

TECHNICAL PAPERS ON HEALTH AND BEHAVIOR MEASUREMENT

TECHNICAL PAPER 21

Telephone Audio Computer-Assisted Self-Interviewing (T-ACASI) and Survey Measurements of Sensitive Behaviors: Preliminary Results

C.F. Turner, H.G. Miller, T.K. Smith, P.C. Cooley, and S.M. Rogers

Reference Citation

Turner, C.F., H.G. Miller, T.K. Smith, P.C. Cooley, and S.M. Rogers. (1996) Telephone audio computer-assisted self-interviewing (T-ACASI) and survey measurements of sensitive behaviors: Preliminary results. In R. Banks, J. Fairgrieve, L. Gerrard, et al. (eds.), *Survey and Statistical Computing 1996*. Chesham, Bucks, U.K.: Association for Survey Computing.

Telephone Audio Computer-Assisted Self-Interviewing (T-ACASI) and Survey Measurements of Sensitive Behaviors. Preliminary Results

Charles F. Turner, Heather G. Miller, Timothy K. Smith, Philip C. Cooley, Susan M. Rogers¹

Abstract

We report the first known application of T-ACASI (Telephone Audio Computer-Assisted Self Interviewing) technology for the administration of a complex survey to the general population. This T-ACASI application replicated the U.S. National AIDS Behavioral Survey with a general population sample. For this application, the mode of survey administration was randomly assigned in order to generate estimates of the impact of T-ACASI on the measurement of sensitive behaviors. Survey measurements included a full range of sensitive AIDS-related behaviors, such as number of sexual partners, frequency of anal sex, other sexual practices, and drug use. Preliminary results indicate that respondents felt more comfortable answering such sensitive questions in T-ACASI mode rather than reporting these behaviors to a human interviewer. These preliminary data also indicate that T-ACASI yielded higher reported prevalences of many of sensitive behaviors.

Keywords

Telephone Audio Computer-Assisted Self Interviewing (T-ACASI), Computer-Assisted Interviewing (CAI), sensitive behaviors, AIDS, survey measurement

Introduction

The HIV epidemic has created a need for data on the prevalence, patterns, and trends in behaviors that transmit HIV infection. This, in turn, has spawned a number of major surveys of HIV-related sexual and drug use behaviors. Because of the substantial costs associated with sending field interviewers to tens of thousands of households across the country, the largest surveys of the adult population of the United States have used *telephone* survey techniques.² Telephone surveys have also played a crucial role in shaping our understanding of AIDS-related behaviors in other nations.

Because telephone surveys have played a central role in shaping our understanding of AIDS-risk behaviors, there is considerable cause for concern over emerging evidence suggesting that interview

¹ This research benefitted from contributions by Lori Von Colln, and Joseph Catania. Our program of methodological research on survey measurement of sensitive behaviors is supported by the National Institute of Child Health and Human Development and by the National Institute of Aging at the U.S. National Institutes of Health under grant 1-R01-HD31067 to the first author. This report includes preliminary results for surveys completed during the period April 10 to May 10, 1995, and statistical analyses conducted during May-June, 1995. A full report of the final results of this study is presently being prepared for publication.

² The National AIDS Behavioral Survey research program (Catania *et al.*, 1992), for example, conducted telephone interviews with 10,630 respondents in 1990, and it is presently conducting telephone interviews with a new probability sample of 6,400 American adults. These NIH-funded telephone survey efforts are substantially larger than surveys of adults' AIDS-related behaviors that have been undertaken using personal visit survey methods.

modes requiring respondents to disclose sensitive, stigmatized, or illicit behaviors to a human interviewer are subject to nontrivial reporting biases.³ In particular, requiring respondents to disclose such information to a *human interviewer* appears to substantially diminish the willingness of respondents to report engaging in these behaviors

This preliminary report provides an overview of a new telephone survey technology that does not require respondents divulge such information to a human interviewer, and it reports some preliminary results from a pilot test of this technology.

