

THE HYPOTHETICAL INFINITE POPULATION IN SAMPLING

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{ Is it possible to obtain an appropriate sample of a finite population by surveying every teacher in a state? No, not if one generalizes to a hypothetical infinite population. Ray Cardozier illuminates a common fallacy.

Graduate students in education, and especially in agricultural education, have long used the total population as their "sample" in survey studies. Typically, a graduate student chooses to study some question with his universe consisting of all teachers of vocational agriculture in a state. Since his universe totals not more than 300, perhaps fewer, he decides to study the total population. He assumes that since inferential statistics are valid only for inferring sample data to the total universe, he is relieved of the task of such computations and interpretations.

Is he? Indeed, is it possible to study a total universe? The definition of a sample and a universe are well known. Thus, all teachers of agriculture in a given state constitute a total universe of that group. But does it — especially if one examines the purpose?

Almost all studies that deal with all teachers in a state are conducted with a view to discovering data about that population which can be used to make decisions about teachers of agriculture in that state in the future. Tacit in this is the assumption that future groups of teachers will be like the present population, or at least they will resemble the present population insofar as the pertinent independent variables are concerned. If this is not so, the data would be invalid for use with future groups and the study unnecessary or even dangerous, lest invalid inferences be made. Hence, we must assume that, at least in one or more respects — that is, the framework within which findings from a present universe will be inferred to future universes — the present total population is a representative sample of future populations. Thus, the present total population is, assumedly, a random sample of a larger, perhaps infinite, universe. If this is so, then one should treat data from the present population like that of any other random sample — using inferential statistics to determine meaning of data.

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This position is by no means new or untried. Many reputable social scientists have long handled their data within this context. Sociologists have tended not to accept this rationale but to insist on purity in sampling — if not perfect randomization, something approaching it. Psychologists, on the other hand, have followed the biological researchers in experimental design and concerned themselves largely with the question of securing matched groups. Little attention is given to the original manner of obtaining the total sample. One might assume that since the object was to infer findings of the experiment, that the total sample was randomly selected from a total population. Not so! The total sample is chosen from the standpoint of obtaining homogeneity.

The reason for purposive selection is usually apparent — it would be virtually impossible to obtain for experimental purposes a completely representative sample of all members of a given group in the world, or in the United States or even in a single state. In addition, if it were possible, there is the matter of the hypothetical infinite population of the future to which findings of current research would be applied.

In both of these cases, the key is to make sure that the findings are applied only to those segments of future populations that resemble the populations which were included in the research. Hence, the psychologist is sound if he carefully points out that the conclusions from his experiment are valid only with populations that are like those involved in his study. Likewise, the survey researcher is at liberty to treat data from his "total population" only if he clearly points out that conclusions apply only to the extent that future populations and circumstances parallel those of his study. The fallacy lies in misuse of findings — applying them to future populations which differ or in which variables that might influence outcomes differ.

Nonetheless, it appears sound to suggest that survey researchers cease treating so-called total populations as such and admit that their studies have value only to the extent that they apply to future groups and hence are, for practical purposes, samples of hypothetical infinite populations.

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RESEARCH
PROJECTS

Among the projects completed in Arizona recently was an Agricultural Experiment Station study conducted by Dr. John R. Williams entitled, Occupations of Former Students of Vocational Agriculture in Arizona...

This research project has been published as Experiment Station Study Number 227. -R.W. Cline