THE LANGUAGE OF SELF-ADMINISTERED QUESTIONNAIRES
AS SEEN THROUGH THE EYES OF RESPONDENTS[1]

by

Cleo R. Jenkins
U.S. Bureau of the Census
and
Don A. Dillman
U.S. Bureau of the Census and Washington State University

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"... we must recall that language includes much more than oral and written speech. Gestures, pictures, monuments, visual images, finger movements--anything consciously employed as a sign is, logically, language."

John Dewey in Newell, A and Simon, H.A.

Human Problem Solving, 1972, pp. 65-66

I. INTRODUCTION

Much survey research has been directed at studying interviewer-administered questionnaires. As a result, we have learned a great deal about question wording and sequencing effects in surveys and about the effect of memory on data quality (e.g., Jobe et al, 1993; Jobe et al., 1990; Lessler, 1989; Converse and Presser, 1986; Belson, W., 1981). Although it is equally important to understand these sources of error in self-administered questionnaires, it is not sufficient. The graphical presentation of information is every bit as important because it too has something to say to the respondent.

In Tourangeau's model (1984), as well as other models of the survey interview process, the first step is specified as "comprehending the question." Depending on the model, different steps follow, but generally, "retrieval of the relevant facts, judgment, and finally, response" are mentioned.

Although "comprehending the question" is the first step in an interviewer-administered survey, the task is different in a self-administered survey. In a self-administered survey, respondents must first "perceive the information" before they can comprehend it. Once they perceive it, they must "comprehend the layout of the information" as well as "the wording of the information." Furthermore, respondents must

comprehend much more than just the wording of the survey questions and response categories. In a self-administered survey, respondents are often given introductory material and instructions. Also, they must comprehend directions that are meant to guide them through the form.

In an interviewer-administered questionnaire, the interviewer plays a critical role in what information the respondent perceives. In a self-administered format, the entire onus of perception is on the respondent, and we have not developed procedures for controlling errors that might arise as a result of their not perceiving information as we intend. In fact, we have not studied this much at all.

In addition, we need to pay attention to what motivates respondents to answer surveys. Cialdini (1988) has argued that people decide whether to perform a requested task on the basis of the inherent attractiveness of that task <u>and</u> other social or psychological influences, including

- ! reciprocation (the tendency to favor requests from those who have previously given something to you),
- ! commitment and consistency (the tendency to behave in a similar way in situations that resemble one another),
- ! social proof (the tendency to behave in ways similar to those like us),
- ! liking (the tendency to comply with attractive requests),
- ! authority (the tendency to comply with requests given by those in positions of power), and
- ! scarcity (the tendency for rare opportunities to be more highly valued).

Groves and others (1992) provide examples of how each of these can be utilized to encourage survey participation. Although most of the examples refer to interviewer behavior or the implementation process, some can be applied to questionnaire design. For example, the fact that people tend to comply with attractive requests suggests that respondents will be more likely to answer an attractive questionnaire than an unattractive one.

Groves and others also argue that the helping tendencies of people can be utilized to encourage response. Three emotional states have been found to be associated with

decisions to help another: anger, happiness, and sadness. One would expect that people are likely to become angry and therefore less likely to respond to a mail survey when the questions or the instructions are not easily understood.

Finally, the literature on opinion change (Petty and Capioppo, 1986) suggests that when a topic is of high personal relevance, subjects will change their opinion based on an in-depth review of a message. However, when the topic is not important to the subject, they will rely on a heuristic review, such as the credibility of the source. This literature suggests that if a questionnaire is not really important to a respondent, then we probably aren't going to persuade them to complete it by presenting them with an in-depth, highly logical, persuasive discussion of why they should complete it. Instead, we should rely on other means.

II.   GRAPHICAL DESIGN PRINCIPLES

In the remainder of this paper, we present questionnaire design principles that struggle with how to best present information to (1) motivate respondents to attempt the tasks presented to them and to (2) aid respondents to accurately answer the questionnaire once they are motivated to do so. Most of the principles have not been tested carefully on controlled designs, although we try to cite those occasions in which they have been. Principle 20 (structuring and organizing a questionnaire) is an example of a principle drawn from experimental evidence with the Decennial Census questionnaires. Most of the other principles are drawn from the results of cognitive interviews with both the Schools and Staffing Survey and the Census of Construction Industries and from the redesign of the Survey of College Graduates. The response effects of the redesigned examples remain generally untested at this time. Therefore, the principles should be viewed as reasonable hypotheses for improving response, lowering item non-response, and improving accuracy. A major reason for writing this paper is to encourage experimental research on these issues.

