Session IV
Practical Issues

Thomas J. Leeper

Government Department
London School of Economics and Political Science
1 Practical Issues
- Participant Recruitment
- Attention, Satisficing, and Noncompliance
- Use of Covariates
- Effect Heterogeneity

2 Handling “Broken” Experiments

3 Research Ethics

4 Conclusion
1 Practical Issues
   - Participant Recruitment
   - Attention, Satisficing, and Noncompliance
   - Use of Covariates
   - Effect Heterogeneity

2 Handling “Broken” Experiments

3 Research Ethics

4 Conclusion
1 Practical Issues
   ■ Participant Recruitment
     ■ Attention, Satisficing, and Noncompliance
     ■ Use of Covariates
     ■ Effect Heterogeneity

2 Handling “Broken” Experiments

3 Research Ethics

4 Conclusion
How do we find participants?

- Volunteers
  - Volunteer Science
  - In-house subject pool

- Paid crowdworkers
  - Prolific Academic
  - Mechanical Turk
  - Crowdflower

- “Representative” samples
  - Big players: YouGov, TNS, Gallup, Nielsen, GfK
  - Others: Kantar, SSI, Lucid
SUTO Framework

- Cronbach (1986) talks about generalizability in terms of UTO
- Shadish, Cook, and Campbell (2001) speak similarly of:
  - Settings
  - Units
  - Treatments
  - Outcomes

- External validity depends on all of these
<table>
<thead>
<tr>
<th>Population</th>
<th>Your Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Setting</td>
</tr>
<tr>
<td>Units</td>
<td>Units</td>
</tr>
<tr>
<td>Treatments</td>
<td>Treatments</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Outcomes</td>
</tr>
</tbody>
</table>
In your study, how do these correspond?
<table>
<thead>
<tr>
<th>Population</th>
<th>Your Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Setting</td>
</tr>
<tr>
<td>Units</td>
<td>Units</td>
</tr>
<tr>
<td>Treatments</td>
<td>Treatments</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Outcomes</td>
</tr>
</tbody>
</table>

In your study, how do these correspond? how do these differ?
<table>
<thead>
<tr>
<th>Population</th>
<th>Your Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Setting</td>
</tr>
<tr>
<td>Units</td>
<td>Units</td>
</tr>
<tr>
<td>Treatments</td>
<td>Treatments</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Outcomes</td>
</tr>
</tbody>
</table>

In your study, how do these correspond? how do these differ? do these differences matter?
Common Differences

- Most common thing to focus on is demographic representativeness
  - Sears (1986): “students aren’t real people”
  - Western, educated, industrialized, rich, democratic (WEIRD) psychology participants
Common Differences

- Most common thing to focus on is demographic representativeness
  - Sears (1986): “students aren’t real people”
  - Western, educated, industrialized, rich, democratic (WEIRD) psychology participants

- But do those characteristics actually matter?
Common Differences

- Most common thing to focus on is demographic representativeness
  - Sears (1986): “students aren’t real people”
  - Western, educated, industrialized, rich, democratic (WEIRD) psychology participants

- But do those characteristics actually matter?

- Shadish, Cook, and Campbell tell us to think about:
  - Surface similarities
  - Ruling out irrelevancies
  - Making discriminations
  - Interpolation/extrapolation
Questions?
1. Practical Issues
   - Participant Recruitment
   - Attention, Satisficing, and Noncompliance
   - Use of Covariates
   - Effect Heterogeneity

2. Handling “Broken” Experiments

3. Research Ethics

4. Conclusion
One final issue with unit-related sources of heterogeneity is how we handle or analyze survey-experimental data where we think participants misbehaved.
One final issue with unit-related sources of heterogeneity is how we handle or analyze survey-experimental data where we think participants misbehaved.

This falls into a couple of broad categories:

- Noncompliance
- Inattention
- Survey Satisficing
How should we deal with respondents that appear to not be paying attention, not “taking” the treatment, or not responding to outcome measures?

1. Keep them
2. Throw them away
Best Practice: Pre-Analysis Protocol

- Excluding respondents based on survey behavior is one of the easiest ways to “p-hack” an experimental dataset
  - Inattention, satisficing, etc. will tend to reduce the size of the SATE
- So regardless of how you handle these respondents, these should be decisions that are made *pre-analysis*
When are you excluding participants?

<table>
<thead>
<tr>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### When are you excluding participants?

<table>
<thead>
<tr>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisficing behaviors</td>
<td></td>
</tr>
</tbody>
</table>
### When are you excluding participants?

<table>
<thead>
<tr>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Satisficing behaviors</td>
<td></td>
</tr>
<tr>
<td>- Inattention</td>
<td></td>
</tr>
</tbody>
</table>
**When are you excluding participants?**

<table>
<thead>
<tr>
<th>Pre-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisficing behaviors</td>
</tr>
<tr>
<td>Inattention</td>
</tr>
<tr>
<td>Covariate-based selection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Post-Treatment</th>
</tr>
</thead>
</table>
When are you excluding participants?

<table>
<thead>
<tr>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisficing behaviors</td>
<td></td>
</tr>
<tr>
<td>Inattention</td>
<td></td>
</tr>
<tr>
<td>Covariate-based selection</td>
<td></td>
</tr>
<tr>
<td>Pretreated</td>
<td></td>
</tr>
</tbody>
</table>
When are you excluding participants?

