Nonmarital Sex and Condom Knowledge among Ethiopian Young People: Improved Estimates Using a Nonverbal Response Card

David P. Lindstrom, Tefera Belachew, Craig Hadley, Megan Klein Hattori, Dennis Hogan, and Fasil Tessema

The accurate assessment of risky sexual behaviors and barriers to condom use is essential to reduce the spread of HIV/AIDS. This study tests a new nonverbal response-card method for obtaining more accurate responses to sensitive questions in the context of face-to-face interviewer-administered questionnaires in a survey of 1,269 Ethiopian young people aged 13–24. Comparisons of responses between a control group that provided verbal responses and an experimental group that used the card indicate that the prevalence of nonmarital sexual intercourse may be two times higher and knowledge of condom access may be 22 percent lower in the study than typical population-survey methods suggest. These results suggest that our nonverbal response-card method yields less biased estimates of risky adolescent sexual behavior and perceived access to condoms than those derived from conventional face-to-face interviewer-administered surveys, and that this method provides an effective, easy-to-use, low-cost alternative. (Studies in Family Planning 2010; 41[4]: 251–262)

Successful programs to combat the spread of HIV/AIDS in a population require accurate information about the prevalence of risky sexual behaviors among men and women. Estimates of the at-risk population by subgroup permit programs to target certain groups in the population and are essential for the effective social marketing of condoms for disease prevention. Sample surveys are the primary source of information about risky sexual behaviors and condom use. Yet survey researchers have long known that in interviewer-administered surveys, respondents often intentionally misreport their behavior and attitudes in order to create a more favorable image of themselves in the eyes of the interviewer or to avoid creating an awkward interaction. Response bias is an especially critical issue for obtaining information about sexual behaviors, particularly high-risk sexual behaviors.

A number of innovations in survey methodology have been developed to address response bias, including strategies to increase the level of respondents' privacy and confidentiality while preserving the advantages of having an interviewer present. These innovations typically involve some level of respondents' self-administration for the sensitive portion of the interview, and often require basic literacy. In this study, we introduce a new nonverbal response-card method for soliciting responses to sensitive questions that was developed and tested in a survey of adolescents' sexual behavior and knowledge fielded in southwestern Ethiopia. We present reports of sexual behavior, knowledge of condoms, and acceptance of premarital sex for respondents who gave conventional verbal responses, and for respondents who used the nonverbal response-card method. The results reveal significant differences in reported behavior, knowledge, and attitudes according to response method. In particular, we find higher levels of nonmarital sexual experience and lower levels of condom knowledge reported by respondents who used the nonverbal response-card method compared with the levels of those who used the verbal response method.

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Background

Demographic research in developing countries has long been concerned with survey measurement and analysis of potentially sensitive issues and behaviors, including sex before marriage or outside of marriage, unprotected intercourse, substance use, abortion, family violence, and the autonomy of women in household decisionmaking. Although a consensus exists that many responses to survey questions on these topics may be inaccurate, research on reporting errors in developing country surveys has focused primarily on issues dealing with nonresponse (Gibson et al. 1999; Mishra et al. 2006), the temporal compression or telescoping of events (Gage 1995), or the consistency and reliability of responses (Knodel and Piampiti 1977; Strickler et al. 1997; Eggleston et al. 2000; Williams et al. 2001; Nyitray et al. 2009). Less attention has been given to the accuracy of survey responses to sensitive items in interviewer-administered population surveys (for exceptions, see Weinhardt et al. 1998; Gregson et al. 2002; Mensch et al. 2003; Gregson et al. 2004; Lara et al. 2004; Nnko et al. 2004; Plummer et al. 2004; Obermeyer 2005).

In face-to-face interviewer-administered surveys, nonresponse and intentional misreporting are common problems that occur with questions that address sensitive topics. The refusal to participate in a survey interview or to respond to individual questions can bias survey results. A potentially more serious problem arises when subjects, rather than refuse to answer, intentionally misreport their behavior or opinions because they feel socially obligated to cooperate or because they wish to make a positive impression on the interviewer. This type of misreporting may be more problematic from a data-quality perspective than nonresponses because it is not easily detected and can bias sample estimates without the researcher's knowledge. In comparison, item-specific nonresponse can be assessed for the differences between those who respond to specific items and those who do not.

Systematic misreporting on sensitive topics generally takes the form of underreporting socially undesirable behaviors or attitudes and overreporting desirable ones. Tourangeau and colleagues (2000) identify social desirability, invasion of privacy, and risk of disclosure as three dimensions of sensitive questions that generate response bias. Social desirability bias refers to the tendency of respondents to report behaviors or attitudes that project a favorable image of themselves and that do not offend the interviewer or elicit the interviewer's disapproval. Social desirability bias stems from an individual's need for social approval, as well as the desire to conform to perceived cultural norms of good behavior and cooperation and avoid embarrassment and shame. Johnson and van de Vijver (2003) find systematic cross-cultural differences in the response effects of social desirability, with lower levels of social desirability bias associated with higher levels of affluence and social power. In the United States, minority groups are more likely than majority whites to underreport stigmatizing behaviors such as substance abuse and abortion (Jones and Forrest 1992).

Because social desirability bias is based on the respondent's assessment of the degree of sensitivity of a question and how the interviewer will judge a particular response, the relative magnitude and direction of response effects in face-to-face interviews will vary, often in predictable ways, across questions, response modes, individuals, social groups, and cultures (Catania 1999). These issues are particularly salient for survey research on sexual behavior and reproductive health (see Zehner 1970; Axinn 1991; Puri and Busza 2004; Marston and King 2006; Bearinger et al. 2007). For example, the double standard for the sexual behavior of men and women produces a tendency for women to underreport the number of their sexual partners and for men in some age or cultural subgroups to overreport the number of their partners (Catania et al. 1990; Smith 1992; Mensch et al. 2003; Curtis and Sutherland 2004; Nnko et al. 2004; Plummer et al. 2004; Fenton et al. 2005; Marston and King 2006). Persons who are highly educated and those living in cities typically are less inhibited than poorly educated rural respondents in reporting non-normative behaviors. These differentials in response bias prevent the accurate description of sexual behaviors at the population level and misrepresent the extent of social and economic differences in reported sexual behaviors.