1.   Present information in a format that respondents are accustomed to reading.

We consider this the most important principle and one that is constantly and inadvertently violated. Jenkins et al. (1992a) present the results of cognitive interviews with the Schools and Staffing Survey. Example 1 shows the cover page of the School Questionnaire from the Schools and Staffing Survey. Jenkins et al. conclude that the readers, persistent as they were, usually did a pretty good job of following this page until they reached the end of the first column. These respondents read through the title information, then the first two paragraphs on the left-hand side of the page. Because these paragraphs refer to the label, they turned the questionnaire sideways to look at the label. When done, they returned to where they had left off on the left-hand column, and continued to read down the column. Instead of continuing to the top of the second column, however, generally they turned the page.

Example 2 presents a diagrammatical representation of the cover page's reading structure. It reveals the eye's necessary movement across the page. As can be seen, the current format requires respondents to make some pretty large unexpected leaps across the page, unexpected in the sense that a person anticipates reading a line of information from left to right, starting at the top of the page and moving down it.

It is not surprising, therefore, that the skimmers didn't bother to read this page at all. Generally, they glanced at it and turned the page. Because the skimmers never read the school named on the label, they often reported for the wrong school. In fact, this error was so great in 1991 that data for 10 states needed to be suppressed at first.

We present a redesigned version of the cover page using a natural reading format in conjunction with the next principle.

2. Present only the most relevant information using graphical design features and composition.

Another problem with the School Questionnaire's cover page is that it presents too much information. Skimmers quickly dismissed this information, probably because nothing was made particularly salient to them and they were not willing to look for that which was important. This suggests

that the most important information needs to be made easily perceptible.

Example 3 shows a "user-friendly" cover page adapted from Jenkins and Ciochetto (1993). This cover page presents only the information the respondent needs to begin completing the questionnaire and it does so using a natural reading format and graphical design features. Jenkins and Ciochetto deliberately used a box that contains an unshaded area within a shaded one to showcase the very important instruction that was overlooked on the original questionnaire.

Example 4 exhibits the straight forward reading structure of this page. No need for the eye to do anything out of the ordinary, which we are more and more convinced is critical to designing good self-administered questionnaires.

3.   Pique respondents' interests early in the questionnaire.

A third problem with the School Questionnaire was that respondents found themselves being asked to passively read a lot of material: the cover page, the cover letter (which was placed on the inside cover of the questionnaire booklet), and instructions (see Example 5). Skimmers skipped over this material entirely and went directly to question (a) in the middle of page 4 to begin completing the questionnaire.

Based on this, the third principle is: pique respondents' interest early in the questionnaire. Don't begin the questionnaire with a lot of prose, begin by asking a question or two. We hypothesize that respondents are more likely to read information once they have become actively engaged in answering the questionnaire.

As shown in Example 6, Jenkins and Ciochetto (1993) suggest beginning the Student Records Questionnaire by asking respondents to record the current time followed by a screener question. It is only after they ask these questions that they present a condensed version of the cover page and letter information. Even when they present this information, they deliberately used a question-and-answer format to keep the respondent actively engaged.

4. Dominantly feature questions over additional explanatory information.

This principle is violated in the Census of Construction Industries Questionnaire. Example 7 presents the "dollar value of business" item from that questionnaire. As can be seen, this item, like all of the items on the questionnaire, begins with a brief capitalized heading in bold that is meant to quickly convey the nature of the item. DeMaio and Jenkins (1991) conclude that respondents often neglected to read beyond the heading because the heading provided them with just enough information to formulate their own question. And, of course, they formulated the wrong question.

Example 8 presents a revised version of the item. In this version, the item heading is replaced with a bold-faced, comprehensive question. Bold-faced type was used to convey the importance of the question. Also, it serves as a road map for questions like this that have a leading phrase followed by several parts that are interrupted with other information. The other information is put in light-faced type.

