

COGNITIVE LABORATORY STUDIES OF THE 1986 SUPPLEMENT TO THE NATIONAL
HEALTH INTERVIEW SURVEY FINAL RESULTS

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Today I am going to summarize the results and conclusions of a series of cognitive laboratory studies that were carried out during the process of developing the 1986 Dental Health Supplement to the National Health Interview Survey (NHIS). This study is part of a larger study being carried out by NCHS on the Cognitive Aspects of Survey Methodology.

The NHIS is conducted yearly in over 40,000 households. It consists of a core interview that remains the same for a number of years and a supplement which changes from year to year. Prior to the current year, the supplement development and testing process employed two large field pretests with revisions between rounds of testing. In 1985 NCHS instituted a project in which an alternate method of testing using in-house laboratory methods and techniques from cognitive science were compared to a strictly field testing procedure.

The goal of the study was to provide a preliminary answer to three questions:

1. What role can laboratory studies 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 does a testing process that makes exclusive use of field testing compare in terms of cost, timing, and knowledge gained to a potential alternative that might employ a combination of laboratory testing, field testing, and application of cognitive science techniques?

At the point that our study began, the Center had developed a draft of the Dental Health Supplement and was planning the first evaluation of that draft - a field pretest. This draft also became the basis for the cognitive laboratory studies. NCHS felt that it was important to continue with the usual field testing process to both provide a point of comparison to the laboratory studies and to assure that there would be a fully tested questionnaire available in 1986 should the lab not prove to be an adequate testing vehicle.

The study was designed to consist of an exploratory phase directed at 1) understanding the response tasks associated with the questionnaire, 2) identifying any problems respondents had, and 3) developing potential solutions. The results of this exploratory phase were to be compared to those found in the field testing. In addition they were to be used in a subsequent developmental phase directed at developing alternate versions of the questionnaire. The final step was devoted to comparing alternate versions of the

questionnaire in two different sites of testing - a field pretest and an in-house laboratory pretest. One of the questionnaires was to be largely based on laboratory findings; the other was to be largely based upon findings from the initial round of field pretesting. The goal of the last round was to determine if laboratory findings transferred to the field and to see if a formal split ballot test would produce different results in two different types of settings.

In addition to the investigations of these three main questions and the goal of delineating and evaluating a laboratory testing procedure, several other types of investigations were carried out. Using the questions on the draft dental health supplement we framed the research in the context of two general substantive issues. Namely, we were concerned with examining:

1. What recall and estimation strategies respondents use when making a judgement on the number of events in a retrospective reference period?
2. How do respondents make judgments when asked questions with unfamiliar terms?

We were interested in whether or not we could identify the response process, influence this process, and whether we could develop ways to improve or facilitate accurate responses to the questions.

We also examined different techniques from the cognitive sciences including the use of protocol or "think-aloud" interviews in which the respondents verbalize their thoughts as they respond, the extensive use of comprehension probes, and experimental manipulation of the questions designed to reveal the components of the response process. The distinction here is that rather than testing a question that might be used in the survey, we use questions that illuminate the response process such as, including some on fictitious items, some with very limited definition of terms, and some with introductions that suggest or imply that certain responses are more common than others.

Part of the project was devoted to comparing the conclusions reached through a qualitative debriefing of interviewers and observers to the conclusions reached on the basis of tabulated results. This was important to NCHS because very tight schedules in previous years had forced them to rely on a more qualitative assessment, and they wondered if they were losing any information by doing this. We also examined different ways of recruiting respondents, methods of assessing accuracy of response, and the collection of validation information. The methods examined during the study are summarized in Figure 1.

Obviously, with such a long list of issues methods examined, I can not provide the deta

What I have chosen to do in this talk is to present our conclusions as to the role cognitive laboratory testing can play in the design and testing of questionnaires. This of course, is unsatisfying both to me and you. However time does not permit both review the of wealth of evidence supporting our conclusions and a review of the conclusions--so I have chosen to emphasize the latter in the hope that it will stimulate your interest in the fuller report.

