

THE APPLICATION OF COGNITIVE SURVEY METHODOLOGY TO AN
ESTABLISHMENT SURVEY FIELD TEST

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INTRODUCTION

Federal surveys are often classified into two types, household surveys and establishment surveys. For example, the Bureau of Labor Statistics (BLS) compiles employment statistics from two major sources. The first source is household interviews, and the second source is reports from employers. Household data are obtained from members of a household and are often based on the respondent's recall of past events. If one member of the household does not have the required data available to him/her chances are that another member will. In a household the identification of a respondent with the required information is not too difficult a task to accomplish. In an establishment, however, data are obtained from the establishment's records and locating the appropriate respondent in the appropriate department with access to the required information may be more difficult than in the household (Werking, Tupek and Clayton; 1988). In both cases data quality depends on the extent to which the required data are available to the respondent. In household surveys data quality is questioned depending on whether it has been obtained via self report or from a proxy respondent. Likewise it is crucial to the quality of data obtained from an establishment that the appropriate department or division that collects the data within the establishment be identified. It is also crucial that an appropriate respondent within the establishment be identified prior to the development of the survey strategy or instrument to (1) determine if these data exist, (2) to assure that the survey instrument gets to the appropriate respondent and (3) to assure that the terms used in the questionnaire are congruent with language used by the establishment to collect the data. Although a considerable amount of work has been conducted by the Bureau of Labor Statistics and other survey organizations on survey and questionnaire design using cognitive survey methodology this work has been conducted primarily on household surveys while little, if any, of this type of work has been conducted on establishment surveys.

The purpose of this paper is to describe some of the cognitive psychological questionnaire design procedures used to develop a special, one-time establishment survey for the Department of Labor. The purpose of this survey is to assess the extent to which business establishments require drug testing of their employees or applicants for employment and the extent to which these establishments provide assistance to employees with drug problems. This survey has been designed as a mail-out-questionnaire for business establishments that would also include follow-up telephone interviews. The pretests conducted have been designed to evaluate the respondents' comprehension of the questions and to identify the cognitive processes they used to answer them. In addition, special attention has been given to developing key questions that served to trigger skip patterns within the questionnaire. Because some of the data requested would be from the records maintained by the firm the pretests needed to determine the availability of these records as well as their ability to meet the data objectives of this survey.

Pretests Because the Office of Management and Budget (OMB) clearance policy allows only nine respondents to be pretested prior to receiving formal approval to begin a project, the pretest results to be reported will be presented in two parts. The first part (phase 1) presents the methods and results of the initial nine respondent pre-OMB approval pretest. The second part (phase 2) presents the methods and results of a larger scale pretest conducted subsequent to receiving OMB approval to begin this project.

PHASE I

METHOD

Sample The subjects for this pretest were selected from a list of local establishments which were known to have employee assistance or drug testing programs that was provided to the BLS by The Association of Labor Management Administrators and Consultants on Alcoholism (ALMACA). Nine representatives from the establishments on this list were contacted and asked to participate as respondents in this project. A team of two interviewers went to each establishment to conduct

protocol analyses (Ericsson and Simon; 1984) and debriefing interviews with these respondents.

The questionnaire The draft pretest questionnaire consisted of 19 questions. Seven of these 19 questions were designed to determine whether the establishment had an employee assistance program and its characteristics, nine were designed to determine whether the establishment tested employees or applicants for illegal drug use, one was designed to determine if the establishment had a formal written policy concerning drug use and or drug testing procedures, and two were designed to obtain the total number of drug tests the establishment performed in 1987, and how many of those tests produced results that indicated illegal drug use by employees and applicants for employment.

Definitions

Before discussing the procedures used to conduct this study definitions of protocol analysis and focus group will be provided. Protocol Analysis Protocol analysis is a method of analyzing individuals' responses to verbal material. This method consists of instructing respondents to describe the thoughts they are having or processes they are using while performing the verbal tasks they are assigned. When the respondents are instructed to provide this information while at the same time answering the question or performing the task, the procedure is called concurrent protocol analysis.

