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EXPLORING THE USE OF FEDEX MAILINGS AS AN ADAPTIVE DESIGN INTERVENTION IN A MIXED-MODE ABS STUDY

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Background

- Research is ongoing into adaptive design interventions in mixed-mode surveys with mail as the primary contact mode, e.g.:
 - National Household Education Survey (NHES):
 - Prepaid incentives (Jackson, McPhee, Lavrakas 2019)
 - Paper-only mailings (McPhee 2019)
 - National Survey of College Graduates (NSCG): mode changes, withholding of contacts (Coffey, Reist, Miller 2019)
- Another potential intervention: rush mailings (FedEx or Priority)

Research question

- Rush mailings generally increase response rates (Brick et al. 2012)
- But, they are much more expensive than First Class mailings
- Therefore, they are typically used for nonresponse follow-up rather than initial mailings
- NHES has experimented with alternative (non-adaptive) timings of a FedEx follow-up mailing
- **Question:** relative to using FedEx at the same mailing for all cases, can we improve representativeness at the same or lower cost by determining the timing of the FedEx mailing based on observable characteristics?

Analytic sample and approach

- NHES:2019 design
 - Address-based sample (ABS) of 205,000 addresses (commercially purchased frame)
 - Two-phase design
 - Screener to determine eligibility
 - Topical for eligible screened households
 - Screener uses web-push mailings: 2 web letters, followed by 2 paper surveys
- NHES:2019 FedEx timing experiment (applied to subset of the sample)
 - **FED2**: send mailing 2 (web letter) by FedEx ($n = 23,330$)
 - **FED4**: send mailing 4 (paper survey) by FedEx ($n = 23,330$)
- Approach: retroactively analyze these uniform (non-adaptive) treatments to project data collection outcomes if FedEx mailings had been adaptively targeted

Hypothetical adaptive design

- Simulate a “dynamic” approach inspired by NSCG experimentation (Coffey, Reist, Miller 2019)
 - Examine partial R-indicators at one or more “intervention points” during data collection
 - Intervene differentially for under- and overrepresented subgroups
- Variable-level R-indicators
 - Higher → more imbalance with respect to that variable
 - Used to identify variables on which to intervene
- Category-level R-indicators
 - Negative value → category is underrepresented
 - Positive value → category is overrepresented
 - Used to ID subgroups to receive more or less intensive protocols

Intervention points and potential interventions

- **ADAPT2**: only intervention point is mailing 2; options are:
 - Send mailing 2 by FedEx
 - Send mailing 2 by First Class
- **ADAPT24**: intervention points at mailings 2 and 4
 - Mailing 2 options: same as **ADAPT2**
 - Mailing 4 options:
 - Send mailing 4 (First Class if mailing 2 by FedEx, otherwise FedEx)
 - Withhold mailing 4
- Analytic approach
 - Use R-indicators to ID subgroups we *would* send to FedEx at mailing 2
 - Assemble “adaptive design” dataset comprised of **FED2** for those subgroups and **FED4** for others

