Introduction to Survey Design

The Total Survey Error Approach

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What You Need

1. Questionnaire - what to ask
2. Sample - who gets it
3. Implementation - how to collect it
4. Statistics - how to understand it

Survey

- What do you want to know?
  - Do we already know it?
    - Or, have we already asked it?
      - Second hand data can be nice!
  - If not, then, ask it:
    - What's your question?
- Regardless, requires in-depth knowledge of the lit

Implementation

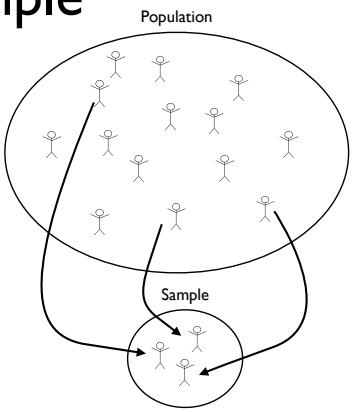
- Survey houses (academic & private)
  - E.g., Gallup, YouGov, ISR at UofM, SSI
- Academic surveys
  - E.g., CCES, ANES, GSS, TOPS
- DIY
  - Paper and pencil
    - Door-to-door or mail or telephone (modes)
  - Online software (e.g., Qualtrics, SurveyGizmo)

surveygizmo

qualtrics

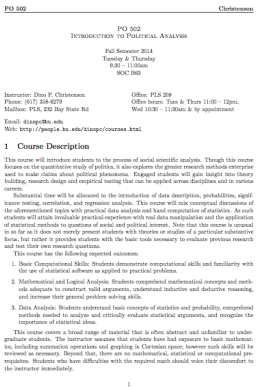
Sample

- Representative of the population!
  - Which population?
- Convenience samples
  - Friends and family (not recommended)
  - Students
  - Opt-in online



Statistics

- For some *good* designs...
  - Just need the basics
  - PO 502 or some introduction to applied social science statistics



PO 502 Christenson

PO 502
Introduction to Political Analysis

Fall Semester 2014
Tuesday & Thursday
9:30 – 11:00am
SOC 180

Instructor: Dino P. Christenson
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Office hours: Tues & Thurs 11:00 – 12pm,
Wed 10:30 – 11:30am & by appointment

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Web: http://people.bu.edu/dinopc/courses.html

1 Course Description

This course will introduce students to the process of social scientific analysis. Though this course focuses on the quantitative study of politics, it also explores the greater research methods enterprise used to make claims about political phenomena. Engaged students will gain insight into theory building, research design and empirical testing that can be applied across disciplines and in various careers.

Substantial time will be allocated to the introduction of data description, probabilities, significance testing, correlation, and regression analysis. This course will mix conceptual discussions of the aforementioned topics with practical data analysis and hand computation of statistics. As such students will attain invaluable practical experience with real data manipulation and the application of statistical methods to questions of social and political interest. Note that this course is unusual in so far as it does not merely present students with theories or studies of a particular substantive focus, but rather it provides students with the basic tools necessary to evaluate previous research and test their own research questions.

This course has the following expected outcomes:

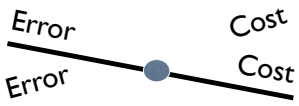
1. Basic Computational Skills: Students demonstrate computational skills and familiarity with the use of statistical software as applied to practical problems.
2. Mathematical and Logical Analysis: Students comprehend mathematical concepts and methods adequate to construct valid arguments, understand inductive and deductive reasoning, and increase their general problem solving skills.
3. Data Analysis: Students understand basic concepts of statistics and probability, comprehend methods needed to analyse and critically evaluate statistical arguments, and recognize the importance of statistical ideas.

This course covers a broad range of material that is often abstract and unfamiliar to undergraduate students. The instructor assumes that students have had exposure to basic mathematics, including summation operations and graphing in Cartesian space; however such skills will be reviewed as necessary. Beyond that, there are no mathematical, statistical or computational prerequisites. Students who have difficulties with the required math should voice their discomfort to the instructor immediately.