When the respondents are instructed to first answer the question or perform the verbal task and then identify the processes that were used, the procedure is called retrospective protocol analysis. Protocol analysis is similar to debriefing procedures often used in questionnaire design work but differs in one major respect. Debriefing is concerned primarily with the accuracy of the answers the respondent provides to questions, whereas protocol analysis is more concerned with the processes respondents use to arrive at their answers regardless of the accuracy of these answers. In fact, in some cases an objective of a protocol analysis may be to identify specific processes that systematically bias or distort the accuracy of a respondents' answers.

Focus Groups Focus groups are conducted for information gathering purposes and are generally conducted in the following way. A facilitator, or group leader: (1) identifies issues about which the group is asked to express an opinion, (2) asks questions to which the group is asked to provide answers, or (3) presents concepts the group is asked to define. Group discussions are started in an informal, unstructured manner. The facilitator,

or group leader, usually convenes the group by explaining the nature of the group's task or purpose. Then, specific issues or other tasks are presented to the group. Using techniques such as paraphrasing and probing the facilitator or group leader guides the group to a solution. The proceedings of focus groups can be recorded on either audio tape, video tape, or manually transcribed onto paper by a person designated as the group recorder. Content coding of the group discussions for analytic purposes may be accomplished in a number of ways. A frequently used method is to have several raters listen to the tape of the group discussion and then independently establish a matrix of mutually exclusive and exhaustive categories which each rater believes represents the issues/problems with which the group dealt. From these

ratings, an interrater reliability coefficient may be derived and other quantitative analyses of the group process accomplished.

Procedure The questionnaire design process began by conducting focus groups with the data users. The objective of these groups was to operationally define (1) the concepts the questionnaire was to quantify and (2) to identify the types of data the survey instrument was required to provide. A series of draft questionnaires was developed. These questionnaires were presented to the sponsors of the survey to determine if they appeared to address effectively their data requirements. After a series of such meetings a final draft questionnaire was decided on and plans for pretesting it were developed.

A primary objective of this pretest was to assess the respondents' understanding of the questions they were asked and to determine how difficult they thought the questions were to answer (Cannell and Kahn; 1968). These evaluations were facilitated by the use of both concurrent and retrospective protocol analysis (Ericsson and Simon; 1984) of the respondent's answers to the survey questions and the difficulty ratings they made of the questionnaire during a debriefing interview. Any conceptual or question wording difficulties that were identified in the questionnaire were corrected and modified until the respondents understood the questions, and the skip pattern within the questionnaire correctly took them and the interviewer to the next series of questions. Since it was not feasible to bring establishment representatives to the laboratory for pretesting, the pretest was designed to take the laboratory procedures to the

establishment representatives.

The application of the laboratory-based cognitive questionnaire design methods described above to this field based pretest was accomplished in the following way. A debriefing procedure was developed, and draft questionnaires were printed that were structured and worded in what was considered an effective way of obtaining the required information. The appropriate establishment representative was contacted by telephone and told the nature of the pretest and what would be required of him or her if he or she choose to participate. Pretest and debriefing interviews were scheduled and were conducted with the selected respondent by a team of two BLS employees.

Upon arrival, the BLS team introduced themselves and informed the respondent of the methodological nature of the study and the voluntary nature of the respondent's participation in it. The respondent was then asked for permission to allow the interview to be taped recorded. The respondent was told that the purpose of recording the interview was to allow others involved in the questionnaire design process to listen to the tape at a later time. The respondent was also informed of the format that the interview would take and told that the purpose of this study was to collect data that would enable the survey instrument to be refined. In addition the respondent was informed that the information he or she provided would be held in strict confidence. Next, the respondent was given an explanation of how the interview would proceed, how the protocol analyses worked, and what would be required of them when they made their difficulty ratings of the questionnaire. After this presentation the respondent was requested to sign a consent form which allowed the BLS to conduct and audio tape the interview session. After the consent form was signed, the interview began.

