Comparison between SAQ and CASI for Supplemental Survey Nonresponse

Jibum Kim
NORC

Tom W. Smith
NORC

Seok-ho Kim
University of Chicago

Jeong-han Kang
University of Chicago

Jennifer Berktold
University of Chicago

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Address correspondence to Jibum Kim,
NORC, 1155 East 60th Street #274, Chicago, Illinois 60637.
E-mail: kim-jibum@norc.org

Consistent with the far-reaching impact of technology in our lives today, computer-assisted methods, such as computer-assisted telephone survey or computer-assisted personal interview, for conducting survey research have become increasingly popular modes of data collection, gradually surpassing the previously dominant paper-and-pencil methods (Couper and Nicholls 1998; Couper and Hansen 2002; Tourangeau 2004). Likewise, It is expected that computer-assisted self-administered mode (CASI or CASQ) has the potential to replace paper-and-pencil self-administered questionnaire (SAQ) as the dominant mode of self-completed data collection (Leeuw, Hox, and Kef 2003).

Previous studies have pointed out that self-administered modes of data collection help ensure the privacy of respondents and also reduce social desirability bias, thus improving the data quality of questions that ask about sensitive behaviors (Sudman and Bradburn 1982; Tourangeau and Smith 1996; Tourangeau and Smith 1998). Unlike SAQ, CASI allows respondents to directly interact with the computer in reading and answering the questions one at a time.

Despite the advantages of CASI over SAQ in addressing sensitive questions and complex instrument design, existing research comparing these two modes is limited. The majority of studies comparing SAQ with CASI methods have been based on special populations (Kiesler and Sproull 1986; Leeuw, Hox, and Snijkers 1995), and mode effects of SAQ versus CASI on sensitive questions are not consistent. For example, Wright, Aquilino, and Supple (1998) found that adolescents (12-18) were more likely to answer sensitive

questions on CASI, but for adults aged 19-34 there were no significant mode effects between SAQ and CASI.

In surveys of longer duration, SAQs are often used in conjunction with in-person interviews. Methodologies that utilize a mixed mode of self-administered survey and personal interview are commonly adopted to take advantage of the benefits offered by a specific mode. In other words, supplemental surveys are used as data extenders and cost minimizers. Although the self-administered survey has been an important component of numerous studies, only a few studies have focused on supplemental nonresponse in mixed mode surveys (i.e., Smith 1992 for PAPI and SAQ; Couper and Rowe 1996 for CAPI and CASI). In a study of CASI survey nonresponse, Couper and Rowe (1996) found that people with low education, old age, no computer use experience, who are black, or who have vision problems were less likely to complete CASI, while there were no significant relationships for gender and the frequency of reading. Although their sample is limited to respondents aged 30 and over living in the Detroit metropolitan area, Couper and Rowe's study, as the authors have noted with some caution, has important implications for CASI applicability for the general population.

As a replication of their study, this paper examines the correlates for nonresponse of the self-administered questionnaire sections of two years of the General Social Survey (GSS). The GSS, which is a full-probability sample of English-speaking adults living in U.S. households, is one of the most widely used social science datasets in the United States. Between 2000 and 2002, the GSS

switched from a PAPI-SAQ format to a CAPI-CASI format. This provides us with the opportunity to examine any effect the change in data collection mode might have on supplemental nonresponse.

Methods

Data

NORC at the University of Chicago has collected General Social Survey (GSS) since 1972 (see Davis, Smith, and Marsden 2003 for a detailed description of the GSS). The GSS has traditionally collected respondents' attitudes and behaviors using both personal interview and supplemental self-administered questionnaire. After completion of the personal interview, respondents fill out two self-administered questionnaires, the first being for the International Social Survey Program (ISSP) and the second a questionnaire about their sexual behaviors (Figure 1). The ISSP is a collaboration of 39 countries and conducts surveys on topics that vary from year to year. Each GSS contains two ISSP modules; In 2000 the ISSP did surveys on social inequality and the environment, and in 2002 topics were on social relations and support systems and gender, family, and work. The ISSP modules do not necessarily deal with sensitive issues. After the ISSP modules the GSS asks respondents to fill out a questionnaire on sexual behaviors and experiences with drug use. This material is sensitive.

