

The Unit Non-respondents to Telephone Survey in Taiwan

Kuagn-hui Chen, National Chung Cheng University, Taiwan

Su-Feng Cheng, National Chengchi University, Taiwan

Question:

Researchers have been perplexed by the issue of unit non-response for a long time. It is common that selected respondents do not participate in the interview for such reasons as failure to make contact with the respondents, refusal of the respondents to participate, and inability of the respondents to participate (e.g., language barrier and absence). In addition to respondents' socio-demographic background and psychological predisposition, the social environment where the survey was taken, the design and topic of the survey, and interviewers' skills and motivation also influence whether respondents would participate when they are contacted (Groves and Couper 1998, 29-42).

If the occurrence of unit non-response is not randomly distributed, some factors systematically determine whether a selected respondent will successfully participate in the survey. Individuals with specific characteristics are more likely to be non-respondents. When these characteristics are related to the issues the researchers are studying, the presence of unit

non-response will diminish the representativeness of the final sample and lead to biased estimation, and researchers cannot draw valid inferences from the sample coefficient to the population parameter of interest.

A variety of methods and techniques have been introduced to correct the bias resulting from unit non-response. It is common for researchers to use the method of weighting in an attempt to reduce unit non-response bias. However, since researchers have little or no information about the unit non-respondents, it is unlikely for them to examine the difference between participants and non-respondents in order to estimate the loss of representativeness of the final sample as compared to the target population. Therefore, the lack of information regarding the absentees makes the unit non-response bias very difficult to deal with in a satisfactory manner.

We need to know more about the unit non-respondents in order to properly assess the possible impact of unit non-response. This paper is thus designed to describe the demographic characteristics and political attitudes of the non-respondents with the assistance of the information provided by the unit non-respondents' spouses in a telephone survey conducted in Taiwan. Non-respondents and participants are compared with regard to their demographic characteristics and political attitudes. If non-respondents and participants are similar, unit non-response does not hurt the representativeness of the collected data. If there exists

significant difference between the two groups of individuals, the issue of representativeness is needs to be further examined and addressed.

Data:

A telephone survey data set is analyzed in this paper to examine the characteristics of unit non-respondents. This telephone survey was conducted by the Election Study Center at National Chengchi University in Taiwan in June 2011, and a national representative sample of 354 pairs of husbands and wives were successfully interviewed in this survey. The questions asked in this telephone survey include each participant's demographic background, interaction between husbands and wives, political and social attitudes, and perception of spouse's political attitudes. In addition to these participated couples, while we also successfully interviewed 804 married adults at the same time, their spouses failed to participate in the interview because of inability, refusal, or unavailability. In other words, these absent spouses were unit non-respondents, when the unit of analysis is individual respondent.

Table 1 shows the reasons for non-response. While nearly half of them did not participate because they were not successfully contacted by the interviewers, 37.8% of them immediately refused to participate when they were contacted or refused to continue during the interview. The remaining 13.7% of non-responses happened because of other unsure reasons or technical problems. In addition

to the demographic variables such as gender, ethnicity, income, and occupation, we inquired their spouses about the non-respondents' political attitudes such as party preference and political support. We are therefore able to examine the non-respondents' political attitudes based on the information provided by their spouses.

Table 1. Reasons for unit non-response

Reasons	n	%
Non-contact Phone not answered	111	13.8
Unavailable	279	34.7
Lack of co-operation: refuse to participate	304	37.8
Others	110	13.7
Total	804	100.0

In this paper, the two data sets will be analyzed and compared to assess the characteristics of non-respondents regarding their demographic characteristics and political attitudes. The results of this analysis will be helpful for researchers to estimate the impact of unit non-response on representativeness of the final sample with regard to their political attitudes.

Analysis Strategy:

Given the availability of the 804 non-respondents' information provided by their spouses who participated in the survey, we develop the following analysis strategy shown in Figure 1 to examine the characteristics of the non-respondents. The analysis strategy is based on the idea that the two sample data sets under study are equivalent and representative of the target population, if there is no unit non-response in both data sets. This analysis strategy

is composed of three steps of comparison.

