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The Effects of Male vs. Female Telephone Interviewers

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ABSTRACT

The effects of male vs. female telephone interviewers on the nonresponse rate, the length of the interview and the responses from 473 farm operators and their spouses were examined using data from the 1980 Farm Women's Survey. The analysis showed that the refusal rate, interview length and many of the responses were significantly affected by whether the telephone interviewer was male or female.

 * This paper was prepared for limited distribution to the *
 * research community outside the U.S. Department of *
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 * necessarily those of SRS or USDA. *
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CONTENTS

	<u>Page</u>
SUMMARY	ii
INTRODUCTION	1
BACKGROUND	1
SURVEY DESIGN	2
INFERENCE LEVEL	4
EFFECTS OF MALE VS. FEMALE TELEPHONE INTERVIEWERS ON THE:	
NONRESPONSE	5
MISSING DATA	7
LENGTH OF THE INTERVIEWS	8
FARM CHARACTERISTICS	9
OTHER SURVEY VARIABLES	12
THE TIME OF THE INTERVIEWS	14
CONCLUSIONS	15
REFERENCES	16
APPENDIX A: Test Procedures	17
APPENDIX B: Description of Variables	19
APPENDIX C: Results for the Wives	24
APPENDIX D: Results for the Husbands	27

SUMMARY

The telephone interviewers in the 1980 Farm Women's Survey were randomly assigned to a sample of farm operations so that half of the sample was interviewed by males and half by females. The nonresponse rates, the length of the interviews and the answers from the respondents for a multitude of questions were compared between the male and female interviewers by analyzing the data from the farm operators and their spouses. The analysis showed that:

- o Male interviewers had a higher refusal rate than female interviewers. The refusal rates were significantly different (11.9 percent vs. 8.2 percent) when interviewing the women and almost significantly different (13.5 percent vs. 10.3 percent) when interviewing the men.
- o The length of the interviews was significantly longer for male interviewers regardless of whether they interviewed the husbands or the wives.
- o The answers given to male interviewers for farm value, percent owning land and percent renting land were significantly different from the female interviewers. The sex of the interviewer did not significantly affect the responses for other farm characteristics such as farm acreage and peak number of hogs.
- o Male and female interviewers did not obtain significantly different results in most instances for questions pertaining to background information of the respondent, knowledge and use of farm programs and involvement in farm committees, organizations and women's groups.
- o The data from male and female interviewers were significantly different for more than one-third of the questions dealing with work involvement, the decisionmaking process, financial arrangements and satisfaction with farm programs.

This study illustrates that the sex of the interviewer can significantly influence the nonresponse rate, the length of the interviews and the answers from respondents. The results are not intended to imply that female interviewers are better than male interviewers or vice versa, but only to demonstrate that the data can be influenced by whether the interviewer is male or female.

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INTRODUCTION

The National Opinion Research Center (NORC) conducted a nationwide telephone survey during the summer of 1980 called the Farm Women's Survey (FWS) through a cooperative agreement with the U.S. Department of Agriculture (USDA).⁽⁶⁾ The survey was designed so that the effects of whether the interviewer was male or female could be evaluated for a subsample of the farm operations. Because of limited resources and time, NORC was not able to conduct this evaluation.

Telephone interviewing is a method of data collection used by the Statistical Reporting Service (SRS) of USDA in conjunction with mail and/or personal interviewing for several surveys. Generally, the interviewers are female and the respondents are male for these surveys. The impact that male or female telephone interviewers may have on agricultural data has never been researched by SRS. Therefore, the Survey Research Section of SRS decided to analyze the data from the 1980 FWS.

This report discusses the effects of the sex of the interviewer on the nonresponse rates, the length of the interviews and the data from 473 husbands and their wives. Analysis comparing the responses between the husbands and wives rather than between the male and female interviewers will be discussed in another report.

BACKGROUND

Although the effects of male vs. female interviewers on nonresponse rates and data responses have not received much attention in survey research ⁽¹⁰⁾, some studies have shown that the sex of the interviewer can influence the data from respondents. Trussell and Elinson ⁽⁹⁾ found that interviewers of the same sex as the respondent elicited more reports of illness. Benney and others ⁽¹⁾ showed in a mental health study that the percentage of respondents listing sex habits as a possible cause of mental disturbances was smaller for male interviewers. Also, the percentage was smallest when males interviewed men and largest when females interviewed women. Thumin ⁽⁸⁾ found that the sex of the interviewer had a significant impact on responses dealing with insomnia. Kindel ⁽⁷⁾ discovered that wives report exerting more influence on family decisions when reporting to female rather than male interviewers.

Examples also exist where the sex of the interviewer did not have an impact on the responses or the refusal rate. Colombotos and others (2) claimed that there was essentially no difference in the reporting of psychiatric symptoms to male and female interviewers for a survey of households in a community. Dillman and others (4) showed that the refusal rates for male and female telephone interviewers were virtually the same for a study conducted in Washington state.

In summary, the current literature shows that the sex of the interviewer can influence the data. Factors such as the subject matter, the specific questions asked and the compositions of the interviewers and respondents likely determine if the sex of the interviewer will affect the data.

SURVEY DESIGN

SRS provided NORC with a random sample of 4,060 farm operations, which NORC used to conduct a nationwide survey of farm women. This sample was constructed from a national economic survey conducted by SRS early in 1979 using a stratified area frame sample of land parcels. The sample was comprised of farm operations for the year 1978. Since the FWS was carried out during the summer of 1980, NORC redefined the population as farm operations during 1978 that were still in business in 1980.