The interview First, the tape recorder was set up and turned on and the respondent was given a copy of the questionnaire. Next, the respondent was told the purpose of this study was to collect data for a Dept. of Labor Survey of Employer Antidrug Programs (SEAP) and that the data obtained would be used to provide a report to Congress about illegal drug use in the work place and employers efforts to deal with employee drug problems. The respondent was further told the specific purpose of the pretest was to identify and correct conceptual and wording problems in the questionnaire through protocol analysis

and probing and to identify the types of cognitive processes that he/she used when answering the questionnaire. The respondent was informed that individuals who were to complete this questionnaire would receive it in the mail. The answers that a "real" respondent provided to the mail-out questionnaire would determine whether he/she received a telephone follow-up interview. The pretest-respondent was told that since we knew that he/she had an employee assistance program prior to the present meeting, follow-up questions would be asked when the pretest questionnaire was completed. The respondent was, therefore, instructed to answer the first page of the test questionnaire as if it had been received in the mail. When he/she was finished answering those questions we would begin the telephone interview portion of the survey and conduct it as a face to face interview. The respondent was told to stop if he or she had any questions in order for us to discuss them and then continue. The respondent was again reminded that after completing the self-report portion of the pretest questionnaire that the telephone interview portion of it would be conducted as a face to face interview. To confirm for ourselves that the respondent understood these instructions we repeated them once again asked him or her if he or she had any questions, and again reminded him/her to stop whenever he/she had questions or problems and that we would answer them before proceeding. Finally the respondent was told that a series of debriefing questions would be asked after the interview was completed and that these questions would focus on his or her perceptions of the questionnaire and difficulties he or she may have encountered while answering it. If the respondent had no further questions, then he or she was instructed to begin.

RESULTS

Nine interviews were originally scheduled but one was canceled because of a scheduling conflict. The reported results are, therefore, based on the eight interviews that were conducted.

There were no problems understanding the survey questions reported by any of the eight respondents who were pretested. Of the eight respondents interviewed: five had four years of college; two had master degrees; and, one had two years of college. The education level of this sample when coupled with the care taken to develop clear and unambiguous questions may explain the observed lack of difficulty these respondents had comprehending the survey questions. Of

the eight establishments represented by the respondents surveyed, however, only two had drug testing programs. The pretest, nevertheless, identified two problems: (1) the lack of immediately available required data, and (2) the lack of a definition of an establishment that made sense to a representative of an employee assistance program run for a professional organization such as a bar association or medical association that provided employee assistance to a number of establishments each having different policies or procedures concerning illegal drugs.

The Lack of Immediately Available Required Data The problem of the lack of immediately available required drug test data was identified when probing one respondent's answers to the questions about how many drug tests were performed by the establishment in 1987 and upon whom these tests were performed. The pretest respondent reported that his or her establishment collected that drug test data, but that those data were not kept in one place, but were scattered throughout individual employee records and would require collection and collation before they could be reported. This respondent

indicated that with sufficient notification their establishment could, and would provide the requested data. The following questions illustrate this problem.

1. HOW MANY APPLICANTS FOR EMPLOYMENT WITH THIS ESTABLISHMENT WERE TESTED FOR ILLEGAL DRUG USE IN CALENDAR YEAR 1987?
2. HOW MANY OF THESE APPLICANTS TESTED POSITIVE FOR ILLEGAL DRUG USE IN CALENDAR YEAR 1987?
3. OF THOSE APPLICANTS WHO TESTED POSITIVE FOR ILLEGAL DRUG USE IN CALENDAR YEAR 1987, HOW MANY TESTED POSITIVE FOR EACH OF THE FOLLOWING: COCAINE ; CANNABIS; OTHER?

The series of questions listed above was asked of employees also. Had this respondent actually been contacted for a telephone interview without advance notification that that interview would occur he/she would not have been able to provide the required information because it would not have been immediately available. Some procedure, therefore, had to be developed to enable the respondent to obtain and provide the required data.

Professional Associations' Employee Assistance Programs The second problem concerned how to handle employee assistance programs of professional associations such as bar or medical associations. Two such cases were encountered during our pretest interviews. In both of these cases a professional association existed that was comprised of independent

establishments. Each establishment that was a member of the association, however, had its own set of policies regarding illegal drug use as well as different procedures for determining what constituted drug use. The directors of both of the programs we interviewed informed us that it would have been impossible for them to answer our questions about drug testing procedures or policies for any given member of the association in an actual interview situation.