Audio-CASI and T-ACASI Technology

In-Person Audio-CASI. During the past four years, researchers at Research Triangle Institute (RTI) developed an audio computer-assisted self interview (Audio-CASI) technology to administer complex questionnaires for use in personal interview surveys (Turner, et al., 1992b; O'Reilly and Turner, 1992; O'Reilly et al., 1994; Cooley et al., 1996). This private interview mode can be used with any respondent who can hear and speak; it does not require literacy in any language.⁴ Findings from our early Audio-CASI pilot tests (O'Reilly et al., 1994) indicated that:

- Audio-CASI technology is stable and can be used with a minimum of disruption to typical survey and research routines.
- Virtually without exception, respondents had no trouble using this new technology. This was true for both educated persons and those with substantial literacy problems, for the young and the old, for English-speaking respondents, and for those who spoke only Spanish or Korean.
- Even literate respondents reported preferring the new technology to paper-and-pencil self-administered questionnaires (SAQs).

During 1995, RTI's in-person Audio-CASI technology was adopted for use in two major national surveys: the National Survey of Family Growth (Cycle V; N = 10,000 females, ages 15-44) and the National Survey of Adolescent Males (New Cohort; N=1,741 males, ages 15-19). Preliminary data from these large-scale surveys indicate that Audio-CASI technology was well accepted by field interviewers and survey respondents in personal visit surveys, and it produced substantial increases in the reporting of sensitive behaviors. Preliminary data (see Table 1) from a randomized experiment embedded in the NSAM (Turner, Ku, Sonenstein, Pleck, 1996), for example, indicated a four-fold increase in the number of adolescent males who reported having male-male sexual contacts. Table 1 presents published results obtained from the first 928 respondents in the 1995 NSAM. This table shows the percentage of respondents who report engaging in each of six types of male-male sexual contact, and the final line of the table shows the results for a composite measure indicating whether the respondent reported at least one type of male-male contact. It will be seen from Table 1 that respondents were more than four times more likely to report some male-male contact in the Audio-CASI interview.

³ See, for example, Jones and Forrest, 1992; Aquilino, 1994; Gfroerer and Hughes, 1992; Shober, 1992; Miller, Turner, and Moses, 1990: ch 5; Turner, Lessler, and Devore, 1992a; Turner, Danella, and Rogers, 1995; Turner, Ku, Sonenstein, and Pleck, 1996.

⁴ Our field experiments have found that it is possible to use Audio-CASI to interview subjects who speak only Korean or Spanish using field interviewers who speak only English (Turner, Rogers, et al., 1996; Hendershot et al., 1996). English speaking field interviewers carry cellular telephones when recruiting and interviewing Korean or Spanish speaking subjects. If field interviewers encountered problems rostering the household, recruiting subjects, or conducting the interview, they called the central office where Korean and Spanish speaking interviewers are available to assist in the process. This could provide an efficient and cost-saving way of including subjects who would otherwise be excluded from national samples.

TABLE 1. Estimates of Prevalence of Different Types of Male-male Sexual Contact in National Sample of Males Ages 15 or 19 by Mode of Data Collection (Self Administered Questionnaire or Audio-CASI): Preliminary Results from the 1995 NSAM-2.

MEASUREMENT	ESTIMATED PREVALENCE (per 100)				ODDS RATIO	P
	Paper SAQ		In-Person Audio-CASI			
	Est.	(N)	Est.	(N)		
Ever masturbated another male	1.1	(176)	2.3	(731)	2.07	0.29
Ever been masturbated by another male	0.6	(176)	3.0	(730)	5.44	0.03
Ever had insertive oral sex with another male (your penis in his mouth)	0.6	(176)	2.5	(730)	4.42	0.07
Ever had receptive oral sex with another male (his penis in your mouth)	0.6	(176)	2.1	(730)	3.67	0.13
Ever had receptive anal sex with another male (his penis in your rectum or butt)	0.0	(176)	1.2	(730)	(b)	0.05
Ever had insertive anal sex with another male (your penis in his rectum or butt)	0.6	(176)	1.6	(729)	2.93	0.23
Any Male-Male Sex (a)	1.1	(176)	4.7	(728)	4.26	0.01

NOTE: Preliminary data from first 928 cases of 1995 NSAM-2. P-values are those for likelihood ratio chi-square for fit of independence model to the 2-way table of mode by reporting of behavior.