Privacy issues are a second dimension of sensitive questions that generate response effects in interviewer-administered surveys. Sensitive questions, particularly those dealing with intimate sexual behaviors, may be viewed as intrusive. Investigators count on the impersonal and scientific nature of the survey interview to reduce the awkwardness associated with questions about private matters. In cultures that emphasize collectivism and cooperation in social interaction, however, the need to maintain positive and harmonious relations with the interviewer can contribute to biased results if respondents react to intrusive questions by providing inaccurate responses (Jones 1983; Johnson and van de Vijver 2003). For instance, in Ethiopia, refusal rates for surveys are exceptionally low compared with those in richer countries, in part because of the strong cultural emphasis on politeness and conformity (CSA [Ethiopia] and ORC Macro 2006). These high response rates, however, may mask

intentional misreporting by respondents who might otherwise refuse to participate.

A third dimension that generates response effects for sensitive questions is the risk of disclosure. Respondents may refuse to answer a sensitive question or intentionally misreport a behavior or attitude because of concerns that others will hear their responses during the interview. They also may be concerned that interviewers who hear embarrassing responses will reveal those responses to others, especially when the interviewers are recruited locally from the same ethnic, linguistic, and religious group.

These response effects are often sensitive to the mode of data collection the interviewer uses for sensitive questions. In spite of the problems of nonresponse and misreporting, the advantages offered by the presence of an interviewer (which include higher overall participation rates, question clarification, fewer invalid responses, and direct observation) generally outweigh the potential drawbacks (Catania et al. 1990). A number of innovations in questionnaire administration and response modes have been introduced for use in face-to-face interviews to reduce the response effects produced by sensitive questions (Tourangeau et al. 1997). In computer-assisted self-interviewing (CASI), questions are displayed on a computer screen and responses are entered using the keyboard. Simultaneous verbal instructions may be provided by the interviewer or played through earphones (audio computer-assisted self-interviewing [ACASI]) to guide the respondent. An alternative method for collecting sensitive survey data is to provide the respondent with a self-administered paper-and-pencil questionnaire that the respondent places in a sealed envelope upon completion.

Studies conducted in developed countries have consistently shown that some form of self-administration in the sensitive section of a questionnaire reduces the level of misreporting (Couper and Stinson 1999). For example, illicit drug use is more likely to be reported by means of self-administered questionnaires than by means of interviewer-administered questionnaires (Tourangeau et al. 2000). Tourangeau and Smith (1996) found that the difference between the number of sexual partners reported by men and women in interviewer-administered questionnaires was sharply reduced when computer-assisted self-administration was used. Jones and Forrest (1992) found that women's reporting of abortions in response to the National Survey of Family Growth (NSFG) in the United States increased significantly when respondents were given a self-administered questionnaire. In the case of desirable behaviors, Gribble and colleagues (1999) report that normative behaviors such as consistent condom use are less likely to be overreported in a telephone audio computer-assisted self-interview (T-ACASI). Macalino and colleagues (2002) found that injecting drug users reported lower levels of preventive behavior with ACASI than in face-to-face interviews. As expected, research also indicates that the impact of self-administration is negligible with nonsensitive questions (Turner et al. 1998; Tourangeau et al. 2000).

The recent proliferation of methodological experiments in the developing world suggests that alternative methods for survey administration have potential for reducing social desirability bias, although the results are mixed. Gregson and colleagues (2002 and 2004) used informal confidential voting interviews in which the interviewers read the questions and the respondents wrote the answers on voting strips before placing the strips in ballot boxes. This method produced higher rates of reported HIV-risk behaviors than did face-to-face interviews. In a study of induced abortion in Mexico, Lara and colleagues (2004) used a random response technique in which the respondent answered yes or no to one of two randomly assigned written questions: "Were you born in April?" or "Did you ever try to interrupt a pregnancy?" Although the reported rate of attempted induced abortion was higher with the random response technique than with the rate reported when other methods were used, only one question was asked using this random response technique, and the rates of reporting successful abortions using other methods (face-to-face interviews, ACASI, and self-administered questionnaires) in subsequent questions differed by interview location. In a study conducted in rural Malawi, Mensch and colleagues (2008) found inconsistent response effects by interview method. Whereas reports of multiple lifetime sexual partners and of having had sex with a friend or acquaintance were higher among respondents who used ACASI, reports of ever having had sex and of having had sex with a boyfriend were higher among respondents in face-to-face interviews. Mensch and colleagues (2008) also found that the association between having a positive biomarker for an STI and reporting risky sexual behavior was stronger in face-to-face interviews than among respondents who used ACASI. In contrast, in a study conducted in Saõ Paulo, Brazil, Hewett and colleagues (2008) found stronger correlations between risk behaviors and biomarkers for STIs when interviews were conducted with ACASI than when they were conducted face-to-face. Additionally, the STI-positive participants interviewed face-to-face were more likely to underreport risky sexual behavior than were those who used ACASI.

Although some form of self-administration of sensitive questions has great potential, important barriers to

successful self-administration in developing countries remain. Both the computer-assisted and paper-and-pencil methods place burdens on the respondent that make them less appropriate for populations where levels of educational attainment are low (Gribble et al. 1999). The paper-and-pencil method requires more than basic literacy, and computer-assisted methods, even when the questions are read to the respondent aloud or on audio, require basic familiarity with a keyboard and number recognition. In many developing-country settings, literacy and numeracy are limited and familiarity with computers outside of large urban areas is rare, which reduces the effectiveness of the paper-and-pencil and computer-assisted modes of self-administration (van de Wijgert et al. 2000; Cleland et al. 2005). For example, in an experimental study of the relative effectiveness of ACASI and self-administered paper-and-pencil questionnaires, Mensch and colleagues (2003) found that in certain settings the use of a computer in survey interviews produced anxiety, suspicion, and hostility from the study population. They also found that technical problems had occurred in 20 percent of the interviews, largely due to issues with the keypad (Hewett et al. 2004). The informal confidential voting interviews tested in Zimbabwe did not involve the use of computers, but required respondents to be sufficiently literate; 8 percent of the respondents in Zimbabwe were not sufficiently literate to take the survey (Gregson et al. 2002). The ballot method also had slightly higher rates of missing data than the face-to-face interviews, but these rates did not exceed 4 percent. The rate of inconsistent responses was also generally low but higher than it was in face-to-face interviews.

Concerns about social desirability bias, invasion of privacy, and risk of disclosure are particularly salient when studying adolescents' sexual and reproductive health, because young people may conceal their romantic relationships from anyone perceived to be an elder (Mensch et al. 2003; Plummer et al. 2004; Haram 2005; Bearinger et al. 2007). In this study, we present an alternative methodology that overcomes some of the limitations of self-administered questionnaires and computer-assisted methods for populations with high rates of illiteracy and little familiarity with computers. The nonverbal response card addresses the three problematic dimensions of sensitive questions described above (social desirability, invasion of privacy, and risk of disclosure) that generate response effects in face-to-face interviewer-administered questionnaires. In addition, it places minimal cognitive demands on the respondent, is highly portable, can be used with any language, is inexpensive, and is adaptable to a wide variety of subject matter and response options.

