

RESULTS OF COGNITIVE/LABORATORY STUDIES OF THE  
1986 NHIS DENTAL CARE SUPPLEMENT

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1. INTRODUCTION. This part of the NCHS study of the Cognitive Aspects of Survey Methodology (CASM) aims to answer three main questions:

1. What role can laboratory studies can play in the design and testing of questionnaires?
2. How might the methods and findings of the cognitive sciences contribute to the design and testing of questionnaires?
3. How do the current development and pretesting procedures used by the Center compare in terms of cost, timing and knowledge gained to potential alternative procedures that might employ a combination of laboratory testing, application of cognitive science techniques, and field testing?

The work is being carried out as a collaborative effort between the National Center for Health Statistics (NCHS), the NCHS contractor National Opinion Research Center (NORC), and the NORC subcontractor Bolt Beranek and Newman (BBN). This means that staff at all three sites carry out technical work on the project.

The 1986 Supplement to National Health Interview Survey (NHIS) is the subject survey for the project. The NHIS is conducted yearly in a sample of over 40,000 households. The survey consists of an unchanging core interview and one or more supplements that change from year to year. The supplements are designed to meet the needs of other agencies within the Public Health Service. Currently the supplement design and testing process takes about 18 months and employs two full scale pretests conducted under conditions that simulate the full NHIS interviewing procedures.

The NHIS was chosen as the subject survey for the CASM study because there had been a long history of methodological research on the survey, because it had previously been considered by the Committee on National Statistics during its study of the potential for interaction between survey research and cognitive sciences (Jabine, et. al, 1984) and because of the need for a yearly design effort.

When we began the study, there were 3 supplements planned for the 1986 NHIS, a vitamin and mineral supplement, a health insurance supplement, and a dental care supplement. NHIS staff had already drafted questions for each of these supplements, and these became the starting point for the CASM study.

2. METHODS. We began the study by examining each draft questionnaire and identifying response issues that could be studied in the laboratory. Not all issues are suitable for laboratory testing. For example, the vitamin and mineral supplement requires that the respondent go and get their vitamin bottles so that the ingredients can be recorded by the interviewer. Whether the respondents would be willing to do this during a household interview cannot be tested in a laboratory.

We identified a large number of issues that could be studied but decided to limit the study to the dental questionnaire and to focus on two specific response issues that applied to many questions. The two issues chosen were:

1. What recall and estimation strategies do respondents use when determining the number of events that occurred during a reference period?
2. How do respondents answer questions that contain unfamiliar terms?

Both of these issues are important to many surveys. Many questions require that respondents report on the number of events that occurred during a specific retrospective reference period. Examples from the NHIS include requests for information on numbers of visits to dentists, to doctors, to hospitals, number of illness days, and so on.

We chose the second issue for study because a considerable proportion of the questions in the NHIS contain terms that may be unfamiliar to some respondents. These questions ask the respondent if he is a member of the category of people who have a certain characteristic. In many cases the respondent would not be expected to know what these things are unless he is in the category. For example, some questions ask if any family member is covered by CHAMP-VA

insurance, has diverticulitis, thrombophlebitis, and so on. The assumption that is made when asking these questions is that the respondent will reason that if he doesn't know what the thing is, then he doesn't have it and therefore the answer is "NO". We were thus interested in whether this was a valid assumption and if there were other methods that people used to answer such questions.

A recall and estimation strategy is a method that the respondent uses to try to remember specific events and to then calculate the number that occurred. For example, if I asked you how much beer you drank in the last month, you might try a variety of approaches when formulating your answer. You might try to directly recall the times you drank beer and count them up. You might reason from your knowledge of your own habitual behavior thinking: I never drink beer; I typically have two each evening; and so on. You might use an anchoring and adjustment strategy in which you first thought about your habitual behavior and then tried to recall specific instances where you might have consumed more or less than you usually do...My brother-in-law was here, and I drank twice as much as usual.

Thus, we are interested (1) identifying the strategies respondents use to answer these two types of questions, (2) determining whether any strategies are more effective than others, and (3) finding ways (particular questioning schemes) to evoke the more effective strategies.

In carrying out the research, we used several techniques. The main tool was "protocol analysis." In this technique the respondent is requested to report on his thinking process as or soon after he has formulated his response. We used the technique in combination with various other methods that we thought might give us some insight into how the respondents formulate their answers. These included varying the amount of information that was given in the question, varying the order of the questions, and providing a set of recall cues for some of the questions.

Interviews were conducted in 4 different sites--at NORC in Chicago, at BBN in Boston, in North Carolina, and at NCHS. All interviews were recorded using either video or audio tape.

3. RESULTS. Because of time limitations, the results for unfamiliar terms will not be discussed. The results on recall of the number of events in a reference period will be discussed in terms of what they imply about the design of questions. One consistent finding of our studies, survey research in general, and cognitive science is that recall is improved if:

1. Multiple recall cues are given,
2. More time is allowed for the recall of events, and
3. The respondent puts more effort into the recall process.

A recall cue is something that helps you remember an event. It is generally viewed as a key or guide that directs your memory down a certain pathway. For example, if you were trying to remember the amount of beer you drank during the past month, you might first remember that you went to a ball game and that would mean that you probably drank beer there. A person who mentioned the ball game to you would be providing a cue for your recall.