NORC selected a systematic subsample of 1,000 operations from the 4,060 operations and interviewed the male operators as well as the farm women. Therefore, both the husband and wife were contacted for the subsample if there was a married couple. Half of the 1,000 operations were randomly assigned to female interviewers and half to male interviewers so that the effects of the sex of the interviewer could be evaluated.

The telephone interviewing was performed by 25 interviewers from NORC's central office on the campus of the University of Chicago after a full week of training. The size of the assignments varied for the interviewers because of different productivity levels and work schedules. The number of interviews handled by each interviewer is not known. Therefore, the possibility exists that some of the interviewers attempted only a few of the interviews in the subsample.

NORC was not able to adhere strictly to the randomness of the assignments to the male and female interviewers since priority was given to completing the interviews rather than the experimental design. The assignments were altered in some instances to try to convert refusals, to verify cases classified as nonfarm, to trace operations with no telephones and to make call-backs.

In most instances, the same person interviewed the husband and wife in the household. The sex of the interviewer who completed the interview for a respondent or who made the last attempt to complete the interview for a nonrespondent was recorded for 984 of the 1,000 operations. When attempting to interview the men, 497 of the 984 interviews were carried out by male interviewers and 487 by female interviewers. The numbers were similar when trying to interview the females with 472 completed by male interviewers and 512 by female interviewers.

Table 1 gives the final disposition for the 1,000 operations. In 497 cases, the interviews were completed with the husband and wife. These cases will be referred to as completed household interviews. The sex of the interviewer was the same for the husband and wife in 473 of the 497 completed household interviews. Of the 473 cases, 222 of the interviews with the husband and with the wife were completed by male interviewers and 251 were completed by female interviewers.

Twenty-eight percent of the operations were ineligible household interviews. An operation was classified as ineligible for the analysis if it was no longer a farm or if both a husband and wife were not associated with the operation. The husband and/or wife refused to participate in the survey for 15 percent of the interviews.

Table 1--The final disposition of the 1,000 operations in the Farm Women's Survey.

Final Disposition	Number
Completed household interview	
o The sex of the interviewer was the same for the husband and wife	473
o The sex of the interviewer was different for the husband and wife	24
Ineligible (no longer farming, deceased, or not married)	280
Refusal	
o Husband and wife	59
o Husband only	55
o Wife only	36
Contacted but interview not arranged	
o Husband and wife	4
o Husband only	39
o Wife only	10
Never able to contact	20
TOTAL	1,000

INFERENCE LEVEL

The effects of male vs. female interviewers on the nonresponse rate were analyzed using the 984 operations for which the sex of the interviewer was recorded. The effects of the interviewer's sex on the interview length and the responses were investigated using the 473 completed household interviews where the sex of the interviewer was the same for the husband and wife. As mentioned in the previous section, the subsample of 1,000 operations was selected from the national area frame sample of 4,060 cases. The compositions of the 984 operations and the 473 completed household interviews were analyzed to determine if inferences at the national level are valid for these samples.

The national area frame is based on area frames from each state that are stratified by land use. The stratum definitions are similar among states. Each land-use stratum in the area frame can be classified into a unique land-use series. For example, series 10, which corresponds to intensively cultivated land, may include several land-use strata for each state. The number of land use strata in each series was compared for the national area frame, the subsample of 984 operations and the 473 completed cases of interest to see if all strata were represented in the subsample and completed cases. Strata in which not a single farm operation was identified during the 1979 economic survey were excluded from the comparisons.

There were 244 strata with farm operations in the national area frame as shown in Table 2. The subsample of 984 operations did not include 16 percent of these strata. In addition, 37 of the 40 excluded strata were agri-urban, rangeland and nonagricultural strata. Therefore, the subsample was geared to operations in the intensively and extensively cultivated strata, which may not be representative of all strata. Also shown in this table is the number of strata in each series with at least one completed household interview. The data shows that only 63.1 percent of the strata were accounted for and that the agri-urban, rangeland and nonagricultural strata were underrepresented.

Inferences in this report will pertain only to the sample and not to the nation because of the underrepresentation of the strata in the 984 operations and in the 473 completed household interviews. The stratification design was not used in the analysis because so many strata were missing. Therefore, the sample was treated as a simple random sample.

Table 2-- The number of strata in each series is given for the national area frame, for the subsample of 984 operations and for the 473 completed household interviews.

Series	Number of Strata		
	For the National Area Frame	For the Subsample of 984 Operations	For the 473 Completed Household Interviews
Intensively Cultivated	80	78	69
Extensively Cultivated	45	44	36
Agri-Urban Residential	65	39	21
Rangeland	51	42	28
Nonagricultural	3	1	0
Total	244	204	154

EFFECTS OF MALE VS. FEMALE TELEPHONE INTERVIEWERS ON THE NONRESPONSE

Three statistics--completion rate, refusal rate and ineligible rate--were analyzed for the 984 operations to evaluate the effects of male vs. female telephone interviewers on nonresponse. The completion rate was defined as the number of completed or successful interviews (excluding ineligible interviews) divided by all interviews for the specified sex of the interviewer and respondent. The refusal and ineligible rates were based on the number of refusals and ineligibles, respectively, divided by all interviews. The rates are displayed in Table 3 for the male and female interviewers.