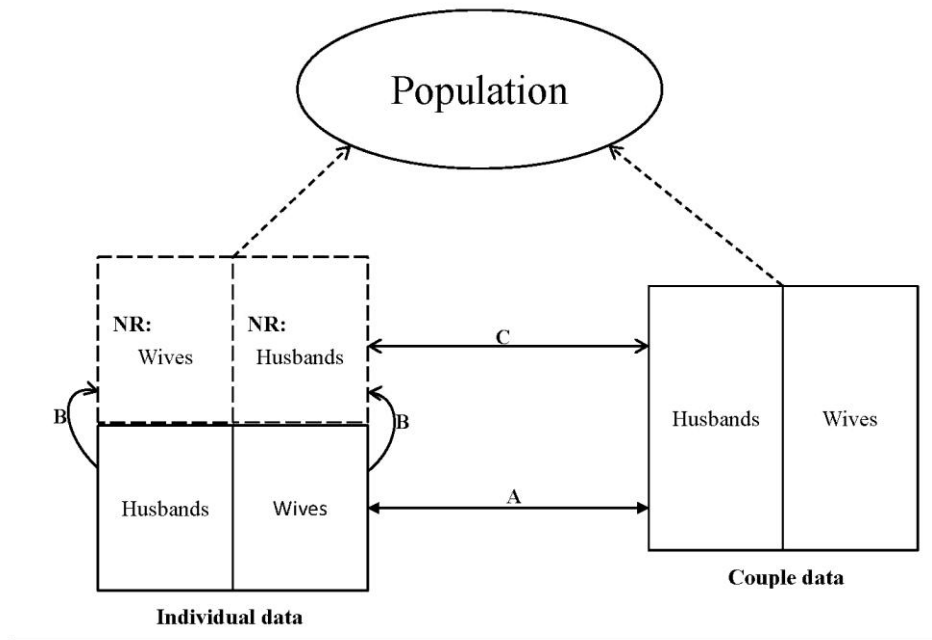


Figure 1. Analysis Strategy

First, the demographic variables of the 354 pairs of husbands and wives (hereafter referred to as couple data) are compared to those of the 804 individual wives or husbands (hereafter referred to as individual data). If the occurrence of unit non-response in the individual data is randomly distributed, the participants and the non-respondents should be similar, and therefore there exists no significant difference between the individual data and the couple data (relationship A in Figure 1). Second, demographic background and political attitudes of the non-responding spouses in the individual data set are displayed in accordance with the information provided by the participated married individuals. (relationship B). Third, the non-respondents in the individual data set are compared to the respondents of the couple data to see if unit non-respondents are different from respondents between the two data

sets, and to further assess the possible concern of biased estimation resulting from unit non-response (relationship C).

Data Analysis:

Following the three steps of analysis mentioned above, we compare respondents of the two data sets. If both samples were originally equivalent when they were randomly selected, and if the unit non-response randomly happened during the interview, respondents of the two data sets should be similar. As it is shown in Table 2A, sex is an important factor contributing to the occurrence of unit non-response. While there are even number of males and females in the couple data, the ratio of men to women in the individual data is 4:6. As compared to females, males are more likely be unit non-respondents.

Table 2A. Demographic characteristics of the two data sets: sex

Sex		Data set:		
		Individual	Couple	Total
Male	n	328	354	682
	column %	40.8%	50.0%	45.1%
Female	n	476	354	830
	column %	59.2%	50.0%	54.9%
Total		804	708	1512
$\chi^2=12.51$ (Yates's continuity correction) d.f.=1 p<.001				

Since the original unit of observation in this survey is couple, instead of individual respondent, the variable of sex is controlled in the rest of analysis. All the respondents from the two data sets are compared in terms of their demographic background, and the results are listed in Table 2B.

