

WHICH IS BETTER: GRID LISTING OR GROUPED QUESTIONS DESIGN FOR DATA COLLECTION IN ESTABLISHMENT SURVEYS?

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I. INTRODUCTION

Some questionnaires are designed to gather a standard set of information about each of the segments of the organization. The organization may be a household from which information on persons living there is being sought. The organization might be a business which has several satellite offices about which information is being requested. The organization may also be a grouped living situation which is both a business or establishment and also a household of sorts for the people staying there. And, as in the case of households, information for this third type is desired on the individuals staying at the facility. The questionnaire format utilized in obtaining repetitive sets of information has sometimes been a grid design with the questions along one axis and persons' names or organizational unit designations along the other axis. In Sudman and Bradburn's book *Asking Questions* (1982), the authors point out that, although meeting all interested parties' needs should be the goal of the questionnaire format, the order of importance is respondent first, followed by interviewer and, finally, data processing requirements. Although the grid design (Appendix A as an example) is efficient for survey planners, there is question whether it is the best design for survey respondents. An alternative design (Appendix B as an example) has been suggested. It is a grouped questions design which has the questions clustered together for each reported segment of the organization. The entire question set is repeated on subsequent pages for each additional reported unit. This design has been recommended as a better one for respondents.

Limited research has been done regarding the comparative advantages of using a grid questionnaire or an alternative design. Most research on the issue has been with household surveys and censuses. For example, DeMaio, Martin and Sigman's work in 1987 with decennial census questionnaires indicates that the grid design caused completion errors. Bates' work in 1993, again on the decennial census questionnaire design, compared the grid and grouped questions designs. In her study, the grouped questions design clustered all the questions for one person on one page or area on the questionnaire with the entire question set repeated for each person. She found that the grouped questions design had less respondent error. In 1993 establishment surveys research on the Schools and Staffing Survey questionnaire, Jenkins and Ciochetto

compared four questions on a grid design to four questions in a grouped questions design. They found that the grid design (matrix format as they called it) contributed to many respondents' errors and that the grouped questions design seemed to make the task easier for respondents, resulting in less error. These household and establishment survey and census' results suggest that a grouped questions design may be a better choice than a grid design for self-administered paper questionnaires. The research presented in this paper tested both a grid listing design and a grouped questions design for use in a self-administered establishment survey.

Our research involved facilities that have juveniles who are placed with them through court or agency order because of offenses that the juveniles have committed.¹ The Census Bureau conducts the mailout/mailback census of such facilities every two years for the Department of Justice. During earlier censuses nearly every facility required telephone callbacks to either remind respondents to return the questionnaire or to reconcile an inconsistency in the data they did provide. From these contacts there was substantial evidence that respondents had difficulties with the census questionnaire. The Bureau's Center for Survey Methods Research was asked to develop and test a questionnaire that would provide the necessary data and that would be easier for respondents to complete. The objective of the research was to identify potential problems and provide information for designing a questionnaire that would be easy for respondents to understand and to navigate, and, at the same time, reduce response error.²

II. METHODOLOGY

We developed two versions of a self-administered questionnaire that contained a set of questions about each juvenile housed at the facility on July 26, 1995. Appendix A is the grid or grid listing form and Appendix B is the grouped questions version. On the grid design the questions are in the column headings, limiting the space

¹The data collection for this questionnaire design research was shared equally with Laurel Schwede, project manager. She has also added much through her review, comments and suggestions for this paper.

²This research was phase 2 of a three phase project. Phase 1 is described in Schwede and Ott (1995) and a fuller description of the methodology, results and recommendations of Phase 2 are included in Schwede and Moyer (1996).

for questions and answer choices. On the pages of the grouped questions design, the entire question and answer set is available for the respondent for each juvenile.

Our sample included 18 facilities in seven states and the District of Columbia. The States were on the East Coast and in the Mid-West. We visited both private and public facilities. The facilities were detention centers, children's shelters, group homes, treatment centers and training schools and combinations of these. They ranged in size from a place which held just five juveniles to one with over 600.

We conducted on-site interviews with persons who have completed, or probably will in the future complete, the census questionnaire. The respondents varied from secretary to manager in their levels of responsibilities. Many of our interviews were conducted with two or more individuals. Most facilities kept some records on computer; two did not.

