

Nonsampling or systematic errors



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Nonsampling errors can occur both in a sample survey and in a census. Such errors occur because of human mistakes and not chance. The errors that occur in the collection, recording, and tabulation of data are called nonsampling errors. Nonsampling errors occur because of human mistakes and not chance. Nonsampling errors can be minimized if questions are prepared carefully and data are handled cautiously. Many types of systematic errors or biases can occur in a survey, including selection error, nonresponse error, response error, and voluntary response error.

The following chart shows the types of errors. (i) Selection Error: When we need to select a sample, we use a list of elements from which we draw a sample, and this list usually does not include many members of the target population. Usually it is not feasible to include every member of the target population in this list. This list of members of the population that is used to select a sample is called the sampling frame. Thus, the sampling frame that is used to select a sample may not be representative of the population. This may cause the sample results to be different from the population results.

The error that occurs because the sampling frame is not representative of the population is called the selection error. If a sample is nonrandom (and, hence, non representative), the sample results may be quite different from the census results. (ii) Nonresponse Error: Even if our sampling frame and, consequently, the sample are representative of the population, nonresponse error may occur because many of the people included in the sample did not respond to the survey. This type of error occurs especially when a survey is conducted by mail.

A lot of people do not return the questionnaires. It has been observed that families with low and high incomes do not respond to surveys by mail. Consequently, such surveys over represent middle-income families. This kind of error may also occur in a telephone survey. Many people may not be home when the interviewer calls. This may distort the results. To avoid the nonresponse error, every effort should be made to contact all people included in the survey. (iii) Response Error: The response error occurs when the answer given by a person included in the survey is not correct.

This may happen for many reasons. One reason is that the respondent may not have understood the question. Thus, the wording of the question may have caused the respondent to answer incorrectly. It has been observed that when the same question is worded differently, many people do not respond the same way. The answers given by respondents may differ depending on the race of the interviewer. (iv) Voluntary Response Error: Another source of systematic error is a survey based on a voluntary response sample.

The polls conducted based on samples of readers of magazines and newspapers suffer from voluntary response error or bias. Usually only those readers who have very strong opinions about the issues involved respond to such surveys. Surveys in which the respondents are required to call some telephone numbers also suffer from this type of error. Here, to participate, many times a respondent have to pay for the call and many people do not want to bear this cost. Consequently, the sample is usually neither random nor representative of the target population because participation is voluntary.