# The Use of Touch-Screen ACASI in a High-Risk Population: Implications for Surveys Involving Sensitive Questions

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How do we motivate survey respondents to truthfully answer questions on sexual behavior, drug use, and other topics that are "sensitive"? This issue has posed a dilemma throughout the history of survey research, and many investigators have examined the issue of how to modify survey questions or administration procedures in order to maximize truthful responding (see Bradburn, 1983; Schaeffer, 2000; Tourangeau, Rips, & Rasinski, 2000; for reviews). Generally, these investigators have advocated the use of self-administration rather than interviewer-administration of sensitive questions, and the increasing capability of computers to facilitate self-administration has in fact produced a technologically-driven evolution in survey methods. In particular, the use of laptop computers having digitized speech capability has led to the development and widespread application of ACASI (Audio Computer-Assisted Self-Interviewing) systems, in which the computer is used to present the questions via both headphones and the laptop screen, and the respondent is able to enter responses by pressing single keys.

## Development of Touch-Screen ACASI

Several studies have found ACASI, or its telephone equivalent, T-ACASI, to be useful in increasing reported frequencies of sensitive behaviors (Des Jarlais, Paone, Milliken, Turner, Miller, Gribble, Shi, Hagan, & Friedman, 1999; Gribble, Miller, Catania, Pollack, & Turner, 2000; Tourangeau & Smith, 1996), and in the absence of validating information, it is assumed that this increase reflects reporting that is closer to the truth (i.e., "more is better"). The current study was designed to examine the use of a further extension of ACASI in which the respondent is able to enter responses by touching the laptop screen, rather than entering responses through the computer keypad (for technical details, see Cooley, Rogers, Turner, Al-Tayyib, Willis, & Ganapathi, 2001). In particular, we expected that for a population having a relatively low level of education, and possibly considerable reading difficulty -- patients in an inner city sexually transmitted disease (STD) clinic -- this *Touch-Screen* procedure would be preferred, and might ultimately lead to increases in truthful responding, compared to standard interviewer-based questionnaire (IAQ) administration. In addition to providing a test of a new technology, the current experiment also provided an opportunity to study responses to sensitive questions in a particularly appropriate population sub-group. Generally, survey experiments on mode effects involving sensitive topics have utilized a general population, and even where the sample was selected to be over-represented by those likely to have engaged in sensitive behaviors, it is not known by the investigators whether individual respondents have engaged in these behaviors. For the current study, we felt that administering a sensitive questionnaire in an STD clinic, although not providing individual-level validation, would represent an environment in which it could be safely concluded that most individuals had experienced many of the behaviors and situations being researched.

## Experiment 1: Investigation of patient perceptions of sensitive questions

Because one goal of this study was to investigate patient perceptions of sensitive behaviors, rather than making assumptions with respect to either item comprehension or respondent motivation to withhold sensitive information, we examined these issues directly. Specifically, we focused on the following issues: a) Do clinic patients appear to comprehend key terms and concepts in such a way that the researchers can conclude that decision processes, as opposed to basic comprehension processes, are dominant in driving respondent behavior for the remaining phases of the research?; b) What are patient perceptions concerning the provision of truthful information to the types of questions to be administered in this study?; and c) To what extent do patients generally appear to perceive STD/HIV risk-factor questions as sensitive? Note that if such questions are not viewed as sensitive in nature, there is no particular reason to expect variation in reporting of these factors as a

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function of interviewing procedure.

**Procedure**

Instrument development. The investigators initially developed a semi-structured instrument (the "Clinic Socialization Questionnaire") that did not directly ask for reports of sensitive behaviors, but was instead designed to determine attitudes towards telling the truth versus withholding information in the clinic environment. The questionnaire contained questions on: a) knowledge related to STDs, b) reasons for the current visit, c) expectations concerning treatment and questions to be asked by medical staff during the visit, d) previous visits to STD clinics, e) attitudes toward disclosing truthful and accurate information during the clinic visit, f) prior knowledge of activities to occur during the visit, and g) interpretation of key terms such as "regular sex partner" and "monogamous."

