

DIARIES IN A CONSUMER EXPENDITURE SURVEY

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The Bureau of Labor Statistics (BLS) has requested that the Bureau of the Census undertake an ongoing program of several surveys, the primary purpose of which is to provide the BLS with a data base for determining when to revise the Consumer Price Index (CPI), and to also provide the expenditure data base to revise the weights. The overall program consists of three interrelated surveys: the Point of Purchase Survey, the Quarterly Interview Survey, and the Diary Survey. This paper will discuss only the Diary Survey.

The purpose of the Diary Survey is to provide estimates of the small inexpensive items which respondents tend to forget over relatively short periods of time in a recall-type survey. The particular expenditure classes for which the Diary Survey is being used include food and beverages, personal care products and services, small household supplies, and a few other relatively inexpensive items.

1972-73 Survey

The Census Bureau last conducted the Diary Survey in 1972-73. The survey methodology was very similar to that used in the current survey and will be discussed later. Evaluation of the 1972-73 Diary Survey showed reasonably close correspondence between diary estimates of food purchases for home use and data from other independent estimates. This similarity in estimates might be attributed to the amount of space on the diary form allowed for food entries, and also the fact that the "homemaker" who has a better grasp of these expenditures was probably the usual diary keeper. The completeness of reporting among the variety of food items showed considerable disparity, with reporting being more complete for the expensive items such as meat and poultry, and for frequently purchased items such as milk and bread. Items such as flour and sugar which are less frequently purchased were substantially underreported. The 1972-73 Diary Survey also proved to provide estimates reasonably close to independent sources for meals purchased in restaurants or other eating places. For items other than food, the predominant factor appeared to be the role of the various family members in making purchases. When the purchase was principally an item that would be purchased by the homemaker, the reporting was considerably more complete, although not as complete as for food. For further discussion of this evaluation, see Technical Paper Nos. 45 and 46, 1972-73 U.S. Consumer Expenditure Survey.

In anticipation of expected low response rates in 1972-73, the Bureau conducted an experiment to test the effects on response rates of offering a cash incentive to sample households for participating. The sample was

divided into three parts, with one-third of the sample receiving \$10, one-third receiving \$5, and one-third receiving no cash. The results of that test indicated that incentives had no overall substantial effect on response rates. Although some very minor improvements were shown in some individual items like meat, the overall variance of the reported expenditures was so high that the small amount of variance explained by incentives is negligible. For further discussion of this incentive test see "Incentive Effects on Amounts Reported in an Expenditure Diary Survey" by Charles D. Cowan, U.S. Bureau of the Census.

As expected response rates were low initially. During the first quarter of the 1972 survey, the response rate was 74.4 percent, with weekly rates fluctuating from 70 to 79 percent with no noticeable ascending trend. However, by the end of the 1973 survey, the response rate had jumped to slightly below 90 percent for the whole year and exceeded 89 percent in each quarter of that year.

1978 Pretest

As part of the preparation for the Diary Survey, a pretest was conducted during the period of August-September 1978. The basic purposes of the pretest were 1) to test alternative survey instruments, materials, and methodologies, and 2) to obtain administrative data on costs, timing, and response rates to be used in finalizing plans and procedures for the national survey.

The Diary pretest sample consisted of 1,200 sample units selected at three sites: the Philadelphia, Pennsylvania standard metropolitan statistical area (SMSA); the Akron, Ohio SMSA; and Walworth County, Wisconsin, which is primarily a rural area. The sample was distributed evenly over a 6-week period during August and September 1978.

There has been some consideration given to eventually merging the Point of Purchase Survey with CE. For that reason, we conducted a controlled experiment to determine the best type of diary for collecting both outlet and expenditure data and to see what effects the additional burden of collecting outlet (place of purchase) data would have on expenditure reporting. It was thought that if outlet data could be collected as a part of the Diary Survey, eventually the Point of Purchase Survey interview could be reduced in length, and possibly eliminated altogether.

For this experiment, three types of diaries were used in the pretest: (1) an outlet structured diary (Diary A); (2) a product structured diary which collected outlet information (Diary B); and (3) a product structured diary which did not obtain outlet information (Diary C). Diary C was the same design as that used in 1972-73.