In order to compare statistically the statistics from the male and female interviewers, Chi-square tests were performed. A description of the hypotheses tested, the test statistic and the decision rule is given in Appendix A.(3) The statistical tests showed that:

- (1) Male interviewers had a higher refusal rate than female interviewers. At the .10 significance level, the refusal

rates were significantly different when the women were interviewed and almost significantly different when the men were interviewed. The refusal rate was significantly higher for male interviewers when the male and female samples were combined.

- (2) The completion rate was not significantly influenced by the sex of the interviewer. However, when interviewing the men, the completion rates for male and female interviewers were almost significantly different.
- (3) The ineligible rates were not significantly different between male and female interviewers.

Table 3-- The completion, refusal and ineligible rates by sex of the interviewer. Also given are the significance levels from the Chi-square tests.

Rate	Respondent	Sex of the Interviewer		Significance Level
		Male	Female	
Completion	Men	55.3	60.4	.110
	Women	62.5	63.5	.751
	Men and Women	58.8	62.0	.155
Refusal	Men	13.5	10.3	.119
	Women	11.9	8.2	.055*
	Men and Women	12.7	9.2	.013*
Ineligible	Men	23.3	23.8	.859
	Women	23.5	26.2	.336
	Men and Women	23.4	25.0	.408

The symbol, *, denotes a significant difference between male and female interviewers at the .100 significance level.

As mentioned earlier, the denominator for the calculations of the completion, refusal and ineligible rates was based on all interviews. Some analysts prefer to exclude inaccessible and ineligible interviews from the denominator when deriving completion and refusal rates and exclude inaccessible cases from the calculation of ineligible rates. This approach to computing these statistics was also used for comparative reasons and the significance levels resulting from the Chi-square tests are given in Table 4.

The inferences drawn with respect to the refusal and ineligible rates are the same by both approaches as can be seen by comparing the significance levels from the tests in Tables 3 and 4. On the other hand, the inferences differ for the two approaches for the completion rates. When the inaccessible and ineligible interviews were excluded from the denominator of the calculations, the completion rates were significantly higher from the female interviewers when interviewing males and when the male and female samples were combined. These significant differences did not occur (see Table 3) when the denominator included all interviews.

Table 4-- The significance levels from the Chi-square tests when inaccessible and ineligible cases were excluded for the completion and refusal rates and when inaccessible cases were excluded for the ineligible rates.

Rate	Respondent	Sample Size	Significance Level
Completion	Men	746	.022*
	Women	734	.132
	Men and Women	1480	.005*
Refusal	Men	746	.120
	Women	734	.075*
	Men and Women	1480	.018*
Ineligilbe	Men	978	.859
	Women	979	.347
	Men and Women	1957	.416

The symbol, *, denotes a significant difference between male and female interviewers at the .100 significance level.

EFFECTS OF MALE VS. FEMALE INTERVIEWERS ON THE MISSING DATA

The 473 completed household interviews were reviewed for missing data entries. Eighty-five questions were selected for review from the questionnaire for the wives. Sixty-three of these questions were also on the questionnaire version for the husbands. Therefore, 63 variables were examined for both the husbands and wives and 22 variables were reviewed only for the wives.

Most variables had very little missing data. Sixty-six of the 85 variables for the wives and 58 of the 63 variables for the husbands had less than one percent of the data missing. Only 4 of the variables had missing data for more than 3 percent of

the interviews. These four variables were farm value, farm debt, percent of sales from crops and acres planted to crops. The first two variables had more than 3 percent of the data missing for both the husbands and wives while the last two variables had more than 3 percent of the data missing only for the wives.

The effect of the sex of the interviewer on the amount of missing data was examined only for these four variables. The Chi-square tests showed no significant differences between the male and female interviewers. The significance levels from the tests were all greater than .29. The other variables were not evaluated because the amount of missing data was so small that it was not of practical concern and because the Chi-square tests for most variables would likely not be accurate due to very small cell counts in the contingency tables.

EFFECTS OF MALE VS. FEMALE INTERVIEWERS ON THE LENGTH OF THE INTERVIEWS

The length of the interview was coded by NORC for each respondent. The interviews with the husbands required less time than the wives because the male questionnaire was shorter. The time to complete each interview was compared between the male and female interviewers to determine if there was a significant difference in the interview length. The Wilcoxon Rank-Sum test was used to make the statistical comparisons rather than the parametric t-test because of the skewed distribution of the time variable. A description of the Wilcoxon test is given in Appendix A.(3)

The test results comparing the male and female interviewers are displayed in Table 5. The analysis showed that the length of the interview was significantly longer for male interviewers regardless of whether the respondent was male or female. The average length of the interview with the wives was 30.1 minutes for male interviewers and 28.9 minutes for female interviewers. When interviewing the husbands the average length was 23.9 and 22.4 minutes for the male and female interviewers, respectively.

Table 5-- The mean ranks by sex of the interviewer and the significance levels from the Wilcoxon test for the length of the interview.

Respondent	Sample Size	Sex of the Interviewer		Significance Level
		Male	Female	
Husband	467	248.3	221.3	.061*
Wife	465	245.3	221.9	.031*
Husband and Wife	932	490.3	445.2	.011*

The symbol, *, denotes a significant difference between male and female interviewers at the .100 significance level.