(a) Composite measure of any male-male sex is derived from the six individual measurements. Cases with missing data for any of the six behaviors were excluded from the analysis of the composite measure.

(b) Odds ratio cannot be calculated due to zero denominator.

SOURCE: Turner, Ku, Sonenstein, and Pleck (1996).

*Telephone Audio-CASI (T-ACASI) Technology.*⁵ In the Winter of 1994-1995, we extended our in-person Audio-CASI system to allow it to conduct complex, call-in or call-out⁶ T-ACASI surveys. This new system is an outgrowth—both in its motivation and its architecture—of the technology RTI developed for in-person Audio-CASI surveys of sexual and contraceptive behaviors. These efforts have resulted in the development of a software platform that fully integrated Audio-CASI and T-ACASI capabilities and that can be implemented on a wide array of hardware. In our T-ACASI system, PCs

⁵ Early experimentation with T-ACASI was begun at the Bureau of Labor Statistics (BLS) during the late 1980s under the rubric of Touch-Tone Data Entry (TTDE) surveys (Werking et al., 1988a, 1988b; Werking and Clayton, 1990; Clayton and Harrell, 1989; Clayton, 1991; Phipps and Tupek, 1990). These initial T-ACASI applications have been limited to quite simple data collection tasks, typically involving only 5 to 10 questions asked without skip patterns or other tailoring of the survey instrument (Weeks, 1992). In addition, both the subject populations and the subject matter for these early T-ACASI efforts were limited to routine, nonsensitive reporting of commercial or technical data by trained and reasonably literate respondents.

⁶ In a call-in survey, the respondent initiates the interview by calling a number that is answered by the T-ACASI interviewing system. In a call-out survey, a human telephone interviewer calls the respondent and subsequently transfers the call to the T-ACASI system.

equipped with a hardware interface can handle incoming and outgoing calls. Under this system, the administration of a survey can be painlessly migrated from one environment to another by merely cloning the relevant software and digitized voice files.

Encouraging preliminary results are available from a pilot study which implements the questionnaire from the National AIDS Behavioral Survey under T-ACASI (NABS) (Catania et al., 1992). Below we summarize our preliminary analysis of results from the first 142 cases interviewed in this study.

Methods

Survey Instrument. This experiment used a slightly modified version of the questionnaire from the 1990 National AIDS Behavioral Survey (NABS) (Catania et al., 1992). The NABS survey was previously administered by telephone to a national sample of 10,630 adults in 1990.

Our study questionnaire included a total of 83 questions covering a wide range of HIV risk behaviors; it was divided into four sections. The first section of the questionnaire (Section A) included a short series of non-sensitive demographic and attitude questions. The final section of the questionnaire (Section D) asked a brief series of questions concerning respondents' preferences for and reactions to the T-ACASI and interviewer-administered modes of interviewing. These sections of the questionnaire were always administered by the human interviewer. Sections B and C contained all of the sensitive questions on sexual practices and other HIV-related matters. The mode of administration of these sections was experimentally manipulated.

Experimental Design. Respondents were randomly assigned to one of two experimental conditions.

- In Condition 1, all questions in Section B were administered by a human interviewer and all questions in Section C were administered using T-ACASI.
- In Condition 2, all questions in Section B were administered using T-ACASI, and all questions in Section C were administered by a human interviewer.

This design allowed us to assess the impact of interview mode on all of our sensitive measurements, and it also allowed respondents to experience and provide *comparative* judgments about these two interview modes. This design also insured that the content of the questions was not confounded with the mode of interview, and the order in which respondents received each mode was balanced across the experiment.

Implementation of T-ACASI. All respondents were contacted, screened for eligibility, and administered Section A by a human interviewer following standard telephone survey procedures. At the appropriate point (Section B or C, depending upon the experimental condition), the interviewer forwarded the phone call to the automated T-ACASI system. Respondents then listened to computer-controlled, pre-recorded questions and responded by pressing keys on a touchtone telephone. Upon completion of the T-ACASI portion of the interview, the computer transferred the telephone call back to the human interviewer, who administered the remaining section(s)⁷ of the questionnaire and closed out the interview.