The interviews consisted of the respondents proceeding through the questionnaire and completing the forms for their facilities. Respondents were asked to read the questionnaire aloud and also to verbalize their thoughts as they formulated their answers and completed the form. This process is commonly called concurrent think-aloud cognitive interviewing. The interviews were audio taped.

We wanted each respondent to use both formats and then tell us which they preferred. However, we were concerned that the completion of one version would influence the preference so we took the precaution to minimize this bias by dividing the sample into "grid design beginners" and "grouped questions design beginners." Half of respondents were asked to begin with the grid design as their first questionnaire and then, when they had reported for several juveniles, were asked to switch to the grouped questions design and report for other juveniles. The other half began with the grouped questions design and switched to the grid.

The grouped questions design (Appendix B) allowed respondents to provide information on one juvenile per page. This design provides the entire question and answer set for each child. The only exception is item 12 for which the entire question is on the questionnaire but for which respondents had to refer to a separate list of offenses on a card in order to choose a code for each child's most serious offense. On the grid (Appendix A), the column headings contain truncated questions or the questions are eliminated altogether, e.g., item 8 compared to item 6 on the grouped questions design. These two questions ask for the same information. It would have been impossible to include all words in the column heading. On the grid design, respondents were directed to a flashcard for the additional information needed to explain the items. On the front and back of one page of the grid design data for 31 juveniles could be reported. Only two juveniles' data were obtained on the front and back of one page of the grouped questions design.

III. RESULTS

One of the objectives of this research was to determine the design preference of the respondent. We listened for this information during the interview. Often when respondents began completing the second version of the questionnaire they commented on the new design in comparison to the previous one. In addition we asked for their design preference during the retrospective questioning after the respondents had completed both forms.

Of the 18 facilities we visited, fourteen provide us with a design preference. Of the 14, nine preferred the grid design. Of these, three respondents had been assigned the grid to complete first; six had been assigned the grouped questions design first.³

Five of the facilities preferred the grouped questions design. Four of those began with the grid.

DESIGN PREFERENCE

Initial design used by R.:	No. of R's preferring:	
	Grid	Grpd q's
Grid	3	4
Grpd q's	6	1 (See footnote 3.)
Totals	9	5

Respondents provided several reasons for their preference for the grid. First, respondents reported that it seemed easier to complete. It seemed easier because it was similar to the way they already keep records, that is, rosters of their own, computer generated lists, etc. It was a familiar mode of reporting to them. The second reason for the grid preference is that they felt they didn't have to read the question every time. Once the question had been answered for one child, those answers served as guides for reporting for the next child. For some of the facilities a question would have the same answer for all the children and, on the grid was an easy to note this by marking this down the column. Third, the paper volume is less. Even respondents at small facilities realized the advantage of the 31 lines on the grid page as opposed to the stack of pages needed for reporting the same number of children on the grouped questions design. Eight out of the 18 facilities that we visited would have been able to report all their juveniles within 31 lines; 13 of the 18 could have reported

³In the table, notice that one facility's respondent who had completed the grouped questions design first, indicated a preference for that design. However, that respondent was offered the possibility of having the grid without having to write so many "specify" answers (see Appendix A for examples of the "specify" columns on the grid), the preference changed to grid. This respondent and several others misinterpreted the "specify" instructions by entering both the code and the written information for the same item. As a result of this respondent changing her mind, all seven respondents who began with the grouped questions design indicated a preference for the grid.

all of their juveniles on two pages (i.e., 62 lines) of the grid. Since the basic grouped questions design questionnaire contained space for just 15 juveniles, only four of the facilities would have had enough pages to report all of their youth. The basic grid design questionnaire contained 6 pages in total (two are the fold-out grid pages). The basic grouped questions design questionnaire contained 20 pages.