Solutions The problems associated with the lack of the immediate availability of the required data and professional associations' employee assistance programs identified by the phase I pretest were handled in the following ways. The data availability problem led to the modification of the data collection strategy that was used to conduct the survey. Instead of mailing out the questionnaire and then phoning the establishments it identified as having drug testing programs to collect the required data a cover letter would be sent along with the initial mail-out questionnaire. This cover letter would explain to the respondent the types of data we wanted. This letter would also explain to the respondent the amount of time he or she had to collect the requested data and that a follow-up questionnaire would be forthcoming which would provide him or her the option of completing this questionnaire and returning it by mail or waiting for the follow-up telephone interview to occur. In the event that the respondent mailed the questionnaire back, they would still receive a follow-up telephone interview which served the purpose of a records-edit check.

The solution to the problem of developing a meaningful definition of "establishment" for an employee assistance program that provided services for a professional association comprised of independent establishments was dealt with in the following way. EAP representatives were instructed to respond to the questionnaire for only those employees located on the site at which the interview occurred regardless of the fact that the establishments that comprised the professional association that the EAP served located at other sites might have drug testing programs, or drug policies for their employees, or applicants for employment that were different from those of the EAP that provided these establishments with those services.

Phase II

OVERVIEW

After the modifications noted above were made to the questionnaire, a 100 case post-interview response analysis

was conducted. This analysis was conducted for several reasons. First, the computerized data collection procedure needed to be field tested. Second, a larger scale determination of the effectiveness of the questionnaire needed to be made so that any additional problems could be identified and corrected. Third, the data table specifications needed to be developed.

METHOD

Sample

A random systematic stratified sample of 100 establishments was constructed by classifying establishments by Standardized Industrial Class (SIC), size of firm, and geographic location.

Procedure These establishments were sent cover letters and the questionnaire. The cover letter explained that a follow-up telephone interview for edit purposes would occur to shake down the data collection system. Respondents were also informed that they could either complete the entire questionnaire or wait for a telephone interview to occur and provide the requested information then.

Analysis of the responses to these questionnaires identified another problem. This problem revolved around several ambiguously worded questions and the skip patterns they were to initiate. The questions were:

3. DOES THIS ESTABLISHMENT HAVE A DRUG TESTING PROGRAM OR PROCEDURE OF ANY TYPE THAT IT USES TO TEST EMPLOYEES OR APPLICANTS FOR EMPLOYMENT FOR DRUGS? (IF YES, SKIP QUESTION 4)

4. IS THIS ESTABLISHMENT CONSIDERING STARTING A DRUG TESTING PROGRAM? (SKIP QUESTION 5)

5. DOES THIS ESTABLISHMENT TEST ANY OF THE FOLLOWING GROUPS FOR ILLEGAL DRUG USE?

- a. APPLICANTS
- b. etc..

Upon examination of the post interview results, it was observed that a number of respondents answered "NO" to question #3 indicating that their establishment did not have a drug testing program or procedure of any type, ignored the skip pattern, and answered "yes" to question #5, indicating that in 1987 they had tested employees for drug use. Because it was assumed by the questionnaire developers that the absence of a drug testing policy or procedure prevented the establishment from conducting drug tests, the obtained responses to questions #3 and #5 were viewed as an incompatible response pattern. In reality, however, this is not the case, and this response pattern is not

incompatible. Upon further examination it may be seen that Question #3 is a compound question which contains two mutually exclusive clauses. A respondent may answer one part of this two part question negatively, the other affirmatively and still be uncertain about how to answer the question in its entirety.

Furthermore, respondents in small companies might not view an infrequent drug test conducted under unusual circumstances as constituting a program or procedure, especially since the wording of question #3 "program or procedure" implies an established mechanism along with the means to activate that mechanism. On the other hand, even if the establishment performed only one drug test in 1987 the respondent for that establishment might validly disregard the skip pattern answer "Yes" to question 5, and proceed to answer the remainder of the questionnaire.

Solution A re-evaluation of the data requirements for this survey provided the solution to this problem. Upon re-evaluation, it was determined that a primary objective of this survey was to find out whether the establishment conducted drug tests. Replacing the ambiguous question #3 with the question "Does this establishment test employees or applicants for employment for drugs? (if no skip over question #5), removes the source of the problem, i.e., the ambiguously worded question #3 while still allowing the required data to be collected.