Pretest results showed that the mean number of gross outlets reported for Diary A and Diary B was 8.07 and 8.59, respectively; however, slightly more of the outlet entries reported in Diary B were not codeable due to inadequate information.

The adjusted mean expenditures for those expense categories for which the diary is used to derive estimates were: (1) Diary A, \$81.40; (2) Diary B, \$86.58; and (3) Diary C, \$96.55. Although these differences among diary types for the aggregate group of categories examined were not determined to be statistically significant, Diary C was shown to be consistently better than, or as complete as, Diary Types A and B for 16 primary expenditure categories. Because of the concern that the observed differences in mean expenditures between Diary Types A and B with Diary Type C might be due to the additional respondent burden of collecting outlet data, the decision was made to use a form similar to Diary C; that is, a product structured diary which does not obtain information during the initial years of the survey. The prospects from the Pretest for collecting outlet information along with expenditure information in the Diary Survey are encouraging and further research will be done in the near future.

Another area of concern which was explored in the pretest was the method of determining CU composition within the household. The interviewer identified CU's based on a "family" concept; that is, the primary CU consisted of all persons related to the reference person by blood, marriage, adoption, or other legal arrangement. Each person not related to the reference person was treated as a separate CU regardless of his/her financial arrangement with the primary CU. In addition to the above, all persons in the household who were 18 years of age or older (with the exception of any husband, wife, and their never-married children under 18) were asked a series of questions to determine the financial arrangements within the household. The pretest results showed that for 93 percent of the sample households, the CU composition would be the same whether the family concept or the financial concept was used in structuring CU's. Based on these findings, a modified version of the family concept was used to determine CU's in the ongoing survey. Any person or related group of persons, regardless of age, not related to the reference person is asked a series of questions to determine his/her financial arrangements in the household.

The feasibility of interviewing college students at their college residences was also explored in the pretest. College students living away at college were considered part of their parents' CU for the 1972-73 survey. There was evidence from the 1972-73 effort that parents were often unable to report accurately many of their children's expenses, particularly those types of expenses for which the Diary Survey is used.

The pretest sample of college students was drawn from the Akron, Ohio, site and 50 sample units were selected for the Diary Survey. Several of the pretest findings were predictable. College students had a lower income, reported fewer expenditures, and had different types of expenditures from the sample as a whole. College students also had a higher Type A noninterview rate than did the total sample, indicating that they were more difficult to contact. However, once contacted, college students were less likely to refuse than persons from the noncollege sample. Since it was felt that the pretest results indicated it was feasible to collect expenditure information from college students living at their college residences, this feature was incorporated into the sample design.

The response rates for the Diary Survey Pretest were much lower than expected. During the first week, only 74.1 percent of all consumer units completed diaries. Week 2 results dropped only slightly, down to 73.9 percent.

The average amount of time spent in a household for all three interviews was approximately 73 minutes, with an additional mean travel time of 77 minutes.

INITIATION OF ONGOING SURVEY

Data collection for the Diary Survey began in September 1979, using the product structured diary which is composed of a similar set of adjoining pages for each day of a 7-day period. The pages are structured by product category headings to aid the respondent in recalling and recording purchases made during the week.

Sample Design

Data in the Diary Survey are collected from a national probability sample of households designed to be representative of the total civilian noninstitutional population. There are 102 areas of which 86 have been previously defined and selected by the BLS as CPI sample areas.

The annual target sample size at the United States level for this voluntary survey is to receive completed diaries from 5,470 households. In order to achieve this result, a total estimated workload of about 7,700 sample addresses was selected. During the last 6 weeks of each year, the sample will be supplemented to twice its normal size to increase the reportings of expenditures unique to the holiday season.

The unit of analysis or the unit for which expenditure reports are desired is the group of eligible individuals residing in a household comprising a "consumer unit" (CU). For the purposes of the expenditure surveys, a CU consists of all members of a particular housing unit or other type of living quarters who are related by blood, marriage, adoption, or some other legal arrangement, such as foster children. CU determination for

unrelated persons is based on financial independence, that is, they are responsible for paying their own expenses for two out of three of the following: shelter, food, and all other expenses. It is expected that approximately 95 percent of the occupied units will contain a single CU.

