

Using the NCHS Cognitive Lab to Help Design Cycle VI of the National Survey of Family Growth

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Introduction

The Questionnaire Design Research Laboratory (QDRL) was established in 1985 at the National Center for Health Statistics (NCHS) to develop and test Federal data collection instruments and to develop and improve methods of conducting questionnaire design research. It was the first permanent laboratory in a Federal statistical agency to apply cognitive research concepts and methods to questionnaires. Lab staff use a variety of standard cognitive techniques that identify potential problems with perception, sensitivity, comprehension, memory, context, format, vocabulary, reference periods, judgment and response categories. In this role the Lab often works with other divisions within NCHS to pretest their surveys. One such survey is the National Survey of Family Growth (NSFG).

The NSFG is a survey of approximately 10,000 U.S. women that collects a pregnancy history and asks about demographic and social factors associated with childbearing, adoptions, and reproductive health. It covers marriage, cohabitation, divorce, remarriage, contraception, sterilization, infertility, breast feeding, pregnancy loss, sexually transmitted diseases, the use of medical care, and related topics. The survey has been done about every six years since 1973 and is currently conducted by computer assisted personal interview, or CAPI.

A major cognitive burden for NSFG respondents is to recall accurate dates of first sex, miscarriages, abortions, contraceptive use, and the beginning and ending of relationships. To aid recall in Cycle V, respondents were given a paper grid with 12 months across the top and calendar years from birth to the present down the side. The NSFG questionnaire was computer-administered, but, before it began, the respondent was asked to mark her birth on this calendar, and her age at each birth month through the present. She was also asked to write on her calendar five or six important events in her life, the dates of which she was certain. As the interview unfolded, other events were added. Using her calendar, the respondent could link difficult dates to easily remembered dates such as births, marriages, graduations, and work transitions. Gradually the woman's life history calendar was constructed. The cognitive burden for many women reached its maximum when they were asked to

report contraceptive use every month for the preceding four years, information that is used to develop estimates of contraceptive effectiveness. To aid recall the women were first asked to indicate the starting and ending months of their pregnancies, relationships, and periods of sexual abstinence on the calendar. Studies in the QDRL showed that most women enjoyed constructing the life history calendar and were intrigued with the interrelationships of the different events in their lives.

In the next cycle, Cycle VI, the survey will include men for the first time, as well as women, and in its planning effort the staff of the NSFG has convened workshops of experts, contracted with academics, and enlisted the QDRL to help design the survey. Researchers at the University of Wisconsin were asked to do a technical review of a draft questionnaire. In the review, (Schaeffer et al., 1998) they pointed out that survey data is more accurate when retrieval cues match the way a respondent has stored information, and that it is important that the structure and wording of standardized questions match, if possible, the structure and labels used in the respondent's memory. Consequently, they recommended cognitive interviews be done to determine how women and men spontaneously report contraceptive histories, pregnancies, and sexual partners. They suggested that the work draw on ethnographic interviewing techniques, inviting respondents to provide an overview of each topic in their own words. The interviewer would say, "I'd like you to tell me about all the contraceptive methods you have ever used. Begin anywhere you like." The method is intended to provide clues as to how memory is searched and information is reported. The survey designers would learn whether this complex task is approached chronologically, or by first recalling relationships, or by stages in the life cycle. It would show whether recall proceeds from recent use to past use, or the reverse. The findings from the interviews would be used to guide questionnaire design and to instruct interviewers.

QDRL testing of the Cycle VI instrument has been conducted with both women and men. This paper will deal only with the women's questionnaire. The objectives of testing for women have been directed towards improving the NSFG Cycle V female questionnaire, and determining the best ways to shorten

the interview. Most of the questions on the female questionnaire had been used in earlier cycles and had been both pretested and field tested. However, these questions were sometimes moved from one section to another of the new questionnaire, or were being used with new questions and so issues of contextual effects, memory priming, fatigue and satisficing had to be considered in our lab testing. Also, some of the questions on the female form of Cycle VI are new and needed cognitive testing.