1

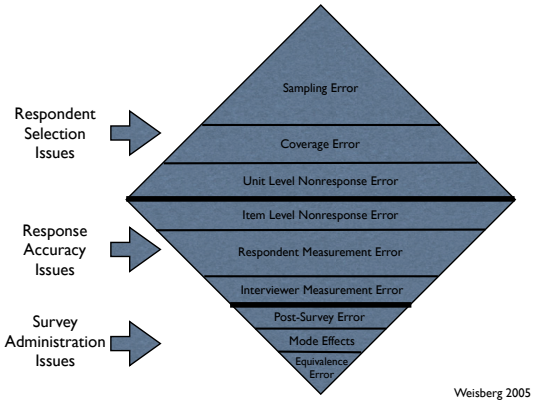
Total Survey Error Approach

- Systematic way to consider tradeoffs in conducting a survey
  - Where to expend resources
    - Time
    - Money
    - Ethics
  - In order to minimize survey error



Good'ish News

- Lots of potential errors
  - But no perfect study!
    - Think about likely errors for your study
    - TSE helps to minimize specific errors by focusing on tradeoffs



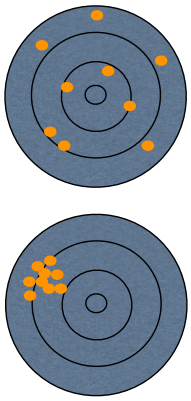
Weisberg 2005

Types of Survey Error

Types of Error

- Two types of error but we care more about one of them

1. Random
   - Occur by chance, without a pattern
2. Systematic
   - Can bias the results



Respondent Measurement Error

- Response accuracy problem
  - Respondent lacks motivation to answer correctly
  - Unclear question wording
    - Temporal issues
    - Double-barreled
    - Overly sophisticated
  - Biased question wording

How many times did you go to the DMV office last year?

Do you support tax credits for the production of biomass energy?

Should the government spend less money on the military and more on education?

Would you be more likely or less likely to vote for John McCain for president if you knew he had fathered an illegitimate black child?

Minimize Respondent Measurement Error

- Use vetted survey questions
- Conduct pre-tests of the questionnaire
- Use "think-aloud protocols"
- Random half-samples of question wording
- Simplify each "stage of survey response"
  1. Comprehension
  2. Retrieval
  3. Judgment
  4. Reporting

Tourangeau, Rips and Rasinski 2000

The High & Low Roads

- Minimize "satisficing"
  - Responding in order to *move on* rather than responding after carefully thinking through the question
  - Potential problems
    - E.g., very short answers to open ended questions
    - E.g., long batteries with same response options
- Solutions
  - Time survey responses
  - Encourage respondent engagement
  - Mix up the direction of response options
  - Break up questions

Krosnick and Alwin 1987

Interviewer Measurement Error

- Interviewer objective:
  - Facilitate interview
  - Obtain accurate answers
- But they can also introduce error
  - Random
    - E.g., wrongly records an answer
  - Systematic
    - E.g., always mispronounces a word

Minimize Interviewer Measurement Error

- Standardized interviewing
  - Ask the identical question the same exact way to all respondents
    - Do NOT interject own views or supply extra info
- Conversational interviewing
  - Help respondents understand the questions
    - Can clarify meanings to achieve accurate responses

Modes Matter

- Survey modes
  - Face-to-face
  - Mail
  - Telephone
  - Internet
- Interviewer error vanishes
  - Mail
  - Internet
- Costs shrink too!
- Tradeoff
  - Response accuracy may decline, especially on open ended questions

Item Nonresponse

- Nonresponse on particular survey questions
  - E.g., refusals, skipped questions, inadequate response options
- Results biased when those who answer are different than those who don't
  - E.g., study of income on vote choice, but if higher income vote more conservatively but don't report income than relationship understated

Weisberg N.d.