Results of the 1972-73 Diary Survey showed that the amount of expenditures reported was highest during the first day of the recording period regardless of what day of the week the first day was and tended to taper off towards the end of the 7-day period. To account for this in the current survey an attempt to control the first day of the recording period is made to allow each day of the week an equal chance of being selected as the first recording day, which should spread any reporting bias resulting from calendar day placement among all days of the week.

Preliminary results of the relationship between the earliest placement day assigned for a diary case and the actual day the diary was placed show that 62 percent of the diaries are placed by the third day (Table 1), and 72 percent are placed by the fourth day. This indicates some difficulty in placing a diary on a specific day. Even though a procedure to spread the diary starting day among all days of the week might help the bias, it may not be practical from an operational standpoint.

Survey Description

The survey methodology for the Diary Survey calls for each selected sample unit to keep 1-week diaries of expenditures over each of 2 consecutive weeks. The earliest possible day for placing a diary with a household is predesignated so that each day of the week has an equal chance to be the starting day of the reference week.

Respondents are asked to report all expenditures made during the recording period, not just those which will be used for CPI revision purposes. The main reason for this is to take away from the respondent the decisionmaking about which items to record in order to reduce the chance of error due to the respondent's confusion over whether to record an item. It was felt that this additional recording would not increase the respondent's burden for reporting, since the vast majority of the items reported are those of interest to the survey.

The interviewer makes three visits to the Diary household over the 2-week period. At the first visit, the interviewer conducts a brief interview with the household respondent which includes obtaining the household composition and selected demographic characteristics of each member. The interviewer then explains to the respondent how to keep a diary, the type of detail that is needed, and where to record the information. The interviewer then makes an appointment for 1 week later. At that time, s/he returns to the household and reviews the first diary for completeness and legibility, updates the household composition, and asks a

few selected questions regarding common types of expenditures. The third appointment is made, again for 1 week later. When the interviewer returns for the third visit, the second diary is reviewed and selected questions on income and work experience are asked.

If the interviewer arrives to pick up the diary on the appointed day, and the diary has not been completed, the expenditures for the week are obtained through recall. The interviewer would mark a box on the front of the questionnaire to indicate the Diary was completed by the recall procedure. However, if the Diary is not picked up on the appointed day, the expenditures cannot be obtained through recall.

Pretest results forewarned the Census Bureau that obtaining participants in the Diary Survey would be just as difficult this time as it had been in 1972. Many other surveys had been experiencing a slight decline in response rate during recent years, but nothing that would compare with the pretest results. It would not be easy to keep the level of cooperation above 85 percent in a nationwide survey. More effort was put into the Diary training, with emphasis on selling the survey and dealing with reluctant respondents. The Diary Survey was started a month ahead of the Quarterly Interview Survey to stress the importance of the Diary Survey, and supervisors were warned that even though the Diary Survey might appear to be simple, it is a survey in which high response rates are difficult to achieve and would require a great deal of attention and involvement from the supervisors.

One of the procedures which had been found to be extremely effective in the 1972-73 survey cannot be used in the current survey. This is to have diary specialists who work only on the Diary Survey. Some interviewers are particularly good at placing diaries, while many interviewers are better at conducting personal interviews in the Quarterly Interview Survey. Because of extremely small workloads in most areas, one to two diary placements a week, interviewer assignment must also include Quarterly Interview Survey interviews.

One technique which was developed in 1972 and is currently being used is the prelocation of hard to locate addresses. Inasmuch as each sample address in the ongoing survey is assigned to a specific calendar day with only 7 days to locate and place a diary with the household, it is difficult for interviewers to locate addresses which are not clearly defined in the census address files. During the month preceding the placement date, the interviewer is given a list of hard to locate addresses to identify and map, so that, once the case is assigned for the survey, its location can easily be found.

Training of Data Collectors

Training for the Diary Survey began in mid-August 1979, with a field supervisor's

conference, and followed 1 week later with a 3-day training session for interviewers. One of the problems which was faced in the 1972-73 survey was the attitude of supervisors and interviewers toward the Diary Survey. They seemed to place less emphasis on the Diary Survey than on the Quarterly Survey. One possible reason for this was the difference in the size of the survey instruments. The Quarterly Survey questionnaire was approximately 120 pages, whereas the Diary Survey had a 4-page questionnaire and a 20-page Diary which was left with respondents. Also, since the Diary Survey was started 6 months after the Quarterly Survey, the Diary Survey possibly did not receive the initial attention it deserved. With this in mind, the Diary Survey was initiated in September 1979, a month before the introduction of the Quarterly Interview Survey. In addition to adding to the importance of the Diary Survey, it also allowed training and experience in those interviewing concepts common to both surveys in a month (September), when the data collected would not be used for estimation purposes. (Estimates are to start with the first quarter of 1980 for both surveys.)