Methods

We will use the term “subjects” for the respondents who are brought into the lab because the lab setting is unique. There is the presence of recording equipment, the interviewers are survey designers rather than professional interviewers, and the subjects are asked to evaluate the questions and their own reactions while they are responding.

Subjects were recruited through newspaper advertisements, flyers and personal networks. They were reimbursed at the rate of \$30 per hour. We had 19 subjects in two rounds of testing. Eleven were white, eight were African American. They ranged in age from 20 to 45, and seven had incomes below \$20,000. The interviews were conducted and videotaped in the QDRL.

Most of the interviews were conducted by staff of the NSFG who are responsible for designing the questionnaire and who were better able to follow complicated routing instructions in the Word Perfect version of the CAPI Reference Questionnaire. All of the interviews were observed by QDRL staff. In addition to the QDRL staff, as many of the 5-person NSFG staff as possible would watch the interviews through closed circuit TV. Having videotapes will allow additional review.

The second round of interviews was designed to administer the full questionnaire, and lasted an hour and a half. In both rounds of testing, the interview started with the Life History Calendar.

Protocol

The following text was read to subjects at the start of the interview:

Thank you very much for coming here today to help us with our questionnaire design for the National Survey of Family Growth, or NSFG. The NSFG has been done by NCHS about every six years since 1973. A representative sample of about 10,000 women from across the United States is interviewed about their reproductive health and family life. The data are important for assuring that all women are getting the health services they need, as well

as understanding reproductive health trends in the country.

Today we are testing how to ask questions related to pregnancies, sexual partners, and contraceptive use, that will be used in the next National Survey of Family Growth in the year 2001. We are also reviewing how a life history calendar, like the one you have in front of you, can help women answer some of the survey questions.

This Life History Calendar is similar to the one used in the most recent NSFG in 1995. Many of our respondents have found that having a calendar to look at, and write on, helped them answer the survey questions accurately by helping them remember exactly when things happened in their lives. In the 1995 NSFG, Respondents kept their calendars at the end of the interview, because all answers to survey questions were recorded in the computerized questionnaire.

[EXPLAIN CALENDAR TO RESPONDENT. EXPLAIN THAT THE YEARS ARE ALONG THE SIDE AND THE MONTHS ACROSS THE TOP, SO EACH CELL REPRESENTS A MONTH AND YEAR IN HER LIFE.]

Now I'd like you to locate on the calendar your month and year of birth, and in that cell, write something that stands for your birth, such as "B.D." or "born".

Now, starting with age 1, write your age in the corner of each cell in the column below the cell for your date of birth, until you reach your current age. (MONITOR AND HELP RESPONDENT AS NEEDED.)

Now please think of five or six things that happened in your life that really stand out in your memory. These can be any events, such as leaving school, starting a job, a death, a birth, or anything that comes to mind. Please write these events on the calendar at the month and year they happened.

The important thing is that you be able to remember and record accurately when the events happened.

Notice that the last four rows of the calendar are enlarged.

In Cycle V of the NSFG, this part of the calendar was used to collect accurate information about contraceptives used over the last 4 years.

Women may also use this enlarged part of calendar to record other helpful information that will help them remember the timing of changes in contraceptive method use, e.g. the initials or first names of sexual partners, months when there were no sexual partners, and periods of being pregnant.

Today, in addition to learning how the calendar is helpful to people, we want to learn about how people most naturally think about the topics in the NSFG.

I will be asking you some broad questions about your reproductive life, and I want you to answer them in the way that comes naturally to you.

GRAND TOUR QUESTIONS

- 1) *To start out, I would like you to tell me about every time in your life that you've been pregnant. Begin anywhere you like.*

You may use your calendar in any way that is helpful to you.

[PROBE: WERE THERE ANY OTHER TIMES YOU WERE PREGNANT?]

[PROBE: HAVE YOU INCLUDED ANY MISCARRIAGES YOU MAY HAVE HAD?]

