

# **Session IV**

## **Practical Issues**

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- 1 Beyond One-Shot Designs
- 2 Handling “Broken” Experiments
- 3 Research Ethics
- 4 Conclusion

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## Beyond One-shot Designs

- Surveys can be used as a measurement instrument for a field treatment or a manipulation applied in a different survey panel wave
  - 1 Measure effect duration in two-wave panel
  - 2 Solicit pre-treatment outcome measures in a two-wave panel
  - 3 Measure effects of field treatment in post-test only design
  - 4 Randomly encourage field treatment in pre-test and measure effects in post-test
- Problems? Compliance & nonresponse

# I. Effect Duration

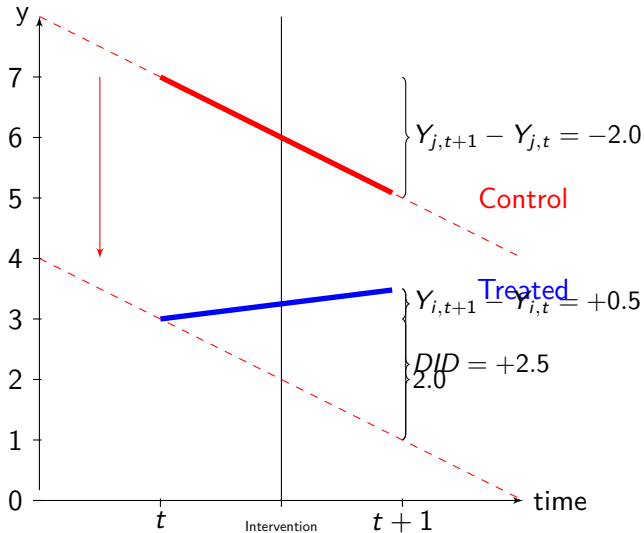
- Use a two- (or more-) wave panel to measure duration of effects
  - T1: Treatment and outcome measurement
  - T2+: Outcome measurement
- Two main concerns
  - Attrition
  - Panel conditioning

## II. Within-Subjects Designs

- Estimate treatment effects as a difference-in-differences
- Instead of using the post-treatment mean-difference in  $Y$  to estimate the causal effect, use the difference in pre-post differences for the two groups:

$$(\hat{Y}_{0,t+1} - \hat{Y}_{0,t}) - (\hat{Y}_{j,t+1} - \hat{Y}_{j,t})$$

- Advantageous because variance for paired samples decreases as correlation between  $t_0$  and  $t_1$  observations increases



## Threats to Validity

As soon as time comes into play, we have to worry about threats to validity.<sup>1</sup>

- 1 History (simultaneous cause)
- 2 Maturation (time trends)
- 3 Testing (observation changes respondents)
- 4 Instrumentation (changing operationalization)
- 5 Instability (measurement error)
- 6 Attrition

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<sup>1</sup>Shadish, Cook, and Campbell (2002)



### III. Randomized Field Treatment

- Examples:
  - 1 Citizens randomly sent a letter by post encouraging them to reduce water usage
  - 2 Different local media markets randomly assigned to receive different advertising
- Survey is used to measure outcomes, when treatment assignment is already known
- Issues
  - Nonresponse
  - Noncompliance

# Noncompliance

- Compliance is when individuals receive and accept the treatment to which they are assigned
- Noncompliance:  
“when subjects who were assigned to receive the treatment go untreated or when subjects assigned to the control group are treated” <sup>2</sup>
- This causes problems for our analysis because factors other than randomization explain why individuals receive their treatment
- Lots of methods for dealing with this, but the consequence is generally reduced power

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<sup>2</sup>Gerber & Green. 2012. *Field Experiments*, p.132.

# Asymmetric Noncompliance

- Noncompliance *asymmetric* if only in one group
- We can ignore non-compliance and analyze the “intention to treat” effect, which will underestimate our effects because some people were not treated as assigned

$$ITT = \bar{Y}_1 - \bar{Y}_0$$

- We can use “instrumental variables” to estimate the “local average treatment effect” (LATE) for those that complied with treatment:

$$LATE = \frac{ITT}{\text{PercentCompliant}}$$

- We can ignore randomization and analyze data “as-treated”, but this makes our study no longer an experiment

## Local Average Treatment Effect

- IV estimate is *local* to the variation in  $X$  that is due to variation in  $D$
- LATE is effect for those who *comply*
- Four subpopulations:
  - Compliers:  $X = 1$  only if  $D = 1$
  - Always-takers:  $X = 1$  regardless of  $D$
  - Never-takers:  $X = 0$  regardless of  $D$
  - Defiers:  $X = 1$  only if  $D = 0$
- Exclusion restriction! Monotonicity!

# Two-Sided Noncompliance

- Two-sided noncompliance is more complex analytically
- Stronger assumptions are required to analyze it and we won't discuss them here
- Best to try to develop a better design to avoid this rather than try to deal with the complexities of analyzing a broken design

## IV. Treatment Encouragement

- Design:
  - T1: Encourage treatment
  - T2: Measure effects
- Examples:
  - 1 Albertson and Lawrence<sup>3</sup>
- Issues
  - Nonresponse
  - Noncompliance

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<sup>3</sup>Albertson & Lawrence. 2009. "After the Credits Roll." *American Politics Research* 37(2): 275–300.  
10.1177/1532673X08328600.

