Developing an Online Mode for the Consumer Expenditure Diary Survey

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I. Current Diary Design and Online Diary Objectives
Consumer Expenditure Diary Overview

- The Consumer Expenditure Diary (CED) currently uses a singular paper diary to collect household expenditures for a week (x2)
- Interviewers place the diary in-person and conduct one more visit
- The CED gathers more detailed expenditures than the Consumer Expenditure Interview Survey
- The Diary is divided into four sections:
  - Food and Drink Away From Home
  - Food and Drink for Home Consumption
  - Clothing, Shoes, Jewelry and Accessories
  - All Other Products, Services and Expenses
## Consumer Expenditure Diary Overview

### Day 1

<table>
<thead>
<tr>
<th>Description</th>
<th>Mark (X) one that best describes what you made this purchase</th>
<th>Total Cost with tax &amp; tip</th>
<th>Enter the total cost of the alcoholic beverage</th>
<th>If alcoholic beverage, $0.00, and mark (X) all apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pizza &amp; Wings</td>
<td>1 2 3 4</td>
<td>1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salad Bar</td>
<td>1 0</td>
<td>1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ice Cream</td>
<td>1 0</td>
<td>1 2 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft Drink</td>
<td>1 2 4</td>
<td>1 2 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1 2 4</td>
<td>1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast</td>
<td>1 0</td>
<td>1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dinner</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snacks</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beverages</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Examples:

- Breakfast: Buffet, Carry-out (lunch), Drive & Cocktails at restaurant
- Pizza and Wings: Delivery, Salad Bar
- Lunch: Bento Box, Ice Cream, Soft Drink
- Dinner: French Fries, Snacks, Beverages
- Snacks: Snack Bar, Beverages, Other
- Beverages: Soft Drink, Ice Cream
- Alcohol: Wine, Beer, Beer

**Please unfold the LEFT FLAP to see Additional Examples.**

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Gemini Redesign Initiative – Proposed Diary Design

- One-week online diary with paper diary backup
- Single portal access
- Personal diary for all household members 15 years old and older
- Respondent to use their device functionality to capture data (such as photos or voice messages), which will create a record in the diary for later completion
Online Diary Objectives

- Improve on each past diary design and refine options as part of the Gemini Redesign Initiative
- Present respondents with options for contemporaneous data entry
- Improve unit and item response rates through increased options and a reduction in proxy reporting
- Lower costs compared to a paper-only option due to reduced or eliminated printing, scanning, and data entry expenses
- Reduce measurement error due to proxy reporting through ease of access afforded by both individual and online diaries
II. Past Design and Testing Efforts
Previous CE Diary Tests and Projects

- Web Diary Feasibility Test
- Individual Diaries Feasibility Test
- Proof of Concept Test – Diary Portion
- Electronic Diary Desktop Design Improvements Project
Web Diary Feasibility Test Overview

- Designed to simulate entry methods used by respondents in CED paper diary
- Formatted for desktops and laptops
- Household-level diary
- New materials -
  - Interviewer Talking Points
  - User Guide
- 1,300 starting sample collected January-March of 2013 with 456 total completed diaries
Web Diary Feasibility Test Diary
Individual Diaries Feasibility Test Overview

- Two instruments formatted for mobile devices and desktops/laptops
- Person-level diary design
- Targeted sampling on area mobile usage, internet penetration, multi-person households, and English-speaking households

Assignment Protocol
- If a household is eligible, household members were offered modes sequentially
  - Mobile mode first and, if they did not have a Smartphone, then
  - Desktop mode, including tablet
- 1,200 starting sample collected August-December of 2014 with 241 HHs completing at least one week
Individual Diaries Feasibility Test Diaries
Proof of Concept Test Overview

- Respondents who were eligible for and selected an online diary were given a single account username and password, and were not restricted to a single online mode (mobile or PC), but instead encouraged to move between the online versions depending on their situation or reporting needs.
- During the diary-keeping week, paradata was collected on the logins and entries for the electronic diaries. This information was available to the team during the test to identify and address potential issues.
- Person-level diary design
- Incentives offered
- 1,200 starting sample collected July to October of 2015 with 520 HHs completing all phases of the test.
Proof of Concept Test Diary

[Image of a diary entry for February 24, 2015, showing expenses such as dinner at a restaurant for $87.60 and food and drink away from home for breakfast, lunch, dinner, and snack/other.]

