Design of Follow-up Questions in Web Surveys

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Abstract. *This paper describes a qualitative study on how to design follow-up questions in self-administered computer-based surveys. Three different designs were examined: follow-up question on the next page, initially invisible on the same page, and initially greyed-out on the same page. The last design was definitely the worst and cannot be recommended. There are some indications that the second design might be preferable, at least when other design elements (such as graphics) do not make the page difficult to render.*

Keywords. Web survey, follow-up questions, question design.

1. Introduction

Self-administrated computer-based surveys, such as web surveys, are today widely used for market research, student and employee surveys. The main advantages of web surveys compared to traditional printed surveys are reduced costs and enhanced quality of the data collected. An estimate from current epidemiological studies using printed questionnaires is that the cost to handle one paper questionnaire (printing, mailing, return postage, and transfer the answers to computer readable format) can be as high as \$45 per person. The significant part of the cost saving using web questionnaires comes from not having to complete missing answers by phone interviews, transforming data into an electronic form and less data cleaning. On average, 80% of all paper questionnaires are returned incomplete or with contradictory answers [1]. These require manual handling, by calling the respondents back in order to complete and correct the answers. In web surveys, data cleaning has been reported to be reduced by 80% [2]. In addition, savings will also be made on postage, printing, and man-hours for handling printed questionnaires. In total, a cost reduction of 70% for the data collection is possible to achieve [6].

However, for larger studies, (as in medical epidemiology) web surveys have not been used so far. There are several reasons for this, including tradition and biased access to Internet, but also the length of the surveys in epidemiological research. A survey containing a food frequency module may contain more than 350 questions and require on average two hours to answer.

It is known that reading on-line, for example, can be 20-30% slower than reading from paper [12]. This lead to recommendations to limit the length of web surveys to a maximum of 2-3 screens [5] or 25 multiple-part questions [9].

We would like to go beyond this limitation by improving the interface of the questionnaires to engage the respondents. One way to engage the respondents is to make the survey interactive by changing the screen layout depending on the respondent's answers.

This study focuses on how to design the layout of follow-up questions in self-administrated computer-based surveys. Three different solutions were examined in an attempt to find out which one is the best. Unlike recommendations in for example [7] the survey in this study is dynamic, which means that the user is exposed to only one, or a few, questions at the same time and that the follow-up questions are depending on how the respondent is answering. This makes it possible to adjust the survey to the user; another advantage is that scrolling can be avoided. According to Fondell [10], scrolling a page can be difficult for users with limited computer experience. These people are often older than 50 years, which is an important group for studies in medical epidemiology due to the many age related health conditions.

Dillman et al. [8] suggest how to minimize different kind of survey errors when using the web instead of paper. Manfreda et al. [11] studied the effects of one-page versus multiple page design and advanced graphics. Contrary to

those studies this study uses a layout as simple as possible and focuses only on the question layout, not on the quality of the answers, nor the use of graphics and fonts although these factors certainly affects user performance [3].

The alternatives to design the answers are usually divided into two categories, closed-end and open-end. In the closed-end alternative the user has to choose between given alternatives using either checkboxes or radio buttons. In the open alternative, there is a text field in which the user types in his/her answer.

The closed end alternative provides easy interpretation of the answers, especially since there are no possibilities to leave misspelled answers. The open-end alternative makes it possible for the user to fill in additional information, important for some respondents, but more difficult to analyze for the researcher. A combination is used in one case in this study.

2. Methods

The participants were chosen in order to achieve a variety in age (Table 1), computer skills (Table 2), profession and level of education. Occupations among the respondents included undergraduate student, graduate student, writer, janitor, administrative assistant, programmer, chef, and retired. In total, the study included 19 users, eleven men and eight women, covering the ages from 20 to 68 years.

Table 1. Age distribution of respondents

20-30	31-40	41-50	51-65	66+
7	5	3	2	2

Table 2. Computer skills of respondents

Some		Large
Using Word, Excel, and email.	Writing some programs and macros.	Good knowledge of hardware.
10	3	6

A protocol with interview questions was prepared and used in all interviews as well as a set of instructions for the respondent to read before answering the questionnaire. Every user answered the survey on the same computer, a laptop, in order to minimise influence from different computer types. The respondents did not have to start the computer, nor the survey. All interviews were tape recorded, with a few exceptions when the respondent did not want to be recorded. The respondents were asked to

“think aloud” during the entire session with the questionnaire in order to catch spontaneous reactions. In addition, the interviewer took notes during the questionnaire session and questions based on these notes were asked after the questionnaire was completed.