The dental questionnaire first asks respondents to recall the number of visits in a two-week reference period. This is followed by a question on the number of visits in the preceding 12-months. Although people are encouraged to respond for themselves, these questions are typically answered by the NHIS household respondent so there is considerable proxy response.

We identified a variety of recall and estimation strategies. We have not classified these strategies in to any systematic hierarchy of strategies, but, instead, have examined them from the point of view of what they imply about improving recall and reporting.

Table 1 summarizes some of the methods that are used by respondents in the recall and estimation process and suggests some ways to facilitate them. The task of the survey interview is to provide a rich context with many cues for the enhancement of recall and to provide the respondents with aids for making judgments on the timing of recalled events. This may be done through means of cues suggested to the respondent, through probes and question stems, or by providing an environment in which the respondent can generate his own context. For example, consider the

Table 1. Summary of recall and estimation strategies and potential ways to facilitate their use during an interview.

STRATEGY	HOW TO FACILLITATE
<b>Anchoring and Adjustment</b>	
Initial recall/response followed by reasonableness assessment, further recall, and adjustment.	Ask respondent to evaluate his confidence in his answer. Suggest strategies of performing reasonableness assessment. Invoke a decomposition strategy to stimulate further recall.
<b>Decomposition</b>	
Additive: Recall of visits for specific reasons, problems, persons, times of year, etc. followed by summation.	Use check-list of treatments, types of visits, and types of providers to stimulate recall of additional categories. Suggest decomposing the year into smaller units to ease recall.
Multiplicative: Recall of rate of visits and multiplication by duration of reference period. Recall of interval and division into duration of reference period.	Probe to see if specific recall of visits can verify that the calculated number is correct. This is a way to invoke an anchoring and adjustment strategy. Assist in division or multiplication.
<b>Temporal Skeleton</b>	
Building in the mind a conception of the reference period with markers at the ends. Recalling events and landmarks associated with them in order to asses overlap with reference period.	Suggest personal landmarks to the respondent that might assist in anchoring either the reference period or the recalled events. Use a temporal skeleton in a decomposition strategy, ie partition recall period into smaller units.
<b>Context</b>	
Cues surrounding the events used by the respondent to stimulate recall. Includes getting there, being there, problems with teeth, treatments received, paying the dentist, thoughts and feelings about the visits, as well as, episode to episode cuing and person to person cuing.	Suggest specific cues such as asking who usually takes the children to the dentist. Read a check list of dental treatments. Allow the respondent to provide a narrative description of his or the family's dental visits to facillate person to person cuing and episode to episode cuing. Encourage the respondent to use personal recall aids such as check books and calendars during reporting.

first strategy listed in the table, anchoring and adjustment. This consists of an initial response followed by an assessment of reasonableness and adjustment of the answer. The use of such a strategy is illustrated by respondents who used the fact that they tried to adhere to a twice yearly frequency of dental visits to formulate an initial answer of two visits. They then followed this with recall of specific visits in order to assess whether the actual pattern of their visits truly implied that there were two visits in the specific reference year.

Some of the contextual cues that respondents used during recall were events associated with getting to the dentist, with being at the dentist, and with paying for the treatments. Dental problems and types of treatments stimulated recall; episode to episode and family member to family member cuing occurred. Recall of thoughts and feelings surrounding the above events also seemed to aid in recall of events and placing them in time. Of course some respondents did not have to use any of these aids and simply were able to recall the events along with their dates. This ideal situation is, however, rare.

Examples of how these strategies might be facilitated include the use of lists of treatments to help the respondent consider all the types of visits that he may have made, the suggestion of personal landmarks that might assist in determining the position of events relative to the reference period, followup questions to respondents who appeared to respond only with facts about their habitual behavior and not to fairly consider the reasonableness of their response, probes and cues that induce an anchoring and adjustment strategy, and structuring of the interview so that it more closely follows the rules of normal narrative conversation.

After reviewing the protocols, we also noted that, before beginning a detailed recall process, many respondents first decided if they (or the family member they were reporting for) ever went in the approximate time frame. This is similar to what others (Martin, 1985) have called a metamemory search. The respondent is asking himself if there is anything to recall, if thinking about dental visits is

likely to yield any specific information. If the answer to this initial question is negative, then the recall process ends, and the respondent does not consider the question further. If the answer is positive, then the respondent must then try to recall the number of visits and decide if they fall within the reference period.

These results have implications to the design of survey questionnaires. Thus, in order to improve the recall and reporting of the number of events, we face two tasks:

1. Prevent false negatives to the initial step, and
2. Introduce probes, questioning techniques, and other methods that assist the respondents in both the recall of the number of events and placing them in time.

Our first goal when asking about the number of events in a reference period is to prevent false negatives. These are the most serious errors because the recall and reporting process ends. Thus, if the respondent initially answers NO, or before he even has a chance to answer NO, one wants to introduce a technique that cause him to consider his answer (put in more time and effort) and that provides some cues for recall.

Succeeding phases of the project are examining the extent to which applying the results of Part A can improve the reporting in the dental health supplement. Questions that attempt to apply some of these results will be compared to the questions developed by NHIS staff.

#### References

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