⁷ The human interviewer administers all questions from Sections D and A to all respondents. If Section B was conducted using T-ACASI, the interviewer administers Section C. The modes of questionnaire administration for the two conditions are:

Condition 1, Sections:	A [Human]	B [Human]	C [T-ACASI]	D [Human]
Condition 2, Sections:	A [Human]	B [T-ACASI]	C [Human]	D [Human].

Hypotheses. In addition to evaluating the feasibility of implementing the new T-ACASI technology, this preliminary study tested two hypotheses:

- H₁ Respondents would feel more comfortable reporting sensitive sexual behaviors to a computer in a T-ACASI interview than to a human interviewer in a standard telephone interview.
- H₂ Respondents would be more likely to report engaging in stigmatized or sensitive behaviors in the more private T-CASI interview mode than in a standard telephone interview with a human interviewer.

Sample Used in Experiment. The sample for this experiment was restricted to persons 18 to 49 years of age. Persons under age 18 were excluded due to the difficulties of obtaining written parental consent in a telephone survey. Persons over age 49 were excluded since they have a low incidence of STDs and report fewer risky sexual practices (Catania et al., 1992, p. 1103; Laumann et al., 1994, Tables 5.4a and 11.2.) Respondents were paid \$10 for participating in this study.

The experiment used a composite sample with two strata. The first and largest strata (target N = 200) was recruited from a probability sample of listed residential telephones in Cook County, Illinois (which includes the city of Chicago and surrounding areas). At the household level, a quota sample was drawn to insure approximately equal numbers of males and females. The second strata (target N = 50) included patients recruited from the Wake County STD Clinic in Raleigh, N.C. This second strata was included in the experiment to provide information on the impact of T-ACASI in a population with a history of HIV-risk behaviors. In this preliminary report, we have aggregated data from the two strata, however, when the full study is reported, our statistical analysis will formally test the extent, if any, to which the impact of T-ACASI varies across these strata.

Present Report. The following section reports the results of our preliminary analyses of 142 interviews completed by May 10, 1995 (115 in the Cook County strata and 27 in the Wake County strata). (A report of the full study results is being prepared for publication.)

Results

Stability of T-ACASI Technology. Overall, the T-ACASI system proved remarkably stable, and interviewers have had relatively little difficulty using it. There was one minor problem at the outset of the study. During the first eight days of interviewing, there were five instances in which respondents experienced *unintentional* disconnections while completing the T-ACASI portion of their interview. We determined that this problem was caused by a programming error on our part. That error was corrected on the ninth day of interviewing, and there were no recurrences of this problem.

Number of Touchtone Households. The feasibility of using T-ACASI depends upon the number of target respondents who have access to a touch-tone telephone. At the conclusion of all field work, it was reported that among the 306 screened households that reported having an adult 18 to 49 and that also reported on the types of telephones in their households, 302 (99 percent) reported having a touchtone telephone. Touchtone telephone ownership was considerably less common among elderly households (i.e., those without an 18 to 49 year old). Only 153 of 203 (75 percent) in this group reported having a touchtone telephone. (This result—unlike others in this report—reflects results for the entire study.)

Break-Offs During Interviews. Because respondents have the opportunity to terminate a T-ACASI interview without offending a human interviewer, we thought there might be a substantial increase in "break-offs" during the T-ACASI section of the questionnaire. Through the first 142 completed cases,

there was only one partial interview due to a respondent breakoff during the T-ACASI section of the interview.⁸ (Since respondents were being paid to complete the interview, this should probably be treated as an upper bound on what can be achieved under other conditions.)

Acceptance by Respondents. Respondents generally reported a preference for T-ACASI when reporting on sensitive behaviors, but they also reported that pressing buttons in T-ACASI was less interesting than speaking with a human interviewer. (It should be noted that respondents verbally reported these judgements to the same interviewer who conducted the interviewer-administered portion of the survey. It is possible that some respondents found it difficult to tell these interviewers that they were less interesting than the computer.)

TABLE 2. Respondent Preferences for T-ACASI versus Standard Telephone Interview using a Human Interviewer.

