

Limited Domain Diaries of Consumer Expenditures: Results from a Pilot Test

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INTRODUCTION

The Consumer Expenditure Survey (CE) is a national survey collecting information on the spending patterns and living costs of American consumers. The survey is conducted, on a continuing basis since 1980, by the Census Bureau for the Bureau of Labor Statistics (BLS). There are two separate components. The Diary is designed for recording detailed expenditures, especially food items, for two consecutive weeks. The Interview is a panel survey with five interviews and a three month recall period. Although all expenditures are collected, the Interview is designed to capture large and/or regular expenditures, such as for travel and utilities. With the exception of expenditure groups designated to be derived exclusively from one of the two components, individual categories are selected from one or the other component. The source selection of the categories is done every ten years and is based on statistical data comparisons of the estimated mean square error from each component. (BLS, 1995)

Expenditure surveys require sustained cooperation by all household members in remembering their expenditures and communicating this information to the household member(s) serving as the diary-keeper(s) or the respondent(s). The diary and interview methods are both burdensome, resulting in less than complete reports. Some expenditures tend to be underreported in the Diary and the Interview. One example concerns medium size items in categories of apparel and home furnishings that are too frequently purchased to be accurately recalled in the Interview but are too few among the multitude of small items to be reported in the Diary. (Silberstein & Scott, 1991)

For these reasons, research was undertaken to explore ways to reduce the scope of both components and improve the expenditure estimates. Under this proposed methodology, the diary questionnaire would be split in two portions, administered to two separate samples. The source of the estimates would be assigned prior to data collection, so that items collected in the Diaries would not be collected in detail in the Interview. (Summary data would still be collected for economic research purposes.) The reporting period would be extended for one of the diaries in order to obtain sufficient data for estimation.

A pilot test was conducted between November 1994 and April 1995 to explore the issues involved in using the new diary procedures. The findings were mixed and

the proposed methodology was considered only marginally beneficial in the CE. However, test results provided valuable insights to be used in future redesigns. This paper describes the study and its results.

STUDY DESIGN

In designing a survey one should follow certain principles. With regard to the content (or *domain*), only data that are needed should be asked of the respondents so that questionnaire length is minimized. A larger than needed domain is desirable in cases where boundaries may not be easily understood by the respondent. While expanding the domain should be kept to a minimum, this approach tends to ensure the target domain is covered. More inclusive domains can also reduce the effort required of the respondent to figure out whether or not to report the information.

In the current Diary, respondents are asked to write down every expenditure incurred during the two week diary keeping. Approximately twenty percent of the entries are not within the needed domain. An undue burden, therefore, results from recording expenditures that are not used in estimation. Diaries limiting the domain to selected types of expenditures are preferred in several countries. For instance, Canada collects only food expenditures in the Diary (Champion, 1995), and food and selected other items are collected in the Diary conducted in the U.K. (ONS, 1995; Kemsley, et. al., 1980). In these two surveys, larger household expenditures are collected only in the interview portion.

The aim of the test was to provide feedback primarily on four questions:

1. Could respondents proficiently keep the diary for a limited domain rather than for all expenditures?
2. Would it be feasible for respondents keep a diary for a longer time span than the current two weeks?
3. Were the test diaries well designed in order to collect the needed data?
4. Would a telephone follow-up be feasible for collecting additional expenditures after the end of diary keeping?

The test included two separate samples of households, each given one of the test diaries. These diaries had limited well-defined domains and smaller instruments. The *domain* was defined as the inclusive and comprehensive set of food, personal, and household expenditures that respondents were asked to report. The domain of each test diary was aggregated into

major *groups* of expenditures. Further, a series of *categories* of expenditures were subsumed within each of these major groups. Examples, *cues*, were given under category titles. This type of diary page provided: 1) the space in which to record expenditures, known as diary *entries*; and 2) the structure, or *cognitive map*, which served to jog the memory of the expenditures made. This design, used in the current diary as well, is believed to provide more accurate reporting compared to an open space diary page (Silberstein, 1993) or to a page with preprinted entries (Tucker, 1992). The test diaries further emphasized this design since the categories were highlighted with a bright yellow color.