<table>
<thead>
<tr>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisficing behaviors</td>
<td>Speeding on treatment</td>
</tr>
<tr>
<td>Inattention</td>
<td></td>
</tr>
<tr>
<td>Covariate-based selection</td>
<td></td>
</tr>
<tr>
<td>Pretreated</td>
<td></td>
</tr>
</tbody>
</table>
When are you excluding participants?

<table>
<thead>
<tr>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisficing behaviors</td>
<td>Speeding on treatment</td>
</tr>
<tr>
<td>Inattention</td>
<td>“Failing” a manipulation check</td>
</tr>
<tr>
<td>Covariate-based selection</td>
<td></td>
</tr>
<tr>
<td>Pretreated</td>
<td></td>
</tr>
</tbody>
</table>
When are you excluding participants?

<table>
<thead>
<tr>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisficing behaviors</td>
<td>Speeding on treatment</td>
</tr>
<tr>
<td>Inattention</td>
<td>“Failing” a manipulation check</td>
</tr>
<tr>
<td>Covariate-based selection</td>
<td>Drop-off</td>
</tr>
<tr>
<td>Pretreated</td>
<td></td>
</tr>
</tbody>
</table>
Pre-Treatment Exclusion

- This is totally fine from a causal inference perspective
Pre-Treatment Exclusion

- This is totally fine from a causal inference perspective

- Advantages:
  - Focused on engaged respondents
  - Likely increase impact of treatment
Pre-Treatment Exclusion

- This is totally fine from a causal inference perspective

- Advantages:
  - Focused on engaged respondents
  - Likely increase impact of treatment

- Disadvantages:
  - Changing definition of sample (and thus population)
Post-Treatment Exclusion

This is much more problematic because it involves controlling for a *post-treatment* variable.
Information  →  Opinion

Etc.
Risk that estimate of $\beta_1$ is diminished because effect is being carried through the manipulation check.
Introduction of “collider bias” wherein values of the manipulation check are affected by other factors.
Post-Treatment Exclusion

- Any post-treatment exclusion is problematic and should be avoided
Post-Treatment Exclusion

- Any post-treatment exclusion is problematic and should be avoided

- Can estimate a LATE
  - Interpretation: Effect of manipulation check among those whose value of the check can be changed by the treatment manipulation
Post-Treatment Exclusion

- Any post-treatment exclusion is problematic and should be avoided

- Can estimate a LATE
  - Interpretation: Effect of manipulation check among those whose value of the check can be changed by the treatment manipulation

- Non-response or attrition is the same as researcher-imposed exclusion
  - Not problematic if MCAR
  - Nothing really to be done if caused by treatment
Introduction of “collider bias” wherein values of the manipulation check are affected by other factors.
Post-Treatment Exclusion

- Any post-treatment exclusion is problematic and should be avoided.

- Can estimate a LATE
  - Interpretation: Effect of manipulation check among those whose value of the check can be changed by the treatment manipulation.
Post-Treatment Exclusion

- Any post-treatment exclusion is problematic and should be avoided

- Can estimate a LATE
  - Interpretation: Effect of manipulation check among those whose value of the check can be changed by the treatment manipulation

- Non-response or attrition is the same as researcher-imposed exclusion
  - Not problematic if MCAR
  - Nothing really to be done if caused by treatment
Questions?
Apparent Satisficing

- Some common measures:
  - “Straightlining”
  - Non-differentiation
  - Acquiescence
  - Nonresponse
  - DK responding
  - Speeding

- Difficult to detect and distinguish from “real” responses
Metadata/Paradata

Timing

- Some survey tools will allow you to time page
- Make a prior rules about dropping participants for speeding
Metadata/Paradata

- Timing
  - Some survey tools will allow you to time page
  - Make a prior rules about dropping participants for speeding

- Mousetracking or eyetracking
  - Mousetracking is unobtrusive
  - Eyetracking requires participants opt-in
Metadata/Paradata

- **Timing**
  - Some survey tools will allow you to time page
  - Make a prior rules about dropping participants for speeding

- **Mousetracking or eyetracking**
  - Mousetracking is unobtrusive
  - Eyetracking requires participants opt-in

- **Record focus/blur browser events**
Direct Measures

- How closely have you been paying attention to what the questions on this survey actually mean?
Direct Measures

■ How closely have you been paying attention to what the questions on this survey actually mean?

■ While taking this survey, did you engage in any of the following behaviors? Please check all that apply.
  ■ Use your mobile phone
  ■ Browse the internet
  ■ …
Instructional Manipulation Check

We would like to know if you are reading the questions on this survey. If you are reading carefully, please ignore this question, do not select any answer below, and click “next” to proceed with the survey.

Strongly disagree
Somewhat disagree
Neither agree nor disagree
Somewhat agree
Strongly agree
Instructional Manipulation Check

Do you agree or disagree with the decision to send British forces to fight ISIL in Syria? We would like to know if you are reading the questions on this survey. If you are reading carefully, please ignore this question, do not select any answer below, and click “next” to proceed with the survey.

Strongly disagree
Somewhat disagree
Neither agree nor disagree
Somewhat agree
Strongly agree
Treatment Noncompliance

Definition:
“when subjects who were assigned to receive the treatment go untreated or when subjects assigned to the control group are treated” ¹

Treatment Noncompliance

■ Definition:

“when subjects who were assigned to receive the treatment go untreated or when subjects assigned to the control group are treated” \(^1\)

■ Several strategies

■ “As treated” analysis
■ “Intention to treat” analysis
■ Estimate a LATE

---

\(^1\) Gerber & Green. 2012. *Field Experiments*, p.132.
Analyzing Noncompliance

- If noncompliance only occurs in one group, it is *asymmetric* or *one-sided*

- 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: \( ITT = \bar{Y}_1 - \bar{Y}_0 \)
Analyzing Noncompliance

- If noncompliance only occurs in one group, it is asymmetric or one-sided.

