Adaptive Design Experimentation in the High School Longitudinal Study of 2009 Second Follow-up Field Test: Investigating Incentive Treatments

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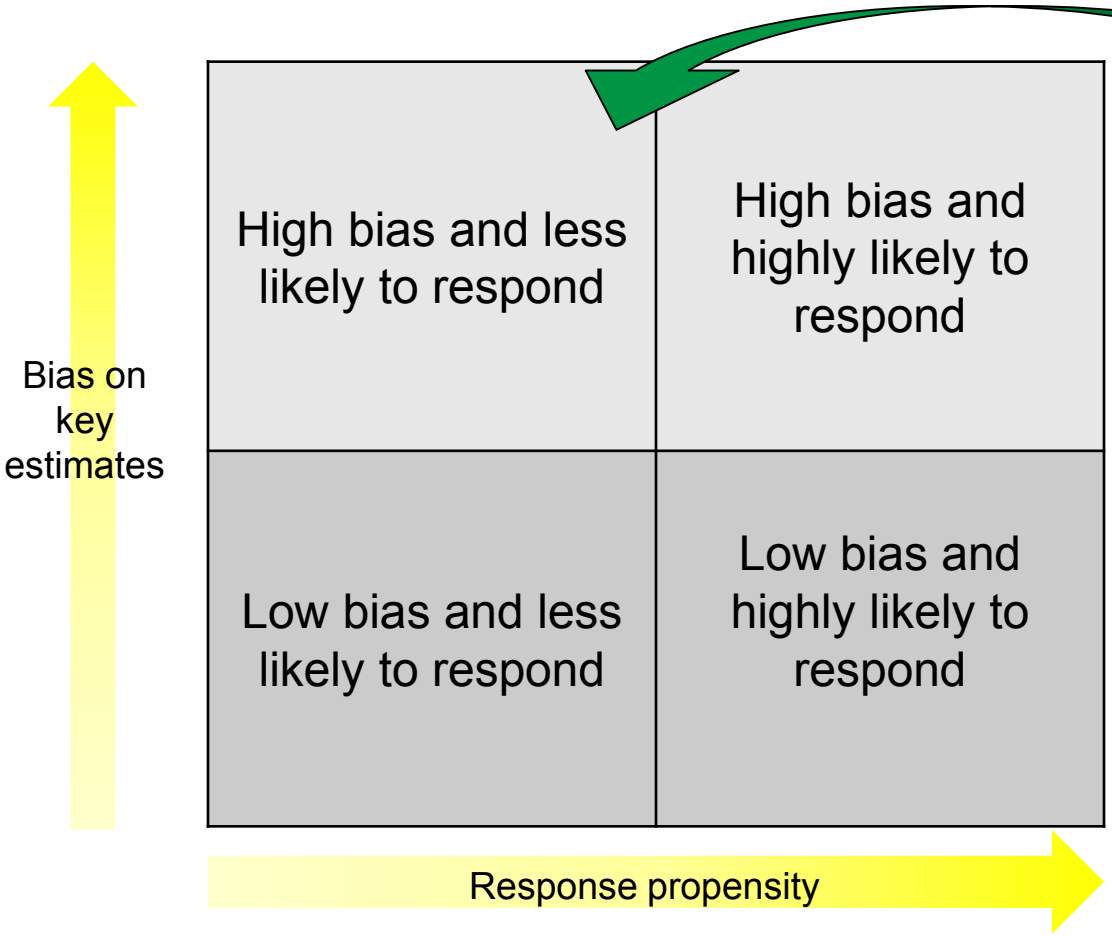
Introduction to adaptive design

- "Alteration of sampling and collection approaches during the course of a data collection using real time process and survey data to improve survey cost efficiency and to achieve more precise and less biased estimates."
- Largely driven by declining response rates, costs for improving them, and concern about related data precision and biases
- Adaptive design experiments are numerous in the field and tend to focus on response rates

Introduction to NCES adaptive design

- This presentation highlights current research at NCES with longitudinal studies that:
  - Focuses on improving response rates
    - Using response propensity to more efficiently use resources
  - Simultaneously considers bias reduction