The Diary Survey training of interviewers consists of verbatim training given by the 12 regional office supervisors. Detailed instructions are given on the various concepts and techniques used in the survey. In addition, there are several exercises in which two interviewers conduct mock interviews with each other using a written guide. This gives them the opportunity to practice interviewing in a less stressful atmosphere.

After training, the first assignment given to an interviewer is carried out in the presence of a supervisor or senior interviewer. The majority of the interviewers used in this survey are newly recruited with no previous interviewing experience. We do not necessarily find this a disadvantage inasmuch as some concepts vary from other current surveys and interviewers do not have to be retrained on previously learned concepts.

In addition to the initial observation, one additional observation was made by the supervisor during the first quarter. After the first quarter, the supervisor is expected to observe each interviewer at least once a quarter, and more frequently if performance indicates.

Another quality control measure on the Diary Survey interviewing is the Diary Reinterview. Reinterview is a procedure in which a proportion of the consumer units are selected and a second interview is completed. In this particular survey, only the household composition and a few selected questions from the interview questionnaire are asked. This is being done only to check on curbstoning, and not as an evaluation of the data collected. It would not be possible to verify the expenditures reported on the diary itself.

Data Processing

Processing of the Diary Survey starts when the questionnaires and diaries are returned to the regional offices from the interviewers. An edit for consistency and completeness of the reported information is performed by the office clerk. Problems in diary recording are reported back to the interviewer as a reminder of areas which need improvement in future interviews. The respondent is not contacted to correct deficiencies in the diaries inasmuch as memory lapse would erode any possible gain. Therefore, this edit is more of a check on the interviewer's performance rather than the data itself. Upon completion of the office edit, the questionnaires and diaries are sent to a central location for further processing.

When the diaries and questionnaires arrive in the processing unit, they are checked in against a master control list of assigned sample units to ensure that all sample cases are accounted for; the regional offices are notified immediately of any sample units for which a form has not been received. After the questionnaires and diaries are checked in, they are placed in work units and forwarded to the editing and coding unit.

The Household Characteristics Questionnaire is screened for important notes which might contain good data and then coded for household and CU relationship, industry, and occupation. If data are found in the notes it is transcribed to its proper data location. Reported expenditures in the diaries are coded in a separate operation by a staff trained in expenditure coding. Entries which the coding staff are unable to code according to the prescribed coding system are referred to the BLS for resolution.

Once the editing and coding have been completed, the forms are sent to the data keying unit for keying and transmission to the computer center.

The computer processing consists of a preedit of selected items to check for consistency, validity, and keying errors. This includes a variety of checks, such as range checks of item codes, upper value checks of dollar values, and consistency between various demographic characteristics.

A number of tables will be produced out of the preedit to help evaluate the quality of some of the diary procedures and to assist the supervisors in evaluating the performance of interviewers. Tables will be produced by regional office and by interviewer of preedit errors, inhouse interview time, travel time, and field office edit time. This administrative information will be used to evaluate the performance of the field staff and to review the design of the survey with the view of improving its efficiency.

After the preedit operation, the data will go through a number of edit and imputation routines. Missing or invalid demographic data will be either assigned from existing data in the CU or imputed from a demographic characteristics data file. The source file

for imputation will be developed from edited Diary and Quarterly cases, supplemented by an edited Current Population Surveys (CPS) data file. It was felt necessary to use the CPS household data to supplement the imputation file because the Diary and Quarterly Survey samples are relatively small and, therefore, probably not very effective for this purpose. After the demographic edit is complete, an edit of work experience items will be performed to validate the relationships between industry and occupation entries and a few other selected items.

Once the file is edited, the data will be weighted on a monthly basis and the edited and weighted computer tapes turned over to the BLS for tabulation and analysis. We expect to deliver the first tapes in January 1981.

