

UNDERSTANDING THE QUESTIONNAIRE IN BUSINESS SURVEYS

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Introduction

There have been significant improvements in surveys of households and individuals using insights from the cognitive sciences. A natural extension is to use cognitive methods to improve business surveys. This paper describes our cognitive research conducted on Census Bureau business surveys, and focuses on our findings regarding how reporters in large companies understand questionnaires. We first highlight relevant literature. Then we describe our methods and our findings related to questionnaires. We conclude with general business survey recommendations for large companies and discuss the issues involved in implementing cognitive research for business surveys.

Literature Review

Cognitive research methods have gained broad acceptance for improving survey questions in population surveys. A summary of major findings as they apply to survey methodology is found in Sudman, Bradburn and Schwarz (1996). The cognitive framework for the survey response task (Tourangeau, 1984) suggests that survey respondents must:

1. Understand what the question means.
2. Retrieve relevant information.
3. Form a judgment.
4. Communicate the answer.

In addition, the literature notes features of establishments that affect the survey response process (Edwards and Cantor, 1991). These include:

- the existence of information systems (records);
- identification of the appropriate respondent(s) who have knowledge of and ability to retrieve information from those records;
- "rehearsal" or frequency of the record look-up process for particular types of data;
- accumulation of data from multiple respondents or sources to complete a single questionnaire;
- possible distinction between the person who has the authority to report vs. the ability to report (e.g., having knowledge of and access to records);
- definition of businesses at several levels -- enterprise, establishment, industry, etc.

Some of these add complications or steps to the cognitive process described above.

For establishment surveys, cognitive methods have been used at the Census Bureau, BLS, the Energy Information Administration, and at Central Statistics Offices in Canada and Great Britain. Some examples include Bureau (1991), Carlson, et al. (1993), Corby (1986), Cox et al. (1989), DeMaio and Jenkins (1991), Dippo et al. (1995), Goldenberg (1994), Goldenberg et al. (1993, 1994, 1997), Gower and Nargundkar (1991), Hogue and Stevens (1987), Jenkins (1992), Jenkins and Dillman (1993), Palmisano (1988), Phipps (1990), Phipps et al. (1995), Ponikowski and Meily (1989), Sykes (1997), and U.S. Bureau of the Census (1990). Common themes that emerge from these papers are 1) respondents pay little attention to instructions, especially if they are not included on the questionnaire form; and 2) the quality of data obtained when respondents estimate is, not surprisingly, inferior to that obtained from records.

Research Methodology

Traditional application of cognitive research methodology in survey research calls for in-depth interviews with respondents to identify difficulties at the various stages of the cognitive response process affecting the accuracy of the response. Typically this is accomplished in a series of one-on-one interviews with respondents where results pertain to identifying potential measurement error properties of specific questions or series of questions, and suggesting possible repairs for error reduction.

In contrast, our study presents a broader interpretation of cognitive research. Instead of one-on-one interviews with a single respondent, we met in a group setting with company staff involved with government reporting at large multi-unit companies. Rather than focusing on a single questionnaire, we asked them to interpret the organization of their companies and the supporting information structures relative to statistical reporting requirements. In addition, we explored reporting issues such as respondent identity, as well as their response processes and interpretation of selected concepts and definitions for selected Census Bureau questionnaires.

Questions were asked about understanding the 1997 Economic Census forms and one or two other surveys that used self-administered paper forms to collect economic quantities. Discussion of these survey forms was embedded in the context of the other topics described earlier. We were unable to focus fully on specific report

forms or instructions in the manner associated with traditional cognitive interviewing. Thus, in general, our results do not provide information about how to determine or reduce the measurement error for specific questions. Nor do they provide information about the best placement of instructions within the form or in a separate booklet, or for determining the best layout of questions and response categories.

Site visits were completed with thirty large multi-unit companies. This research focused on large companies because they account for a very large portion of census statistics and survey estimates. In addition, large multi-unit companies are complex and believed to face more complex statistical reporting issues than smaller companies. These results cannot be assumed to apply to medium or smaller sized firms, either single or multi-units. Such firms have simpler organizational structures and information systems and they likely have much smaller staffs to do government reporting. This function may be performed by accounting firms contracted to keep books and complete government forms, clerks or someone with little or no accounting background.

The companies included in this research represented a variety of industry types, with some companies diversified into numerous industries. Both public and privately owned companies were selected, as well as companies with both foreign and domestic involvement. The selected companies also exhibited differing cooperation rates on various Census Bureau surveys and censuses. In addition, special effort was made to include some companies from rapidly developing sectors that represent future growth areas for Census Bureau products. It must be noted that this is a judgment sample useful for exploratory purposes, and that statistical analyses and tests are not appropriate.