The reasons that four facilities preferred the person pages were, first, they liked having everything in front of them, i.e., they did not like going back and forth to the flashcard. Second, they kept the juveniles' records in paper files and it was easier to just match one questionnaire page to one juvenile's paper file, than it was to match a line of the grid to the paper file--the grid was clumsy for them. Third, it would be easier to divide up the task between staff members if separate pages could be distributed. Fourth, because it was easier to do, they preferred marking a box rather than entering a code. And, fifth, for those respondents who misinterpreted the instructions for the specify columns and entered both the code and the data word, the person pages required less writing.

Again, referring to Appendix A, the grid: Notice that the column heading questions were truncated to shorter questions or phrases, or to important nouns that we felt contained the gist of the question. We did this because of space constraints. We didn't want to expand the size of the grid because of additional printing costs incurred if a larger paper size was used. We thought a larger size would make the grid seem too daunting a task. We also didn't want to use smaller print because that would make the questions and instructions too difficult to read. Note that the column headings directed respondents to flashcards for additional instructions which were needed to complete the items. Grid-preferrers liked the truncated wording because they didn't want to weed through the questions for each child. In contrast, four of five respondents preferring the grouped questions design did so because they did not like going back and forth to the flashcards. They much preferred having all the information in front of them for each question as it is on the group questions design. We theorize that the going back and forth made it difficult to learn the task and this difficulty influenced their preference. Whereas, the grouped questions beginners learned the task with all the questions and answer categories in front of them. When the grouped questions respondents switched to the grid design they knew what to look for on the flashcards. Hence, the flashcard use seemed less difficult and the total task seemed easier.

Another reason why some respondents preferred the grid was that it is similar in appearance to the computer records or the daily rosters or charts that they keep every day for their facilities. Respondents who preferred the grouped questions design tended to use paper files, either a file card system or the juveniles' case file folders. They could match one page to each record card or a file. Only two of

the 14 facilities had their information exclusively on paper record, that is, with no computer assistance. We feel that this is an important fact in the design of future facility questionnaires. We found that computers are growing as the record keeping mode used by these facilities. It is important to consider this when designing even paper questionnaires to which respondents may have to match their own computer records.

We would predict that respondents using the grouped questions design would be more likely to read the questions thoroughly, since the questions and answers for each child were printed right on the questionnaire, rather than on a separate flashcard. In fact, two respondents changed answers for juveniles reported earlier on the grid. When they switched to the grouped questions form, they thought that they interpreted the question and answer categories more clearly with the grouped questions design than they had on the grid. However, although respondents seemed to read more thoroughly as they began the grouped questions form, respondents using this design developed an answering technique similar to the truncating used in the grid column headings. They truncated the questions and answers for themselves, making the answering task easier and faster, just as the grid had done for people who preferred it. For instance, respondents would truncate the question, "Which agency placed, committed or detained this juvenile here?" to: "Which agency." "What is this juvenile's adjudication status?" would be translated to "adjudication status" or "status" and the answer category chosen. Often the answer category would also be truncated, such as "adjudicated" for "adjudicated in juvenile court."

On the grid, there were other possible causes for error. Often the answer categories were not always on the grid, (see Appendix A, items 9 and 13 as examples), some respondents would use the answer they had provided for the previous child without looking up the answer categories on the flashcard. In addition, when one respondent saw some of the questions as similar, she would remember the code from one answer set and use the code to answer another question. This happened only once in our interviews but we only had 14 completed interviews. Another possible source of coding error occurs after the respondent has chosen a code from the flashcard, returns to the grid, and enters the code in the wrong place. Had the entire question and answer set been in the grid column headings these errors most likely would not have happened.

We observed respondents answering one question for all their juveniles at once, essentially working down the grid instead of across the grid. For instance, many facilities were all male, or they held only juveniles that committed delinquent offenses or that had been placed by the local court. These answers could be recorded at one time for all the children on the grid. On the grouped questions design they had to be answered individually. The grid was more

efficient for these rote questions, preventing them from being missed. However, if the wrong choice was made in the beginning, all the children would be miscoded. For instance, if the respondent chose "state agency or state court" instead of "local agency or local court" and repeated the answer down the column without considering the answer for each child, each line would be coded in error. On the grouped questions design, the decision must be made for each child and the error may be caught, or at least not repeated. So, there is evidence from our study that the grouped questions design may produce more accurate data than the grid design. However, we also observed respondents completing information for the first few juveniles on the grouped questions design and then providing the same answer for each juvenile without reading the question, essentially, replicating the grid design answering behavior.