## Treatment Noncompliance

- Several strategies
  - “As treated” analysis
  - “Intention to treat” analysis
  - Estimate a LATE

# Questions?





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Quiz time!

# Compliance

- 1 What is compliance?
- 2 How can we analyze experimental data when there is noncompliance?

# Balance testing

- 1 What does randomization ensure about the composition of treatment groups?
- 2 What can we do if we find a covariate imbalance between groups?
- 3 How can we avoid this problem entirely?

# Nonresponse and Attrition

- 1 Do we care about outcome nonresponse in experiments?
- 2 How can we analyze experimental data when there is outcome nonresponse or post-treatment attrition?

# Manipulation checks

- 1 What is a manipulation check? What can we do with it?
- 2 What do we do if some respondents “fail” a manipulation check?

# Null effects

- 1 What should we do if we find our estimated  $\widehat{SATE} = 0$ ?
- 2 What does it mean for an experiment to be *underpowered*?
- 3 What can we do to reduce the probability of obtaining an (unwanted) “null effect”?



# Effect heterogeneity

- 1 What should we do if, post-hoc, we find evidence of effect heterogeneity?
- 2 What can we do pre-implementation to address possible heterogeneity?

# Representativeness

- 1 Under what conditions is a design-based, probability sample necessary for experimental inference?
- 2 What kind of causal inferences can we draw from an experiment on a descriptively unrepresentative sample?

# Peer Review

- 1 What should we do if a peer reviewer asks us to “control” for covariates in the analysis?
- 2 What should we do if a peer reviewer asks us to include or exclude particular respondents from the analysis?

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# History: Key Moments

- 1 Tuskegee (1932-1972) and Guatemala (1946-1948) Studies
- 2 Nuremberg Code (1947)
- 3 Helsinki Declaration (1964)
- 4 U.S. 45 CFR 46 (1974) and “Common Rule” (1991)
- 5 The Belmont Report (1979)
- 6 EU Data Protection Directive (1995; 2012)
  - UK Data Protection Act (1998)

# Helsinki Declaration

- Adopted by the World Medical Association in 1964<sup>4</sup>
- Narrowly focused on medical research
- Expanded the Nuremberg Code
  - Relaxed consent requirements
  - Risks should not exceed benefits
  - Institutionalization of ethics oversight
- Do these rules apply to non-medical research?

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<sup>4</sup><http://www.bmj.com/content/2/5402/177>

# The Belmont Report

- Commissioned by the U.S. Government in 1979<sup>5</sup>
- Three overarching principles:
  - 1 Respect for persons
  - 2 Beneficence
  - 3 Justice
- Three policy implications:
  - Informed consent
  - Assessment of risks/benefits
  - Care for vulnerable populations

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<sup>5</sup><http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html>



# Benefits and Harm

- What is a “benefit”?
- What is a “harm”?
- How do we balance the two?

# Ethical Considerations

- Most ethical issues are not unique to *experimental* social science
- Some especially important issues:
  - 1 Randomization
  - 2 Informed consent
  - 3 Privacy
  - 4 Deception
  - 5 Publication bias

# I. Randomization

- Is it ethical to randomize?

## II. Informed Consent

- Persons must consent to being a research subject
- What this means in practice is complicated
  - What is consent?
  - What is “informed” consent?
  - What exactly do they have to consent to?
- Cross-national variations
  - Consent forms required in U.S.
  - Not required in UK

# III. Privacy

- Under EU Data Protection Directive (1995), data can be processed when:
  - Consent is given
  - Data are used for a “legitimate” purpose
  - Anonymous or confidential
- Data cannot leave the EU except under conditions

# III. Privacy

- Experimental might be additionally sensitive
- Answers reflect “manipulated” attitudes, behaviors, perceptions, etc. that respondents may not have given in another setting

## IV. Deception

- Major distinction between psychology tradition and economics tradition<sup>6</sup>
  - Purpose of the study
  - Purpose of specific items or tasks
  - Order or length of questionnaire
- Psychologists focus on *debriefing*
- Within economics, norms about *acts of omission* versus *acts of commission*
  - Omission: In a multi-round trust game, an additional round is added
  - Commission: Telling respondents it is a dictator game, but it is actually a trust game

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<sup>6</sup>Dickson, E. 2011. "Economics versus Psychology Experiments." *Cambridge Handbook of Experimental Political Science*.

## V. Publication Bias

- Publication bias not typically discussed as an ethical question
- If studies are meant to policy or practical implications, then we care about PATE or a set of CATEs, including whether their effects are positive, negative, or zero.
- Publication bias (toward “significant” results) invites wasting resources on treatments that actually don’t work



## Lots of Other Ethical Questions

- 1 Funding
- 2 Independence and Politicization
- 3 Vulnerable populations (e.g. children, sick)
- 4 Incentives
- 5 Cross-national research
- 6 End uses/users of research
- 7 Others. . .

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# Learning Outcomes

By the end of the week, you should be able to . . .

- 1 Explain how to analyze experiments quantitatively.
- 2 Explain how to design experiments that speak to relevant research questions and theories.
- 3 Evaluate the uses and limitations of several common survey experimental paradigms.
- 4 Identify practical issues that arise in the implementation of experiments and evaluate how to anticipate and respond to them.

# Wrap-up

- Thanks to all of you!
- Stay in touch ([t.leeper@lse.ac.uk](mailto:t.leeper@lse.ac.uk))
- Good luck with your research!