Available pathways, by protocol

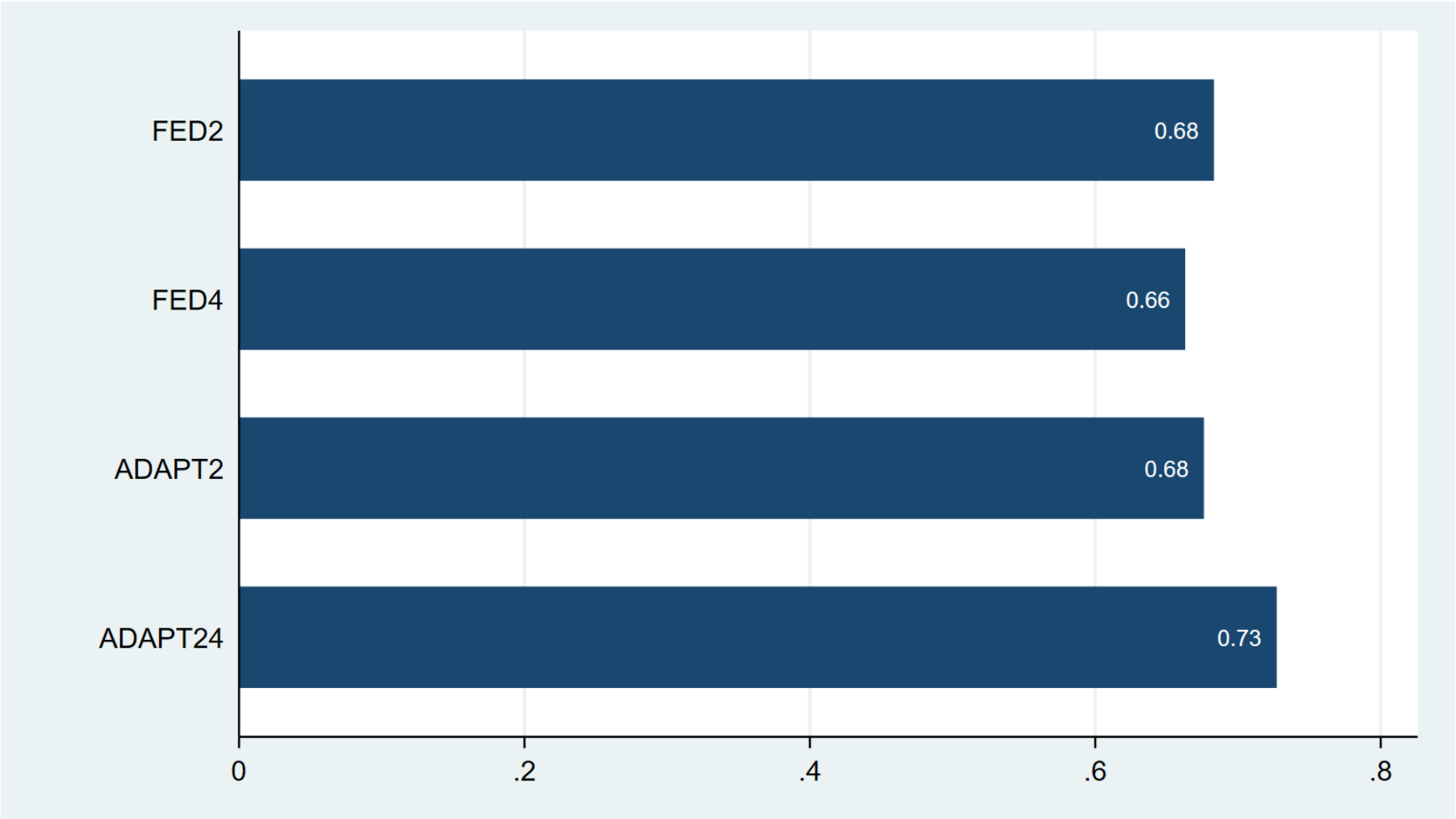
Protocol	Mailing 1	Mailing 2	Mailing 3	Mailing 4
FED2	First Class	FedEx	First Class	First Class
FED4	First Class	First Class	First Class	FedEx
ADAPT2	First Class	FedEx	First Class	First Class
	First Class	First Class	First Class	FedEx
ADAPT24	First Class	FedEx	First Class	None
	First Class	FedEx	First Class	First Class
	First Class	First Class	First Class	None
	First Class	First Class	First Class	FedEx

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Household Education Surveys (NHES) Program of 2019.

