Analysis of Messy Data

VOLUME 2

NONREPLICATED EXPERIMENTS

George A. Milliken/Dallas E. Johnson

It has been estimated that nearly fifty percent of all experiments are of the "nonreplicated" type; that is, experiments in which there are no independent replications of the treatment combinations being studied. Such experiments must be designed efficiently and analyzed correctly, since they are usually expensive to conduct, and proper interpretation of their results is often critical to decision making.

However, many of these experiments are not analyzed in a statistically valid way because researchers are often unaware of the existing methods appropriate for them. *ANALYSIS OF MESSY DATA, Volume 2: Nonreplicated Experiments* has been written to correct this situation. It offers a wealth of statistical methods for analyzing nonreplicated experiments, as well as techniques to make computations feasible using existing statistical software.

This one-of-a-kind book contains considerable information that was until now only available in journal articles. It explains:

- how to recognize whether replications are independent
- how to test for interaction in nonreplicated experiments
- how to obtain reasonable estimates of experimental error variance in nonreplicated experiments
- how to determine whether Tukey's or Mandel's model can be used to model the data collected in an experiment
- when and how to use a multiplicative interaction model
- how to use existing statistical software to fit these models

You'll also learn how to determine which treatment combinations are the primary causes of significant interactions and how to construct and use interaction plots to interpret the data.

There is a broad range of useful information on the application of half-normal plots, 2^n factorial experiments, blocking techniques, fractional replications of factorial experiments, and polynomial models.

The volume shows you how to use quadratic response surface models and contour plots to advantage when developing new products or improving old ones.

The approach used in this second volume is similar to that of the first *ANALYSIS OF MESSY DATA, Volume 1: Designed Experiments*, 1984. Each topic is covered from a practical viewpoint, with emphasis placed on the implementation of methods rather than on theory.

Numerous real-world examples are used to illustrate the methods; unique reference tables are provided; and formulas are included that enable the reader to program the techniques on a personal computer.

ANALYSIS OF MESSY DATA, Volume 2: Nonreplicated Experiments is an indispensable source of design methodology and inter-pretation for all researchers and consulting statisticians who work with experiments that cannot be replicated. It is also an essential reference for library statistics collections, as well as "must" reading for students of advanced statistics.

C6371

ISBN 0-412-06371-9

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CHAPMAN & HALL/CRC

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