Using Text Messages to Increase Interviewer Compliance in the Survey of Income and Program Participation

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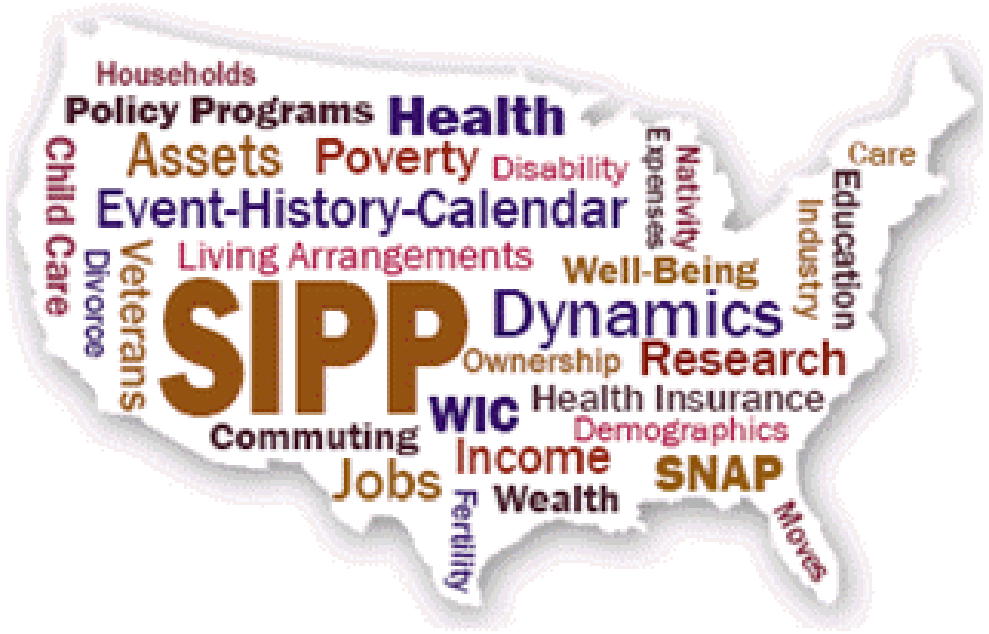
Survey of Income and Program Participation (SIPP)

- National longitudinal panel survey
  - 53,000 households each year
  - Conducted primarily face-to-face
  - multi-year panel

- Key Program Outcomes
  - Temporary Assistance for Needy Families (TANF)
  - Women, Infants, and Children (WIC)
  - Supplemental Security Income (SSI)
  - General Assistance (GA)
  - Supplemental Nutrition Assistance Program (SNAP)



- Challenges
  - Panel attrition
    (movers impact attrition)
  - Budgetary constraints

Motivation

Goal: To stimulate more effort on high priority cases and less effort on low priority cases with a text message

- In 2016 and 2017, SIPP experimentally prioritized select cases in order to improve data quality in the final product
  - Cases were assigned a H, M, L priority via transmissions to the laptop
  - Experiments resulted in modest improvements in data quality (2% point increases among targeted cases) with minor adverse effects to cost of data collection
- Priority protocol did not factor into performance evaluations. Research is still required to determine a fair assessment of priority compliance and an appropriate method for enforcing compliance.
- Not all interviewers showed signs of following the priority protocols evidenced by a post-hoc analysis.

Why Text Messages?

- Text messages are more flexible than phone reminders
- We believe that an interviewer is more likely to see the text in a timely manner than an email or a phone reminder
- Some interviewer indicated that they wanted a better way of knowing when priority changes occurred

Research Questions

- Does the number of text messages have an impact on interviewer behavior?
- What is the impact of a text message on interviewer behavior the following period?
- Do we plan on texting in the future? If so, how do we plan on texting?

Text Messages – Treatment Randomizations

- Dimension 1: Content
  - No Message
  - Reminder – Reminder to follow future prioritizations
  - Feedback – Feedback about prior prioritization
    - Positive or constructive feedback
    - Deterministic based on prior period behavior – discrimination criterion
- Dimension 2: Time
  - 10:00am, 12:00pm, 5:00pm, 7:00pm (Eastern Daylight Time)
  - Interviewers in Eastern/Central Time zone - eligible for all four times
  - Interviewers in Mountain/Pacific Time zone - not eligible for 10:00am texts

Text Messages – Content

- **Reminder Message:** This is a message from SIPP. Your case priorities have been updated. Please transmit and work accordingly. Contact your supervisor with any concerns.

- **Positive Feedback Message:** This is a message from SIPP. You worked your cases according to priorities last week. Thanks for your hard work! Contact your supervisor with any concerns.

- **Constructive Feedback Message :** This is a message from SIPP. To ensure data quality, please work your cases according to priorities. Contact your supervisor with any concerns.