The domain of each test diary represented twenty percent of the average dollar amount spent over a year by households. Table 1 lists the types of expenditures and some of the cues included in each diary (referred to as Diary 1 and Diary 2). The focus of Diary 1 was on expenditures for food and beverages at home and away from home, personal care items and services, and housekeeping supplies. The focus of Diary 2 was on apparel, home furnishings, sports and recreation equipment, entertainment, and selected transportation expenditures. The categories selected for this diary were identified as needing improvement.

Figure 1 depicts the test configuration. Diary 1 was kept for two 1-week periods whereas Diary 2 was kept for two 2-week periods. As with the current Diary, three visits were made by the Field Representatives (FRs): an initial visit to place the first diary, a second visit to pick up and review the first diary and, at the same time, place the second diary, and a third visit to pick up and review the second diary. A Telephone Follow-up was administered in Diary 2 one month after the end of diary keeping, asking respondents to report on their expenditures for the previous month. The domain of the follow-up pertained to the more infrequent expenditures within the domain of Diary 2.

The diaries' organization and appearance differed from the current form in several ways:

- ◆ Diary 2 was divided by week only, eliminating the subdivision by day of Diary 1 and the current Diary. This change seemed appropriate for the types of expenditures in Diary 2.
- ◆ A brief list of expenditures covered by each diary was included on the cover.
- ◆ Certain expenditure groups, such as Food Away From Home in Diary 1 and Apparel in Diary 2, received greater emphasis. These two groups appeared on the first page of the diaries, rather than in the middle pages, and showed more specific categories of expenditures.

- ◆ New columns were added to capture the item attribute information currently collected only in the Interview (e.g., whether carpeting is wall-to-wall, room size, or squares).
- ◆ Location cues (e.g., department stores) were added to increase memory retrieval of specific shopping trips.

Due to budget constraints, the test included only 150 cases. The sample was systematically selected from the designated 1994 production sample, so that a portion of the cases received the test diaries rather than the current diary. (Test data were not included in the published estimates.) A larger sample allocation (70%) was given to Diary 2, since it differed more from the current Diary and was the main focus of test. The sample was spread across ten primary sampling units (PSUs¹) and four Regional Offices: Seattle, Philadelphia, Dallas, and Kansas City. Experienced FRs were given one day training and one half day self-study on how to place the new diaries, conduct the telephone interview, and administer the respondent assessment. The Telephone Follow-up was administered by the same FR that placed the diaries, utilizing the rapport established with the respondents.

TEST RESULTS

Response

The response rates² were 80% for Diary 1 and 78% for Diary 2. (Table 2) These rates were comparable to response rates obtained from the current Diary in the areas sampled.

As in the current Diary, respondents that failed to make entries on the diary were asked to recall their expenditures at diary pickup. In Diary 2, this meant asking respondents to recall items for the previous two weeks rather than the usual one week. The rates of diaries completed in this manner were 17% of Diary 1 responses and 27% of Diary 2 responses. (Table 2)

Ninety three percent of eligible respondents participated in the Follow-up. For the test, eligibility was limited to households that responded in the second period of Diary 2 (nearly all did). Households without a telephone or that refused to provide their telephone number were also excluded.

Reported Expenditures

After nonresponse, there were 30 cases for each of the two weeks of Diary 1 (60 diaries) and 82 cases for each

¹ PSUs consist of counties (or parts thereof), group of counties, or independent cities. (BLS, 1995)

² Response rate = percent households that agreed to participate over eligible households.

of the two periods of Diary 2 (164 diaries). The total number of diary entries made by respondents were 1987 in Diary 1 and 1708 in Diary 2. (Table 2)

Summary comparisons were carried out between test data and data from production diaries. In order to compare these data sets, the expenditure classification of groups and categories used in the test was imposed on the production data after data collection. In addition, production data reflected the time period and PSUs used in the test. Within these constraints, there were 248 production cases that completed both diary weeks and these served as comparisons. Although there was no attempt to match family characteristics from the test to the production cases, the selection procedures used ensured similarity across the samples.

