

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					SUN	MON	TUE	WED	THU	FRI	SAT
1. Food and Drinks Away from Home											
Examples:		breakfast buffet carry-out lunch dinner & cocktails at restaurant	pizza delivery Chinese takeout child's school lunch	beer at happy hour pretzels at ballgame wine at tavern	croissant from café ice cream from truck wedding reception caterer	soda from vending machine hot dog from convenience store popcorn & soda at movies	← Please unfold the LEFT FLAP to see Additional Examples				
Mark (X) one that best describes the type of meal	Description (see examples above and on the flap)	Mark (X) one that best describes where you made this purchase				Total Cost with tax & tip	If alcoholic beverages included, mark (X) all that apply			Enter the total cost of the alcohol	
		Fast Food Take-out Delivery Concession	Full Service Places	Vending Machines or Mobile Vendors	Employer or School Cafeteria		wine	beer	other		
101.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4		1 2 3					
102.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4		1 2 3					
103.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4		1 2 3					
104.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4		1 2 3					
105.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4		1 2 3					
106.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4		1 2 3					
107.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4		1 2 3					
108.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4		1 2 3					
109.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4		1 2 3					



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

Food and Drink Away from Home | Food and Drink for Home Consumption | Clothing, Shoes, Jewelry, and Acc. | All Other Products/Services

Meal Type	Description	Where Purchased	Total Cost with tax and tip	Alcohol Included? (Check all that apply)			Total Alcohol Cost	Date Purchased	Clear
				Wine	Beer	Other			
Breakfast	bagel, juice	Employer or School Ce	\$2.79	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		03-14-2011	
Lunch	pizza	Fast Food, Take-out C	\$5.57	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		03-14-2011	
Snack/Other	coffee	Fast Food, Take-out C	\$1.35	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		03-14-2011	
Lunch	sandwich, soda	Employer or School Ce	\$5.15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		03-14-2011	
Dinner	chips	Vending Machines or M	\$.70	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		03-15-2011	
Lunch	elem. school lunch - mor	Employer or School Ce	\$45.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		03-15-2011	
Snack/Other	soda	Vending Machines or M	\$.65	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		03-21-2011	
Dinner	buffet	Full Service Places	\$62.23	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$12.00	03-23-2011	
Snack/Other	drinks from cash bar	Full Service Places	\$15.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	\$15.00	03-23-2011	
Dinner	caterer-Family Reunion	Fast Food, Take-out C	\$350.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$95.00	03-24-2011	

Add Rows | Save



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

Enter Date

respond.census.gov/ce

Logout **CE Diary**

July 15, 2014

Enter Description

\$0.00

Recorded for another household member

Food and Drink Away from Home

Breakfast Lunch
Dinner Snack/Other

Select Type of Vendor

Alcohol Included?
Wine Beer Other

Cost of Alcohol:
\$0.00

Cancel

United States Census Bureau

CONSUMER EXPENDITURE DIARY SURVEY

About the Survey Help User Guide Change Password

Food and Drink Away from Home | Food and Drink for Home Consumption | Clothing, Shoes, Jewelry, and Acc. | All Other Products/Services

Meal Type	Description	Where Purchased	Total Cost with tax and tip	Alcohol Included? (Check all that apply)			Total Alcohol Cost	Date Purchased	Recorded for another household member	Clear
				Wine	Beer	Other				
Breakfast	sandwich & coffee	Employer or School C	\$5.98	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		07-15-2014	<input type="checkbox"/>	<input type="button" value="X"/>
Snack/Other	soda	Vending Machines or	\$1.25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		07-15-2014	<input type="checkbox"/>	<input type="button" value="X"/>
Lunch	sandwich & chips	Fast Food, Take-out,	\$7.95	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		07-15-2014	<input type="checkbox"/>	<input type="button" value="X"/>
Dinner	Steak dinner	Full Service Places	\$55.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$15.00	07-15-2014	<input type="checkbox"/>	<input type="button" value="X"/>
Select One		Select One		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Select One	<input type="checkbox"/>	<input type="button" value="X"/>
Select One		Select One		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Select One	<input type="checkbox"/>	<input type="button" value="X"/>
Select One		Select One		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Select One	<input type="checkbox"/>	<input type="button" value="X"/>
Select One		Select One		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Select One	<input type="checkbox"/>	<input type="button" value="X"/>
Select One		Select One		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Select One	<input type="checkbox"/>	<input type="button" value="X"/>
Select One		Select One		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Select One	<input type="checkbox"/>	<input type="button" value="X"/>

Add Rows

Burden Statement Accessibility Privacy Security



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

AT&T LTE 10:54 AM 98%
respond.census.gov

February 24, 2015

Dinner at Restaurant

\$87.60

Food and Drink Away from Home

Breakfast Lunch
Dinner Snack/Other

Alcohol Included? (Select all that apply)
Wine Beer Other
None

Cost of Alcohol: \$9.00

Cancel Save

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CONSUMER EXPENDITURE DIARY SURVEY

Information User Guide User Settings Logout

Enter Your Expense Below

Date	Description	Cost	Category
February 24, 2015	Coffee	\$3.00	Food and Drink Away from Home

Meal Type: Select One

Alcohol Included? (Select all that apply) Cost of Alcohol: \$0.00
 None Wine Beer Other

Clear Save

Summary of Expenses

You haven't entered any expenses this week.