Minimize Item Nonresponse

- Require answering question
  - Tradeoff: Respondent drops out
- Skilled interviewer can encourage answers
  - Tradeoff: cost in training interviewer
- Multiple imputation
  - Create values for missing values via predicted values from regressions with random error term
  - Requires a lot of data and missing at random

Unit Nonresponse

- Respondents in sample do not take survey
  - Cannot be contacted
  - Refuse to take it
- Can bias the sample if those who participate are systematically different than those who do not
- Refusal rate increasing
  - Some conservative pundits discourage participation
    - Could result in underestimate of Rep vote

Minimize Unit Nonresponse

- Tailor interview request as valuable to the respondent
- Pay respondents to participate
  - E.g., $1-$5 can yield 2%-12% increase with diminishing returns
    - Unless very large
      - E.g., ANES 2012 $25-$100 yields 38% pre- and 94% post

Cantor, O'Hare, and O'Connor 2008, Singer and Ye 2013

Weisberg N.d.

Coverage Error

- Discrepancy between list of population and actual population
  - E.g., sampling from a telephone book which misses all those with unlisted telephone numbers

In 2012 Republican pollsters overstated Romney's chances because cell phone numbers were not sampled

Weisberg N.d.

Minimize Coverage Error

- Address-based sampling uses addresses instead of telephone numbers
- Internet surveys initially high coverage error but decreasing steadily with greater Internet access
- Use multiple sampling frames - and weight those with greater probability of falling into sample

Sampling Error

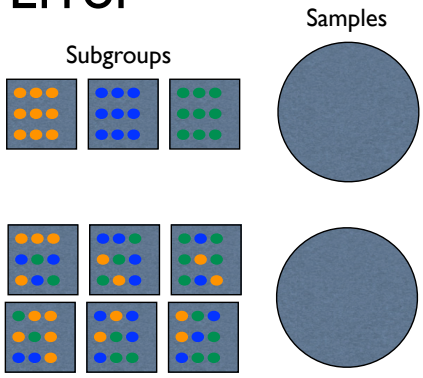
- Any time we interview only a sample of the population
  - By chance our estimates will be off from the population
- With probability sampling we therefore provide a margin of error
  - Conventional confidence interval is 95%
  - Estimate is within 2.5% of true population estimate

Minimize Sampling Error

- Increase sample size
  - Tradeoff: can be costly
    - Less so for internet surveys
      - But more is not always better
      - 1936 Literary Digest poll of 2m

Minimize Sampling Error

- Stratified sample
  - Take proportions from subcategories, e.g., regions
- Cluster sample
  - Sample within known clusters, e.g., city blocks



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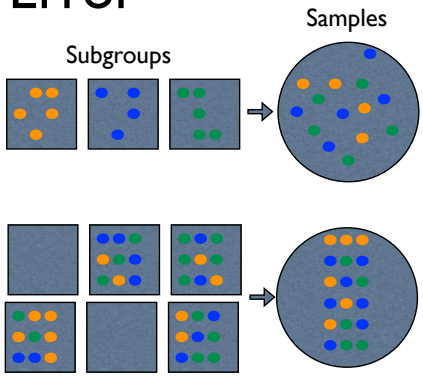


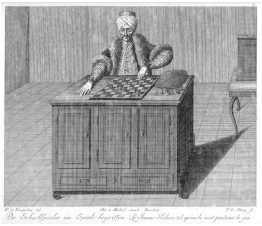
Sampling & the Internet

- Internet surveys
  - Difficult to conduct probability sampling
  - Email list of the population of interest?
    - Option: probability sample via telephone or mail requesting they take an online survey
- Most use opt-in polls
  - Sampling errors cannot be validly computed
  - Increased risk of selection bias
  - Similar to coverage error and nonresponse biases
    - Solution: weight respondents
      - E.g., poststratification adjustment, sample matching, propensity score weights