Table 3 shows comparisons of the percent reporting in the test diaries and the applicable subset of the current Diary. The biweekly percent reporting indicates how many respondents, over all respondents, reported the various groups of expenditures in a two week period. Since respondents usually do not report expenditures they do not make, increased reporting levels were interpreted as an indication of improved diary keeping. Compared to the current Diary, Diary 1 provided consistently higher rates of reporting. Noteworthy was the 7% increase for Food Away From Home, although the difference was not significant due to the small sample size of Diary 1. In Diary 2, the Entertainment and Transportation expenditure group showed a significant increase in percent reporting, but other groups were approximately the same. Increased reporting of some of the expenditures was reflected in the comparisons given in Table 4. The table shows the total dollar value reported in one expenditure group, for all respondents combined, as percentage of the total dollar value in all expenditures. Overall, the test data were remarkably similar to the production data.

The effect of restricting the diary domains was an important aspect of the test. It was found that the majority of data entries in both diaries were within the desired domains. Two percent of Diary 1 entries and twelve percent of Diary 2 entries were outside the desired domains. (Table 2) In Diary 2, only one third of the respondents included out-of-domain items and, when they did, they mostly reported everyday household expenditures (in particular, a single entry for *groceries* or individual *personal care* items). There were only a few out-of-domain entries for expensive items, such as airline tickets. Newspapers, books, and magazines were reported in both diaries, although they were not in the domain of either.

Most of the diary entries were made within the

appropriate lines provided for each category; thus it seems the diary keepers had a good understanding of the task and the structured design was effective.

Most of the out-of-domain items were entered in the Additional Page which was a blank page with lines and columns. This indicated that diary keepers searched through the diary pages, could not find an explicit category that mentioned the items, but still wanted to report them. As explained by the FRs, some respondents wanted to record items they viewed as naturally associated with diary keeping.

The test highlighted weaknesses in some of the titles and cues chosen, as the examples in Table 5 show. In example 1, the out-of-domain entries were inconsistent with the cues but they appear to be related to the title word *HARDWARE*, which was more prominent than the cues. In example 2, some of the reported items were considered outside the desired domain, although they appear consistent with the category titles and cue words. It can be concluded this category was not well defined as shown, and, as always, the word *MISCELLANEOUS* was not helpful.

Example 3 shows a category presented with a domain larger than needed, since it was difficult to define its scope. The estimation requirement was to include vehicle parts purchased directly by respondents and exclude vehicle repair and maintenance jobs that required labor costs. This distinction was not communicated on the diary pages. Two items were listed on the example pages, but, not surprisingly, both types of vehicle expenditures were reported.

Debriefings and Assessments

Two debriefing sessions were conducted for the FRs to share with BLS and Census insights acquired through the test and to provide suggestions on how to improve the forms and procedures. Twenty FRs participated in the debriefing sessions. The FRs had also completed a short questionnaire for each respondent case. Their comments and suggestions are summarized below.

Respondents indicated that filling out either diary was not considered a hard task. However, the FRs suggested more should be done to remind respondents to keep the diary and have all members of the household contribute their expenditures.

The FRs liked the use of two diaries with separate domains. They stated that too much is asked of the respondent in the current Diary. However, they pointed out the domain of Diary 2 might have been too narrow, since many respondents had few expenditures to report and felt "inadequate" as a result. It was suggested that

additional items could be asked in both diaries, perhaps in the form of totals, such as *groceries* in Diary 2 and *gasoline* in Diary 1. These data could be collected even if not used in the estimates.

