Exploring Common Causes of Survey Cooperation and Response Quality in a Diary Study

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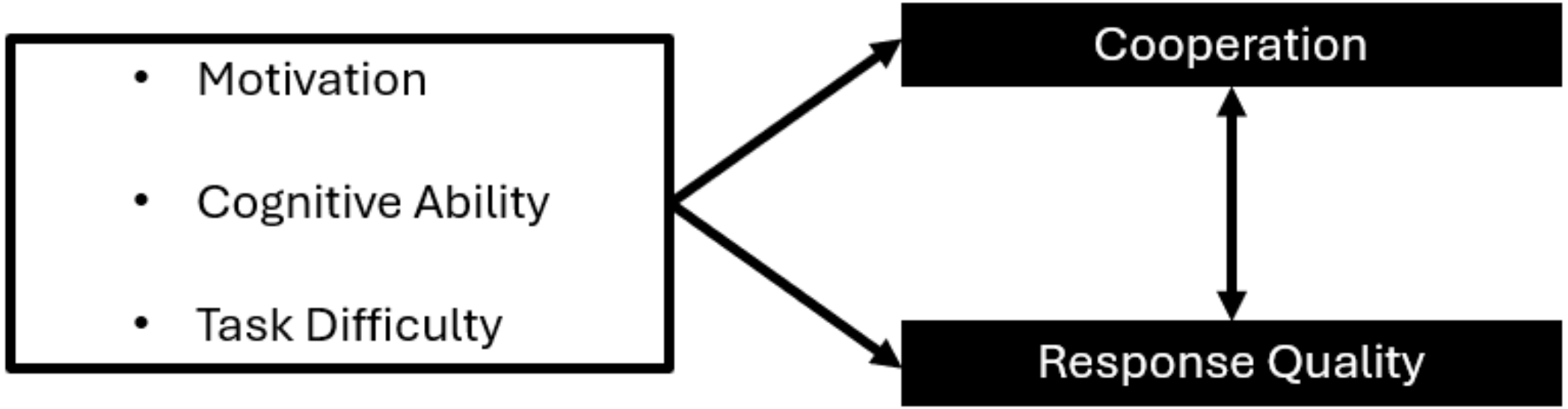
Total Survey Error balancing act

- Nonresponse error and measurement error are often treated separately
- But recruitment effort/reluctance may be linked to downstream response behaviors
- In diaries, burden increases risk of delayed entry → potential recall error
- Goal: examine the association between cooperation propensity and response quality in a web diary

Research questions

- **RQ1**: Does an individual's likelihood of cooperating predict diary response quality?
- **RQ2**: Do common factors (motivation, cognitive ability, task difficulty) explain both cooperation and quality?

Conceptual framework linking cooperation with response quality



Expectation: Factors adopted from satisficing framework (Krosnick 1991) have the potential to predict both response quality and cooperation (e.g., Groves & Couper 1998; Groves, Presser, & Dipko 2004). For a comprehensive review of other potential common causes, see Olson (2013).

Study context: ADCM (2017) for FoodAPS

- Nationally representative U.S. household sample (pilot test for FoodAPS)
- In-person recruitment + **self-administered web diary** (7 days)
- Rich **paradata**: contact outcomes + interviewer observations + web timestamps
- Incentives included baseline and completion bonuses; daily reminders

Modeling cooperation propensity (two-stage)

- **Stage 1**: Screener cooperation (n=1,569 contacted) → logistic regression using frame vars + interviewer observations
- **Stage 2**: Main-study completion (conditional on screener; n=687 invited) → logistic regression adding screener vars
- Predicted probabilities multiplied → overall propensity score
- Create **tertiles**: lowest / middle / highest propensity