Patient selection. Eligible patients were individuals between the ages of 15 and 39 who were seeking treatment at the clinic for an active STD. Interviewers approached patients as they scheduled appointments and attempted to elicit their cooperation. Two interviewers interviewed a total of 73 patients: 31 male, 42 female; 35 had been to an STD clinic before, 38 had not. Mean patient age was 24.7.

Questionnaire administration. Two research interviewers administered the 45-minute Clinic Socialization Questionnaire. All interviews for this phase of the study were conducted in a private room at the STD clinic, prior to the clinic examination. The semi-structured interview procedure posed scripted questions, but also allowed for deviation in wording and probing in order to clarify responses that were difficult to code. In this sense, the instrument operationalized the concept of non-standardized interviewing (Suchman and Jordan, 1990).

**Results**

Response frequencies for key questions are shown in Table 1. Overall, respondents appeared to comprehend the terms used fairly well. However, although patients agreed that the main person with whom one is having sex is a "regular sex partner," they failed to apply that term consistently to other individuals who would be termed as such by survey administrators. Although by no means conclusive, this points out the potential for undercounting, given this phrasing.

Concerning variables that may be related to the tendency to provide truthful responses, patients at least claimed to have come prepared to provide information that was truthful. More significantly, there was relatively little indication that topic areas related to sex were particularly sensitive; only one-third reported that discussing such private issues was uncomfortable.

Table 1. Experiment 1: Key questions presented and tabulated results.

| | |
|---|---|
| ***Questions relevant to term comprehension:*** | |
| Have you ever heard the term "STD, or sexually transmitted disease"? | Yes: 98.6%<br>No: 1.4% |
| If you're having sex with several people, but mostly with one person, do you consider the person you have sex with the most your "regular sex partner"? | Yes: 84.9%<br>No: 12.3%<br>DK: 2.7% |
| How about the other people you're having sex with - Would you consider them to be regular sex partners? | Yes: 20.5%<br>No: 72.6%<br>DK: 5.5% |
| ***Questions relevant to truthful responding:*** | |
| Do you believe that all information that you provide to health professionals at the clinic is confidential, or do you believe that it's shared with others? | Confidential: 56.2%<br>Shared: 42.5% |
| You're just here to get checked and treated, and are not much interested in talking with a doctor or nurse about personal things: | Agree: 34.7%<br>Disagree: 54.2%<br>DK: 11.1% |
| It's uncomfortable talking to clinic staff about your sexual practices and behaviors: | Agree: 33.3%<br>Disagree: 58.3%<br>DK: 8.3% |

**Conclusions**

Overall, we concluded from the initial experiment that in this (medical) environment, patients believed it to be generally important to answer sensitive questions truthfully. Nonetheless, one third of the patients reported discomfort in talking to staff about their sexual behavior. At this point, we felt that the very general questions we had asked regarding the discussion of sexual topics may not have conveyed to patients the truly graphic nature of the relevant survey questions, and that they therefore had little concrete basis on which to base their opinions. Therefore we hypothesized that a procedure that avoids social contact, such as ACASI, might still be useful in motivating truthful responding, even in the clinic environment, and that this was worth testing in a further experiment.

There was also clear evidence that some patients wondered about data confidentiality, and we felt that this might also influence preferences related to administration mode. It has been suggested that respondents believe that the use of computers enhances the overall legitimacy of the data-collection effort (Tourangeau and Smith, 1996). However, to the extent that concerns about confidentiality extend beyond the point of initial reporting of sensitive behaviors to the interviewer, these may be present under ACASI as well as IAQ procedures. That is, there may be no reason to believe that the use of ACASI will necessarily serve to alleviate concerns about data confidentiality, or to improve the quality of reporting by patients who are concerned about the ramifications of truthful reporting. An important caveat therefore is that the use of an ACASI system as opposed to IAQ may improve truthful reporting to the extent that concerns about *privacy* during the interview, as opposed to those concerning data *confidentiality*, motivate respondents (see Singer, Mathiowetz, and Couper (1993) concerning this distinction). Overall, we felt that it was simply not clear, without further experimentation, how an ACASI procedure would be perceived by STD clinic patients.