There are generally a great number of similarities between the 2000 and 2002 GSS. In each case, the survey lasts for one and half hours. The overall

response rate is also analogous: the 2000 GSS has a sample size of 2,817 with a 70 percent response rate, and the 2002 GSS has a sample size of 2,765 with a 70.1 percent response rate.

Between 2000 and 2002, the mixed mode of the GSS data collection method changed from paper-and-pencil personal interview (PAPI) and self-administered questionnaire (SAQ) to computer-assisted personal interview (CAPI) and computer-assisted self-administered interview (CASI). However, for supplemental survey nonresponse on the self-administered part of the GSS, there is about 6% difference in response rate: 90.5% in 2000 and 83.9% in 2002 (Smith 2003). Figure 1 summarizes the features of the 2000 and 2002 GSS.

[Figure 1 about here]

Measures

Dependent Variable. The dependent variable is derived based on whether or not the interviewee was a non-respondent for the self-administered part of the GSS; that is, did the respondent participate in the personal interview part of the GSS but not fill out the self-administered portion of the survey. In 2000 and 2002, some respondents participated in PAPI and CAPI, respectively, but opted not to participate in the self-administered supplemental survey. A dummy variable is coded 1 if the respondent participated in the personal interview but did not complete the supplemental survey, and the variable is coded 0 otherwise.

Independent Variables. For comparability, we used the same independent variables as those used by Couper and Rowe (1996). Age was aggregated into seven groups: 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, and 75 and over. For the analysis, we set 18-24 as a reference category. Gender was coded as a dichotomous variable (female = 1). The race/ethnicity variable is a composite of responses to race and ethnicity questions in the GSS. We aggregated the race/ethnicity category into four groups: non-Hispanic white, non-Hispanic black, non-Hispanic other, and Hispanic. Based on completed years of schooling, we collapsed education into 4 categories: less than high school, high school, some college, and college and over. Work status consists of three categories: full-time, part-time, and non-working. Due to rotation of items (Davis, Marsden, and Smith 2003), not all respondents were asked for their self-reported health status. We collapsed respondents who were asked for their self-reported health status into two categories: "excellent," "good," and "fair," vs. "poor." For those who were not asked self-reported health status, we created a dummy variable where 0 represents missing health status so as not to lose those cases. Finally, we created a dummy variable for computer use (ever use computer = 1).

Analysis. First, we describe the characteristics of overall and supplemental respondents in 2000 and 2002. We next use logistic regression models to determine which respondents among those who completed the personal interview did not fill out the self-administered questionnaire, and to identify how nonresponse patterns vary across 2000 and 2002. There is a fairly wide

discrepancy between completed cases in the 2000 GSS (2,817) and cases included in the analysis (n = 2,343) because the GSS uses a split-ballot design and does not ask every question of every respondent. Therefore, in 2000, 464 people were lost due to missing computer use items. On the other hand, in 2002 the computer use items were asked of all interviewees so that the discrepancy between completed cases (n = 2,765) and cases included in the final analysis (n = 2,730) is less.

Results

Table 1 presents a description of the sociodemographic characteristics of respondents and nonrespondents. Comparing age distributions between respondents and nonrespondents, the percentage of older people is larger for nonrespondents than for respondents in both 2000 and 2002. In other words, older people are more likely to be nonrespondents than younger people. From 2000 to 2002, while there is no change in percentage differences between respondents and nonrespondents for the youngest group (about 4-5% difference for each year), the differences increase from middle age on. In general, the computer-assisted survey in 2002 seems to reinforce older people's tendency toward nonresponse to CASI. The percentages for female respondents and nonrespondents are similar for 2000 and 2002. Compared to the respondents' race distribution, the group of nonrespondents shows a smaller proportion of non-Hispanic whites, or larger proportions of other ethnic groups. For blacks in particular the differences between respondents and nonrespondents are greater,

increasingly from 2 percent in 2000 to about 10 percent in 2002. In sum, minority

ethnic groups were more likely than non-Hispanic whites to skip supplemental

questions, and the tendency became stronger, especially for blacks from 2000 to

2002. Education also shows some difference between 2000 and 2002. Persons

with less than 12 years of school show similar percentages between respondents

and nonrespondents in 2000, but in 2002 less educated people appear much

more likely to be nonrespondents. Employment status and self-rated health

status show similar patterns in 2000 and 2002. Although those who ever use

computer are more likely to be respondents, the gaps between computer users

and computer non-users increased from 11 percent in 2000 to 17 percent in 2002.