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:

The screenshot shows the 'Consumer Expenditure Diary Survey' form. The left sidebar contains the following fields: 'Date of expense/purchase' (03/01/2016), 'Category' (Food and Drinks Away from Home), 'Describe the meal' (Enter Description), 'Total cost (include tax and tips)' (\$ 0.00), 'What meal was this?' (Breakfast, Lunch, Dinner, Snack/Other), and 'What alcoholic beverages were included?' (None, Beer, Wine, Other). The main area is titled 'Summary of your expenses (0)'. Navigation links at the top include Information, User Guide, User Settings, Help, and Logout.

Prototype 2:

The screenshot shows the category selection screen for the 'Consumer Expenditure Diary Survey'. The top navigation bar includes 'Expense Date', 'Expense Type', 'Expense Detail', and 'Expense Review'. The main content area is titled 'Select the type of expense you want to enter for April 10, 2016' and features nine icons representing different expense categories: Food and Drinks Away From Home, Food and Drinks For Home Consumption, Clothing, Shoes, Jewelry, and Accessories, Transportation Expenses, Entertainment and Recreation, Home Furnishings and Decorative Items, Medical Expenses and Supplies, Education Expenses and Supplies, and All Other Products, Services, and Expenses. A second screenshot below shows the 'Expense Detail' step for 'Food and Drinks Away From Home' on 'March, 5 2016'. It includes fields for 'Describe the meal', 'Cost' (\$ 0.00), 'What Meal Was This?' (Lunch), and 'Select Any Alcohol Included?' (None). Navigation buttons include 'Cancel', '+ Add another', and 'By Save'.

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



 **Consumer Expenditure Diary** [Log out](#) [Contact us](#) [Help](#)

Add Expenses


Select date of expense:

- 1 Friday, March 17
- 2 Saturday, March 18
- 3 Sunday, March 19
- 4 Monday, March 20
- 5 Tuesday, March 21
- 6 Wednesday, March 22
- 7 Thursday, March 23

My Expenses

[View Members](#)  

Friday, March 17 (0)	▼
Saturday, March 18 (0)	▼
Sunday, March 19 (0)	▼
Monday, March 20 (0)	▼
Tuesday, March 21 (0)	▼
Wednesday, March 22 (1)	▼
Thursday, March 23 (0)	▼

 **CE Diary** [Log out](#) [Contact us](#)

My Expenses

[Help](#)

Friday, Mar 17 (0)	▼
Saturday, Mar 18 (0)	▼
Sunday, Mar 19 (0)	▼
Monday, Mar 20 (0)	▼
Tuesday, Mar 21 (0)	▼
Wednesday, Mar 22 (1)	▼
Thursday, Mar 23 (0)	▼

 [Members](#)  [Filter](#)  [Search](#)  [Add](#)



Online Diaries Improvement Project Diaries – Entry Screen

BLS Consumer Expenditure Diary [Log out](#) [Contact us](#) [Help](#)

Add Expenses

Date: Saturday, March 18
Type: Meals, Snacks, and Drinks Away From Home

Describe meal *i*
Enter description

Total cost (include tax and/or tip) *i*
\$ 0.00

What meal was this?
 Breakfast Lunch
 Dinner Snack/Other

Select any alcohol included:
 None Beer
 Wine Other

[Clear](#) [Save](#)

My Expenses

[View Members](#) Enter search term

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 - 20Gal	\$43.98
Thursday, March 23 (0)	

BLS CE Diary [Log out](#) [Contact us](#)

Add Expenses

Date: Saturday, Mar 18
Type: Meals, Snacks, and Drinks Away From Home

Describe meal *i*
Enter description

Total cost (include tax and/or tip) *i*
\$ 0.00

What meal was this?
 Breakfast Lunch
 Dinner Snack/Other

Select any alcohol included:
 None Beer
 Wine Other

[Back](#) [Clear](#) [Save](#)



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...

Expense Type	Count	Percentage
Meals, Snacks, and Drinks Away From Home	71	25.9
Food and Drink for Home Consumption	128	46.7
Clothing, Shoes, Jewelry, and Accessories	9	3.3
Entertainment and Recreation	9	3.3
Home Furnishings and Decorative Items	1	0.4
Education Expenses and Supplies	2	0.7
Transportation Expenses	21	7.7
Medical Expenses and Supplies	8	2.9
Personal Care, or Hygiene Items	10	3.6
All Other Products, Services, and Expenses	15	5.5

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?



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