

# Creating a ‘User-Friendly’ Expenditure Diary

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**I**nterest in American expenditures has a long history dating back to the late 1800s, when the Bureau of Labor Statistics (BLS) first looked at the economic welfare of our early immigrants. Today, BLS is mandated to report detailed information on all the ways in which Americans spend their money. The Consumer Expenditure Diary (CED, Diary) is the instrument used to collect information on the many purchases made each week by sampled households.

When it comes to reporting detailed expenditure information, not all purchases are equally easy to remember and record. Some expenditures, such as daily busfare, are often part of a “work commute” mental script and may be readily recalled. Other purchases, like sodas and snacks from vending machines, tend to be more mundane, buried within the concerns of daily activities, and more easily overlooked. The diary mode of data collection has long been recognized as an especially useful tool for collecting daily records of these types of frequent, low-salience purchases before they are forgotten. The diary also makes it possible to collect followup details on purchases that can be used to produce the weights for the Consumer Price Index.<sup>1</sup> Such information would be difficult, if not impossible, to collect accurately without some means of recording the purchases during the week as they occur.

Over time, numerous economic researchers have adopted a diary approach to track household consumption, gauge reactions to new products appearing on the market, and observe social trends. Through their work, it has become abundantly clear that diaries are useful data collection tools. However, in order to attract and keep respondents, a diary must be user friendly and actively engage the respondents’ interest in the data-reporting task.

## **Developing a BLS diary**

Over the years, BLS created various expenditure diaries with the hope that they would produce high response rates and accurate estimates. But evidence from numerous research studies, expert reviews, and the reports of interviewers and respondents alike has indicated that these diaries were not particularly user friendly. From the perspective of the respondent, the main problem with the current CED Diary is that it is difficult to navigate; neither its logic nor its structure is apparent. (See exhibit 1.) The respondent must navigate both vertically and horizontally and must inspect every page thor-

<sup>1</sup> For example, reports for grocery items need to include details about the type of packaging and whether the item is fresh or frozen. Detailed information on clothing includes the gender and age range of the recipient. Meals away from home have followup details about purchase of alcoholic beverages.

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oughly in order to determine how to proceed. In addition, respondents have reported that Diary instructions are not easy to read or follow. (See exhibit 2.) For example, respondents do not understand some of the words, such as “consumer unit,” used by BLS. Likewise, the pages used as examples in the current diary have been reported to be somewhat overwhelming and, worse, may contribute to, rather than ameliorate, respondents’ confusion. Finally, the large size and landscaped layout (as opposed to the more typical book format) makes it difficult for some respondents to read and use the diary.

In response to these concerns, the Branch for Research and Program Development in the BLS Division of Consumer Expenditure Surveys chartered the Redesign and Analysis of Diary (RAD) team to develop a more attractive and appealing CED that would be less burdensome to complete. The first step in the process was to identify the many graphical features that might be used to guide respondents through a diary. Color, icons, highlighting, and shading were all considered as tools that could clarify the respondents’ task and help them report information fully and accurately.

Working with a contractor, the RAD team developed three prototype diaries that were ready for evaluation by the spring of 2001. The prototypes were distinguished by the color of their covers, their internal structure, and their length.

Prototype 1 (the peach diary), also entitled “Your Daily Notebook,” was identical to the current BLS production diary, but was reformatted with icons, color, and a portrait, booklike orientation. It was divided into seven days, within which were five major expenditure categories. Within each category were several subcategories identifying subsets of expenditures that should be recorded. Because of its peach-colored cover, Prototype 1 was referred to as the peach “current” diary. (See exhibit 3.) The copious subcategorization of expenditures rendered the peach diary the longest of the three, at 144 pages.

Prototype 2 (the yellow diary), en-

titled “Track How You Spend Your Money; also was divided into 7 days. As with the peach diary, all the expenditure categories and subcategories were repeated every day, with tabs indicating where each day began. Expenditures were recorded on the day of purchase and under the correct descriptive category. The difference between this diary and the peach “Current” diary was that in the former there were fewer subcategories within the major expenditure categories. Because of its yellow cover, Prototype 2 was referred to as the yellow “day” diary. (See exhibit 4.) With fewer subcategories, it was 132 pages long.

Prototype 3 (the teal diary), entitled “Your Daily Notebook,” was divided into four major expenditure categories, instead of the days of the week. Respondents recorded purchases under the correct expenditure category, along with the day on which they were purchased. Because of its teal cover, Prototype 3 was referred to as the teal “parts” diary. (See exhibit 5.) By eliminating the repetition of the 7 days, it was the shortest of the prototypes, at only 36 pages.