EFFECTS OF MALE VS.
FEMALE INTERVIEWERS
ON THE FARM
CHARACTERISTICS

Nine variables pertaining to characteristics of the farm were analyzed since variables similar to these are asked in surveys conducted by SRS. These variables were:

1. Acres in the farm
2. Acres planted to crops
3. Farm value
4. Percent of farms not in debt
5. Percent of farms where all sales come from crops
6. Percent of farms owning land
7. Percent of farms renting land
8. Peak number of hogs last year
9. Peak number of cattle last year.

The estimates from the male and female interviewers for farm characteristics such as farm value were not compared to the official national estimates published by SRS because of definitional differences and because the inference level for this study was not assumed to be at the national level. Therefore, no statements will be made as to whether male or female interviewers obtained data closer to the official estimates.

The first three variables had highly skewed distributions so the Wilcoxon Rank-Sum test was used to study the effects of the sex of the interviewers on the data. Table 6 contains the results. The mean ranks by sex of interviewer were virtually the same for the acres in the farm. The responses for cropland acreage were not significantly different between male and female interviewers for the husbands or wives but were significantly different when the data from the husbands and wives were combined. Finally, both the husbands and wives gave significantly higher farm values to female interviewers.

Table 6-- The mean rank by sex of the interviewer and the significance level from the Wilcoxon test for each variable.

Variable	Respondent	Sample Size	Sex of the Interviewer		Significance Level
			Male	Female	
Acres in the Farm	Husband	471	235.0	236.9	.883
	Wife	467	234.1	233.9	.986
	Husband and Wife	938	468.7	470.2	.931
Acres Planted to Crops	Husband	469	224.9	243.9	.130
	Wife	450	218.4	231.7	.279
	Husband and Wife	919	442.7	475.3	.063*
Farm Value	Husband	413	194.8	217.4	.055*
	Wife	283	132.8	149.9	.080*
	Husband and Wife	696	327.2	366.8	.010*

The symbol, *, denotes a significant difference between male and female interviewers at the .100 significance level.

The results of the Chi-square tests on variables four through seven are shown in Table 7. The questions about owning and renting land, which were only asked of the wives, had significantly different responses for male and female interviewers. Female interviewers elicited a greater percentage of farms owning land but a smaller percentage renting land.

Table 7-- The percentage for each variable by sex of the interviewer and the significance levels from the Chi-square tests.

Variable	Respondent	Sample Size	Sex of the Interviewer		Significance Level
			Male	Female	
Percent of Farms Not in Debt	Husband	439	28.6	30.5	.675
	Wife	353	30.7	34.2	.480
	Husband and Wife	792	29.5	32.2	.428
Percent of Farms Where All Sales Come From Crops	Husband	461	25.4	29.8	.284
	Wife	417	25.9	29.9	.364
	Husband and Wife	878	25.6	29.9	.161
Percent of Farms Owning Land	Husband		Not Asked	Not Asked	
	Wife	473	87.4	92.0	.095*
Percent of Farms Renting	Husband		Not Asked	Not Asked	
	Wife	466	49.3	37.7	.011*

The symbol, *, denotes a significant difference between male and female interviewers at the .100 significance level.

The last two variables pertain to hogs and cattle. The distributions for these variables were heavily concentrated at zero. The Wilcoxon test was not used since this test only tolerates a moderate number of ties in the ranks. As an alternative, the observations from each variable were grouped into five categories--no hogs (or cattle), 1-50, 51-100, 101-500, and more than 500 hogs (or cattle). The tests showed no significant differences between the male and female interviewers as shown in Table 8.

Table 8-- The percentage for each range of the peak number of hogs and cattle by sex of the interviewer and the significance level from each Chi-square test.

Variable	Respondent	Sample Size	Category	Sex of the Interviewer		Significance Level
				Male	Female	
Peak Number of Hogs	Husband	471	0	79.6	78.0	.683
			1-50	5.0	6.0	
			51-100	4.5	4.8	
			101-500	9.5	8.0	
			500+	1.4	3.2	
	Wife	464	0	82.0	77.7	.724
			1-50	7.8	8.9	
			51-100	1.9	3.7	
			101-500	6.5	7.3	
			500+	1.8	2.4	
Peak Number of Cattle	Husband	470	0	41.8	43.6	.968
			1-50	29.1	30.0	
			51-100	10.0	9.2	
			101-500	15.9	14.8	
			500+	3.2	2.4	
	Wife	458	0	43.5	46.7	.300
			1-50	29.9	31.6	
			51-100	10.8	11.9	
			101-500	12.1	8.6	
			500+	3.7	1.2	

In summary, the sex of the interviewer did not affect the responses for the following variables: farm acreage, peak number of hogs, peak number of cattle, percent of farms not in

debt and the percent of farms where all sales come from crops. However, the data for farm value, the percent of farms owning land, the percent of farms renting land and acreage planted to crops were influenced by whether the interviewer was male or female.

EFFECTS OF MALE VS.
FEMALE INTERVIEWERS
ON THE OTHER SURVEY
VARIABLES

In addition to the analysis of the farm characteristics that are of particular interest to SRS, analysis was done on 76 other variables for the wives and 56 for the husbands. Fewer variables were available from the husbands for analysis because fewer questions were asked of them. Each variable was classified into one of the following nine categories:

- o Background Information
- o Work Involvement
- o Decisionmaking Process
- o Financial Arrangements
- o Knowledge of Farm Programs
- o Use of Farm Programs
- o Satisfaction with Farm Programs
- o Involvement in Farm Committees and Organizations
- o Involvement in Farm Women's Groups

A description of each variable in each of the nine categories is given in Appendix B. Appendices C and D contain the results of the statistical tests for the wives and husbands, respectively.