Meeting participants included three or four Census Bureau staff members. These included one of the three cognitive researchers working on the project, one or two specialists from appropriate subject areas, as well as the project sponsor, a senior executive in the Census Bureau. Generally, the company was represented by 2 - 6 employees. In most cases, the person in charge of government reporting participated, as well as staff directly assigned to complete various Census Bureau report forms. These people were well trained professional accountants located in the companies' government or financial reporting units. Other meeting participants represented various roles, including controllers, managers of Financial Reporting, information specialists, Human Resources staff, Tax Accounting staff, and Legal Department staff. Meetings typically lasted between 3 and 4 hours and were tape recorded with signed permission from the company. Before each visit,

a detailed protocol was prepared to guide the unstructured interview. The protocol was tailored for each company based on background research, while also covering a general research topics list.

Findings

Within this section we provide a summary of the questionnaire issues identified during the meetings. It should be noted that often we heard that if the corporate reporting staff did not have access to the data necessary to complete the request, they delegated the task to others outside the corporate reporting staff, or acquired pieces of the information from others. Frequently these "others," whom we shall call "local data providers," are accounting staffs for business units within the company who have direct access to the necessary data. The findings presented in this paper only contain those issues identified from the corporate reporting staff perspective.

Questionnaire Elements

In all cases, company reporters referred to Census Bureau report forms or questionnaires using the form number. Reference to form numbers was pervasive across all government forms, not just Census Bureau forms. This is in contrast to the use of survey names in household surveys, where attention is paid to creating a descriptive name or acronym that will appeal to respondents.

Company reporters note the due date on the form. The due date is used to schedule tasks to complete the form relative to other priorities. It may also be compared with dates when different data items become available. This, along with competing demands, drives companies' requests to the Census Bureau for extensions of deadlines. Respondents expressed concern that some Census Bureau report forms say "Due date: within X days of receipt." Interpretation of this due date instruction is difficult if the form "floats" around before reaching the appropriate respondent.

We have implicit evidence of the importance of the mandatory statement. Although the statement itself was rarely discussed during our meetings, all respondents were aware of the mandatory nature of many of our surveys. Some reporters distinguished mandatory surveys from those that are voluntary, as they explained their reasons for not participating in voluntary surveys.

We frequently heard how surveys "float" around in a company, often acquiring an internal buck slip in which names are subsequently crossed off with the acclamation, "This is not my responsibility." This problem appeared to stem from the fact that the mailing label either had no person's name on it, or the name of a person who had left the company. Although our participants acknowledged

the latter problem, all thought that having a person's name on the mailing label would greatly aid in getting the survey to the right person or at least the right department.

The mailing label is of paramount importance not only for its primary role of getting the survey to the right place. Nearly all respondents reported using information printed on the mailing label to define the reporting unit. That is, they interpreted the name and address information to determine for which part of the company to report data on the report form, regardless whether the Census Bureau intended the reporting unit to be the entire company, business units involved in particular industries, or an individual establishment. Respondents' varying interpretations of the desired reporting units are pertinent because these large companies have multiple subsidiaries and are frequently involved in new acquisitions, mergers and joint ventures.

Instructions

Respondents indicated they look at the instructions, even those contained in separate sheets or booklets. In fact, reporters in these large companies, whose duties include multiple financial reporting tasks, seem accustomed to referring to instructions in separate documents. However, there was an occasional indication that instructions on the form next to the question may be more likely to be consulted than separate instructions.

Instructions were consulted to varying degrees. While most respondents reported that they review the instructions more carefully only for questionnaire items that were unclear to them, a few indicated thorough reading of instructions. The latter was consistently found among reporters newly assigned the task of completing Census Bureau forms. All experienced reporters completing ongoing surveys indicated that they review instructions to identify changes in data requirements from previous periods. Most respondents claimed that the instructions were adequate for their purposes, although there were a couple notable exceptions where experienced company reporters volunteered a request for more detailed specific instructions.

All respondents who acted as government reporting coordinators reported distributing copies of instructions along with copies of report forms to accountants elsewhere in the company who were asked either to complete the forms for their areas or to provide data. In other cases, respondents, who took responsibility for completing the forms themselves, interpreted instructions and questions to others from whom they requested data, communicating by e-mail or phone.