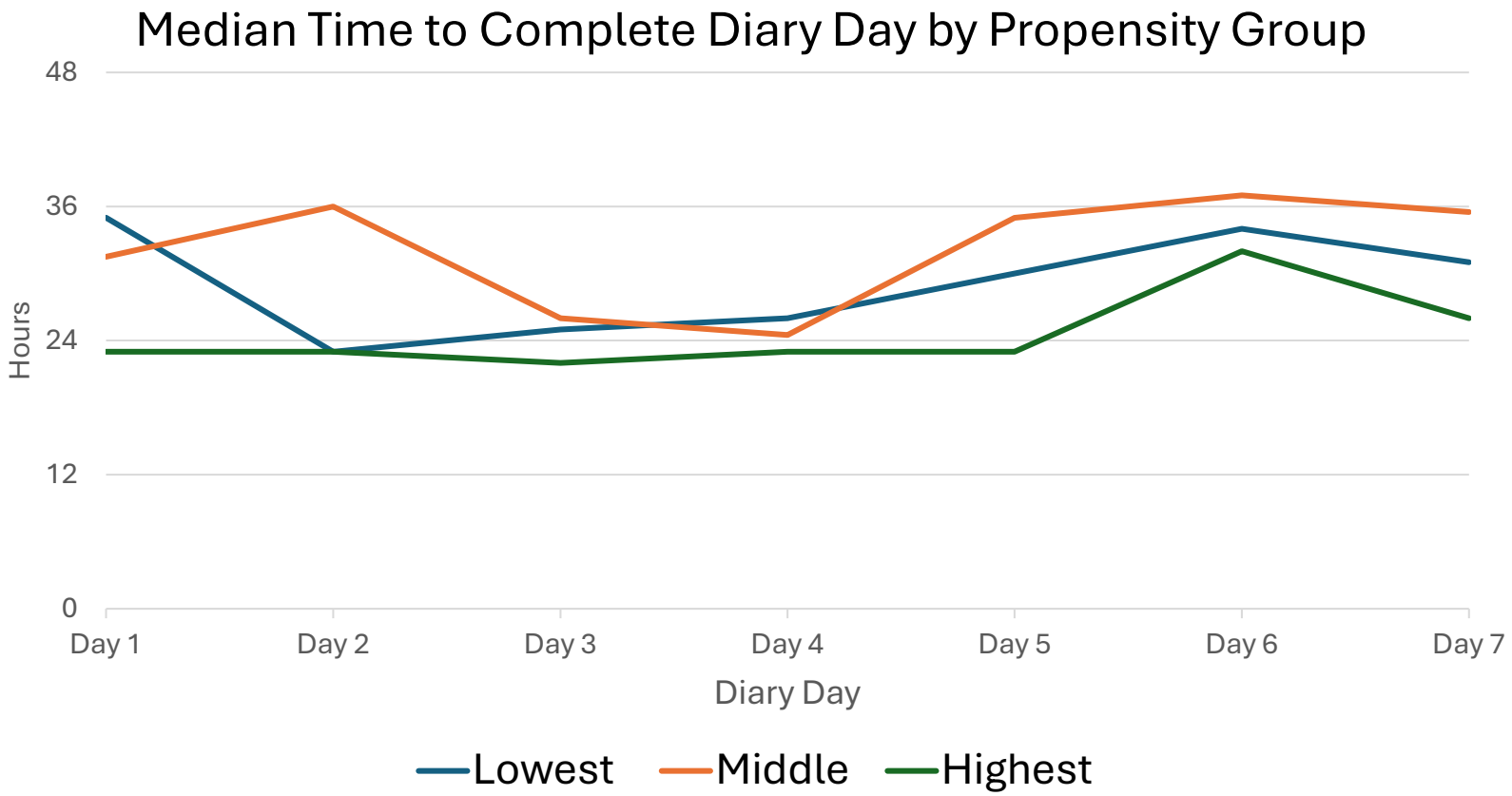
Response quality indicators (web diary)

- **Timeliness**
  - Time-to-complete each diary day (timestamp paradata)
  - **Backfilling:** completing a diary day **> 24 hours** after it became available
- **Data quantity**
  - Completed diary days (0–7 with at least one acquisition)
  - Confirmed “no-event” days
  - Indicator: reported no acquisitions for all 7 days
  - % of items missing price info (FAH, FAFH, overall)

Common cause indicators

- **Motivation**
  - SNAP or WIC participation (as measure of sponsor relationship); low food security (as measure of topic importance);
- **Cognitive ability**
  - Education; age; interviewer observation about task understanding
- **Task difficulty/reporting burden**
  - Household size; shopping frequency; number of places household shops for food, household dining out frequency, amount spent on groceries

Results (RQ1): Timeliness/backfilling differs by propensity group



- Lower and middle propensity groups show longer time-to-complete diary days (see figure); and a larger mean number of backfilled days (ANOVA p = 0.03)

RQ1 cont'd: Percent of respondents backfilling diary day by propensity group

Diary Day	Lowest Group	Middle Group	Highest Group
Day 1	51.8	46.5	42.0
Day 2	45.5	51.4	39.9
Day 3	48.3	45.8	37.1
Day 4	48.3	43.8	36.4
Day 5	50.4	51.4	35.7
Day 6	53.2	56.3	49.0
Day 7	50.4	56.9	45.5

- This pattern was fairly consistent throughout the study period from Day 1 to Day 7

Results (RQ1): Other quality indicators show weak/no differences

- **Diary days completed**: low-propensity respondents completed slightly more days (marginal; p = 0.08)
- **No-event reporting**: some differences, but overall weak evidence
- **Missing prices**: no significant differences across propensity groups (FAH, FAFH, overall)

- *Interpretation*: reluctance shows up primarily as **delayed reporting behavior;** not uniformly “worse” data

Results (RQ2): Common predictors of cooperation vs. predictors of backfilling

Hypothesized Cause	Predicts Cooperation?	Predicts Backfilling?
Motivation (SNAP/WIC status; food insecurity)	✓	✗
Cognitive Ability (education)	✓	✗
Task Difficulty (shopping frequency)	✓	✗

- "Common causes" predict **cooperation propensity**
- These factors **do not** meaningfully predict the number of backfilled days
- So the propensity–backfilling link remains **not explained** by these measured common causes

What might explain backfilling among reluctant respondents?

- Backfilling may reflect **constraints** and **participation patterns** (busyness, weekend batching), not just disengagement
- Incentives/reminders may sustain **data quantity** even when **timeliness** suffers
- Unmeasured factors (e.g., conscientiousness) may matter

Implications for diary & high-burden surveys

- Recruitment to reduce nonresponse may inadvertently increase specific behaviors that have the potential to increase measurement error (e.g., delayed entry)
- Paradata has the **potential** to support **adaptive design** focused on response quality, not just participation
  - E.g., paradata-triggered interventions to groups at risk of backfilling

Limitations and future directions

- Propensity models may omit key predictors; interviewer observations are not perfect measures
- Three propensity groups due to sample size/power
- Timeliness and missingness are **proxies**, not direct validation of measurement error
- Evaluate quality using **MSE/bias**, not response rate alone
  - How does recruiting reluctant respondents affect key estimates?
  - Do paradata-triggered interventions seem to help?

Final takeaways

- Cooperation propensity is linked to **timeliness** (backfilling) in a diary study
- Other indicators (quantity, missing prices) show **little/no difference** by propensity
- Measured “common causes” explain cooperation but not backfilling
- Practical message: treat recruitment and measurement as coupled; use paradata to examine this link.

Thank you!

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