

Deriving Hypotheses from Theory

Department of Government
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1 Causal Claims in the News

2 Review of Last Week

3 Generating Hypotheses

4 Hypothesis Testing

5 Preview

Causal Claims in the News

- Share news stories
- What was the claim?
- Was there any evidence or test?

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Last Week

- What are theories?
 - A tentative conjecture about the causes of some phenomenon of interest
 - An argument that attempts to explain how concepts are causally related
- Deduction and Induction
- Evaluating theories

Generality & Parsimony

Think for 90 seconds about each of these principles:

- Generality: Theories that can explain more are preferred over theories that can explain less
- Parsimony: Simple theories are preferred over complex theories

Are these principles defensible?

Are they any good?

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Hypotheses

¹Kellstedt and Whitten (p.4)

Hypotheses

- Definition: a theory-based statement about a relationship that we expect to observe.¹

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Hypotheses

- Definition: a theory-based statement about a relationship that we expect to observe.¹
- Features
 - Derived from theory
 - Specific
 - Empirical/observable

¹Kellstedt and Whitten (p.4)

How do we generate hypotheses?

- Think about *observable implications*
- What would evidence consistent with this theory be?
- What would evidence inconsistent with this theory be?

How do we generate hypotheses?

- Think about *observable implications*
- What would evidence consistent with this theory be?
- What would evidence inconsistent with this theory be?
 - This is *falsifiability*

Example: Broad Street Cholera

- 1854 outbreak of cholera in London
 - Around Broad Street (Soho)
 - 616 eventual deaths

Example: Broad Street Cholera

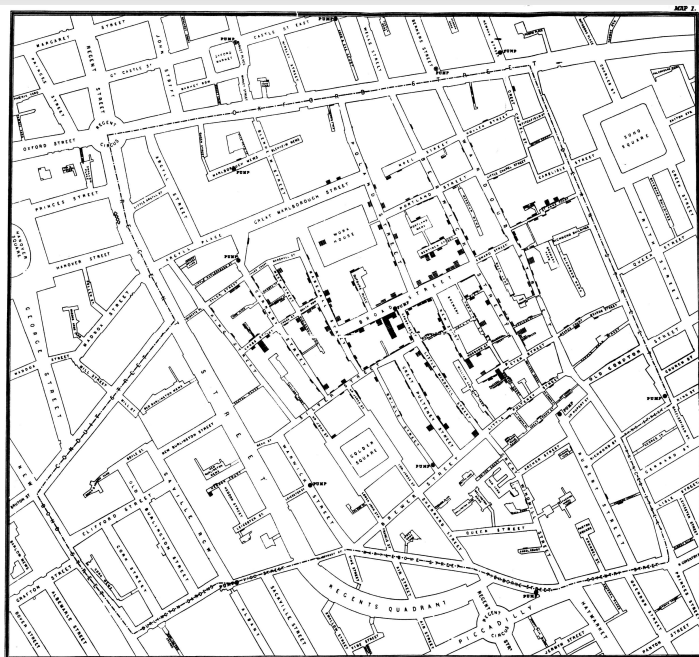
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Example: Broad Street Cholera

- 1854 outbreak of cholera in London
 - Around Broad Street (Soho)
 - 616 eventual deaths
- What causes transmission of cholera?
- Dominant theory at time: “miasma”
- Hypotheses:
 - Clean up garbage → ↓ cholera
 - Open windows → ↓ cholera



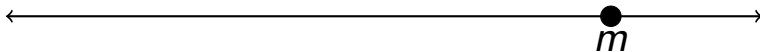
Observational Equivalence

- Definition: All hypotheses for two (or more) theories are identical
- What to do?
 - Generate more specific expectations
 - Move outside scope conditions
 - Settle for lack of explanation

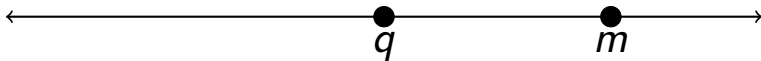
Median Voter Theory of Legislatures



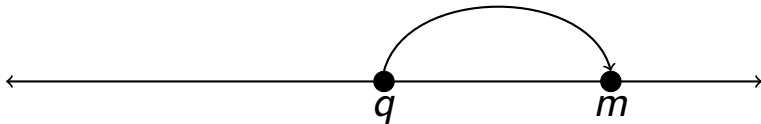
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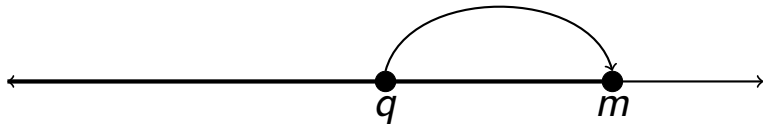
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Median Voter Theory of Legislatures



If this is true, why do we sometimes see policies left of m in the U.S. House?