Response Strategies

Nearly all reporters kept documentation related to

government reporting. We were repeatedly shown or told about files or notebooks containing completed government report forms, along with supporting "work papers" or accounting schedules documenting calculations of items and/or indicating data sources. In addition, these files often contained annotated copies of report forms and instructions, perhaps with highlighted areas. Notes indicated pertinent instructions relative to data available from the company's records. For example, particular "include" or "exclude" statements may be highlighted. Or the notes may indicate "things to remember or check for" when preparing the report. In many cases, respondents explained that they translated our report forms into spreadsheets, which automated data retrieval and calculations, at least to some extent. On occasion, we were shown copies of these spreadsheets that displayed the underlying formulas or data sources.

For repeated surveys, all respondents used this documentation of previous period reporting as a guide for completing the forms. Indeed, respondents who have completed the survey in the past are much more likely to use the previous survey and this documentation than they are to re-read detailed instructions. The advantage of doing this is that changes from one period to another reflect real changes in the business and not changes in understanding the question. There are disadvantages, however. Any previous errors are perpetuated. Also, if there are changes in the survey, respondents may miss these changes and simply fill out the form as they did the previous time. In addition, simply changing the order or numbering system on a survey can lead to respondents putting data on the wrong lines.

A common procedure to address new surveys or data requests is for the company reporter or financial reporting manager to convene a meeting of the reporting staff, with appropriate staff from other areas such as Human Resources or Tax Accounting. At this meeting, the group reviews the data request and formulates a response strategy. They interpret the survey and the instructions, form their opinion of what data are being asked for, identify data sources within the company, assign data retrieval and reporting tasks, and set a schedule for completing the response task relative to other duties.

As corporate accountants, the company reporters for these large companies practice Generally Accepted Accounting Principles (GAAP) and data captured in company information systems are based on GAAP. To the extent that data items requested on Census Bureau report forms follow GAAP, the accountants had no trouble understanding them and retrieving data. In fact, the reporters tended to interpret questions in the context of GAAP. This is true even when there was uncertainty about what we were asking for -- they assume the item

has the same definition as required by GAAP. This is not a bad assumption, since most of the information requested in Census Bureau surveys follows accounting standards. There are, however, some exceptions. Some economic concepts of interest to data users deviate from accounting standards, and measurement errors are more likely to occur in these instances.

The Census Bureau offers a toll-free telephone number for respondents to call if they have difficulty understanding what a question means. Business respondents are not hesitant to call this number if they do not understand a question. They also call Census Bureau analysts responsible for particular surveys. In general, they report being satisfied with the service they receive when they ask a question. However, neither external or internal advice will be sought, or be of much use, if respondents believe that they understand the concept, when, in fact, they do not. This will be the case if the survey concept differs from GAAP or from the way that the business treats the concept for its internal accounting.

Terms

A critical concept to the collection of the Economic Census and some other Census Bureau surveys is the definition of establishment. The Census Bureau definition is essentially a business presence at a physical location. Respondents had various interpretations of the term. In industries, such as retail, where management decisions are made and profit/loss is monitored for individual locations, then respondents' interpretation of the term "establishment" tended to agree with the Census Bureau's intent. However, in some companies, the term was equated with "business unit" or divisions operating in particular business activities, which typically accumulate multiple "establishments" in the Census Bureau context. For industries that operate in a network, such as communications, finance, and transportation, geographic units are not meaningful management units, and thus "establishment" was not a meaningful term. Interpretation of the term "establishment" in these industries is unclear, and likely inconsistent.

As another example, the Census Bureau uses the term "auxiliary" to indicate establishments that provide non-revenue producing support functions. Some respondents knew what we meant by the term "auxiliary," although this term was not their language. Others reported they did not know what "auxiliary" meant.

Most Census Bureau report forms request data about domestic business activity only. By "domestic," we mean "within the boundaries of the United States." When questioned about whether they typically included information from U.S. territories, such as Puerto Rico, Guam, or the Virgin Islands, companies that internally

defined the U.S. to include its territories were unable to split out that data.

Implications for Questionnaire Design

Our findings suggest a paradox regarding redesigning business survey questionnaires. Since company reporters routinely refer to the survey report forms completed for previous periods and associated documentation, there exists a conditioning effect. Maintaining consistent design, layout and item numbering relative to previous forms will reduce (some types of) measurement error. Although redesign of Census Bureau report forms may result in more visually appealing layout and may reduce errors of interpretation, navigation or process, simply changing the forms may increase measurement error because it disrupts the reporter's routine response process. As is common in cognitive testing, our results indicate the need to evaluate the trade-offs in various types of measurement errors due to changing the forms versus maintaining the current layout. Alternately, as redesigned questionnaires are developed, relationships with respondents must be maintained to keep them informed in advance of implementation.