The first step in the process of evaluating the strengths and weaknesses of each version of the diary was to submit all three to knowledgeable BLS staff for review.<sup>2</sup> The comments generated by this review process ranged from the correction of typos to more profound concerns about missing data elements and the quality of the data. The initial process of internal review resulted in the elimination of the peach “current” diary, which was almost universally disliked because of its length and complexity. This left the RAD team with two viable prototypes.

### **Round 1: Evaluation of Prototypes 2 and 3**

Beginning in June, 2001, copies of the yellow and teal prototype diaries were distributed to 15 U.S. Census Bureau

<sup>2</sup>The first rounds of internal BLS evaluation included reviews by staff in the Consumer Expenditure Program, the Consumer Price Index Program, and the Office of Survey Methods Research.

interviewers known as field representatives, 90 BLS staff and summer interns from the Office of Prices and Living Conditions and the Office of Survey Methods Research, and 11 managers and staff from the Census Bureau. The prototype diaries were randomly assigned, with roughly half of the participants receiving a yellow “day” diary and half receiving a teal “parts” diary.

All participants were asked to keep the assigned diary for their entire consumer unit for 1 week. In addition, the field representatives completed a short questionnaire developed by the Census Bureau, which they mailed to the RAD team at BLS, along with comments written in the margins of their diaries. All other BLS and Census Bureau participants took part in discussion groups to talk about their experiences using the diary, to identify potential problems, and to brainstorm ideas for improvements.

In total, the RAD team conducted 12 discussion sessions with 6 to 13 participants per session and a small-group interview with three Census Bureau managers. In each of the groups, there was a mix of participants, some of whom kept the yellow diary, and some, the teal diary. In this way, participants were able to discuss the relative merits of the two versions.

The strategy of choosing knowledgeable BLS and Census Bureau staff as participants in the first round of study was selected for many reasons. First, it was a way to generate interest in the new diary by disseminating information about proposed changes. Second, it provided BLS subject-matter experts and Census Bureau field staff with an opportunity to comment on the prototypes and to help determine the design of the new diary. Third, it was a chance to draw upon the expertise of those who know what data the diary should collect and to critique the prototypes in light of the estimates they would produce.

While each discussion group had its own unique flavor and focus of interest, the comments made throughout were remarkably similar. Unanimity on

certain key points was highly reassuring and made it relatively easy to decipher the main themes conveyed in many different ways.

As regards the yellow “day” diary, participants reported that having the diary divided by day of the week helped them to recall their purchases. However, at 132 pages, this version was still bulky, repetitive, and somewhat difficult to navigate and use.

The teal “parts” diary was more problematic. While it was considerably shorter and easier to manage, participants reported that they missed the day-of-purchase structure in attempting to recall their expenses. Apparently, these memories were not classified internally by expenditure category, but rather were associated with the activities of the day of the week.

The main results from the first round of study found their fullest expression in the following list of recommendations generated by the participants:

- Clarify the instructions, recording rules, and definitions for both prototype diaries; provide a set of “frequently asked questions” (FAQs).
- Eliminate the subcategories and simplify the recording task in the yellow “day” diary.
- Expand the examples and avoid needless repetition of examples in both diaries; use the pages with examples to convey as much new information as possible.
- Organize the teal “parts” diary by day of the week, as done in the yellow “day” diary.
- Make the yellow “day” diary as compact as possible, with a length similar to that of the 36-page teal “parts” diary.
- Provide a “mental map”—an overview of all the major categories—at the beginning of the diary so that respondents do not have to study the entire booklet in order

to understand what lies ahead.

- Tell respondents about any expenses that should not be recorded.
- Use check boxes to collect followup details, such as the type of packaging for groceries or the type of meal eaten away from home.
- Make the diary look easy and user friendly, yet, at the same time, maintain a professional and official quality.

While these recommendations were directed specifically toward the development of a new prototype, other comments surfaced that addressed the overall task of keeping a diary:

1. *Keeping a diary is a difficult memory task.*

- It is often difficult to remember to record expenditures in the diary.
- If expenditures are not recorded close to the time of purchase, they generally become increasingly difficult to report accurately.
- If a diary is not portable, it is sometimes difficult to remember what was purchased and what the price was by the time one returns home.

