

Nonresponse work at Statistics Sweden – examples from the past and plans for the future

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Abstract

Nonresponse is likely to introduce bias and additional variability in the point estimator, thus having a direct negative impact on quality through an increase in the mean squared error of the estimator. For a national statistical institute nonresponse will also have an indirect negative effect on quality; more money spent on nonresponse related work indirectly means less money available for other important quality-defining activities. In this paper, we provide insight into some nonresponse-related initiatives that has been carried out by Statistics Sweden and present some plans for the future.

Keywords: sample survey, quality, mixed mode, qualitative study, responsive design

1. Introduction

In an internal report from Statistics Sweden (1981, p. 296), it is stated that already by the mid-1970s the sample surveys conducted by Statistics Sweden were associated with nonresponse rates close to the acceptable limit. In 1975, the nonresponse rate in the Swedish Labor Force Survey (LFS) was around 8 %. Today, the nonresponse rate is close to 28 %. Thus the LFS, which is considered to be one of the most important surveys conducted by Statistics Sweden, exemplifies that nonresponse is an ever-increasing problem within the field of official statistics. This is especially true for sample surveys where the respondents participate on a voluntary basis.

From a statistical point of view, nonresponse is expected to contribute to an increase in the mean squared error of point estimators used, both through bias and increased variance. This is a well-known fact which over time has attracted much interest from both survey practitioners and theoreticians. However, nonresponse is not merely a statistical problem. For a national statistical institute (NSI), the problem of nonresponse will also have an indirect negative effect on quality, as it by definition indicates an inefficient use of available resources. Once again the Swedish LFS will serve as an example. In a given month, roughly twice as many contact attempts are used for nonrespondents as for respondents. Under the somewhat simplifying assumption that all contact attempts are associated with the same cost, this means that almost as much money is spent on identifying nonrespondents as on actually getting hold of respondents.

Against this background, it is not surprising that the problem of nonresponse is considered an issue of major importance by many NSIs. In section 2, we give some examples of nonresponse work that has recently been carried out by Statistics Sweden. In section 3, some plans for the future are presented in conclusion.

2. Examples from the past and plans for the future – three projects in the nonresponse field at Statistics Sweden

2.1 An experiment to evaluate alternative contact strategies

Since 2004, Statistics Sweden has yearly conducted a national survey of public health, named Health on Equal Terms (HET), at the request of the Swedish National Institute

of Public Health (SNIPH). The survey, which aims at describing the state of the Swedish population's health and its changes over time, is an ongoing collaboration between SNIPH and county councils/regions in Sweden. The survey questionnaire consists of about 100 items and is sent by regular mail to a random sample of 20 000 individuals. For the last few years the data has been collected using a mixed-mode paper/web strategy, in which a web response option is offered as an alternative to the paper questionnaire.

As the HET response rate has been steadily declining from 61 percent in 2004 to 49 percent in 2011, SNIPH and Statistics Sweden decided to conduct an embedded experiment within the HET of 2012. The main objective was to evaluate a couple of alternative contact strategies against the standard one with respect to response rates and costs (using the proportion of web respondents as a surrogate measure of the latter). Below, we briefly describe two of these alternative strategies as well as the standard strategy and present some of the results of the experimental comparisons.

The standard strategy (S, group size 2 500) begins with a mailout including both a paper questionnaire and a login to the web questionnaire (printed on the invitation letter). Thereafter, if necessary, at most three reminders are sent out, all including the login, but only the last two including the paper questionnaire.

Alternative strategy 1 (A1, group size 2 500) starts with a mailout including only the invitation letter and the web questionnaire login. However, the letter also contains information about a forthcoming paper questionnaire to be sent to those who do not respond by the web within a week or so. The second and fourth mailouts both include the paper questionnaire as well as the login, whereas the third mailout only includes the login.

Alternative strategy 2 (A2, group size 2 500) uses a pre-notice letter (without web questionnaire login) as the first mailout. The second mailout includes the invitation letter with the web questionnaire login as well as the paper questionnaire. The third and fourth mailouts are as in strategy A1.

Table 1 below shows the final response rates and the proportions of web responses for each strategy, by gender and age group, with 95 % confidence intervals.