- 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: $LATE = \frac{ITT}{\%Compliant}$.
Local Average Treatment Effect

- IV estimate is *local* to the variation in $X$ that is due to variation in $D$
- This matters if effects are *heterogeneous*
- 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!
Questions?
1. Practical Issues
   - Participant Recruitment
   - Attention, Satisficing, and Noncompliance
   - Use of Covariates
   - Effect Heterogeneity

2. Handling “Broken” Experiments

3. Research Ethics

4. Conclusion
Consider the following:

- When are we required to include covariates in the analysis of an experiment?
- When are we allowed to include covariates in the analysis of an experiment?
- When are we not allowed to include covariates in the analysis of an experiment?

Discuss with a partner for 2 minutes.
We never have to use covariates!
We never have to use covariates!

We may want to for:

- Subgroup comparisons
- Repeated/panel designs
- In case of noncompliance or attrition
We never have to use covariates!

We may want to for:

- Subgroup comparisons
- Repeated/panel designs
- In case of noncompliance or attrition

Any use of covariates should be planned!
Block Randomization I

Stratification: Sampling:: Blocking: Experiments
Block Randomization I

Stratification: Sampling:: Blocking: Experiments

- Basic idea: randomization occurs within strata defined before treatment assignment
Block Randomization I

**Stratification::Sampling::Blocking::Experiments**

- Basic idea: randomization occurs within strata defined before treatment assignment
- CATE is estimate for each stratum; aggregated to SATE
Block Randomization I

Stratification::Sampling::Blocking::Experiments

- Basic idea: randomization occurs within strata defined before treatment assignment
- CATE is estimate for each stratum; aggregated to SATE
- Why?
  - Eliminate chance imbalances
  - Optimized for estimating CATEs
  - More precise SATE estimate
<table>
<thead>
<tr>
<th>Exp.</th>
<th>Control</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>F</td>
</tr>
</tbody>
</table>

# population of men and women
pop <- rep(c("Male", "Female"), each = 4)

# randomly assign into treatment and control
split(sample(pop, 8, FALSE), c(rep(0,4), rep(1,4)))
<table>
<thead>
<tr>
<th>Obs.</th>
<th>$X_{1i}$</th>
<th>$X_{2i}$</th>
<th>$D_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>Old</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>Old</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>Young</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>Young</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Old</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>Old</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>Young</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>Young</td>
<td>1</td>
</tr>
</tbody>
</table>
Block Randomization II

- Blocking ensures ignorability of all covariates used to construct the blocks
- Incorporates covariates explicitly into the design
Block Randomization II

- Blocking ensures ignorability of all covariates used to construct the blocks
- Incorporates covariates explicitly into the design
- When is blocking statistically useful?
Block Randomization II

- Blocking ensures ignorability of all covariates used to construct the blocks
- Incorporates covariates explicitly into the design
- When is blocking statistically useful?
  - If those covariates affect values of potential outcomes, blocking reduces the variance of the SATE
Block Randomization II

- Blocking ensures ignorability of all covariates used to construct the blocks
- Incorporates covariates explicitly into the design
- When is blocking statistically useful?
  - If those covariates affect values of potential outcomes, blocking reduces the variance of the SATE
  - Most valuable in small samples
Block Randomization II

- Blocking ensures ignorability of all covariates used to construct the blocks
- Incorporates covariates explicitly into the design
- When is blocking statistically useful?
  - If those covariates affect values of potential outcomes, blocking reduces the variance of the SATE
  - Most valuable in small samples
  - Not valuable if all blocks have similar potential outcomes
Statistical Properties I

Complete randomization:

\[ SATE = \frac{1}{n_1} \sum Y_{1i} - \frac{1}{n_0} \sum Y_{0i} \]

Block randomization:

\[ SATE_{\text{blocked}} = \sum_{1}^{J} \left( \frac{n_j}{n} \right) \left( \widehat{\text{CATE}}_j \right) \]
<table>
<thead>
<tr>
<th>Obs.</th>
<th>$X_{1i}$</th>
<th>$X_{2i}$</th>
<th>$D_i$</th>
<th>$Y_i$</th>
<th>CATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>Old</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>Old</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>Young</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>Young</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Old</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>Old</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>Young</td>
<td>0</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>Young</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Obs.</td>
<td>$X_{1i}$</td>
<td>$X_{2i}$</td>
<td>$D_i$</td>
<td>$Y_i$</td>
<td>CATE</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>----------</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>Male</td>
<td>Old</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>Old</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>Young</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>Young</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Old</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>Old</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>Young</td>
<td>0</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>Young</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Obs.</td>
<td>$X_{1i}$</td>
<td>$X_{2i}$</td>
<td>$D_i$</td>
<td>$Y_i$</td>
<td>CATE</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>---------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td>Male</td>
<td>Old</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>Old</td>
<td>1</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>Young</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>Young</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Old</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>Old</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>Young</td>
<td>0</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>Young</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Obs.</td>
<td>$X_{1i}$</td>
<td>$X_{2i}$</td>
<td>$D_i$</td>
<td>$Y_i$</td>
<td>CATE</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>---------</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>Male</td>
<td>Old</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>Old</td>
<td>1</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>Young</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>Young</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Old</td>
<td>1</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>Old</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>Young</td>
<td>0</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>Young</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Obs.</td>
<td>$X_{1i}$</td>
<td>$X_{2i}$</td>
<td>$D_i$</td>
<td>$Y_i$</td>
<td>CATE</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>----------</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>Male</td>
<td>Old</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>Old</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>Young</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>Young</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Old</td>
<td>1</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>Old</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>Young</td>
<td>0</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>Young</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>
SATE Estimation

\[ SATE = \left( \frac{2}{8} \times 5 \right) + \left( \frac{2}{8} \times 3 \right) + \left( \frac{2}{8} \times 4 \right) + \left( \frac{2}{8} \times 3 \right) \]

