Improving diary keeping of daily expenditures with online diaries

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U.S. Bureau of Labor Statistics
European Survey Research Association Conference
Lisbon, Portugal
August 1, 2017
Outline

- Overview: Consumer Expenditure (CE) Survey
- Brief Background: CE Redesign
- Proof of Concept Test Design and Diary Protocols
- Results
- Lessons Learned
- Current Research and Future Plans for Diaries
Consumer Expenditure Survey

- Collects Spending Data on the U.S. Population
- Sponsored by the U.S. Bureau of Labor Statistics, collected by the Census Bureau
- Survey participants report dollar amounts for all non-investment purchases. Business expenses and reimbursements are excluded.
- Provide expenditure weights for the U.S. Consumer Price Index (CPI)
- Recall Interview and Diary Survey
What is the CE Redesign?

“...aims to redesign the Consumer Expenditure (CE) survey to improve data quality through a verifiable reduction in measurement error—particularly error caused by underreporting.”
CE is the CE Redesign?

“...aims to redesign the Consumer Expenditure (CE) survey to improve data quality through a verifiable reduction in measurement error—particularly error caused by underreporting.”
CE Redesign Plan

Wave 1
- Advance Mailing
- Visit 1: Recall Interview
- Diary Week & Records Collection
- Visit 2: Records Interview

Wave 2
- Advance Mailing
- Visit 1: Recall Interview
- Diary Week & Records Collection
- Visit 2: Records Interview

12 months between waves

Respondent engagement mailings
Post Wave Non-monetary Incentive: Spending Summary Report
# Current vs. Proposed: Diary

<table>
<thead>
<tr>
<th>Current CE Diary</th>
<th>Proposed CE Diary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household open-ended paper diary</td>
<td>Online, personal diaries with paper back-ups</td>
</tr>
</tbody>
</table>

**Main goals of online diary**

- Add flexibility and ease for respondents
- Allow for in the moment reporting
- Allow for midweek monitoring
Proof of Concept
Test Design
Proof-of-Concept (POC) Test

- Fielded July 2015 – Sep 2015
- Ensure that the basic underlying structure and components of the new design are feasible
- Designed to mirror the proposed design to the fullest extent possible – one wave of design plan, including 1-week online diary
- Final response rate: 50%
Proof of Concept Test Diary

CONSUMER EXPENDITURE DIARY SURVEY

Enter Your Expense Below

Date: June 15, 2015
Description: Enter Description
Cost: $0.00
Category: Clothing, Shoes, Jewelry, and Accessories

Gender: Select One
Age: Select One
Purchased for someone outside your household

Summary of Expenses

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Cost</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 16</td>
<td>down payment on home</td>
<td>$150,000.00</td>
<td>All Other Products and Services</td>
</tr>
<tr>
<td>June 15</td>
<td>dinner with family</td>
<td>$345.00</td>
<td>Food and Drink Away from Home</td>
</tr>
<tr>
<td>June 16</td>
<td>movie tickets (computer, edited)</td>
<td>$10.98</td>
<td>All Other Products and Services</td>
</tr>
<tr>
<td>June 15</td>
<td>bananas</td>
<td>$2.53</td>
<td>Food and Drink for Home Consumption</td>
</tr>
</tbody>
</table>
Online Diary Eligibility (N=1,008)

- Eligible for online diary: 73.9%
- Home Internet Access - Frequent Use: 20.0%
- Home Internet Access - Infrequent Use: 6.1%
- No Home Internet Access: 73.9%
Mode Choice for Online Eligibles (N= 747)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online</td>
<td>46.3%</td>
</tr>
<tr>
<td>Paper</td>
<td>52.3%</td>
</tr>
<tr>
<td>Refused</td>
<td>1.3%</td>
</tr>
</tbody>
</table>
Interviewer Observations on Paper Choice

“...they felt expenses would be captured more accurately & completely w/hands on booklet.”

“...thought it would be too much”

“Respondents have a prepaid data plan on IPhone - preferred not to use it for CED”

“She was web savvy but preferred paper as didn't want to do anymore log ins”

“Mrs. was not present. She uses internet but he asked paper diary for her since he will not able to explain recording on line.”
Mode Choice by Education Level

<table>
<thead>
<tr>
<th>Education Group</th>
<th>Online</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to HS graduate</td>
<td>38.1%</td>
<td>60.5%</td>
</tr>
<tr>
<td>Some college and Associate</td>
<td>43.9%</td>
<td>54.3%</td>
</tr>
<tr>
<td>Bachelors</td>
<td>48.9%</td>
<td>50.0%</td>
</tr>
<tr>
<td>Masters and beyond</td>
<td>20.6%</td>
<td>37.4%</td>
</tr>
</tbody>
</table>
Mode Choice by Age Group