[PROBE: HAVE YOU INCLUDED ANY ABORTIONS YOU MAY HAVE HAD?]

- 2) *Now, please tell me about your sexual relationships in the past 3 years, that is, since January, 1996. Please tell me the timing of your very first, and your most recent, sexual intercourse with each of your male partners, calling them by their initials. Begin anywhere you like. Please record these partners on your calendar if you think it will help you remember the timing more accurately.*

[PROBE: HAVE YOU HAD SEXUAL INTERCOURSE WITH ANY OTHER PARTNERS SINCE JANUARY 1996? PLEASE INCLUDE EVERY PARTNER IN THE LAST 3 YEARS, EVEN IF YOU HAD INTERCOURSE ONLY ONCE WITH HIM SINCE JANUARY 1996.]

[PROBE: NOW TELL ME WHICH PARTNERS, IF ANY, YOU CONSIDER A CURRENT PARTNER, AND WHY.]

- 3) *Please tell me about all the times in the last 3 years, that is since January 1996, when you had no sexual partners. In other words, tell me the months when you did not have sexual intercourse even once. Begin anywhere you like.*

Please record these periods of no sex on your calendar if you think it will help you remember the specific months more accurately.

[PROBE: HOW DID YOU FIGURE OUT WHEN THESE PERIODS OF NO INTERCOURSE WERE?]

[PROBE: HOW DID YOU REMEMBER THAT?]

- 4) *Now I'd like you to tell me about all the contraceptive methods you have ever used. Begin anywhere you like.*

Please record the methods on the calendar if you think this will help you give the most accurate description possible.

[PROBE: DID YOU USE ANY OTHER METHODS? (SHOW R THE CYCLE VI LIST OF METHODS AT THIS POINT)].

[PROBE: PLEASE TELL ME EACH METHOD YOU USED, AND THE EXACT MONTHS IN WHICH YOU USED EACH METHOD.]

[PROBE: CAN YOU TELL ME WHICH METHODS YOU USED WITH WHICH PARTNER IN EACH MONTH?]

FOLLOW-UP OR DEBRIEFING QUESTIONS (IF TIME AVAILABLE)

- a) *How difficult was it for you to provide the information asked for?*
- b) *Why was it difficult?*
- c) *How accurate do you feel the information you gave is?*
- d) *Was the order of subjects comfortable for you?*
- e) *Did you feel the calendar was useful?*
- f) *Did the calendar make answering the questions easier?*
- g) *Should interviewers ask respondents to write specific things on the calendar? What things? Is the calendar most helpful if interviewers ask respondents to write specific things on the calendar? Or should the respondent decide on her own what to write?*
- h) *Can you think of additional ways that survey researchers can help women to give accurate information about their pregnancy histories, their month-by-month contraceptive use, their sexual partners, and periods of sexual abstinence?*

BONUS GRAND TOUR QUESTION, IF TIME AVAILABLE

- 1) *Please think about each of your pregnancies in turn, and describe your feelings at the time you found out you were pregnant each time.*
- 2) *Please think again about each of your pregnancies in turn, and tell me whether you consider it a wanted pregnancy, a mistimed pregnancy, or an unwanted pregnancy.*

Findings

Willis and Lessler (1999) described the typical kinds of problems that turn up in cognitive testing of a survey questionnaire:

1. Reading: Interviewers have difficulty reading the question uniformly.
2. Instructions: Conflicting, inaccurate, or complicated instructions.

3. Clarity: Question is lengthy, awkward, ungrammatical, or has complicated syntax; technical terms are undefined; question can be interpreted in multiple ways and its unclear what is to be included or excluded; reference periods are missing, not well specified, or in conflict.
4. Assumptions: Inappropriate assumptions are made, the question assumes constant behavior, or it contains more than one implicit question.
5. Knowledge and memory: Respondent may not know the information, not have an opinion, or attitude may not have been formed; information may not be remembered, or computation of a frequency or rate may be hard and lead to response error.
6. Sensitivity/Bias: Content or wording of the question may refer to behavior that is embarrassing, private, illegal, or not socially sanctioned.
7. Response categories: There may be a mismatch between the question and the response alternatives. There may also be unclear terms, undefined words, vague categories, overlapping categories, missing categories, or an illogical order.