DIMENSION	PREFERENCE FOR			ODDS RATIO (a)
	T-ACASI	Human	Indifferent	
Best at protecting your privacy	49%	11%	40%	4.53
Best for getting honest answers	73%	17%	10%	4.39
Best for asking about sensitive topics like sexual behavior	66%	23%	11%	2.88
More comfortable giving your answers	44%	24%	31%	1.82
Easier to use	30%	59%	11%	0.51
Most interesting to use	27%	50%	23%	0.54
Easiest to change answer (b)	1%	61%	37%	0.02

(a) Odds ratio for choice of T-ACASI:Human Interviewer; indifferent responses were excluded.

(b) This question asked respondents to rate which was "hardest" mode in which to change answers. We report responses for the "easiest" mode in order to make them consistent with the coding of other dimensions in the table.

Table 2 shows respondents' preference ratings. The majority (73 percent) of respondents thought that T-ACASI was most likely to elicit honest reporting of sexual behaviors while only 17 percent thought human interviewers were most likely to elicit more honest responses. Similarly, respondents judged T-ACASI to be:

- best at protecting privacy;
- best for asking about sensitive topics such as sexual behavior; and
- best at making them feel comfortable answering questions in this survey.⁹

These benefits of T-ACASI come with some costs. By a 2:1 margin, respondents rated interviewer administration as "easiest to use" and "most interesting." Finally, we note that respondents overwhelmingly reported that it is easier to change their answers when talking to a human

⁸ Counts are based on final status codes for interviews. It is possible that some respondents broke off and the interview was completed after a call back.

⁹ Interviewers asked respondents: "Did you feel more comfortable giving your answers to me or entering them yourself using your telephone?"

interviewer than when using T-ACASI. This last finding has prompted us to revise the use of the telephone keypad for future studies. In the present study, respondents are instructed to enter a two key sequence (*B) to back up. In future studies, we plan to dedicate a unique key (e.g., #) to this purpose.

Completeness of Data. In evaluating this technology, we had some concern that T-ACASI might offer respondents an "easier" opportunity to refuse to respond or to say they "don't know" in response to questions, particularly those that were sensitive. We found no evidence of such a phenomenon; indeed the reverse was true. For the most sensitive items in this survey (including lifetime and recent experiences with anal sex), there was little missing data in the interviewer administered condition. In our T-ACASI interviews, there was no missing data for any item. While this last finding is superficially satisfying, we suspect that it indicates a need to remind T-ACASI respondents at regular intervals of the keys they should press if they "don't know" or do not wish to answer a question.

Reduction in Bias. Given the very small sample sizes included in these preliminary analyses (maximum Ns for each condition: 62 and 80), we feared that there would be inadequate statistical power to detect differences across interview modes. On the contrary, our preliminary analyses indicate that there are large differences which are significant or approach significance in the responses given to many of the most sensitive questions asked in this survey. Table 3 presents results for a selection of items that might be thought (on *a priori* grounds) to be subject to reporting bias. Our preliminary data indicate that T-ACASI increased the likelihood that respondents would admit having:

- very limited sexual experience (that is, having no sexual partners in adulthood; having had no sexual intercourse in the past 6 months; and, having had intercourse fewer than 10 times in the past 6 months);
- never using a condom;
- infrequent discussions of their sex lives with their partner;
- unstable sexual relationships (i.e., their most recent sexual relationship lasted less than 6 months)
- engaging in anal intercourse.¹⁰

In addition to increasing the likelihood that respondents would admit potentially embarrassing facts about themselves, T-ACASI appears to diminish the likelihood that respondents will overreport normative behaviors. For example, Table 3 shows that while 14.8 percent of respondents told a human interviewer that they had "used a condom every time they had sex in the past 6 months," only 6.8 percent of respondents made this claim when they were interviewed using T-ACASI.

¹⁰ Our ongoing analyses of data for the full experiment suggests that this result is attenuated in the sample from the full study.

