

**IMPROVING COMPREHENSION AND RECALL IN THE CONSUMER
EXPENDITURE INTERVIEW SURVEY: DISCREPANCIES IN COMPREHENSION AND RECALL AS A SOURCE OF NONSAMPLING ERROR ***

Leslie A. Miller, and Theodore Downes-Le Guin, Bureau of Labor Statistics
Leslie A. Miller, 600 E. Str. NW., Rm. 5217 Washington, D.C. 20212

The current paper describes research focusing on the Consumer Expenditure Interview Survey. Over the years, data analysis has indicated that this survey may be underestimating expenditure levels (Gieseman, 1987). This, combined with the fact that researchers increasingly depend on surveys as a fundamental source of data (Anderson, Kasper, and Frankel, 1979) leads us to investigate ways to improve our data collection methods. The Bureau of Labor Statistics (BLS) has begun research to develop and test improvements in questionnaire wording and design for the Consumer Expenditure Interview Survey Questionnaire. Specifically, the research discussed below was designed to employ both cognitive laboratory research and survey methodology to evaluate and recommend a new collection format for the Health and Medical Expenditures (Section 15) of the Consumer Expenditure Interview Survey Questionnaire.

We begin with a discussion of the Consumer Expenditure Survey, including the current format of the Health and Medical Expenditures Section. Baseline research in comprehension and recall is outlined, followed by the goals of the current research. The current research includes two phases: laboratory research on the cognitive approaches respondents use in answering questions, and a feasibility field test of the revised instrument to be conducted in fall of 1989. The results of the laboratory research are presented and a discussion of how these results and cognitive theory proved useful and supportive in redesigning the instrument follows.

THE CONSUMER EXPENDITURE SURVEY

Description of the Consumer Expenditure Survey

The Consumer Expenditure Survey program produces an ongoing and comprehensive flow of data on the purchasing habits of American consumers. The principal purpose of this survey is to provide data on the importance of different commodities in the Consumer's budget. The survey also reveals spending patterns for households with varying characteristics and has been a component in constructing "standard budgets" for various socio-economic groups (Pearl, 1975). The data also are used for economic research and analysis (U.S. Department of Labor, 1984). Data collection for this survey is carried out by the Bureau of the Census under contract to the Bureau of Labor Statistics.

The continuing Consumer Expenditure Survey began in 1980 utilizing two separate samples: (1) a Quarterly Interview Survey consisting of a rotating panel of approximately 5000 respondents who are interviewed once a quarter for five consecutive quarters with the first quarter of data used only for bounding purposes; and (2) a Diary Survey in which approximately 5000 respondents keep a daily log of expenditures for two consecutive one-week periods (BLS Handbook of Methods, 1988). Although both the Interview Survey and the Diary Survey collect consumer expenditure information, the approach of these surveys is different. The Interview Survey consists of 22 sections collecting information on expenditures respondents can be expected to recall over a period of three months or longer. This includes fairly large expenditures such as rent, health and medical expenses and educational expenses. The Diary Survey, on the other hand, is designed to collect detailed data on frequently purchased smaller items such as food and beverages, tobacco, non-prescription drugs, housekeeping supplies, and personal care services and products. Diary survey items are generally less likely to be recalled by respondents over the three month recall period used in the Interview Survey.

Status of Section 15 Prior to Research

Section 15 of the Consumer Expenditure Interview Survey concentrates on Medical and Health Expenditures. As stated above, the purpose of this section is to obtain information about medical expenses paid for by the Consumer Unit (CU) and any reimbursement for these expenses in order to determine net out-of-pocket medical expenses for a sample CU. A Consumer Unit is defined as a person or group of persons in a household related by either blood, marriage, adoption, or who, as a person or as a group, are independent of all other persons in the household for payment of their major expenses. Section 15 also covers medical expenses paid by the Consumer Unit for care of persons outside the Consumer Unit. Section 15 is divided into three parts.

1. Part A contains screening questions to determine if the CU has paid or been reimbursed for medical or health care, services or items during the reference period.
2. Part B obtains detailed information about medical payments.
3. Part C obtains detailed information about medical reimbursements.