In sum, since the adoption of CASI, older people, blacks, the less educated, and

computer non-users are more likely to have become nonrespondents.

[Table 1 about here]

Table 2 reports results from logistic regression analyses that examined the

relationship between nonresponse and respondent sociodemographic

characteristics and computer use. The first column in Table 2 presents estimated

log-odds coefficients for the 2000 survey, and while the second column shows

log-odds coefficients for 2002. The third column reports the differences in

estimated coefficients between 2000 and 2002. The differences reported in the

third column are exactly the same as an estimated coefficient for an interaction

between a dummy for 2002 and the independent variable, after pooling both

years and introducing all interactions between the dummy year and other independent variables. The statistical significance or insignificance of the interaction, therefore, indicates the presence or absence of a difference in the effect of the independent variable between 2000 and 2002.

In the 2000 survey, respondents aged 65 and older are more likely to be nonrespondents than those aged 18 to 24. Those who are not working are less likely to be nonrespondents than those who have a full-time job. The odds of nonresponse for those who have ever used a computer are about 61 percent of the odds of nonresponse for those who never used a computer. There are no significant relationships for nonresponse by gender, race or ethnicity, or education; and self-rated health also shows no significant relationship for nonresponse. In 2002, the relationship between employment status and nonresponse is similar to that of 2000. Furthermore, like the 2000 survey, gender and self-rated health are not statistically significant predictors of nonresponse in the 2002 survey. Finally, computer non-use does not have a stronger impact on nonresponse in 2002 than that of 2000, once we control for sociodemographic factors.

Some differences between 2000 and 2002 occur in age, race, and education. In the 2002 GSS, nonresponse increases after middle age (45 or older) much earlier (younger) than it does in 2000. Even though the third column in Table 2 implies that this difference from 2000 is not statistically significant, the magnitude of difference for aged 55-64 or 75 and over looks substantially large. Larger samples may have statistically supported the difference. However, the

difference between the two years is most striking for race. Non-Hispanic blacks and others are about twice more likely than whites to be nonrespondents on the 2002 supplemental survey absent in 2000. Blacks' tendency toward nonresponse also increased statistically from 2000. With regard to education, high school graduates are less likely to be nonrespondents than those whose education level is less than high school in 2002.

[Table 2 about here]

Discussion

Our findings, based on a national probability sample of English-speaking adults aged 18 and over, suggest that in the mixed data collection of personal interview and self-administered survey, researchers should be more attentive to the potential bias of supplemental nonresponse in CASI. Specifically, researchers who use the GSS should consider the effects of supplemental nonresponse as they incorporate items of interest in the self-administered component.

CASI not only lowers the supplemental response rate, but also changes the dynamics of who responds. Unlike PAPI and SAQ data collection in 2000, even those aged 45 to 64 were less likely to respond to the CASI supplemental survey compared with CAPI in 2002. Compared with whites, blacks and other ethnic groups were more likely to be nonrespondents in CASI. This finding is similar to the result of Couper and Rowe's study, which suggests that blacks are

more likely to be nonrespondents in CASI (Couper and Rowe 1996). One important finding in our study, however, which differs from Couper and Rowe, is that we do not see an interaction effect between race and computer use. To control for the possibility that the 2000 GSS is an exception, we checked the effects of race on supplemental nonresponse in the 1998 survey. Like the 2000 GSS, we do not find any significant relationship between race and supplemental nonresponse in the 1998 survey (data not shown).