RESULTS

The following results are based the above noted sample of 100 cases. After correction for edit failures, inconsistent reporting, the short duration of the post-interview test and the primary objective of the posttest (which was to develop a final questionnaire) a 62% response rate (N=62) was obtained.

A. 61 usable units (98%) of the usable sample units gave us a name and 60 usable units (97%) of the usable sample gave us a phone number, for the follow-up interviews.

B. 30 usable units (48%) did not follow the skip instructions on the initial questionnaire.

C. 10 usable units (17%) marked 'NO' to every box on the initial questionnaire, indicating the respondent may not be reading the questionnaire at all.

DISCUSSION

Based on the the results reported above, four changes were made to the pretest questionnaire. First, a clearer definition of an establishment was provided to the respondent. Second, the question initiating the

skip pattern was modified. Third, the the item sequence of the questionnaire was modified to accommodate the changes made in the skip pattern. Fourth, a cover letter identifying the data that would be required of the respondent was written and sent out along with the mail-out portion of the questionnaire so that the respondent would have sufficient time to acquire the information required by the survey.

In spite of the changes noted above 30 respondents (48%) failed to follow the skip pattern and 10 respondents (17%) marked "NO" to every response box indicating the presence of a response set and likely response bias. Future BLS research focusing on response sets and response bias are being planned but are beyond the scope of this paper and will not be discussed here. Concerning the respondents failure to follow the skip pattern, however, it is possible that this phenomenon is an artifact of the mail self report mode of administering the survey instrument. No skip pattern problems were observed during the pretest, however, the skip patterns were manipulated by the interviewer, not left to the interpretative discretion of the respondent. What we may have discovered is that extreme care must be taken when wording questions to be used to initiate skip patterns, especially when the questionnaire is of the self report type. In fact research focusing on respondents failure to follow skip instructions is clearly lacking and much needed.

SUMMARY AND CONCLUSIONS

This paper described the field application of laboratory-based cognitive survey technology to an establishment survey. The purpose of this survey was to collect information about employers' drug testing practices and policies regarding employee drug use in the work place. Focus groups with program managers were held to clarify survey concepts. A draft questionnaire was designed and pretested. Pretest methodology included: probing, concurrent and retrospective protocol analysis, and questionnaire revisions based on problems identified in the pretest. The results obtained indicated that the application of cognitive survey

technology to field based establishment surveys is a valuable tool. Problems that would have otherwise remained undetected were identified and resolved. It is noted at this point that the perspective this author takes of the questionnaire design process is a cyclical one. Draft questions are developed and assembled to form a draft questionnaire. This draft questionnaire is then pretested on a small scale possibly in a laboratory. The data from the pretest is then used to evaluate the effectiveness of the questionnaire. Through data analysis, problems are identified and solutions to them suggested. These solutions are then subjected to further tests. This

cycle continues until an effective questionnaire is developed. This questionnaire is then field tested further and a similar test cycle in the field takes place. Explicitly stated, the process described above is three staged. The first stage is the laboratory, or small scale pretest phase. The second stage is the larger scale field test and the third stage is the full scale implementation stage. It is emphasized here that these stages are not mutually exclusive and that one should be used to complement the other.

References

- Cannell, Charles F. & Kahn, Robert L. (1968). Interviewing. In Aronson, E. & Lindzey, G. (Eds.), The Handbook of Social Psychology (2nd ed., Vol. 2). (pp. 526-595). Reading, Mass.: Addison-Wesley Publishing Co.
- Ericsson, K. Anders & Simon, Herbert A. (1984). Protocol Analysis: Verbal Reports as Data. Cambridge, Mass.: MIT Press.
- Questionnaire Design: Report on the 1987 BLS Advisory Conference. (1987). Bienias, J., Dippe, C., Palmisano, M. (Eds.) Washington, DC. ABSTRACT.
- Werking, G., Tupek, A., and Clayton, R. (1988), "CATI and touch-tone self-response applications for Establishment Surveys," The proceedings of the Bureau