

Concepts, Questions, and Hypotheses

February 11

Outline

- What is an experiment?

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- Concepts

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- Theory/hypotheses

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- Druckman and Nelson exercise

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- What is an experiment?
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- Theory/hypotheses
- Druckman and Nelson exercise
- Next week

Definition

The observation of units after, and possibly before, a randomly assigned intervention in a controlled setting, which tests one or more precise causal expectations.

Definition

Elements

1. Causal theory or expectation
2. Physical intervention
3. Control
4. Randomization
5. Measurement

"Just do an experiment?"

- We never just do an experiment
- Experiments have to be:
 - theoretically motivated
 - test interesting questions

What can we test experimentally?

- Forward causal questions?
- Backward causal questions?

What can we test experimentally?

- Forward causal questions?
 - Does X cause Y?
 - What effects does X have?
 - "What if?" questions
- Backward causal questions?

What can we test experimentally?

- Forward causal questions?
 - Does X cause Y?
 - What effects does X have?
- Backward causal questions?
 - What causes Y?
 - How much of Y is attributable to X?

Why not backward causal questions?

- The set of potential X's is infinite
 - We can only test a few at a time
 - Some X's might be unobservable or unknown
 - Showing that X1 causes Y doesn't tell us anything about whether X2 causes Y

Questions?

Protocol

Protocol is the complete planning document for how to design, implement, and analyze an experiment

It contains details of:

1. Theory/hypotheses
2. Instrumentation
3. Sampling
4. Implementation
5. Analysis
6. Procedures for recording deviations from protocol

Protocol

Today we'll focus on the first of these:

1. Theory/hypotheses

Outline

- What is an experiment?
- Concepts

Concepts

- Experimenters often focus a lot on procedure, but not on concepts
- Defining concepts of interest has to be a first step
- Concepts are what connect the experiment to extant literature and the real world *

* Shadish, Cook, Campbell p.65

"The empiricist perspective seems reasonable on the face of things. And yet we are unable to talk about questions of fact without getting caught up in the language that we use to describe these facts. To be sure, things exist the world separate from the language we use to describe them. However, we cannot talk about them unless and until we introduce linguistic symbols."

Concept definition

- Term/label
- Attributes (i.e., definition)
- Indicators (i.e., operationalization)

Example

Democracy

- What attributes does democracy have?

Example

Democracy

- What attributes does democracy have?
- How can we measure it?

Example

Democracy

- What attributes does democracy have?
- How can we measure it?
- How do we distinguish it from other concepts?

Pattern matching

- How well do particular cases fit your definition of the construct?
- Is Ukraine a democracy?
- Is abortion a contentious political issue?
- Is 1 Euro/day a poverty wage?
- When is an immigrant considered "Danish"?

How do we develop concepts?

- Look to existing literature
 - Clear definition
 - Disagreement about definition and measurement
- Generate our own

Conceptualization

- Resonance
- Domain
- Consistency
- Fecundity
- Differentiation
- Utility
- Operationalization

* Gerring Table 5.1 (p.117)

Resonance

What does this mean?

Domain

What does this mean?

Consistency

What does this mean?

Intension versus Extension

- Intension: Number of attributes
- Extension: Number of referants

Fecundity

What does this mean?

- Dictionary definition:

Fertility or fruitfulness

Differentiation

What does this mean?

An example

In psychological work, we have concepts of "value" and "opinion":

- Opinion is a summary evaluation of a particular object
- Value is a belief about a desired end-state of the world

Are these different concepts? Why?

Utility

What does this mean?

Questions?

Construct validity

- Once we know our concept(s) of interest, how do we operationalize them?
- How do we know something when we see it?

An example

Definition: Opinion is a summary evaluation of a particular object

Operationalization?

Construct validity

- What are possible threats to construct validity?

* Shadish, Cook, and Campbell Table 3.1 (p.73)

Construct validity

- What are possible threats to construct validity?
- Which of these threats do you have questions about?

* Shadish, Cook, and Campbell Table 3.1 (p.73)

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Research Question

- Once we know what we want to study, we need a research question
- What makes a good research question?

Research Question

Theory

- We're not going to talk about this during the course
- It's your job to find or develop theory relevant to your RQ
- Theory must be testable (i.e., falsifiable)

Research
Question

Theory

Hypotheses

- From theory, we derive testable hypotheses
- Hypotheses are expectations about differences in outcomes across levels of a putatively causal variable

Research
Question

- Derive experimental design from hypotheses
- In observational research, we look for data to test theories

Theory

- In experimental research, we have to intervene to generate data

Hypotheses

- We can only test hypotheses by comparing two (or more) experimental conditions

Design

Research
Question

- Experimental "factors" are expressions of hypotheses as randomized groups

Theory

- What intervention each group receives depends on hypotheses

Hypotheses

- presence/absence
- levels/doses
- qualitative variations

Design

Questions?

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- What is an experiment?
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Example: Druckman and Nelson

- Research question
- Theory/hypotheses
- Variables
- Design
- Data collection/protocol
- Analysis
- Results/findings

For next week

Readings

- Shadish, Cook, and Campbell (Ch. 1,2,8)
 - Internal validity: How do we know experiments work?
- Freedman
 - Start thinking about the ethics of experiments

For next week

Readings

- Get a sense of what can be studied experimentally

Exercise

- Visit Time-Sharing Experiments for the Social Sciences
 - <http://tessexperiments.org/>
- Pick two studies from TESS and write-up the details from the worksheet
- We will share them in class next week