IV. RECOMMENDATIONS

We cannot tell you that one design is better than another for all establishments. The grid design seemed a better choice for the type of places that we visited, i.e., facilities that had careful records and/or personal knowledge of the child.

What can be said is it is important to include complete questions and answer sets in the column or row headings of a grid design. Respondents wanted the questionnaire to have all information on the one form to make it easier for them. Without the question and answer choices on the headings, accuracy can be affected because some respondents will guess codes and confuse the codes between questions when referring back and forth to an additional information sheet like our flashcard. If the questions and answers cannot be accommodated in the column headings, consider reducing the number of questions so that there are fewer questions and, therefore, more space for the questions and answer sets that remain. Do consider a grouped questions design if your expected reporting units are few in number, like some of the facilities we visited that reported information for less than ten children or places that do not use computer record keeping for the data you are seeking.

Offering respondents a choice of the type of form to complete is another possibility. If they keep records by computer, the grid may be their preference. In fact we found that respondents would like to use the grid design as a model. They wanted to prepare for our census data request by having the data already compiled by the time our questionnaire arrives. Since our questions are the same as those that are frequently asked by other data collectors, our model could be used for other requests. Because so many facilities now keep computer records, consider offering them the option to provide either a printout or a diskette by using the grid design as the model for their data extract. Some establishments, however, may still prefer the grouped questions format because they have the

information on paper records or available in their heads and do not refer to a computer or even to records. However, if more than one mode is used, be cautioned that each form can produce its own measurement error.

Summary of Recommendations

Use a grid design when:

- There are many units (e.g., juveniles) to report
- There are few questions or characteristics to obtain
- The entire question and response category set fits in the limited space
- The establishment records are usable computerized records.

Use a grouped questions design when:

- There are few units to report
- There are many questions to ask or characteristics to obtain
- Questions and response categories don't fit into limited grid space
- Establishment records are not computerized or are computerized but not useful for your data collection.

REFERENCES

- Bates, Nancy. (1993). "The 1992 Simplified Questionnaire Test: Item Nonresponse and Telephone Debriefing Evaluations." Paper presented at U.S. Bureau of the Census 1993 Annual Research Conference. Arlington, VA, March, 1993.
- DeMaio, T. J., E. A. Martin and E. P. Sigman. (1987). "Improving the Design of the Decennial Census Questionnaire." Paper presented at the Annual Meeting of the American Statistical Association, San Francisco, CA, August, 1987, pp. 256-261.
- Jenkins, Cleo and Susan Ciochetto. (1993). "Results of Cognitive Research on the Multiplicity Question from the 1991 Schools and Staffing Survey Students Records Questionnaire." Washington, DC: U.S. Govt. report, Census Bureau, Center for Survey Methods Research. Unpublished report.
- Schwede, Laurie and Laurie Moyer. (1996). "Children in Custody Questionnaire Redesign Project: Results from Phase 2 Questionnaire Development and Testing." Washington, DC: U.S. Government report from the Census Bureau, Center for Survey Methods Research. Unpublished report.
- Schwede, Laurie and Kathleen Ott. (1995). "Children in Custody Questionnaire Redesign Project: Results from Phase 1." Washington, DC: U.S. Govt. report from the Census Bureau, Center for Survey Methods Research. Unpublished report.
- Sudman, Seymour and Norman M. Bradburn. (1982). *Asking Questions*. San Francisco: Jossey-Bass.

Census Bureau, Center for Survey Methods Research.
Unpublished report.
Sudman, Seymour and Norman M. Bradburn. (1982).
Asking Questions. San Francisco: Jossey-Bass.



1. Please COMPLETE a LINE (items 3—15) for each juvenile in your care who —

A. is aged 21 or younger

AND

B. was assigned a bed in this functional unit on JULY 26, 1995 at 11:30 p.m.

AND

C. was assigned to a bed here then because he/she has been charged with or adjudicated for delinquent or status offense(s)

AND

D. was placed, committed or detained here by at least one of the following —

- a court or law enforcement agency
- a state, county, or municipal agency responsible for placing juveniles charged with or adjudicated for delinquent or status offense(s)

Juvenile MUST fulfill all four requirements (A—D) to be included below.

