Understanding Variation in Treatment Effects: Musings on Quantitative Methods

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Papers Use the Full Range of Methods

• Moderator analyses (Morris, Kling)

• Symmetrically-predicted endogenous subgroups (ASPES; Peck)

• Principal stratification (PS; Page et al.)

• Mediation analyses (Kling)
Overview of Musings

• Which methods should be used and when?
• What are similarities and differences of the methods?
• What are key methodological issues?
• Final comments
Which Methods to Use?

• All disaggregate full sample impacts into "component" parts to assess variation in impacts
  – Many are subgroup analyses

• Provide complementary information

• Choice of methods should be based on
  – Primary research questions from the evaluation’s logic model
  – Available baseline, service receipt, and mediator data
  – Plausibility of identifying assumptions
Broad Categorization of Methods

• Moderator analyses
  – Based on *pre-intervention* characteristics
    • Individuals and sites
    • Broader target population

• ASPES, PS, and mediation analyses
  – Based on *post-intervention* measures
    • Program-related and other experiences after random assignment
    • Short-term (mediating) outcomes
What Distinguishes the ASPES, PS, and Mediation Analyses?

• **ASPES**
  – Mediators are available for *one* research group only
    • e.g., Receipt of specific intervention services by treatment group
    • Directly predict mediators for the other research group

• **PS and mediation analyses**
  – Mediators are available for *both* research groups
    • e.g., Teacher practices; child care decisions; depression indices
    • Do not know mediator values in the other research condition
    • Use impacts on mediators to link mediators to longer-term outcomes
What Distinguishes PS and Mediation Analyses?

• Mediation analyses
  – Motivation: Mediators may be correlated with long-term outcomes
  – Questions:
    • What are these linkages?
    • To what extent do impacts on mediators explain impacts on longer-term outcomes?

• PS analyses
  – Motivation: The intervention is likely to change mediator values more for some people than others
  – Question:
    • What are intervention effects on long-term outcomes for the subgroup whose mediator values were improved by the intervention?
Methods Rely on Key Assumptions

• Moderator analyses
  – Based fully on the experimental design

• ASPES
  – Need *high quality baseline data* for predicting mediators

• Mediation Analyses
  – Standard OLS approaches assume *mediator ignorability*
  – IV approaches invoke the *exclusion restriction*
  – Difficult to recover average mediated effects for the population

• PS Analyses
  – Requires *distributional assumptions* on potential outcomes
Ways to Improve Analyses

• Collect detailed baseline data

• Focus the analysis on key mediators and moderators that align with the conceptual model
Final Comments

• Methods show promise for understanding variation in treatment effects
  – Need more empirical work
  – Need tools, such as computer programs

• Results must be interpreted carefully
  – Apply to subgroups, not necessarily to the full sample
  – Hinge on credibility of assumptions
  – Statistical power could be an issue
  – Important to avoid fishing for positive findings
For More Discussion

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