Methodology

We developed the nonverbal response card for and tested it in the Gilgel Gibe Social and Sexual Relationship History Survey conducted in Ethiopia in 2006. The survey collected information about the formation of romantic relationships and the transition to sexual activity among adolescents and young adults aged 13–24. The sample for the survey was drawn from the Gilgel Gibe Demographic Surveillance System (DSS), which incorporates rural communities and small urban centers in the immediate areas surrounding the Gilgel Gibe Dam in Jimma Zone. The area is southwest of the capital city, Addis Ababa, reachable in approximately six hours' driving time from the capital, and has a population of approximately 45,000. The survey randomly sampled 1,300 young people from the approximately 8,900 households in the Gilgel Gibe DSS.

The study population is predominantly Muslim and ethnically Oromo. The Oromo are the largest single ethnic group in Ethiopia, constituting approximately 40 percent of the national population. The median age at marriage in the Oromiya region is 18.7 years for women aged 20–24 and 24.4 years for men aged 25–59 (CSA [Ethiopia] and ORC Macro 2006). Premarital sexual intercourse is common among partners who are engaged to be married in Ethiopia and generally occurs less than one year before marriage (Lindstrom et al. 2009). In the Oromiya region, recent sexual intercourse is low among never-married young people aged 15–24, as reported in the 2005 Ethiopia Demographic and Health Survey (DHS). In that survey, 2.1 percent of never-married women aged 15–24 reported having sexual intercourse in the past 12 months, as did 9 percent of never-married men aged 15–24. Reports of extramarital sexual activity are even less common. Only 0.5 percent of women in union aged 15–49 reported having had sexual intercourse with a nonmarital or noncohabiting partner in the past 12 months, as did only 0.8 percent of men in union (CSA [Ethiopia] and ORC Macro 2006).

The adolescent and young adult respondents in the Gilgel Gibe Social and Sexual Relationship History Survey were interviewed at home. Same-sex interviewers were used. The questionnaire collected information concerning contact with health services, food insecurity, aspirations, attitudes regarding gender relations, HIV knowledge, and information about the past four romantic relationships, including information on the background characteristics of each partner and the nature of intimate physical and sexual contact between the partners.[1] Respondents were also asked about the conditions under which first sexual intercourse occurred, their knowledge and use of condoms, perceptions of HIV risk, and attitudes regarding the appropriateness of premarital

sex. Sensitive questions regarding sexual behavior and knowledge were asked at the end of the interview.

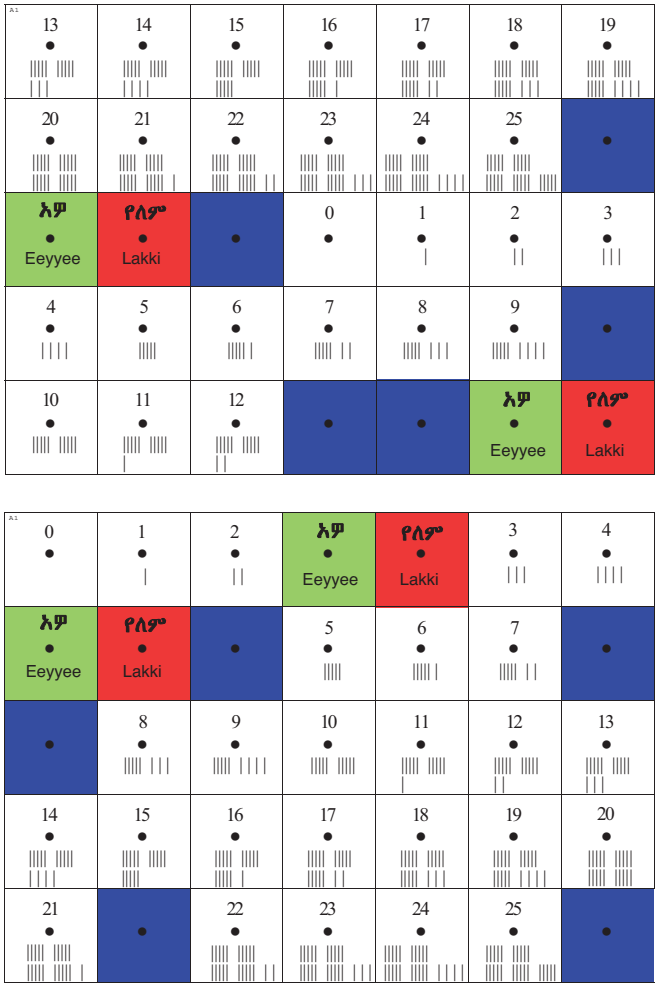
Nonverbal Response Method

A major concern of the investigators in launching this study was that sensitive questions about sexual behaviors would be subject to considerable response bias in this largely rural Muslim population. To address the issue of response bias, the authors developed an innovative response method called the nonverbal response card. This new method uses a response card that allows the respondent to communicate nonverbally and confidentially their responses to questions read by the interviewer.

The response card is an 8.5-by-11-inch laminated sheet of heavy paper with a respondent side and an interviewer side. Each side is divided into 35 cells (five rows and seven columns) with a small hole punched through the center of each cell. On the respondent side of the card, the cells contain written and color-coded responses (see Figure 1). The numeric responses range from 0 to 25 (for the number of sexual partners and age at first sex), and the non-numeric responses are "Yes," "No," and "Does not apply." The numeric responses are indicated by both a written number and vertical bars (for example, || for 2, ||||| ||||| for 10). The non-numeric responses are written in the two local languages and are color coded, green for "Yes," red for "No," and blue for "Does not apply."

Figure 1 Nonverbal response cards

(a) Side facing respondent



(b) Side facing interviewer

963	238	631	842	479	420	292
938	105	669	351	691	675	888
539	634	988	410	192	881	561
467	889	912	632	359	745	433
743	317	705	898	590	986	871

363	756	168	547	204	706	353
191	660	785	297	672	990	928
522	176	906	737	374	935	109
789	278	878	818	283	980	492
568	248	551	178	879	983	153

Notes: • represents the hole in the card for the response stick; cells on the respondent side with • alone are colored blue and are used for "Does not apply" (for example, age at first sex for respondents who have not had sex); cells with the word "Eeyyee" and its Amharic equivalent are colored green and are used for "Yes"; cells with the word "Lakki" and its Amharic equivalent are colored red and are used for "No." The valid range of numeric responses for the questions was 0–25 and was specific to the survey questionnaire for which the cards were tested and used.