5. Include in each question all of the relevant information necessary for respondents to answer it, rather than specifying information in a subsequent instruction.

This principle is demonstrated using another item from the Census of Construction Industries Questionnaire, the "number of employees" item (see Example 9). Respondents would read the heading here, and sometimes the question, then they would turn their attention to the answer boxes at the right (DeMaio and Jenkins, 1991). At this point, their eyes were drawn immediately to the column headings rather than the header. The header reads "Number of employees of this establishment during the pay period including the 12th of--," and because "pay period" is not mentioned in either the heading or the question, several respondents mistakenly thought this item was referring to monthly or quarterly time periods.

A revised version of this item is presented in Example 10. Besides removing the heading, the pay period header was made the leading phrase in this version. This question now

contains all of the information the respondent needs to answer it. And just to make sure respondents don't misunderstand, the pay periods are also repeated in each of the column headings.

6. Vertically align the questions and response categories.

As can be seen in the top view of Example 11, the Public School Questionnaire uses a question-on-the-left-answer-on-the-right format. Jenkins et al. (1992a) conclude that respondents often did not read instructions in this format. This is because they generally began to search for the answer once they read the question. As a result, their thoughts and consequently, their eyes were drawn away from the left-hand side of the page, where the instructions lay, to the right-hand side, where they knew the answer categories were.
The second view in Example 11 uses a vertical alignment. This places the instructions directly before the answer category, where respondents are more likely to perceive them. However, this may not solve the problem of respondents either overlooking or ignoring instructions. As already mentioned, respondents have a tendency to read only as much as they think is necessary to answer a question. Therefore, even if they perceive the instructions, they may still ignore them. If the instruction is relatively simple to begin with, a better solution is to incorporate it into the body of the question, as demonstrated in the last view.

7. If incorporating needed information into the question makes it too complicated to understand, then provide accompanying instructions at the place where they are needed.

If an instruction is long and/or complicated, incorporating it into the body of the question is likely to fail. As can be seen in Example 12, Item 2 of the Public School Questionnaire asks how many students were enrolled in the school on or about October 1 of this school year. Jenkins et al. (1992a) conclude that this item was difficult for respondents to read and understand because the flow of the question is interrupted by two parenthetical phrases and a

lengthy two-sentence instruction. This leads us to conclude that one should never try to insert a stand-alone instruction between phrases of a continuous question.

Question 13a(2) in Example 8 illustrates the use of include and exclude statements that are too lengthy to incorporate into the body of the question. Here, the instructions are placed directly after the question. This places them as close to the question as possible without disrupting its flow. Still, further research is needed to determine the best method for coaxing respondents to read information that is not easily incorporated into the question.

8.   Utilize single-task formats rather than multi-task formats.

Item 30 from the Public School Questionnaire (shown in Example 13) asks respondents to cross classify their employees by full- or part-time status and assignment. Jenkins et al. (1992a) conclude that quite a few respondents seemed able to process only one aspect of this item--the categorization of employees by job description--and were unable to simultaneously deal with the additional request to report these employees by both full- and part-time status.

In Example 14, the multi-tasked format is replaced with a simpler one. This is accomplished by focusing on only one request at a time--first, respondents are asked to classify part-time employees by job description in part a. Then they are asked to classify full-time employees by job description. Because this format repeats information at the point it is needed, we hypothesize that it will make the respondent's task easier. Of course, the disadvantage is that it lengthens the questionnaire, which may decrease a respondent's motivation to complete it. This example illustrates the fact that there can be competing forces at work when we design a questionnaire and that we clearly need to learn more about these forces.

9.   Utilize single-question formats rather than matrix-question formats.

Question 1 in Example 15 asks respondents if they currently have the students for class listed down the left-

hand side of the page. If the respondents do, then they are to answer three follow-up questions. Jenkins and Ciochetto (1993) conclude that this format presents respondents with too many tasks at once. Furthermore, it presents them with a choice, but provides little guidance for making the choice. They can choose to answer a full set of questions about one student at a time. In this case, they work across the rows. Or they can answer the same question for each of the students. In this case, they work down the columns.