An information booklet accompanies the interview survey and is intended to serve as a cueing device for respondents.

STATEMENT OF PROBLEM

Collecting accurate information from people regarding their health payments and reimbursements has been acknowledged by researchers as a difficult task (Anderson, Kasper, and Frankel, 1979). This task difficulty is reflected in reports from various sources which offer recommendations for improving respondent recall and comprehension in the Interview Survey. In January of 1987, the Bureau of Labor Statistics organized a Questionnaire Design Advisory Conference to explore the contributions cognitive psychology could offer to survey methodology (Bienias, Dippo and Palmisano, 1987). As a result of the Advisory Conference, BLS contracted with the Research Triangle Institute (RTI) for preliminary cognitive research on certain sections of the Consumer Expenditure Survey (Lessler, 1988, 1989). From the outset Section 15 appeared to pose a number of problems for respondents; these problems were investigated by RTI and discussed in memoranda and interviewer intercoms from the United States Bureau of the Census (Green, 1988; Lessler 1988, 1989).

Report from the Research Triangle Institute (RTI), memoranda and intercoms

Research conducted by RTI included: (1) detailed examination of the response task (forms appraisal); (2) gathering information from CE interviewers; (3) detailed observations of the response process (response protocols); and (4) examination of alternate methods of assessing respondent comprehension.¹ Major issues raised by RTI's research and Census memoranda and intercoms include:

- **Cues and markers.** Currently the questions do not assist respondents in placing events in time by taking advantage of personal landmarks or cues respondents might use to anchor different reference periods. For example, Section 15 asks both for the month of each payment/ reimbursement and the month and year in which the corresponding medical care was received. Respondents may not understand that these are separate questions.

- **Difficult question phrasing.** Many questions use technical terms that are specific to the questionnaire or do not have a widely shared definition among respondents. Response categories may not correspond to respondents' methods of classifying expenditures. Other questions include "hidden instructions" in the interviewer manual; these instructions modify the question meaning slightly but are not read to the respondent. In addition, RTI's conversations with interviewers indicated that questions may be awkward in length and unnatural wording.

The problems above served as the basis for identifying section-specific comprehension and recall tasks to be tested in the BLS cognitive laboratory. The goals of the current research are to:

- Inform respondents fully about the task to be completed by improving contextual cues and comprehension through rewording and reordering questions, clarifying technical terms, removing hidden instructions and improving the Information Booklet.
- Improve recall by changing the task requirements and interview conditions to better fit respondent capabilities, encouraging the use of records and other recall aids for use between and during interviews.
- Evaluate other structural and grammatical changes.

LABORATORY RESEARCH

The current research involved two phases. Phase I included group and personal interviews focusing on comprehension and recall problems, concluding with the design of a new data collection form. Phase II (to be completed in the fall of 1989) consists of a feasibility field test of the new data collection form.

Subjects

Sixty respondents were recruited (via radio advertisements and flyers posted in the Washington metropolitan area) to participate in laboratory research. All respondents were selected with an attempt to balance characteristics such as age, race, gender and income. Respondents were reimbursed \$15 for time and travel expenses.

General Procedure

Participants in the laboratory research were informed of the nature of the research and were asked to complete a screening questionnaire to obtain demographic information. In addition, respondents signed a consent form. Upon arriving at the laboratory, all participants in group interviews were asked to self-administer several written questions pertaining to concepts used in Section 15 and recall strategies for expenses. Participants were then asked to discuss as a group their interpretations of several concepts and definitions and how they felt they would best recall information about medical expenditures. The moderator used outlines to stimulate and guide discussion; each participant was encouraged to express his/her individual responses in addition to group discourse. A limited number of personal interviews were conducted using the same questionnaire and discussion outline.

Data Analysis

Laboratory material was qualitatively interpreted. Written responses were transcribed verbatim and grouped into broader categories. Verbal responses were reviewed on video tape and major ideas were documented. All data were then analyzed using contingency tables.

