

A BIBLIOGRAPHY ON PROPERTIES OF EXPERIMENT DESIGN, 1950-1967

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Abstract

A number of authors have discussed such properties of experiment design as efficiency, balance, orthogonality, sensitivity, replication, blocking, and randomization. A listing of papers on properties of experiment designs from 1950 through 1967 was prepared and is presented in the present paper.

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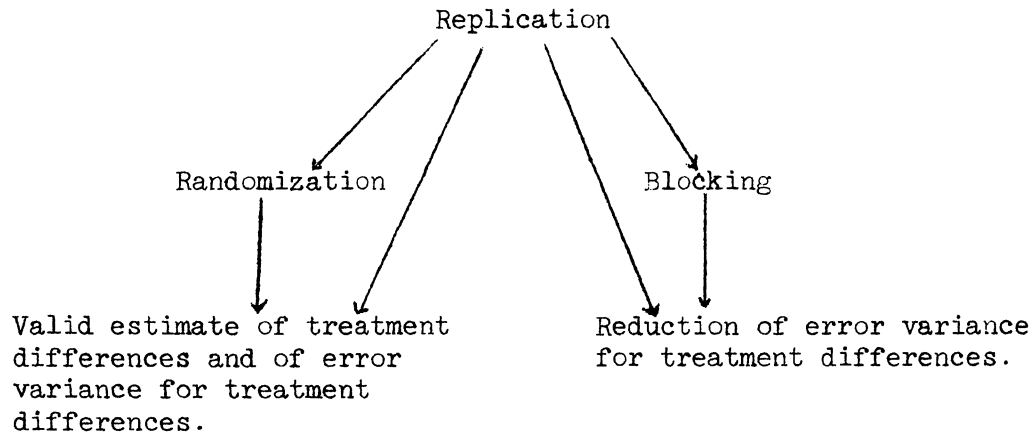
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The author has been concerned with a bibliography on most aspects of the lay-out of, the conduct of, and analysis of data from experiments. At present, a bibliography up to and including papers published in 1967 is being readied for publication. From this bibliography it was desired to obtain a bibliography on the properties of experiment designs where an experiment design is defined to be the arrangement of the selected set of treatments in the experiment; this is the subject of the paper. The selection of treatments for inclusion in an experiment design is denoted as the treatment design. The properties associated with treatment design are not considered herein.

There is a need for rigorously defining properties of experiment and treatment designs. Several formulations of definitions appear to be desirable to cover various situations. For example, one of the most useful would be a combinatorial definition. A second definition often used relates to the relationships of parameters. A third definition could be formulated in terms of the properties of  $N'N$  where  $N$  is the design matrix denoting the occurrence of treatments in blocks (or other stratification categories such as rows and columns). Other forms of defining a property of an experiment design may be useful.

Sir Ronald A. Fisher stated three basic properties of experiment design for comparative experiments and related them pictorially as follows:



Orthogonality, efficiency, and sensitivity are other Fisherian properties of experiment designs. These properties as well as several others are discussed in the papers listed below. Several of the papers deal with empirical results on a property of experiment designs, e.g. efficiency. Other papers treat a property from a theoretical or from a mathematical point of view.

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#### Abbreviations

- AMS = Annals of Mathematical Statistics.
- Bull. ISI = Bulletin de l'Institut Internationale de Statistique.
- JASA = Journal of the American Statistical Association.
- JISA = Journal of the Indian Statistical Association.
- JISAS = Journal of the Indian Society of Agricultural Statistics.
- JRSSA = Journal of the Royal Statistical Society, Series A.
- JRSSB = Journal of the Royal Statistical Society, Series B.