Each cell on the interviewer side of the card contains a unique three-digit number. The number of cells and response options provided on the card are survey specific and can vary across questionnaires or question sets within questionnaires, permitting the use of the card for a variety of topics and study populations.

The card is held by the respondent with the respondent side visible only to the respondent and the interviewer side visible only to the interviewer. The respondent indicates his/her response to a question by inserting the point of a stick that is provided through the hole in the appropriate response cell. The interviewer records the three digit number in the cell on the interviewer side of the card through which the point of the stick is protruding. To ensure that the interviewer does not recognize a response based on the position of the response cell, a total of ten response cards were prepared in which the order of the responses on each card varies (but the response set remains the same), and the three-digit number assigned to each response is different. There are also multiple "Yes," "No," and "Does not apply" response cells on each card so that the respondent does not repeatedly use the same cell for "Yes" or "No" on any single card. The three-digit numbers are randomly assigned to the 35 possible responses with a total of ten unique numbers (corresponding to each of the ten cards) assigned to each response. The three-digit numeric codes are recoded to their corresponding response after the data have been entered into computer-readable data files.

At the start of the sensitive section of the questionnaire, the interviewer presents the respondent with an envelope containing the ten response cards. The respondent is instructed to pull out the cards and inspect them while the interviewer explains how to use the cards and how the cards are designed to preserve the confidentiality of the respondent's answers. The interviewer uses a demonstration card that has only two rows of cells with examples of the numeric and non-numeric response cells to show the respondent how the card is used and to remind the respondent throughout the interview that green is for "Yes," red is for "No," and blue is for "Does not apply." The respondent is instructed to hold onto any one of the cards and to set the other cards down. At any point during the interview the respondent can change cards if he/she wishes. At the end of the sensitive portion of the interview, the respondent is instructed to place all of the response cards back into the envelope in any order.

Application of the Response-card Method

The survey questionnaire and nonverbal response cards were first pretested with 202 randomly selected adolescents in an urban community in the Gilgel Gibe study area. The interviewers received one week of intensive training prior to the pretest, and they received an additional week of training with the final version of the survey questionnaire and nonverbal response cards before beginning the interviews. The interviewers quickly grasped the concept and use of the cards, and reported that respondents easily understood the response procedures and were comfortable with the cards.

Following the pretest, the nonverbal response cards were randomly assigned to one-half of the full study sample of 1,300 young people in advance of interviewing. Table 1 presents selected sample characteristics for the respondents who provided verbal responses and for respondents who used the nonverbal response cards. The distributions by sex, age, education, marital status, place of residence, religion, and ethnicity are virtually identical for the two groups. This comparison provides confirmation of the randomization of the response method: the two groups are comparable in size and indistinguishable from one another with respect to the principal social and demographic characteristics.

Table 1 Percentage distribution of survey respondents aged 13–24, by selected sociodemographic characteristics, according to survey response method used, Gilgel Gibe Social and Sexual Relationship History Survey, Southwest Ethiopia, 2006

Characteristic	Verbal response	Card response
Sex		
Female	49.0	49.1
Male	51.0	50.9
Age		
13–16	52.4	51.7
17–20	30.0	30.2
21–24	17.5	18.1
Education		
None	35.5	35.2
1+ years	64.5	64.8
Marital status		
Never married	76.1	76.1
Married	23.4	23.4
Divorced/separated/widowed	0.5	0.5
Residence		
Urban	23.9	25.2
Rural	76.1	74.8
Religion		
Muslim	88.6	87.9
Orthodox Christian	10.3	11.5
Other Christian	1.1	0.6
Ethnicity		
Oromo	88.2	90.7
Amhara	3.3	2.5
Yem	3.3	3.5
Other	5.2	3.3
Observations (N)	(633)	(636)

Note: Of the sample of 1,300, there were 31 nonrespondents and refusals.

Each interviewer conducted interviews using both methods to reduce the potential influence of interviewer effects on differences in reporting generated by the two methods. Interviewers were required to use the nonverbal response cards for the sensitive portion of the questionnaire with the respondents who were assigned the nonverbal response card (the experimental group), and they were required to use the conventional verbal response method with the other one-half of the sample (the control group). The sensitive portion of the survey included 50 questions on sexual behavior, knowledge, and attitudes. Two separate questionnaires were prepared: one for those assigned to the card method and one for those assigned to the verbal method. The questionnaire for use with the cards included instructions to be read by the interviewer on how to use the card for each question. It did not include any skip instructions for the sensitive portion of the questionnaire because the interviewer did not know the respondent's responses to earlier questions. Respondents were told to point to any of the solid blue squares if the question did not apply. For example, when asked how old they were at the time of their first sexual intercourse, respondents were told "If you have never had sexual intercourse point to any of the blue squares." The questionnaire used with the verbal responses included skip patterns for questions that were not applicable based on earlier responses. In all other respects, the two questionnaires were identical.

Invalid responses (a numeric response for a yes/no question or a yes/no response for a numeric question) ranged from approximately 1 to 3 percent of responses for those who used the card method, compared with less than 1 percent of those who responded verbally. A slight tendency was observed among respondents who used the cards to use the blue squares ("Does not apply") to respond "No."[2]

As a result of the low levels of reported sexual behavior in this population, many of the sensitive questions such as those concerning the conditions under which first sexual intercourse or condom use occurred were not applicable to most respondents. Of the 50 questions for which the card method was used, a total of 12 applied to all respondents and addressed sensitive topics regarding nonmarital sexual behavior, condom knowledge, and sexual attitudes.[3] Based on the social stigma attached to risky sex, the widespread social marketing of condoms, and recent exposure to more permissive models of courtship and sexual relationships in the study area, we expect nonmarital sex and the acceptance of casual sex to be underreported and condom knowledge and acceptance of premarital sex in committed relationships to be overreported by respondents who are using the verbal response method.