[Image of a Consumer Expenditure Diary Survey page on respond.census.gov, showing entry fields for date, description, cost, and category, with examples of meal types and alcohol included options.]
Electronic Diary Desktop Design Improvements

Project Overview

- Designed online diaries focused on the desktop/laptop platforms
- Developed two prototypes incorporating design elements that utilize the increased screen space of desktops/laptops (relative to mobile devices)
  - Expanded list of categories to improve recall (more expense type cues)
- Prototype 1 focused on presenting all respondent actions and feedback (e.g., entries) on one screen
- Prototype 2 presented expense entry tasks on progressive screens. This version included many more visual cues for each expense category type
- The prototypes were laboratory tested with 30 respondents using a within-subject design
Electronic Diary Desktop Design Improvements

Project Diary Prototypes

Prototype 1:

Prototype 2:
III. Current Design and Testing Efforts
Current Test and Design Objectives

- Applying past experiences and lessons learned from previous online diaries CE is working with Westat to develop an online diary that is...
  - Optimized to the respondent’s device and accessible from a single portal
  - Adaptable to future enhancements as technology advances
  - Written in a common programming language that is transferable
  - Equipped with robust paradata monitoring
Online Diaries Improvement Project Overview

- Two instruments optimized to the respondent’s device (mobile or desktop/laptop) and accessed through a single portal
- Person-level diary design
- Developed based on previous CE online diaries
- Robust paradata output
- Modular design that allows for technological enhancements
Online Diaries Improvement Project Instrument Design

Desktop design with focus on minimizing burden and providing feedback:

- Default to expense date and category last selected.
- Entered expenses are added to top of summary list and highlighted to provide entry feedback.
Online Diaries Improvement Project Instrument Design

- Mobile design – same focus as desktop:
  - Same look and feel as desktop, but optimized for mobile
  - Instrument appropriately renders for varied device screen sizes
  - Uniform look and feel to promote usage of multiple devices.

- Developed using secure open-source software for scalability and accommodating future technologies
Online Diaries Improvement Project Diaries - Home Screen

### Add Expenses

<table>
<thead>
<tr>
<th>Select date of expense</th>
<th>My Expenses</th>
<th>View assets</th>
<th>Enter search term</th>
<th>Help</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday, March 17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday, March 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunday, March 19</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Monday, March 20</td>
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<td></td>
<td></td>
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<tr>
<td>Tuesday, March 21</td>
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<td></td>
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<tr>
<td>Wednesday, March 22</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Thursday, March 23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### My Expenses

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Thursday, Mar 23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BLS**

CE Diary

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday, Mar 17</td>
<td></td>
<td></td>
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<td>Wednesday, Mar 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday, Mar 23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Log out  Contact us  Help
Online Diaries Improvement Project Diaries – Entry Screen
Online Diaries Improvement Project Usability Test

Three Component Usability Test –

- A home component for testing instrument placement and instructions on diary keeping
- A home component for testing participants’ ability to log in and interact with the instrument, such as enter expenditures over the course of a week
- A component where the interviewer returns to the home to test pickup of the diary and collect debriefing information
Online Diaries Improvement Project Usability Test

- Goal of 60 component interviews (placement/reporting/pick-up). As of March 30th:
  - 18 placement interviews completed; 4 pick-up interviews completed
    - 18 households represent 48 persons (~2.7 persons 15+ per household)
    - 1 nonresponse for pick-up interview (never used web diary)
    - 15 of 18 households have accessed the diary; 24 of 48 persons have accessed the diary.
    - 14 of 17 households have entered at least 1 expense; all persons accessing the diary have entered at least one expense
Online Diaries Improvement Project Usability Test

- Of those where user device detected: 41% used a mobile device.
- As expected most expenses are for food...

<table>
<thead>
<tr>
<th>Expense Type</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meals, Snacks, and Drinks Away From Home</td>
<td>71</td>
<td>25.9</td>
</tr>
<tr>
<td>Food and Drink for Home Consumption</td>
<td>128</td>
<td>46.7</td>
</tr>
<tr>
<td>Clothing, Shoes, Jewelry, and Accessories</td>
<td>9</td>
<td>3.3</td>
</tr>
<tr>
<td>Entertainment and Recreation</td>
<td>9</td>
<td>3.3</td>
</tr>
<tr>
<td>Home Furnishings and Decorative Items</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Education Expenses and Supplies</td>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td>Transportation Expenses</td>
<td>21</td>
<td>7.7</td>
</tr>
<tr>
<td>Medical Expenses and Supplies</td>
<td>8</td>
<td>2.9</td>
</tr>
<tr>
<td>Personal Care, or Hygiene Items</td>
<td>10</td>
<td>3.6</td>
</tr>
<tr>
<td>All Other Products, Services, and Expenses</td>
<td>15</td>
<td>5.5</td>
</tr>
</tbody>
</table>
IV. Future Analyses and Design Efforts
Moving Forward…

Online Diary Results and Future Plans

- Percent of entries where expense and entry occurred on same day
  - For those not same day - what was the average difference between entry date and expense date?
- Edits and deletes – how well do descriptions match category?
- Expanded categories – were often missed expenses captured?
- Online versus paper – comparable data quality?
Contact Information

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