

Research Design

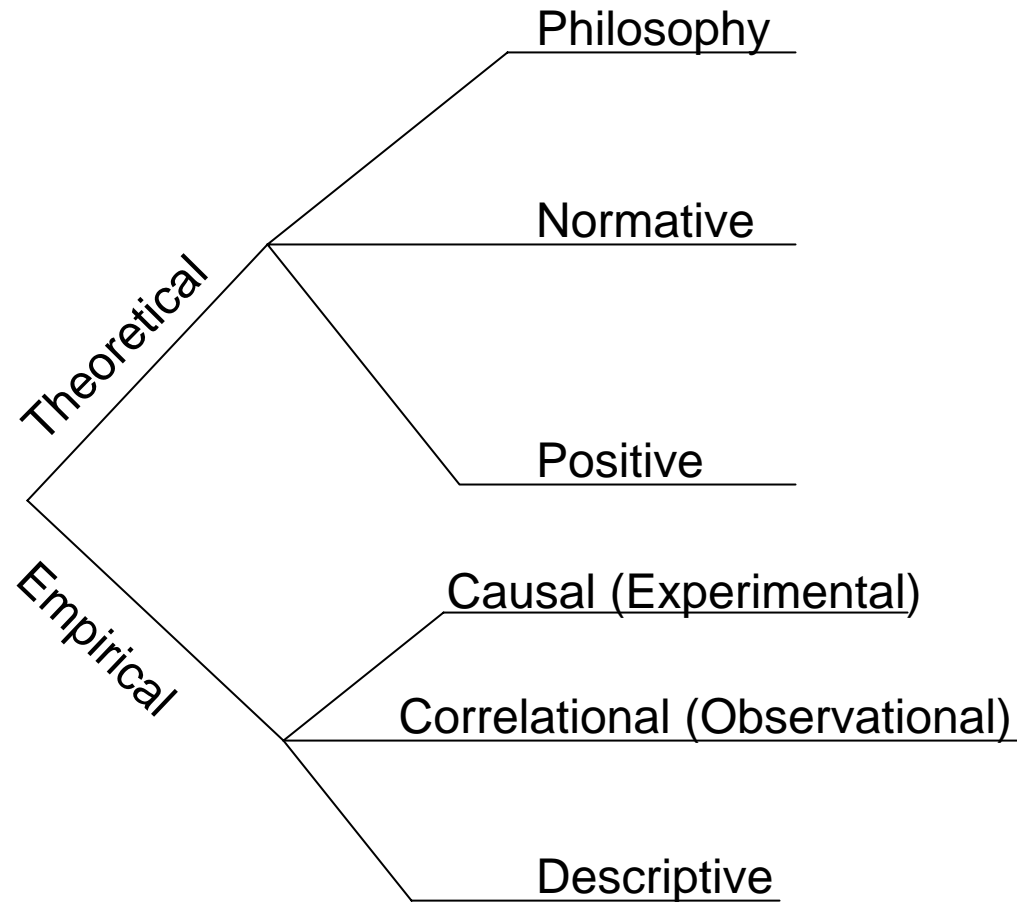
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Spring 2004

General Comments

- The road map of political science
- Different ways of doing political science research
- Major components of research designs
- Designing research to ferret out *causal* relationships
- Social science vs. natural science/engineering

The Road Map



Major Components of Research Designs

- Research question
- Theory
- Data

Research Question

- Important
 - Not too general
 - Not too specific
 - Just right
- Contribute to literature
 - How to tell: Social Sciences Citation Index
 - E.g.: effect of redistricting on congressional election results
 - Search for Cox & Katz, “The Reapportionment Revolution and Bias in U.S. Congressional Elections,” *AJPS* 1999

Theory

- Definition: A general statement of a proposition that argues *why* events occur as they do and/or predicts future outcomes as a function of prior conditions
- General/concrete trade-off
- Desirable qualities of theories
 - Falsification (Karl Popper)
 - Parsimony (Occam's razor)

Data

- More on this later, but first some basic terms:
 - Cases
 - Observations
 - Variables
 - Dependent variables
 - Independent variables
 - Confounding (lurking) variables
 - Units of analysis

Causality

- Definition of causality
- Problems in causal research
- Campbell and Stanley

Definitions of Causality

- Logical
 - A causes B if the “presence” of A is a sufficient condition for B .
- Experimental
 - A causes B if B occurs following the “exogenous” introduction of A
 - When does exogeneity occur?
 - Classic experiments
 - Ansolabehere & Iyengar on negative campaign ads
 - “Natural” experiments
 - Voting machines in Georgia & Massachusetts
 - Village councils in India
 - When does it not occur?
 - Typical research in previous examples
 - Anything strategic (prices, deterrence, campaign spending)

