Do low survey response rates bias results? Evidence from Japan

Ronald R. Rindfuss
Minja Kim Choe
Noriko O. Tsuya
Larry L. Bumpass

INTRODUCTION

Surveys collected by government agencies and scientific groups have become a dominant source of social demographic data over the past 50 years, especially in the family and fertility sub-fields. However, in recent years, in the wealthy, urbanized, developed countries with service-oriented economies, response rates have declined substantially. For example, in Japan, the national opinion surveys on family planning by Mainichi Newspapers had a steady decline in their response rates from 92% in 1950 to 61% in 2004, the last year the survey was conducted. Or to take another example, in the first wave of the Generations and Gender Program, response rates were under 60% in Austria, Czech Republic, France, Germany, Hungary, the Netherlands and Russia. Further, even among respondents, the proportion not answering certain items has been increasing. For example, in the U.S. Current Population Surveys, the proportion of missing data on wages has increased from 14% in 1983 to 33% in 2008.

Various reasons have been put forward for the declines in response rates. People are increasingly living in gated communities where a doorman or gatekeeper will not let a field worker knock on a potential respondent's door. Many who have been frequently bothered by marketing surveys have developed a negative attitude towards all surveys. Crime has increased and people are afraid to talk to strangers. Especially with increased proportions of women in the labor force, family lives have become more complicated and people do not have time to deal with survey researchers. In some places, including Japan, unscrupulous individuals have used surveys as a pretext to swindle gullible respondents, and such cases have received widespread publicity.

The decline in response rates has been receiving considerable attention from investigators in the survey research field, with numerous articles in *Public Opinion Quarterly*. A number of studies have found evidence of more bias across items within a given survey than across surveys. Economists, in particular, have examined attrition resulting from non-response in successive waves in longitudinal surveys. The findings suggest that whether or not there is bias depends on the issue being examined, the use of proper control variables within multivariate analysis, and the use of weights to account for differential response rates.

These studies by survey researchers and economists are not widely known by social demographers. Further these studies have tended not to use fertility or family variables as outcome measures. As a result, anecdotal evidence, including reviews of papers submitted for publication or proposals submitted for funding, suggests that the prevailing opinion within demography is that surveys with low response rates are not worth analyzing. In this paper we examine the extent to which low response rates bias results for both survey response rates and attrition rates.

DATA

This study uses cross-sectional and longitudinal national surveys from Japan. The cross-sectional data are from the 2009 National Survey on Family and Economic Conditions (NSFEC). The 2009 NSFEC is a national probability sample of Japanese men and women aged 20–49. Using a stratified, two-stage probability sampling based on the 2005 population census tracts distribution, the 2009 NSFEC obtained 3,112 usable responses. Hereafter, the 2009 NSFEC will be referred to as the "cross-sectional survey."

The NSFEC was first conducted in 2000, and in 2009 there was a follow-up data collection. This follow-up will hereafter be called the "longitudinal survey." The data collection agency, the questionnaire and protocols were the same for both the 2009 cross-sectional and longitudinal survey. The response rate for the cross-sectional survey was 54% and for the longitudinal survey 53%. Both are sufficiently low to warrant concern.

In the longitudinal survey, response rates were lowest among men, those who had never been married, the youngest, and those living in large metropolitan cities. While this variation is in the direction one would expect, it is also important to note that in no

demographic group was the response rate what might be termed "high." For example among older ever-married women, the response rate was only 69%.

Because the cross-sectional survey sample was drawn from Japan's residence registration (*jumin kihon daicho*), a system that covers the entire population resident in Japan, we know the age, sex and place of residence of respondents and non-respondents. Response rates were patterned by age (lowest for the youngest), sex (lower for men) and place of residence (lowest in large metropolitan areas). And yet again even among those who were older, female and living in more rural areas, response rates were still fairly low – in the 60 to 65% range.

ANALYTIC STRATEGY

We examine whether there is bias on a wide range of variables that are of substantive interest to social demographers: fertility intentions, family and gender attitude items, measures of marital happiness, reports of hours spent on various household tasks, and reports of knowing people who had engaged in such family behaviors as using child care, having a non-marital birth, cohabiting, and planning not to marry. For each of these "dependent variables" we follow the same logic.

To fix terms, we are interested in both "distributional" bias and "relational" bias. Distributional bias is the extent to which the respondents and non-respondents differ on the distribution of the dependent variable (mean, percent distribution and the like). Relational bias is the extent to which the patterns of association between key independent variables and the various dependent variables differ between respondents and non-respondents. In short, relational bias asks a statistical interaction question within the context of a multivariate analysis.

The problem, of course, is that we do not have data for the non-respondents, and so we need to find suitable ways to simulate what those relationships might be. For the longitudinal survey, we use the 2000 data on the various dependent variables, and ask whether the distributions and relationships differ for those who were respondents and non-respondents in 2009. The logic is that if the 2009 non-responders do not differ in their 2000 dependent variables, distributional and relational, then we would conclude that the likelihood of bias is low; and if they do differ, then the likelihood of bias is high.

For the 2009 cross-sectional survey, we need to use a different strategy. To understand that strategy it is important to note that the fieldwork involved a relatively large number of field workers throughout the country such that it was possible to complete the survey in a short period of time – about a month or so. The strategy begins with an assumption that there is a continuum that exists between responders and non-responders. Put differently, with sufficient effort those who might initially be difficult to get to respond might eventually do so. These "difficult respondents" might be hard to find at home, might not always answer the door bell, or might say "OK, I'll respond but later." So our strategy is to divide those for whom we have a completed questionnaire into those who were "easy" (the response came early in the field work with few attempts to obtain the data) and those that were "difficult" (the response came late in the fieldwork and required repeated call backs). We treat the difficult ones as proxies for the non-respondents.

Admittedly, the logic for examining non-respondent bias for the 2009 cross-sectional survey is not as compelling as the strategy for the longitudinal survey. Nevertheless, it does provide some purchase on non-response bias. And, to the extent that we obtain similar results for both the cross-sectional and longitudinal surveys, we will be more confident in our results.

RESULTS

The analyses and interpretation of the analyses are still underway. To insure that we had broad coverage, we included numerous independent and dependent variables. This, in turn, led to a substantial number of significance tests – more than 1000 so far. Although we are not yet finished, we will certainly finish well before the June 2012 European Population Conference. Here we provide a brief overview of findings to date.

In terms of distributional bias, that is the extent to which it appears that non-respondents might provide different responses than respondents, we find considerable evidence for distributional bias in the longitudinal survey: i.e., for roughly a third of the examined dependent variables. We find less evidence for the cross-sectional survey – a little more than 10% of the cases. Given the differences in response rates by background characteristics, and given the relationship between these background variables and our dependent variables, finding distributional bias is not surprising.

The picture with respect to relational bias is quite different. Here we were using multivariate models, controlling for such variables as age, sex, education, rural-urban upbringing, sibship size, marital status, parenthood status and size of place of residence, and then examining whether these variables interacted significantly with the non-response variable. For both the longitudinal survey and the cross-sectional survey, we tested 406 interactions. At the .05 level, one would expect approximately 20 to be significant by chance. In neither the cross-sectional nor the longitudinal case were more than 20 significant. This suggests that in properly constructed multivariate analyses, controlling on observable variables that might affect both non-response and the dependent variable, one can obtain unbiased results even with low response rates.

CONCLUSION

The conclusion will discuss both the implications of our results and ways in which survey agencies could, with minimal cost, obtain data that would more easily allow researchers to investigate for possible non-response bias before undertaking their substantive analyses.