Qualitative Research Caveat

The research reported in this paper employed focus groups and personal interviews both as primary means of data collection and as supplements to a large-scale sample survey. The verbal protocols

and the concepts analyzed from the self administered questions served as a basis for revising the Interview Survey instrument and as a precursor to a quantitative feasibility field test.

From a social science viewpoint, focused group discussions can stand on their own as data collection method or serve to supplement both quantitative and other qualitative methods. Some researchers have argued that focus groups are a good tool for preliminary or exploratory research, but require subsequent quantitative research for validation (Morgan, 1988). More recent use of focus groups in the social sciences has shown, however, that well-conducted qualitative research need not always act as a supplement to quantitative studies. Focus groups have the advantages of providing relatively economical, easily-gathered information using a larger group of participants than most qualitative methods (Kreugar, 1988). Our research issues, which focus on detailed internal processes people use in forming answers to survey questions, would be very difficult to investigate in a sample survey. Providing that focus groups are not interpreted as probability samples, and participants' behavior and attitudes are not presented as projectable to a larger population, the technique proves extremely useful in gathering detailed information about respondent behavior.

RESULTS OF LABORATORY RESEARCH

The majority of the respondents had similar difficulties with question wording, term definition and recalling expenditures and reimbursements. The following breaks down the most commonly observed difficulties into problems of comprehension and problems of recall, followed by changes made to the questionnaire to address these problems.

Comprehension

Qualitative observations from the laboratory interviews confirm the lack of effort many respondents make at recalling past events and answering questions within the desired definition and temporal boundaries. Offering respondents an introductory statement at the beginning of the section may motivate respondents to consider the question more carefully, and is consistent with the Cannell *et al.*'s recommendation (1987) that researchers help respondents to understand their reporting role in the interview. In addition, increasing question length is thought to elicit higher frequency and quality reporting (Laurent, 1972). Thus, the introductory sentence recommended was, "Now I am going to ask you some questions about medical payments and reimbursements. We will begin with your payments."

In addition, the laboratory research addressed a number of specific comprehension problems common in Section 15's question wording and response categories.

Poorly Defined or Technical Terms

Laboratory research revealed that Section 15 uses technical terms with a variety of possible interpretations (Miller, 1988), a common issue in complex survey instruments. Before revision, the questionnaire asked respondents, "Have you (or any members of your CU) made any *payments* for any of the following medical services? Include all *payments*, even those for persons who are not CU members." In the case of reimbursements, respondents were asked, "Have you (or any members of your CU) received any *reimbursements* from insurance companies or others for any medical services?" Respondents also were asked whether they made any payments or received any reimbursements for physician's services and services by a practitioner other than a physician. When asked to define the terms *payment*, *reimbursement*, *physician* and *practitioner* in the context of these questions, participants provided a variety of sometimes conflicting definitions and expressed the need for clarification. Confusion about these terms suggests that survey respondents' most salient definitions may not correspond at all to the definitions intended by BLS. For payments, the majority of laboratory participants applied rather abstract definitions, such as money issued in the form of a check, money paid out-of-pocket and anything paid

out for medical services. When probed, several respondents wondered if payment includes only out-of-pocket expenses or related medical expenses such as health insurance premiums and credit transactions.

Participants' definitions of reimbursement correspond more closely to the meaning intended by BLS. Most participants defined reimbursements as money sent by an insurance company to cover all or part of a medical expense, not including insurance payments made directly to the hospital. However, several respondents qualified their statements in a manner not consistent with the section-specific definition. Several vague definitions and questions -- money sent to me by an insurance company, refunds from a doctor's office for overpayment, not sure how to report a credit from a provider -- suggest that reimbursements, like payments, are ambiguously defined in respondents' minds. A similar difficulty arises when respondents try to distinguish *physicians* and *practitioners*. For example, several participants insisted that, although chiropractors do not hold M.D.s they are physicians because they perform a medical service. Others classified chiropractors as practitioners because they do not have M.D.s. Nearly half of the participants agreed that a medical professional must have an M.D. to qualify as a physician. On the other hand, when asked to define practitioner, most participants said they didn't know to what the term referred. Evidently respondents categorize medical professionals differently based on personal associations and unstandardized cues. The degree to which these definitions differ from the meanings intended by BLS throws doubt on the validity of measures based on these terms. Because the Consumer Expenditure Interview Survey must be understandable to respondents who represent all levels of cognitive sophistication, the solution used in rewording the section was to simplify terms and provide less ambiguous definitions so that all respondents interpret questions similarly (Dillman, 1978; Jabine *et al.*, 1984).