= 3.75
SATE Estimation

\[ SATE = \left( \frac{2}{8} \times 5 \right) + \left( \frac{2}{8} \times 3 \right) + \left( \frac{2}{8} \times 4 \right) + \left( \frac{2}{8} \times 3 \right) \]

= 3.75

The blocked and unblocked estimates are the same here because \( Pr(Treatment) \) is constant across blocks and blocks are all the same size.
SATE Estimation

- We can use weighted regression to estimate this in an OLS framework.
- Weights are the inverse prob. of being treated w/in block.
  - \( \Pr(\text{Treated}) \) by block: \( p_{ij} = \Pr(D_i = 1|J = j) \)
  - Weight (Treated): \( w_{ij} = \frac{1}{p_{ij}} \)
  - Weight (Control): \( w_{ij} = \frac{1}{1 - p_{ij}} \)
Statistical Properties II

Complete randomization:

\[ \hat{SE}_{SATE} = \sqrt{\frac{\hat{Var}(Y_0)}{n_0} + \frac{\hat{Var}(Y_1)}{n_1}} \]

Block randomization:

\[ \hat{SE}_{SATE_{\text{blocked}}} = \sqrt{\sum_{j=1}^{J} \left( \frac{n_j}{n} \right)^2 \hat{Var}(SATE_j)} \]
**Statistical Properties II**

Complete randomization:

$$\hat{SE}_{SATE} = \sqrt{\frac{\hat{Var}(Y_0)}{n_0} + \frac{\hat{Var}(Y_1)}{n_1}}$$

Block randomization:

$$\hat{SE}_{SATE_{blocked}} = \sqrt{\sum_{1}^{J} \left(\frac{n_j}{n}\right)^2 \hat{Var}(SATE_j)}$$

When is the blocked design more efficient?
Practicalities

- Blocked randomization only works in exactly the same situations where stratified sampling works
  - Need to observe covariates pre-treatment in order to block on them
  - Work best in a panel context

- In a single cross-sectional design that might be challenging
  - Some software can block “on the fly”
Questions?
1 Practical Issues
   - Participant Recruitment
   - Attention, Satisficing, and Noncompliance
   - Use of Covariates
   - Effect Heterogeneity

2 Handling “Broken” Experiments

3 Research Ethics

4 Conclusion
Detecting Effect Heterogeneity

Always block if you expect heterogeneity!

- QQ-plots: Suggestive evidence
- Regression using treatment-by-covariate interactions
Detecting Effect Heterogeneity

Always block if you expect heterogeneity!

- QQ-plots: Suggestive evidence
- Regression using treatment-by-covariate interactions
- (Replication and meta-analysis)
Suggestive Evidence

We can never know $\text{Var}(TE_i)$!
Suggestive Evidence

We can never know $\text{Var}(TE_i)$! But...

- Quantile-quantile plots
Suggestive Evidence

We can never know \( \text{Var}(TE_i) \)! But...

- Quantile-quantile plots
  - Compare the distribution of \( Y_0 \)'s to distribution of \( Y_1 \)'s
  - If homogeneity, a vertical shift in \( Y_1 \)'s
  - If heterogeneity, a slope \( \neq 1 \)
Suggestive Evidence

We can never know $\text{Var}(TE_i)$! But...

- **Quantile-quantile plots**
  - Compare the distribution of $Y_0$’s to distribution of $Y_1$’s
  - If homogeneity, a vertical shift in $Y_1$’s
  - If heterogeneity, a slope $\neq 1$

- **Equality of variance tests**
  - If homogeneity, variance should be equal
  - If heterogeneity, variances should differ
QQ Plots

# y_0 data
set.seed(1)
n <- 200
y0 <- rnorm(n) + rnorm(n, 0.2)

# y_1 data (homogeneous effects)
y1a <- y0 + 2 + rnorm(n, 0.2)
# y_1 data (heterogeneous effects)
y1b <- y0 + rep(0:1, each = n/2) + rnorm(n, 0.2)

qqplot(y0, y1a, pch=19, xlim=c(-3,5), ylim=c(-3,5), asp=1)
curve((x), add = TRUE)
qqplot(y0, y1b, pch=19, xlim=c(-3,5), ylim=c(-3,5), asp=1)
curve((x), add = TRUE)
Equality of Variance tests

> var.test(y0, y1a)

F test to compare two variances

data:  y0 and y1a
F = 0.60121, num df = 199, denom df = 199,
p-value = 0.0003635
alternative hypothesis:
  true ratio of variances is not equal to 1
95 percent confidence interval:
  0.4549900 0.7944289
sample estimates:
  ratio of variances
    0.6012131
Equality of Variance tests

> var.test(y0, y1b)

    F test to compare two variances

data: y0 and y1b
F = 0.53483, num df = 199, denom df = 199,
p-value = 1.224e-05
alternative hypothesis:
  true ratio of variances is not equal to 1
95 percent confidence interval:
  0.4047531 0.7067133
sample estimates:
  ratio of variances
        0.5348312
Questions?
Regression Estimation
Aside: Regression Adjustment in Experiments, Generally

- Recall the general advice that we do not need covariates in the regression to “control” for omitted variables (because there are none)

- Including covariates can reduce variance of our SATE by explaining more of the variation in Y
Scenario

Imagine two regression models. Which is correct?