Table 1. Response rates by strategy, gender and age group

	Response rate			Proportion of web responses		
	S	A1	A2	S	A1	A2
Men	48 ± 3	45 ± 3	45 ± 3	17 ± 3	32 ± 4	16 ± 3
Women	54 ± 3	55 ± 3	53 ± 3	12 ± 2	21 ± 3	7 ± 2
16-29	35 ± 4	34 ± 4	33 ± 4	33 ± 7	37 ± 7	15 ± 5
30-44	40 ± 4	39 ± 4	40 ± 4	16 ± 5	33 ± 6	20 ± 5
45-64	56 ± 4	55 ± 4	55 ± 3	12 ± 3	26 ± 4	11 ± 3
65-84	72 ± 4	71 ± 4	69 ± 4	6 ± 3	17 ± 4	4 ± 2
Total	51 ± 2	50 ± 2	49 ± 2	14 ± 2	26 ± 2	11 ± 2

Interestingly, and perhaps surprisingly, all three contact strategies generated almost equal response rates. Even within subgroups there are no differences between the three

strategies. Thus, with respect to response rates, none of the two alternative strategies performed better than the standard one. On the other hand, neither did they perform worse; this is good news in terms of costs, since the standard strategy requires sending out a greater number of paper questionnaires.

Concerning the proportion of web responses, strategy A1 outperformed the other two. Clearly, starting with the web option alone and including the paper questionnaire at a later stage of the data collection can have great impact on people's choice of response mode. Since there is usually a negative correlation between the proportion of web responses and data collection costs, strategies like A1 could be preferable in large sample surveys. This result replicates the findings of Holmberg et al (2010).

In summary, this experiment shows that a response rate at the level of that of the standard strategy can be achieved at a lower cost by simple adjustments of the mailout contents, at least in the HET survey. If there exists a contact strategy with potential of increasing the response rate, more experiments need to be done in order to find it. There is also a need for further analyses on collected data to investigate whether strategies differ with respect to the nonresponse bias and measurement error they generate (i.e. mode effects). If increased response rates come at the price of larger systematic errors, sticking to a standard strategy might be better.

2.2 Nonresponse from a qualitative perspective – an interview study

In order to obtain an in-depth understanding of why a sample member becomes a nonrespondent, Statistics Sweden recently conducted a qualitative interview study. Through qualitative interviews it is possible to reach the nonrespondents' thoughts and feelings, and by listening to their discussions and arguments it is possible to get insights about new aspects that are difficult to find with other approaches. Such understanding may prove to be of great value for Statistics Sweden in the continuing work aimed at reducing problems related to nonresponse.

The study consisted of eleven in depth interviews; six of them face to face and five of them through telephone. The interviewed nonrespondents were all sample members of surveys conducted by Statistics Sweden; The Labor Force Survey, The Living Condition Survey or surveys with self-administrated questionnaires. The nonrespondents vary in terms of age and educational level.

The interviews were partly targeted at concrete survey-related issues such as incentives, data collection mode, survey length, survey conductor and sponsor, confidentiality issues. These factors are often highlighted in nonresponse research and investigated through experimental designs (see e.g. Singer and Bossarte 2006; Groves et al 2004; Dillman et al 1995). In this study we wanted to get the nonrespondents' perspectives on these issues. The results are not straightforward and the interviewed nonrespondents vary in their perceptions. However, one summarizing conclusion that can be drawn is that there are clear interaction effects, indicating that different important aspects are not independent from each other. The impact of the surveys' length on the respondents' decisions to participate or not depends for instance on the survey subject or the data collection mode, and the trust in confidentiality seems to be more important if the survey subject is sensitive.

Another important focus in the study was on a wider societal context, or more specifically, attitudes towards civic responsibility and attitudes and experiences of statistics. We wanted to see if this could help us in the understanding of non participation in surveys. This is partly a matter of what is called the survey climate (Lorenc et al 2013), but we mean that it should also be considered in an even broader sense. Based on the interviews, our view is that attitudes towards surveys and

non-participation behavior to some extent are connected to the wider issue of social connection and involvement, both at an individual and a structural level.

Some of the interviewed nonrespondents expressed that they would be motivated to participate if it was clear why their participation is important. They mean that they have trust in public authorities and that they are willing to contribute to society, but to have them participate in surveys from Statistics Sweden takes more knowledge about Statistics Sweden and how survey participation makes a difference. Others question that their response could be of importance and this skepticism seems to be connected to a general distrust in public authorities and, for some of the nonrespondents, in statistics. One of the nonrespondents expresses his skepticism toward surveys in the following way:

“I can’t see that it will mean anything. /.../ It doesn’t feel important for me. It doesn’t.”

Later on in the interview he is talking about public authorities:

“They are all so heavy. Everything. I mean like Public Employment Service or The Swedish Social insurance agency or something like that. I think that they are all idiots. That’s what I think.”

From this study it is clear that information and attitude change can be a feasible track in the continuing work with nonresponse. However, important parts of the problem is out of our reach as an NSI – they are about broader issues in society and there is a need for cooperation with other actors, such as other public authorities and media.

2.3 Responsive design

Several earlier studies at Statistics Sweden illustrate that a data collection motivated principally by a desire to get the best possible ultimate rate of response is inefficient. They suggest that scarce resources are being spent with little effect on the estimates and little improvement in representativity. Against this background, a project on responsive design has recently been carried out at Statistics Sweden. The objective of the project was to explore procedures for obtaining a balanced set of respondents from a given probability sample.