2. Refer to FLASHCARD C enclosed for additional information and coded answer categories for the items below.

Line number	3. Enter the initials or an identifying number of persons meeting ALL 4 requirements above.	4. Sex Mark (X) ONE		5. Birthdate			6. Is this juvenile of Hispanic origin? Mark (X) ONE		7. What is this juvenile's race? Mark (X) ONE		8. Here because of — Mark (X) ONE		9. Custody arrangement See Flashcard C		10. Sent here from same state that functional unit is in? Mark (X) ONE If NO, Specify			11. Which agency placed, committed, or detained this juvenile here? See Flashcard C for choices and codes Indicate ONE code — If code 9 (Specify)		12. Probation or Parole violation?			13. Adjudication status See Flashcard C Enter as many codes as appropriate per juvenile — If code 6 (Specify)			14. Most serious offense; reason for being here See Flashcard C			15. Date of admission here for item 14 offense			Line number
		Male	Female	Mo	Day	Yr.	YES	NO	Code	Specify	Code	Specify	Code	Specify	YES	NO	Specify	Code	Specify	Code	Code(s)	Specify	Code	Mo	Day	Yr.						
00	EXAMPLE	X		03	14	82		X	1		1		2		X	Maine	3		1		2, 3				03	07	14	95	00			
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IF MORE THAN 11 JUVENILES MEET REQUIREMENTS A THROUGH D ABOVE, CONTINUE ON REVERSE

Person 1

1. What is the case number of this juvenile meeting ALL four requirements shown on page 5?

Case number

2. What is this juvenile's sex?

- 01 Male
02 Female

3. What is this juvenile's birthdate?
Enter digits

Month Day Year
_ _ _ _ _

4. Is this juvenile of Hispanic origin?

- 01 Yes, Hispanic origin
02 No, not of Hispanic origin

5. What is this juvenile's race?

- 01 White
02 Black
03 American Indian or Alaska Native
04 Asian
05 Pacific Islander
06 Other → Specify _____

6. Is this juvenile assigned to a bed here because of a delinquent offense or a status offense? Mark (X) ONE

See Flashcard A for specific definitions of delinquent offense and status offense to be used in this census.

- 01 Delinquent/criminal offense
02 Status offense
03 Other → Specify _____
04 Don't know

7. Which phrase best describes the custody arrangement under which this juvenile is housed in this functional unit?
Mark (X) all that apply

- 01 Diversion in lieu of court action
02 Detention
03 Commitment to an agency and placement here
04 Commitment to this facility
05 Placement without commitment
06 Sentenced to this facility
07 Other → Specify _____

8. Was this juvenile placed, committed or detained here by an agency or court in the same state in which this functional unit is located?

- 01 Yes
02 No → Specify State _____

9. Which agency placed, committed or detained this juvenile here? Mark (X) ONE

- 01 State agency or State court
02 District of Columbia agency or court
03 Local agency or local court
04 A Native American Tribal Authority
05 Bureau of Indian Affairs (BIA)
06 U.S. Bureau of Prisons
07 U.S. Marshals
08 Immigration and Naturalization Service (INS)
09 Other → Specify _____

10. What is this juvenile's adjudication status?
Mark (X) all that apply.

- 01 Not being adjudicated
02 Pending adjudication hearing in juvenile court
03 Adjudicated in juvenile court
04 Pending hearing or trial in adult criminal court
05 Convicted in adult criminal court
06 Other → Specify _____
07 Don't know

11. Is this juvenile housed here because of a probation or parole violation?

- 01 Yes, probation violation
02 Yes, parole violation
03 Neither probation or parole violation

12. What is the most serious offense for which this juvenile has been placed, committed, or detained here?

See Flashcard B for the list of offenses ranked by seriousness to answer this question. Write the two-digit code for the most serious offense in box.

If a juvenile is housed here because of a probation or parole violation, use the code for the latest offense.

Offense

13. On what date was this juvenile admitted to this functional unit for the offense listed in item 12?

Month Day Year
_ _ _ _ _