Events vs. Expenditures and Expenditures vs. Medical Expenditures

As we have seen above, several questions in Section 15 have a tendency to prompt respondent misunderstanding; over the course of the interview this misunderstanding increases respondent burden and decreases respondents' desire to pay close attention to the task (Lessler, 1988, 1989; Miller, 1988). Lack of attention is evidenced by reports of irrelevant or inappropriate information in response to payment and reimbursement questions. Many laboratory participants, when asked if they had made payments or received reimbursements for medical services, tended to explain why they consulted a provider and what services they received rather than the germane payment or reimbursement. The original question wording may have induced this effect by emphasizing services over payments. Before revision the questionnaire asked, "Have you (or any members of your CU) made any payments for any of the following medical services?" followed by a cueing list of services presented in the Information Booklet. A slight rewording reverses the emphasis: "Since the first of (MONTH, 3 MONTHS AGO) has anyone in your CU made any payments for...?" followed by a similar cueing list.

In addition, when asked for the definition of payment in the context of Section 15, laboratory participants frequently reported non-medical expenditures such credit payments (car loans and bank cards) and monthly bills. Just as the intended emphasis on payments/reimbursements can become lost in respondents' attention to services, emphasis on medical payments/reimbursements can become confused with other types of expenses discussed during the interview. In addition to emphasizing payments over services, the rewording presented above compels respondents to focus on the appropriate type of payments by cueing them with categories of specific services presented in the Information Booklet.

Similarly, a later sequence of questions reads, "What care or service was received and who received it?" and, "Was the person a CU member?" The questions do not signal whether respondents previously have referred to items, care or services; in instances in

which respondents have mentioned medical items, and the question provides a faulty cue. Rewording the question to read, "What was the care (service, item) and who received the care (service, item)?" should result in better respondent understanding.

Other

Before revision, Section 15 listed *Services by a Practitioner Other than a Physician* under *Other Medical Care Services*. This categorization poses problems since respondents are unable to define non-physician medical practitioners, as discussed above. For the field test, services by non-physician providers have been grouped with physician services to form a new category of *Physician and Other Medical Professionals Services*. This categorization serves three purposes. First, *Physician Services* is removed as a subset of *In-Patient Hospital Care*. Second, practitioner is changed to *Other Medical Professionals* to reduce ambiguity. Finally, all services by medical care providers are collected in the same expenditure category, decreasing the chance of respondents reporting all provider expenditures as *Physician Services*.

Recall

Order of Recall

Currently, Section 15 is structured to collect payments made for certain expenditure categories, then reimbursements for these categories. This payment-then-reimbursement structure is repeated on every page until all expenditure categories are exhausted. Is this the best way to collect medical expenditure information? Data from laboratory research suggest otherwise. Many participants said they would prefer to report payments and reimbursements in an unstructured format. Given a choice of reporting structures, however, about an equal number of participants said they prefer reporting specific payments followed by specific reimbursements (38), and a structure in which all payments are reported before all reimbursements (39). This is in contrast to a lesser number of respondents preferring to report using the current structure. An educational difference is evident with respect to reporting preference: more participants who had attained a higher education level (BA or above) said they prefer the more structured approach of reporting payments followed by any reimbursement received for that payment. Less educated participants tended to prefer reporting all payments followed by all reimbursements. Whatever the reporting structure, however, respondents said they prefer to report first by CU member and month of payment/reimbursement.