Table 9 summarizes the results of the tests in Appendices C and D. Presented in this table is the percentage of the variables that had significant response differences between male and female interviewers for two broad groupings of the categories. For the first group of categories--background information, knowledge and use of farm programs, involvement in farm committees, organizations and women's groups--about 10 to 11 percent of the variables showed significant differences between the male and female interviewers. If the variables were independent, one would expect a significant difference to be stated incorrectly for 10 percent of the variables since the significance level of each test was .100. This statement is not strictly valid for this study since the variables were not independent. However, in general, the responses for these categories do not appear to be affected by the sex of the interviewer.

The second group of categories--work involvement, decisionmaking process, financial arrangements and satisfaction with farm programs--had significant differences for 51.9 percent of the variables from the husbands and 29.3 percent from the wives. These percentages are high enough to

conclude that the responses were influenced by the sex of the interviewer.

Table 9-- The percentage of the variables that had significant response differences between male and female interviewers for the two groups of categories.

Categories	Respondent	
	Husband	Wife
	<u>Percent</u>	
Background Information	10.3	11.4
Knowledge of Farm Programs		
Use of Farm Programs		
Involvement in Farm Committees and Organizations		
Involvement in Farm Women's Groups		
Work Involvement	51.9	29.3
Decisionmaking Process		
Financial Arrangements		
Satisfaction with Farm Programs		

A brief summary of the analysis for each category will now be given.

- o Background Information: There were no significant differences in responses between the male and female interviewers.
- o Knowledge of Farm Programs: Only one of the six items was significantly different by the sex of the interviewer for the husbands and for the wives.
- o Use of Farm Programs: In general, the male and female interviewers had little influence on the data. The husbands, however, usually gave lower responses to male interviewers.
- o Involvement in Farm Committees and Organizations: There were no significant differences between the male and female interviewers for the husbands. The wives had significantly

different answers by sex of the interviewer for some variables pertaining to farm organizations. The wives' responses on farm organizations were always higher from male interviewers.

- o Involvement in Farm Women's Groups: The three questions, which were only on the wives' questionnaire, did not produce significantly different data for the male and female interviewers.
- o Work Involvement: Almost half of the variables produced significant differences from the male and female interviewers. When a significant difference occurred, the husbands and wives always indicated more work involvement when interviewed by males.
- o Decisionmaking Process: The responses from the wives were not significantly different between male and female interviewers for nine of the ten variables. However, the husbands' answers were significantly different for five of the nine questions asked the men with the male interviewers obtaining higher responses for these five questions.
- o Financial Arrangements: These questions were only asked of the wives. Three of the 11 variables were significantly different with the male interviewers receiving higher responses.
- o Satisfaction with Farm Programs: None of the three variables were significantly different for the wives but two variables were almost significantly different at the .100 level. Both questions that the husbands were asked had significantly higher responses from female interviewers.

THE TIME OF THE INTERVIEWS

Throughout this report significant differences have been attributed to whether the interviewer was male or female. Research has shown that response rates can be affected by other factors such as the time of the interview. A study based on 1,260 telephone interviews in Maryland found a higher refusal rate on weekends than weekdays and another study showed refusals were highest in the evenings and lowest in the mornings.(5)

The day of the week and the time of the day for each interview were recorded for the respondents. These factors were evaluated to see if the day and time of the interviews were significantly different for male and female interviewers.

The day of the week took on six values since calls were not made on Sunday. The time of the day was grouped into three categories--morning, afternoon and evening. The resulting significance levels from the Chi-square tests were all greater than .300. Therefore, there were no significant differences between the male and female interviewers with respect to the time the interviews were conducted.

CONCLUSIONS

The nonresponse rate, the length of the interview and the data from respondents can be affected by whether the interviewer is male or female. In this study, male interviewers had a higher refusal rate than female interviewers. The refusal rates were significantly different (11.9 percent vs. 8.2 percent) when interviewing the women and close to significantly different (13.5 percent vs. 10.3 percent) when interviewing the men.

The length of the interviews was also influenced by the sex of the interviewer. The average time to complete an interview was significantly longer for male interviewers.

Male interviewers usually obtained higher responses, especially from the wives, for questions that had significantly different answers between the male and female interviewers. Topics of a more sensitive nature--farm characteristics, involvement in farm work, the decisionmaking process, financial arrangements and satisfaction with farm programs--provided significant response differences between male and female interviewers for more than one-third of the questions. On the other hand, topics that were less sensitive to the respondents--background information, knowledge and use of farm programs and involvement in farm committees, organizations and women's groups--were not affected by the sex of the interviewer in most instances.

Since the "true" values are not known for the multitude of variables analyzed, nothing can be stated about whether the male or female interviewers obtained more accurate data. This study only serves to illustrate that the responses can be affected by whether the interviewer is male or female.

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APPENDIX A: Test Procedures

Two procedures were used in this study to test for significant differences between male and female interviewers. One of the procedures is commonly referred to as the Chi-Square Test for Differences in Probabilities while the other procedure is called the Wilcoxon Rank-Sum Test. The hypotheses tested, the test statistic and the decision rule will now be described for each procedure.

(A) Chi-Square Test for Differences in Probabilities: Each observation was classified into one of c different categories for the male interviewers and for the female interviewers. For all the Chi-Square tests except for the tests on the peak number of hogs and cattle, the value of c was 2. For the tests on the peak number of hogs and cattle, c was equal to 5.