In Example 16, the matrix format is replaced with a single array of questions pertaining to one student at a time, with the questions running down the page rather than across it. In this version, respondents need only be concerned with answering one question about one student at a time, and they need not deviate from moving down the page in search of the next question. Although the researchers recommend further work in this area, a small number of cognitive interviews showed that this is a more manageable task from the respondent's point of view. (This example also used a new skip instruction. We discuss skip instructions later.)

Additional research supporting the single-question format comes from both focus group and experimental research on the 1990 Decennial Census Questionnaire. A focus group examination of the Census Questionnaire in which respondents were asked to answer a series of questions for each member of their household in a matrix format (questions in left-hand column to be answered for household members listed across the top of the page) identified the matrix format as a barrier to response (Dillman et al., 1991). Furthermore, a revised questionnaire, which used a single-question rather than a matrix-question format, attained an improved response rate (Dillman et al., 1992).

10. Make headings and instructions at the top of a page more prominent than those in the middle of a page.

Respondents find transitions between topics helpful. A transition need not be complicated, it simply needs to be enough to warn the respondent the topic is about to change. For instance, in Example 17, the heading "SECTION 2--STAFFING PATTERNS" in the middle of the page was enough to convey to

respondents that the topic was about to change (Jenkins et al., 1992a).

In contrast, Example 18 shows a transitional heading followed by an instruction that comes at the top of a page. Contrary to expectations, respondents tended to read transitional headings and instructions that came in the middle of a page, but few read information that fell at the top of a page.

We hypothesize that respondents may be exhibiting a similar kind of behavior here as they exhibited with the introductory information. Many respondents skipped over the introductory material in an effort to get to the questions, but once they were actively engaged in answering the questionnaire, they were more likely to read information put into their path. Perhaps respondents skip over information at the top of a page in an effort to get to the next question, but once they become involved in answering the questions, they are more likely to see other information.

11. Provide directions in a natural reading format and utilize graphical design features and composition to make the directions more salient.

In order to efficiently and accurately answer a self-administered questionnaire, respondents must be able to maneuver their way through the questionnaire. One very important instruction for doing this is the skip instruction. The problem with skip instructions, however, is that respondents commonly overlook them (Jenkins and Ciochetto, 1993; Turner et al., 1992; Gower, 1989).

Jenkins and Ciochetto (1993) conclude that respondents overlook skip instructions for two reasons, one of which is derived from the other. The primary reason respondents overlook the skip instruction is because they do not perceive it, but the reason they do not perceive it is because of the convoluted reading structure presented by the skip instruction. Item 29a shown in Example 19 illustrates this. A respondent begins to answer this item by first reading the question "Were there any teaching vacancies in this school for this school year, i.e., teaching positions for which teachers were recruited and interviewed?" Then they will move to the

right-hand side of the page to answer the question, see the answer boxes, and continue to the right of these to read the answer choices "yes" and "no." The next step in the process is to choose one of these, say the "no" response, and to move back to the left of this to mark the answer box. Note what is happening at this moment--the respondents are moving away from the skip instruction. <u>If the skip instruction has not been in some way made salient to respondents before they begin their journey back to the left, chances are they are never going to see it.</u> Once they mark the answer box they are likely to conclude they are done answering this question and are going to begin to look for the next question.

Experimental data presented by Turner et al. (1992) confirm the hypothesis that respondents only see information to the right of an answer category if it is in some way made salient. Among other questionnaire design issues, Turner et al. studied the extent to which respondents and interviewers correctly executed branching instructions embedded in alternative versions of the 1990 National Household Survey on Drug Abuse (NHSDA) questionnaire. Turner et al. conclude that respondents were more likely to overlook a visually obscured branching instruction, as shown in question 1 of Example 20, than a visually salient one, as shown in question 5. They conclude that both the length and visual salience of questions a through e in question 5 assisted respondents in correctly following the branching instruction in question 5.

These studies suggest that directions need to be presented in a more natural reading format and graphical design features and composition should be used to make the directions more salient. Given this information, three alternative skip instruction formats are presented below, each of which appears to have advantages and disadvantages: (1) the salient skip instruction, (2) the intermediate skip instruction, and (3) the natural reading sequence skip instruction.