Targeting based on likelihood to introduce bias *and* response propensity



Assumption: Bringing in more individuals that introduce higher bias may be more effective way of reducing bias than just increasing response rate

NCES has used adaptive design in multiple studies

• Baccalaureate and Beyond (B&B) Longitudinal Study	• 2012
• Education Longitudinal Study of 2002 (ELS:2002)	• 2012
• High School Longitudinal Study of 2009 (HSLS:09)	• 2013
• Beginning Postsecondary Student Study (BPS)	• 2014
• National Household Education Study (NHES)	• 2016 (planned)

Adaptive design in HSLS:09

- Information presented here is drawn from recent work on one NCES longitudinal study
  - High School Longitudinal Study of 2009 (HSLS:09) Second Follow-up Field Test
- Study and related adaptive design research conducted with RTI International

Previous HSLS:09 adaptive design work

- HSLS:09 follows a representative sample of 9th graders from the Fall of 2009
- The 2013 update gathered information during transition into postsecondary education or work
  - Over 23,000 students currently in HSLS:09 sample
- 2013 Update: **Bias was successfully reduced on key estimates**
  - As adaptive phases progressed, the respondent algebra 1 coursetaking rate more closely approximated known 2009 rate

HSLS:09 Second Follow-up Field Test (2015)

- 2013 Update experience tells us the bias likelihood model works
  - Individuals likely to introduce bias were targeted
- Effectiveness of the design still depends on success of treatments used to encourage response
  - Monetary and non-monetary incentives needed testing

Experiments tested treatments

- Used monetary incentives but not just about testing incentive amounts
- Effect of active treatments such as prepaying for incentives, the act of boosting incentive amounts, or monetary incentive vs. time
- Most effective treatments to be used in main study adaptive design (2016)
- Sample assigned randomly across treatment groups (N=1,100)

Experiments tested 4 treatments

- Treatments included in field test experiments:
  1. Baseline incentive offer ($15 or no baseline incentive)
  2. Timing of prepay
     - Early prepay (sent with data collection announcement letter)
     - Late prepay (6 weeks into data collection)
  3. Incentive boost
     - $0, $15, or $30
  4. Second boost ($25) or abbreviated interview

Field test phases and treatments

Phase	Group A	Group B	Group C	Group D
Phase 1 (4/13): Web only, $5 prepay for selected cases	No baseline incentive offer; no prepay	$15 incentive offer; no prepay	No baseline incentive offer; $5 prepay	$15 incentive offer; $5 prepay
Phase 2 (5/4): Telephone interviewing added	Telephone added	Telephone added	Telephone added	Telephone added
Phase 3 (5/26): $5 prepay for selected cases	$5 prepay	$5 prepay	(Prepay at baseline)	(Prepay at baseline)
Phase 4 (6/8): Increased incentive for selected cases	$0 or $15 or $30 boost	$0 or $15 or $30 boost	$0 or $15 or $30 boost	$0 or $15 or $30 boost
Phase 5 (7/6): Increased incentive or abbreviated	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview

1. Baseline incentive: B and D received $15 offer

Phase	Group A	Group B	Group C	Group D
Phase 1 (4/13): Web only, $5 prepay for selected cases	No baseline incentive offer; no prepay	$15 incentive offer; no prepay	No baseline incentive offer; $5 prepay	$15 incentive offer; $5 prepay
Phase 2 (5/4): Telephone interviewing added	Telephone added	Telephone added	Telephone added	Telephone added
Phase 3 (5/26): $5 prepay for selected cases	$5 prepay	$5 prepay	(Prepay at baseline)	(Prepay at baseline)
Phase 4 (6/8): Increased incentive for selected cases	$0 or $15 or $30 boost	$0 or $15 or $30 boost	$0 or $15 or $30 boost	$0 or $15 or $30 boost
Phase 5 (7/6): Increased incentive or abbreviated	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview

1. Baseline incentive : AC vs. BD

- Baseline incentive was significantly effective overall
  - No baseline offer (AC) vs. $15 baseline offer (BD):
    Chi-square = 6.72, p = 0.009