Results

Table 2 presents the proportion of young people who reported having a nonmarital sexual partner in the 12 months prior to the survey, by response method, categorized by sex, education, place of residence, and marital

Table 2 Percentage of survey respondents aged 13–24 who reported sexual behavior and perception of their HIV risk, by survey response method and selected sociodemographic characteristics, Gilgel Gibe Social and Sexual Relationship History Survey, Southwest Ethiopia, 2006

	All respondents				Never-married respondents	
Characteristic	n	Had nonmarital sexual partner in past 12 months[a]	Ever at risk of acquiring HIV in past 12 months	Two or more lifetime sexual partners	n	Ever had sexual intercourse
Response method						
Verbal response	633	2.8	0.2	1.4	482	3.7
Card response	636	5.8*	3.8**	3.2*	484	6.9*
Card (%)/verbal (%)	—	(2.07)	(19.00)	(2.29)	—	(1.86)
Females						
Verbal response	310	2.6	0.3	2.3	184	3.8
Card response	305	5.2	3.6**	2.3	195	6.8
Card (%)/verbal (%)	—	(2.00)	(12.00)	(1.00)	—	(1.79)
Males						
Verbal response	323	3.1	0.0	0.6	298	3.7
Card response	321	6.2	4.1**	4.0**	289	7.0
Card (%)/verbal (%)	—	(2.00)	nc	(6.67)	—	(1.89)
No education						
Verbal response	225	2.2	0.4	1.8	107	3.7
Card response	218	5.0	4.6**	5.0	106	5.8
Card (%)/verbal (%)	—	(2.27)	(11.5)	(2.78)	—	(1.57)
Some education (1+ years)						
Verbal response	408	3.2	0.0	1.2	375	3.7
Card response	408	6.1*	3.5**	2.2	378	7.2*
Card (%)/verbal (%)	—	(1.91)	nc	(1.83)	—	(1.95)
Rural						
Verbal response	482	2.1	0.2	0.8	361	2.8
Card response	469	5.8**	4.5**	3.6**	356	5.7
Card (%)/verbal (%)	—	(2.76)	(22.50)	(4.50)	—	(2.04)
Urban						
Verbal response	151	5.3	0.0	3.3	121	6.7
Card response	157	5.7	1.9	1.9	128	10.3
Card (%)/verbal (%)	—	(1.08)	nc	(0.58)	—	(1.54)
Never married						
Verbal response	482	3.3	0.0	0.4	482	3.7
Card response	481	6.4*	3.3*	2.1*	481	6.9*
Card (%)/verbal (%)	—	(1.94)	nc	(5.25)	—	(1.86)
Ever married						
Verbal response	151	1.3	0.7	4.6	—	—
Card response	145	3.4	5.5*	6.8	—	—
Card (%)/verbal (%)	—	(2.62)	(7.86)	(1.48)	—	—

* Difference in proportions significant at $p \leq 0.05$; ** $p \leq 0.01$. — = Not applicable. nc = Not calculable.

[a]Never-married respondents who report having had one or more sexual partners in the past 12 months, and ever-married respondents who report having had two or more sexual partners in the past 12 months.

status. Nonmarital sexual partners were identified by asking the following question: "Including your current relationship, how many men [women] have you had sexual intercourse with in the past 12 months?" Never-married respondents who reported having had sexual intercourse with one or more partners in the past 12 months and ever-married respondents who reported having had sexual intercourse with more than one partner in the past 12 months are treated as reporting a nonmarital sexual partner.[4] Table 2 also presents the proportion of youth reporting that they felt they were ever at risk of acquiring HIV in the past 12 months, the proportion reporting two or more lifetime sexual partners, and, among never-married young people, the proportion reporting ever having had sexual intercourse.

The overall prevalence of nonmarital sex among those responding verbally was low: 2.8 percent of young people reported a nonmarital sexual partner in the past 12 months, and 3.7 percent of never-married young people reported ever having had sexual intercourse. These low reported levels of nonmarital sexual activity are consistent with the reports in the 2005 Ethiopia DHS described above. The reported levels of nonmarital sexual experience in the sample were approximately two times higher, however, among respondents who used the nonverbal response cards. The effect of the response method on the willingness of the young people surveyed to report that they were at risk of acquiring HIV in the 12 months prior to the survey is especially striking. Virtually no respondents answering the questions verbally admitted to being at risk of acquiring HIV, compared with 3.8 percent of respondents who used the card method.

Although we might expect the response effect to be greatest among those subgroups for whom the reporting of nonmarital sexual relations is most stigmatized, such as women, rural inhabitants, and married respondents, no such pattern emerged. Although no clear patterns were found in the response effect by subgroup, the reported levels of sexual experience and HIV risk were consistently higher among those who used the card method than among those who responded verbally. The response effect was weakest among urban respondents, which is consistent with the perception that urban populations are more accepting than rural populations of nonmarital sexual activity.

Table 3 presents the proportion of respondents who reported knowing where to obtain condoms and who indicated acceptance of premarital sex according to response method used, categorized by sex, education, place of residence, marital status, and recent contact with health services. In contrast to our expectations regarding responses to questions about nonmarital sexual activity, which we expected to be underreported in the verbal responses, we expected knowledge of condoms and acceptance of premarital sex in committed relationships to be overreported in the verbal responses. Public health campaigns promoted by the government and by nongovernmental organizations in the study area have emphasized the importance of safe sex practices and condom use. In this context, we expect young people to overreport knowing where to obtain condoms because some may perceive a lack of knowledge to be a sign of ignorance or backwardness. The results in Table 3 support this expectation, and consistently show that the young people in the sample overreported knowing where condoms can be obtained and overreported knowing a place where they would feel comfortable obtaining condoms when they gave verbal responses. The proportion of respondents who reported knowing where they could obtain a condom was 22 percent lower among those who used the card method, compared with those using the verbal response method (34 percent compared with 43 percent). Respondents who used the card method were also less likely to report acceptance of premarital sex among couples who were engaged to be married, and somewhat less likely to report such acceptance among couples who were going steady.

The response effect for condom knowledge varied across subgroups and was weakest among females and those with no schooling. Critically important for sexual health interventions targeted at high-risk groups, the largest difference in response patterns is found among single respondents and respondents who reported having had no recent contact with health services. About half (51 percent) of the single respondents who used the verbal response method reported knowing where to obtain a condom, compared with only 37 percent of respondents in the same group who used the nonverbal response card. Similarly, among those who have had no recent contact with health services, 28 percent who used the verbal response method reported knowing where to obtain a condom, compared with only 19 percent who used the card method. This difference in reported knowledge of access to condoms presents additional challenges for public health programs by suggesting that conventional survey estimates may significantly overestimate this knowledge, and most likely condom use as well, among subgroups who are often the target of outreach programs.