**Experiment 2: Mode Preference**

The primary goal of the second experiment was to determine patients' relative preference for Interviewer Administration *(IAQ*), Keyboard ACASI (*Key*), or Touch-Screen ACASI (*Touch*) for presentation of very sensitive survey questions. In brief, patients experienced each mode, and then were administered a debriefing questionnaire which inquired about their preferences, and the reasons for those preferences.

**Subjects**

The subject population was similar to that used for Experiment 1; a total of 108 individuals (54 male, 54 female) between the ages of 15 and 39 who agreed to participate were interviewed at the STD clinic.

**Procedure**

Risk-Factor Questionnaire. The research team developed a sensitive gender-tailored STD/HIV risk factor questionnaire modeled on one used previously in a study in the clinic. The questionnaire contained three sections, on a) drug, alcohol use, and family abuse; b) sexual history and partner information; and c) STD history and symptoms (see Table 2 for sample questions felt by the researchers to be particularly sensitive).

The questionnaire was then programmed onto a laptop computer system, such that each of the three sections could be administered under each administration mode (IAQ, Key, or Touch). In total, six presentation sequences were programmed, representing all possible orderings of IAQ, Key, and Touch, so that any effects of ordering would be balanced across mode.

Table 2. Experiment 2: Sample sensitive questions asked of male respondents.

| |
|---|
| *Thinking about all the times you got someone pregnant, how many of those pregnancies ended in abortions?* |
| *When, if ever, was the last occasion you had anal sex with a woman? By anal sex, we mean a man's penis entering a partner's anus or rectum.* |
| *Have you EVER had painful sores or blisters on your sex organs?* |
| *Have you EVER had dripping or oozing or a discharge from your sex organs that had a strange color or smell?* |
| *Have you ever had sex with a man involving genital area/penis contact?* |

The computer was programmed so that once a sequence number was entered, the system would automatically enable the correct mode. For IAQ, the interviewer was to simply face the computer and read the questions as in CAPI (Computer-Administered Personal-Interviewing) administration. For Key ACASI, the patient faced the computer to read the questions, listened as they were administered through the headphones, and entered responses directly on the keyboard (for example, by pressing '1' and then the Enter key for a "Yes" answer).

For the Touch-Screen procedure, a touch-sensitive overlay device was affixed to the laptop video screen, and answers were entered by touching an on-screen response category and then a "Continue" box with either the finger or the tip of a pen. The system read the question and each response category, with instructions as to how to answer (e.g., "If yes, press 1. If no, press 9").

For both Key and Touch-Screen procedures, the pre-recorded digitized voice used to present questions was female. For both procedures, the system also contained function keys to a) repeat a question, b) return to the previous question, c) enter "Don't Know" as a response, and d) refuse to answer a specific question.

Debriefing questionnaire. A paper-based debriefing questionnaire was also developed to determine which of the presented modes the patients preferred, reasons for this preference, whether they had problems with the mechanics of the computer-based procedures, whether they found the survey questions to be sensitive, and how accurate they believed their answers to be.

Questionnaire administration. Two interviewers administered the questionnaire in a private location in the STD clinic to volunteer subjects. Interviewer and patient gender were matched. At the start of the interview, the interviewer obtained informed consent and provided brief training on the Key and Touch ACASI modes, and the

patient practiced each. Then, the main Risk-Factor questionnaire was presented according to the sequence order that was assigned to that patient. In all, nine complete sets of the six sequences were run for each gender, or 108 total subjects. For the IAQ section, the interviewer read the questions and response categories to the patient and entered the responses on the keyboard. For the Key and Touch modes, the patient used the appropriate response entry method and the interviewer oriented him/herself so as not to be able to view the computer screen. The questionnaire took about 30 minutes to complete.

Following administration of the questionnaire, the interviewer orally administered the ten-minute paper-based debriefing questionnaire to assess which procedure the patient preferred. Finally, the interviewer gave the patient a $30 grocery coupon as remuneration. Data for all questionnaires were stored on the computer's hard-drive, and later transmitted over phone lines to RTI staff in Washington, D.C.

