Causal Mechanisms and Process Tracing

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Review Case Studies

- Many uses of case studies
- In case comparisons (last week), we focused on scoring cases on variables to test theories *between cases*
- Now we focus on *within-case* comparisons

Causal Process Observations

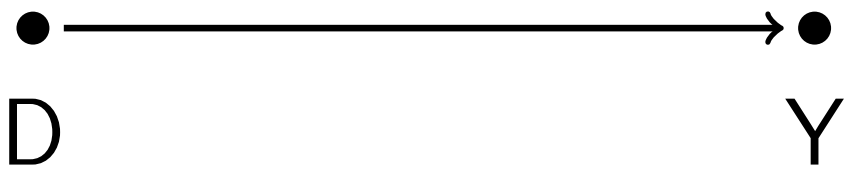
- Definition: "An insight or piece of data that provides information about the context, process, or mechanism, and that contributes distinctive leverage in causal inference"[1]
- Might be used to:
  - Inductively generate hypotheses
  - Deductively test a chain of causal relationships

[1] Brady and Collier 2004, p.277

Four (or five) principles of causality[2]

1. Correlation
2. Nonconfounding
3. Direction ("temporal precedence")
4. Mechanism
5. (Appropriate level of analysis)

[2] From Kellstedt and Whitten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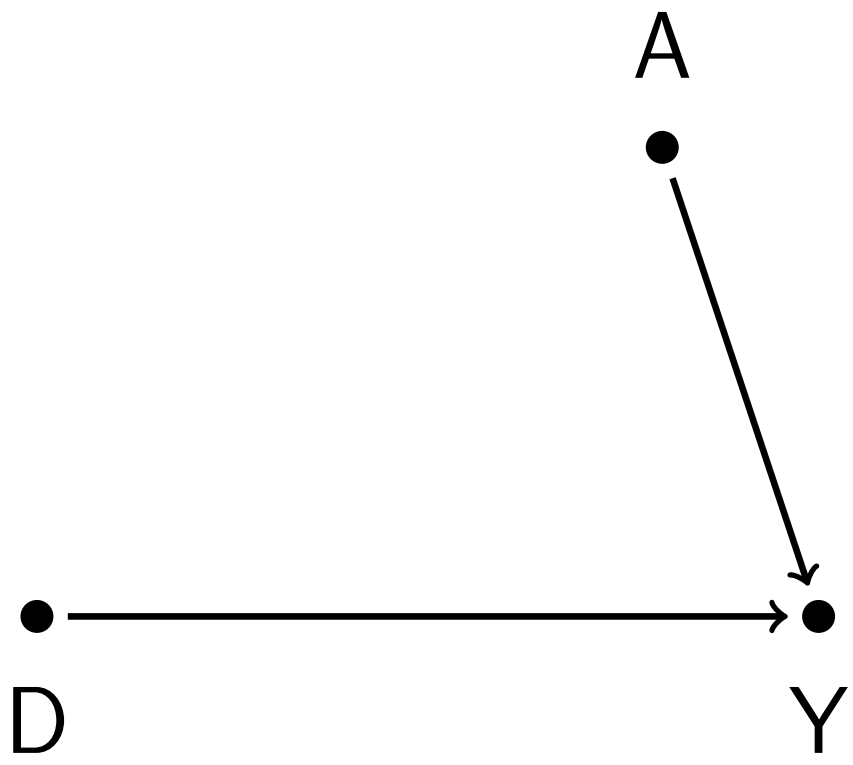
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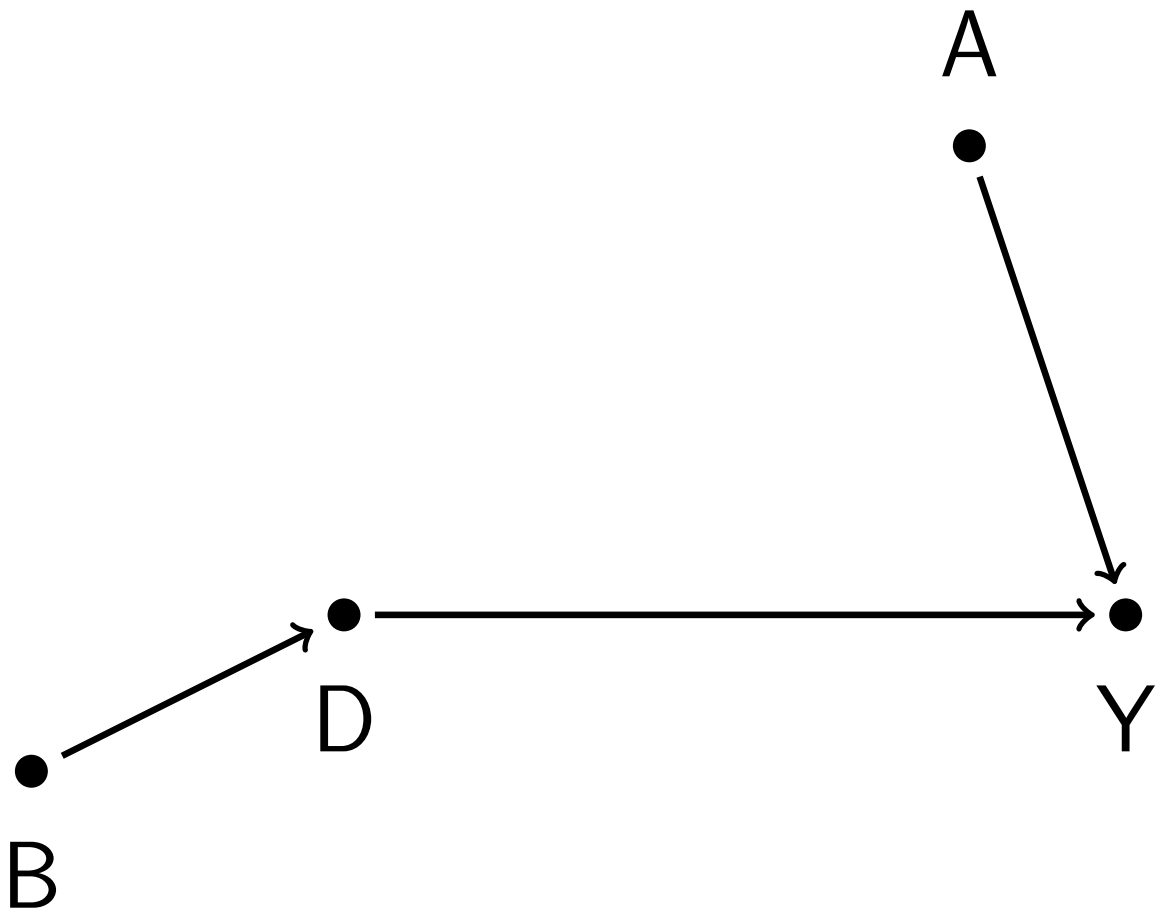