1. Mean-difference estimate of SATE is “not significant”
2. Regression estimate of SATE, controlling for sex, age, and education, is “significant”
Scenario

Imagine two regression models. Which is correct?

1. Mean-difference estimate of SATE is “not significant”
2. Regression estimate of SATE, controlling for sex, age, and education, is “significant”

This is a small-sample dynamic, so make these decisions pre-analysis!
Treatment-Covariate Interactions

- The regression paradigm allows us to estimate CATEs using interaction terms
  - $X$ is an indicator for treatment
  - $M$ is an indicator for possible moderator
Treatment-Covariate Interactions

- The regression paradigm allows us to estimate CATEs using interaction terms
  - $X$ is an indicator for treatment
  - $M$ is an indicator for possible moderator
- SATE: $Y = \beta_0 + \beta_1 X + e$
Treatment-Covariate Interactions

- The regression paradigm allows us to estimate CATEs using interaction terms
  - $X$ is an indicator for treatment
  - $M$ is an indicator for possible moderator
- SATE: $Y = \beta_0 + \beta_1 X + e$
- CATEs:
  $$Y = \beta_0 + \beta_1 X + \beta_2 M + \beta_3 X \ast M + e$$
Treatment-Covariate Interactions

- The regression paradigm allows us to estimate CATEs using interaction terms
  - $X$ is an indicator for treatment
  - $M$ is an indicator for possible moderator
- SATE: $Y = \beta_0 + \beta_1 X + e$
- CATEs:

$$Y = \beta_0 + \beta_1 X + \beta_2 M + \beta_3 X \ast M + e$$

- Homogeneity: $\beta_3 = 0$
- Heterogeneity: $\beta_3 \neq 0$
Questions?
Practical Issues Quiz Research Ethics Conclusion

1 Practical Issues
   ▪ Participant Recruitment
   ▪ Attention, Satisficing, and Noncompliance
   ▪ Use of Covariates
   ▪ Effect Heterogeneity

2 Handling “Broken” Experiments

3 Research Ethics

4 Conclusion
Quiz time!
Compliance

1. What is compliance?
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?
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?
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?
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?
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 $\hat{SATE} = 0$?
Null effects

1. What should we do if we find our estimated $\hat{SATE} = 0$?

2. What does it mean for an experiment to be underpowered?
Null effects

1. What should we do if we find our estimated $\hat{SATE} = 0$?

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

What should we do if, post-hoc, we find evidence of effect heterogeneity?
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?
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?
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?
Questions?
1 Practical Issues
   ■ Participant Recruitment
   ■ Attention, Satisficing, and Noncompliance
   ■ Use of Covariates
   ■ Effect Heterogeneity

2 Handling “Broken” Experiments

3 Research Ethics

4 Conclusion
History: Key Moments

1. Tuskegee (1932-1972) and Guatemala (1946-1948) Studies

2. Nuremberg Code (1947)

3. Helsinki Declaration (1964)


5. The Belmont Report (1979)

   - UK Data Protection Act (1998)
Helsinki Declaration

- Adopted by the World Medical Association in 1964\(^2\)
- Narrowly focused on medical research
- Expanded the Nuremberg Code
  - Relaxed consent requirements
  - Risks should not exceed benefits
  - Institutionalization of ethics oversight

\(^2\)http://www.bmj.com/content/2/5402/177
Helsinki Declaration

- Adopted by the World Medical Association in 1964\(^2\)
- 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?

\(^2\)http://www.bmj.com/content/2/5402/177
The Belmont Report

Commissioned by the U.S. Government in 1979

Three overarching principles:
1. Respect for persons
2. Beneficence
3. Justice

Three policy implications:
- Informed consent
- Assessment of risks/benefits
- Care for vulnerable populations

---

3 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
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?
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

- These rules have become more expansive under GDPR (in force as of 2018)

- Data cannot leave the EU except under conditions
III. Privacy

- Experimental might be additionally sensitive
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\(^4\)
  - Purpose of the study
  - Purpose of specific items or tasks
  - Order or length of questionnaire

---

IV. Deception

- Major distinction between psychology tradition and economics tradition\(^4\)
  - Purpose of the study
  - Purpose of specific items or tasks
  - Order or length of questionnaire

- Psychologists focus on *debriefing*

---

IV. Deception

- Major distinction between psychology tradition and economics tradition\(^4\)
  - 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*

---

IV. Deception

- Major distinction between psychology tradition and economics tradition
  - 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

---

IV. Deception

- Major distinction between psychology tradition and economics tradition\(^4\)
  - 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

V. Publication Bias

- Publication bias not typically discussed as an ethical question
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.
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
Lots of Other Ethical Questions

1. Funding
Lots of Other Ethical Questions

1. Funding
2. Independence and Politicization
Lots of Other Ethical Questions

1. Funding
2. Independence and Politicization
3. Vulnerable populations (e.g. children, sick)
Lots of Other Ethical Questions

