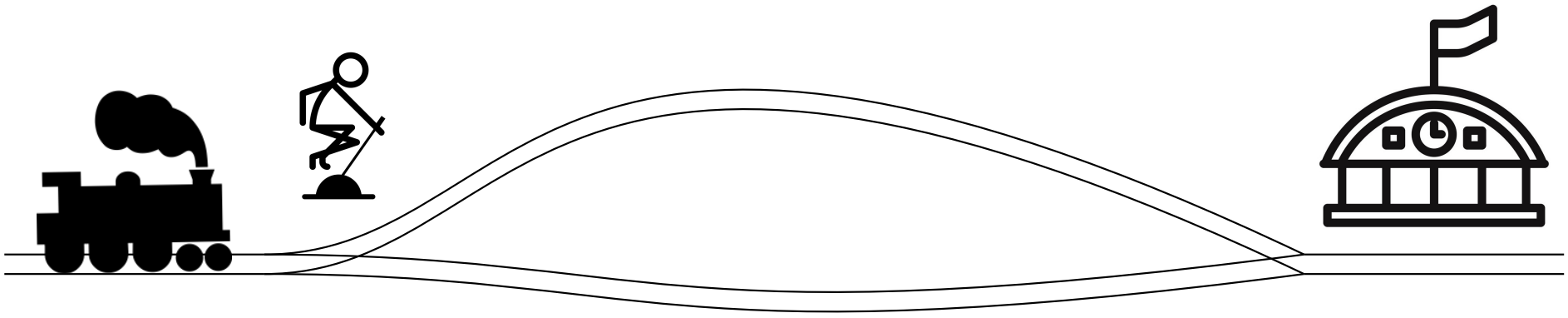

Figure: Hall's switching scenario.

(10) a. The train reached the station because the engineer flipped the switch.

b. The engineer flipping the switch caused the train to reach the station.

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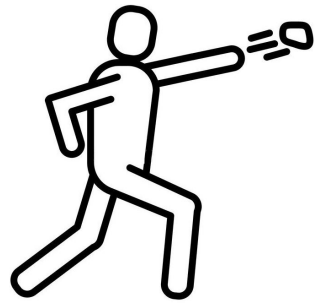
Suzy and Billy, expert rock-throwers, are engaged in a competition to see who can shatter a target bottle first. They both pick up rocks and throw them at the bottle, but Suzy throws hers before Billy. Consequently Suzy's rock gets there first, shattering the bottle. Since both throws are perfectly accurate, Billy's would have shattered the bottle if Suzy's had not occurred, so the shattering is overdetermined.

(Hall and Paul 2003, p. 110; Hall 2004, p. 235)



(11) a. The bottle broke because Suzy threw her rock at it.
b. Suzy throwing her rock at the bottle caused it to break.

(12) a. The bottle broke because Billy threw his rock at it.
b. Billy throwing his rock at the bottle caused it to break.

It is not quite clear what 'dependence' is supposed to be, but at least it seems to imply that you would not get the effect without the cause. The trouble about this is that you might from some other cause. That this effect was produced by this cause does not at all show that it could not, or would not, have been produced by something else in the absence of this cause.

— Elisabeth Anscombe (1971)

It is not quite clear what 'dependence' is supposed to be, but at least it seems to imply that you would not get the effect without the cause. The trouble about this is that you might from some other cause. That this effect was produced by this cause does not at all show that it could not, or would not, have been produced by something else in the absence of this cause.

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Suzy produced the bottle to break, Billy did not.

Possible analyses of production:

- Causal process (Salmon 1984, Dowe 2000)
- Transmission of a force (Talmy 1988, Wolff 2007, Copley and Harley 2015)
- Locality + quasi-Newtonian laws (Maudlin 2007)
- Chain of NESS tests (Beckers 2016)
- Chain of counterfactual dependence (McHugh 2023)

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