

The influence of question wording on the reporting of contraceptive method use

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Abstract:

There is an inconsistency in estimates of recent contraceptive method use across health surveys. One of the reasons for this inconsistency appears to be the difference between question formats across surveys. This paper examined whether different question formats produced differences in reporting contraceptive method use. It examined an experiment in the National Survey of Family Growth Cycle 6. The separate question format produced a slightly higher reporting of the contraceptive method use but the difference was not significant. Weak evidence of an interaction between the question format and elapsed time from the last sexual encounter was found.

Studies on sexual behavior provide important information needed to decrease the prevalence of STDs, HIV, and unplanned pregnancy and to improve understanding of the family growth of the country. For this reason, survey methodologists have done many studies about the reporting of sexual behavior. Based on the belief that deliberate misreporting is a major reason for measurement error in research on sexual behavior, many of these studies focus on how to reduce social desirability bias.

For those in a sexual relationship, sexual behaviors are frequent, not very distinctive events. This may make it difficult for respondents to recall their use of contraception. Thus, aside from deliberate misreport, memory error can also produce measurement error in reports about sexual behavior. In many health surveys, the most recent contraceptive method used has become a widely used indicator to estimate the prevalence of contraception. However, estimates of the most recent contraceptive method use across surveys are inconsistent. One of the reasons for this inconsistency is differences in question wording (Santelli et al 2000). For example, in 1995, the NSFG (National Survey of Family Growth) used a single question format: whether the respondent or her partner had used any method the last time he or she had sex. By contrast, in 1995, the National Survey of Adolescent Males (NSAM) used a separate question format: the first question asked whether the respondent, himself, used a method the last time he had sex and a subsequent question asked whether his partner used a method at the last sexual encounter.

Asking two questions may prompt more accurate recall because it gives respondents more time to think about the question and it conveys that accurate information is important. Thus, the separate question format may lead to greater contraceptive method use reporting; it may in particular increase reports of contraceptive methods that women control. Further, the separate question format may help those who have difficulty in recalling the contraceptive use more so than those who easily recall it. This paper examined the influence of question format on the report of contraceptive use and its size by subgroup with Cycle VI of the National Survey of Family Growth.

Survey response process and accurate answers

Respondents engage in a number of mental processes as they answer a survey

question. The conventional list of response components consist of comprehension, retrieval, estimation and judgment, and reporting (Tourangeau et al, 2000). Once respondents understand what the question is asking, they try to retrieve appropriate information from their memory. Especially when an event is very similar to other events, it may be hard to recall a specific event (Linton 1975). Means et al (1988) also find that similar events are much less likely to be recalled than nonrecurring events by validating survey answers with medical records (Means et al., 1988 as cited in Croyle and Loftus 1993). Unfortunately, because many respondents are potential satisficers in answering survey questions, it is critical to motivate respondents to work hard enough to produce an accurate answer. (Krosnick and Alwin 1987).

Sudman et al (1996) suggests that putting relevant information in the question have a significant effect on retrieval. It is needless to say that a partner is important in sexual intercourse. Thus, asking a partner's contraceptive method use separately may help respondents to retrieve the contraceptive use more easily, as compared to a single question.

The separate question format also increases question length and interview time. Since respondents have more time to think about the question, respondents may report more contraceptive method use in a separate question format. Laurent (1972) find longer questions increase the duration of answers, the number of items reported and accuracy of answers. He believes that this is because longer questions may give cognitive and motivational cues in recalling past memories to respondents. Similar results indicating longer questions elicit more accurate answers have been found in other studies as well (Bradburn et al 1979, Cannell et al 1981)

Factors to affect recall of the event

Although the use of effective cues may help to retrieve information from memory, people easily forget past events as time goes by. Wagenaar (1986) show that older events are harder to recall than more recent ones; on average, 60% of critical details are forgotten after 5 years. Cannell and Fowler (1963) find that failure to report doctor visits increases rapidly as time elapses (Cannell and Fowler 1963 as cited in Cannell et al 1981). Since recall is affected by the elapsed time of the event, respondents whose last sexual intercourse occurs long ago may have a more difficult time in recalling the contraceptive method. Thus the separate question format may help these people more than those whose last sexual intercourse is recent.

