HOW WEB SURVEYS DIFFER FROM OTHER KINDS OF USER INTERFACES [1]

Michael F. Schober, New School for Social Research
Frederick G. Conrad, University of Michigan
Patrick Ehlen, New School for Social Research
Scott S. Fricker, University of Maryland
Michael F. Schober, Dept. of Psychology F330, New School University,
65 Fifth Ave., New York, NY 10003

Key Words: web surveys, question clarification, data quality, response accuracy, human-computer interaction

INTRODUCTION

When responding to a web survey, respondents (or users) usually are invited to participate, are presented with questions, and provide information about themselves. This is quite different in structure from the more typical web interaction on several counts. In a more typical web interaction, (a) the user initiates the interaction, rather than being invited to participate; (b) the user requests information from the system, rather than being asked for information by the system; and (c) the system provides responses to the user, rather than the user providing responses to the system.

We propose that as web survey interfaces are developed an important distinction should be kept in mind between interactions in which the user *provides* information to the system (like web surveys) and interactions in which the user *obtains* information from the system (like web searches). Users *provide* information to systems when they file taxes electronically, vote via the Internet, fill out on-line job applications, or register new product purchases online. Users *obtain* information from systems when they retrieve statistics from federal agencies, search with Google, or download PDF documents, photos, and movies. Principles of interface design for the two types of systems may not be the same.

Note that the distinction isn't simply that the stakes are higher when users have initiated the interaction and are searching for information (i.e., in the information-obtaining case). In both types of systems there are activities for which the stakes can be quite low for the user, as when users fill out satisfaction surveys after on-line purchases (in the information-providing case) or casually surf the web (in the information-obtaining case). Similarly, in both types of systems there are activities for which the stakes are high—when it will certainly matter to users that they have understood the system precisely and that the information exchange has been appropriately precise, as when users file their taxes electronically (an information-providing task) or when they retrieve statistics (an information-obtaining task). That said, it is probably the case that on average stakes tend to be lower when users provide information than when they obtain it.

We propose that, all else being equal, user behavior will differ for interfaces where users provide information rather than obtain it, because the consequences to the user of misunderstanding tend to differ in the two cases. When users provide information to systems, there are fewer consequences of misunderstanding because the user doesn't do anything further with the data after submitting them to the system. In contrast, when users obtain information from systems, the consequences of misunderstanding are potentially greater, because the user is getting the data in order to achieve some other goal.

We also propose that users bring different assumptions to information-providing situations like web surveys than they bring to information-obtaining situations like web searches. For instance, users who are survey respondents are more likely to assume that words in survey questions mean what they seem to mean—that is, they rely on a *presumption of interpretability* (Clark & Schober, 1991). In a web search, users are more likely to recognize that words and labels on web sites that plausibly could refer to what the user is looking for actually may not, because they know that web sites they are searching weren't necessarily designed for their particular needs.

This presumption of interpretability follows from a simple principle of ordinary discourse: speakers, not their addressees, are usually responsible for what they mean, and conform to a *principle of speaker responsibility*. In a web survey, the survey designer (the "speaker") asks questions of the user (the addressee), and is therefore responsible for the meanings of those utterances. In a web search, in contrast, the user (speaker) queries the system (addressee), and is responsible for the meaning of each utterance.

[1] We thank the Bureau of Labor Statistics for assistance with this project. This material is based upon work supported by the National Science Foundation under grant No. IIS-0081550. The opinions expressed are those of the authors and not of the Bureau of Labor Statistics.

If the burden of responsibility is indeed different between the two types of interfaces, this leads to a simple prediction: users should seek clarification of the concepts used in a web survey *less often* than they would for the same concepts in a web search, all else being equal.

In the current study, we examine whether this prediction holds true, keeping other factors as constant as possible.