1. Funding
2. Independence and Politicization
3. Vulnerable populations (e.g. children, sick)
4. Incentives
Lots of Other Ethical Questions

1. Funding
2. Independence and Politicization
3. Vulnerable populations (e.g. children, sick)
4. Incentives
5. Cross-national research
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
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...
Questions?
1. Practical Issues
   - Participant Recruitment
   - Attention, Satisficing, and Noncompliance
   - Use of Covariates
   - Effect Heterogeneity

2. Handling “Broken” Experiments

3. Research Ethics

4. Conclusion
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.
Learning Outcomes

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

1. Explain how to analyze experiments quantitatively.
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.
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.
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)
- Good luck with your research!
Beyond One-Shot Designs

Behavioral Outcomes
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
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
1. 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:

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

Behavioral Outcomes

![Graph showing the comparison between Control and Treated groups over time. The graph includes a line for each group, with the Control group showing a decrease and the Treated group showing an increase. The x-axis represents time (t, Intervention, t + 1), and the y-axis represents the behavioral outcomes.](image)
\begin{align*}
\{ Y_{j,t+1} - Y_{j,t} = -2.0 \} \\
\{ Y_{i,t+1} - Y_{i,t} = +0.5 \}
\end{align*}
\[ Y_{j,t+1} - Y_{j,t} = -2.0 \]
\[ Y_{i,t+1} - Y_{i,t} = +0.5 \]
\[ Y_{i,t+1} - Y_{i,t} = +0.5 \]

\[ Y_{j,t+1} - Y_{j,t} = -2.0 \]
$DID = +2.5$
Threats to Validity

As soon as time comes into play, we have to worry about threats to validity.\(^5\)

---

\(^5\) Shadish, Cook, and Campbell (2002)
Threats to Validity

As soon as time comes into play, we have to worry about threats to validity.\(^5\)

1 History (simultaneous cause)

\(^{5}\)Shadish, Cook, and Campbell (2002)
Threats to Validity

As soon as time comes into play, we have to worry about threats to validity.\(^5\)

1. History (simultaneous cause)
2. Maturation (time trends)

---

\(^5\) Shadish, Cook, and Campbell (2002)
Threats to Validity

As soon as time comes into play, we have to worry about threats to validity.\(^5\)

1. History (simultaneous cause)
2. Maturation (time trends)
3. Testing (observation changes respondents)

\(^5\)Shadish, Cook, and Campbell (2002)
Threats to Validity

As soon as time comes into play, we have to worry about threats to validity.\footnote{Shadish, Cook, and Campbell (2002)}

1. History (simultaneous cause)
2. Maturation (time trends)
3. Testing (observation changes respondents)
4. Instrumentation (changing operationalization)
Threats to Validity

As soon as time comes into play, we have to worry about threats to validity.\(^5\)

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

\(^5\) Shadish, Cook, and Campbell (2002)
Threats to Validity

As soon as time comes into play, we have to worry about threats to validity.\(^5\)

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

---

\(^5\) 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
III. Randomized Field Treatment

Examples:

1. Citizens randomly sent a letter by post encouraging them to reduce water usage
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
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
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
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” 6

- 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.

---

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:

\[
\text{ITT} = \bar{Y}_1 - \bar{Y}_0
\]

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

\[
\text{LATE} = \frac{\text{ITT}}{\text{PercentCompliant}}
\]

- 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:
  - Albertson and Lawrence\(^7\)

---

IV. Treatment Encouragement

- Design:
  - T1: Encourage treatment
  - T2: Measure effects

- Examples:
  1. Albertson and Lawrence\(^7\)

- Issues

---
IV. Treatment Encouragement

- **Design:**
  - T1: Encourage treatment
  - T2: Measure effects

- **Examples:**
  1. Albertson and Lawrence\(^7\)

- **Issues**
  - Nonresponse
  - Noncompliance

---

Treatment Noncompliance
Treatment Noncompliance

- Several strategies
  - “As treated” analysis
  - “Intention to treat” analysis
  - Estimate a LATE
Questions?
Heterogeneity due to Outcomes

- This is expected!
  - E.g., non-equivalent outcomes

- Reasonable to explore multiple outcomes
  - Multiple comparisons
  - Power considerations
  - Construct validity
Heterogeneity due to Outcomes

- This is expected!
  - E.g., non-equivalent outcomes

- Reasonable to explore multiple outcomes
  - Multiple comparisons
  - Power considerations
  - Construct validity

- What outcomes you measure depend on your theory
Heterogeneity due to Outcomes

- This is expected!
  - E.g., non-equivalent outcomes

- Reasonable to explore multiple outcomes
  - Multiple comparisons
  - Power considerations
  - Construct validity

- What outcomes you measure depend on your theory

- Lots of potential for behavioral measures!
Behavioural measures

Some behaviours that can be directly measured through survey questionnaires.
Behavioural measures

Some behaviours that can be directly measured through survey questionnaires.

Three broad categories:
Behavioural measures

Some behaviours that can be directly measured through survey questionnaires.

Three broad categories:

1. Behavioural measures that provide survey paradata
Behavioural measures

Some behaviours that can be directly measured through survey questionnaires.

Three broad categories:

1. Behavioural measures that provide survey paradata
2. Behavioural measures that operationalize attitudes
Behavioural measures

Some behaviours that can be directly measured through survey questionnaires.

Three broad categories:

1. Behavioural measures that provide survey paradata
2. Behavioural measures that operationalize attitudes
3. Behavioural measures that operationalize behaviours
**Behavioural Measures for Paradata**

Why?