Adaptive design intervention subgroups

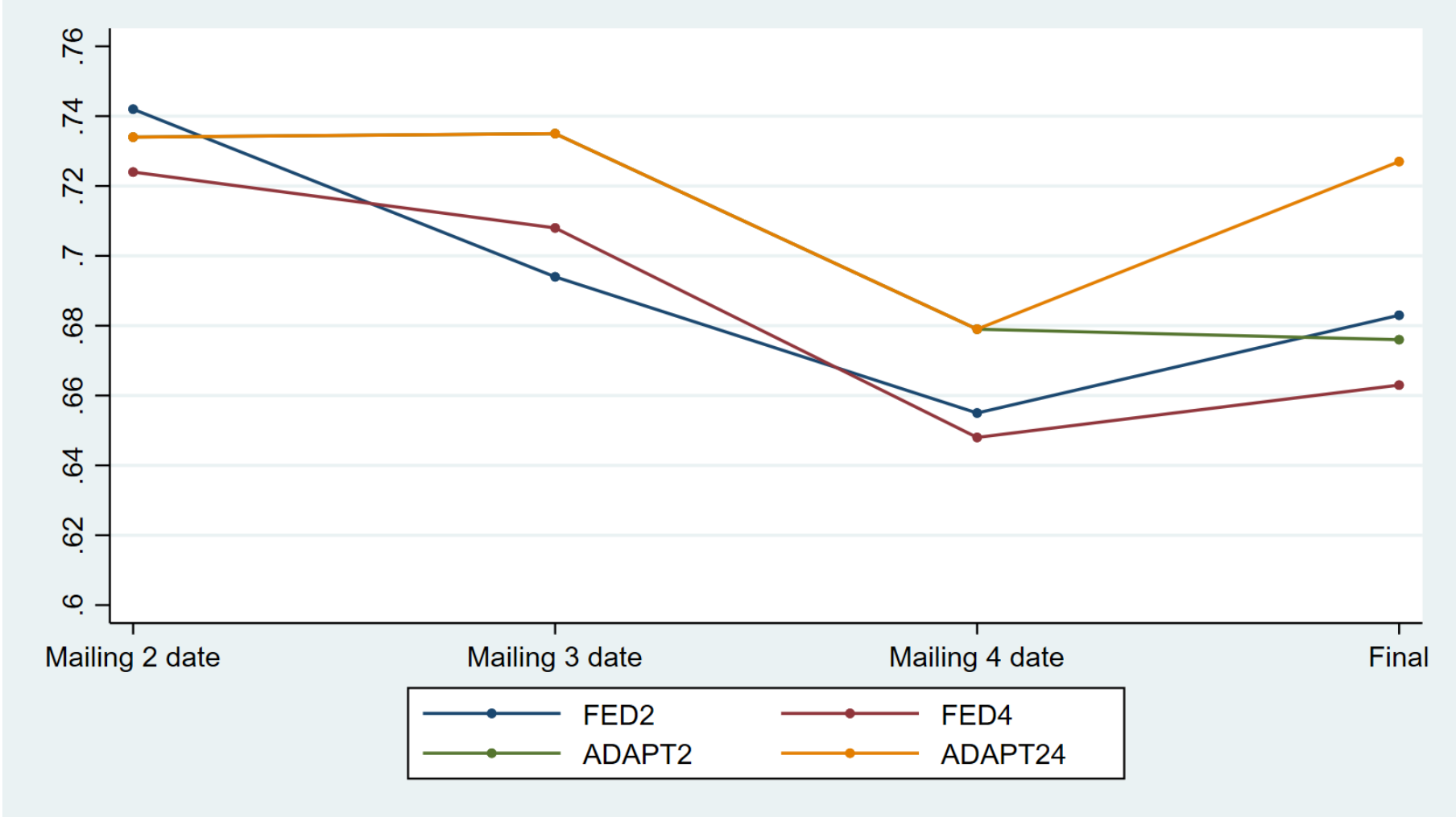
Protocol	Intervention point	Intervention variable	Group(s)	Intervention
ADAPT2 and ADAPT24	Mailing 2	Age by home tenure	Renters, age missing Renters, 18 – 55 Owners, age missing Tenure missing, 36 – 45 Age and tenure missing	FedEx
			All others	First Class
ADAPT24 only	Mailing 4	Age by home tenure	Owners, 56+	Withhold mailing 4
			All others	Send mailing 4