2. *Reporting for other people is difficult.*

- Family members other than the respondent are less diligent about tracking their expenses and reporting them than the respondent is.
- Family members other than the respondent may become irritated and annoyed when asked about their spending.
- Adolescents are often uncomfortable and uncooperative about reporting their expenditures to their parents.
- Household members not directly instructed by the FR tend to make

more reporting errors.

3. *Mathematical calculations are difficult.*

- It is often difficult to compute prices (with or without sales tax), even with the aid of a receipt.
- Many respondents are unable to figure out the price of a purchase if a receipt for that purchase does not clearly specify discounted coupon amounts and sale prices.
- Rebates also are difficult to compute and record.

Taking into account all of this information, the RAD team turned to expenditure diaries from other countries for ideas on how to apply what was learned. Many international diaries had appealing designs, but the diary used by the Household Budget Survey Program from the United Kingdom seemed to fit most closely the needs described by our study participants and answered many of their objections. The U.K. diary included check-box-style columns for followup details, a day-of-the-week structure with only five major categories each day, and an attractive, yet professional-looking, design. Consequently, the RAD team designed a new “Prototype 4” diary in the same vein as the one from the United Kingdom,<sup>3</sup> but incorporating additional beneficial features specified by BLS participants. (See exhibit 6.) For example, Prototype 4 included a “mental map” at the beginning of the diary, explaining its overall structure (exhibit 7), as well as expanded example pages (exhibit 8) and a series of FAQs addressing the most common recording difficulties that arose during the study (exhibit 9). Among the last were the following:

- How detailed should my descriptions be?

<sup>3</sup> The major categories in BLS Prototype 4 are (a) “food and drinks from grocery and other stores,” (b) “catered events and meal plans,” (c) “food and drinks from grocery and other stores,” (d) “clothing, shoes, jewelry, and accessories,” and (e) “all other products, services, and expenses.”

- How should I record multiple purchases?
- How should I record prepayments, such as a subway fare card?
- How should I record credit card purchases?
- Should I record automatic deductions taken from my paycheck or bank account?
- Should I record typical monthly bills?
- What should I do when I use coupons, discount cards, or loyalty cards?
- Can I just give you receipts instead of writing the information down?
- How should I record items if I don't know whether they include tax?
- What if I make a contribution or a charitable donation?
- What about gift certificates or gift cards?
- What do I do about returns and exchanges?
- Should I record subsidized and reimbursed expenses?
- What should I do about shipping and handling costs?
- What's the difference between a concession stand and a mobile vendor?

## Round 2: Evaluation of Prototype 4

Even though Prototype 4 was developed from information gathered during the first round of study, the new design still needed to be evaluated to identify both its strengths and weaknesses. A five-pronged strategy was formulated for a second round of study:

- Eight diaries were posted throughout the Division of Consumer with a request for review and comment.
- Fifteen diaries were mailed to the

same Census Bureau FRs who participated from the first round of study, along with a short questionnaire to target key questions of interest.

- Fourteen diaries were distributed to a subgroup of BLS staff who participated in the first round of study, so that they could participate in another 2-hour review session comparing the prototypes.
- Fourteen diaries were distributed to staff of the Office of Prices and Living Conditions and the Office of Survey Methods Research who had *not* participated in the first study, so that they could record their expenditures for a week and participate in an interview.
- Twenty diaries were distributed to members of the public, so that they could record their expenditures for a week and participate in an interview.

During the course of the study, the participants mentioned several features of the new diary that they especially liked and found helpful: (a) The division of the diary into days of the week, (b) the book's graphical design and layout, (c) the FAQs, (d) the lists of products and services used as examples within each major category, and (e) the new example pages with more sample entries and information boxes used to highlight reporting details.

Participants also identified concepts and instructions that still needed to be clarified:

1. Some participants remained unsure how to record multiple purchases of the same item (for example, five cartons of yogurt). To resolve this uncertainty, an additional FAQ was included: "How should I record multiple quantities?"
2. In keeping with the requirements of the Consumer Price Index, respondents were told in the in-

structions not to record expenses incurred when they were away overnight. However, almost every participant in the study supplied a different interpretation of what being "away overnight" meant. To standardize reports, it was recommended that this instruction be clarified and highlighted in interviewer training sessions.