- Respondents use of the survey tells us something meaningful about their behaviour
Behavioural Measures for Paradata

Why?

- Respondents use of the survey tells us something meaningful about their behaviour

What?
Behavioural Measures for Paradata

Why?
- Respondents use of the survey tells us something meaningful about their behaviour

What?
- Nonresponse
Behavioural Measures for Paradata

Why?
- Respondents use of the survey tells us something meaningful about their behaviour

What?
- Nonresponse
- Response latencies
Behavourial Measures for Paradata

Why?

- Respondents use of the survey tells us something meaningful about their behaviour

What?

- Nonresponse
- Response latencies
- Reading times
Behavioural Measures for Paradata

Why?
- Respondents use of the survey tells us something meaningful about their behaviour

What?
- Nonresponse
- Response latencies
- Reading times
- Answer switching
Behviouiral Measures for Paradata

Why?
- Respondents use of the survey tells us something meaningful about their behaviour

What?
- Nonresponse
- Response latencies
- Reading times
- Answer switching
- Eye tracking
Behavioural Measures for Paradata

Why?
- Respondents use of the survey tells us something meaningful about their behaviour

What?
- Nonresponse
- Response latencies
- Reading times
- Answer switching
- Eye tracking
- Mouse tracking
More Designs

Behavioural Measures for Paradata

Why?
- Respondents use of the survey tells us something meaningful about their behaviour

What?
- Nonresponse
- Response latencies
- Reading times
- Answer switching
- Eye tracking
- Mouse tracking
- Smartphone metadata
Behavioural Measures for Attitudes

Why?
- Attitudinal self-reports might be “cheap talk”
Behavioural Measures for Attitudes

Why?
- Attitudinal self-reports might be “cheap talk”

What?
Behavioural Measures for Attitudes

Why?
- Attitudinal self-reports might be “cheap talk”

What?
- Implicit Association Test
Behavioural Measures for Attitudes

Why?
- Attitudinal self-reports might be “cheap talk”

What?
- Implicit Association Test
- Incentivized Survey questions
Behavourial Measures for Behaviour

Why?

- We want to observe or affect behaviour (e.g., in an experiment)
Behavioural Measures for Behaviour

Why?
- We want to observe or affect behaviour (e.g., in an experiment)

What?
- Directly measure or initiate a direct measure of a behaviour
- May be measured by something that occurs within the confines of the survey or something outside of the survey
Example 1: Active Information Choice

---


11https://dpte.polisci.uiowa.edu/dpte/
Example 1: 
Active Information Choice

- “Followed link” identification

---


11 https://dpte.polisci.uiowa.edu/dpte/
Remember, please check **ALL** rows containing any links shown in **PURPLE**. Leave all other rows unchecked.

- Link Link
- Link Link
- Link Link
- Link Link
- Link Link Link
- Link Link
- Link Link
- Link Link
- Link Link
- Link Link
- Link
- Link Link Link
- Link
- Link
- Link
Example 1: Active Information Choice

- “Followed link” identification

---


11 https://dpte.polisci.uiowa.edu/dpte/
Example 1: Active Information Choice

- “Followed link” identification
- Information boards

---


11 https://dpte.polisci.uiowa.edu/dpte/
<table>
<thead>
<tr>
<th>Reports From the Hive, Where the Swarm Concurs</th>
<th>Doctors Can Work Together to Improve Patient Health, But Need Appropriate Incentives</th>
<th>SEC Vote Requires Business Filings to Add Environmental Risks to Bottom Line</th>
<th>Wellness, Rather Than Illness, Is Focus Under Outcome-Accountable Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay for Performance Improves Quality of Health Care Through Collaborative Medicine</td>
<td>Patients Better Served When Providers Paid for Health Outcomes</td>
<td>Anatomy of a Tear-Jerker</td>
<td>Gender Differences in Education Need Innovative Solution</td>
</tr>
<tr>
<td>Why are 3-D Movies so Bad?</td>
<td>Improving America's Health Requires Provider Incentives, Not 'Fee-for-Service'</td>
<td>Spammers Use the Human Touch to Avoid CAPTCHA</td>
<td>Heart Attack While Dining at Heart Attack Grill in Las Vegas</td>
</tr>
<tr>
<td>Physicians Group Says Quality Will Improve Under Outcome-based Payments</td>
<td>When Paid for Outcomes, Doctors Have Little Reason to Treat Highest Risk Patients</td>
<td>USDA Raises Com Export Outlook</td>
<td>Out of the O.R., T.R. Knight Back Onto the Stage</td>
</tr>
<tr>
<td>Council Is Set to Consider Increases in Hotel and Property Taxes</td>
<td>A Bowl of Chili with Bragging Rights</td>
<td>Will a Standardized System for Verifying Web Identity Ever Catch On?</td>
<td>Paying Doctors Based on Outcomes Will Lead to Rationing</td>
</tr>
</tbody>
</table>
Example 1: Active Information Choice

- “Followed link” identification
- Information boards

---


11 https://dpte.polisci.uiowa.edu/dpte/
Example 1: Active Information Choice

- “Followed link” identification
- Information boards
- Video choice

---


11 https://dpte.polisci.uiowa.edu/dpte/
Example 1: Active Information Choice

- “Followed link” identification\(^8\)
- Information boards\(^9\)
- Video choice\(^{10}\)
- Dynamic Process Tracing Environment \(^{11}\)


\(^{11}\) https://dpte.polisci.uiowa.edu/dpte/
Stage: Primary Election
Sub-stage: Early Primary

- Andy Fischer's Political Experience
- DELEGATE COUNT, END OF FEBRUARY
  Republican Primary
- Sam Green's Mother provides a Childhood Anecdote
- Dana Turner's Picture
- Terry Davis's Current Job Performance
- Taylor Harris's Age
Primary elections require voters to choose the party they want to vote in. Before we begin the Iowa primary, please choose either the Republican or Democrat Primary. You will see candidates for both parties but will be only able to vote in the party you choose.

