Using Mixed-Methods Evaluation to Support Better Non-Experimental Impact Analysis

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Mixing Methods to Obtain Better Non-Experimental Impact Findings

- Essence of any non-experimental impact analysis = opportunistic identification of a reliable counterfactual
- Our thesis = extensive, systematic use of qualitative information regarding
  -- intervention’s intake & service delivery process
  -- intervention’s context
  allows one to do this better—i.e., to make quantitative non-experimental impact analyses less subject to selection bias

- Selection bias = difference in participant & non-participant outcomes, interpreted as impact, that is not causal
Outline of Talk

- Framing the challenge . . . and opportunity
- Strengthening impact analyses by tapping
  -- qualitative information on selection into intervention participation
  -- qualitative information on service delivery and other influences on participant outcomes
- Defining an all-inclusive mixed-methods protocol
- Testing the performance of the protocol
Framing the Challenge . . . and Opportunity

- **Stylized situation**
  - know outcomes for participants & non-participants
  - have data to balance on background characteristics
  - no other knowledge

- **Add qualitative information on . . .**
  - selection into intervention participation—what real-world process makes some individuals participants and others not
  - outcome-generating process among participants—places all-other-things-equal conditions are violated

- Choose the most promising non-experimental impact analysis strategy based on this qualitative information
Strengthening Impact Analyses by Tapping Qualitative Information on Selection Into Intervention Participation
How Eligibility ➔ Recruitment ➔ Participation Defines Comparison Group Possibilities

1. In Target Population/Eligible?
   - No: Ineligibles
   - Yes: Recruited?

2. Recruited?
   - No: Non-Recruited Eligible Non-participants
   - Yes: Participated?
     - No: Recruited Eligible Non-participants
     - Yes: Intervention Sample for Impact Analysis
# Qualitative Data’s Source & Role: Eligibility- and Recruitment-Based Comparison Groups

<table>
<thead>
<tr>
<th>Candidate Comparison Group</th>
<th>Qualitative Topic</th>
<th>Data Source</th>
<th>Assess candidate comparison group</th>
<th>Identify confounding variables to equalize</th>
<th>Look for single continuous selection variable (RDD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ineligibles</td>
<td>Eligibility criteria</td>
<td>Program staff</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Non-recruited eligible non-participants</td>
<td>Recruiting practices</td>
<td>Program staff</td>
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<td>✓</td>
<td></td>
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<tr>
<td>Recruited eligible non-participants</td>
<td>Recruiting practices</td>
<td>Program staff</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
How Application → Acceptance → Participation Defines Comparison Group Possibilities

- In Target Population/Eligible?
  - No: Ineligibles
  - Yes: Applied?
    - No: Eligible Non-Applicants
    - Yes: Complete Intake Process?
      - No: Early Opt-Outs
      - Yes: Screened In?
        - No: Screen Outs
        - Yes: Started Program?
          - No: Late Opt-Outs
          - Yes: Intervention Sample for Impact Analysis
## Qualitative Data’s Source & Role: Application- and Acceptance-Based Comparison Groups

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<tr>
<th>Candidate Comparison Group</th>
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<th>Use 1: Assess candidate comparison group</th>
<th>Use 2: Identify confounding variables to equalize</th>
<th>Use 3: Look for single continuous selection variable (RDD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligible non-applicants</td>
<td>Application motivations</td>
<td>Client focus groups</td>
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<td>Intake opt-outs</td>
<td>Opt-out patterns</td>
<td>Intake staff</td>
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<tr>
<td>Intake screen-outs</td>
<td>Reasons for excluding eligibles</td>
<td>Intake staff</td>
<td>✓</td>
<td>✓</td>
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Strengthening Impact Analyses by Tapping Qualitative Information on the Outcome-Generation Process
Model the Outcome-Generation Process to Create Counterfactual Free from Intake Selection Bias