**Results**

Reporting of sensitive behaviors: As expected, patients reported a variety of behaviors that might be considered to be sensitive, or that are associated with increased risk of contracting HIV or an STD. For example, females and males reported, respectively, that: a) 42.4% and 62.5% had five or more drinks on one day in past month; b) 48.4% and 72.5% had sex while under the influence of alcohol in the past month; c) 33.3% and 35.2% had used cocaine at least one time, and d) 44.4% and 77.8% had been arrested at least once. Interviewers reported that although patient reaction varied, most appeared fairly comfortable answering the questions, and were not visibly shocked or overtly offended by the sensitive nature of the presented questions.

Mode preference. Analysis was then conducted in order to determine which administration mode subjects reported having preferred. For those who expressed a preference (101 of 108), Touch-Screen was strongly preferred over Key or IAQ (Table 3). The overall difference in preference as a function of administration procedure was significant by Chi-square test ($p<.05$).

Preference for the Touch-Screen procedure was greater for females than for males, although the gender by mode interaction was not statistically significant (see Table 4). Further: a) preference for mode did not depend on age or educational level reported; b) preference did not depend on whether the patient was visiting the clinic for the first time or not; c) preference *did* depend strongly on income: Those reporting less than $10,000/year income strongly preferred Touch-Screen ACASI to other modes ($p<.05$ by Chi-square test).

Table 3. Patient preference for mode of sensitive question administration.

| Mode of question administration | Number and percent preferring mode |
|---|---|
| IAQ | 23 (22.8%) |
| Key ACASI | 26 (25.7%) |
| Touch-Screen ACASI | 52 (51.5%) |
| TOTAL | 101 (100.0%) |

Table 4. Patient preference for mode, by gender.

| Mode | % of females preferring mode | % of males preferring mode |
|---|---|---|
| IAQ | 10 (18.5%) | 13 (27.7%) |
| Key ACASI | 11 (20.4%) | 15 (31.9%) |
| Touch-Screen ACASI | 33 (61.1%) | 19 (40.4%) |
| TOTAL | 54 (100.0%) | 47 (100.0%) |

Qualitative analysis of administration mode preference. Additional qualitative analysis was conducted in order to assess the reasons that patients gave for preferring particular modes over others. In summary, it was found that:

1) Of those who preferred IAQ (23), the majority indicated that this was because they either found this the easiest, procedurally (39%), or because they preferred human contact when answering the questions (52%).

2) Those who preferred Key ACASI (26) indicated that they selected it rather than IAQ because of ease/attractiveness of the computer (50%), or because of the privacy it provides (50%). They reported preferring this over the Touch-Screen mainly because they found it to be the easiest to use (65%).

3) Those who preferred Touch-Screen ACASI (52) usually mentioned enhanced privacy as the reason they selected this rather than IAQ (67%), although a minority mentioned ease of use/attractiveness of the computer (27%). In reporting why they preferred Touch-Screen over Key, they overwhelmingly mentioned ease of use/attractiveness (98%).

4) Of 39 subjects who expressed a codeable preference when explicitly asked which computer-based procedure was the most private, 27 chose Touch-Screen, and 12 Key. Of the 27 choosing Touch, 67% stated that this was because no one can observe what the respondent is typing, and 9 mentioned that as soon as one answers, the

screen moves to the next question, so no one can observe the question that the respondent is answering. Of the 12 who were able to articulate a reason for considering Key to be more private than Touch-Screen, all mentioned that this was because with keyboard-based data entry, no one is able to see what the respondent is touching on the laptop screen.

Overall it appeared that the major reasons for preferring computer-based presentation involved the privacy that it affords, relative to IAQ, as well as the inherent attractiveness and perhaps novelty of the ACASI technique. Further, Touch-Screen ACASI was preferred over Key ACASI mainly due to respondent preference for using the screen to enter their responses, versus the keyboard. Finally, note that even individuals who preferred IAQ did not report particular difficulties in using the computer-based procedures; they were easily able to operate those, but simply preferred human interaction.

A final set of analyses was conducted to investigate mode effects across administration condition, in the form of significant differences in responses to the sensitive survey questions, but no systematic results were obtained. This was disappointing but not surprising, given the small sample and relative lack of statistical power for all but extremely large potential effect sizes.