EXPERIMENTAL DESIGN

We compared rates of clarification-seeking in a web search (information-obtaining) task and a web survey (information-providing) task. In both tasks, users encountered the same concepts for which they could request clarification. The concepts were taken from ongoing US government surveys (the Consumer Price Index Housing survey and the Current Point of Purchase Survey). The concepts had thus been extensively studied and carefully defined by survey designers to decide what those concepts included and excluded. For example, the official definition for "expenses for moving" reads

> Include fees paid to professional movers, including packing, freight and storage. Do not include the expenses involved if the respondent moves him/herself without professional help. Include parcel delivery service, except U.S. Postal Service.

Both tasks were carried out at the Bureau of Labor Statistics laboratory in Washington, DC. 32 paid users who had responded to an ad in the *Washington Post* participated in the web search task; 33 demographically matched users participated in the web survey task. Users ranged in age from 19 to 79, averaging 42.2 years; 33 were White, 25 were Black, and 4 were Asian. Users averaged 15.3 years of education, with 54% reporting that they had completed a bachelor's degree or some graduate-level study (MA, MS, or Ph.D.). The reported computer use of our respondents ranged from *less than once per year* (n=2) to *every day* (n=47); 95% of users reported using a computer at least once a month.

Web survey task. In the web survey task, users answered 8 survey questions (4 about housing and 4 about purchases) on the basis of fictional scenarios adapted from those used in Lind, Schober, and Conrad (2001) and Coiner, Schober, Conrad, and Ehlen (2002). Four questions from each domain appeared on a web page at a time. To answer each question, respondents were to turn to a different page in a packet of scenarios. Here is an example of what the interface looked like:

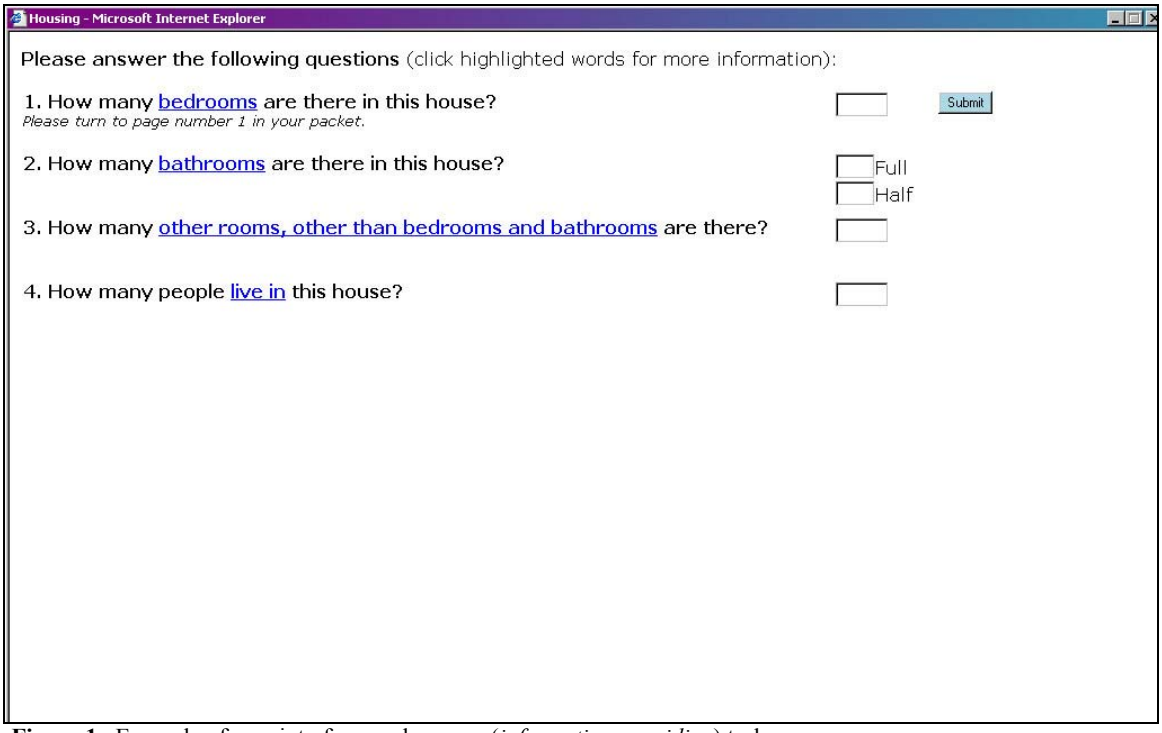

Figure 1. Example of user interface, web survey (*information-providing*) task.