Table 2B. Demographic characteristics of respondents: education, age, and sex

Education	Male			Female		
	Individual	Couple	Total	Individual	Couple	Total

Elementary	n	47	38	85	60	42	102
	column %	14.4%	10.7%	12.5%	12.6%	11.9%	12.3%
Junior high	n	42	41	83	49	28	77
	column %	12.8%	11.6%	12.2%	10.3%	7.9%	9.3%
Senior high	n	93	108	201	201	133	334
	column %	28.4%	30.5%	29.5%	42.2%	37.6%	40.2%
College	n	68	49	117	79	71	150
	column %	20.8%	13.8%	17.2%	16.6%	20.1%	18.1%
University	n	77	118	195	87	80	167
	column %	23.5%	33.3%	28.6%	18.3%	22.6%	20.1%
Total		327	354	681	476	354	830
		$\chi^2=12.74$ d.f.=4 p=.013		$\chi^2=5.66$ d.f.=4 p=.226			

		Male			Female		
Age		Individual	Couple	Total	Individual	Couple	Total
20-29	n	9	6	15	16	13	29
	column %	2.8%	1.7%	2.2%	3.4%	3.7%	3.5%
30-39	n	50	81	131	112	110	222
	column %	15.4%	22.9%	19.4%	23.8%	31.2%	27.0%
40-49	n	102	111	213	171	109	280
	column %	31.5%	31.4%	31.5%	36.4%	30.9%	34.0%
50-59	n	91	92	183	120	74	194
	column %	28.1%	26.1%	27.0%	25.5%	21.0%	23.6%
60 and above	n	72	63	135	51	47	98
	column %	22.2%	17.8%	19.9%	10.9%	13.3%	11.9%
Total		324	353	677	470	353	823
		$\chi^2=7.69$ d.f.=4 p=.103		$\chi^2=8.67$ d.f.=4 p=.070			

		Male			Female		
Social class (Occupation)		Individual	Couple	Total	Individual	Couple	Total
Upper middle white collar	n	135	164	299	105	82	187
	column %	41.2%	46.3%	43.8%	22.1%	23.2%	22.5%
Middle lower white collar	n	40	42	82	87	62	149
	column %	12.2%	11.9%	12.0%	18.3%	17.5%	18.0%
Farmer	n	14	24	38	7	9	16
	column %	4.3%	6.8%	5.6%	1.5%	2.5%	1.9%
Blue collar	n	79	80	159	68	51	119
	column %	24.1%	22.6%	23.3%	14.3%	14.4%	14.3%
Other	n	60	44	104	209	150	359
	column %	18.3%	12.4%	15.2%	43.9%	43.4%	43.3%
Total		328	354	677	470	354	830
		$\chi^2=6.98$ d.f.=4 p=.137		$\chi^2=1.498$ d.f.=4 p=.827			

		Male			Female		
Ethnic background		Individual	Couple	Total	Individual	Couple	Total
Hakka	n	34	46	80	55	35	90
	column %	10.8%	13.2%	12.1%	11.9%	10.1%	11.1%
Minnan	n	244	255	499	347	263	610
	column %	77.7%	73.1%	75.3%	74.8%	75.8%	75.2%
Mainlander	n	34	40	74	56	43	99
	column %	10.8%	11.5%	11.2%	12.1%	12.4%	12.2%
Aborigine	n	2	8	10	6	6	12
	column %	.6%	2.3%	1.5%	1.3%	1.7%	1.5%

Total	314	349	633	464	347	811
	$\chi^2 = 4.293$	d.f.=3	p=.231	$\chi^2 = .857$	d.f.= 3	p=.836

Overall, there exists no substantial gap between the two groups of respondents with regard to their demographic characteristics. None but one difference reaches the .05 level of significance. Males of the couple data set are significantly different from their counterparts of the individual data set regarding their level of education. Male respondents of the couple data are more likely to be best educated than those of individual data. This difference in education between the two groups of males reveals that best educated males are more likely to be unit non-respondents.