The procedures considered rely on indicators that can be monitored during data collection. The identified indicators mirror different aspects of the nonresponse problem. They are complements to the response rate, which in itself is insufficient for describing the quality of the survey response. The indicators are general and designed for use in sample surveys, where the inclusion probabilities are known and several auxiliary variables are available. The auxiliary variables available in a survey can be employed to meet two different goals. Some may find use at the data collection stage to monitor the data collection and to carry out suitable interventions. Others may be used at the estimation stage, where they serve to compute calibrated weights for the nonresponse adjusted estimates. A motivation for an increased and systematic use of auxiliary information in the data collection phase is that a better control of the field work can be obtained. The data inflow can be continuously studied, and the emphasis of the analysis can be altered, for example by focusing on low-responding subgroups, identified with the aid of selected auxiliary variables.

So far, two reports have been finalized in the project (Lundquist and Särndal 2012, 2013). The work is closely related to the ideas and concepts presented in Särndal (2011). Other relevant recent articles dealing with the nonresponse problem, with an emphasis on the data collection phase, are for example Schouten et al. (2012) and Wagner (2012). The former gives a broad description of uses of indicators in connection with nonresponse error, including an overview of the *R*-indicator and the

work accomplished in the RISQ-project. Wagner (2012) sets up a typology of data sources with three levels; the approach discussed within the project fits best in the level “the response indicator and frame data/paradata”.

In the reports it is shown how to use the indicators in monitoring the data collection in already established surveys. The concepts proposed by the project are of general scope and can be applied to a variety of sample surveys. In the project, the 2009 Swedish Living Conditions Survey (LCS) was chosen to illustrate the use of the indicators. The indicators are studied using paradata from the Swedish CATI-system for examining the data collection in retrospect of the LCS 2009. The results in the first report confirm earlier findings; the follow-up does not produce the improvement that one would hope for.

The use of the indicators has also been applied to other surveys at Statistics Sweden. Examples are the inspection of the data collection and in the evaluation of embedded experiments. To analyze the data collection the effects of additional call attempts have been studied in the LCS 2011, the Party Preference Survey 2012 and the International Assessment of Adult Competencies Survey 2011. Embedded experiments have been used to investigate suggestions of survey design improvements. In LCS 2011 a new call strategy was contrasted with the traditional contact strategy, and in the Work Environment Survey 2011 a mixed-mode design was compared with the traditional uni-mode design.

Retrospective experiments have been carried out by interventions in the LCS 2009 data file. These experiments, showed that appropriate interventions in the data collection can bring considerable improvement –increased balance, reduced distance – compared with the actual LCS data collection. The cost savings realized by fewer call attempts might instead find use in improving other aspects of survey quality.

3. Plans for the future

As indicated in section 1, nonresponse may have a large indirect impact on quality due to inefficient use of resources in the data collection process. A customized and efficient IT-system is considered a prerequisite for a more efficient interview process. The system should both facilitate and support work efforts guided towards “easy-to-reach” respondents, and provide tailored support for work efforts guided towards the “hard-to-reach” respondents. For example, the system should be flexible enough to handle changing contact strategies for different sample groups during the ongoing data collection period. In order to decide whether the best option is to purchase a commercial system or to develop a system in-house, Statistics Sweden must specify in detail the critical features and function of a new system. This work is ongoing.

Another project that will start during 2013 is looking into the possibility of introducing the web as an alternative to telephone interviews. If successful, such an initiative may have an impact on quality both directly, through increased response rates, and indirectly, through reduced cost for data collection. In particular, such a solution has a large potential for the Swedish LFS, which is a rotating panel survey. If a non-ignorable fraction of the LFS-respondents that have already participated at least once before would use the web, substantial cost reduction is likely to follow.

When conducting telephone surveys, access to high-quality phone numbers is imperative. During 2013, the process of accessing phone numbers and matching them to sample units will be evaluated. Moreover, we will also look more carefully into the question “Of all the different phone numbers that are matched to a given individual, which are the best to use”? Typically, the matching process will result in three or more different phone numbers, possibly from more than one source, being matched to given

individual. If it is possible to successfully prioritize between different sources of phone numbers, one can foresee that a larger part of the budget will be spent on contacting sample members for whom valid phone numbers are available.

A strategy is needed for how to implement the indicators discussed in section 2.3 in the monitoring of the field work. The requirements are different between surveys. A possible next step is to choose an important survey that can serve as an illustration. One candidate to use is the LCS. Based on findings from a previously conducted experiment, a small responsive design experiment was carried out on the 2012 version of the LCS. In particular, a response propensity method was used in the follow-up part of the data collection. The results of this test will be analyzed in spring 2013.

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