<u>Salient Skip Instruction.</u> Example 21 shows the salient skip instruction. Rather than having information placed to the right of the answer categories, directional arrows are placed to the left of both answer boxes. These arrows extend horizontally from each answer box towards the left-hand margin of the page and then turn vertically downwards. One of these

arrows proceeds to the next question and the other ends with a verbal instruction within a shaded box.

This format was designed to overcome the conventional skip instruction's highly convoluted reading format (moving from left to right, right to left, back again to the right and finally, back to the left) and to replace a more-difficult-to-perceive verbal instruction with a more-easily-perceived combination visual/verbal instruction. In our judgement, the advantage of this format is that respondents may visually take in, if only briefly, the skip instruction information while moving from left to right in search of the answer categories.

The disadvantage, however, is that whereas respondents may be more likely to see this information, they also may be more likely to misunderstand it. It is possible that the wrong respondents (those who are supposed to continue to the next question) may mistakenly execute the skip instruction because of its visual salience, leading to a serious error--the omission of data. Another disadvantage with this format is that a question with a complicated skip instruction may become visually cluttered.

Intermediate Skip Instruction. Example 22 presents the intermediate skip instruction. This format relies on two features: (1) graphical instructions (an arrow) for going to the next question and (2) words to direct other respondents through a skip pattern. The two paths are further distinguished by originating the arrow from the left of the answer choice, and placing the words to the right.

In our judgment, the advantage that this format may have over the salient skip instruction is that respondents are unlikely to make the serious error of incorrectly executing the skip instruction. Another advantage is that it may not appear as visually cluttered to respondents. However, a small number of cognitive interviews suggest that it may not be as efficiently executed as the salient skip instruction. Just as with the conventional skip instruction, the word instruction to the right of the answer category may be overlooked at first. However, it is likely to be more efficiently executed than the conventional skip instruction, in which nothing but words are used off to the right of the answer choices. Therefore, this skip instruction format is a deliberate

compromise between the conventional and salient skip instruction.

    <u>Natural Reading Sequence Skip Instruction.</u> In contrast to the above skip instructions in which a respondent must move from left to right in search of the answer categories and then reverse this direction and move from right to left to answer the question, another possibility might be to establish a skip instruction format with a more efficient, natural, and logical flow. This format is shown in Example 23. As can be seen in this example, the answer boxes are placed to the right of the answer categories and the skip instructions to the right of the answer boxes. To maintain the vertical alignment of the answer boxes, the answer categories are right-justified rather than left-justified. Also, if the answer categories need to be double or triple-lined, as is the case with the category "Dropout/Chronic Truant (See Definition Below)" in question 1 of Example 23, then the answer box should follow the last of these lines. This is to help maintain the respondent's natural reading structure, for which we have been arguing all along.

    This skip instruction seems to have several advantages over the preceding skip instructions. The first and probably best advantage is that the information is presented to respondents in the sequence they need it: first the answer categories, then the answer boxes, and finally, the skip instruction. Example 24 compares the reading format of the natural reading sequence skip instruction with that of the conventional skip instruction. As can be seen, respondents need not ever reverse their direction with the natural reading sequence skip format. Another advantage is that the natural reading sequence format is not cluttered looking.

    A disadvantage, however, is that respondents may overlook bracketed skip instructions using this format. Although these instructions will be closer to the answer boxes in this format than they are in the conventional skip instruction format (that is, if the answer categories come between the answer boxes and the skip instruction), they be just far enough away from the answer boxes as to be out of the respondent's view.

    Another disadvantage is that from an overall perspective, the questionnaire's vertical alignment is disrupted. In the

previous formats, the questions, answer boxes, and categories are all left justified and begin in the same horizontal position on the page. Although vertical alignment of the questions can be maintained using the natural reading sequence skip instruction format, the answer categories will certainly not be vertically aligned. The answer boxes can be made to maintain vertical alignment within a question; however, they may not be able to maintain alignment from question to question, further disrupting the overall look of the questionnaire.

A final disadvantage with the natural reading sequence skip instruction is related to data processing. In this format, the location of the keycodes is problematic. One possibility is to place the keycodes before the answer category, but this puts them quite a distance from the answer box from the keyer's perspective. This may slow down production and/or increase keyer error. Another possibility is to place them either directly before or after the answer box, but this may confuse the respondent.