Placing events in time

Most laboratory participants reported they would not use any temporal markers or cues to help them recall payments and reimbursements during the three month reference period. As mentioned above, however, participants say they would use the CU member for whom the payment/reimbursement was made and the month the payment/reimbursement was made/received to aid in reporting. Thus CU member and month are serving as mnemonic cues. Other research has pointed to memorable events and temporal landmarks as increasing respondent self-reports and reducing false-positive reports (telescoping) (Moss and Goldstein, 1979; Loftus 1983). While the Interview Survey does not provide respondents formal opportunities to use personal landmarks, the laboratory research suggests that many respondents attempt to create their own landmarks by remembering the three-month history of specific CU members. We can speculate that respondents may associate the reference period dates with personal events, such as a CU member's birthday.

FEASIBILITY FIELD TEST

Subjects

Two hundred twenty-two sample addresses will be selected

using a non-probability sample of households from four Census Primary Sampling Units (PSUs).

Procedure

Thirteen Senior Field Representatives (SFRs) and thirty-one interviewers will conduct field interviews of revised Section 15. The interviews will be conducted according to standard Census practice, with changes in collection procedures for the revised sections only (2 other sections are being tested also). SFRs and interviewers will be apprised of revisions and thoroughly trained in revised collection procedures.

Debriefing

In order to obtain additional criteria for comparing the effectiveness of the experimental instrument, a set of debriefing questions will be given to interviewers to administer to the respondents. In addition, interviewers themselves will complete a debriefing at the conclusion of each interview to collect their evaluations of respondents' reactions to the revised questions. The purpose of the debriefing instruments is: (1) To determine whether the scope of the survey and definitions of specific terms has been adequately communicated to respondents and (2) to help evaluate whether the instrument is more successful in prompting recall of the sorts of incidents which respondents are likely to shield or forget.

Data Analysis

Approximately 40 field interviews will be audio taped and transcribed. All transcribed tapes will be coded for both respondent behavior (question answering) and interviewer behavior (question reading). Debriefing data will be analyzed along with coding results to provide an overall assessment of the effectiveness of changes in the survey instrument in improving respondent comprehension and recall.

COMPREHENSION AND RECALL: DISCUSSION OF LABORATORY WORK AND THEORY

In an attempt to increase comprehension and recall, and ultimately to increase the accuracy of survey responses, research and literature from sociological and psychological sciences aided us in redesigning the Health and Medical Expenditures Section of the Consumer Expenditure Interview Survey. With the current research discussed and the results presented, what remains is a review of the applicability of theory to the research findings.

Survey respondents' task of answering questions can be difficult, especially when it involves retrieving factual and retrospective information rather than present attitudes. Survey researchers have acknowledged this by paying more attention to the mental processes that take place in answering questions (Bradburn *et al.*, 1987; Cannell *et al.*, 1981). After all, the nature of these processes ultimately determines the amount and accuracy of reported data, which is to say the very utility of the survey results (Bradburn *et al.*, 1987). The researcher's job is to encourage respondents to answer questions accurately and with minimum cognitive burden. To do this the researcher must structure questions to mimic the mental processes respondents use when answering and retrieving information outside of the survey context. Results from cognitive psychology can be useful in understanding the question-answering process, particularly for comprehension and recall, and help us meet this objective.

Most issues related to comprehension deal with respondent understanding of the task and respondent meaning assignment to a survey question (Torangeau, 1984). With respect to ambiguities in terminology, the aim should be to reduce abstract or ambiguous terminology to account for individual and cultural variations in the understanding of terms (Jabine *et al.*, 1984). Ambiguity arises not only with abstract concepts but with seemingly concrete terms -- in our case, for instance, *physicians* and *payments*. Reduction of these

ambiguities lends more credence to the assumption that all respondents have understood questions similarly (standardized stimuli) and that the questions being asked are interpreted as the researcher intended (validity).