More encouragingly, our analyses comparing respondents who had versus those who did not have recent contact with health services suggest that the conventional verbal response method may underestimate the potential impact of contact with the health-service sector on such knowledge. Based on the verbal responses, young people who had recent contact with health services were

Table 3 Percentage of survey respondents aged 13–24 who reported knowledge of access to condoms and indicated their acceptance of premarital sex, by survey response method used, selected sociodemographic characteristics, and contact with health services, Gilgel Gibe Social and Sexual Relationship History Survey, Southwest Ethiopia, 2006

Characteristic	Know where to obtain condoms	Know a comfortable place to obtain condoms	It is acceptable for a young woman to have sexual intercourse when she is: casually sexually attracted	going steady	engaged	It is acceptable for a young man to have sexual intercourse when he is: casually sexually attracted	going steady	engaged
Response method								
Verbal response	43.1	35.2	15.0	36.8	49.6	23.1	40.8	54.3
Card response	33.7**	27.0**	19.7*	31.9	41.7**	26.2	34.4*	46.0**
Card (%)/verbal (%)	(0.78)	(0.77)	(1.31)	(0.87)	(0.84)	(1.13)	(0.84)	(0.84)
Females								
Verbal response	25.8	16.8	5.2	25.2	43.2	14.2	31.3	49.7
Card response	21.7	17.7	8.1	25.0	41.1	19.0	30.0	45.5
Card (%)/verbal (%)	(0.84)	(1.05)	(1.56)	(1.99)	(0.95)	(1.34)	(0.96)	(0.92)
Males								
Verbal response	59.8	52.9	24.5	48.0	55.7	31.6	49.8	58.8
Card response	45.3**	35.9**	30.9	38.5*	42.2**	33.1	38.8**	46.6**
Card (%)/verbal (%)	(0.76)	(0.68)	(1.26)	(0.80)	(0.76)	(1.05)	(0.78)	(0.79)
No education								
Verbal response	18.2	11.6	7.1	28.0	46.7	12.9	30.7	47.1
Card response	17.2	12.7	11.3	20.9	42.1	16.8	24.7	44.5
Card (%)/verbal (%)	(0.95)	(1.09)	(1.59)	(0.75)	(0.90)	(1.30)	(0.80)	(0.94)
Some education (1+ years)								
Verbal response	56.9	48.3	19.4	41.7	48.8	28.7	46.3	58.3
Card response	42.6**	34.7**	24.2	37.8	58.6**	31.2	39.7	46.8**
Card (%)/verbal (%)	(0.75)	(0.72)	(1.25)	(0.91)	(1.20)	(1.09)	(0.86)	(0.80)
Rural								
Verbal response	34.0	27.2	14.1	33.0	49.2	20.1	35.9	51.2
Card response	25.8**	19.1**	18.3	29.4	40.3**	21.9	28.8*	42.6**
Card (%)/verbal (%)	(0.76)	(0.70)	(1.30)	(0.89)	(0.82)	(1.09)	(0.80)	(0.83)
Urban								
Verbal response	72.2	60.9	17.9	49.0	51.0	32.5	56.3	64.2
Card response	56.9**	50.3	23.8	39.4	45.6	38.8	50.9	56.3
Card (%)/verbal (%)	(0.79)	(0.83)	(1.33)	(0.80)	(0.89)	(1.18)	(0.90)	(0.88)
Never married								
Verbal response	50.6	41.7	17.8	27.8	50.4	27.4	42.9	56.8
Card response	36.7**	29.7**	22.4	21.8	40.1**	28.8	36.5*	44.7**
Card (%)/verbal (%)	(0.73)	(0.72)	(1.26)	(0.78)	(0.80)	(1.05)	(0.85)	(0.79)
Ever married								
Verbal response	24.2	14.6	6.0	39.6	47.0	9.3	33.8	46.4
Card response	19.2	18.1	10.8	35.0	46.6	17.7*	27.9	50.3
Card (%)/verbal (%)	(0.79)	(1.24)	(1.80)	(0.88)	(0.99)	(1.90)	(0.83)	(1.08)
No recent contact with health services								
Verbal response	28.0	20.6						
Card response	18.9**	12.7*						
Card (%)/verbal (%)	(0.68)	(0.62)						
Recent contact with health services								
Verbal response	51.1	42.9						
Card response	42.1**	35.1*						
Card (%)/verbal (%)	(0.82)	(0.82)						

*Difference in proportions significant at $p \leq 0.05$; **$p \leq 0.01$.

1.8 (51.1/28.0) times more likely than those who had not had recent contact with health services to report knowing where to obtain a condom. Based on the answers recorded on the nonverbal response cards, young people who had recent contact with health services were 2.2 (42.1/18.9) times more likely than those who had not to report knowing where to obtain a condom. The use of the nonverbal response card suggests that contact with health services was about 22 percent more effective (2.2/1.8 = 1.22) in providing young people in the study area with knowledge of where to obtain a condom than is suggested by the verbal responses.

Discussion

The primary purpose of the Gilgel Gibe Social and Sexual Relationship History Survey was to provide a baseline assessment of the prevalence of potentially high-risk sexual behaviors. Because of the relative religious conservatism of the study population and the need to interview young people in their homes, we anticipated problems of response bias to questions about sexual behavior and knowledge. We developed the nonverbal response cards to provide a more private and confidential method for respondents to use to answer sensitive questions, and we tested the effectiveness of the cards using a randomized controlled trial design in which one-half of the sample used the response cards and the other half provided verbal responses. Our findings from the Gilgel Gibe survey indicate that young people in this context are more likely to report stigmatized behaviors and are more likely to admit a lack of sexual knowledge when they use the nonverbal response cards than when they give verbal responses. Although the prevalence of premarital and extramarital sexual behavior was still low in the study population, the nonverbal response-card method produced estimates of these behaviors that were around two times higher than the estimates provided by the conventional verbal response method. We also found that estimates of the proportion of young people who knew where to obtain condoms were approximately 22 percent lower for those who used the more private and confidential card method, compared with those who used the verbal response method. Most critically for public health programs, the overreporting of condom knowledge was greatest among single young people and those who reported having had no recent contact with the formal health sector.

Despite the strengths of the nonverbal response-card method, it is not without weaknesses. Because the interviewers do not know the respondents' answers to the sensitive questions, skip patterns cannot be built into the questionnaire. To address this problem, blue squares were included in the response card to indicate "Does not apply." The use of the blue square, however, places a greater burden on the respondent than would the use of the verbal response method that includes an interviewer-directed skip pattern. The pretest version of the nonverbal response card included ordinal response categories, but the respondents had difficulty using the card accurately for this purpose. Future research using the card method should explore the viability of incorporating ordinal and nominal response categories with dedicated cards and interviewer guide cards. The nonverbal response card also introduced interviewer error when the three-digit code recorded by the interviewer was invalid and respondent error when the type of response (yes/no or numeric) was inconsistent with the question asked. A subsequent version of the nonverbal response card uses a larger font for the three-digit codes and separates the card into a yes/no panel and a numeric response panel to reduce these types of errors.