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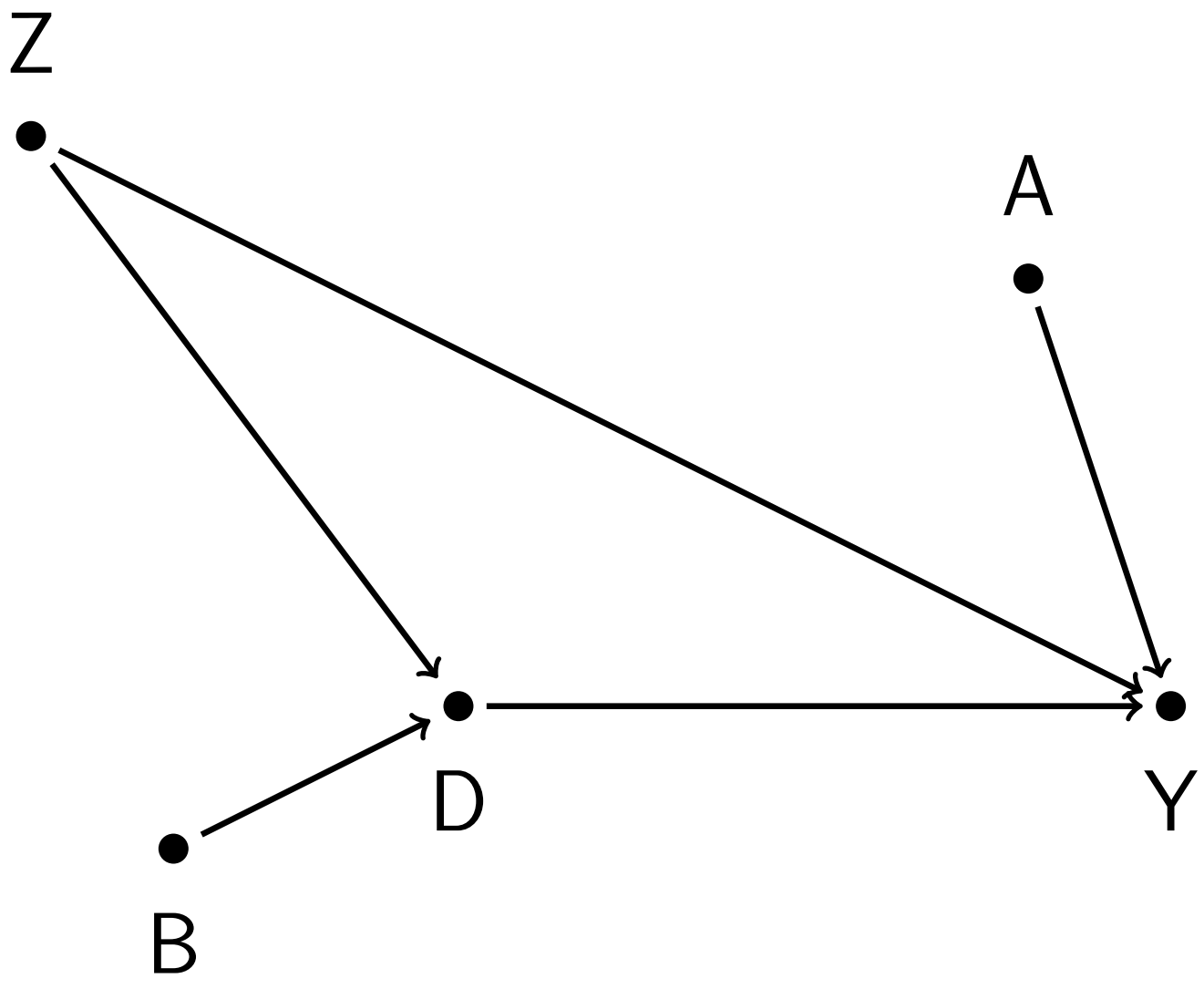
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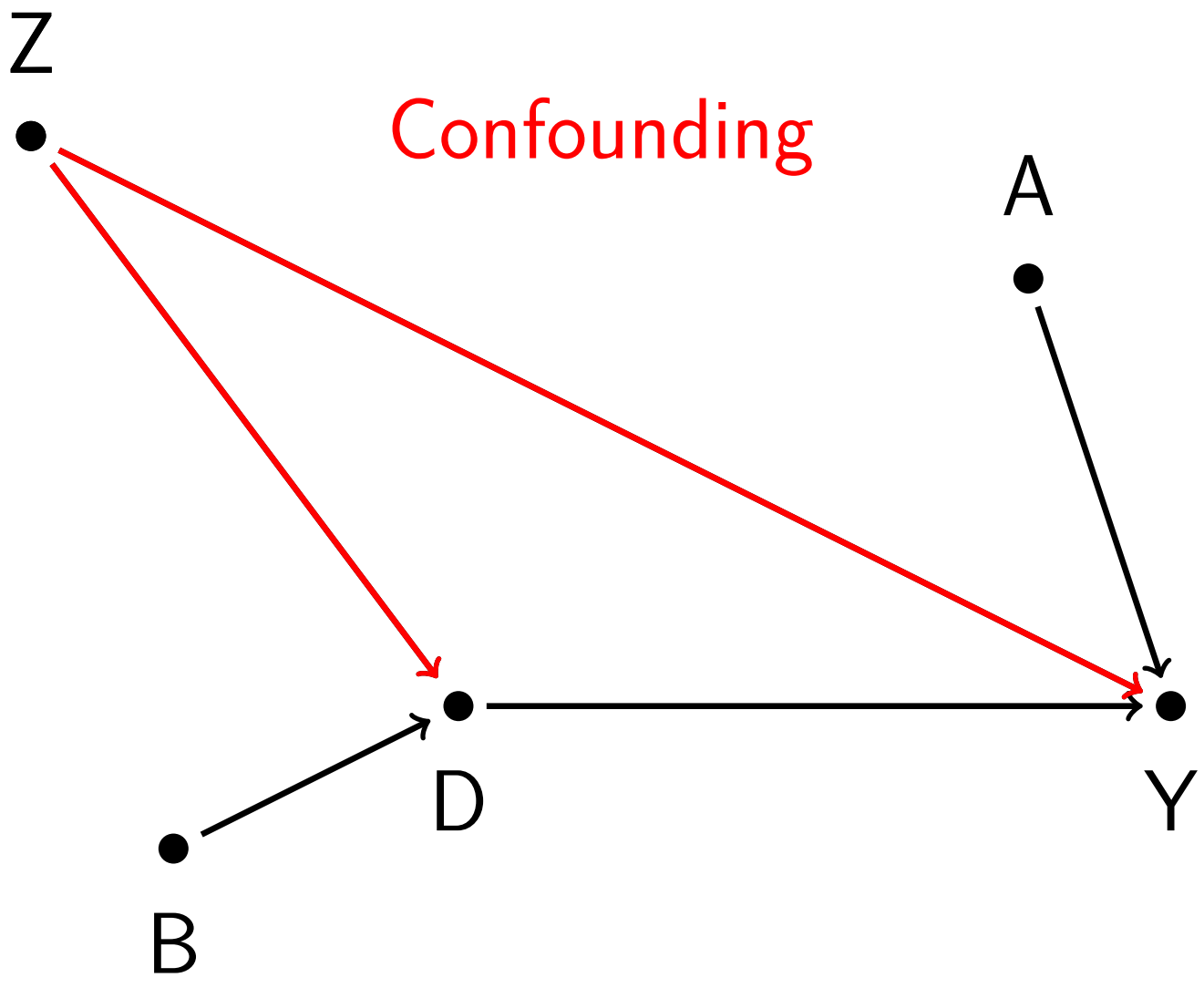
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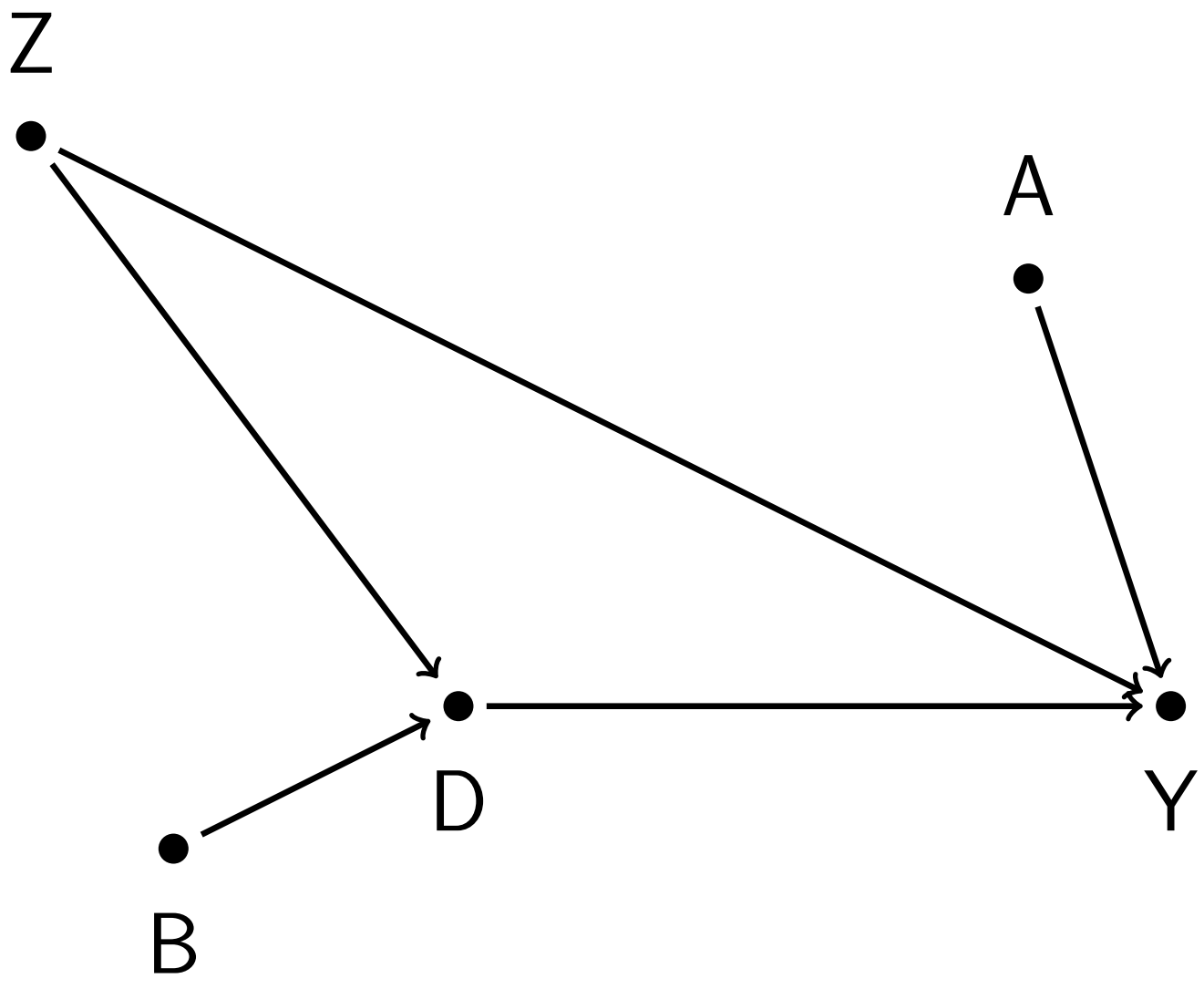
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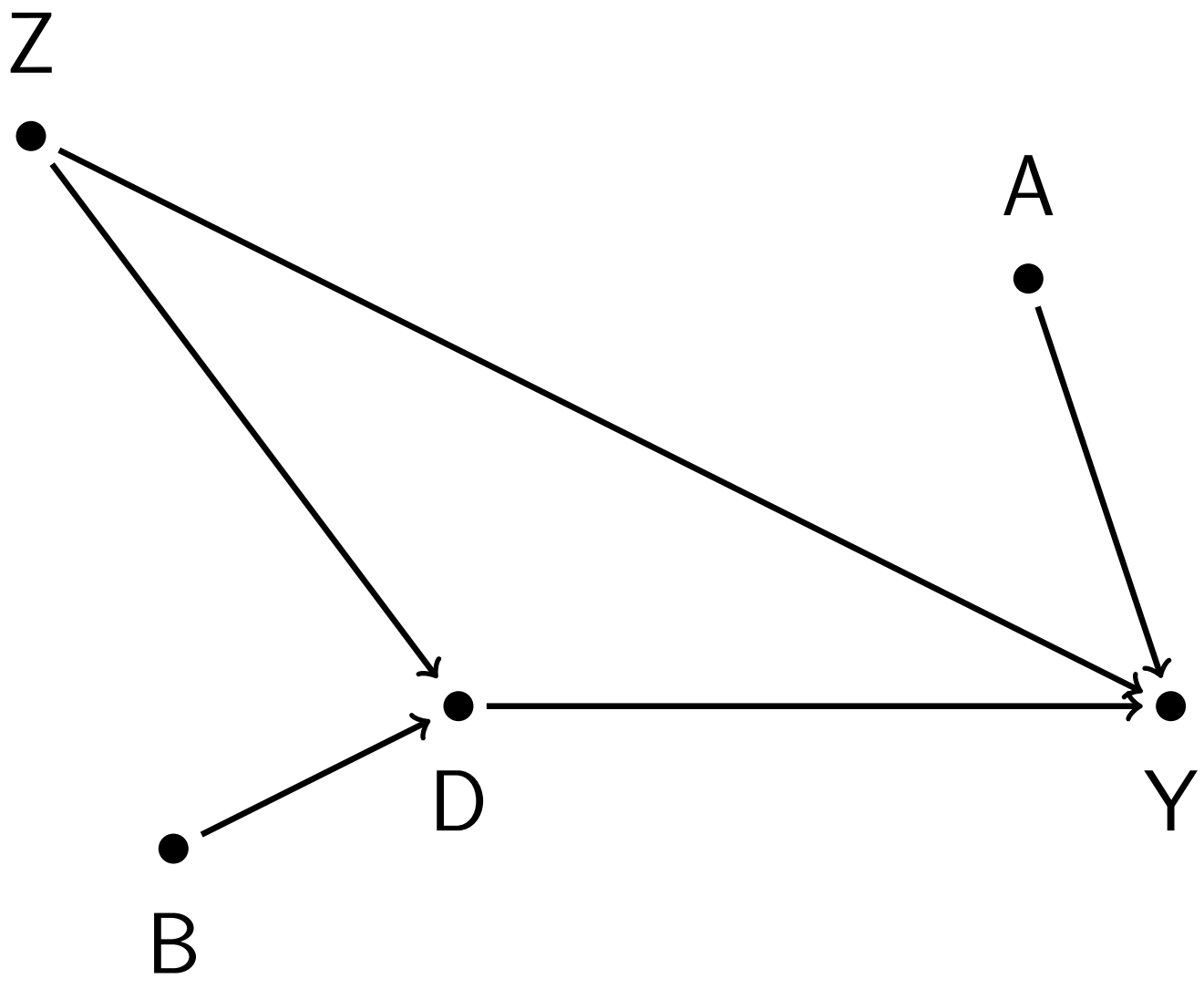
Mediators/Mechanisms