Methods of reducing ambiguities and clarifying terms include the use of commonly-understood vocabulary, providing examples of complex terms and explicitly defining unusual terms. The choice is dictated by preference, convenience and the constraints of the survey project. Providing examples as a form of definition is a typical procedure in survey design (Jabine *et al.*, 1984; Tucker, Vitano, Miller, and Doddy, 1989) but involves the risk of influencing respondents' answers. In a separate BLS research project, for instance, Diary Survey respondents were observed to report products used as examples on the diary pages with greater frequency than similar products that were not used as examples. Researchers have yet to demonstrate whether examples should consist of items that are typical, atypical or bounding to the response category.

In the Health and Medical Expenditures Section, laboratory research demonstrated that several key words -- physician, practitioner, payment and reimbursement -- had non-universal definitions. Due to the length of the Consumer Expenditure Interview Survey,² several types of medical providers were collapsed under the categorical term *physician*, with examples of types of providers to clarify the category's meaning. In the case of the terms *payment* and *reimbursement*, the questions were reworded to define the terms within the context of the survey rather than allowing respondents to use the more common, broad definitions.

As a new perspective on a perennial issue, researchers have examined the literature of cognitive psychology for methods to improve the frequency and quality of retrospective reporting. Several methods suggested for reducing the impact of memory decay on the reporting of events include:

1. Reducing the reference period (Cannell and Fowler, 1965 in Fowler, 1988).
2. Increasing the number of questions about events to allow more time for respondents to recall and form answers (Madow, 1963 in Fowler, 1988)
3. Giving respondents a chance to reconsider their answers by mailing a verification of responses or requesting the same information more than once in the survey.
4. Using a bounding or reinterview procedure to give respondents an anchoring point and to sensitize them to the types of information that will be requested.
5. Asking respondents to keep a diary to report events (Sudman and Bradburn, 1974 in Fowler, 1988).

The use of such methods usually is limited by the requirements of, and constraints upon, a particular survey. The Consumer Expenditure Interview Survey uses some methods for increasing recall, such as bounding interviews, but is prevented from using others by reference period requirements and limits on interview length. What happens when the researcher is unable to maximize respondents' recall abilities through conventional means? Cognitive theory provides a number of alternatives. As we describe below, theories of false negative/false positive reports and scripts and schemata proved useful in reordering the collection sequence of payments and reimbursements in Section 15; judgmental heuristics and part set cueing provided us with information about stimulating recall with landmark events and examples.

False negative/false positive reports provide an illustration of the different types of distortions possible when respondents attempt to answer questions, including failure to report information due to failure of retrieval, carelessness or unwillingness of the respondent to make the necessary retrieval efforts and falsely reporting events outside of the specified reference period (telescoping). We can increase the power of retrieval by: (1) providing an introductory sentence to

explain the purpose of the data being collected; (2) restructuring the interview to better suit respondents' scripts and (3) providing recall cues and markers so respondents use the reference period. Using an introductory sentence in Section 15, re-ordering the collection sequence of payments and reimbursements and presenting month and CU member cues may decrease the likelihood of false reports.

Theories of scripts and schemata served as the basis for the revision of the collection sequence of payments and reimbursements. Many psychological researchers agree that the storage, retrieval and interpretation of past experiences is managed by higher-level knowledge structures, variously named scripts and schemata. Schank and Abelson (1977) have conducted extensive research into mnemonic scripts which they believe serve to guide stereotypical sequences of action. Their research and that of others (Bower, Black and Turner, 1979) indicates that scripts/schemata exist primarily to encode the prevalent sequence of events or the most typical information in a specific or general situation; subsequent recall is influenced by these schemata (Anderson, 1985). Thus, in some surveys, schema theories can serve as a valuable bases for estimating missing information and for correcting inaccurate information (Anderson, 1985). For example, in the context of a survey question about past dental appointments, respondents may refer to a script for their visits to the dentist. The "dentist script," when properly evoked by the question, prompts respondents to answer according to their stereotypical dental appointment behavior rather than by retrieving memories of actual behavior. In an oft-cited example, respondents frequently report going to the dentist twice a year because most dentists recommend twice-yearly checkups -- even though respondents may actually go annually or less often. While use of a script in this instance has a negative influence on response accuracy, awareness that the script exists for a majority of respondents allows the researcher to predict the error and to design the question in such a way to discourage reliance on a stereotypical script. For example by providing reasons for visiting the dentist as a cue.