Catania et al (1990) suggest that personal salience may shape reporting. In sex surveys, they note that adolescents show the highest test-retest reliability in reports about sexual behavior for a given period. They argue that this may reflect the fact they have less information to recall and fewer contaminating events. Those who have many sexual partners and large sexual behavior lists may have more difficulty in recalling a specific sexual event. Coates et al (1986) also find the same trend in AIDS-related behavior by using test-retest reliability. Based on this, I expect that respondents with numerous sexual experiences will have more difficulty in remembering contraceptive use at the last sexual encounter so that the influence of the question format will be larger for these people. Because people who have sex with a large number of partners have a greater risk of HIV or STD infection, accurate research on these people is critical (Catania et al 1990)

Reporting about one's contraceptive method use is proxy reporting. Some contraceptive methods, especially those that women control, can be hidden from the male respondent's knowledge (Salem et al 2004). Since male respondents have more time and interaction with a wife or cohabiting partner than with partners in short-term relationships, they may have more knowledge about their partner's contraceptive use when the partner is a spouse or cohabiting partner. Menon et al. (1995) find that convergence in reporting of joint activity between self-respondents and proxy-respondents is related to the level of discussion with a partner. Bickart et al. (1991) also find that the difference between self and proxy reports is smaller when there is more discussion between the other person and the respondent (cited in Sudman et al 1996). In sex research, the gap in reporting contraception used between couples is also decreased as the level of interaction is increased (Koenig, Simmons and Misra 1984). Thus, I expect that the respondent whose last sexual partner is not a spouse or cohabiting partner will have more difficulty in recalling the partner's contraceptive use so that the influence of separate question format may be larger for these respondents.

Based on this literature, I set up hypotheses as follows:

1. The reporting of contraceptive method use will be increased by separate questions about each partner's use; separate questions will increase reporting of methods that females control, such as birth control pills.
2. The level of increase in separate questions will be larger for people whose last sexual intercourse is long ago, for those with many sexual partners and for those whose partners are not their spouses/cohabiting partners.

METHODS

I used the National Survey of Family Growth Cycle VI (NSFG) male dataset. NSFG was conducted from January 2002 to March 2003 by the Survey Research Center on behalf of the National Center for Health Statistics (NCHS). It was based on an area probability sample that represents the civilian non-institutionalized population of the United States, 15-44 years of age. Unlike previous cycles of the NSFG, Cycle 6 included males in the sample. A total of 12,571 in-person interviews (7,643 females and 4,928 males) were completed. This represented a 79 percent response rate¹ overall (80 percent for females and 78 percent for males) The questionnaire for males averaged about 60 minutes in length, while the female interview averaged about 80 minutes. The sample includes 84 strata and 168 clusters. (Public use data file documentation, National Survey of Family Growth Cycle 6: 2002, National Center for Health Statistics)

The experimental questions on contraceptive use were in the male questionnaire. The questions were located in the third and fourth of 11 sections. The third section (Section C) asked questions about the last sexual intercourse with a current wife or cohabiting partner and the fourth section (Section D) asked about the last sexual intercourse with someone other than a current wife or cohabiting partner. A randomly designated 30% of the respondents got the single question format asking about the respondent's and partner's contraceptive use together, while 70% got separate questions asking about the respondent's and partner's contraceptive use separately. The exact questions used in the experiment are summarized below in the Table1.

¹ The overall response rate at the end of Phases 1 and 2 was approximately 64 percent, using the AAPOR definition that uses an estimated eligibility rate among the nonrespondent screener cases but does not reflect unequal probabilities of selection. The Phase 3 response rate was approximately 40 percent, which yielded a combined response rate of between 78–79 percent, using the approved AAPOR double sample computation not reflecting unequal probabilities within phases (AAPOR 2004)

Table 1. The summary of questionnaire wording

Single question group: Random 30%		
Question1	Did you or she use any methods to prevent pregnancy or sexually transmitted disease?	
Response Option	1. Yes 5. No	
Follow-up Q	That last time, what methods did you and she use? [MA]	
Response Option	1. Condom or rubber 2. Withdrawal or pulling out 3. Vasectomy or male sterilization 4. Pill 5. Tubal ligation or female sterilization 6. Injection 7. Spermicidal foam/jelly/cream/film/suppository 8. Hormonal implant 9. Rhythm or safe period 10. Something else	
Separate question group: Random 70%		
Question1	Did you, yourself use any methods to prevent pregnancy or sexually transmitted disease?	Did she use any methods to prevent pregnancy or sexually transmitted disease?
Response Option	1. Yes 5. No	1. Yes 5. No
Follow-up Q	That last time, what methods did you use?	That last time, what methods did she use?
Response Option	1. Condom or rubber 2. Withdrawal or pulling out 3. Vasectomy or male sterilization 10. Something else	4. Pill 5. Tubal ligation or female sterilization 6. Injection 7. Spermicidal foam/jelly/cream/film /suppository 8. Hormonal implant 9. Rhythm or safe period 10. Something else

Although I predict that the separate question format will produce more contraceptive method use reporting, it is hard to say that more reporting means more accurate reporting. Thus, I investigated only whether the separate question format produced more reporting of contraceptive method use than the single question format.