Projected overall R-indicators: end of data collection



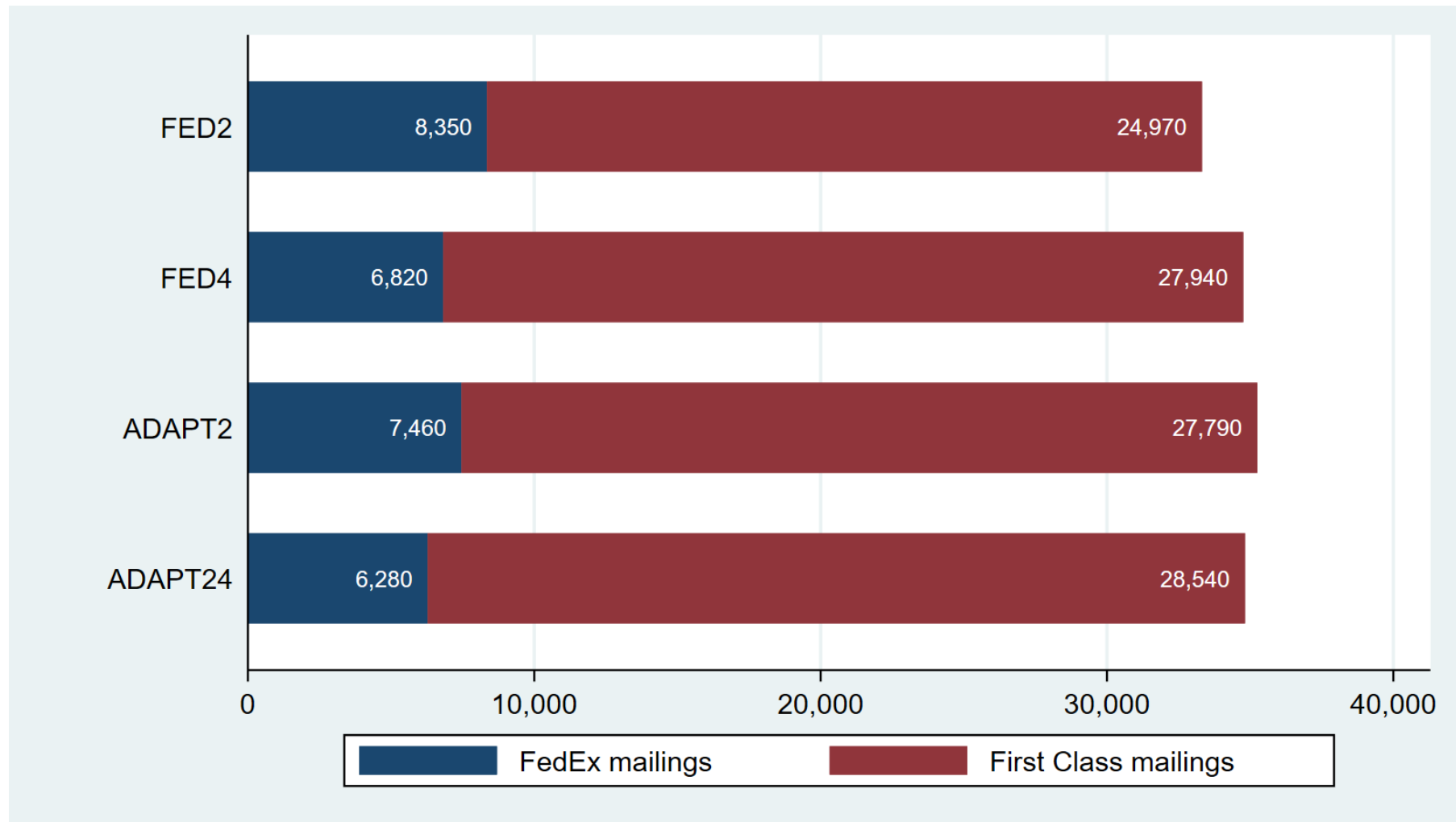
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Household Education Surveys (NHES) Program of 2019.

Projected overall R-indicators at each mailing date



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Household Education Surveys (NHES) Program of 2019.

Projected number of mailings (scaled to same eligible respondent target)



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Household Education Surveys (NHES) Program of 2019.

Conclusions

- Both adaptive designs likely to save money relative to using FedEx at mailing 2 for all cases
- If timing of FedEx mailing is only intervention (**ADAPT2**):
 - Similar sample balance as using FedEx at mailing 2 for all cases
 - However, also little apparent advantage over simply using FedEx at mailing 4 for all cases
- Achieving higher representativeness at lower cost requires adding the option of pulling mailing 4 altogether for overrepresented cases (**ADAPT24**)
 - Leads to a loss of yield, though still likely to reduce costs after accounting for this
 - Consistent with prior simulation research (Tourangeau et al. 2017): reducing effort on overrepresented cases may be most cost effective way to improve sample balance
 - Recall: simulation constrained by NHES:2019 experimental design; more flexibility would be available in the field

Conclusions (cont.)

- Results emphasize importance of “continuous” monitoring/intervention
 - Adaptive FedEx targeting improved sample balance *at the mailing at which it was implemented*
 - However, benefits diminished over time unless followed by additional intervention at later mailing
 - In the field, would probably want an intervention point at mailing 3 as well
- Factoring in predicted effectiveness of interventions did not meaningfully change outcomes relative to targeting only on R-indicators
- Need to consider operational factors: how close to the mailing can decisions be made?
 - Simulation assumed intervention decisions would be made one week before the mailing
 - Longer lag time may reduce effectiveness of targeting

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THANK YOU