
# Theory and Causal Inference

## Design Political Research: Week 9

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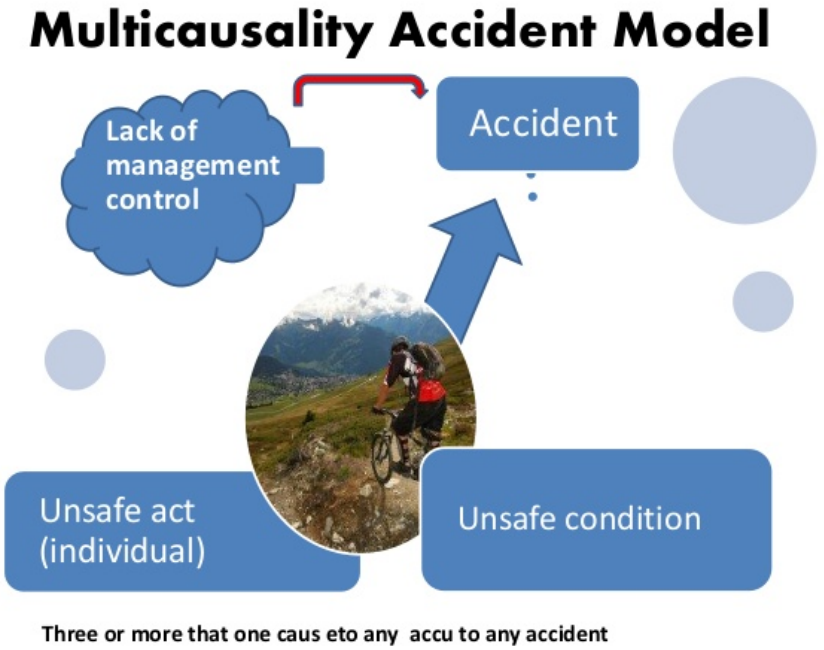
# How to understand causation?

- Find A is causal, rather than random, consequence.
- How do we identify the causes of A?
- How do we justify B is a cause of A?

# Pluralist view?

- ≠ multicausality




Pluralism 并不是否认同一个结果可能有不同原因，而是同一个原因可以从不同方向解释， 见下

Pluralist view: formal causes, material causes, efficient causes, deterministic causes, probabilistic causes, correlational causation, causal mechanisms…

- Different explanations for the same causation
- Different perspective of the same causal explanation.

这种观点有什么不好呢？两点：见后

# Why not pluralist view?

- Over-stating the different-ness
- Not benefiting the research

# A universal view

- A minimal definition
- 16 criteria of formal properties of causal arguments
- 8 criteria for research design

# Defining causation

Cause: Events or conditions that raise the prior probability of some outcome occurring, under ceteris paribus conditions (Gerring 2005, 169).

- $P(Y|X) > P(Y|-X)$.
- Why a minimal causation?
  - Hint: Sartori's ladder
- Bayesian framework?
  - $Y(A|B) = \frac{Y(B|A)Y(A)}{Y(B)}$
  - $Posterior = \frac{Likelihood \times Prior}{Evidence}$

Cause 于Gerring不取决于likelihood，不取决于evidence， 而只是关于prior

# Causal Proposition

- Specification (clarification, operationalization, falsifiability)
- Precision
- Breadth
- Boundedness
- Completeness
- Parsimony
- Differentiation (exogeneity) 孰因孰果
- Priority
- Independence
- Contingency Different from background factors,不是random的
- Mechanism
- Analytic utility
- Intelligibility understandable
- Relevance
- Innovation
- Comparison

Parsimony: (economy, efficiency, simplicity, reduction, Ockham's razor), 有必要吗？分组讨论， 1-4 必要性， 5-8非必要性