Those with no job and those who ever used a computer are less likely to be nonrespondents in 2000 and 2002. The effect of employment status appears to be related to free time, which may cause less burdensome for those who have no job. Whether respondents ever use the computer could have two implications for supplemental nonresponse: literacy and experience (Couper and Rowe 1996). In order to test this effect, we ran a separate analysis on the 2000 data using ten verbal ability items (called wordsum) variables. Controlling for the wordsum battery, the effect of computer use becomes nonsignificant, which offers support for the theory that computer use is a proxy for literacy. Given that the effect of computer use is virtually the same between 2000 (PAPI) and 2002 (CAPI), it is possible that nonresponse is being driven by literacy rather than experience.

Unfortunately, because the 2002 GSS does not include the wordsum battery, we are unable to determine whether computer use reflects literacy or experience. The wordsum variables, however, will be included in the 2004 GSS, and we may be able to sort out these effects in future analyses.

Despite the important implications of using CASI in mixed mode data collection, findings from this study should be interpreted cautiously for several reasons. First, this is not an experimental study. This study merely compares SAQ and CASI in two different years (2000 vs. 2002). Second, the results of our examination of the supplemental survey section (SAQ or CASI) cannot be explained purely by the presence of sensitive questions. The ISSP modules precede the sexual behavior questions, and most of the supplemental survey nonrespondents skipped all modules, rather than just the sex behavior module. Thus, what we have found in this paper cannot be generalized to explain nonresponse obtained for questionnaire including only sensitive issues. Third, since we examined supplemental response comparing a mixed mode of PAPI and SAQ in 2000 and a mixed mode of CAPI and CASI in 2002, we do not know how PAPI and CAPI impact respondent reactions and subsequent supplemental nonresponse. We cannot rule out that these effects are a result of the change from PAPI to CAPI, rather than the change from SAQ to CASI. Finally, we only examined one year for CASI, so it remains to be seen whether our correlates of CASI will be similar in future surveys.

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Figure 1. The Design of GSS Core and Supplemental Questions in 2000 and 2002

2000	2002
Paper & Pencil Personal Interview (PAPI) N = 2,817	Computer Assisted Personal Interview (CAPI) N = 2,765
GSS Core Questions ↓	GSS Core Questions ↓
Topical Modules ↓	Topical Modules ↓
ISSP (SAQ)	**ISSP (CASI)**
Inequality (ballot 1-3) **Environment (ballot 4-6)**	**Social Relations (ballot 1-3)** **Gender/Family/Work (ballot 4-6)**
↓	↓
Sexual Behavior (SAQ)	Sexual Behavior (CASI)
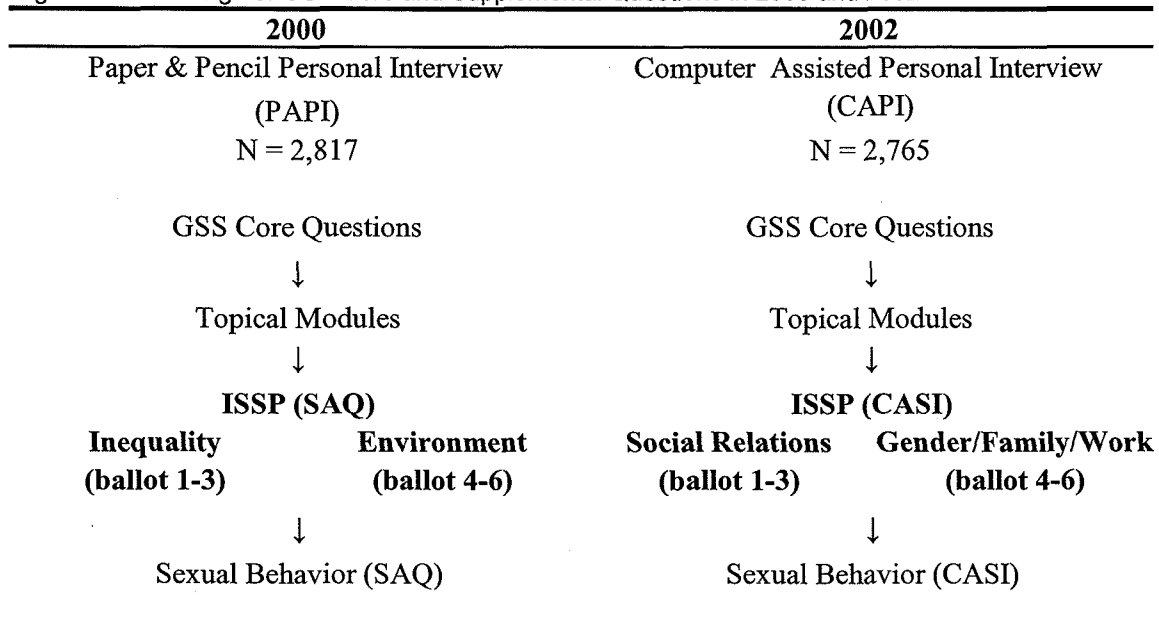
Table 1. Sample Characteristics of Supplemental Survey Nonrespondents, 2000-2002