- Calculate no-intervention counterfactual outcomes from data on individuals who select into the intervention.
- Doesn’t matter if those who select out of the intervention (previous source of counterfactual outcomes) are different.
- Model how participant outcome $Y_i$ varies with level of intervention services received (e.g., $\$ \text{ spent}$):
  - for categories of spending, $S_i$, intervention staff believe most likely to push outcomes upward
  \[
  \hat{Y}_i = \hat{e} + \hat{g}S_i + \hat{h}'X_i
  \]
- Create no-intervention counterfactual outcome by reducing spending to $\$0$ (i.e., by $S_i$): $Y_i^{\text{Counter}} = Y_i - \hat{g}S_i$
Does This Model Suffer from Omitted-Variable Bias that Distorts $\hat{g}$?

- Yes, if correlates of $S_i$ also correlate with $Y_i$ without being part of the causal path from $S_i$ to $Y_i$ -- and are not in $X_i$
- Factors that correlate with $S_i$ depend on sources of variation in spending from participant to participant
  -- availability of funds when enrolled
  -- staff decisions on extent of needed services
  -- participant decisions on duration of participation
- Participant decisions can create omitted variable bias in
  \[ \hat{Y}_i = \hat{e} + \hat{g}S_i + \hat{h}'X_i \]
  -- exit early from low motivation \(\Rightarrow\) low $S_i$ non-causally accompanies low $Y_i$ \(\Rightarrow\) $\hat{g}$ too large
  -- exit early due to high ability \(\Rightarrow\) low $S_i$ non-causally accompanies high $Y_i$ \(\Rightarrow\) $\hat{g}$ too small
Using Additional Qualitative Information Can Turn Selection Risk into a “Specification Test”

- Gauge—and report—direction of skewing from qualitative information on program staff beliefs about predominant reasons for early exit
  - low motivation → impact estimate too large
  - high ability → impact estimate too small

- Use as “specification test” for initial analysis model
  - initial estimate > biased upward cost-based estimate → switch to comparison group yielding smaller estimate
  - initial estimate < biased downward cost-based estimate → switch to comparison group yielding larger estimate
Multiple reasons data on “untreated” cases can come from different times & places than participant data

-- different cost & legal permission issues when accessing data for people not connected to focal intervention

-- intervention begins at same time for all reasonably similar individuals in a locality \( \Rightarrow \) “untreated” cases must come from different times/places

-- for statistical power, insufficient number of comparison group cases available from times and places that supply participant sample
Equalizing Service Environment and External Conditions When Lack Time/Place Alignment

- Need qualitative information to decide which services in community resemble focal intervention enough to matter
- Descriptive information on local environmental conditions (labor market, housing market, crime rate, etc.) also important
- Formal quantitative modeling = complex, over-taxing of degrees of freedom (need to take account of alternative services in community at all points in follow-up period)
- Qualitative strategy:
  -- pick comparison samples with longitudinal paths for these factors most similar to participant samples
  -- through manual inspection & judgmental selection
Defining and Testing a Comprehensive Mixed-Methods Protocol
Mixed-Methods Protocol for Non-Experimental Impact Analysis: Comprehensive Approach

- Gather all the above qualitative data types to support selection & execution of best non-experimental impact analysis design based on external comparison groups.

- All qualitative data types have modest costs
  - program staff interviews
  - applicant focus groups
  - field studies/document review

- Implement spending-at-$0 counterfactual analysis
  - “specification test” of success of comparison group approach at avoiding intake selection bias
  - modest marginal cost if already doing cost-benefit analysis
Testing Performance of the Mixed-Methods Protocol

- Embed the all-inclusive protocol in a future random assignment experiment
- Check accuracy of resulting impact estimates, compared to experimental “Gold Standard” results
- Track & compare costs as well

“If non-experimental designs supported by a mixed methods approach are ever to be trusted in place of experiments, a test of this sort—or, better yet, a series of such tests—seems indispensable.”

- Bell & Gasper, forthcoming
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