- Definition: "the generative mechanism through which the focal independent variable is able to influence the dependent variable of interest" [3]
- Dropping the tautology, "the pathway(s) or process(es) by which an effect is produced"
- Allows us to distinguish:
  - *Direct* effects
  - *Indirect* effects

[3] p. 1173 from Baron, R.M., and Kenny, D.A. 1986. "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations." *Journal of Personality and Social Psychology* 51(6): 1173–1182.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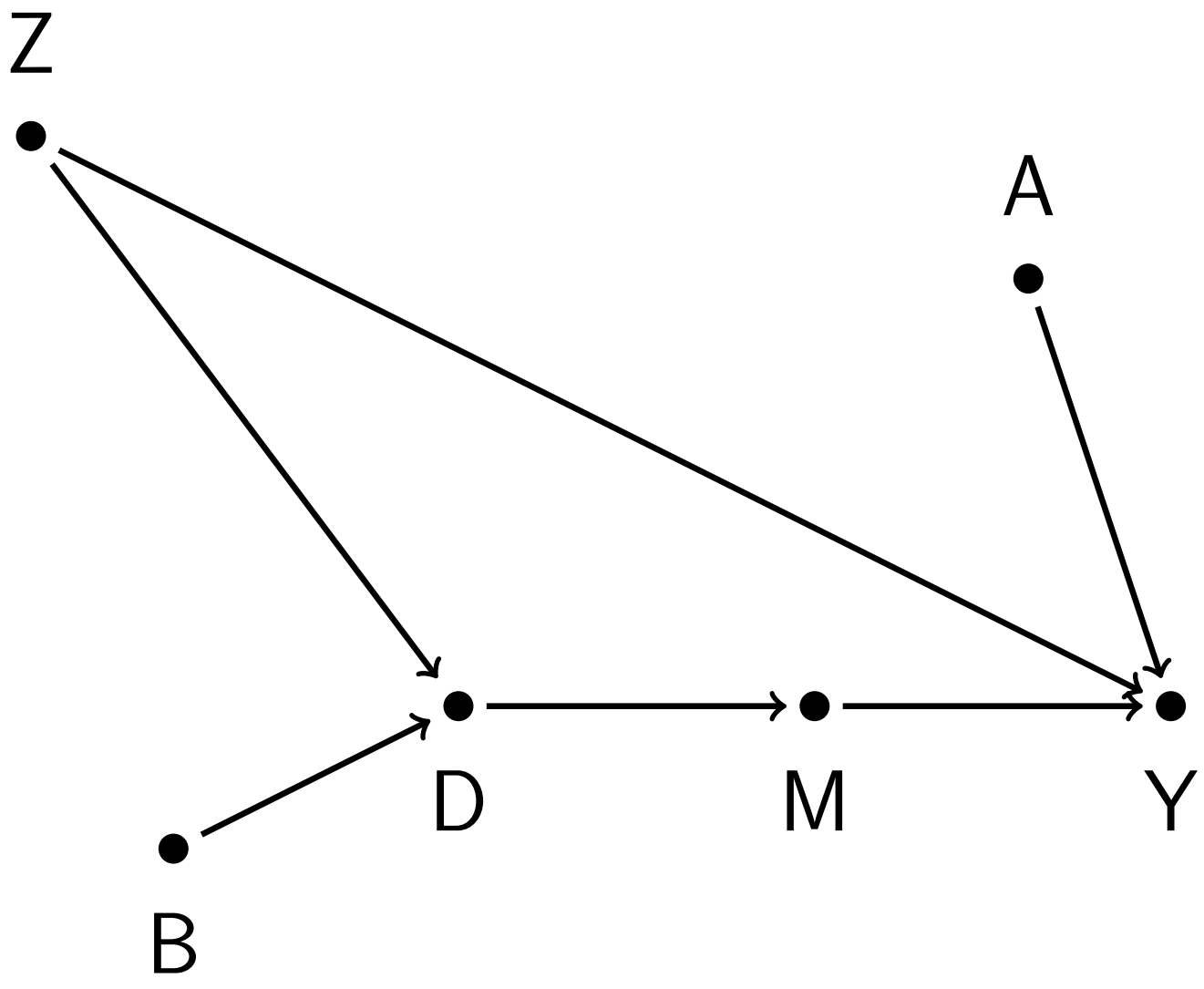
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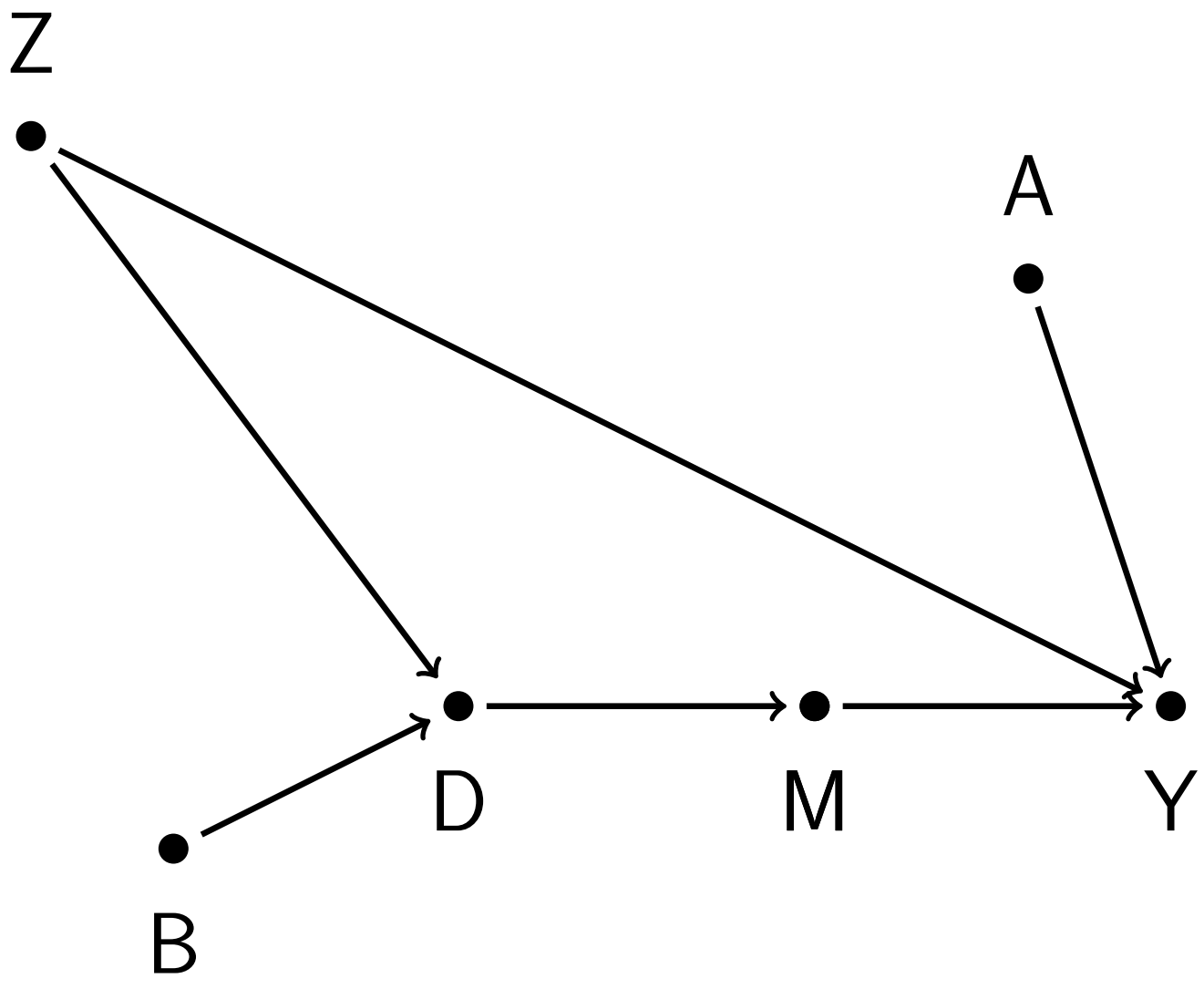
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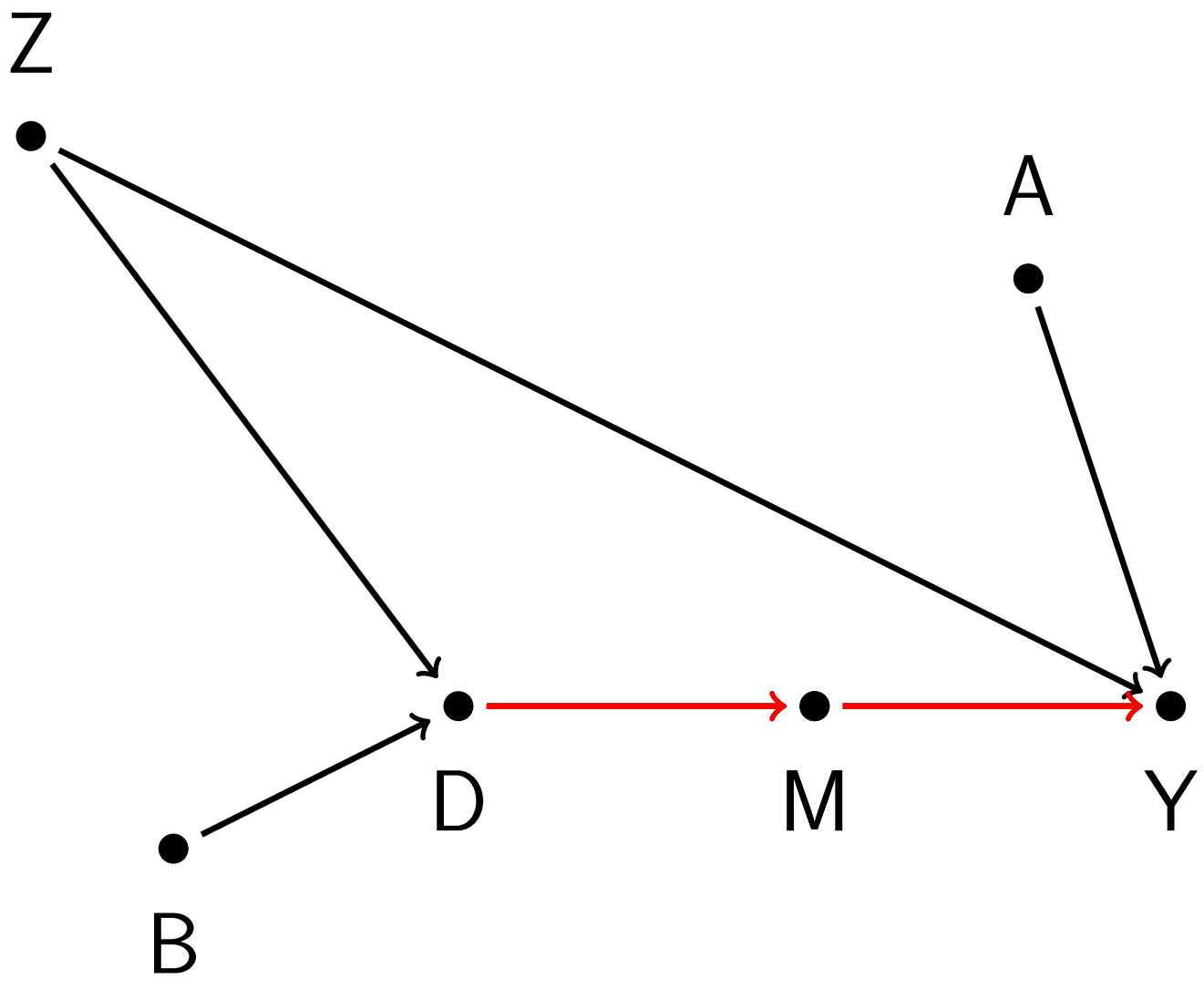
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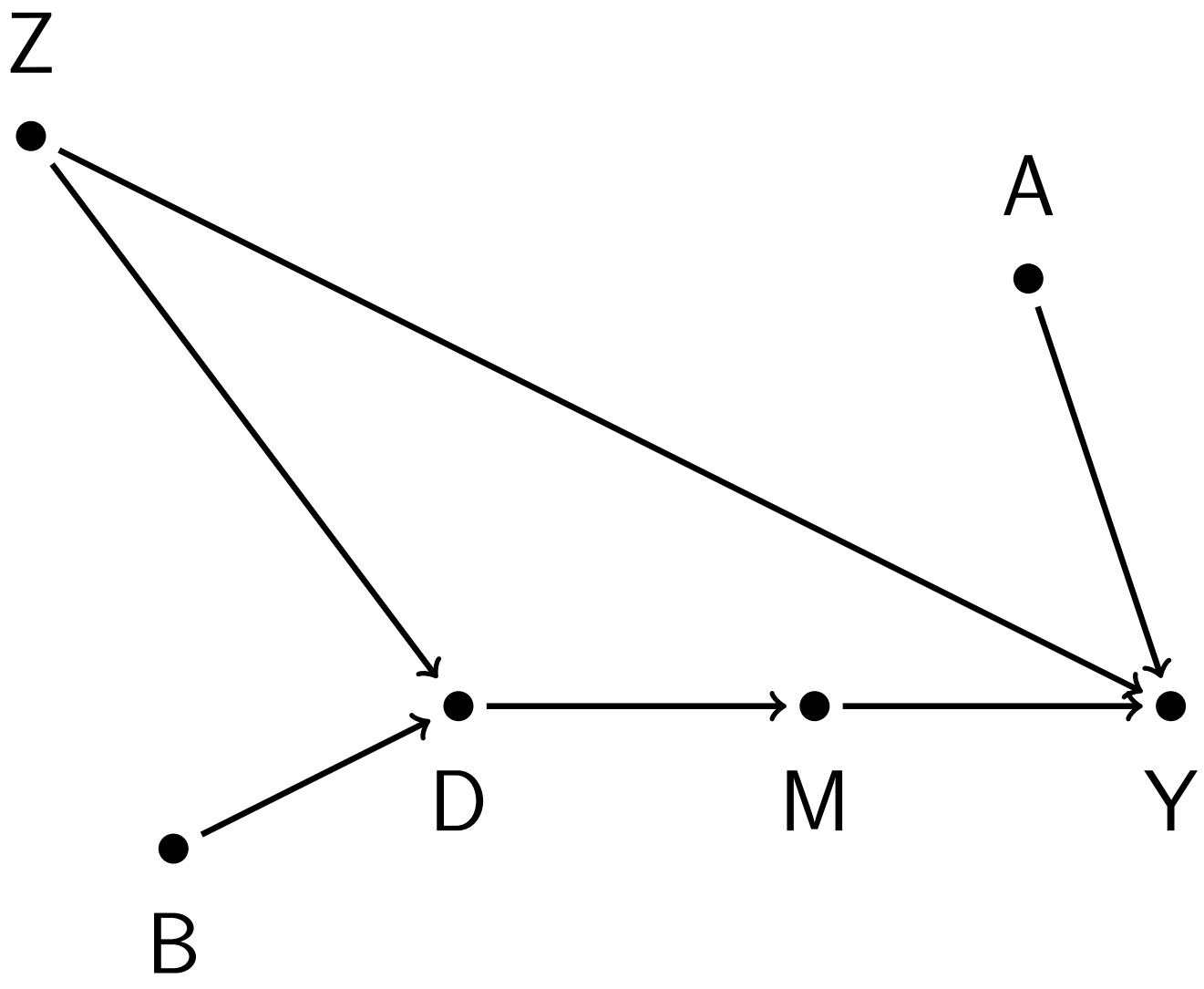
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Two Uses of Studying Mechanisms