Since these data are based on a stratified, multi-stage area probability sample, the standard errors will be underestimated unless the features of the complex survey sample design are taken into account. For this reason, I used SAS 9.1, which allowed design of the

sample to be taken into account. In addition, I used the final post-stratified weight in my analysis. This weight adjusted for different sampling rates, response rates and coverage rate to get nationally representative estimates. I dropped males without heterosexual experience from the analysis; 4,109 cases were retained.

For assessing exposure to diverse sexual activity, the number of lifetime sexual partners was used. Since more than half of the respondents answered that their number of life time sexual partners was more than seven (the highest category), it was recoded into a dichotomous variable. The relation to the last sexual partner was also recoded into a dichotomous variable (wife/cohabiting partner vs. others). Finally, I recoded elapsed time from the last sex into three levels (within 3 months, 3 – 12 months, more than 12 months).

Table 2. Variable operationalization

Main effect	Type	Reference	Category
Format of question	categorical	1: single format	1: single question format 2: separate question format
No. of lifetime sexual partners	categorical	1: 1-6	1: 1-6 2: 7 or more
Relation	categorical	1:wife/cohabiting partner	1: wife/cohabiting partner 2: other
Elapsed time from last sex	categorical	1:within 3 months	1: within 3 months 2: 3 months - 12 months 3: 12 months +

By combining the answers from the separate questions about the respondent’s and the partner’s contraceptive method use, I created a new index which can compare the answers from the single question format to those from the separate question format. To see how separate question format helped recall female’s controlling contraceptive method use, I made a dichotomous variable for reporting birth control pill use (pill) as well. These two variables - - whether or not any contraceptive method was used, and whether or not birth control pill was used -- were used as dependent variables.

RESULTS

First, I examined whether there were any demographic differences between the two experimental groups to show that any difference in reporting was caused by the different question format and not by differences in respondents’ background characteristics. As expected, there was no significant difference between groups in terms of education, age, race,

religion, income, marital status, region, job, and the number of sexual partners.

Next, I examined the average reporting of any contraceptive method use and birth control pill use at the last sex according to the question format. I also examined these by subgroups. As expected, reporting of any contraceptive method use and pill use increased in a separate question format. However, this trend was not consistent by subgroups. The results are summarized in the Table 3.

Table 3. Contraceptive use by question format

	n	Any contraceptive use		Pill use	
		single question	separate question	single question	separate question
		%	%	%	%
Total	4,109	68.87	71.97	23.34	23.91
No. of lifetime sex partners					
1 ~ 6	2,248	70.45	71.43	24.18	25.14
7 or more	1,861	66.68	72.64	22.18	22.40
Relation					
wife/cohabiting partner	2,079	59.96	64.00	21.06	19.62
other	2,030	86.19	87.72	27.77	32.38
Elapsed time from last sex					
within 3 months	3,071	67.33	70.89	24.09	23.18
3 - 12 months	507	76.86	75.91	15.92	30.63
12 months or older	531	74.43	77.88	24.08	24.10

To examine whether the difference in reporting of contraceptive method use by question formats was statistically significant, I used Proc Survey Frequency with Rao-Scott statistics. In the separate question format, respondents tend to report use of contraceptive method more (72.0%) than those in the single question format (68.9%) but the difference failed to reach statistical significance ($X^2=1.55$, $p<0.21$). With reports about birth control pill use, a separate question format produced a little higher reporting (23.9%) than a single question format (23.3%) but this also did not show statistical significance ($X^2=0.06$, $p<0.81$). Thus, the first hypothesis was not supported. These results are summarized in the Table 4.

Table 4. Contraceptive method use and pill use by question format

	single	separate	Rao-Scott Chi-square	Degree of freedom	p-value
Contraceptive method used	68.9	72.0	1.55	1	0.21
Pill used	23.3	23.9	0.06	1	0.81

To test the other hypotheses, I fitted logistic models including terms representing the interaction of the question format and three respondent characteristics variables. The reporting of any contraceptive method use and the reporting of birth control pill use were predicted respectively. The models are summarized below.