In addition to the potential problems described by Willis and Lessler, there may be problems of context where earlier questions effect respondent's understanding in interviewer administered questionnaires.

This round of NSFG focused attention on the wording of interviewer instructions, wording of questions, reference periods, hidden assumptions, memory demands, sensitivity, response categories, logical question order and skip instructions. For example, subjects were asked about the religion of their first and most recent sexual partners, before being asked about their own religion. Several subjects found this order to be illogical.

There were other questions that needed transitional lead-ins so they would not seem so abrupt a change of topic. After a lengthy series of questions about childhood living arrangements, the survey asks "Now I'd like to ask you about smoking. In your entire life have you smoked at least 100 cigarettes?" Every subject understood the question, but they looked surprised. The transition should be strengthened.

Some questions contained hidden assumptions that troubled subjects. One such question was, "*We need to know when you first used a birth control method. It is very important that we get this date correct. Now, please look at your calendar, and tell me in what month and year you first used a method.*" One subject understood that instruction to mean birth control during sexual

intercourse although it didn't explicitly say that. She didn't know how to answer because she and her boyfriend had intended to have intercourse, tried and failed to use a condom, and so they didn't have sex. Should that attempted use be considered as first method use? The answer is no, but the definition needs to be made very clear in interviewer training.

Implied assumptions in questions sometimes angered respondents. Another question was "Did you use any birth control method the first time you had intercourse?" A young woman initiated pill use at an early age to control menstrual cramps. While she was on the pill for that reason she was raped. Although she felt that she was not using the pill as contraception, for the purposes of the survey, she was "using a method." The questionnaire designers intend that the question refer to method use for any reason during sex. Interviewers will need to be apprized that actual protection against conception is the key concept. This subject was offended with the implications of the follow up questions. The intent of the question is to refer to method use for any reason, and that intent will be made clearer, but in a manner sensitive to respondents' feelings in such a situation as described above.

Findings About the Life History Calendar--

Subjects were very positive about the Life History Calendar, and all used it at least occasionally to help them remember dates or their age. They would say that they thought that their answers were accurate because, "With the calendar, it's easy to pinpoint things." Examples of events that one subject initially chose to write on the calendar are:

1. Sept 85; Grandmother died.
2. April 96; Friend tried suicide.
3. May 97; High school graduation.
4. June 97; First real job.
5. Oct. 97; Kicked out of school.
6. Sept. 98; Birth of son.

Most subjects filled in dates with relative ease, typically taking their cue from suggestions of the interviewer. It took about five minutes for subjects to mark the cell for the month and year of their birth, number their age down the column of the birth month, and fill in four or five events. These events often define important life transitions. One subject, although she lamented that she couldn't think of much, marked down the month she went abroad which turned out to be where she spent four years getting a college education and meeting her current boyfriend. These dates were very useful to establishing her relationship history, her contraceptive history, her exposure to pregnancy, as well

as her education and employment histories. With other subjects who are mothers, the dates of their babies' births solidly anchor other life events.

Some events, like first sex, tend to be remembered by grade in school, which is then translated by use of the calendar into an age, often with careful thinking about whether the sex happened before or after a birthday during that school year. These memories could usually be reconstructed by all our subjects, whether 20 or 44 years of age. However, there was some indication that remembering events that had happened twenty years earlier was a particular challenge for older subjects.

