Random Assignment and Experiments

POST 8000 – Foundations of Social Science Research for Public Policy

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Goal for Today

Elaborate on the 'gold standard' for causal inference research, with its benefits and limitations.

Observational vs. Experimental Research

Observational research: involves a comparison of units subjected to different treatments.

- More common, more flexible. But difficult to isolate causal effects.

Experimental research: units under study are randomly assigned to treatments.

- satisfies key questions about observational research design

Experiments

Experiments are more effective at addressing causality.

- Want to explain social phenomena like medical researchers testing therapeutic care.
- Satisfies insights from Rubin's potential outcomes framework
- Researcher control over conditions isolates confounding systematic factors.
- Random assignment isolates systematic differences from random differences.

Random Assignment and Causal Inference

Random assignment (e.g. coin-flipping) means each unit has same chance to be in particular group (e.g. control or treatment).

- All groups are equal in expectation, beyond treatment(s).
- Control group behaves as treatment group(s) without treatment, as counterfactual.
- Various tests (e.g. *t*-test) can assess differences between control and treatment(s).

The Utility of Experiments (Roth, 1995)

1. *"Speaking with theorists":* provides an experimental test for a theoretical model.
2. *"Searching for facts":* generates new data to explore aspects of previous experiments.
3. *"Whispering in the ears of princes":* isolates causal effects, certainly of interest to policymakers.

Types of Experiments

There are numerous ways of assessing causal effects. One typology:

1. “Between subjects”: units randomly assigned to distinct treatment/control groups.
2. “Within subjects”: units observed before and after receiving a treatment.

Validity Concerns

Experiments ideally maximize internal validity, if (possibly) at the expense of external validity.

Internal Validity

Internal validity: stimulus faithly administered, as implemented in the design. Concerns:

- Noncompliance
- Attrition

External Validity

External validity: results generalizable from the “lab” to the “real world.” Concerns:

- Convenience sampling (esp. college students)
- Hawthorne effect

Types of Experiments

Experiments are super-flexible. Some types you'll encounter:

1. Lab experiments
   - Maximize internal validity, prioritized over external validity
   - Typically prone to convenience sampling.
2. Survey experiments
   - Balance internal/external validity concerns
   - Typically higher *n* with more representativeness
   - Concerns: spillover, less agency over treatment
3. Field experiment
   - Same pros/cons as survey experiments, but with typically less control over treatment administration.
   - Cons (spillover, treatments) even more pronounced
4. Natural experiment
   - i.e. an exogenous shock to a panel design
5. Quasi-experiment
   - Treatments/controls with no randomization, or control over the treatment.

Discussion

1. What's more important: internal or external validity?
2. Think of your research: what type of experiment is feasible for you? What would it look like?

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