Users were instructed that definitions of blue highlighted terms were available by clicking on those terms. If users clicked, the full definition from a US government survey appeared, as in this example:

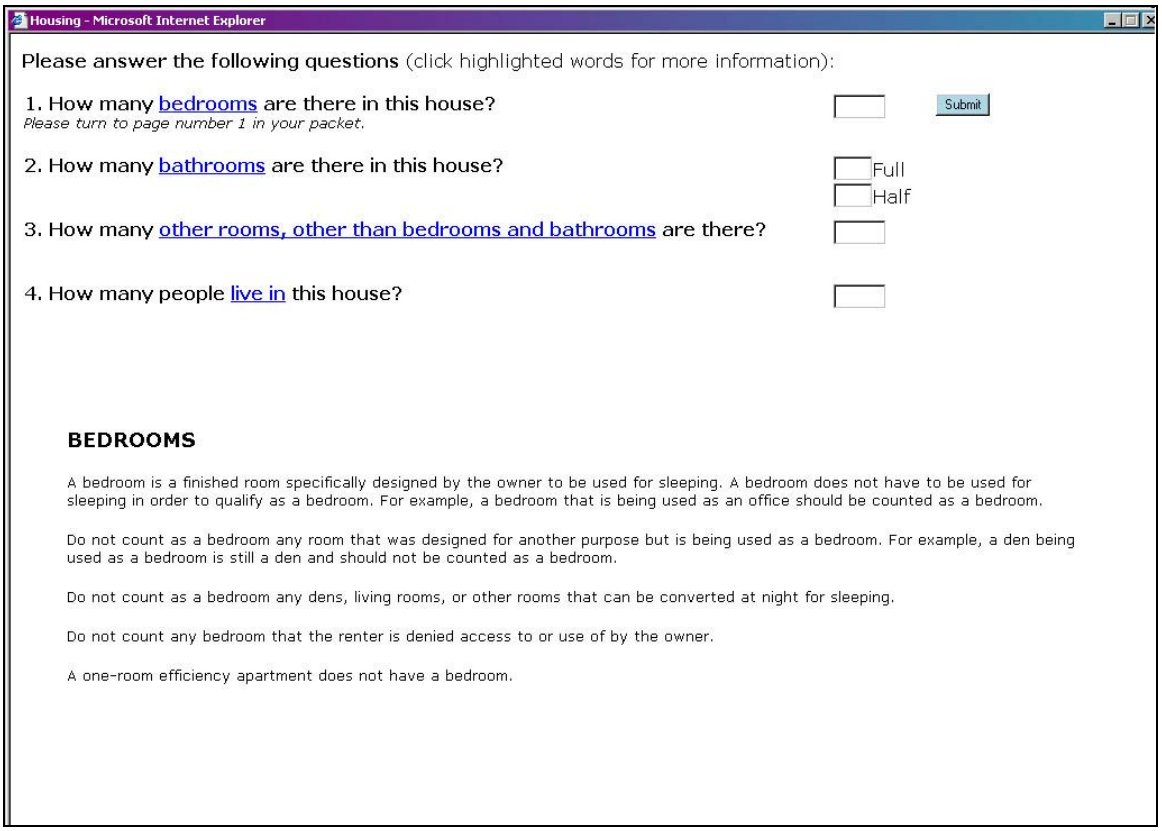

Figure 2. User interface with definition of term (*bedroom*) provided, web survey (*information-providing*) task.