(1) HYPOTHESES: $H_0: p_{1j} = p_{2j}$ for $j = 1, 2, \dots, c$

$H_A: p_{1j} \neq p_{2j}$ for some j

where p_{ij} is the probability that an observation will be in category j for the i^{th} sex of the interviewer where $i = 1$ for male interviewers and $i = 2$ for female interviewers.

(2) TEST STATISTIC: Let O_{ij} be the number of observations in the j^{th} category for the i^{th} sex of the interviewer and let E_{ij} represent the expected number of observations in cell (i,j) if H_0 is really true. Then the test statistic, T , is given by:

$$T = \sum_{i=1}^2 \sum_{j=1}^c \frac{O_{ij}^2}{E_{ij}} - N$$

where N is the total number of observations from the male and female interviewers.

(3) DECISION RULE: The large sample approximation--the Chi-Square distribution--was used for the distribution of T . When $c = 2$, the Chi-Square distribution with one degree of freedom is used. When $c = 5$, the Chi-Square distribution with four degrees of freedom is used. The null hypothesis, H_0 , is rejected when $T > x_{1-\alpha}$ where $x_{1-\alpha}$ is the $(1-\alpha)$ quantile of the Chi-Square distribution with one degree of freedom when $c = 2$ or four degrees of freedom when $c = 5$. The level of significance, α ,

for all tests was $\alpha = .100$. Therefore, when $c = 2$, H_0 was rejected when $T > 2.706$ and when $c = 5$, H_0 was rejected when $T > 7.779$.

(B) Wilcoxon Rank-Sum Test: Let X_1, X_2, \dots, X_n be the observations for the male interviewers and let Y_1, Y_2, \dots, Y_m be the observations for the female interviewers. Ranks 1 through $n + m$ are assigned to the combined sample of X's and Y's. That is, rank 1 is assigned to the smallest value of the $n + m$ observations, rank 2 to the next smallest and so forth. Let $R(X_i)$ and $R(Y_j)$ denote the rank assigned to X_i and Y_j , respectively, for a given i and j .

(1) HYPOTHESES: $H_0: E(X) = E(Y)$

$H_A: E(X) \neq E(Y)$

(2) TEST STATISTIC: The test statistic, T , is given by:

$$T = \sum_{i=1}^n R(X_i) - \frac{n(n+1)}{2}$$

where $\sum_{i=1}^n R(X_i)$

is the sum of the ranks assigned to the male interviewers and n is the number of observations from male interviewers.

(3) DECISION RULE: The null hypothesis, H_0 , is rejected

when $T < w_{\alpha/2}$ or $T > nm - w_{\alpha/2}$ where $w_{\alpha/2} = \frac{nm}{2} +$

$x_{\alpha/2} \sqrt{\frac{nm(n+m+1)}{12}}$ and $x_{\alpha/2}$ is the $\alpha/2$ quantile

of a standard normal random variable. In this study $\alpha = .10$ so $x_{.05} = -1.645$.

APPENDIX B: Description of Variables

<u>CATEGORY</u>	<u>VARIABLE</u>	<u>DESCRIPTION</u>
Background Information	F1	Average age
	F2	% that are white (excluding hispanics)
	F3	% with at least a high school education
	F4	Average number of children
	F5	Average number of years lived or worked on a farm
Work Involvement	F6	% at least occasionally involved with plowing, disking, cultivating or planting
	F7	% at least occasionally involved with applying fertilizers, herbicides or insecticides
	F8	% at least occasionally involved with doing other field work without machinery
	F9	% at least occasionally involved with harvesting crops including running machinery
	F10	% at least occasionally involved with caring for farm animals
	F11	% at least occasionally involved with running farm errands
	F12	% at least occasionally involved with making major purchases of farm supplies or equipment
	F13	% at least occasionally involved with marketing the products
	F14	% at least occasionally involved with supervising the farm work of other family members
	F15	% at least occasionally involved with supervising the work of hired farm labor
	F16	% at least occasionally involved with bookkeeping, maintaining records, paying bills, or preparing income tax forms for the operation

<u>CATEGORY</u>	<u>VARIABLE</u>	<u>DESCRIPTION</u>
	F17	% at least occasionally involved with caring for a vegetable garden or animals for family consumption
	F18	% saying they could probably run the operation on their own if something happened to their spouse
	F19	% considering themselves one of the main operators for the farm
	F20	% at least occasionally involved with doing household tasks like house-cleaning or preparing meals
	F21	% at least occasionally involved with looking after children
	F22	% ever having an off-farm job
Decisionmaking Process	F23	% where she or both decide whether to buy or sell land ("both" means husband and wife)
	F24	% where she or both decide whether to rent more or less land
	F25	% where she or both decide whether to buy major farm equipment
	F26	% where she or both decide whether to produce something new
	F27	% where she or both decide when to sell the products
	F28	% where she or both decide whether to try a new production practice
	F29	% that would like a greater part in making farm decisions
	F30	% where she or both decide whether to buy major household appliances
	F31	% where she or both decide when to make household repairs
	F32	% where she or both decide whether she takes an off-farm job
Financial Arrangements	F33	% with own name on a title to owned land
	F34	% with own name on any lease to rented land
	F35	% with own name having appeared on checks received in payment of farm products sold