Convenience Samples

- Getting respondents is:
  - Tough
  - Expensive
  - Time consuming

Mechanical Turk

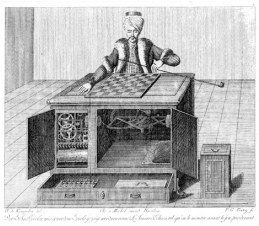


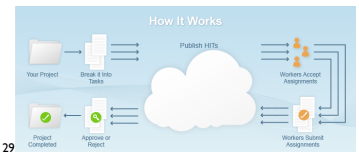
Convenience Samples

- Crowd source your sample!
- Not always appropriate
  - See previous slide
- Mechanical Turk okay for
  - Experiments Berinsky, Huber & Lenz 2011
  - When other approaches difficult
    - Tight panel waves around developing events

Christenson & Glick 2014

Just Human





Survey Mode Effects

- How the survey is conducted
  - Face-to-face & telephone
    - Interviewer effects, esp on sensitive questions
    - Social desirability bias, appear likable to interviewer
    - Solution: phrasing of questions to legitimate all responses
    - Solution: use interviewer-less modes

Symbolic Racism Scale

1. It's really a matter of some people not trying hard enough; if blacks would only try harder they could be just as well off as whites

2. Irish, Italian, Jewish and many other minorities overcame prejudice and worked their way up. Blacks should do the same...

Henry, P.J., & Sears, D. O. 2002

Survey Mode Costs

- Money
  1. Face-to-face
  2. Telephone
  3. Mail
  4. Internet
- Time
  1. Face-to-face
  2. Mail (awaiting response)
  3. Telephone
  4. Internet
- Response
  1. Internet
  2. Mail
  3. Telephone
  4. Face-to-face

Junk Mail Spam

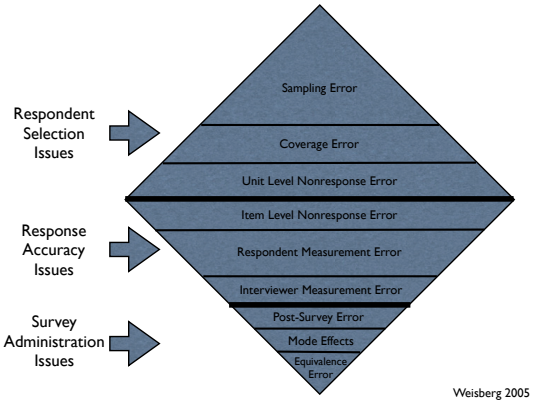
Interaction Ritual

Post-Survey Error

- Error during the processing and analysis of survey data
  - E.g., coding open-ended questions
    - Solution: create comprehensive coding schemes
    - Solution: calculate inter-coder reliability

Equivalence Error

- Lack of equivalence of surveys measuring same concepts
  - House effects, survey organization regularly attaining more of one response than another
  - Different countries, interpretations differ by culture
  - Different times, real world conditions change
    - E.g., "liberal" and "conservative" different today than in the past
- Solution: tread carefully when comparing surveys across
  - time
  - countries
  - survey organizations



Weisberg 2005

Types of Survey Error

Resources Books

- Groves, Robert M. (1989). Survey Errors and Survey Costs. New York: Wiley.
- Biemer, P.; Lyberg, L. (2003). Introduction to Survey Quality. Wiley & Sons, Inc.
- Weisberg, Herbert F. (2005). The Total Survey Error Approach: A Guide to the New Science of Survey Research, University of Chicago Press
- Asher, Herbert. (2007). Polling and the Public: What Every Citizen Should Know, 8th Edition. Washington, DC: CQ Press.
- Groves, R.; Fowler, F.; Couper, M.; Lepkowski, J.; Singer, E.; Tourangeau, R. (2009). Survey Methodology (2nd Edition). Wiley & Sons, Inc.
- Lohr, Sharon L. (2010). Sampling: Design and Analysis, 2nd ed. Boston: Cengage Learning.
- Atkenson, Lonna and R. Michael Alvarez (N.d.). Oxford University Press Handbook on Polling and Polling Methods.
- Tourangeau, Roger, Lance J. Rips, & Kenneth Rasinski (2000). The Psychology of Survey Response. Cambridge, UK: Cambridge University Press.