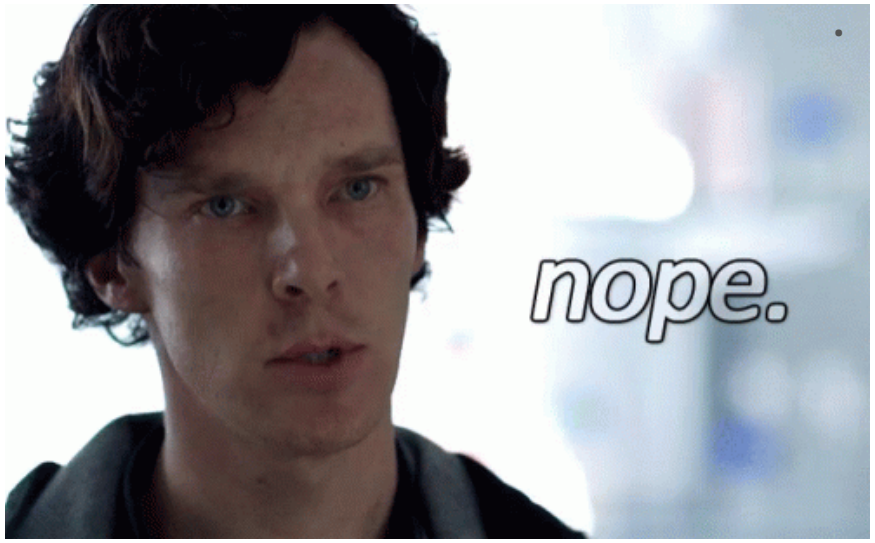
# Criteria of Demonstration

1. Plenitude
2. Comparability
3. Independence
4. Representativeness
5. Variation
6. Transparency
7. Replicability

# Plenitude

Conducting an empirical based study.

Nope

- 


Yes

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# Comparability

- Descriptive comparability: 'X' and 'Y' mean roughly the same thing across cases.
- Causal comparability: X and Y do not interact in idiosyncratic ways in different cases. Lucky shirt; lucky shoes
- Control: the extent to which remaining dissimilarities (of both sorts) may be taken into account.

