

RESPONSE ERROR AND REALITY IN GEOGRAPHIC INVESTIGATION

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Certain fundamental aspects of scientific research have been ignored in the geographic literature. Questions concerning the validity of the collected data and information obtained for further analytical purposes have yet to be raised and discussed. It is argued that the evaluation of total error in survey findings is largely neglected and that an urgent need exists for a methodology of survey evaluation for the practical problems of the researcher.¹ Although adequate attention has been given to sampling error in geographic studies, little concern has been given to response error as well as to non-response error. Sampling error refers to a statistical error based on probability in which the range of the error can be controlled by changing the characteristics of the determined sample. Such error arises because not every individual in the population under study is included in the sample. Furthermore, the extent of the sampling error can be measured and confidence intervals can be calculated. An example of such error is the error interval in calculating the best estimate of the mean.²

$$M = x + Z \frac{\sigma}{\sqrt{N}}$$

Where: M = the population mean
 x = the sample mean
 Z = Sigma value corresponding to the required probability level

$$\frac{\sigma}{\sqrt{N}}$$

= the standard error of the mean

On the other hand, response error refers to the collection of information from individuals who tend to over- or underestimate the actual values of the measured variables. A third type of error is the nonresponse error which is attributed to the case where a per-

son who is part of the sample could not be reached. Such an error may arise from a systematic bias when the random characteristics of the sample are subject to change.

The effect of response and non-response errors on the results of research is more dangerous and distorting of reality than the sampling error, since the exact amount of error in response nonresponse errors cannot be determined. Therefore, it is very essential that an adequate concern be given to response nonresponse errors in geographic investigation. The fundamentality of such concern should be emphasized at a stage of geographic research where a growing interest among geographers is geared toward the behavioral aspects of spatial phenomena. Such behavioral characteristics are emphasized in many recent studies such as that of Cox and Gollidge,³ Olsson and Gale,⁴ Rushton,⁵ Pred,⁶ and many others.

It is the aim of this paper to discuss response error as well as its major sources. The understanding of such errors will help in minimizing the response error and in bringing the results of the researcher as close as possible to reality. Such an aim is shared by all branches of social science. As it has been stated: "all prediction is subject to error; indeed, one of the aims of science is to reduce errors of prediction."⁷

Seriousness of Response Error

It is argued that the existence and importance of response error in reports of some types of data . . . has become so evident that has led to serious concern as to the validity of the data.⁸ Also, it is stressed that the bias of non-response error is so serious in many surveys that an adjustment of the original size of the sample is an essential part of sample design.⁹ Since response

error exists in many scientific studies, geography is not exceptional, especially in those studies concerned with the behavior of individuals. Also, since there is no excuse for geographers not to agree with the fact of existing errors in their collected data, one would have to raise questions concerning the conclusions and the results derived from such data. One may want to question whether these results represent absolute facts and absolute reality or a mere approximation of facts and reality. The verification of a theory should start with facts and end with facts. It is questionable how valid the data are in representing facts. This, in turn, will question the validity of accepting, for example, many conclusions derived from studies testing the principles of Central Place Theory. Since what are measured are not facts but approximation of facts, not reality, but an approximation of reality, one has to be cautious in accepting or rejecting some of the principles derived from theories dealing with individual behavior. Until the direction and the magnitude of response error can be measured the concluded results of such studies of individual behavior are still in the shadow of scientific reality.

Sources of Response Error

Inaccuracy of Statements.

Inaccurate information refer to the errors that are made in the formulation of statements either from the side of the investigator or the respondents. Also, related to inaccuracy is what is termed "predictive inaccuracy" which defines the response error that is related to intention data.¹⁰ Intentional deceit is considered a source of serious inaccuracy when respondents feel that material loss or unpleasant emotional reactions will be associated with a particular response.¹¹ The unwillingness and inability of the respondents

and the investigator to provide and record accurate information are the two basic sources of response error.

There is no general theory in the social sciences which is capable of explaining the motivations behind the unwillingness of the respondents to provide and record accurate information. However, the reasons for unwillingness lie in the emotional aspects of the questions, the required time, damage of prestige, and invasion of confidential matters. It is noticed that many business establishments refuse to give any private information concerning their customers. Answers related to age, sex, income, and personal prestige are usually over- or underestimated. An interesting study concerning personal prestige was carried out by a commercial airline. The passengers were asked directly whether or not they were afraid of flying. Only few respondents expressed their fears of flying. When the question was asked indirectly whether or not their friends were afraid of flying, a much larger percentage of the respondents indicated fears of flying.¹² In another study, a sample of 148 were interviewed to examine the sincerity of the respondents. Only 66 percent indicated that most people answer honestly.¹³

Respondent's Image of the Interviewer

The personality and the appearance of the interviewer may be a source of inaccuracy. The respondent's answer to the interviewer's questions reflects more than the mere fact of the matter; they reflect his perception of the interviewer.¹⁴ An example is given by a study in which low-income women interviewed by a well-dressed and carefully groomed girl reported buying expensive cosmetics. When the researcher sent another woman dressed similarly to the women interviewed,

the average price paid for brands of cosmetics they bought dropped sharply.¹⁵

Ambiguity of Information

The term ambiguity defines the errors made in interpreting spoken or written statements. Ambiguity usually comes out of misunderstanding on the communication or observation level. The forms of the questions being directed to the respondent are a major source of error. The ambiguity of the questions stems from one or more of the following sources:¹⁶ question length, respondent unfamiliarity of one or more words in context, ambiguity of words, two questions combined in one, and lack of specificity.

Inability of the Respondent

This source of inaccuracy is related to the inaccessibility of the required information rather than to a deliberate deception by the respondent. Also, the inability to answer the required questions is affected by the sharpness of the respondent's memory. Questions concerning matters which occurred a long time ago was subject to wrong answers. "How old is your house?", "Did you shop at X store last year?" are types of questions related to the memory of the respondent. Sometimes people give answers and find later that they have been mistaken. The unconsciousness of motivation is another reason behind liability. It has been noticed that people often do not themselves know why they do things. It has been found in psychology that some advertising messages are received "subliminally"; that is absorbed without conscious awareness.¹⁷

Conclusion

The seriousness of response error in the data of studies dealing with the spatial aspects of the individual's be-

havior stems from the absence of methods which can determine the magnitude and the direction of such error. Although most of the stress in geographic investigation is on sampling error, scant attention has been given to response error as well as to nonresponse error. The primary sources of response error are the unwillingness and the inability of the respondents to answer the researcher's questions. More emphasis is needed on response error, especially at a stage where the behavioral aspects of the individual's spatial movement is of growing concern to many geographers.

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