TABLE 3. Estimates of Prevalence of Sensitive Behaviors Obtained from Telephone Interviews using: (1) Human Interviewers, and (2) Telephone Audio-CASI (T-ACASI)

MEASUREMENT	ESTIMATED PREVALENCE (per 100)				ODDS RATIO	P
	HUMAN INT.		T-ACASI			
	Estimate	(Base N)	Estimate	(Base N)		
Anal Intercourse						
Ever had anal intercourse	25.4	(67)	42.0	(50)	2.13	0.03 (a)
Had anal intercourse in past 6 months	3.0	(67)	12.0	(50)	4.43	0.03 (a)
Oral Sex						
Given oral sex (since age 18)	79.7	(59)	79.5	(73)	0.99	ns (b)
Received oral sex (since age 18)	89.8	(59)	89.0	(73)	0.92	ns (c)
Limited Sexual Experience						
Had no sex partners since age 18.	1.6	(61)	7.6	(79)	4.93	0.09 (d)
Had no sex in last 5 years.	4.8	(62)	11.4	(79)	2.53	0.15 (e)
Did not have sex in past 6 months	1.5	(67)	8.0	(50)	5.74	0.01 (f)
Had sex fewer than 10 times in past 6 months	22.7	(67)	41.3	(50)	2.51	0.01 (f)
Condom Use						
Never used a condom in lifetime	8.1	(62)	18.4	(76)	2.57	0.07 (g)
6 months: Used condom every time had sex	14.8	(54)	6.8	(44)	0.42	0.14 (h)
6 months: Almost every time or every time had sex	27.8	(54)	15.9	(44)	0.49	0.14 (h)
Stability and Quality of Relationships						
Most recent sexual relationship lasted less than 6 months	5.8	(52)	21.3	(61)	4.42	0.01 (i)
Never discussed sex life with most recent partner	1.9	(52)	14.8	(61)	8.83	0.03 (j)
Discussed sex life less than once a month	28.8	(52)	49.2	(61)	2.39	0.03 (j)
Ever had a one-night stand since age 18	59.0	(61)	64.4	(73)	1.26	ns (k)

NOTES. P-values are those for statistical tests of association in 2-way tabulations of Interview Mode by Question Response. In cases where the response distributions have more than two categories, these p-values do not apply to each individual odds ratio. (a) MH = 4.97, d.f. = 1. Mantel-Haenszel test for trend in 2 x 3 table (Interview Mode by Reporting of Anal Sex. Categories of anal sex were: (1) Never experienced, (2) Experienced, but not in last 6 months; (3) Experienced in past 6 months). Note that the anal sex questions were not asked of persons who reported no heterosexual sex in previous 12 months or who reported only female-female sex in past 5 years. (b) $L^2 = 0.00$, d.f. = 1. Likelihood ratio chi-square test of independence model for 2 x 2 tables (Interview Mode by Given Oral Sex: Yes/No). Question not asked of persons who reported having no sex partners since age 18. (c) $L^2 = 0.02$, d.f. = 1. Likelihood ratio chi-square test of independence model for 2 x 2 tables (Interview Mode by Received Oral Sex: Yes/No). Question not asked of persons who reported having no sex partners since age 18. (d) $L^2 = 2.91$, d.f. = 1. Likelihood ratio chi-square test of independence model for 2 x 2 tables (Interview Mode by Had Any Sex Partners since Age 18: Yes/No). (e) $L^2 = 2.02$, d.f. = 1. Likelihood ratio chi-square test of independence model for 2 x 2 tables (Interview Mode by Had Sex in Past 5 Years: Yes/No). (f) MH = 7.27, d.f. = 1. Mantel-Haenszel test for trend in 2 x 3 table (Interview Mode by Frequency of Sex in past 6 months. Categories for frequency of sex were: 0; 1-10; and 11+ times.) Note that this question was not asked of persons who reported no heterosexual sex in previous 12 months. (g) $L^2 = 3.23$, d.f. = 1. Likelihood ratio chi-square test of independence model for 2 x 2 tables (Interview Mode by Ever Used a Condom: Yes/No). (h) MH = 2.13, d.f. = 1. Mantel-Haenszel test for trend in 2 x 4 table (Interview Mode by Condom Use in Past 6 months). Categories for condom use were never; sometimes; almost always; every time.) Note that these questions were asked only if person reported having one or more sex partners in past 6 months. (i) $L^2 = 6.03$, d.f. = 1. Likelihood ratio chi-square test of independence model for 2 x 2 table (Interview Mode by Most Recent Relationship Lasted More than 6 Months: Yes/No). Question not asked of persons who reported that they did not have a person that they had sex with most often in past year. (j) $L^2 = 9.00$, d.f. = 1. Likelihood ratio chi-square test of independence model for 2 x 4 table (Frequency of Discussion by Interview Mode). Categories for frequency of discussion were: Never; < 1 month; 1-2 times a month; 1+ times a week. Note that this question was not asked of persons who reported that they did not have a person that they had sex with most often in past year. (k) $L^2 = 0.41$, d.f. = 1. Likelihood ratio chi-square test of independence model for 2 x 2 table (Interview Mode by Ever Had a One-Night Stand: Yes/No). Question not asked of persons who reported that they had not had sex since age 18.

