Discussion

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First, I shall comment briefly on the very interesting paper presented by Dr. Greenberg.

The assumption that the probability distribution associated with the sensitive question is the same as that associated with the non-sensitive question, except for the location parameter, is not an appealing one, for one may expect that in practice the distributions may be quite unlike each other. Moreover it is easy to see that the unbiased estimator can be obtained without any assumption regarding the forms of the distributions.

It follows that, while an investigation of the maximum likelihood estimator could yield some information about the relative efficiency of the unbiased estimator, the maximum likelihood estimator is not to be preferred in practice, since it would require assuming the functional form of the probability distribution. On the other hand, an interesting investigation from the practical point of view would be that of the optimum allocation of the design parameters, given that the unbiased estimator is to be used. Another interesting question concerns the relative magnitudes of the mean-square errors for (a) the direct interview approach for a single question, (b) the randomized response approach assuming that all response biases eliminated, and (c) the randomized response approach if one assumes that the bias is only reduced by specified amounts.

The valuable paper by Mallows and Williams is concerned with an extremely serious problem. As the authors have noted, this bias (which we have come to call the "rotation group bias") has been observed in the Current Population Survey conducted by the Bureau of the Census and in one or two other panel surveys. In fact, however, this bias probably exists in every survey, whether it is a survey based on a fixed panel of respondents or a survey that uses rotating subsamples. It probably exists even in a one-time survey, since clearly it can be regarded as the first interview of a panel survey. Of course, it is only in the latter case that the bias can be detected clearly, and then only if the several rotation groups for each round of the survey are separately tabulated. Thus it is important, for all surveys, to understand the causes of the bias, for such an understanding may lead to the adoption of procedures for reducing these biases.

Those who design or conduct surveys and those who make use of survey results will therefore welcome the discussion presented by Mallows and Williams, in which the bias can be shown to appear if there is a differential probability of being interviewed for persons designated for the sample. We cannot, however, regard it as established that the differential probability of being interviewed does in fact account for any substantial part of the bias that has been observed. The hypothesis advanced by Mallows and Williams is one of a dozen or more hypotheses or classes of hypotheses that have been advanced in attempts to explain the rotation group bias. I wish briefly to mention a few of the other hypotheses.

It may be that one contribution to the bias is the fact that attitude and the behavior of the interviewer varies as a function of the length of time that the sampled unit has been a member of the sample. It may be that the interviewer is required to obtain more detailed information in the course of the first interview, for example demographic information about each member of the household. It is quite possible that the interviewer may be quite meticulous in his questioning of a new unit, but become less careful after repeated interviews, perhaps by assuming the answers to questions that he does not in fact ask.

Interviewers are not assigned their work at random. and the interviewers that are assigned to units new to the sample may tend to be of a different type, perhaps because it may seem desirable to the supervisors to assign particularly skilled interviewers to new cases. This policy may contribute to a difference between units new to the sample and those that have previously been interviewed.

In the Current Population Survey, for example, certain probing questions are asked of persons whose initial responses during the interview would indicate that they are not in the labor force. These probes result in some of these persons being classified finally as unemployed. But the probes are used only for units of the first and the fifth months in the sample, thus possibly contributing to the bias observed.

The identity of the respondents actually reporting for the given household in the sample varies over the life of the panel, and the characteristics of the respondent and his relationship to the person about whom information is recorded affect the responses given. If, as is usual, the respondent is not chosen at random, this could give rise to a rotation group bias.

The bias may be the result of psychological conditioning by means of previous interviews, without any real changes in the characteristics that are to be reported.

It may be that some respondents will merely recall and repeat an earlier response. The hypothesis has been advanced that the probability of such behavior is related to the characteristics of the respondent. It can be shown that this would lead to a rotation group bias.

Finally, we cannot overlook the possibility that the characteristics of some persons may actually change as a result of being interviewed.

For example, a person originally not in the labor force may begin looking for work, or an unemployed person may leave the labor force, as a result of his labor force status having been discussed during previous interviews.

It is likely that more than one of the possibilities that have been mentioned (or some that have not been mentioned) are effective to some degree. A considerable amount of research has been done through the investigation of existing data and even by mounting special experiments to measure the effects implied by the hypotheses mentioned. A great deal more research is probably required to determine the most important causes of the rotation group bias, and to find ways of reducing or, hopefully, eliminating the bias.