Experiment group	Final response rate
AC: No baseline offer	46.5
BD: $15 baseline offer	54.4

2. Timing of $5 prepay: at baseline for C and D

Phase	Group A	Group B	Group C	Group D
Phase 1 (4/13): Web only, $5 prepay for selected cases	No baseline incentive offer; no prepay	$15 incentive offer; no prepay	No baseline incentive offer; $5 prepay	$15 incentive offer; $5 prepay
Phase 2 (5/4): Telephone interviewing added	Telephone added	Telephone added	Telephone added	Telephone added
Phase 3 (5/26): $5 prepay for selected cases	$5 prepay	$5 prepay	(Prepay at baseline)	(Prepay at baseline)
Phase 4 (6/8): Increased incentive for selected cases	$0 or $15 or $30 boost	$0 or $15 or $30 boost	$0 or $15 or $30 boost	$0 or $15 or $30 boost
Phase 5 (7/6): Increased incentive or abbreviated	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview

2. Timing of prepay: AB vs. CD

Experiment group	Final response rate
AB: Late prepay	48.9
CD: Early prepay	52.0

- Prepay timing had no effect
  - Late prepay (AB) vs. Baseline prepay (CD)

    Chi-square = 1.05, p = 0.31

3. Incentive boost offer

Phase	Group A	Group B	Group C	Group D
Phase 1 (4/13): Web only, $5 prepay for selected cases	No baseline incentive offer; no prepay	$15 incentive offer; no prepay	No baseline incentive offer; $5 prepay	$15 incentive offer; $5 prepay
Phase 2 (5/4): Telephone interviewing added	Telephone added	Telephone added	Telephone added	Telephone added
Phase 3 (5/26): $5 prepay for selected cases	$5 prepay	$5 prepay	(Prepay at baseline)	(Prepay at baseline)
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Phase 5 (7/6): Increased incentive or abbreviated	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview

3. Incentive boost: comparison overall and by amount

Group	Within phase response rate
No boost	11.9
Any boost	19.5
$15 boost	22.0
$30 boost	17.0
No boost	11.9
$15 boost	22.0
No boost	11.9
$30 boost	17.0

- Incentive boost

Significant effect of boost to no boost:
Chi-square = 6.90, **p = 0.009**

No significant difference between $15 and $30 conditions:
Chi-square = 2.09, p = 0.15

Significant effect of $15 boost to no boost:
Chi-square = 9.22, **p = 0.002**

Not quite significant difference between no boost and $30 boost:
Chi-square = 2.67, p = 0.10

4. Abbreviated interview vs. second incentive boost

Phase	Group A	Group B	Group C	Group D
Phase 1 (4/13): Web only, $5 prepay for selected cases	No baseline incentive offer; no prepay	$15 incentive offer; no prepay	No baseline incentive offer; $5 prepay	$15 incentive offer; $5 prepay
Phase 2 (5/4): Telephone interviewing added	Telephone added	Telephone added	Telephone added	Telephone added
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Phase 5 (7/6): Increased incentive or abbreviated	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview	$25 boost or abbreviated interview