Conclusions

The preliminary findings of our experiment support the hypothesis that subjects prefer T-ACASI interviewing when answering sensitive questions. These data also indicate that T-ACASI increases the likelihood of subjects reporting sensitive behaviors and decreases overreporting of normative behaviors. Further evidence about the feasibility of conducting T-ACASI surveys and its effect upon the reliability and validity of survey measurements of AIDS-related and other sensitive behaviors should be forthcoming over the next two years. We have recently been awarded funding from the U.S. National Institutes of Health to conduct a large-scale experiment embedded within a national telephone survey of AIDS-related behaviors. Respondents in this experiment will be randomly assigned to receive the sensitive sections of the survey using either standard telephone interview procedures or T-ACASI interviewing.

References

- Aquilino, W. (1994) Interview mode effects in surveys of drug and alcohol use: A field experiment. *Public Opinion Quarterly* 58:210-240.
- Catania, J.A., Coates, T.J., Stall, R., Turner, H., Peterson, J., Hearst, N., Dolcini, M.M., Hudes, E., Gagnon, J., Wiley, J., et al. (1992) Prevalence of AIDS-related risk factors and condom use in the United States. *Science* 258:1101-1106.
- Clayton, R.L. (1991). Developing CASI data collection methods in the current employment statistics survey. Paper presented to the CASIC Methodology Panel at the U.S. Bureau of the Census, Suitland, MD, April 1991.
- Clayton, R. and Harrell, L. (1989). Developing a cost model of alternative data collection methods: Mail, CATI and TDE. Proceedings of the American Statistical Association, Section on Survey Research Methods.
- Cooley, P.C., Turner, C.F., O'Reilly, J.M., Allen, D.A., Hamill, D.N., and Paddock, R.E. (1996) Audio-CASI: Hardware and Software Considerations in Adding Sound to a Computer-Assisted Interviewing System. *Social Sciences Computing Review*, 14(2): 197-204..
- Gfroerer, J.C. and Hughes, A.L. (1992) Collecting Data on Illicit Drug Use by Phone. In C.F. Turner, J.T. Lessler and J.D. Gfroerer (Eds.) *Survey Measurement of Drug Use: Methodological Issues*. (DHHS Publication Number 92-1929), Washington, DC: Government Printing Office.
- Hendershot, T.P., Thornberry, J., Rogers, S.M., Miller, H.G., Turner, C.F. (1996). Multilingual Audio-CASI: Using English-speaking field interviewers to survey elderly Korean households. In Warnecke, R., Ed., *Health Survey Research Methods*. Hyattsville, MD: National Center for Health Statistics.
- Jones, E.F. and Forrest, J.D. (1992) Underreporting of abortion in surveys of U.S. women: 1976 to 1988. *Demography* 29:113-126.
- Laumann, E., Gagnon, J., Michael, R., and Michaels, S. (1994) *Social Organization of Sexuality*. Chicago: University of Chicago Press.
- Miller, H.G., Turner, C.F. and Moses, L. E. (Eds.) (1990) Chapter 6: Methodological Issues in AIDS Surveys. In *AIDS: The Second Decade*, Washington DC: National Academy Press.
- O'Reilly, J., Hubbard, M., Lessler, J., Biemer, P., and Turner, C.F. (1994). Audio computer assisted self-interviewing: New technology for data collection on sensitive issues and special populations. *Journal of Official Statistics* 10:197-214.
- O'Reilly, J. and Turner, C.F. (1992) Survey interviewing using audio-format, computer-assisted technologies. Presentation to the Washington Statistical Society, March 18, 1992.
- Phipps, P.A., and Tupek, A.R. (1990). Assessing measurement errors in a touch-tone recognition survey. Presented at the Measurement Error Conference, Tucson, Arizona.