The questions in this study were selected from on-going studies at the Department of Medical Epidemiology at the Karolinska Institutet in Stockholm, Sweden.

3. Results

3.1. Follow-up question on the next page

A common construction in web survey systems is to present the initial question and the eventual follow-up question on different pages. This construction is easy to implement and will work in almost all web browsers.

The users were first exposed to the question in figure 1 below.

Have you smoked anything during the last two months?

☐ Yes

☐ No

<< Previous Abort Next >>

Figure 1. Initial question.

If the user answers “yes” and clicks “next” s/he will be exposed to a follow-up question with the layout as in figure 2.

How much have you been smoking?

☐ Less than one package a week

☐ One to two packages a week

☐ Three to four packages a week

☐ Five to seven packages a week

☐ More than seven packages a week

<< Previous Abort Next >>

Figure 2. Follow-up question on next page.

As expected, no user reacted to this layout. It is what could be expected and causes no confusion on what to do. However, one disadvantage was discovered: when the follow-up question is presented, the context of the initial question is lost which may force users to think longer before answering in order to re-establish the context of the initial question. One user clicked "Previous" to see the first question again.

3.2. Follow-up question on the same page

Presenting the follow-up question on the same page as the initial question solves the problem mentioned above: the context of the initial question is preserved. A disadvantage is that these types of pages require a new rendering that may take time if the computer or connection is slow. However, since the questions used in this study did not include graphics, it is only a minor concern.

When the user comes to the initial question, it appears like in figure 3 below.

Figure 3. Initial question.

If the user then answers "yes", the follow-up question will pop-up beneath the first question and the page will look like figure 4 below.

No user had any difficulties with this layout. One of the users spontaneously exclaimed: "It's cool that it [the follow-up question] appears immediately after answering the first question, nice". Indicating that the visible interactivity was perceived positive.

Figure 4. Follow-up question on the same page.

3.3. Follow-up question initially grey

A third version of follow-up question would be to show both the initial question and the follow-up question at the same time, as it would be in a paper questionnaire. However, in order to prevent respondents from answering the follow-up question without answering the initial question, we greyed-out the follow-up question initially and thus made it impossible to answer until the initial question was answered. The page first appeared as in figure 5 below.

Figure 5. Initial question with follow-up greyed out.

The respondent can see that there is a follow-up question. The grey colour indicates that it is currently inactive. If the user clicks "yes" on the first question, the follow-up question becomes active, the grey becomes black, and it is possible to answer the follow-up question, see figure 6.

What is your current weight? kg

Have you ever lost 5kg or more during one year?

☒ Yes
☐ No

How much and how many times have you lost weight?

1 2 3 4 5 or more

5 kg to 10kg ☐ ☐ ☐ ☐ ☐

More than 10kg ☐ ☐ ☐ ☐ ☐

<< Previous Abort Next >>

Figure 6. Follow-up question selectable

Many users spent a lot of time trying to read the grey text, even if they were not supposed to answer the question. After a while they figured out that the follow-up question didn't affect them. One user first focused on the grey text, skipping the initial question entirely. Another user said: "Is it supposed to be like this? Is it completely loaded?"

4. Conclusions

We have presented an initial qualitative exploration on how to design follow-up questions in a computer-based questionnaire. Although the number of respondents were small, the layout with the follow-up question initially grey must be considered as really bad. Since the users spent a lot of time and energy on trying to read the grey text they did not focus on the first question.

When it comes to recommending follow-up questions on the same or next page further studies are necessary. Due to the reactions from the respondents, presenting the follow-up question on the same page as the initial question is slightly better for the users than the one with the follow-up question appearing on the next page. Besides the users' positive reactions, the "same page" solution also requires less clicking (one next button less compared to the two page solution). This takes both time [2] and focus from the question.

A limitation of the technique where follow-up questions are presented on the same page as the original question is scalability. If the number of answer alternatives or the number of follow-up questions is great, the advantages of presenting the follow-up question on the same come in conflict with the demand of minimising scrolling [10].

A future study to distinguish the best solution of the two should include many more users and measure both actual time used and the perceived time used, the amount of users of the two-page solution that need to go back, and the users overall perception of the questionnaire.

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