Table 5. Logistic model

Model 1a	Logit (y) = $\beta_0 + \beta_1 \cdot \text{format} + \beta_2 \cdot \text{no. of partner} + \beta_3 \cdot \text{format} \cdot \text{no. of partner}$
Model 1b	Logit (y) = $\beta_0 + \beta_1 \cdot \text{format} + \beta_2 \cdot \text{relation} + \beta_3 \cdot \text{format} \cdot \text{relation}$
Model 1c	Logit (y) = $\beta_0 + \beta_1 \cdot \text{format} + \beta_2 \cdot \text{elapse} + \beta_3 \cdot \text{format} \cdot \text{elapse}$

I used Proc Surveylogistic to see the interaction between the question format and the number of lifetime sexual partners. Neither the interaction term nor the overall model was significant in predicting contraceptive method use. As with the contraceptive method use, the model to predict birth control pill use didn't reach statistical significance and the interaction was not significant either. The results are summarized below.

Table 6. The interaction of question format and the number of lifetime sexual partners

Model - 1a (no. of partner)	Contraceptive method use		Pill use	
	Wald χ^2	p value	Wald χ^2	p value
Overall Fit	2.91	0.41	2.39	0.50
Type 3 Analysis				
Format	0.10	0.75	0.08	0.78
No. of sexual partner	1.18	0.28	0.37	0.54
Interaction	1.30	0.25	0.03	0.87

The second model tested the interaction of the question format and the relation to the last sex partner; Again, I examined reported use of any contraceptive method and of birth control pill. When the last sex partner was not a wife/cohabiting partner, males were more likely to report using contraception. This was reflected in the main effect for relation to partners. However, the interaction between the question format and the relation to the last partner was not significant in either model.

Table 7. The interaction of question format and the relation of the last sex partner

Model - 1b (relation)	Contraceptive method use		Pill use	
	Wald χ^2	p value	Wald χ^2	p value
Overall Fit	116.17	0.00	40.59	0.00
Type 3 Analysis				
Format	1.24	0.27	0.23	0.63
Relation to partner	45.22	0.00	3.27	0.07
Interaction	0.02	0.89	1.64	0.20

The third model examined the interaction between the question format and elapsed time from the last sex. Once again, the interaction term was not significant for overall contraceptive method use; however, for birth control pill use, the interaction term was significant.

Table 8. The interaction of question format and elapsed time from the last sex

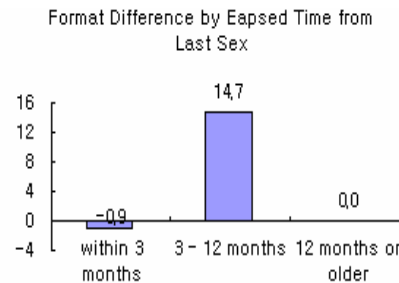
Model - 1c (elapsed time)	Contraceptive method use		Pill use	
	Wald χ^2	p value	Wald χ^2	p value
Overall Fit	11.36	0.04	7.67	0.18
Type 3 Analysis				
Format	1.44	0.23	0.12	0.72
Elapsed time from last sex	4.88	0.09	4.12	0.13
Interaction	0.39	0.82	7.23*	0.03

For those whose last sex was within three months, their reported level of birth control pill use was almost the same regardless of the question format (24.1% in a single question format vs. 23.2% in a separate question format). However, for those whose last sex was three to twelve months ago, 30.1% of the respondents reported birth control pill use in a separate question, versus 15.9% in a single question format. Although this result was consistent with the hypothesis, it was sensitive to the grouping of elapsed time into categories. For those whose last sex was three to twelve months ago, in the single question format, the reporting of birth control pill use was quite low, which contrasted with the reporting of birth control pill use in the separate question format. Besides, this interaction pattern didn't hold for those whose last sex was more than a year ago - they reported the same level of birth control pill use regardless of the question format. All of this decreased my confidences in the interaction effect.