- Republican
- Democrat

Select an answer, then click the End button to end the questionnaire.
Example 2: Sign-up/Enrolment

An extension of information choice behaviour would be explicit engagement in other kinds of (small) behaviours, such as:

- Entering an email address to receive information or join a mailing list

- Signing up for an appointment or further interaction

---


Example 3: Incentivised Survey Questions

Definitions:

- A survey question is just a self-report
- An incentivized survey question attached financial gains or losses to the answer options
Mark your gamble selection with an X in the last column across from your preferred gamble.

<table>
<thead>
<tr>
<th>Gamble</th>
<th>Event</th>
<th>Payoff</th>
<th>Probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>$10</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>$10</td>
<td>50%</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>$18</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>$6</td>
<td>50%</td>
</tr>
<tr>
<td>3</td>
<td>A</td>
<td>$26</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>$2</td>
<td>50%</td>
</tr>
<tr>
<td>4</td>
<td>A</td>
<td>$34</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-$2</td>
<td>50%</td>
</tr>
<tr>
<td>5</td>
<td>A</td>
<td>$42</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-$6</td>
<td>50%</td>
</tr>
</tbody>
</table>

Example 3: Incentivised Survey Questions

Definitions:

- A survey question is just a self-report
- An *incentivized* survey question attached financial gains or losses to the answer options
Example 3: Incentivised Survey Questions

Definitions:

- A survey question is just a self-report
- An incentivized survey question attached financial gains or losses to the answer options

Paradigm could be applied to any measure of behavioural intentions to avoid cheap talk.
Example 4: Purchasing Decisions

Common ways to study purchasing behaviour include:
Example 4: Purchasing Decisions

Common ways to study purchasing behaviour include:

- Direct attitudinal questions
Example 4: Purchasing Decisions

Common ways to study purchasing behaviour include:

- Direct attitudinal questions
- Retrospective and prospective self-reports
Example 4: Purchasing Decisions

Common ways to study purchasing behaviour include:

- Direct attitudinal questions
- Retrospective and prospective self-reports
- Conjoint experiments
Example 4: Purchasing Decisions

Common ways to study purchasing behaviour include:

- Direct attitudinal questions
- Retrospective and prospective self-reports
- Conjoint experiments

Another way is embedding a purchase in a survey.¹⁴

---

More Designs Behavioral Outcomes

Source: Wikimedia Commons (Sun Ladder, KMJ)
Example 5: Donations

Miller and Krosnick\textsuperscript{15} asked for charitable donations via cheque directly as part of a paper-and-pencil survey.


Example 5: Donations

- Miller and Krosnick\(^{15}\) asked for charitable donations via cheque directly as part of a paper-and-pencil survey.

- Klar and Piston\(^{16}\) offered respondents a survey incentive up-front for participation and then later offered them a chance to donate (a portion of payment) to a charity.

---


Example 6:
Web Tracking Data

1. Active installation of a tracking app, such as YouGov Pulse\(^\text{17} \ 18\)

2. Post-hoc collection of web history files using something like Web Historian \(^\text{19}\)

\(^{17}\)https://yougov.co.uk/find-solutions/profiles/pulse/


\(^{19}\)http://www.webhistorian.org/
Other Possibilities

Other Possibilities

- Coordination tasks
  - Synchronous group tasks\(^{20}\)
  - Game play
  - Simulations

Other Possibilities

- Coordination tasks
  - Synchronous group tasks\textsuperscript{20}
  - Game play
  - Simulations

Other Possibilities

- Coordination tasks
  - Synchronous group tasks
  - Game play
  - Simulations

- Offering incentives to perform future behaviour (tracked elsewhere)

---

Other Possibilities

- Coordination tasks
  - Synchronous group tasks
  - Game play
  - Simulations

- Offering incentives to perform future behaviour (tracked elsewhere)

- OAuth/API integrations w/ other platforms
  - Merging website usage data w/ survey data
  - Treating website sign-up or usage as behavioural outcomes
  - Linking with smartphone metadata

---

Some principles for survey measures of behaviour
Some principles for survey measures of behaviour

1. Know why you are collecting a behavioural measure!
Some principles for survey measures of behaviour

1. Know why you are collecting a behavioural measure!

2. Know whether you are studying a past, present, or future behaviour.
Some principles for survey measures of behaviour

1. Know why you are collecting a behavioural measure!

2. Know whether you are studying a past, present, or future behaviour.

3. Be creative! Recognise possibilities and limitations of any given survey mode.
Some principles for survey measures of behaviour

1. Know why you are collecting a behavioural measure!

2. Know whether you are studying a past, present, or future behaviour.

3. Be creative! Recognise possibilities and limitations of any given survey mode.

4. Validate, validate, validate!
Activity!

With a partner, brainstorm how one or more of these behavioural measures might be applied to a survey experiment (either as outcome, treatment, covariate, or behavioural check) relevant to your own work or your organisation.