Findings from the Grand Tour Questions

Even though the "grand tour" questions were designed to evoke natural story telling, some subjects wanted more structure. For example one question was "*Now I'd like you to tell me about all the contraceptive methods you have used in the last 3 years, that is since January 1996.*" One subject had difficulty with the question and said "Sometimes a diaphragm, sometimes condoms. I don't know how to fit my answers into your questions." In response to probing for specific months when she used one or the other, she explained that in winter they used condoms because it was cold and she didn't want to get out of bed although she remembered using the diaphragm once on Valentine's Day. The 'grand tour' question assumed a continuity of use that doesn't always pertain to coitus-dependent contraception. The question needs to be directive about timing, if we are to learn how people approach the difficult cognitive task of providing a month-by-month contraceptive history.

Another "grand tour" question was "Please think about each of your pregnancies in turn, and tell me whether you consider that you wanted the pregnancy to happen at the time it did, or not, and whether you would consider it a wanted pregnancy, a mistimed pregnancy, or an unwanted pregnancy." In response one subject said, "There was one time I had a scare. I remember thinking I didn't know what I'd do. The person I was with ended up being my husband. I had just started college. I definitely didn't want to be pregnant but I wouldn't call it 'unwanted.' I would have called it mistimed. I don't see how a pregnancy could be unwanted."

For another subject, it wasn't just a pregnancy scare. She had an abortion and described the pregnancy as "Not wanted/unwanted" without any ambivalence. Comments such as these help survey designers understand the nuances of language that should be used to define concepts they want to study.

The "grand tour" questions worked well in combination with the Life History Calendar. Another "grand tour" questions was, "Now, please tell me about

your sexual relationships in the past 3 years, that is, since January 1996. Please tell me the timing of your very first, and your most recent sexual intercourse with each of your partners, calling them by their initials. Begin anywhere you like." One subject put her pencil in the cell for January 1996 and systematically pointed out month by month when she was in a relationship. When asked in which months she had no sexual partners, it was easy for her to read off months from the calendar that perfectly fit the inverse of what she had just reported.

When asked, "*Now I'd like you to tell me about all the contraceptive methods you have ever used.*" she gamely asked, "Month by month, or sections?" She said she used the Pill the entire time, from January to October but used condom as a backup if she had "messed up." When she stopped using the pill, she used condoms or withdrawal. While pointing out those months, she volunteered that "Pills are a little bit of a pain, but they are worth it."

There are many factors that affect how easily a woman can tell you what contraceptive she used every month for the last three years. The number of methods, whether the method is coitus-dependent, the number of partners, and frequency of sex certainly affect the effort involved. The criteria described by Geta Menon (1994) are useful in approaching these answers. If the behavior is infrequent, and memorable, it can be remembered and counted. If it is frequent, an estimate is better than an attempt to remember every occasion.

Findings about cognitive aspects of the survey:

The purpose of the second round of testing was to time the survey, to see whether questions were ordered logically within sections, to discover whether the skip patterns functioned correctly, and to note cognitive issues that came up. For example, several questions are introduced by lead-ins that say, "Next, I need to ask you about...." One subject disliked the use of the word "need" she explained that it was almost threatening, especially coming from the government. She suggested that the question ask, "Next, I'd like to ask you" as a less demanding and more courteous expression.

One question asked, "Did you ever stop using a method because you were not satisfied with it in some way?" The subject said that was a difficult question because of the word "satisfied". She didn't know how to answer. She got headaches from the Pill, so she stopped using it. Among the response alternatives was the choice "Afraid of side effects" but that did not seem like a good choice to her because she wasn't afraid of them, she had experienced them. In response to the same question another subject answered no she wasn't afraid of side effects, but then went on in the next question to mention

that she stopped using a method because the spermicide hurt. This question failed to evoke the response expected and should be modified and re-tested.

Conclusion

QDRL testing the NSFG Cycle VI draft instrument generated a lot of useful information about timing, question routing, and issues of sensitivity. Also, by eliciting people's natural telling of their stories, the "grand tour" method of questioning shed light on causal connections. For the survey designers balancing the competing demands of measuring fertility and its determinants, being responsive to newly arising health issues, and limiting the questionnaire to a reasonable length of time is a daunting task. The feedback provided from QDRL testing is extremely helpful before the questionnaire is programmed for CAPI.

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