Table 9. Reporting of birth control pill use by question format and elapsed time

Elapsed time from last sex	single question	separate question	Difference*	Unit (%)
				Percent increased**
within 3 months	24.09	23.18	-0.90	-3.7%
3 - 12 months	15.92	30.63	14.71	92.4%
12 months or older	24.08	24.10	0.02	0.1%

*: separate question - single question
 **: Difference / single question



To see whether this interaction was still kept with other control variables, I fitted a model with all three respondent characteristics and their interactions with the question format variables. Again, any reported contraceptive method use and reported use of birth control pills were dependent variables.

$$\text{Logit (y)} = \beta_0 + \beta_1 * \text{question format} + \beta_2 * \text{no. of sex partners} + \beta_3 * \text{relation to last sex partner} + \beta_4 * \text{elapsed time from last sex} + \beta_5 * \text{Q. format} * \text{no. of partner} + \beta_6 * \text{Q. format} * \text{relation} + \beta_7 * \text{Q. format} * \text{elapsed time}$$

Both models were significant in predicting dependent variables overall. However, relation to the last sexual partner was the only significant predictor for any contraceptive method use: respondents were more likely to report a contraceptive use when the partner was not a spouse or cohabiting partner. For the model on reporting use of birth control pills, relation to the last partner and elapsed time from the last sex were significant. In addition, the interaction between the question format and elapsed time from the last sex was marginally significant again.

Table 10. Logistic regression with all respondent characteristics and their interaction

Variable	Any contraception		Bith control pill	
	Wald x2	p-value	Wald x2	p-value
Overall Model	124.94	0.00	50.25	0.00
Question format (Q)	2.37	0.84	0.24	0.62
No.of sex partners (N)	2.37	0.12	1.11	0.29
Relation (R)	41.72	0.00	5.50	0.02
Elapsed time (T)	2.10	0.35	6.64	0.04
q. format * no. of partners	2.06	0.15	0.00	0.96
q. format * relation	0.02	0.88	0.56	0.46
q. format * elaped time	0.32	0.85	5.72	0.06

The model to predict birth control pill confirmed the results shown from the previous logistic model 1c. Namely, those whose last sex was more recent (within three months) reported more birth control pill use than those whose last sex was old (more than three months ago). The increase in reporting of birth control pill use in the separate question format compared to the single question format was larger for those whose last sex was three to twelve months ago than those within three months.

DISCUSSION

I found that reporting of contraceptive method use overall and birth control pill use in particular did not differ by the question format: whether a single question or separate questions were used, respondents reported the same level of contraceptive use and the same level of pill use by their partners. As expected, the separate question format produced a

slightly higher reporting of overall contraceptive method use and birth control pill use but the difference between the two question formats was not statistically significant.

The format of question did not affect the overall reporting of contraceptive method use, but I also examined the effect of question format by subgroups. To test whether the effect of question format varied by subgroup, I fitted logistic models with terms representing the interaction of the question format variable with three respondent characteristics. Out of six models predicting reported contraceptive method use and birth control pill use, only one statistically significant interaction was found. It was the interaction between question format and elapsed time from the last sex. Those who had their last sexual intercourse three to twelve months ago were more likely to report birth control pill use (30.6%) in a separate question than in a single question (15.9%). This increase in reporting due to question format was larger for those whose last sex was three to twelve months ago than those whose last sex was within three months. However, this result was sensitive to the categorization of elapsed time and it should be interpreted cautiously.

In conclusion, I did not find the effect of different question format in this experiment nor strong empirical evidence of interaction between question format and respondent characteristics. This goes against other researchers' arguments that inconsistency of contraceptive method use reporting in health surveys is probably due to differences in questions (Santelli 2000). Adopting the separate question format will add two questions and this will increase interviewing time slightly. However, considering the large scale of the study, this slight change may increase costs by a noticeable amount.

To find a reason for the inconsistencies in reporting of contraceptive method use across health surveys and to know which question format is better at eliciting more accurate information, it would be useful to replicate this study. It is not guaranteed that more reporting is a better measure of contraceptive method use since some contraceptive measures, such as condom use, can be socially desirable behavior and may be overreported. Therefore, when replicating this study, it will be useful to have a gold standard to validate the accuracy of answers. However, it is difficult to get outside validation measures to determine what is a true answer. The consistency between sexual partners can function as a standard to measure the accuracy of the report. Thus, a study design including both female and male sexual partners may help to solve this problem.

Acknowledgments

Many thanks to Dr. Roger Tourangeau, Director, Joint Program in Survey Methodology, University of Maryland, whose time and instruction I have benefited from. Also many thanks to the National Center for Health Statistics (NCHS) which conducted and released National Survey of Family Growth (NSFG) Cycle VI public dataset. My study questions were part of an experiment in NSGF Cycle VI 2002 and this project would not have been possible without this important data source.

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