In addition, age seems important to a certain degree affecting whether selected respondents would participate in the survey, although the difference is not significant. The same pattern regarding age is found in men and women: there are more people in their thirties in the couple data than in the individual data. This difference indicates that people of this age are more likely to be unit non-respondents. Since the target population of the survey was married adults in Taiwan, there were only a few couples who were in their twenties. Therefore, it seems reasonable to infer that younger people are more likely to be unit non-respondents.

Although respondents of the individual data set and those of the couple data set seem similar with regard to their ethnic background and social class, the two groups of respondents are significantly different in term of sex and education. Males, best

educated males in particular, are more likely to be unit non-respondents. Furthermore, although the result shows that age cohort is not significant at .05 level, it is obvious that younger people are also more likely to be non-respondents.

The next step of analysis focuses on the information provided by the respondents of the individual data set to investigate who the unit non-respondents are (relationship B in Figure B). Each respondent was asked by the interviewers about his or her spouse's occupation, ethnic background, Taiwanese/Chinese identity, partisanship, and evaluation of the two major presidential candidates, Ma and Tsai. Table 3 lists the male and female non-respondents' background and attitudes reported by their spouses.

Table 3. Information about non-respondents provided by spouses

Social class (Occupation)		Male	Female	Total
Upper middle	n	193	69	262
white collar	column %	40.5%	21.0%	32.6%
Middle lower	n	86	50	136
white collar	column %	18.1%	15.2%	16.9%
Farmer	n	22	12	34
	column %	4.6%	3.7%	4.2%
Blue collar	n	110	58	168
	column %	23.1%	17.7%	20.9%
Other	n	65	139	204
	column %	13.7%	42.4%	25.4%
Total	328	476	328	804

Ethnic background		Male	Female	Total
Hakka	n	60	36	96
	column %	12.6%	11.0%	11.9%
Minnan	n	362	247	609
	column %	76.1%	75.3%	75.7%
Mainlander	n	37	24	61
	column %	7.8%	7.3%	7.6%
Aborigine	n	5	3	8
	column %	1.1%	.9%	1.0%
Non-response	n	12	18	30

	column %	2.5%	5.5%	3.7%
Total		476	328	804

Identity		Male	Female	Total
Taiwanese	n	261	158	419
	column %	54.8%	48.2%	52.1%
Both	n	157	132	289
	column %	33.0%	40.2%	35.9%
Chinese	n	10	7	17
	column %	2.1%	2.1%	2.1%
Non-response	n	48	31	79
	column %	10.1%	9.5%	9.8%
Total		476	328	804

Partisanship		Male	Female	Total
Pan-blue	n	157	97	254
	column %	33.0%	29.6%	31.6%
Independent	n	106	95	201
	column %	22.3%	29.0%	25.0%
Pan-green	n	129	90	219
	column %	27.1%	27.4%	27.2%
Non-response	n	84	46	130
	column %	17.6%	14.0%	16.2%
Total		476	328	804

Evaluation of Ma		Male	Female	Total
Strongly like	n	26	30	56
	column %	5.5%	9.1%	7.0%
Like	n	145	92	237
	column %	30.5%	28.0%	29.5%
Dislike	n	111	68	179
	column %	23.3%	20.7%	22.3%
Strongly dislike	n	72	48	120
	column %	15.1%	14.6%	14.9%
Non-response	n	122	90	212
	column %	25.6%	27.4%	26.4%
Total		476	328	476

Evaluation of Tsai		Male	Female	Total
Strongly like	n	25	31	56
	column %	5.3%	9.5%	7.0%
Like	n	124	82	206
	column %	26.1%	25.0%	25.6%
Dislike	n	112	81	112
	column %	23.5%	24.7%	24.0%
Strongly dislike	n	38	28	66
	column %	8.0%	8.5%	8.2%
Non-response	n	177	106	283
	column %	37.2%	32.3%	35.2%
Total		476	328	804