As in some of our previous studies on telephone interviewing (Schober & Conrad, 1997; Schober, Conrad, & Fricker, 2003) and on web surveys (Conrad & Schober, 1999; Lind, Schober, & Conrad, 2001; Coiner, Schober, Conrad, & Ehlen, 2002), respondents were presented with two kinds of scenarios. For each respondent, half the scenarios led to a straightforward mapping between the situation described in the scenario and the question, and half led to a complicated mapping. For example, for the question "How many bedrooms are there in this house?" the complicated scenario presented a floor plan for a house in which accompanying text explained that the room labeled "den" was being used as a bedroom. The corresponding straightforward scenario simply labeled that room "bedroom."

Web search task. In the web search task, users needed to get information from the system in order to write down answers to 4 questions about housing prices, and in order to fill out another 4 items in a fictional reimbursement report. Each user was presented with a packet of printed scenarios similar to those provided to the web survey respondents. The scenarios included a question that the user could answer by searching either a housing web site where prices were listed or a corporate web site where reimbursement rates were listed. For example, the following text appeared above a floor plan in one of the housing scenarios:

> You need a home with a separate room where you and your spouse can sleep, a separate room where your elderly mother can sleep, and a separate room where your child can sleep. Some friends of yours told you that they saw a house in the Fiesta Estates that they think meets your needs. Here's the map from the realtor. Based on the **number of rooms** in the house, how much does this house rent for?

Just as in the web survey task, there were two versions of the floor plan. One labeled a room as a "den" but explained that it was being used as a bedroom – this was complicated scenario – and one labeled it simply as a bedroom – this was the straightforward scenario.

The same 8 concepts from the survey were used, with the same definitions available by clicking. There was thus the same number of search tasks as there were survey questions.

The web search interface was as similar as possible to the survey interface (see Figure 3). The interface

used the same font and colors, although the pages were laid out somewhat differently in order to make the tasks plausible. Because web search tasks almost always involve more than one layer of search (even a direct hit using Google requires an initial Google layer, but often the searching goes deeper, with users making a choice at each step), this web search required users to actively select the appropriate table rather than having it appear automatically. For the housing domain, users had to choose between tables of sales and rental pricing and click the appropriate link. For the reimbursement domain, users had to select particular purchases from a larger set of purchases and click the appropriate link. An example of the kind of table that users could retrieve in the housing search tasks is displayed in Figure 4.