We have described skip instructions at some length because it is an area which is exceedingly important, but now lacks ideal solutions. The alternatives presented need extensive testing in large samples.

12.   Utilize graphical design techniques to establish a clear path through the questionnaire for the respondent to follow.

Many questionnaires mix questions and information, utilizing space wherever it is available and thinking that so long as the information is presented, it will get read. As can be seen in Example 25, it is unclear to the respondent where to begin, and most important in what order the information is to be read.

Example 22 is a redesigned page from the Survey of College Graduates. Here the white answer spaces contrast with the light blue background. The message intended, and communicated by graphical layout rather than words, is to establish a visual path through the questionnaire by associating the white spaces with the "need to provide an answer."

13.   Avoid using the same design feature to request different respondent actions.

The essence of this principle is to associate particular design features with what the respondent is being asked to do, and to be completely consistent with their use.   For example:

13a.   <u>Use dark type for question stems and light type for response category options.</u>

13b.   <u>Write all definitions and special instructions for a particular question in italics placed within parentheses.</u>

13c.   <u>Use capital letters for words to be emphasized to the respondent in both questions and answers.</u>

The important point here is not that capitals must be reserved for emphasis, and italics for instructions, or that bold type is better for questions than light type.   Doing the opposite may work just as well--the issue is consistency, so that as a respondent gets into a questionnaire they begin to associate the chosen procedure with a particular piece of information or request for action.

14.   Utilize variability in design features judiciously.

Closely associated with the need to be consistent is the need to limit variability.   One would never consider writing a paragraph in which every word is written in different type fonts and sizes.   Doing so would slow down the reader's comprehension.   Instead, one should select a limited number of design elements and use them consistently.

15.   Visually emphasize information the respondent needs to see and de-emphasize information the respondent does not need to see.

Coding information is a good example of this principle. In Example 26, the codes are bold and made even more prominent by encasing them in boxes.   Not only that, but they are placed directly in the respondent's reading path.   One result is that respondents may mentally process information irrelevant to

them, thus making the task of responding more time consuming and difficult than necessary.

In Example 22 the light blue background is a 10 percent screen, and the coding information is printed in small numbers without boxes in 100 percent color. The respondent, who is already being guided "towards" the white answer spaces by black type of questions and answers and "away from" the blue background seems less likely to see or be confused by the dark blue lettering. Furthermore, the codes are placed outside the respondent's reading path. Yet, for a person who is searching for the blue code numbers, they are easily visible.

16. Utilize graphical layout of questions on the page to distinguish among different types of question structures; maintain consistency within types.

If a questionnaire begins by listing answer categories below the stem of a question vertically, like the "yes/no" answer categories in the first question in Example 27, it is undesirable to occasionally present answer choices horizontally, or even to sometimes use a second or third column of answer choices. Once a format is selected it needs to be followed consistently.

If one has a question like C9 and C10, where several items in a series are to be evaluated and the answer categories are the same for each item in the series, these answer categories should be placed to the right of the items and the respondent should be instructed to choose from among horizontally arranged categories in this case. Respondents should learn to choose from among vertical choices when the boxes are on the left and from among horizontal choices when boxes are to the right.

17. Provide descriptive captions either above, beneath, or to the right of blank answer spaces and utilize appropriate signs or symbols whenever numbers are requested.

When people are asked to report income, number of weeks worked, or other data by filling in blank spaces, inaccuracies may result from utilizing the wrong units or from not remembering exactly what was asked. Therefore, the answer

spaces in Example 27 have captions to remind people what is
being requested. For instance, C13 has the caption "Total
1991 earned income." In addition, the blank answer space has
a dollar sign and ".00" in it to keep people from reporting
cents, since they weren't wanted.

18. **Utilize dominant graphical markings to provide the most
important information needed by the respondent to guide
them through the answering process.**

This principle is violated in Example 25, where the
"return to" instruction is predominant. It is also violated
in Example 28 where the black marks used to optically scan the
questionnaire are quite dominant. In neither case do the
dominant marks effectively guide the answer process.
In Example 29, the dominant markings are the
questionnaire's title, **THE 1992 NATIONAL CENSUS TEST**, followed
by the **ARROW** and the **PERSON 1** and **PERSON 2** headings. These
dominant markings are meant to guide the respondent through
the form.