With regard to social class, recoded from their occupation, more

than forty percent of male non-respondents belong to upper-middle class, and nearly a quarter of them are blue collar workers. This is reasonable because work is an important factor that hinders the selected male respondents from participating in the survey. It seems another story among the female non-respondents, and a substantial number of them are housewives, so most of them are listed in the last category. On the one hand, ethnic background of the non-respondents reported in Table 3 reflects the general distribution of ethnic groups in Taiwan. On the other hand, there are less mainlanders than we usually observe in survey reports. It is possible that mainlanders are more likely to be non-respondents. With regard to partisanship, most of the less but similar proportion of non-respondents support the pan-blue camp. In terms of their evaluation of the Ma and Tsai, the two major presidential candidates in 2012, there are about the same proportion of non-respondents holding positive and negative attitudes to the two major political figures.

The above distribution of non-respondents' attitudes needs to be compared to that of participants in order to assess whether the two groups of people are politically different. The following analysis compares the unit non-respondents of the individual data and the respondents of the couple data (relationship C in Figure 1). We focus on the factors related to the political cleavage in Taiwan. These factors are ethnicity, partisanship, and Taiwanese/Chinese identity. In addition, we also compare their

evaluation of Ma and Tsai. The results are reported in Table 4.

Table 4. Comparison of non-respondents and respondents

Ethnic background		Male			Female		
		Non-respondent	Respondent	Total	Non-respondent	Respondent	Total
Hakka	n	60	46	106	36	35	71
	column %	12.9%	13.2%	13.0%	11.6%	10.1%	10.8%
Minnan	n	362	255	617	247	263	510
	column %	78.0%	73.1%	75.9%	79.7%	75.8%	77.6%
Mainlander	n	37	40	77	24	43	67
	column %	8.0%	11.5%	9.5%	7.7%	12.4%	10.2%
Aborigine	n	5	8	13	3	6	9
	column %	1.1%	2.3%	1.6%	1.0%	1.7%	1.4%
Total		464	349	813	310	347	657
		$\chi^2 = 5.048$	d.f.=3	p=.168	$\chi^2 = 4.836$	d.f.= 3	p=.184

Identity		Male			Female		
		Non-respondent	Respondent	Total	Non-respondent	Respondent	Total
Taiwanese	n	261	153	414	158	207	365
	column %	61.0%	45.7%	54.3%	53.2%	60.5%	57.1%
Both	n	157	163	320	132	130	262
	column %	36.7%	48.7%	41.9%	44.4%	38.0%	41.0%
Chinese	n	10	19	29	7	5	12
	column %	2.3%	5.7%	3.8	2.4%	1.5%	1.9%
Total		428	335	763	297	342	639
		$\chi^2 = 20.042$	d.f.=2	p<.001	$\chi^2 = 3.776$	d.f.= 2	p=.151

Partisanship		Male			Female		
		Non-respondent	Respondent	Total	Non-respondent	Respondent	Total
Pan-blue	n	157	129	286	97	130	227
	column %	40.1%	39.0%	39.6%	34.4%	44.5%	39.8%
Independent	n	106	113	219	95	66	161
	column %	27.0%	34.1%	30.3%	33.7%	22.8%	28.2%
Pan-green	n	129	89	218	90	93	183
	column %	32.9%	26.9%	30.2%	31.0%	32.2%	32.0%
Total		392	331	723	282	289	571
		$\chi^2 = 5.195$	d.f.= 2	p=.074	$\chi^2 = 9.986$	d.f.= 2	p=.007