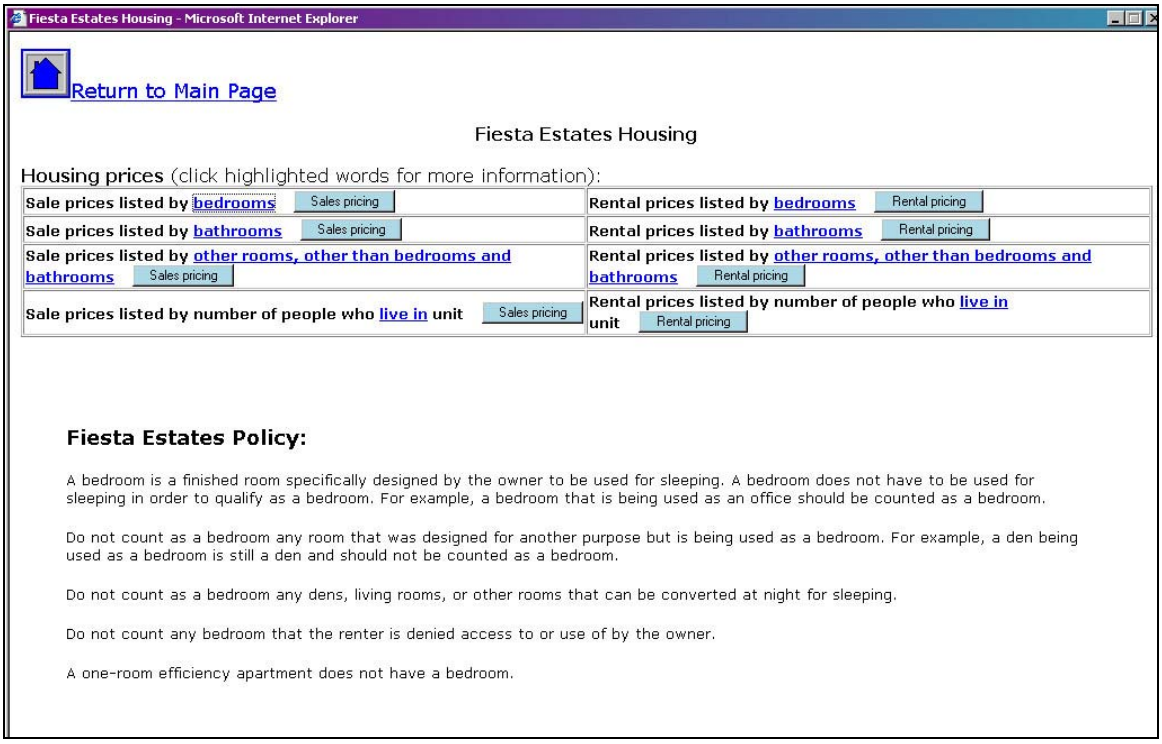

Figure 3. Example of user interface, web search (information-obtaining) task, with definition of term.

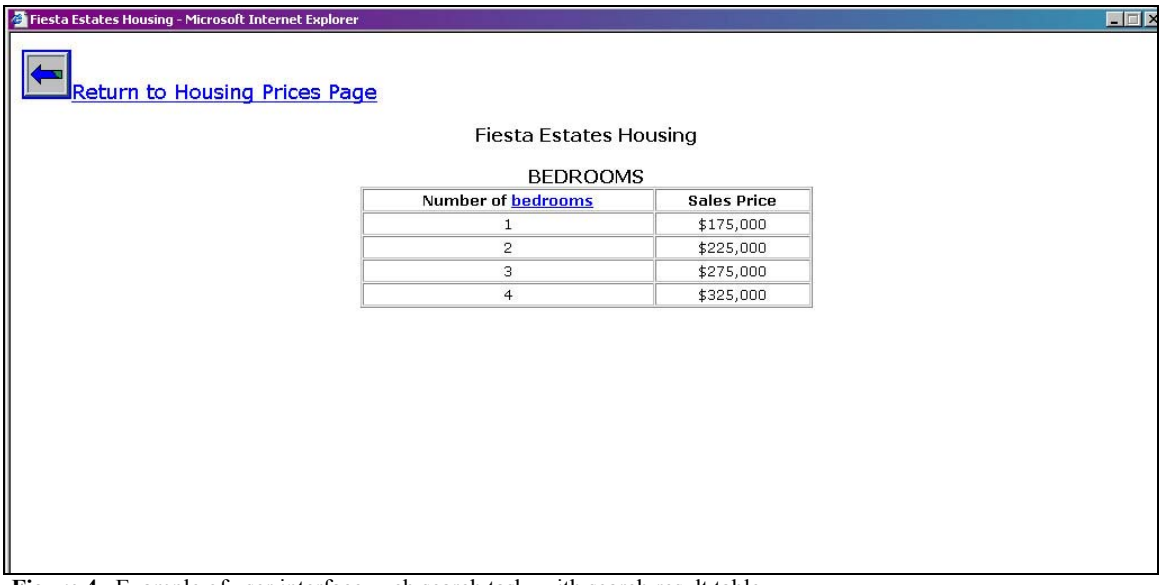

Figure 4. Example of user interface, web search task, with search result table.