The longer reporting period in Diary 2 did not appear to affect cooperation. Diary 2 was considered much easier than Diary 1 or the current Diary because of the relatively small domain, especially when recall was used. The FRs also felt the one month telephone report for Diary 2 was better than the three month recall for similar items in the Interview.

The diaries' layout, size, and structure were generally considered good. The FRs noted that respondents did not usually look beyond category headings and paid the closest attention only to the first few cue words. The location cues were a good innovation, especially for the Food Away from Home section. In particular, the FRs suggested: 1) an increase in font size to facilitate reading, 2) a brief index to help finding items on the diary pages, and 3) a small calendar on the diary cover to highlight the diary keeping period.

The FRs and the respondents reacted positively to the Telephone Follow-up in Diary 2. The telephone call was expected since a leaflet with explanations was given to respondents at the last pickup visit. Only a few items had been purchased in the designated domain and they were easily remembered. The average interview length was just under 10 minutes.

SUMMARY

Findings and recommendations are listed below for each of the research questions.

1. Feasibility of limited domain diaries

Test results showed that limited domain diaries are feasible in the CE. Respondents were cognizant of what to include in and exclude from the diaries. Very few items were outside the desired domains, and these items pertained to expenditures that could be reasonably included in limited domain diaries.

While these results were positive, the conclusion from the study was that splitting the diary would not provide the needed improvements in data quality that were hoped. The domain of Diary 2 was too restricted and this may have inhibited respondents from diary keeping. It appears that a limited domain diary of expenditures would have to encompass a greater scope and include everyday purchases of food items.

2. Longer diary keeping

In Diary 2, almost a third of the respondents did not keep the diary after having agreed to. However, there

was no evidence that the longer diary keeping of two weeks contributed to the lower cooperation.

3. Instrument design

Respondents provided data for the designated domains, sometimes at a higher rate than the current Diary. In most cases, the categories and cues produced the appropriate results. Detailed analysis of the various entries confirmed the importance of providing consistent categories and cues.

There was evidence that the organization and content of the diary pages are noted by the diary keepers. The test diaries did not cue for large and/or infrequent expenditures, and these were not reported. The current Diary would be easier to complete if categories never used in estimation from the Diary would not be explicitly shown on the diary pages.

4. Use of telephone as a follow-up

The Telephone Follow-up was successful. The one-month recall was a good length to collect accurate data by telephone for certain expenditures. A computer driven collection system would greatly enhance the potential for future telephone follow-ups.

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TABLE 1 - Domains of Test Diaries: Types of Expenditures and Cues

DIARY 1

FOOD & BEVERAGES AWAY FROM HOME
FOOD & BEVERAGES AT HOME
TOBACCO
PERSONAL CARE ITEMS & SERVICES
 Non-prescription drugs, cosmetics, haircuts,
 baby-sitter, child care, motor vehicle fines
HOUSEKEEPING SUPPLIES
 Paper products, detergents, postage

DIARY 2

APPAREL
APPLIANCES
HOME EQUIPMENT
 Computer, telephone, security alarm,
 infant equipment, luggage
HOME FURNISHINGS
 Furniture, decorative items, linens, carpets
SPORTS & RECREATION EQUIPMENT
 Exercise equipment, toys, hobbies
ENTERTAINMENT
 Audio/video equipment, movies, sporting events
SELECTED TRANSPORTATION
 Gasoline, vehicle parts, public transportation