What is the Cognitive Laboratory Method? At the beginning of the project, we were not sure of what the cognitive laboratory method consisted of. Based upon the variety of methods we examined, we consider the cognitive laboratory approach to the design and testing of questionnaire to be distinguished by:

1. Testing carried out under laboratory conditions and does not attempt to replicate the general conditions of the survey.
2. Use of cognitive research techniques such as think-aloud protocols, probes on comprehension, and small-scale experiments designed to reveal components of the survey response process.
3. Use of audio or video recording of interviews to obtain detailed data on the process involved in responding.
4. Selection of research topics based upon hypotheses about the response process.
5. Use of relatively small, self-selected samples.
6. Use of experimental designs with random assignment of subjects to treatments.
7. Iterative testing procedures that quickly apply the results of previous rounds of testing.
8. Collection of validation data.

Summary of Conclusions and Recommendations

We concluded that laboratory testing and the cognitive sciences can play an important role in the design and testing of questionnaires. Using laboratory testing and such cognitive techniques as protocol analysis, comprehension probes, and experimental manipulation of questions, we were able to identify some of the processes respondents used in formulating answers, to analyze the problems they experienced, and to develop hypotheses about how questions might be improved. Many problems that were identified in the first field pretest were pinpointed in the laboratory in less time, with fewer respondents, for less professional effort, and at lower cost. The laboratory can also provide greater insight into the source of respondent difficulties. Concepts from the cognitive sciences were used to guide the development of alternative questions, and subsequent laboratory testing revealed that these changes were often successful in improving response.

Field testing remains a vital component of the questionnaire development process. Problems with handling and administering materials only became apparent in field tests. Moreover, interviewers were in a position to offer excellent suggestions for clarifying the wording of some questionnaire items. We concluded that field testing can increase the efficiency of laboratory testing and laboratory testing can increase the efficiency of field testing. The procedures used by NCHS for the design of the NHIS supplements can be improved by using a combination of both approaches. Based upon our evaluation of both the laboratory and field testing activities, we recommend the following prototype for the design process. Our prototype takes the form of a series of individual recommendations for each stage of the process.

The recommendations as to the testing process may seem elaborate to some of you. Remember however that they apply to a survey that costs many millions of dollars and involves many many thousands of respondents. However, many of the recommendations are appropriate to smaller scale efforts as well.

Planning:

1. The testing process should be carefully planned involving all parties -- the sponsor, the NCHS survey research staff, and the data collection agent (U.S. Census Bureau for NHIS).
2. Goals of all items selected by the sponsor should be specified.
3. Planning should be done early enough so that all necessary government clearances can be obtained.

Exploratory Studies:

1. Initial testing done in laboratory.
2. Number of respondents need not be large but should reflect range of characteristics known to affect response.
3. Lab testing guided by explicit hypotheses as to problems that might arise in the response process, the nature of the response task, and methods for improving response.
4. Protocol interviews can be used to generate these hypotheses.
5. Lab results supplemented by field tests on nine or fewer respondents.
6. Experienced, currently employed field interviewers serve as consultants to lab testing.
7. All three parties, the sponsor, survey researchers, and data collection staff, review and evaluate results.

Developmental Methods:

1. Use iterative laboratory testing and experimental design.
2. May be desirable to include techniques that increase the differences among alternate methods -- to increase statistical power and reveal the response process.
3. Respondents should be debriefed. It is important to record the interviews or have the sponsor observe them so that the sponsor can have direct experience with the results.
4. Laboratory subjects should reflect the differences to be measured. It may be necessary to move the lab to accomplish this.
5. Laboratory results should be analyzed and tabulated with appropriate statistical methods.
6. Testing should be flexible and iterative.
7. All parties should be involved in a detailed analysis and interpretation of the results.

Testing Methods:

1. Larger scale field tests should be done following the laboratory tests.
2. The field tests should use alternative questionnaires.
3. The tests should collect qualitative and quantitative data needed to evaluate the questionnaires.
4. Data should be tabulated before decisions are made.
5. Choice of versions to be tested, site of testing, and sample sizes to be used in the field test should be based upon obtaining maximum statistical power.
6. All parties should be involved.

Figure 1. Research Methods Examined

1. Use of protocol interviews.
2. Use of EXTENSIVE probing and debriefing of respondents.
3. Experimental manipulation of questions designed to reveal the response process.
4. Comparison of qualitative conclusions to quantitative conclusions.
5. Ways of recruiting laboratory respondents.
6. Methods of assessing accuracy.
7. Collection of validation information.
8. Random assignment of volunteer respondents to alternate questionnaires.
9. Quick iteration of testing process.
10. Video and audio recording of responses.
11. The variation of pace of the interview.