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Online</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 15-19</td>
<td>48.6%</td>
<td>50.0%</td>
</tr>
<tr>
<td>Age 20-39</td>
<td>54.6%</td>
<td>44.4%</td>
</tr>
<tr>
<td>Age 40-64</td>
<td>40.9%</td>
<td>53.4%</td>
</tr>
<tr>
<td>Age 65 and older</td>
<td>23.0%</td>
<td>76.0%</td>
</tr>
</tbody>
</table>
### Diary Completion Rates

#### Percent of diaries

<table>
<thead>
<tr>
<th></th>
<th>Online (N=345)</th>
<th>Paper (N=646)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filled</td>
<td>81.0%</td>
<td>89.0%</td>
</tr>
<tr>
<td>Non-Participation</td>
<td>13.0%</td>
<td>7.0%</td>
</tr>
<tr>
<td>No Expenses</td>
<td>0.3%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Total Recall</td>
<td>6.0%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

- **Filled**: 81.0% (Online) vs. 89.0% (Paper)
- **Non-Participation**: 13.0% (Online) vs. 7.0% (Paper)
- **No Expenses**: 0.3% (Online) vs. 2.6% (Paper)
- **Total Recall**: 6.0% (Online) vs. 1.0% (Paper)
Average Number of Entries by Mode

Note: does no control for demographics.
Average Amounts by Mode

Note: does no control for demographics.
Diary Quality – Item Missingness

Meals Away from home
- Meal type: 9.2% Paper, 9.7% Online
- Alcohol type: 5.2% Paper, 0.0% Online
- Alcohol cost*: 9.7% Paper, 0.0% Online

Food At Home
- Package type: 6.8% Paper, 5.7% Online
- Gender: 3.7% Paper, 0.0% Online
- Clothing: 17.7% Paper

Clothing
- Age: 15.3% Paper

*Alcohol Cost: excludes entries of '0' from non-response
01 Online Diaries – Login Failures

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online diarists w/1+ failure</td>
<td>154</td>
<td>3.3</td>
<td>2.0</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>All online diarists</td>
<td>326</td>
<td>1.6</td>
<td>0.0</td>
<td>0</td>
<td>21</td>
</tr>
</tbody>
</table>

16% never successfully logged in!!
Data showed average online POC diarist had 38% of logins between midnight and 3pm (N=302)
Online Diaries to Record Sensitive Items

- POC records alcohol as a separate expense in the Meals Away from Home section

<table>
<thead>
<tr>
<th></th>
<th>N (CUs)</th>
<th>% CUs reporting alcohol</th>
<th>Min. alcohol entries</th>
<th>Max. alcohol entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online</td>
<td>190</td>
<td>27.4%</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Paper</td>
<td>318</td>
<td>19.2%</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>
Lessons Learned

- Younger, more educated respondents more frequently chose online diaries, but overall respondents chose paper.
- Ease of logins is important to online diary effectiveness.
- Online diaries can improve data quality (in terms of missingness).
- Online diaries can capture data throughout the day (presumably better than paper).
- Online diaries can improve sensitive data collection...maybe.
Ongoing/Planned Research

- 2016: Updated the desktop interface to take advantage of screen size.
- 2017: Built a new online diary using open-source code that can take advantage of “future enhancements” (photo capture, scanning, etc).
- 2017-21: (Pending) Large Scale Feasibility Test, incorporating new diary.
Future Enhancements

- Receipt scanning with Optical Character Recognition
- Photo reminders
- Geo-tagging
- Reminders based on location
Online Diaries Improvement Project Diaries – Entry Screen

[Image of the Online Diaries Improvement Project entry screen]

- **Date:** Saturday, Mar 18
- **Type:** Meals, Snacks, and Drinks Away From Home
- **Details:**
  - Describe meal
  - Enter description
  - Total cost (include tax and/or tip): $0.00
  - What meal was this?
    - Breakfast
    - Lunch
    - Dinner
    - Snack/Other
  - Select any alcohol included:
    - None
    - Beer
    - Wine
    - Other

- **My Expenses:**
  - Friday, March 17 (0)
  - Saturday, March 18 (0)
  - No expenses reported.
  - Sunday, March 19 (0)
  - Monday, March 20 (0)
  - Tuesday, March 21 (0)
  - Wednesday, March 22 (1)
  - Transportation expenses: Gas - 20 Gal $43.95
  - Thursday, March 23 (0)
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