unCHARTed territory: Uptake, Participation and Real-time Response in Ecological Momentary Assessment Data Collection

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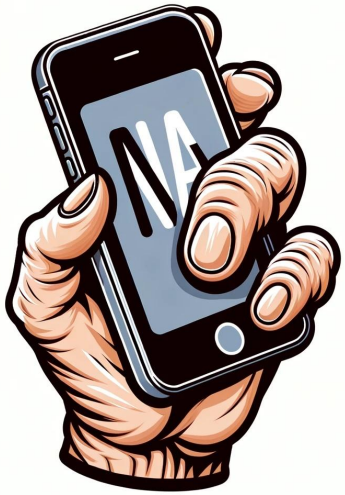
Components of EMA data collection

- Non-participation: Not answering any EMAs despite having agreed to it

- Non-response: Not answering a given EMA ping



Our contribution

- EMA non-participation and non-response can be driven by different processes
- The *spaces* in which EMAs take place can alter non-response patterns
- Scholars using EMAs should be aware of these processes for data collection and analysis

The puzzle

- EMAs ~ highly granular spatiotemporal data (Stone & Shiffman 1994)
  - Tradeoff: burden on respondents (Stone et al., 2023)

- Non-participation in EMAs is affected by factors that generally shape survey non-participation (e.g., health) as well as factors unique to EMAs (e.g., familiarity with technology) (Keusch et al., 2019; Struminskaya et al., 2021)

- The residential neighborhood context and real-time context may determine non-participation and non-response
  - E.g., high crime, traffic

Research questions

1. How does non-participation vary across individual and residential neighborhood characteristics?

2. How does real-time non-response vary across individual characteristics and the places where people are pinged?

Data

- Chicago Health and Activity Space in Real-Time (CHART)
  - Funded by the National Institute on Aging (R01AG050605)
  - Probability sample of 455 older adults (65+) of 10 neighborhoods of Chicago

1. Baseline survey
2. GPS tracking and EMA collection (voluntary) via smartphone (Samsung Galaxy S7 that were given to respondents)
3. Five EMA pings per day, randomly distributed across five daily windows: 8-10, 10:30-12:30, 13-15:30, 18-20
    i. Potential total EMAs/person = 35 per person

Sample and data sources

- Complete observations of White, Black, and Hispanic older adults (n= 351) in Wave 1

- Interview data from CHART, contextual characteristics from American Community Survey (2014-2017)

Results

RQ 1: Non-participation

$$log(\frac{\pi_i}{1-\pi_i}) = \alpha + \beta * X_i$$

RQ1: Non-Participation

- 21% of the sample who agreed to participate in EMAs did not respond to any

- On average, respondents who had previously been the victim of a violent crime were significantly less likely to not participate in any EMAs

Table 1: Average marginal effects on the probability of not completing any EMAs

	Model 1	Model 2
Low self-rated health	0.0870	0.0887
	(0.0501)	(0.0500)
Difficulty using cellphone	0.0473	0.0525
	(0.108)	(0.109)
Lives in disadvantaged tract		0.0529
		(0.0589)
R was victimized		-0.0936*
		(0.0455)
Lives in segregated tract		-0.0218
		(0.0672)
N	351	340

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$
Models control for age, sex, race and level of education. Standard errors in parentheses.

Who were we less likely to gather data from?

- People who spent more time at home, moved less, visited less unique spaces, and visited less richer spaces

Table 2: GPS summary statistics for respondents who completed at least one EMA and those who did not (CHART, Wave 1)

	Completed at least 1 EMA	No EMAs completed
Proportion of time spent at home tract	.7 (.3)	.8 (.3)
Average miles traveled outside the home tract	1.6 (2.2)	0.9 (2.6)
Unique census tracts visited	15.7 (17.8)	5.1 (8.0)
Time-weighted average poverty rate	.2 (.1)	.2 (.1)
Time-weighted median income	60,059.6 (23,754.3)	53,658.3 (24,778.6)

RQ 2: Non-response

$$log(\frac{\pi_{ij}}{1-\pi_{ij}}) = \alpha_j + \beta * X_{ij}$$

Level 1: Ema-pings, n = 5252

Level 2: Respondents, n = 340

RQ2: Non-response

Table 3: Average marginal effects on the probability of non-response

Contrast	AME
Black - White	.18***
Hispanic - White	.09*
Male - Female	.06*
SRH poor - Fair	.13***
Victim of a crime	-.07*
Dydx	
Residential instability	.02*

$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Summary

- We observe some similarities between non-response in EMAs and traditional survey methods

- We also observe correlates of non-response unique to EMAs

Implications

- Unlike user-generated approaches, structured EMA designs provide us with information about what we are missing

- A systematic effort to understand non-uptake, non-participation, and non-response could help improve study designs and maximize the information researchers collect

<u>Questions for the audience:</u>

- How should we think about who and what we do not observe?
- What are, in your opinion, implications of these findings for other types of research with EMAs?

Incentive system at CHART

Randomized:

1. $40 Incentive for interview + $20 carrying the phone + $1 per EMA (even if skipping questions)

2. $40 Incentive for interview + $20 carrying the phone+ $5 per day that you complete at least ⅗ EMAs

Difference across waves:

W1: 0.1 EMA per person

W2: 1.3 EMA per person