

PSC4375: Measurement and Survey Sampling

Week 4: Lecture 7

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Concepts and measurement

- Social science is about understanding **causal relationships**
 - Does minimum wage change levels of employment
 - Does outgroup contact influence views on immigration?
- Relationships are between **concepts**:
 - Minimum wage, unemployment, outgroup contact, views on immigration
 - We took these for granted when talking about causality
- Important to consider how we **measure** these concepts
 - Some straightforward: what is your age?
 - Others more complicated: what does it mean to “be liberal”?
 - **Operational definition**: mapping of concept to numbers in our data

Example

- Concept: presidential approval
- Conceptual definition:
 - Extent to which US adults support the actions and policies of the current US president
- Operational definition:
 - “On a scale from 1 to 5, where 1 is least supportive and 5 is most supportive, how much would you say you support the job that Donald Trump is doing as president?”

Measurement error

- **Measurement error:** chance variation in our measurements
 - individual measurement = exact value + chance error
 - chance errors tend to cancel out when we take averages
- No matter how careful we are, chance error can always affect a measurement.
 - Panel study of 19,000 respondents: 20 reported being a citizen in 2010 and then a non-citizen in 2012
 - Data entry errors
- **Bias:** systematic errors for all units in the same direction.
 - individual measurement = exact value + bias + chance error
 - “What did you eat yesterday?” \rightsquigarrow underreporting

A biased poll?

VZW Wi-Fi 18:23 33%

gop.com

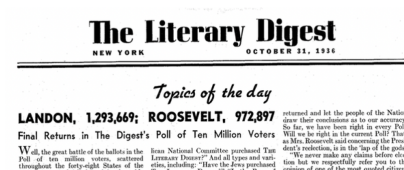
Official Presidential Job Performance Poll

1. How would you rate President Trump's job performance so far?

- ☐ Great
- ☐ Good
- ☐ Okay
- ☒ Other

2. (Optional) Please explain why you selected your response.

1936 Literary Digest Poll



- Literary Digest predicted elections using mail-in polls
- Source of addresses: automobile registrations, phone books, etc.
- In 1936, sent out 10 million ballots, over 2.3 million returned
- George Gallup used only 50,000 respondents

	FDR's vote share
Literary Digest	43
George Gallup	56

Poll fail



	FDR %
Literary Digest	43
George Gallup	56
Actual Outcome	62

- **Selection bias:** ballots skewed toward the wealthy (with cars, phones)
 - Only 1 in 4 households had a phone in 1936
- **Nonresponse bias:** respondents differ from nonrespondents
 - \rightsquigarrow when selection procedure is biased, adding more units won't help!

1948 Election



The Polling Disaster

	Truman	Dewey	Thurmond	Wallace
Crossley	45	50	2	3
Gallup	44	50	2	4
Roper	38	53	5	4
Actual Outcome	50	45	3	2

- **Quota sampling:** fixed quota of certain respondents for each interviewer
 - If Black women make up 5% of the population, stop interviewing them once they make up 5% of your sample
- Sample resembles the population on these characteristics
- Potential unobserved confounding \rightsquigarrow **selection bias**
- Republicans easier to find within quotas (phones, listed addresses)

Sample surveys

- **Probability sampling** to ensure representativeness
 - Definition: every unit in the population has a known, non-zero probability of being selected into sample
- **Simple random sampling**: every unit has an equal selection probability.
- Random digit dialing:
 - Take a particular area code + exchange: 310-495-XXXX.
 - Randomly choose each digit in XXXX to call a particular phone
 - Every phone in the US has an equal chance of being included in sample

Sampling lingo

- **Target population:** set of people we want to learn about
 - Example: people who will vote in the next election
- **Sampling frame:** list of people from which we will actually sample
 - Frame bias: list of registered voters (frame) might include nonvoters!
- **Sample:** set of people contacted
- **Respondents:** subset of sample that actually responds to the survey
 - Unit non-response: sample \neq respondents
 - Not everyone picks up their phone
- **Completed items:** subset of questions that respondents answer
 - Item non-response: refusing to disclose their vote preference

Difficulties of sampling

- Problems of telephone survey
 - Cell phones (double counting for the wealthy)
 - Caller ID screening (unit non-response)
 - Response rates down to 9%
- An alternative: internet surveys
 - Opt-in panels, respondent-driven sampling \rightsquigarrow **non-probability sampling**
 - Cheaper, but non-representative
 - Digital divide: rich vs. poor, young vs. old
 - Correct for potential sampling bias via statistical methods