In the case of the current survey, our intent was to increase reporting of payments and reimbursements for medical expenses (which ultimately begin with recall of the visit itself) by increasing recall abilities of the respondent. Given the finding that most lab participants considered reimbursements as a subsequent event contingent on (usually previous) payments, our judgment was to reorder the collection sequence to collect all reimbursements after payments. In this case, we did not intend to employ respondents' scripts for specific visits to health professionals as an aid for collecting payments and reimbursements, but to take advantage of their apparent schema for the payments/reimbursement sequence.

Judgmental heuristics lends further support to the notion that reporting can be improved by encouraging respondents to exercise their own retrieval methods. According to this research, people use different strategies to estimate past behaviors and events (Jabine *et al.*, 1984). Some respondents anchor estimates with average frequencies ("I usually go to the dentist twice a year...") and then adjust up or down for the particular question ("...but this year I went three times because of a cavity"). For these respondents, reporting may be improved by providing anchoring information. The difficulty arises in identifying which strategies or heuristics (if any) the majority of respondents will use in answering a question. A more thorough understanding of the process by which questions are answered should yield more accurate estimates. For the Interview Survey, laboratory research provided us with information as to the retrieval methods preferred by most respondents; these methods were used in developing cues such as an optional calendar to report medical payments and reimbursements by CU member or by date.³

Finally, part set cueing theory suggests ways to increase the amount of information reported by survey respondents. Part set cueing relies on some members of a category as cues to maximize the amount of information reported for all members of the category. As with examples in complex questions, it is not yet clear whether the representative members should be common examples or atypical, boundary cases. Part set cueing, like all the cognitive theories above, holds great promise for increasing comprehension and recall in the survey context.

Theories from cognitive psychology go beyond a simple stimulus-response description of the process respondents use in answering survey questions. By incorporating these theories into laboratory research conducted for the Health and Medical Expenditures Section of the Consumer Expenditure Interview Survey, we were able to examine in-depth the reasons respondents may misunderstand concepts and may be unable to recall expenditures. This information aided in redesign of the data collection instrument to better conform to respondents' "natural" comprehension and recall processes. The results should be more and better data for BLS, and a less burdensome task for respondents.

References

- Anderson, K. J., and Frankel, M. R. (1979), *Total Survey Error*, San Francisco: Jossey-Bass.
- Anderson, J.R. (1985), *Cognitive Psychology and Its Implications* (2nd ed.), New York: W.H. Freeman and Co.
- Bienias, J., Dippo, C., and Palmisano, M. (1987), *Questionnaire Design: Report on the 1987 BLS Advisory Conference*, Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics.
- Bower, G. H., Black, J. B., and Turner, T. J. (1979), "Scripts in Memory for Text," *Cognitive Psychology*, 11, 177-220.
- Bradburn, N., Rips, L. J., and Shevell, S. K. (1987), "Answering Questions: The Impact of Memory and Interference on Surveys," *Science*, 236, 157-161.
- Cannell, C. F., Miller, P. V., and Oksenberg, L. (1981), "Research on Interviewing Techniques," in Leinhardt (Ed.), *Sociological Methodology*, 389-433, San Francisco: Jossey-Bass.
- Cannell, C. F., Groves, R. M., Maglavy, L. J., Mathiowetz, N. and Miller, P. V. (1987), "An Experimental Comparison of Telephone and Personal Health Surveys," *Vital and Health Statistics*, Ser. 2, No. 106, Washington, DC: U.S. Government Printing Office.
- Dillman, D. A. (1978), *Mail and Telephone Surveys: The Total Design Method*, New York: Wiley and Sons.
- Dippo, C. S. (1989). *The Use of Cognitive Laboratory Techniques For Investigating Memory Retrieval Errors in Retrospective Surveys*. Unpublished manuscript.
- Fowler, F. J., Jr. (1988), *Survey Research Methods*, Vol. 1, Newbury Park, CA: Sage Publications.
- Geiseman, R. W. (1987). *The Consumer Expenditure Survey: Quality Control by Comparative Analysis*. Monthly Labor Review, March, pp. 8-14.
- Green, C. S. (Sept. 8, 1988), *Suggestions for the SORAR and CE Surveys*, United States Bureau of the Census, Internal Memorandum to E. Wilson Burdoff, Washington, DC
- Jabine, T. B., Straf, M. L., Tanur, J. M., and Tourangeau, R. (Eds.) (1984), *Cognitive Aspects of Survey Methodology: Building a Bridge Between Disciplines*: Washington, DC: National Academy Press.
- Kreugar, R. A. (1988), *Focus Groups: A Practical Guide for Applied Research*, Newbury Park, CA: Sage Publications.
- Laurent, A. (1972), "Effects of Question Length on Reporting Behavior in the Survey Interview," *Journal of the American Statistical Association*, 67(338), 298-305.