The web survey task structure was thus the mirror image of the web search task structure, as shown in Table 1. In the survey task, the survey sponsor or researcher invites the potential respondent to participate, while, in search task the user initiates the search, presumably to fulfill a goal beyond the search task (like deciding whether to move to a particular city based on the retrieved crime or education statistics). In the survey task, the system poses a question to the user; in the search task, the user poses a question to the system (which may include millions of computers across the web). In the survey task, it is the user's knowledge that the interaction is designed to unearth; but in the search task it is information in a database that is retrieved if the search is successful. Our user interfaces for both tasks have definitions available for the same words and concepts, but in the survey task these appear in the survey question, while in the search task they appear in the table that is returned from the first layer of searching. Finally, the two experimental tasks differed in that the survey respondent's final action is to submit answers to the system, while in the search task the user's final action is to write down the information that has been retrieved from the database to simulate the further use to which the search results are likely to be put.

	Web survey	**Web search**
Motivation for query	Survey sponsor	Scenario on paper (surrogate for user's desire for info)
Query posed by	System	User
Where info is	Scenario on paper (surrogate for in user's head)	Web database
What gets defined	Words in survey Q	Words in database table
User's final action	User enters response	User writes down info from database

Table 1. Structure of web survey and web search tasks

RESULTS

Clicks for clarification. As Figure 5 shows, users clicked for clarification more than twice as often in the web search task as they did in the web survey task., $F(1,63) = 6.26$, $p = .015$. In both tasks, users were more likely to click for clarification for complicated mapping scenarios than for straightforward mappings, $F(1,63) = 7.27$, $p < .01$; this did not differ in the web search and web survey tasks.

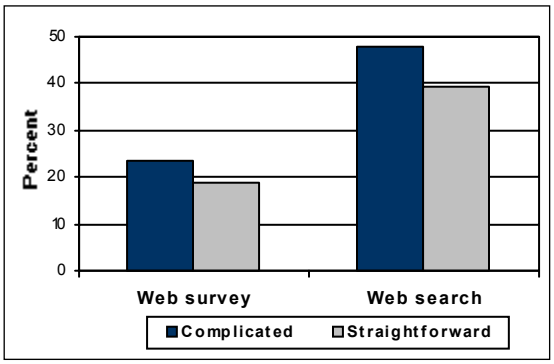

Figure 5. User clicks for clarification by task (*web-survey* vs. *web-search*) and scenario type (*straightforward* v. *complicated*)

Improvement due to clicking. In both tasks users provided substantially more accurate answers when they clicked for clarification than when they didn't. As Figure 6 shows, the difference in accuracy between those occasions when users clicked and when they did not were particularly large for complicated-mapping scenarios in both tasks; improvements for straightforward scenarios were, not surprisingly, more modest because users tended to answer accurately without clarification.

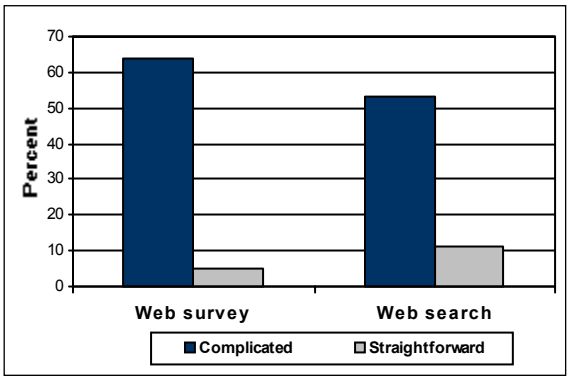

Figure 6. Increase in accuracy when users clicked

User open-ended comments. More users in the web search task (13) than in the survey task (4) reported that questions were "tricky," required attention to detail, or were conceptually unclear. For example, one user in the web search task wrote, "At the beginning of the study I presumed to know the definitions of some of the terms. It wasn't until part way through the study did I come to the understanding that my def. may be different." Another, discussing the definitions that were displayed when users clicked on blue highlighted text, reported, "I personally feel that all of the tasks that were presented were fairly clear and manageable

with the use of the blue highlighted text. Without this, I feel that respondents would be unable to accurately ascertain the meaning of a particular term and thus would be unable to respond correctly."