This study has broader implications for how researchers should solicit responses to sensitive questions in general, as well as to questions that address types of knowledge and attitudes associated with less traditional or more modern lifestyles. Although qualitative research methods have been used to address concerns about the validity of survey responses to sensitive questions and to better understand the dynamics of risky sexual behaviors and condom use (Nzioka 2004; Obermeyer 2005; Marston and King 2006), these methods are costly and are not appropriate for generalizing to entire populations. The nonverbal response card dramatically improves the reporting of risky sexual behaviors in situations in which such behaviors are sensitive and subject to response bias. Because the interviewer does not know the respondent's answer to a survey question, the social desirability motive for misreporting is greatly reduced and is limited to those respondents who, regardless of the mode of question administration or response, do not believe that their responses are confidential. The awkwardness created by intrusive questions is reduced because the respondent does not provide a verbal answer. The response card also reduces participants' concerns about the risk of disclosure during the interview. Not only does the interviewer not know the respondent's answer, no one within listening range does either. This feature of the card is especially important for interviews conducted in crowded settings where privacy is difficult to achieve and also, particularly, for interviews with women and young people in settings where cultural norms prohibit those respondents, particularly young women, from being alone with strangers. The nonverbal response-card method is inexpensive, easily implemented among poor rural populations in which illiteracy is high, and can be adapted to a variety of survey instruments. It is particularly useful in settings in which computer-assisted methodologies are impractical or not feasible.

Notes

1 A romantic relationship was defined by the interviewers as "a relationship that lasted for at least one month in which you were boyfriend and girlfriend or husband and wife. A romantic relationship may have involved sexual relations or it may have involved nothing more than holding hands."

2 In a series of seven yes/no questions regarding the conditions of first sexual intercourse, the proportion of "Does not apply" re-

sponses (blue squares) for those who had responded "Yes" to a prior question on ever had sexual intercourse ranged from 8–10 percent of the card responses, compared with around 3 percent of the verbal responses. Among respondents who had answered "No" to the question on ever had sexual intercourse, 2–3 percent of the card responses to the questions on conditions of first sex were "Yes" or "No" rather than "Does not apply" (blue square).

3 The questions asked of all respondents were: (1) Have you ever had sexual intercourse? (2) Including your current relationship, with how many men [women] have you ever had sexual intercourse? (3) Including your current relationship, with how many men [women] have you had sexual intercourse in the past 12 months? (4) In the past 12 months, do you think you were ever at risk of contracting HIV? (5) Do you know of a place where you could obtain condoms if you needed to? (6) Do you know of a place where you would feel comfortable obtaining condoms? (7) Is it acceptable for a young woman to have sexual intercourse when she is casually sexually attracted to a male? (8) Is it acceptable for a young woman to have sexual intercourse when she is going steady with a male? (9) Is it acceptable for a young woman to have sexual intercourse with a male when she is engaged to be married to him? (10) Is it acceptable for a young man to have sexual intercourse when he is casually sexually attracted to a female? (11) Is it acceptable for a young man to have sexual intercourse when he is going steady with a female? (12) Is it acceptable for a young man to have sexual intercourse with his fiancée?

4 Male respondents in polygamous unions had to report having had more than two sexual partners in the past 12 months in order to be classified as having a nonmarital sexual partner.

References

Axinn, William G. 1991. "The influence of interviewer sex on responses to sensitive questions in Nepal." *Social Science Research* 20(3): 303–319.

Bearinger, L.H., R.E. Sieving, J. Ferguson, and V. Sharma. 2007. "Global perspectives on the sexual and reproductive health of adolescents: Patterns, prevention, and potential." *Lancet* 369(9,568):1,220–1,231.

Catania, Joseph A. 1999. "A framework for conceptualizing reporting bias and its antecedents in interviews assessing human sexuality." *The Journal of Sex Research* 36(1): 25–38.

Catania, Joseph A., David R. Gibson, Dale D. Chitwood, and Thomas J. Coates. 1990. "Methodological problems in AIDS behavioral research: Influences on measurement error and participation bias in studies of sexual behavior." *Psychological Bulletin* 108(3): 339–362.

Central Statistical Agency (CSA) [Ethiopia] and ORC Macro. 2006. *Ethiopia Demographic and Health Survey 2005*. Addis Ababa, Ethiopia, and Calverton, MD: CSA and ORC Macro.

Cleland, J., J.T. Boerma, M. Caraël, and S.S. Weir. 2005. "Monitoring sexual behaviour in general populations: A synthesis of lessons of the past decade." *Sexually Transmitted Infections* 80(Supplement II): ii1–ii7.

Couper, Mick and Linda L. Stinson. 1999. "Completion of self-administered questionnaires in a sex survey." *The Journal of Sex Research* 36(4): 321–330.

Curtis, S.L. and E.G. Sutherland. 2004. "Measuring sexual behaviour in the era of HIV / AIDS: The experience of Demographic and Health Surveys and similar enquiries." *Sexually Transmitted Infections* 80(Supplement 2): ii22–ii27.

Eggleston, Elizabeth, Joan Leitch, and Jean Jackson. 2000. "Consistency of self-reports of sexual activity among young adolescents in Jamaica." *International Family Planning Perspectives* 26(2): 79–83.

Fenton, K.A., A.M. Johnson, S. McManus, and B. Erens. 2005. "Measuring sexual behaviour: methodological challenges in survey research." *Sexually Transmitted Infections* 2001(77): 84–92.

Gage, Anastasia J. 1995. "An assessment of the quality of data on age at first union, first birth, and first sexual intercourse for Phase II of the Demographic and Health Surveys Program." *Occasional Papers No.4*. Calverton, MD: Macro International.

Gibson, David R., Esther S. Hudes, and David Donovan. 1999. "Estimating and correcting for response bias in self-reported HIV risk behavior." *The Journal of Sex Research* 36(1): 96–101.

Gregson, S., P. Mushati, P.J. White, M. Mlilo, C. Mundandi, and C. Nyamukapa. 2004. "Informal confidential voting interview methods and temporal changes in reported sexual risk behaviour for HIV transmission in sub-Saharan Africa." *Sexually Transmitted Infections* 80(Supplement 2): ii36–ii42.

Gregson, Simon, Tom Zhuwau, Joshua Ndlovu, and Constance A. Nyamukapa. 2002. "Methods to reduce social desirability bias in sex surveys in low-development settings: Experience in Zimbabwe." *Sexually Transmitted Diseases* 29(10): 568–575.

Gribble, James N., Heather G. Miller, Susan M. Rogers, and Charles F. Turner. 1999. "Interview mode and measurement of sexual behaviors: Methodological issues." *The Journal of Sex Research* 36(1): 16–24.

Haram, Liv. 2005. "'Eyes have no curtains': The moral economy of secrecy in managing love affairs among adolescents in northern Tanzania in the time of AIDS." *Africa Today* 51(4): 56–73.

