

POLS201 Spring 2019

Quasi Experiments

February 6

Before We Begin

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- So far, we've used the language of experiments
- But you will see that much research is not experimental
 - Survey data, used in many of your papers
 - Economic data
 - Census data
 - and all sorts of data we call "observational"
- Theme for the day: experiments and counterfactuals are great, but we play the cards we've been dealt.

The Connecticut Speeding Paper

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- The message is double edged.
- The bad news:
 - We constantly leap to motivated conclusions about treatments
 - By “we” I mean the media and careless observation
- The good and surprising news:
 - Quasi-experiments can be legit

What is a Quasi-experiment?

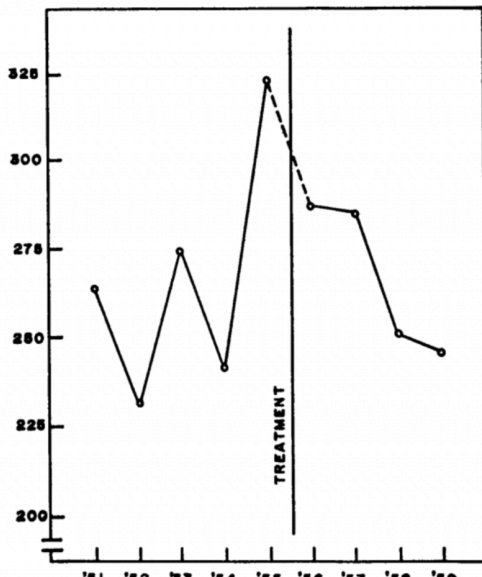
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- An experiment (natural or not) in which assignment is not random.
- Don Campbell (co-author) called them “queasy-experiments” (he had a sense of humor)
 - But that doesn’t immediately invalidate them
 - Like all things: don’t let perfection be the enemy of goodness
- We can test what *might* invalidate them

The crackdown wasn't designed as an experiment

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- But we can think of it that way
- What's the IV? DV? Unit of Analysis?
- Do you see an intervening variable?
 - Note that the IV is the “treatment” or lack thereof.





Year	Crackdown	Accidents	Dry Year
1951	0	13	0
1952	0	11	0
1953	0	13	0
1954	0	15	0
1955	1	13	1
1956	1	12	0
1957	1	11	0
1958	1	10	0
1959	1	9	1

Dry Years here are correlated over time with our IV. In this case the proposed “history threat” would be a legitimate confound. False Positive or Negative?

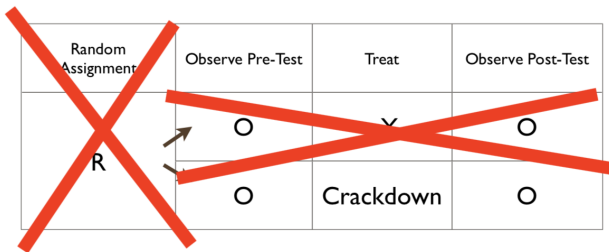
CT Crackdown Research Design

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Random Assignment	Observe Pre-Test	Treat	Observe Post-Test
R	 O	$\sim X$	O
	 O	X	O

CT Crackdown Research Design

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Threats to Internal Validity

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- What are these threats? Do they lead to false positive or false negative conclusions?
 - History Threat
 - Maturation Threat
 - Testing Threat
 - Instrumentation Threat
 - Regression to the Mean

History and Maturation Threat

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- History: Change between the pre-test and post-test
- Maturation: Evolution of individuals units in the study
- Changes correlated with the passage of time which might account for the change.
 - Long term trends NOT discrete events
 - Examples? False Positive or Negative?

Testing & Instrumentation Threat

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- Testing Threat:
 - A change that may occur as a result of the pretest, even without the experimental treatment.
- Instrumentation Threat:
 - The shifting of the measuring instrument independent of any change in the phenomena measured.

Instrumentation Threat Example

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- Statistic Calculated: Deaths / # Gallons of Gas Sold
- Suppose the treatment TRULY worked and people sped less than prior to treatment.
- Lower speeds leads to lower gas usage, even for same mileage traveled
- Smaller denominator makes it look like Deaths have gone
 - ___ = False _____?

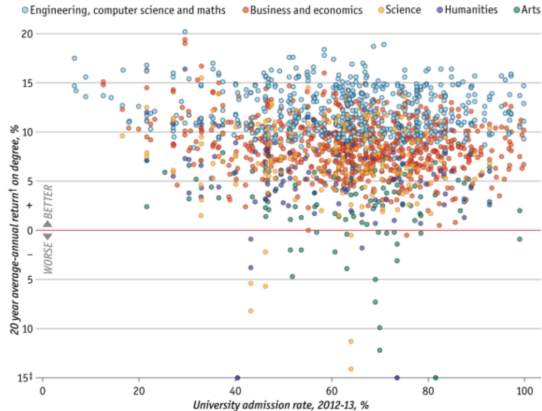
Regression to the Mean

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- Returning to average states “Mean Reversion”
- Particularly risky whey group has been selected for treatment because of its extreme performance on the pre-test.
- Increase in fatalities is what got our attention.
- Remember “selecting on the dependent variable”? This is it.

Let's Work Through an Example: Spending \$ to Promote STEM

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Let's Work Through an Example: Spending \$ to Promote STEM

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- Suppose notice an immediate increase in STEM majors in public universities
- Don't worry about the normative wisdom of the policy
 - Does an increase validate the decision?
 - Does no effect or a decrease invalidate it?
- One immediate answer: don't know unless we can see the counterfactual

Let's Work Through an Example: Spending \$ to Promote STEM

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- In small groups, use the concepts from the Connecticut paper and apply them:
 - History Threat:
 - Maturation Threat:
 - Testing Threat:
 - Instrumentation Threat:
 - Regression to the Mean:
 - Others?

Any Public Policy Can be a Quasi-Experiment

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- The tools shown here can establish a case
- What threats are serious and how can we account for them?
- In all cases: think through the possibilities
- Assertions about public policy effectiveness follow this pattern

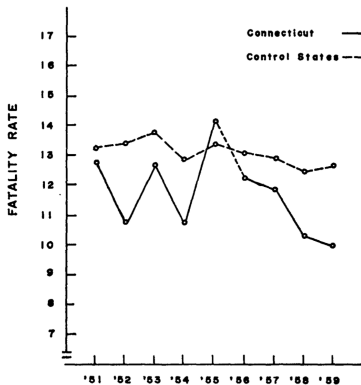
Some Possible Strategies

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- 1 Think through possible confounds and sign the bias. Focus on potential false-positives.
- 2 Isolate the Causal Mechanism
- 3 Add “Control Group” to Analysis

Look for Control Groups

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Look for New Observable Implications

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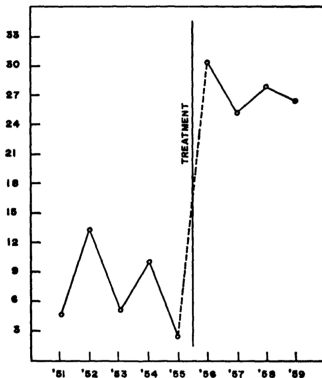


Figure 5. Suspensions of Licenses for Speeding, as a Per Cent of All Suspensions

Look for New Observable Implications

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■ Number of Not Guilty Verdicts