Preliminary Results

Currently, the only results available from the Diary Survey are field response rates, inasmuch as the computer processing system is still in the developmental stages.

Response rates during these first several months have been considerably lower than expected. Although they are comparable to those obtained in the 1972 survey, they are considerably lower than those obtained in the 1973 survey. (See Table 2)

During the first 4 months (September-December), the cumulative response was 78.2 percent, with the rates ranging from 93.4 percent to a low of 59.0 percent among the 12 regional offices. The highest response rate for any week during this period was 84.9 percent for Week 10, and the lowest rate was 58.2 percent for Week 17. (See Table 3)

Since the sample is an annual sample, the weeks start again with the beginning of each year and response rates are cumulated on a calendar basis. As of Week 21 for 1980, the cumulative response rate is 82.8 percent with the highest rate reported being 90.9 percent in Week 13 and the lowest rate reported being 69.4 percent in Week 21. There is an overall improvement of about 4.6 percentage points in the 1980 work to date over the rate obtained in the 1979 period, with most of this

improvement being noted during the last several weeks. (See Table 3)

The field response rates reported for 1979, and to date for 1980 include time periods during which college dormitories are closed for holidays and breaks. Therefore a portion of the generally low response rates can be attributed to the absence of college students from their college residences.

One of the main reasons for the improvement in the 1980 response rate over 1979 is the increased emphasis and restressing the importance of the Diary Survey to the regional office staff. In addition, interviewers are requested to contact the offices earlier in the placement week when they encounter refusals, that the supervisors must make a better effort to convert refusals, and that we keep constant watch over the rates, getting back to problem offices on a timely basis.

Probably the most important effect of our efforts with the field staff has been their placing more effort on contacting households within the allotted time.

When the supervisors were brought together in February, special emphasis was put on the noninterview problem. Supervisors from offices with low Type A noninterview rates spoke to the other supervisors giving their reasons for success. The supervisors were extremely receptive and many have implemented some of the ideas. Of particular note was the suggestion from one office that a control clerk keep in contact with the interviewers to remind them of upcoming diary assignments and to note progress, or more importantly, lack of progress in contacting households in their current weekly assignment. In addition, during an upcoming interviewer refresher training, we intend to use video tape equipment in a Type A (noninterview) workshop. The tapes will depict various and typical noninterview situations, and how one particular interviewer obtained an interview. Also, we will have an introductory video tape of the Census Bureau's deputy director, again stressing the importance of the Consumer Expenditure Surveys.

Hopefully, all of these combined efforts will result in an improvement in our noninterview rate.

TABLE 1

Actual Day Diary Placed During 7-Day Placement Period
(Results based on the first 6 weeks of the Diary Survey)

| | <u>Number</u> | <u>Percent</u> | <u>Cumulative Percent</u> |
|------------------------|---------------|----------------|---------------------------|
| Total | 662 | 100.0 | 100.0 |
| Before Assigned Date | 20 | 3.0 | 3.0 |
| Earliest Assigned Date | 196 | 29.6 | 32.6 |
| Second Day | 126 | 19.0 | 51.6 |
| Third Day | 71 | 10.7 | 62.3 |
| Fourth Day | 67 | 10.1 | 72.4 |
| Fifth Day | 56 | 8.5 | 80.9 |
| Sixth Day | 54 | 8.2 | 89.1 |
| Seventh Day | 45 | 6.8 | 95.9 |
| Eighth Day | 12 | 1.8 | 97.7 |
| After Eighth Day | 15 | 2.3 | 100.0 |

TABLE 2

Diary Response Rates by Quarter
Comparison of 1972 with Current Survey
Diary Survey
(Week 1 Pickup)

| Survey Quarter | Response Rate | | | Noninterview Rate | | | | | |
|----------------|---------------|------|--------------------|-------------------|------|--------------------|---------|------|-------------------|
| | 1972 | 1973 | Current Survey | Total | | | Refusal | | |
| | | | | 1972 | 1973 | Current Survey | 1972 | 1973 | Current Survey |
| 1 | 74.2 | 90.0 | 78.2 | 25.8 | 10.0 | 21.8 | 10.5 | 5.8 | 9.9 |
| 2 | 77.7 | 89.7 | 83.1 | 22.3 | 10.3 | 16.9 | 11.8 | 7.4 | 9.3 |
| 3 | 83.9 | 91.0 | 82.8 ^{1/} | 16.1 | 9.0 | 17.2 ^{1/} | 8.8 | 6.0 | 9.4 ^{1/} |

^{1/} Through Week 21, full quarter results not available.