Discrimination Criterion (DISC) as the weekly randomization condition

- DISC is an intermediate criterion which
  - Identifies *strong evidence* of working high priority cases
  - Determines positive or constructive feedback messages and the likelihood of receiving same content and timing
- Based on interviewer behavior in a prior time period
- *Strong Evidence* during the previous trial period (*t-1)* if either condition is met:
  - Condition 1: $\frac{\#\ Checked{-}in\ H\ cases}{\#\ Assigned\ H\ cases} > \frac{\#\ Checked{-}in\ M\ cases + \#\ Checked{-}in\ L\ cases}{\#Assigned\ M\ cases + \#Assigned\ L\ cases}$
  - Condition 2: $\frac{\#\ Attempts\ on\ H\ cases}{\#\ Assigned\ H\ cases} > \frac{\#\ Attempts\ on\ M\ cases + \#Attempts\ on\ L}{\#\ Assigned\ M\ cases + \#\ Assigned\ L\ cases}$

Design: Sequential Randomized Trials

- SRT was chosen to analyze the text effectiveness of a sequence of various events over multiple contact times.
- There were 13 different trials sent over 13 different weeks, in which 1250 interviewers were re-randomized, over the course of the 20 week data collections.
- The content and timing of the message were re-randomized every trial.
    - If the DISC condition was met, interviewers would receive: 1) positive feedback and 2) ~50 percent chance of receiving the exact same content and timing.
    - Otherwise, the content and timing were uniformly random within constraints, like timezones.

Evaluation: Behavioral Metric (BM) Considerations for Assessing an Interviewer's Contact Effort

- Following BMs will measure each interviewer's contact efforts assessed during a period of time *t*.

- BM 1: The number of contact attempts ($A_{c,t}$) made on case ***c*** between period ***t-1*** and ***t***.

  - The final number of contact Attempts A_c is

$$A_c = A_{c,1} + A_{c,2} + \cdots + A_{c,13}$$

- BM 2: The Evenness-of-Finding Attempts ($EFA_{c,t}$) on case ***c*** is the EFA by time period ***t***.

Evenness of Finding Attempts (EFA)

- Used for diversity indices from ecology and economics
- Coombs and Walsh (2014) adapted this idea for survey research methods when analyzing contact attempts
- Computation

$$EFA = \frac{1}{8} \times \frac{1}{\sum_{w=1}^{8} (proportion\ of\ attempts\ in\ window\ w)^2}$$

- Windows
  - Weekend 8am-12pm
  - Weekend 12pm-3pm
  - Weekend 3pm-6pm
  - Weekend 6pm-11pm
  - Weekday 8am-12pm
  - Weekday 12pm-3pm
  - Weekday 3pm-6pm
  - Weekday 6pm-11pm

Overall Behavioral Metric(s)

- There was no statistical difference in the final number of contact attempts made per case on high priority vs. medium priority cases.
- There were 25% fewer contact attempts per case made on low priority cases compared to high priority and medium priority.
- Mean EFA on high priority cases > Mean EFA on medium priority cases > Mean EFA on low priority cases.

Estimating the Effects of the Number of Text Messages

- We aim to test if more text message increases BM among high priority cases and decreases BM among low priority cases

- Consider
  - X_i : the number of text messages sent to interviewer *i*
  - BM_c: $A_c \times EFA_c$
  - $\overline{BM_i}[Priority] = \sum_{c=1}^{C} \frac{BM_c \times I(c \in Priority)}{I(c \in Priority)}, Priority = \{H, M, L\}$

- Simple Linear Regression model of $\Delta = \overline{BM_i}[H(or\ L)] - \overline{BM_i}[M]$ on *X*:

- The estimated β coefficients in the regression measures the effects the text message.

Preliminary Model Outcomes

- More text messages had positive effect on Δ, High Priority vs. Medium Priority, (28 percent increase, p-value = 0.020)

- More text message did not have a significant effect Δ, Low Priority vs. Medium Priority, (3 percent increase, p-value = 0.142)

Estimating the Effects of the Text Message with Repeated Measures

- We aim to test if a text message increases BM among high priority cases and decreases BM among low priority cases

- Generalized estimating equation (GEE) models of $\Delta = \overline{BM_i}[H(or\ L)] - \overline{BM_i}[M]$ at time t on X_t:
  - $BM_{c,t}$: $A_{c,t}, EFA_{c,t}\ or\ A_{c,t}\ \times EFA_{c,t}$
  - X_t : a collection of time-varying predictors at time t: e.g., Text Msg Sent, DISC, Same Content as prior period, Same Timing as prior period

- The estimated β coefficients in GEE measures the effects the text message.

Discussion

The following are notes about the data that impact model selection and conclusions:

- $A_{c,t}$
  - ~30% of observations being zero (no contacts made).
  - Data is right skewed.

- $EFA_{c,t}$
  - ~80% of observations being zero (no diversity).
  - Data is right skewed.

- By design, many other X_t are related to X_{t-1} when $DISC_{t-1}$ criteria is met.

Tailoring Messages for Future Data Collections

Once model has been selected and the experimental effects are estimated, we plan to:

- Categorize interviewers into groups based on similar traits
- Determine which timing and content worked best for each group
- Determine which change should be made if we are not seeing desired results

Thank You!

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