Resources Articles

- Weisberg, Herbert (N.d.). Total Survey Error. In Atkenson, Lonna and R. Michael Alvarez, editors. *Handbook on Polling and Polling Methods*. Oxford University Press.
- Krosnick, Jon A., & Duane F. Alwin (1987). An Evaluation of a Cognitive Theory of Response-Order Effects in Survey Measurement. Public Opinion Quarterly 51(2): 201-219.
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- Cantor, David, Barbara O'Hare, & Karen O'Connor (2008). "The Use of Monetary Incentives to Reduce Non-Response in Random Digit Dial Telephone Surveys" pp. 471-498 in James M. Lepkowski, Clyde Tucker, J. Michael Brick, Edith D. de Leeuw, Lilli Japec, Paul J. Lavrakas, Michael W. Link, & Roberta L. Sangster (Eds.), Advances In Telephone Survey Methodology, New York: J.W. Wiley and Sons.
- Singer, Eleanor & Cong Ye (2013). The Use and Effects of Incentives in Surveys. Annals of the American Academy of Political and Social Science 645 (Jan.): 112-41.

Resources
POQ Special Edition

- Paul P. Biemer. Total Survey Error: Design, Implementation, and Evaluation Public Opin Q (2010) 74 (5): 817-848 doi:10.1093/poq/nfq058
- Robert M. Groves and Lars Lyberg. Total Survey Error: Past, Present, and Future Public Opin Q (2010) 74 (5): 849-879 doi: 10.1093/poq/nfq065
- Frauke Kreuter, Gerrit Müller, and Mark Trappmann. Nonresponse and Measurement Error in Employment Research: Making Use of Administrative Data Public Opin Q (2010) 74 (5): 880-906 doi:10.1093/poq/nfq060
- Joseph W. Sakshaug, Ting Yan, and Roger Tourangeau. Nonresponse Error, Measurement Error, And Mode Of Data Collection: Tradeoffs in a Multi-mode Survey of Sensitive and Non-sensitive Items Public Opin Q (2010) 74 (5): 907-933 doi:10.1093/poq/nfq057
- Scott Fricker and Roger Tourangeau. Examining the Relationship Between Nonresponse Propensity and Data Quality in Two National Household Surveys Public Opin Q (2010) 74 (5): 934-955 doi:10.1093/poq/nfq064
- Olena Kaminska, Allan L. McCutcheon, and Jaak Billiet. Satisficing Among Reluctant Respondents in a Cross-National Context Public Opin Q (2010) 74 (5): 956-984 doi:10.1093/poq/nfq062
- Wendy D. Hicks, Brad Edwards, Karen Tourangeau, Brett McBride, Lauren D. Harris-Kojetin, and Abigail J. Moss. Using Cari Tools To Understand Measurement Error Public Opin Q (2010) 74 (5): 985-1003 doi:10.1093/poq/nfq063
- Brady T. West and Kristen Olson. How Much of Interviewer Variance is Really Nonresponse Error Variance? Public Opin Q (2010) 74 (5): 1004-1026 doi:10.1093/poq/nfq061
- Jorre Vannieuwenhuyze, Geert Loosveldt, and Geert Molenberghs. A Method for Evaluating Mode Effects in Mixed-mode Surveys Public Opin Q (2010) 74 (5): 1027-1045 doi: 10.1093/poq/nfq059

Thank You

- I welcome your questions
- Also via email: dinopc@bu.edu