TABLE 3

Diary Response Rates at Week 1 Pickup by Survey Week During 1979 - 1980

| Week Beginning | Weekly Response Rate | 1979 | | | Cumulative Response Rate | Week Beginning | Weekly Response Rate | 1980 | | Cumulative Response Rate | |
|----------------|----------------------|-------------------|----------|-------|--------------------------|----------------|----------------------|----------|-------|--------------------------|----------|
| | | Noninterview Rate | | Total | | | | Refusals | Total | | Refusals |
| | | Total | Refusals | | | | | | | | |
| 1 9/2 | 81.8 | 18.2 | 4.5 | 81.8 | 1 12/30 | 78.0 | 22.0 | 13.0 | 78.0 | | |
| 2 9/9 | 84.6 | 15.4 | 9.6 | 82.9 | 2 1/6 | 80.8 | 19.2 | 6.7 | 79.4 | | |
| 3 9/16 | 78.4 | 21.6 | 10.8 | 81.3 | 3 1/13 | 79.4 | 20.6 | 11.3 | 79.4 | | |
| 4 9/23 | 81.2 | 18.8 | 9.9 | 81.2 | 4 1/20 | 77.7 | 22.3 | 16.5 | 79.0 | | |
| 5 9/30 | 76.8 | 23.2 | 10.1 | 80.3 | 5 1/27 | 83.2 | 16.8 | 7.9 | 79.8 | | |
| 6 10/7 | 81.4 | 18.6 | 9.8 | 80.5 | 6 2/3 | 84.4 | 15.6 | 6.7 | 80.5 | | |
| 7 10/14 | 83.8 | 16.2 | 10.5 | 81.0 | 7 2/10 | 82.9 | 17.1 | 8.1 | 80.9 | | |
| 8 10/21 | 76.7 | 23.3 | 10.9 | 80.3 | 8 2/17 | 86.2 | 13.8 | 5.5 | 81.6 | | |
| 9 10/28 | 78.4 | 21.6 | 9.9 | 80.1 | 9 2/24 | 75.8 | 24.2 | 12.1 | 81.0 | | |
| 10 11/4 | 84.9 | 15.1 | 8.5 | 80.7 | 10 3/2 | 88.4 | 11.6 | 8.1 | 81.7 | | |
| 11 11/11 | 78.3 | 21.7 | 14.1 | 80.4 | 11 3/9 | 88.5 | 11.5 | 7.7 | 82.4 | | |
| 12 11/18 | 73.8 | 26.2 | 14.2 | 79.7 | 12 3/16 | 82.6 | 17.4 | 13.0 | 82.4 | | |
| 13 11/25 | 84.3 | 15.7 | 11.9 | 80.1 | 13 3/23 | 90.9 | 9.1 | 5.5 | 83.1 | | |
| 14 12/2 | 84.8 | 15.2 | 6.7 | 80.4 | 14 3/30 | 77.0 | 23.0 | 12.4 | 82.6 | | |
| 15 12/9 | 73.1 | 26.9 | 7.5 | 79.8 | 15 4/6 | 87.4 | 12.6 | 6.8 | 82.9 | | |
| 16 12/16 | 76.7 | 23.3 | 3.9 | 79.6 | 16 4/13 | 89.2 | 10.8 | 6.5 | 83.3 | | |
| 17 12/23 | 58.2 | 41.8 | 12.3 | 78.2 | 17 4/20 | 82.7 | 17.3 | 11.5 | 83.3 | | |
| | | | | | 18 4/27 | 84.6 | 15.4 | 2.9 | 83.4 | | |
| | | | | | 19 5/4 | 81.9 | 18.1 | 9.6 | 83.2 | | |
| | | | | | 20 5/11 | 84.9 | 15.1 | 13.4 | 83.3 | | |
| | | | | | 21 5/18 | 69.4 | 30.6 | 12.9 | 82.8 | | |