POLI210: Political Science Research Methods

Lecture 5.2: Measurement

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Boring admin stuff

Assignment 2 due on Thursday the 7th, 11:59PM

- Hand i **both** .Rmd and PDF files
- Everything should be done in RMarkdown; no R script
- RStudio Cloud:
  - No need to set your working directory
  - Need to import your file into the cloud
- Do not use the `View()` function when knitting
- Use the .csv from the Assignments tab on MC

Remember: this is worth 10% and it's your 1st coding assignment ever!

Four levels of measurement

Nominal variables

- Values are categories that we cannot rank-order from least to most
- Examples: religious affiliation; party identification

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Ordinal variables

- Values can be ranked, but the distance between categories is not equal across the variable's range
- Implication: addition and subtraction not meaningful
- Example: Education level
  - Less than high school $<$ High school graduate $<$ Some college $<$ College graduate $<$ Postgraduate
  - Can we assume that the gap between "high school graduate" and "some college" is the same as the gap between "some college" and "college graduate?"

Four levels of measurement (cntd)

Interval variables

- Values can ranked and equal distance between numbers/categories across the range
- But no meaningful value of 0
- Example: credit score (minimum of 300), feeling thermometer (0 = strong negative feeling, not no feeling)...

Four levels of measurement (cntd)

Interval variables

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- But no meaningful value of 0
- Example: credit score (minimum of 300), feeling thermometer (0 = strong negative feeling, not no feeling)...

Ratio variables

- Just like an interval variable, but it has a meaningful 0: when the value is 0, there is none of that variable
- Example: military personnel of a country, state welfare expenditures in dollars...

Operationalization

Many of the concepts we care about are elusive

- You often can't directly *observe* the concept; it is not tangible
- e.g. can you observe and measure socio-economic status? anxiety? anger?
    - Certainly not in the same way that we can measure the amount of oxygen in the air

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We will have to **operationalize**

- Oftentimes, your theory involves abstract concepts that must be operationalized
  - For instance, I may hypothesize that an incumbent's electoral fortunes are influenced by economic performance
  - But how do we operationalize "economic performance?" i.e. what do I need to observe and measure in order to classify cases as "good" or "bad" economic performance?

Economic performance

The key point: there are many different ways to operationalize economic performance!

- GDP growth? (in the 12 months prior to the election?)
- Unemployment rate?
- Inflation?

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- Ideally, our results should be robust to alternative operationalizations

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Many of the concepts we care about are multidimensional

- It often makes sense to incorporate multiple indicators into a single **index**

What makes for a good measure?

Reliability

- Our measure should have as little "noise" as possible
- Example: a scale
- This is random measurement error

Validity

- There are different types of validity, but in short:
  - "A valid measure accurately represents the concept that it is supposed to measure, whereas an invalid measure measures something other than what was originally intended."

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Validity

- There are different types of validity, but in short:
  - "A valid measure accurately represents the concept that it is supposed to measure, whereas an invalid measure measures something other than what was originally intended."
- Our measure should have as little systematic error as possible
- Example: a scale and tall people
  - This is non-random or *systematic* error

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