TELEPHONE FOLLOW-UP

SELECTED CLOTHING
 COATS, JACKETS, SUITS, UNIFORMS
MAJOR APPLIANCES AND EQUIPMENT
FURNITURE AND CARPETING

FIGURE 1 - Pilot Test Configuration

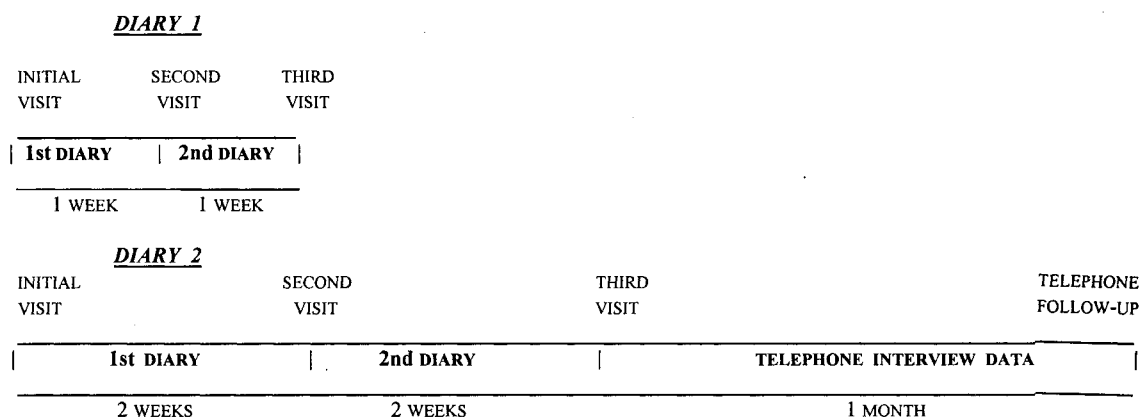


TABLE 2 - Test Diaries

	<u>DIARY 1</u>	<u>DIARY 2</u>
Response rates	80%	78%
Number of respondents	30	82
Number of completed diaries	60	164
Diaries with no expenditures	-	3
Completed by respondents	50	118
Completed by total recall	10	43
Percent of diaries with expenditures	17%	27%
Number of diary entries	1987	1708
Out-of-domain entries	38	211
Percent of total entries	1.9%	12.4%

TABLE 3 - Comparisons of Biweekly Percent Reporting ⁽¹⁾

	TEST	Current Diary
DIARY 1		
Food & Beverages Away From Home	87	80
Food & Beverages At Home	100	98
Personal Care & Housekeeping Supplies	93	88
DIARY 2		
Apparel	57	60
Major Appliances	5	3
Small Appliances and Equipment	42	49
Home Furnishings	19	17
Sports & Recreation Equipment	54	56
Entertainment & Selected Transportation	94 *	89

⁽¹⁾ % over all respondents

* Chi Square, $p < .10$

TABLE 4 - Comparisons of Percent Expenditures ⁽¹⁾

	TEST	Current Diary
DIARY 1		
Total	100	100
Food & Beverages Away From Home	27	24
Food & Beverages At Home	53	56
Personal Care & Housekeeping Supplies	20	20
DIARY 2		
Total	100	100
Apparel	29	25
Major Appliances	4	4
Small Appliances and Equipment	18	14
Home Furnishings	6	12
Sports & Recreation Equipment	15	20
Entertainment & Selected Transportation	28	24

⁽¹⁾ % over the total dollar value of all reported expenditures

TABLE 5 - Diary 2: Examples of Out-of-Domain Entries

1. **TOOLS and HARDWARE**
Cues: Drill, nails, saw, screwdriver, hammer, etc.
 Domain entries: - nail gun, saw, screwdriver, bucket, pliers
 Out-of-domain entries: - shower rod, pipes, faucet washer, filter, lamp socket, tree stand

2. **MISCELLANEOUS HOME EQUIPMENT**
Cues: Security alarm, fan, trash can, luggage, etc.
 Domain entries: - frames, curtain rod, storage box, hanger, tie valet, fireplace clogs, dish drainer
 Out-of-domain entries: - furnace filter, insulation, calendar, light bulbs, heating pad, file hanger

3. **VEHICLE PARTS, EQUIPMENT, ACCESSORIES**
No cues given on diary page
Items listed on example pages: ignition switch, floor mats
 Domain entries: - headlights, windshield wipers, spark plugs, battery
 Out-of-domain entries: - various service expenditures