19. **Avoid the separation of questions through the use of
lines and rectangles in favor of an open format in which
the respondent's answering path is clearly shown.**

Frequently designers of questionnaires utilize lines and
rectangles to separate questions from one another. In general
this practice makes questionnaires more, rather than less,
difficult to answer. The use of rectangles, as shown in
Examples 25 and 30, gives no clear indication of where to go
next; the lines function in much the same way as "stop" signs,
requiring one to stop and contemplate the next steps. This is
especially the case in these two examples, where it is not
readily apparent which box comes next. Consequently, the
boxes require additional information, that is, the prominent
section numbers. Also, the use of lines is one additional use
of ink on a page which must then be cognitively processed by
the reader, in contrast to white (or other background color)
space which one can pass over without pausing to think about
what it means.

In contrast, the formats used in Examples 22, 27, and 29 are open, using lines mostly to identify the page space in which answers are to be provided. These pages are easier for respondents to follow. Also, the respondent path is easily recognized, following the cultural norm of left to right within the defined answering space, and top to bottom on the page.

20. Structure and organize the questionnaire in such a way that it, first, makes sense to respondents and, second, avoids leaving the choice of the order in which questions get answered up to the respondent.

On the surface, this principal seems obvious and easy to implement. However, this may not be so, if the Census long and short forms are any indication. The Census long form is probably one of the most complex questionnaires in existence. It has a fold-out flap which asks for a listing of household members, followed by a matrix of short-form information and finally two pages of sample population questions for each person. This form involves a complex sequence of tasks, the order of which was traditionally dictated by Census needs to provide Congress with mandated information by the end of the census year.

A split-panel experiment with the long form, known as the 1990 Alternative Questionnaire Experiment (AQE), showed that the form's structure was not properly organized from the respondent's point of view (DeMaio et al., 1992). Along with the control form, which was identical to the 1990 Census long form, five experimental questionnaires were tested in the 1990 AQE. Two of the experimental questionnaires (Panels 2 and 3) incorporated many of the principles we have discussed concerning color, the consistent use of typeface and answer spaces, etc. However, three of the experimental questionnaires (Panels 4, 5, and 6) incorporated dramatic changes to the structure and organization of the form. Panel 4 became a matrix booklet in which the flap was eliminated and all of the person items were placed together. Panels 5 and 6

became "kits" in which individual questionnaires for each person in the household were placed in a folder.

The main finding was that "small" format changes alone (as incorporated in Panels 2 and 3) did very little to improve either item or overall response rates, but it took changes to the structure and organization of the questionnaire (as incorporated in Panels 4, 5, and 6) to make improvements. This suggests that "small" format changes are not enough to overcome the difficulty of completing a questionnaire that is not properly organized from the respondent's point of view. In addition, the Simplified Questionnaire Test (Dillman et al, 1992) and the Appeals and Long Form Experiment (Bates, 1993) confirmed this finding.

III.   CONCLUSION

Little information on the design of self-administered questionnaires existed until relatively recently. That which did was based primarily on common sense and individual experience. Instead, it was the verbal language of interviewer-administered questionnaires that predominately captured the attention of researchers.

The evidence presented in this paper demonstrates, however, that we need to pay serious attention to the visual language of self-administered questionnaires in addition to the verbal. Toward this end, we need to develop a set of scientifically derived and experimentally proven graphic design principles to guide us in our quest to improve both response rates and the accuracy of responses. We hope that the principles we've developed are a first step in that direction. We have little doubt that the problems we've uncovered exist. However, because many of the solutions have not been tested, we openly admit that they are subject to challenge. Some of the solutions we've offered will stand the test of time; others will not. Undoubtedly, this is an area in need of further study and creative insight.

Finally, we also hope to expand upon our work here by exploring literature that has remained outside the domain of survey methodology to date-- most notably, the eye-movement and the graphical design literature. Knowing what we do now,

it certainly seems that this literature may offer further insight into the self-administered question-response process.

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