1. Determine *how* a causal effect comes about
2. Establish seemingly disconnected cause and outcome through a chain of smaller causal effects

1. The *how* of the *why*

- A causal effect is an explanation of *why* something occurs
- Mechanisms explain *how* that effect occurs

Example: Smoking

We know that smoking kills.

How does this effect occur?

Source: © Wellcome Trust

2. Sum of small effects

- We may be able to establish a number of small linkages
- The product (multiplication) of these effects is the *total effect*

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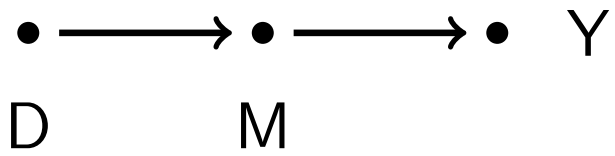
- The product (multiplication) of these effects is the *total effect*
- Two ways to conceptualize this:
  - Deterministic causality
  - Probabilistic causality

Pearl's Front Door Criterion

- Same rules for understanding mechanisms as causes generally
- Mechanisms must be:
  - exhaustive
  - isolated



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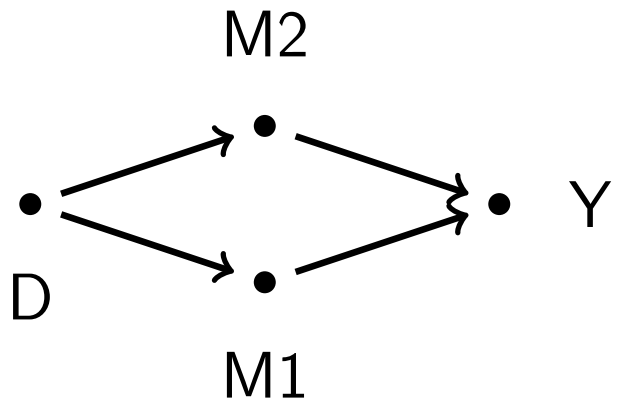

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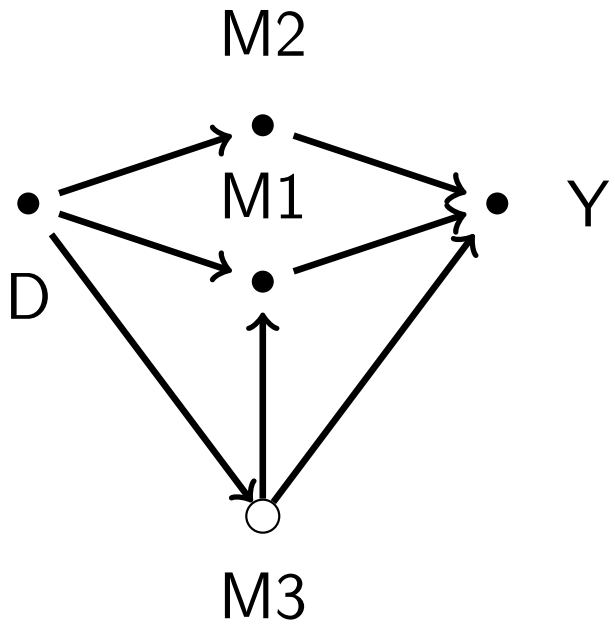