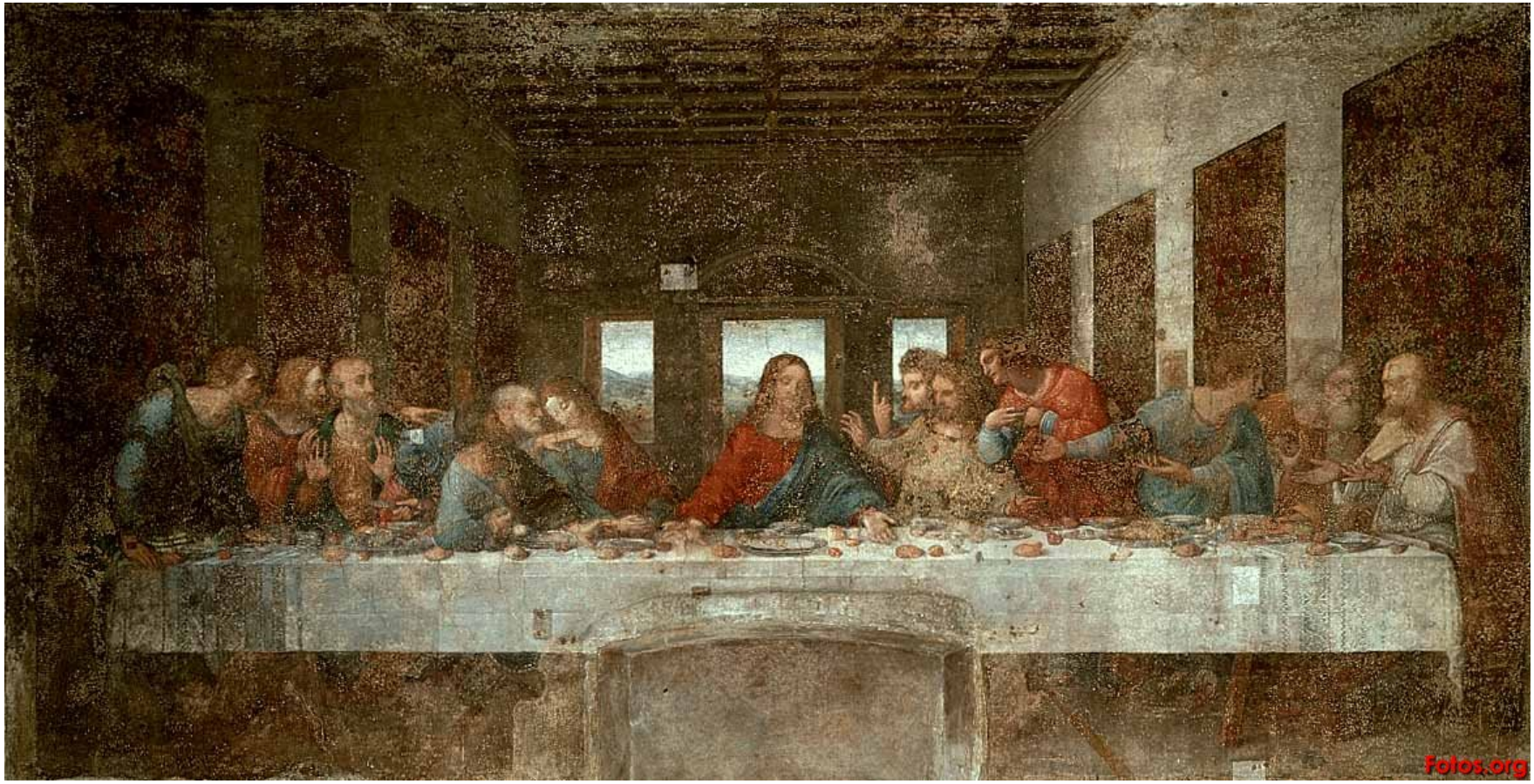
# Independence and Representativeness

# Variation


Kim Il-sung Kim Jong-il Kim Jong-un

# Transparency

## DaVinci's code



# Replicability

# Two strategies to test theory

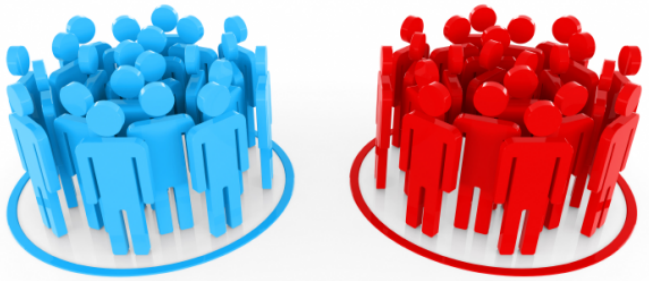
- Actual case strategy (save for later)
- Counterfactual strategy

# What's counterfactual?

- Claims about events that did not actually occur.

# Relation with hypothesis test?

- Following the experimental logic



- Compromising with the reality

# Differences from the hypothesis test

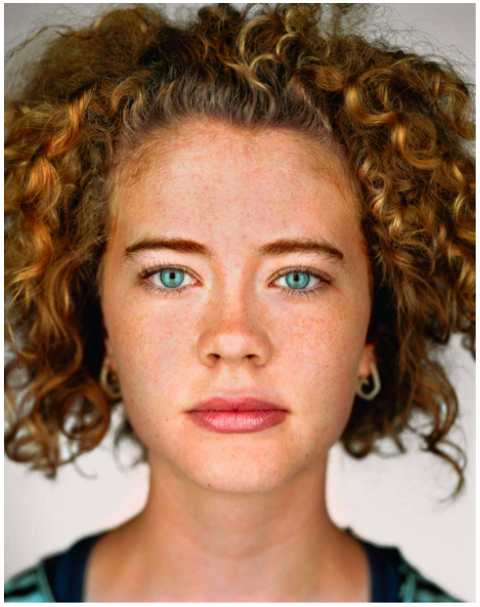
## Hypothesis test

- Rely on "ceteris paribus"
- Some probability assumptions
- Can assess the frequencies and magnitudes of the causality
- Uncertainty can be reduced by more cases

## Counterfactual

- Rely on general principles, laws, or regularities
- Knowledge of historical facts
- Assess effects based on proliferation
- No formal criterion of uncertainty

# Why not actual cases?



*Marta*

*Emma*

- Comparability
- Degree of freedom

# When to use?

- Qualitative, mostly
- # of variables > # of observations

# Risk

How can we know what would have happened?

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