In contrast, users in the web survey task were more likely to report that the task was easy and that definitions were unnecessary. One wrote, "This was interesting that I did not have to think hard to complete the task. I enjoyed responding to the questions." Another wrote, "Easy and clearly understandable." And yet another wrote, "I felt like overall the study was simple and not difficult."

These comments support the proposal that users' assumptions about word meanings are different for web survey interfaces than they are for web search interfaces.

DISCUSSION

This study demonstrates that users click for clarification less often in web surveys than in web searches. In a web survey, users don't seem to question their interpretations as much as they do in a matched search task. This is problematic for web survey designers, since the evidence also shows that clicking for clarification leads to improved comprehension accuracy—and thus improved data quality.

The findings support our proposal that users bring different assumptions to web surveys than they bring to web searches regarding where the burden of responsibility rests for clarifying the meanings of important concepts. In web surveys, the burden of responsibility for misunderstandings—as well as the consequences of those misunderstandings—rests on the shoulders of the researcher. In web searches, in contrast, the user actively assumes the burden of responsibility for understanding, in part because the consequences of misunderstanding are more tangible in the user's pursuit of some particular, individual goal.

What does this mean for designing web surveys? On the one hand, the findings suggest potential benefits from allowing users to click for clarification within a web survey. This practice would amount to a substantial innovation to current practices (e.g., see Dillman's [2000, p. 379] advice to web designers to emulate the design of paper questionnaires, which contain no definitions). But the benefits may not be the same as they would be for other sorts of interfaces. As survey researchers look to the study of other kinds of interactive systems for designing web surveys, it is important to distinguish between systems where users provide rather than obtain information. It may be a mistake to simply apply established guidelines from the field of human-computer interaction (e.g., Nielsen, 2000; Rosenfeld & Morville, 1998) that were developed for a different class of systems.

REFERENCES

Clark, H.H., & Schober, M.F. (1991). Asking questions and influencing answers. In J.M. Tanur (Ed.), *Questions about questions: Inquiries into the cognitive bases of surveys* (pp. 15-48). New York: Russell Sage Foundation.

Coiner, T.F., Schober, M.F., Conrad, F.G., & Ehlen, P. (2002). Assessing respondents' need for clarification in web surveys using age-based user modeling. In *Proceedings of the American Statistical Association, Section on Survey Research Methods*. Alexandria, VA: American Statistical Association.

Conrad, F.G., & Schober, M.F. (1999). A conversational approach to computer-administered questionnaires. In *Proceedings of the American Statistical Association, Section on Survey Research Methods* (pp. 962-967). Alexandria, VA: American Statistical Association.

Conrad, F.G., & Schober, M.F. (2000). Clarifying question meaning in a household telephone survey. *Public Opinion Quarterly, 64*, 1-28.

Dillman, D.A. (2000). *Mail and Internet surveys: The tailored design method (2nd ed.)*. New York: Wiley.

Lind, L.H., Schober, M.F., & Conrad, F.G. (2001). Clarifying question meaning in a web-based survey. In *Proceedings of the American Statistical Association, Section on Survey Research Methods*. Alexandria, VA: American Statistical Association.

Nielsen, J. (2000). *Designing web usability: The practice of simplicity*. Indianapolis: New Riders Publishing.

Rosenfeld, L, & Morville, P. (1998). *Information architecture for the World Wide Web.* Sebastopol, CA: O'Reilly & Associates, Inc.

Schober, M.F., & Conrad, F.G. (1997). Does conversational interviewing reduce survey measurement error? *Public Opinion Quarterly, 61*, 576-602.

Schober, M.F., Conrad, F.G., & Fricker, S.S. (2003). Misunderstanding standardized language in research interviews. *Applied Cognitive Psychology*, *17*, in press.