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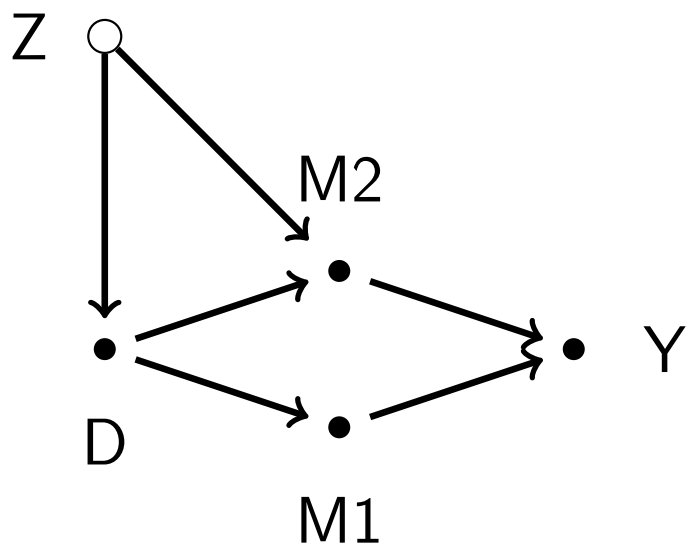

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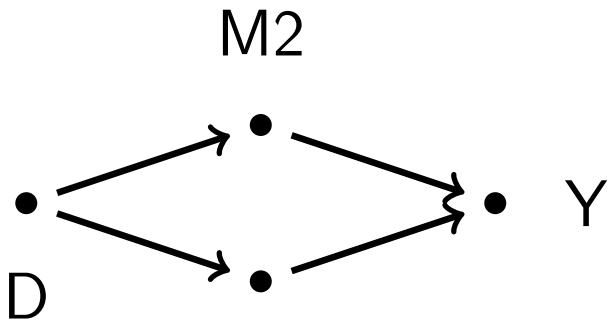

Do We Care About Mechanisms?

Write for two minutes

- Is understanding a mechanism necessary for causal inference?
- When should we be satisfied that we have "bottomed out" a causal process?

Process Tracing

- Definition: "analysis of processes of change that seeks to uncover causal mechanisms and causal sequences"[4]
- Single-case method
- Focused on gathering CPOs
- Sequence of counterfactuals

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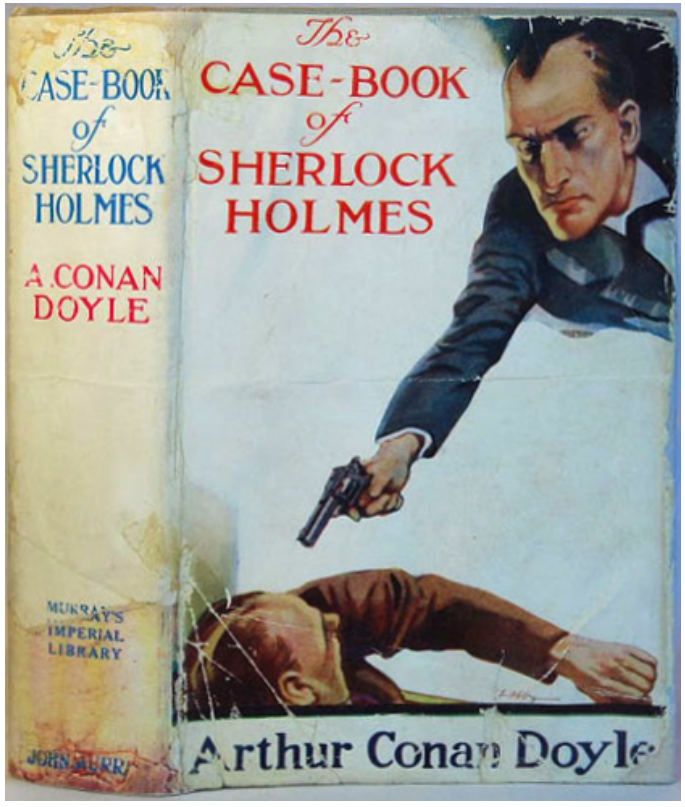
[4] p.300 from Brady, H.E., and Collier, D. 2004. *Rethinking Social Inquiry*. Rowman & Littlefield.

Inductive Process Tracing

- Broad search for sequential steps necessary for an event to occur
- No *a priori* expectations to test
- Analogous to detective work



Source: Public Domain

Deductive Process Tracing

- Sequence of within-case hypothesis tests
- Theory or extant evidence guide chosen comparisons
  - May iterate if there is no or very weak evidence for one's hypothesis(es)

Four Process Tracing Tests[5]

Broadly consistent with Neyman-Pearson hypothesis testing.

1. Straw-in-the-wind test
2. Hoop test
3. Smoking gun test
4. Doubly decisive test

[5] Note: I am not a fan of this typology.

Major Caveat: Uncertainty

- Our certainty about a causal relationship is a direct function of sample size
- Case studies methods have small sample sizes
- Process-tracing is generally a single-case design
  - Reduce uncertainty by finding within-case variation
  - Accept only high certainty about specific case

Research Design Proposal

- Instructions posted on Moodle
- Use class sessions to discuss topics
- Don't worry about design now
- Focus instead on topics, questions, and theories
- Should not be same as dissertation topic

Coming weeks (MT and LT)

- Methods of data collection
  1. Text
  2. Interviews/Surveys
  3. Observation
- Problem Set 4 (due in December)
- Shift to methods of quantitative data analysis