**General Discussion**

Summary of results. Results of Experiment 1 suggested that patients might express a mode preference based on perceptions of item sensitivity, although there was not a strong indication that they believed that the subject matter to be discussed at the clinic (mainly, sex and drug use) was especially sensitive. Experiment 2 then examined preference for mode in the context of administering a very detailed risk factor questionnaire, and determined that patients strongly prefer the Touch-Screen mode. In sum, we demonstrated a potential superiority of the Touch-Screen system, but were not able to strongly relate this to the degree of sensitivity of the survey items we administered.

Relevance to sample surveys. To put our results in proper perspective, it is necessary first to revisit the logic associated with studying responses of high-risk individuals to sensitive health survey questions out of context of the administration variables normally posed by such a survey. The current exercise was conducted in a health clinic environment, and so the environmental conditions, as well as the respondents, were very different from those of a usual population-based survey interview. In particular, an environmental context that involves treatment for an STD may be very different from one in which an interviewer asks sensitive questions within a household environment; most importantly, within the clinic setting, the subject fully expects to be asked such questions. In this light, the fact that we found *any* preference for ACASI in the clinic may be significant, as one might expect such a preference to be magnified in the household survey context, which may elicit a much more stridently negative reaction to the prospect of answering very sensitive questions, especially in a face-to-face mode. Therefore, one might conclude that ACASI systems – and the Touch-Screen procedure in particular – would likely be preferred by high-risk individuals within the usual population survey environment.

However, any conclusion related to mode efficacy makes the strong assumption that we can extrapolate meaningfully to a situation considerably different from the one studied. From this perspective, the most far-reaching ramification of the current study may be that environmental considerations are paramount in influencing response tendencies. More specifically, the issue of whether a question is "sensitive" may not be resolvable unless we also consider the environment in which that question is asked. Certainly, researchers of sensitive questions have recognized that the tendency to answer such questions truthfully is situationally dependent (Nathan, Sirken, Willis, & Esposito, 1990) and that sensitivity varies between individuals (Schaeffer, 2000). However, a usual assumptions of such research is that item sensitivity is a relatively fixed characteristic, and that variation in the environment mainly influences respondent behavior with respect to deciding how to answer that item, as opposed to directly influencing the core level of item-specific sensitivity.

We propose a revision of this concept, and suggest that item sensitivity itself is a dynamic attribute that varies *within* as well as *between* respondents, as a function of context. Further, we believe that question sensitivity may encompass several dimensions, and that these may be influenced separately by key environmental factors. First, questions may be sensitive partly to the extent that the simple act of *asking* them is embarrassing or offensive, apart from the individual's behavior with respect to those items (Lee and Renzetti, 1990; Willis, 1997; Schaeffer, 2000). In the current study, the use of a legitimate medical context appeared to have removed, to a large degree, this element of sensitivity -- or the *Intrusive Threat* of sensitive questions (Lee and Renzetti, 1990). As such, the interviewed individuals might not react to the questions with the same relative indifference and detachment if these questions were asked by a survey interviewer within the context of a household interview.

A second proposed element of sensitivity relates not to the reaction to being *asked* the intrusive question, but rather to answering it truthfully, given that one has engaged in the relevant behavior. This component of sensitivity, which we label Truthful Response Sensitivity, may also vary as a function of context, but does so separately from the element of Intrusive Threat. That is, STD clinic patients may not find the questions offensive, but still decide to answer them untruthfully, for example, to the extent that they believe that a key function of the

clinic is partner notification upon positive test results. On the other hand, a respondent within a household survey may have no reason to believe that the Federal agency conducting the interview will do more than simply collect aggregate data. As such, it is conceivable that the household respondent may react with initial shock to the questions, relative to the complacent STD patient, but ultimately provide more truthful answers due to a relatively lower subjective assessment of the risk of the release of information to outside parties. Overall, we believe that researchers must be critically aware of the possibility that environmental factors could have different -- even opposite – effects on Intrusive Threat Sensitivity and Truthful Response Sensitivity.

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