4. Abbreviated interview vs. second incentive boost offer

Group	Within phase response rate
Abbreviated	10.4
$25 boost	17.9

- Abbreviated or $25 boost
  - Significant effect of $25 boost over abbreviated

    Chi-square = 7.37, p = 0.007

Summary of Experiment Results

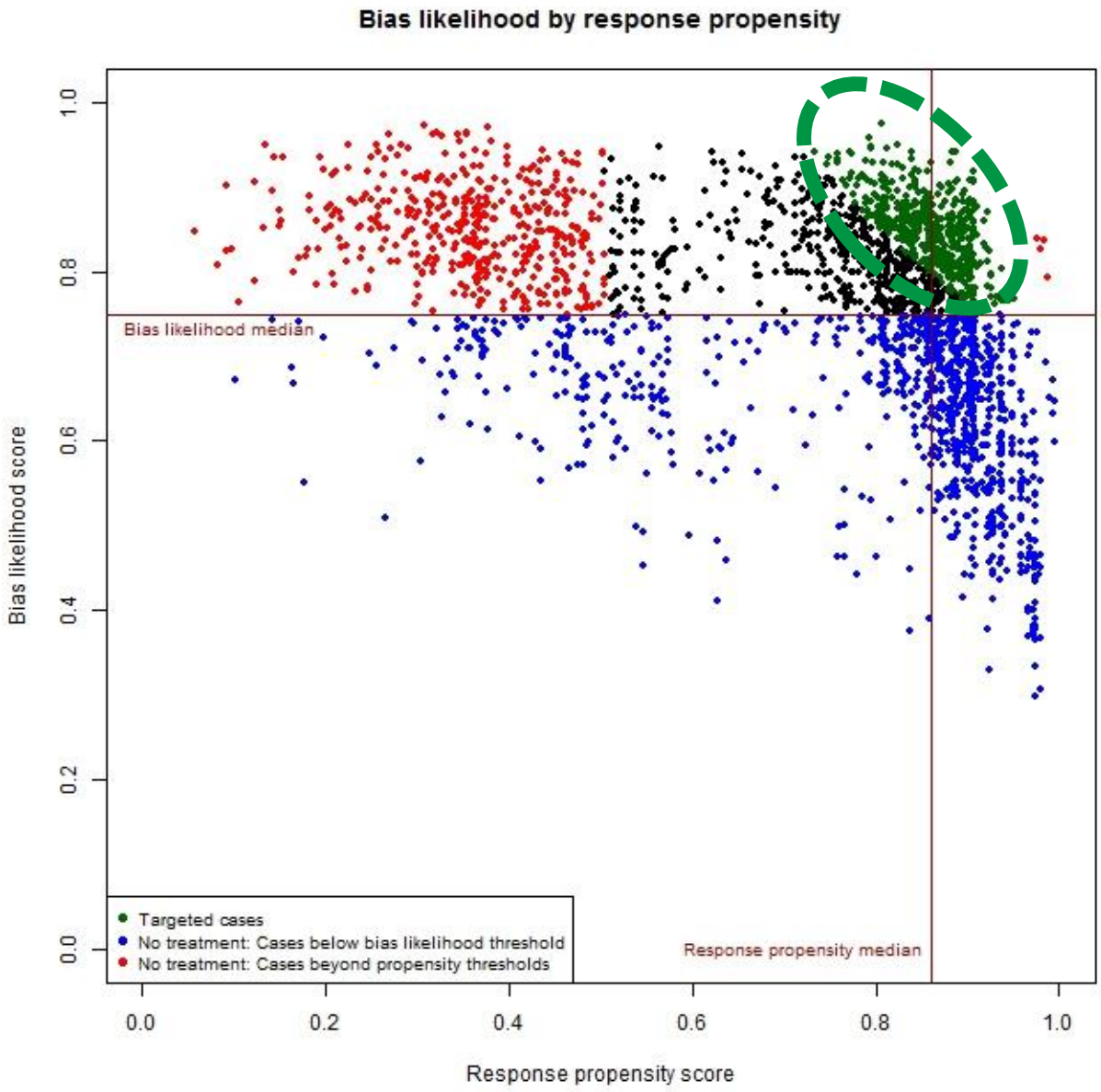
1. Baseline incentive was significantly effective
2. Prepay timing had no effect
3. Incentive boost was significantly effective, though no difference between $15 and $30 levels
   - More testing on best amounts is recommended
4. Final incentive boost more effective than abbreviated interview

Plans for 2016 Main Study

- Start with baseline incentive for targeted cases
- Use up to 2 incentive boosts for targeted cases
- Target sample members using bias likelihood model, adding measures of response propensity to effectively use resources
  - Not targeting cases of highest response propensity

Example*: Plot of bias likelihood by response propensity score

HSLS F2 would target cases in green area



*Example distribution from BPS:12/14

Questions?

- For additional information, please contact
  - Elise Christopher (Project Officer of HSLS:09) – elise.christopher@ed.gov
  - http://nces.ed.gov/surveys/hsls09

- Studies discussed here were done in close cooperation with experts at RTI International
  - Thanks to Dan Pratt, David Wilson, Jeffrey Rosen

Thank you!