3. The diaries instructed respondents to record each meal that was eaten as "Food & Drinks from Food Service Places" as either "breakfast, lunch, dinner, or snack/other." However, only 72 percent of the meals from food service places recorded in Prototype 2 and Prototype 3 during round 1 of the study specified any one of the four types of meals listed. Similarly, low percentage also has been cited as one of the flaws of the current CED. One goal of the redesign project was to reduce the amount of information, including the number of records having to do with meals, that needed to be imputed because of missing data. Because this same error occurred in a number of diaries kept by Census Bureau field representatives, it was decided that the place to begin would be with improved interviewer training. In addition, Prototype 4 was redesigned to include check boxes for "breakfast, lunch, dinner, or snack/other" in order to standardize reporting and reduce the information burden on respondents. (See exhibit 10.)
4. The Consumer Price Index program requires additional information about grocery purchases, including whether the items are fresh, frozen, bottled, canned, or other. An ever-increasing variety of types of packaging, however, makes these distinctions difficult to describe and burdensome to use. Many of the par-

participants in the study requested more clarification of these distinctions, and it became clear that two separate questions had become intertwined in the minds of the respondents:

**Question 1—**

- How is the food packaged? That is, does it come in a can, a bottle, or some other type of packaging?

**Question 2—**

- Is the food fresh, frozen, or in some other condition?

To make explicit the twin possibilities that fresh food may be packaged (for example, fresh tomatoes may be wrapped in cellophane) and frozen food may be canned (for example, frozen orange juice may be sold in a can), the two followup questions were placed into two separate columns together with checkboxes. (See exhibit 6.)

These and other observations collected during the evaluation phase of round 2 of the study translated into many small ideas for correcting minor flaws and tiny oversights—the traditional “tweaking.” The overwhelming message, however, was that Prototype 4 is a user-friendly, attractive, and professional-looking data collection instrument.

**Next steps**

The final steps in the creation of the user-friendly expenditure diary involve

- transforming Prototype 4 into an image-scannable document according to Census Bureau specifications,
- updating interviewer training to mirror design changes in the diary, and
- conducting a field test to assess the effect of changes to the diary.

*Producing an image scannable document.* Because the Census Bureau has updated its system of managing and processing paper forms, it is now possible

to move away from the old procedure of using microfiche to preserve documents. The goal is to produce paper forms, including diaries, that can be scanned into an electronic image. Data would be keyed directly from the computer image, which would also serve as the archived document, replacing microfiche.

In order to meet the demands of this automated process, the user-friendly diary must also be converted into a processing-friendly document. In other words, the final formatted diary must fit the color, font, and size constraints of the processing system’s specifications. This work has been undertaken by the Census Bureau’s Forms Design Office.

*Updating interviewer training.* As the new diary prototypes were being developed, it became apparent that certain aspects of the diary-keeping task needed more emphasis during interviewer training. For instance, BLS suggested that interviewer training needed to include more explanations and practice (1) identifying which “overnight” expenses should not be recorded, (2) specifying the different types of meals, and (3) explaining why the diary has a day-of-the-week structure, but the additional overflow pages do not.

Also, because many of the diary’s new design features would be unfamiliar to the interviewers, a new training manual and procedures for both self-study and classroom study needed to be developed. Among the new features that required instructions were the following:

- FAQs
- example pages with information boxes
- check boxes
- pockets for receipts
- a daily reminder list

In addition, because the new diary will incorporate a computerized introductory segment to collect the house-

hold demographic details, new training on the computer will be required.

*Conducting a field test.* In September 2002, a field test was scheduled to assess the feasibility of using the new user-friendly diary and to evaluate the effects upon estimates and response rates. The redesigned diary will be placed in nine census regions for 4 months; it is anticipated that 1,600 completed diaries will be collected. These diaries will be analyzed and compared with those obtained from a control group, as well as with the regularly produced diaries.

The four main goals of the field test are as follows:

- to determine whether the new user-friendly diary yields higher response rates than those generated by the current production diary;
- to test whether there is a statistically significant difference between the estimates produced by the new diary, and those obtained from the current production diary;
- to evaluate the user friendliness of the new diary in terms of the burden it places on respondents (for example, the length of time the respondent needs to complete the diary and the difficulty respondents experience in completing it); and
- to test the operation of the computerized segments of the data collection and operational control processes.

Only at the end of these final steps will we know whether BLS has, in fact, created a user-friendly diary that is at the same time “processing friendly,” “image friendly,” and “data quality friendly.” If the final verdict is affirmative, the new user-friendly diary will be implemented in 2004. ■