Three Competing Theories

Committee Gatekeeping



Party Cartels



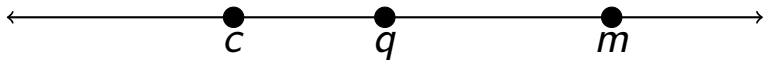
Pivotal Politics



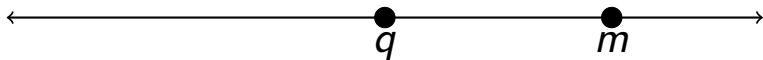
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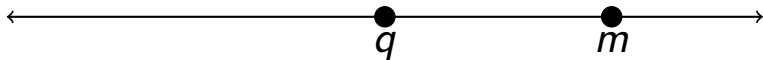
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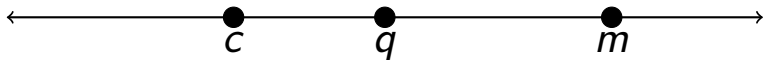
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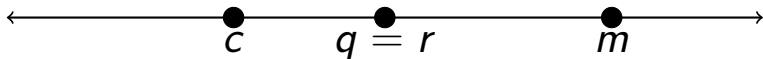
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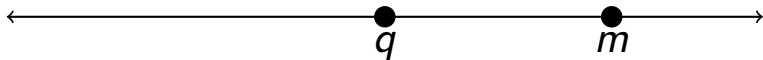
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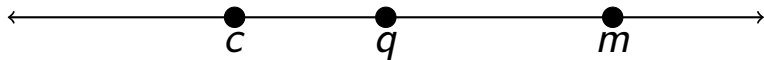
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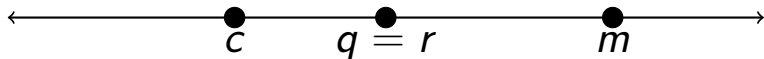
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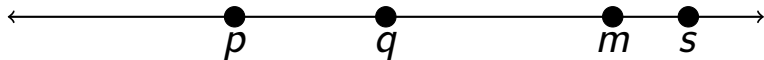
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Hypothesis Testing

- Multiple schools of thought
- History is conflictual and murky
- Two strands of literature
 - Philosophy of science
 - Statistics

Principle of Hypothesis Testing

- 1 Identify and collect data

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 - Independent variable(s)
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- 1 Identify and collect data
- 2 Data should include:
 - Independent variable(s)
 - Dependent variable(s)
- 3 Need variation on both
- 4 Test difference between outcomes when (possibly) causal variable differs

Forms of Hypothesis Testing

Null hypothesis

Begin with *null hypothesis*

Your hypothesis expects an alternative state of the world

c/o Ronald Fisher

Alternative hypotheses

Begin with 2(+) alternative hypotheses

Accept hypothesis consistent with observation

c/o Jerzy Neyman and Egon Pearson

Fearon's Counterfactuals

- Sometimes we cannot test our hypothesis with actual observations
- What does Fearon suggest we do?

A Good Test

- Correct level of analysis
- Within scope conditions of theory
- Well-defined concepts
- Measures of high construct validity, accuracy, and precision
- Possible to observe any correlation between potential cause and outcome
- Consistent with or an improvement upon past methods
- Test using different data than data used to generate theory

Some Testing Challenges

- 1 Deterministic and probabilistic causality
- 2 Effect heterogeneity
- 3 Multiple causation
- 4 Equifinality
- 5 Confirmation or disconfirmation bias

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Preview of Next Week

- What is a case?
- What are case studies?
- How do we use case studies to test and/or build theories?