	2000		2002	
	Yes SAQ	No SAQ	Yes CASI	No CASI
Age Group (%)				
18-24				
25-34	19.9	**18.4**	21.1	**17.5**
35-44	24.0	**22.6**	20.9	**15.0**
45-54	19.4	**19.8**	19.2	**18.7**
55-64	10.7	**11.3**	11.9	**17.8**
65-74	8.4	**11.3**	9.7	**10.7**
75-89	8.0	**10.8**	6.4	**15.0**
Female (%)	56.6	**56.1**	54.9	**57.90**
Non Hispanic White (%)				
Non Hispanic Black	15.3	**17**	12.7	**22**
Latino	7.2	**9**	7.3	**7.7**
Non Hispanic Other	3.0	**3.3**	3.1	**4.9**
Less than High School(%)				
High School Graduate	28.9	**28.8**	30.3	**26.4**
Some College	28.4	**22.2**	29.8	**24.5**
College and Over	25	**28.8**	25.8	**25.7**
Working Full Time (%)				
Working Part Time	11.8	**9.4**	12.4	**10.7**
Not Working	32.9	**31.1**	34.2	**38.8**
Good Health (%)				
Poor Health	4.3	**5.2**	3.4	**5.6**
Health Not Asked	20.8	**19.8**	32.5	**36**
Ever Used Computer (%)	58.7	**48.1**	69.5	**52.6**
N	2131	**212**	2302	**428**

Source: General Social Survey, 2000-2002
Note: Total N=2,343 in 2000,
      Total N=2,730 in 2002

Table 2. Predicting Nonrespondents Using Logistic Regression

	2000		2002		Difference Between years	
Age Group	log odds coefficient		log odds coefficient		log odds coefficient	
18-24 (reference)						
25-34	0.277		0.407		0.130	
35-44	0.313		0.321		0.008	
45-54	0.364		0.586	*	0.222	
55-64	0.471		1.115	***	0.644	
65-74	0.848	*	0.793	**	-0.056	
75-89	0.872	*	1.488	***	0.616	
Gender						
Male (reference)						
Female	0.037		0.133		0.096	
Race						
Non Hispanic White (reference)						
Non Hispanic Black	0.187		0.741	***	0.554	*
Latino	0.331		0.395		0.064	
Non Hispanic Other	0.207		0.704	**	0.498	
Education						
Less than High School (reference)						
High School Graduate	-0.018		-0.423	*	-0.406	
Some College	-0.171		-0.332		-0.161	
More than College	0.248		-0.058		-0.306	
Working Status						
Working Full Time (reference)						
Working Part Time	-0.384		-0.205		0.179	
Not Working	-0.595	*	-0.367	**	0.228	
Health						
Good Health (reference)						
Poor Health	0.122		0.228		0.105	
Were Not Asked	-0.029		0.122		0.152	
Computer Use						
Never Used Computer (reference)						
Ever Used Computer	-0.495	**	-0.497	***	-0.002	
Intercept	-2.332		-1.956		0.376	
N	2,343		2,730		5,073	

Source: General Social Survey, 2000-2002