Likewise, on periodic surveys, changes in the form and instructions should be highlighted. Otherwise respondents will assume the form is unchanged. Notice of a change that is embedded in detailed instructions is likely to be overlooked. Some of our respondents requested advance notice of changes, particularly major definitional or conceptual changes affecting data requirements, so that these might be incorporated into data capture or retrieval systems, or to ensure that data are not purged due to system maintenance.

Careful attention should be given to mailing labels to make it clear what parts of the business are to be included or excluded. If the mailing label is insufficient, it should be expanded to give the necessary information. In addition, due dates should be explicitly identified as month, day and year.

We advocate that "traditional" cognitive testing be conducted on Census Bureau report forms in addition to the types of interviews we conducted. For example, in approximately two-thirds of our company visits, we discussed selected concepts, terms, and definitions related to the Annual Capital Expenditures Survey. Although we initially believed there were problems with this survey, our research found few major errors. However, we weren't routinely asking the types of questions or directing the respondent's attention appropriately to have discovered the types of problems typically identified during traditional cognitive interviews. In addition, although all respondents acknowledged and at least to some extent used the separate instruction book, it is

impossible to assess the impact of this separate booklet on data quality or response burden without more traditional cognitive interview approaches.

Adaptations to the Cognitive Research Method for Business Surveys

We believe our methodology is pertinent to the process of questionnaire design in business surveys. Investigating broad issues relating to companies' organization, information structures, and statistical reporting processes from the respondents' perspectives provides a foundation for subsequent research to improve the quality of business surveys on several fronts. Combining unstructured interviews like those we conducted with more specific cognitive interviews related to a survey, along with larger samples of firms, would provide richer information than any one single method.

Nevertheless, the experience of our interviews suggests challenges for the traditional application of think-aloud or retrospective cognitive interview methods in business surveys. For example, in many cases, multiple respondents contribute to completion of a single survey form. The contributing respondents, or "local data providers," may or may not actually see the report form or the instructions, at the discretion of the reporting coordinator. In addition, for many surveys, data are retrieved from multiple information sources. Not only is interpretation of the form required; the reporter must also be familiar with and interpret the contents of various information systems and sources. Thus steps are added to the cognitive response process – knowing the data exists in records, interpreting the data in company records, and judging its adequacy to meet the needs of the questionnaire item. How might we as cognitive researchers study this part of the response process and resulting implications for measurement error?

Respondents complete the survey response task in the context of their jobs, subject to their work environment and work schedules. Frequently, the response task requires several hours. Just like any us, they spend time on multiple tasks throughout their work day. In other words, company reporters are not likely to complete the survey response task during a single sitting. Indeed, this is frequently impossible, since they consult multiple data sources and contact multiple local data providers. Traditional cognitive interviews observing respondents' behaviors as they complete the form in real time are not possible.

Traditional cognitive interviews ask respondents to interpret the meaning of terms and questions, and to describe the process used to arrive at answers. Process probes are very useful in cognitive interviews with these reporters. However, meaning probes, particularly those

relating to accounting terms, may be awkward when administered to professional accountants. Although the terms are technical, accounting terms are standard language for these respondents. Asking meaning probes may be perceived, at best, as a test, or, at worst, as silly questions. While we do not advocate abandoning meaning probes, administering them about accounting terms with accountants requires an astute interviewer.

This prevalence of technical accounting terminology or jargon related to the subject area presents a challenge to researchers trained in cognitive psychology or survey research methods and not in business or accounting. Without business background, it was sometimes difficult to evaluate the adequacy of respondents' answers to meaning or process probes. What mix of technical knowledge and interviewing skills will best equip researchers to perform effective cognitive interviews with establishment respondents?

In conclusion, we believe that our findings reveal aspects of how business survey respondents understand questionnaires that were previously unknown or undocumented. Although based on a relatively small judgment sample, many of our results were very consistent across companies, regardless of industry type or diversity, public or private, or level of foreign involvement. The characteristics and behaviors we found appear to be related to the fact that these companies are very large and organizationally complex, having multiple layers of management and information, rather than associated with the nature of the business. During recent informal discussions, business researchers at Statistics Canada and the Office of National Statistics in Great Britain reported similar findings in their interviews with large businesses.

This research also challenges our preconceptions about designing questionnaires for establishment surveys, as well as raise numerous issues related to adapting cognitive research methods to the establishment setting. We look forward to engaging in a professional dialogue regarding both of these topics with the goal of developing survey designs that will reduce measurement error and improve data quality in business surveys.

Note: This paper reports the results of research and analysis undertaken by Census Bureau staff. It has undergone a more limited review than official Census Bureau publications. This report is released to inform interested parties of research and to encourage discussion.

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