


Answering Questions

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Methodology for Determining
Cognitive and Communicative
Processes in Survey Research

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Cognitive Interviewing Techniques

In the Lab and in the Field

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Cognitive interviewing techniques have been gaining popularity in recent years as a way to improve the quality of the data collected by questionnaires. These methods involve getting input from respondents about their response formulation processes. The model frequently used to study the process (Tourangeau, 1984) involves four stages: comprehension, retrieval, judgment, and response. By getting respondents to talk about how they understand questions, recall information, decide upon its relevance, and formulate answers, survey researchers can learn about problems with the questions they put on their surveys.

Cognitive methods are generally viewed as laboratory methods. Respondents provide detailed information as a result of probing either during the interview (referred to as concurrent methods) or immediately after it (referred to as retrospective methods). Our view is that cognitive methods need not be restricted to the laboratory. Carefully designed questions that elicit information relevant to the four stages of response formulation can be incorporated as part of respondent debriefing for a field test. In this chapter, the purpose and application of cognitive techniques are discussed in both settings: the lab and the field. Using examples from research that has been conducted by the Census Bureau, we attempt to demonstrate the flexibility of cognitive techniques.

The methods discussed in this chapter are those from which

information is obtained directly from the respondent and used to identify problematical concepts, terminologies, and so on. Other methods, such as interactional analysis (coding of interviewer-respondent behavior) discussed in Part One of this book use more indirect assessments to identify problems with a set of questions. For example, a question that produces a significant number of requests for clarification in the actual field setting indicates that respondents may be having difficulty with the response formulation process. Cognitive thinkalouds and respondent debriefing, however, offer the added benefit of providing information about the source of the problem as well as information about its existence.

In the first part of this chapter, we discuss cognitive interviews in the laboratory and give examples of the wide range of ways in which we have implemented them. Next, we discuss respondent debriefing as a method for taking the laboratory out into the field. Finally, we present concluding remarks about the ways in which the two methods complement each other.

In the Laboratory: Cognitive Interviews

As Forsyth and Lessler (1991a) have noted, cognitive laboratory techniques have come to mean a set of tools used to study the response process and identify the errors that may be introduced during the process. The goals are to understand the thought processes employed in answering survey questions and to use this knowledge to construct, formulate, and ask better survey questions. These techniques can determine whether question wording communicates the objective of the question and quickly identify problems such as redundancy, missing skip instructions, and awkward wording with only a few interviews and can provide information on sources of response error that are usually unseen by the interviewer and the survey practitioner. In addition to identifying the errors, cognitive techniques often provide information toward a solution to the problem.

Forsyth and Lessler (1991a) discuss a whole repertoire of cognitive laboratory techniques. As noted elsewhere (DeMato and others, 1993), the Census Bureau's adaptation of cognitive interviews involves concurrent thinkaloud interviews with probing questions, confidence ratings, and requests for paraphrasing incorporated into the session. Concurrent thinkaloud interviews are one-on-one interviews in which the respondents describe their thoughts while answering questions. Respondents are instructed before beginning to "think out loud" and the interviewer guides them during the interview by reminding them to "tell me what you are thinking" or "say more about that."

Thinkaloud sessions are often used to identify difficulties in question comprehension, misperceptions of the response task, types of recall strategies used, and reactions to sensitive questions.

Within the overall framework of the thinkaloud interview, the other methods—probing questions, confidence ratings, and paraphrasing—are used as necessary to gain a complete understanding of how respondents accomplish their task. These additional techniques focus on one or more aspects of the response formation process. Probing questions are used when the information provided by the respondent during the thinkaloud is incomplete and the researcher wants to find out such information as how respondents chose among response choices or how they interpreted reference periods or a particular term. In paraphrasing, respondents are asked to repeat the question in their own words. This permits the researcher to examine whether the respondent understands the question and interprets it in the manner intended. Paraphrasing may also reveal better wordings for questions, for example, if different respondents consistently use the same terminology. Confidence ratings attempt to identify questions that respondents find difficult to answer by having them rate their level of confidence in the answer they have provided. The theory is that low confidence ratings are often the result of lack of knowledge (especially among proxy respondents) or a difficult recall task. However, the literature

protocol included follow-up probes to determine how respondents interpreted specific reference periods (for example, "in the past year"), how they interpreted specific terms (for example, "fairly regularly"), and how confident they felt about their answers to such questions as how old they were when they first started smoking.

The questionnaire included separate sections for current smokers, former smokers, and people who had never smoked. All three respondent types were recruited to test all the questions and also to examine whether the attitudinal questions (asked of everyone) were problematic for any of the three groups. Twenty-one respondents were interviewed in all. All interviews were conducted in the laboratory facility. Permission was secured from all respondents for both videotaping and audiotaping. Interviewers generally followed the protocol, using the standard probes that had been developed. In addition, the specific content of respondents' answers required that some unique probes be used to obtain a full understanding of the answers and the problems the respondents may have had in responding. After each interview was conducted, the interviewer prepared a detailed item-by-item summary of the interview.