Lessler, Judith (1988), *Consumer Expenditure Interview Survey Preliminary Cognitive Laboratory Studies*, Report to Bureau of Labor Statistics, Research Triangle Park, North Carolina: Research Triangle Institute.

Lessler, Judith (1989), *Recall Strategies for Questions from the Consumer Expenditure Survey*, Paper prepared for the AAAS Annual Meeting, Research Triangle Park, North Carolina: Research Triangle Institute.

Loftus, E. (1983) "Since the Eruption of Mt. St. Helens, Has Anyone Beaten You Up? Improving the Accuracy of Retrospective Reports with Landmark Events," *Memory and Cognition*, 11(2), 114-120.

Miller, L. A. (December 21, 1988), *Census, CPI and CE Definitions of Physician and Practitioner*, Bureau of Labor Statistics Internal Memorandum to P. L. Hsen, Washington, DC

Miller, L. A. (December 22, 1988), *Results for the First Part of Phase I - Consumer Expenditure Interview Survey, Section 15 (Medical Expenditures)*, Bureau of Labor Statistics Internal Memorandum to P. L. Hsen, Washington, DC

Morgan, D. L. (1988), *Focus Groups as Qualitative Research* (Qualitative Research Methods, Series 16), Newbury Park, CA: Sage Publications.

Pearl, R. B. (April 21, 1975), *Methodological Analysis of 1972-1973 U.S. Expenditure Survey Data: First Phase Report*, Unpublished Research Report, U.S. Bureau of the Census, Washington, DC.

Schank, R. C., and Abelson, R. (1977), *Scripts, Plans, Goals and Understanding*, Hillsdale, NJ: Lawrence Erlbaum Associates.

Tourangeau, R. (1984). "Cognitive Sciences and Survey Methods." in *Cognitive Aspects of Survey Methodology: Building a Bridge Between Disciplines*. T. Jabine, et al., Washington, DC: National Academy Press.

Tucker, C., Vitrano, F., Miller, L., and Doddy, J., (May 1989), *Cognitive Issues and Research on the Consumer Expenditure Diary Survey*, Paper presented at the annual conference of the American Association for Public Opinion Research, St. Petersburg, Florida.

U.S. Department of Labor, Bureau of Labor Statistics (1984), *Consumer Expenditure Survey: Interview Survey*, Bulletin 2267, Washington, DC: U.S. Government Printing Office.

U.S. Department of Labor, Bureau of Labor Statistics (April 1988). *BLS Handbook of Methods* (Bulletin 2285). Washington, DC: U.S. Government Printing Office.

*The views expressed are attributable to the authors and do not necessarily reflect those of the Bureau of Labor Statistics

Reviewed by Paul L. Hsen and Maria P. Fracasso

¹RTI's research involved many sections of the Consumer Expenditure Interview Survey. However, only those issues viewed by the present authors to be relevant to Section 15 are included.

²The Interview Survey averages two hours in length

³Unfortunately the calendar was not adopted as part of the Interview Survey