<u>CATEGORY</u>	<u>VARIABLE</u>	<u>DESCRIPTION</u>
	F36	% with savings or checking account in her name alone
	F37	% with credit cards or charge accounts in her name alone
	F38	% having had loans from banks or lending institutions in her name alone
	F39	% that have paid enough into Social Security to qualify for benefits in her own name
	F40	% with joint savings or checking account with someone else
	F41	% with joint charge accounts with someone else
	F42	% having had any joint loans with anyone else
	F43	% listing occupation as wife, mother or housewife on income tax forms
Knowledge of Farm Programs	F44	% having heard about the Commodity Loan Program (CLP)
	F45	% having heard about the Conservation Operations Program (COP)
	F46	% having heard about any of the FmHA Loan Programs (FLP)
	F47	% at least somewhat familiar with the CLP and the requirements for participating
	F48	% at least somewhat familiar with the COP and the procedures for obtaining it
	F49	% at least somewhat familiar with the FLP and their eligibility requirements
Use of Farm Programs	F50	% whose farm has applied for a CLP in the last two to three years
	F51	% whose farm has requested help from the COP in the last two to three years
	F52	% whose farm has applied for FLP in the last two to three years

<u>CATEGORY</u>	<u>VARIABLE</u>	<u>DESCRIPTION</u>
	F53	% having any business contacts with ASCS people in the last two to three years
	F54	% having any business contacts with SCS people in the last two to three years
	F55	% having any business contacts with FmHA people in the last two to three years
	F56	% having any business contact with Extension personnel in the last two or three years
	F57	% involved with Extension Service's (ES) classes or activities on farm management
	F58	% involved with ES homemaker clubs or other activities on family living
	F59	% involved with ES activities on food and nutrition
	F60	% involved with ES 4-H or other youth activities
	F61	% involved with ES classes or other activities on inheritance laws or estate planning
	F62	% discussing problems of their operation with an extension agent
Satisfaction with Farm Programs	F63	% at least somewhat satisfied with state or local government services and programs for farmers
	F64	% at least somewhat satisfied with USDA farm programs and services
	F65	% at least somewhat satisfied with USDA programs and services for farm women
Involvement in Farm Committees and Organizations	F66	% ever involved in any committees or groups that helped develop or carry out extension programs.
	F67	% ever serving as a member of any official committee, advisory board, panel, etc. connected with USDA

CATEGORYVARIABLEDESCRIPTION

	F68	% ever serving on any committee, advisory board, etc. concerned with agricultural matters in the state, county or local government
	F69	% who would probably or definitely agree to serve on a committee or panel in the future
	F70	% that have been members of a marketing cooperative in the last two to three years
	F71	% that have been members of a farm supply cooperative in the past two to three years
	F72	% that have been members of any general farm organization, e.g. Grange, in the last two to three years
	F73	% that have been members of any commodity producers' associations in the last two or three years
Involvement in Farm Women's Groups	F74	% that have been members of women's auxiliaries of general farm organizations, e.g., Farm Bureau Women in the last two to three years
	F75	% that have been members of any women's auxiliaries of commodity organizations such as the Cowbells in the last two to three years
	F76	% that have been members of any women's farm organizations, e.g. the United Farm Wives, in the last two or three years

APPENDIX C: Results for the Wives

<u>CATEGORY</u>	<u>VARIABLE</u>	<u>MALE INTERVIEWER</u>	<u>FEMALE INTERVIEWER</u>	<u>SIGNIFICANCE LEVEL</u>
Background Information	F1 <u>1/</u>	235.2	235.8	.962
	F2	95.1	94.4	.763
	F3	83.3	78.5	.182
	F4 <u>1/</u>	225.6	245.2	.119
	F5 <u>1/</u>	231.6	238.0	.608
Work Involvement	F6	41.0	32.8	.075*
	F7	15.6	14.7	.787
	F8	48.0	38.5	.049*
	F9	50.5	43.8	.157
	F10	64.7	59.6	.304
	F11	86.3	81.1	.127
	F12	35.5	32.9	.565
	F13	33.7	24.6	.035*
	F14	58.3	42.0	.001*
	F15	48.0	24.0	.000*
	F16	77.3	75.1	.582
	F17	91.0	82.9	.011*
	F18	60.6	55.2	.234
	F19	50.2	52.0	.701
Decisionmaking Process	F20 <u>2/</u>	100.0	98.0	.034*
	F21	96.1	88.2	.009*
	F22	86.5	86.5	.992
	F23	55.7	59.3	.467
	F24	50.3	50.0	.954
	F25	44.6	46.6	.663
	F26	41.0	35.3	.225
Financial Arrangements	F27	41.7	34.3	.105
	F28	30.6	29.3	.772
	F29	11.3	10.4	.775
	F30	95.1	96.4	.471
	F31	87.3	84.7	.431
	F32	90.9	96.5	.026*
	F33	87.1	86.6	.888
F34	30.8	18.7	.050*	
F35	32.3	32.9	.879	
F36	28.8	29.4	.883	
F37	30.0	29.7	.939	