Evaluation of Ma		Male			Female		
		Non-respondent	Respondent	Total	Non-respondent	Respondent	Total
Strongly like	n	26	49	75	30	22	52
	column %	7.3%	17.7%	11.9%	12.6%	8.0%	10.1%
Like	n	145	121	266	92	117	209
	column %	41.0%	43.7%	42.2%	38.7%	42.5%	40.7%
Dislike	n	111	65	176	68	76	144
	column %	31.4%	23.5%	27.9%	28.6%	27.6%	28.1%
Strongly dislike	n	72	42	114	48	60	108
	column %	20.3%	15.2%	18.1%	20.2%	21.8%	21.1%
Total		354	277	631	238	275	513
		$\chi^2 = 20.038$	d.f.= 3	p<.001	$\chi^2 = 3.348$	d.f.= 3	p=.341

Evaluation of Tsai		Male			Female		
		Non-resp ondent	Respon dent	Total	Non-resp ondent	Respon dent	Total
Strongly like	n	25	25	50	31	27	58
	column %	8.4%	9.9%	9.1%	14.0%	10.3%	12.0%
Like	n	124	96	220	82	104	186
	column %	41.5%	38.1%	39.9%	36.9%	39.5%	38.4%
Dislike	n	112	95	207	81	96	177
	column %	37.5%	37.7%	37.6%	36.5%	36.5%	36.5%
Strongly dislike	n	38	36	74	28	36	64
	column %	12.7%	14.3%	13.4%	12.6%	13.7%	13.2%
Total		299	252	551			
		$\chi^2 = 1.012$	d.f. = 3	p = .796	$\chi^2 = 1.695$	d.f. = 3	p = .683

It is shown in Table 4 that respondents and non-respondents are significantly different in terms of their Taiwanese/Chinese identity, partisanship, and evaluation of Ma. While 61% of male non-respondents are reported by their wives as Taiwanese, only 45.7% of male respondents have this identity. Therefore, the presence of unit non-response leads to an under-estimation of Taiwanese identification and an over-estimation of dual identification among the male respondents. A similar pattern appears on the male non-respondents' partisanship, which is related the issue of identity: they are more likely to be pan-green supporters to a certain extent, although the difference is not statistically significant. Related to the issue of identity and partisanship, the majority of male non-respondents dislikes Ma, who belongs to the pan-blue camp and is viewed as a pro-China political figure.

However, female non-respondents and respondents are more politically similar than males. The only one exception is partisanship. Different from male non-respondents, female non-respondents are more like to be independents and less likely

to be pan-blue supporters. In brief, it is obvious that male non-respondents are politically different from male respondents, and this may lead to biased estimation of the population parameter.

Conclusion and Discussion

In summary, it is found in this analysis that such demographic characteristics as sex, education and age are related to the phenomenon of unit non-response. Males and young adults are in general more likely to be non-respondents in telephone survey. It is also found that the best educated men are also more likely to be non-respondents. The three demographic factors that lead to the unit non-response reflect the fact that males, young people, and better educated individuals are usually busy with their work and career, so they are less likely to be available or less willing to cooperate to participate in the survey.

Furthermore, we examine the political attitudes of the unit non-respondents and find that three political attitudes that are related to the political cleavage in Taiwan are associated with unit non-response among males. That is, males who identify themselves as Taiwanese, support the Pan-green camp, and dislike Ma are more likely to be non-respondents.

Briefly speaking, not only demographic variables but also political attitudes are related to one individual's possibility becoming a unit non-respondent in telephone survey. It is common for researchers to use the method of weighting to adjust the sample

and make the collected sample and population have the same distribution of demographic variables. The current analysis shows that demographic characteristics are related to unit non-response, so using demographic variables to compute the weight of each case in order to make the sample looks like the population is a reasonable way to make the sample more representative of the population. However, since political attitudes are also related to the phenomenon of unit non-response, the method of weighting cannot be a satisfactory solution. This analysis shows that males who are on the opposite sides of the political cleavage have unequal possibilities being a unit non-respondent. This bias cannot be properly addressed with the information of demographic variables. We suggest using household instead of individual person as the unit of observation in telephone interview, so that we can retrieve extra information of the non-respondents to estimate and correct the possible bias resulting from unit non-response.