Hewett, Paul C., Annabel S. Erulkar, and Barbara S. Mensch. 2004. "The feasibility of computer-assisted survey interviewing in Africa: Experience from two rural districts in Kenya." *Social Science Computer Review* 22(3): 319–334.

Hewett, Paul C., Barbara S. Mensch, Manoel Carlos S. de A. Ribeiro, et al. 2008. "Using sexually transmitted infection biomarkers to validate reporting of sexual behavior within a randomized, experimental evaluation of interviewing methods." *American Journal of Epidemiology* 168(2): 202–211.

Johnson, T.P. and F.J.R. van de Vijver. 2003. "Social desirability in cross-cultural research." In *Cross-Cultural Survey Methods*. Eds. J.A. Harkness, F.J.R. van de Vijver, and P. Mohler. Hoboken, NJ: John Wiley & Sons.

Jones, Elise F. and Jacqueline Darroch Forrest. 1992. "Underreporting of abortion in surveys of U.S. women: 1976 to 1988." *Demography* 29(1): 113–126.

Jones, Emily L. 1983. "The courtesy bias in South-east Asian surveys." In *Social Research in Developing Countries*. Eds. Martin Bulmer and Donald P. Warwick. London: UCL Press. Pp. 183–192.

Knodel, John and Sauvaluck Piampiti. 1977. "Response reliability in a longitudinal survey in Thailand." *Studies in Family Planning* 8(3): 55–66.

Lara, Diana, Jennifer Strickler, Claudia Díaz Olavarrieta, and Charlotte Ellertson. 2004. "Measuring induced abortion in Mexico: Comparison of four methodologies." *Sociological Methods and Research* 32(4): 529–558.

Lindstrom, David Philip, Gebre-Egziabher Kiros, and Dennis P. Hogan. 2009. "Transitions into first intercourse, marriage, and childbearing among Ethiopian women." *Genus* 65(2): 45–77.

Macalino, Grace E., David D. Celentano, Carl Latkin, Steffanie A. Strathdee, and David Vlahov. 2002. "Risk behaviors by audio computer-assisted self-interviews among HIV-seropositive and HIV-seronegative injection drug users." *AIDS Education and Prevention* 14(5): 367–378.

Marston, C. and E. King. 2006. "Factors that shape young people's sexual behavior: A systematic review." *Lancet* 368(9,547): 1,581–1,586.

Mensch, Barbara S., Paul C. Hewett, and Annabel S. Erulkar. 2003. "The reporting of sensitive behavior by adolescents: A methodological experiment in Kenya." *Demography* 40(2): 247–268.

Mensch, Barbara S., Paul C. Hewett, Richard Gregory, and Stephane Helleringer. 2008. "Sexual behavior and STI/HIV status among adolescents in rural Malawi: An evaluation of the effect of interview mode on reporting." *Studies in Family Planning* 39(4): 321–334.

Mishra, Vinod, Martin Vaessen, J. Ties Boerma, et al. 2006. "HIV testing in national population-based surveys: Experience from the Demographic and Health Surveys." *Bulletin of the World Health Organization* 84(7): 537–545.

Nnko, Soori, J. Ties Boerma, Mark Urassa, Gabriel Mwaluko, and Basia Zaba. 2004. "Secretive females or swaggering males? An assessment of the quality of sexual partnership reporting in rural Tanzania." *Social Science & Medicine* 59(2): 299–310.

Nyitray, Alan G., Jongphil Kim, Chiu-Hsieh Hsu, et al. 2009. "Test-retest reliability of a sexual behavior interview for men residing in Brazil, Mexico, and the United States." *American Journal of Epidemiology* 170(8): 965–974.

Nzioka, Charles. 2004. "Unwanted pregnancy and sexually transmitted infection among young women in rural Kenya." *Culture, Health & Sexuality* 6(1): 31–44.

Obermeyer, Carla Makhlouf. 2005. "Reframing research on sexual behavior and HIV." *Studies in Family Planning* 36(1):1–12.

Plummer, M.L., D.A. Ross, D. Wight, et al. 2004. "A bit more truthful: The validity of adolescent sexual behaviour data collected in rural northern Tanzania using five methods." *Sexually Transmitted Infections* 80(Supplement 2): 49–56.

Puri, Mahesh C. and Joanna Busza. 2004. "In forests and factories: Sexual behaviour among young migrant workers in Nepal." *Culture, Health & Sexuality* 6(2): 145–58.

Smith, T.W. 1992. "Discrepancies between men and women in reporting number of sexual partners: A summary from four countries." *Social Biology* 39(3–4): 203–211.

Strickler, Jennifer A., Robert J. Magnani, H. Gilman McCann, Lisanne F. Brown, and Janet C. Rice. 1997. "The reliability of reporting of contraceptive behavior in DHS calendar data: Evidence from Morocco." *Studies in Family Planning* 28(1): 44–53.

Tourangeau, Roger and Tom W. Smith. 1996. "Asking sensitive questions: The impact of data collection mode, question format, and question context." *Public Opinion Quarterly* 60: 275–304.

Tourangeau, Roger, Kenneth Rasinski, Jared B. Jobe, Tom W. Smith, and William F. Pratt. 1997. "Sources of error in a survey on sexual behavior." *Journal of Official Statistics* 13(4): 341–365.

Tourangeau, Roger, Lance J. Rips, and Kenneth Rasinski. 2000. *The Psychology of Survey Response*. Cambridge, UK: Cambridge University Press.

Turner, Charles F., Barbara H. Forsyth, James O'Reilly, et al. 1998. "Automated self-interviewing and the survey measurement of sensitive behaviors." In *Computer-assisted Survey Information Collection*. Eds. Mick P. Couper, Reginald P. Baker, Jelke Bethlehem, et al. New York: Wiley and Sons. Pp. 455–473.

van de Wijgert, Janneke, Nancy Padian, Stephen Shiboski, and Charles Turner. 2000. "Is audio computer-assisted self-interviewing a feasible method of surveying in Zimbabwe?" *International Journal of Epidemiology* 29(5): 885–890.

Weinhardt, Lance S., Andrew D. Forsyth, Michael P. Carey, Beth C. Jaworski, and Lauren E. Durant. 1998. "Reliability and validity of self-report measures of HIV-related sexual behavior: Progress since 1990 and recommendations for research and practice." *Archives of Sexual Behavior* 27(2): 155–180.

Williams, Lindy, Teresa Sobieszczyk, and Aurora E. Perez. 2001. "Consistency between survey and interview data concerning pregnancy wantedness in the Philippines." *Studies in Family Planning* 32(3): 244–253.

Zehner, R.B. 1970. "Sex effect in the interviewing of young adults." *Sociological Focus* 3: 75–84.

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