The final report (DeMaio and others, 1991) included an item-by-item review of each section of the questionnaire, recommendations for modifications, and the original interview summaries as an attachment. These summaries were very persuasive in alerting the sponsor to the problems with the draft instrument. Cognitive interviews revealed several types of weaknesses in the questionnaire.

1. *Awkward or ambiguous question wording.* One question asked,

"How many times during the past twelve months have you stopped smoking for one day or longer?" The intent of this question was to measure attempts to quit smoking. However, the question was not always interpreted this way. Several respondents included instances when they had not smoked for at least one day because of illness, excessive drinking the previous day, or other extraneous circumstances. The revised version makes the intent clearer, asking specifically, "How

many times during the past twelve months have you stopped smoking for one day or longer because you were trying to quit smoking?"

2. *Variability in respondents' interpretations of concepts.* One question asked for the respondent's opinion about distribution of free cigarettes and tobacco samples on public property. There were many varied interpretations of "public property," ranging from streets, parks, and government buildings (which are in fact public property) to shopping malls, grocery stores, and movie theaters (which are not). It was ultimately decided that the concept of public property was not crucial to what the sponsor was trying to measure and the term was deleted from the question.

3. *Inadequate or unnecessary response categories.* One question asked respondents to report the rules about smoking in their homes using the following categories, "No one is allowed to smoke anywhere in my home," "Smoking is occasionally allowed," and "Smoking is permitted anywhere in my home." Respondents had problems with the middle category because it mixed the dimensions of place and time. Some thought it referred to particular occasions—like a party, when normally nonsmoking residents would permit smoking. Others thought it meant that smoking was allowed in parts of the house but not others (for example, the children's bedrooms). The middle response category was revised to read: "Smoking is allowed in some places or at some times."

4. *The need for screener questions.* One question asked about smoking policies in particular areas of a respondent's work site, including private offices, lounge areas, cafeterias, and so on. All respondents who had previously reported working were asked this question. However, respondents who worked at home or drove buses could not answer because the question was not applicable to them. People in situations like these had to be screened out of the question.

frequently they used the activities of the previous day as cues and then thought about what they had eaten and at what time. Although this frequently resulted in chronological reporting, the time of day was not the recall stimulus. Other respondents thought primarily in terms of meals and reported their "meals" and then their "snacks." The revised question and many of the other recommendations for change that we made were incorporated in the 1994-96 CSFII, which is being conducted by a private research firm.

Our success with this question in the cognitive interviews led us to wonder if the thinkaloud approach had affected the results. Because the survey will ultimately be carried out under standard interviewing conditions, developing a question that works well only in cognitive interview settings would not be very useful. We conducted a small experiment (Davis and DeMaio, 1993) in which ten subjects were interviewed using standard interviewing techniques and another ten were instructed to think aloud. Interviews were conducted using our recommendations for changes to the CSFII questionnaire. Using the number of food items reported as a criterion of completeness, we found no differences. On the surface, this is comforting for the survey sponsor; however, the number of cases was small and the wording of the question led respondents naturally to think in a more detailed, stream-of-consciousness manner than do standard survey questions. More research is needed to find out how well results of cognitive interviews translate when the questionnaires are implemented in the field.

Self-Administered Questionnaire

The Schools and Staffing Survey (SASS) is a relatively new set of integrated surveys sponsored by the National Center for Education Statistics (NCES). The survey involves self-administered questionnaires sent to various sectors of the educational system, including public school districts, public and private school administrators, public and private schools, and the teachers in the schools. The survey was most recently conducted in 1993-94 and is scheduled to continue to be conducted at five-year intervals. The research

described here involved the public school questionnaire, which is sent to school principals.

Because the questionnaire is self-administered, issues of presentation and comprehension come into play. We have found the current thinkaloud technique to be very useful in discovering which parts of the questionnaire respondents read and how they move around from question to question in addition to helping us learn how they comprehend and answer the questions. The respondents are asked to read aloud as they go through the questionnaire and the researcher probes for clarification as necessary.

For the public school questionnaire, three staff members conducted the interviews. Because one of the goals of the research was to understand the reasons for high rates of inconsistency with other data sources for particular questions, geographical areas of the country with high problem rates were used. Schools with reporting problems and those without any previous experience with the questionnaire were selected for interview within those areas. Staff traveled to the five Midwestern states that had the highest failure rates in one section of the 1990-91 survey. The interviews were conducted during the school day and respondents were not paid. Twenty interviews were conducted and all were audiotaped. Written summaries were then prepared.