The Biggest Problems in Causal Research

- Establishing the exogeneity of “causes” in observational/correlational studies
 - Selection into “treatment” and “control” cases rarely random
 - Medical examples
 - Schooling examples (private vs. public)
 - Freshman special programs example
- Jointly determined relationships
 - Prices/quantities in markets
 - Spending/(expected) votes in elections
 - Armaments/level of violence in international systems

How to Establish Causality

- Donald Campbell and Julian Stanley,
*Experimental and Quasi-Experimental
Designs for Research* (1963)

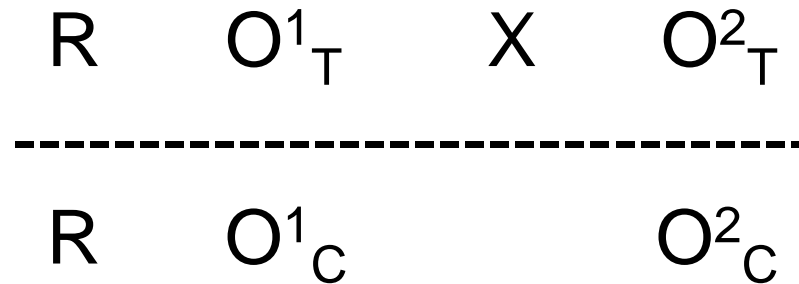
Design types

- Pre-test/post-test with control group
- Solomon four-group design
- One-shot case study
- One-group pre-test/post-test
- Static group comparison
- Post-test only experiment

[Running examples: voting machine effects]

Pre-test/Post-test Control Group

- Summary:



- Effect of treatment:

$$[O^2_T - O^1_T] - [O^2_C - O^1_C]$$

- This is the classic randomized experiment
- Problem: “Hawthorne effect”
 - Placebo helps mitigate

Solomon Four-Group Design

- Summary:

R	O	X	O
R	O		O
R		X	O
R			O

- Allows you to control for the effect of the experiment itself

One-shot Case Study

- Summary:
X O

 or

O X
- Journalism
- Common sense
- “of no scientific value”

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Liquor law's role in postgame riots is hotly debated The Boston Globe

By Mac Daniel, Globe Staff, 2/4/2004

Mayor Thomas M. Menino has blamed newly permitted Sunday liquor sales for helping to fuel post-Super Bowl riots in student areas, saying that young people were "able to run to the store when they ran out of beverage and stock up."

One-group Pre-test/Post-test

- Summary:

O X O

- “Historical control”
- Better than nothing
- Standard way of doing most research
- Big problems
 - No comparison group
 - No random assignment
 - Encourages “samples of convenience”

The manager of one popular liquor store, Huntington Wine & Spirits on Huntington Avenue near Northeastern, said his store closed early Sunday to avoid a drunken rush.

Sunday's riots "were a terrible thing, and they shouldn't have happened."

said manager Steven Rubin, whose store has refused to sell beer kegs for 10 years, despite the store's proximity to major college markets.

When asked if he thought Sunday liquor sales contributed to the riots, Rubin said no.

"Absolutely not," he added, "and I say that only because of what happened two years ago. Two years ago liquor stores weren't open, and we had the same problem."

Static group comparison

- Summary:

X O^2_T

O^2_C

- This is most cross-sectional & correlational analysis
- Problems
 - Selection into the two groups
 - No pre-“treatment” measurement

Imaginary Article adding
Cambridge, Somerville,
plus cities that don't have
Sunday liquor openings

Post-test only experiment

- Summary:

R	X	O
R		O

- No prior observation (assume $O^1_T = O^1_C$)
- Classical scientific and agricultural experimentalism

Where do standard political science studies fall among the Stanley/Campbell designs?

- One-shot case study
 - Little scientific value, but may be descriptively useful
- One-group pre-test/post-test
 - Often used in policy analysis
 - Only justified as a “best design” if there are ethical or other constraints
- Static group comparison
 - Correlational studies by far the most common “scientific” social science research
- Pre-test/post-test with control group
 - “Real” experiments uncommon, but growing in frequency
 - “Quasi-experiments” growing more rapidly
- Solomon four-group design
 - Don’t recall ever seeing this
- Post-test only experiment
 - Leads to weaker statistical tests

What are the Implications for My Research?

- Classical experimentation unlikely, but always preferred (never had one)
- Strive for “natural” or quasi-experiments
 - Alternating years of standardized testing
 - Ruling death penalty unconstitutional
 - Imposition of new voting machines
 - 9/11 terrorist attacks
- Gather as much cross-time data as possible (panel studies)
- If you have a pure cross-section, be humble