- Shober, S.E., Fe Caces, M., Pergamit, M.R., and Branden, L. (1992) Effect of mode of administration on reporting in the National Longitudinal Survey. In C.F. Turner, J.T. Lessler, and J.D. Gfroerer (Eds.) *Survey Measurement of Drug Use: Methodological Issues*. DHHS Publication Number 92-1929, Washington, DC: Government Printing Office.
- Turner, C.F. (1989) Research on sexual behaviors that transmit HIV: Progress and problems. *AIDS*, 3:S63-S71.
- Turner, C.F., Danella, R., and Rogers, S. (1995) Sexual behavior in the United States: 1930-1990: Trends and methodological problems. *Sexually Transmitted Diseases* 22(3): 173-190.
- Turner, C.F., Ku, L., Sonenstein, F.L., and Pleck, J.H. (1996). Impact of Audio-CASI on bias in reporting of male-male sexual contacts. In Warnecke, R., Ed., *Health Survey Research Methods*. Hyattsville, MD: National Center for Health Statistics.
- Turner, C.F., Lessler, J., and Devore, J. (1992a) Effects of mode of administration and wording on reporting of drug use. In C.F. Turner, J.T. Lessler, and J.D. Gfroerer (Eds.) *Survey Measurement of Drug Use: Methodological Issues*. DHHS Publication Number 92-1929, Washington, DC: Government Printing Office.
- Turner, C.F., Lessler, J., and Gfroerer, J. (1992b) Future directions for research and practice In C.F. Turner, J.T. Lessler, and J.D. Gfroerer (Eds.) *Survey Measurement of Drug Use: Methodological Issues*. DHHS Publication Number 92-1929, Washington, DC: Government Printing Office.
- Turner, C.F., Rogers, S.M., Hendershot, T.P., Miller, H.G., Thornberry, J.P. (1996) Improving representation of linguistic minorities in health surveys: A preliminary test of multilingual Audio-CASI. *Public Health Reports*, Vol. 111, (3), 276-279.
- Weeks, M.F. (1992) Computer-assisted survey information collection: a review of CASIC methods and their implications for survey operations. *Journal of Official Statistics*, 8:445-465.
- Werking, G.S., and Clayton, R.L. (1990). Enhancing the quality of time critical estimates through the use of mixed mode CATI/CASI collection. *Proceedings of Statistics Canada Symposium 90 Measurement and Improvement of Data Quality*.
- Werking, G., Clayton, R., Rosen, R., and Winter, D. (1988a) Conversion from mail to CATI in the current employment statistics survey. In Proceedings of the American Statistical Association, Survey Methods Section, 1988:431-436.
- Werking, G., Tupek, A., and Clayton, R. (1988b) CATI and touchtone self-response applications for establishment surveys. *Journal of Official Statistics*: 349-362.

About the Authors

Charles Turner is director of the Program in Health and Behavior Measurement at the Research Triangle Institute (RTI). RTI is an independent, nonprofit research organization established in 1958 by Duke University, North Carolina State University, and the University of North Carolina. Heather Miller is a senior scientist, and Susan Rogers is a research analyst with the same program. Philip Cooley is principal scientist in RTI's Computer Applications and Design Division, and Timothy Smith is a methodologist in RTI's Survey Research Division. Correspondence should be addressed to Charles Turner at Research Triangle Institute, 6101 Executive Boulevard, Rockville, MD 20852 USA; tel. 301-230-4640; fax 301-230-4646; e-mail cft@rti.org.