<u>CATEGORY</u>	<u>VARIABLE</u>	<u>MALE INTERVIEWER</u>	<u>FEMALE INTERVIEWER</u>	<u>SIGNIFICANCE LEVEL</u>
	F38	18.3	16.7	.650
	F39	48.6	40.7	.086*
	F40	94.5	91.1	.152
	F41	58.6	54.9	.414
	F42	81.8	72.4	.016*
	F43	60.2	65.9	.202
Knowledge of Farm Programs	F44	67.1	63.8	.442
	F45	64.9	61.4	.430
	F46	77.9	71.3	.100*
	F47	59.7	60.6	.873
	F48	60.4	64.3	.491
	F49	57.8	61.5	.485
Use of Farm Programs	F50	32.9	34.4	.782
	F51	26.4	22.7	.463
	F52	15.6	20.7	.218
	F53	21.6	19.5	.572
	F54	17.1	12.8	.182
	F55	8.1	11.2	.271
	F56	27.5	26.3	.772
	F57	8.1	5.2	.199
	F58	19.8	18.7	.763
	F59	19.8	21.9	.577
	F60	28.4	21.5	.084*
	F61	10.4	11.6	.679
	F62	20.7	15.9	.178
Satisfaction with Farm Programs	F63	40.5	48.0	.102
	F64	38.0	43.0	.274
	F65	32.1	25.7	.125
Involvement in Farm Committees and Organizations	F66	27.5	29.1	.699
	F67	5.4	6.4	.656
	F68	6.8	5.2	.475
	F69	30.6	27.9	.513
	F70	8.6	4.8	.098*
	F71	14.0	11.2	.374
	F73	12.2	7.2	.067*

<u>CATEGORY</u>	<u>VARIABLE</u>	<u>MALE INTERVIEWER</u>	<u>FEMALE INTERVIEWER</u>	<u>SIGNIFICANCE LEVEL</u>
Involvement in	F74	6.3	5.2	.613
Farm Women's	F75	8.1	6.4	.474
Groups	F76 <u>2/</u>	0.9	1.6	.499

The symbol, *, denotes a significant difference between male and female interviewers at the .100 significance level.

- 1/ The Wilcoxon Rank - Sum test was used for these variables rather than the Chi-Square test. The mean rank score is shown for the male and female interviewers rather than a percentage as was done for all other variables.
- 2/ The approximate value for the significance level may be inaccurate since one or two of the cells in the 2x2 table have expected counts of less than five observations.

APPENDIX D: Results for the Husbands

<u>CATEGORY</u>	<u>VARIABLE</u>	<u>MALE INTERVIEWER</u>	<u>FEMALE INTERVIEWER</u>	<u>SIGNIFICANCE LEVEL</u>
Background Information	M1 <u>1/</u>	237.7	235.4	.857
	M2	95.1	94.0	.627
	M3	74.3	67.7	.115
	M5 <u>1/</u>	237.4	233.9	.781
Work Involvement <u>3/</u>	M6	36.7	34.0	.566
	M7	11.9	13.0	.730
	M8	47.8	37.5	.030*
	M9	49.3	48.4	.848
	M10	70.2	55.1	.002*
	M11	90.0	84.7	.092*
	M12	36.7	28.6	.063*
	M13	28.4	24.4	.338
	M14	58.5	55.6	.564
	M15	39.2	29.3	.070*
	M16	78.0	77.9	.986
	M17	91.2	85.3	.058*
	M18	93.2	91.1	.388
	M20 <u>2/</u>	99.6	99.2	.637
M21	94.0	87.4	.043*	
M22	83.8	78.5	.143	
Decisionmaking Process <u>4/</u>	M23 <u>2/</u>	99.0	96.3	.080*
	M24	99.4	94.7	.008*
	M25 <u>2/</u>	99.1	97.5	.203
	M26	98.0	95.4	.155
	M27	98.1	93.4	.014*
	M28	98.0	91.7	.004*
	M30	73.4	75.2	.659
	M31	78.9	82.0	.398
	M32 <u>2/</u>	99.4	96.8	.086*
	Knowledge of Farm Programs	M44	86.0	88.8
M45		86.0	82.9	.344
M46		88.7	90.0	.646
M47		74.7	79.8	.218
M48		71.7	80.3	.045*
M49		64.0	67.3	.476

<u>CATEGORY</u>	<u>VARIABLE</u>	<u>MALE INTERVIEWER</u>	<u>FEMALE INTERVIEWER</u>	<u>SIGNIFICANCE LEVEL</u>
Use of Farm Programs	M50	25.3	29.2	.377
	M51	23.7	30.8	.113
	M52	13.7	18.1	.215
	M53	59.8	56.2	.425
	M54	40.3	41.8	.731
	M55	16.4	24.4	.032*
	M56	36.0	39.6	.426
	M57	18.5	20.7	.539
	M60	23.4	19.9	.355
	M61	10.4	15.5	.096*
	M62	32.0	33.5	.732
Satisfaction with Farm Programs	M63	36.9	47.6	.019*
	M64	34.2	44.8	.019*
Involvement in Farm Committees and Organizations	M66	24.3	21.9	.534
	M67	17.7	17.1	.883
	M68	16.3	19.9	.308
	M69	57.0	55.8	.787
	M70	21.2	26.3	.192
	M71	30.2	29.9	.943
	M72	52.3	51.4	.852
M73	21.2	18.7	.506	

The symbol, *, denotes a significant difference between male and female interviewers at the .100 significance level.

- 1/ The Wilcoxon Rank - Sum test was used for these variables rather than the Chi-Square test. The mean rank score is shown for the male and female interviewers rather than a percentage as was done for all other variables.
- 2/ The approximate value for the significance level may be inaccurate since one or two of the cells in the 2x2 table have expected counts of less than five observations.
- 3/ Variables M6 to M21 (excluding M18) correspond to the husband's perception of the wife's involvement rather than his perception of his own involvement.
- 4/ For variables M23 to M32, change she to he in Appendix B.