The results were enlightening. These states had been selected because their counts of students and teachers reported in the survey were highly discrepant with other data collected by the NCES. The cognitive interviews showed that a reason for the discrepancy was that respondents did not understand one of the most basic concepts of the survey: they did not understand which school they were supposed to report for (see Jenkins, 1992). Several explanations for the misunderstanding were uncovered. First, the address label that contained the name of the school in sample was located sideways on the front page of the questionnaire and many respondents did not turn the questionnaire to look at it. Second, the failure to notice the school named on the label combined with another factor, the spatial arrangement of the schools in the principal's district.

problem and its magnitude. In a small-scale pretest, respondent debriefing questions are usually asked of all respondents. For large pretests (and also perhaps for the survey itself), samples of respondents are sometimes administered the debriefing questions. Target populations for debriefing questions are usually determined by specific paths taken during the interview. To reduce respondent burden and decrease interview costs, a random sample of respondents can be selected. If there are debriefing questions to be asked of a rare segment of the population it may be necessary to debrief all households with rare characteristics to ensure that enough cases are obtained to facilitate analysis. It is also desirable to select randomly within households the eligible sample person about whom the debriefing questions will be asked. This may be manageable in an automated interviewing environment but too burdensome for a paper-and-pencil interview. A simpler procedure (but one from which generalizations cannot be made) is to select the first sample person within a household who meets the target population criteria.

A critical aspect of a successful respondent debriefing is that the right questions must be asked. Question designers and researchers must have a clear idea of potential problems in order to develop good debriefing questions. Ideas about potential problems can result from the findings of laboratory interviews conducted before the field test, from analysis of data from a previous round of the survey, from careful review of questionnaires, or from observation of earlier interviews.

Open-Ended Debriefing Questions

Several different methods for developing the questions are available. One is to repeat the response back to the respondent, who is then asked an open-ended question intended to determine how he or she developed his or her response. For example, in 1991 the Census Bureau, with consultation from the University of Massachusetts Survey Research Center, conducted a small field test (135 persons were interviewed) of the Leisure Activities Survey. During the field test respondents were asked if they had read any short stories,

novels, or poetry in the last year. As part of the respondent debriefing, they were asked to describe the material they had read. Interviewers recorded the verbatim responses, which then had to be coded for quantitative analysis. In this example, the content of the reading material was coded to determine whether it fit the definition being requested (that is, if it was fiction or nonfiction). The data indicated that over 20 percent of the books named were found by the probing questions to be works of nonfiction, such as histories, biographies or self-help books, suggesting that there was a significant problem among survey respondents concerning the true definition of a novel or short story (Fowler and Roman, 1992).

Closed-End Structured Debriefing Questions

Another method used in developing questions is to develop structured closed-end questions that determine how certain words or phrases are understood and whether the "questions, definitions and instructions proposed for a questionnaire convey the frame of reference desired" (DeMaio, 1983). With closed-end questions, quantitative data are readily available as soon as the information is keyed.

Vignettes

One type of structured question is the vignette, which presents a hypothetical situation and asks respondents how to classify it based on their interpretation of the concept. In the testing of alternative questionnaires during the recent redesign of the Current Population Survey (CPS), vignettes were used to determine how respondents interpreted the concept *work*. They were provided with scenarios describing various work and nonwork activities. The introductions and actual questions asked of the respondents were varied to reflect the different wording of the question in the different versions of the questionnaire. After they read the scenarios, respondents were asked "Would you report him (her) as working last week, not counting work around the house?" or "Would you

questions whereas other question evaluation methodologies used in a field test (such as behavior coding and interviewer debriefing) do not. In addition, debriefing data may reveal problems not evident in response distribution analysis. For example, as mentioned earlier, the respondent debriefing results indicated that nearly 40 percent of respondents did not understand “main job” in the way intended by survey designers. There was essentially nothing in the results of other question evaluation methodologies used that indicated such a misunderstanding (see Esposito and others, 1992). This is an example of what could be termed *silent misinterpretation*. Without debriefing probes, it might never be detected.

Conclusion

The two methods described in this chapter—cognitive laboratory interviews and respondent debriefing—have the same goal: to produce information about cognitive processes that respondents use to respond to survey questions. This information is valuable for revising questionnaires to improve the quality of the data collected. The two methods take very different approaches to obtaining this information, however, and are used at different stages of the questionnaire pretesting process.

Cognitive interviews are fairly unstructured in their probing content and are conducted with small numbers of respondents. They are also flexible. Researchers can do a round of interviews, revise the questionnaire, and quickly do another round of interviews. Because of the small scale and unstructured nature of the research, however, the results are not generalizable to a larger population.

In contrast, respondent debriefing is structured and is conducted on a larger scale as part of a field pretest. It is designed to yield results that are more generalizable than those obtained through laboratory interviews. Because of the large sample sizes used in field tests, respondent debriefing can also provide information about rare situations that are not likely to occur in a small number of cogni-

tive interviews or that are difficult to recruit for. In order for respondent debriefings to be effective, however, researchers need to have hypotheses about cognitive sources of problems with the questionnaire in order to formulate good structured debriefing questions. Cognitive interviews actually provide information that can be used for developing structured debriefing questions.

From this chapter's discussion it is easy to see that the two techniques are complementary. From the descriptions of the techniques we used, the ways in which the techniques are implemented, and the resulting questionnaire revisions, it is clear that cognitive science is making significant contributions to the field of survey research. In our case, these contributions specifically relate to questionnaire development.

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