Werk

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Book Review

Jones B, Kenward MG: *Design and Analysis of Cross-Over Trials.* Chapman and Hall, London New York 1989, pp ix+340, £27.50

This monograph is concerned with a particular class of statistical experiments which frequently occur in clinical research (but also in other fields of experimental research). The responses of subjects to treatments have been observed over different time periods, where one treatment has been applied to each subject and time period. The experimental situation (or design) can be visualized by a rectangular row-column area, the rows and columns representing the subjects and time periods, respectively, and one treatment is assigned to each plot. The statistical models include treatment (main)effects, subject effects, period effects, and cross-over treatment effects, which are residual effects due to the treatments applied in the preceding time period. Also interaction effects are sometimes included. The main tool is linear model theory, specialized to the present situation, providing estimators for parameters and tests for linear hypotheses. Standard linear models with independent normally distributed errors and constant variances are used, but also mixed effects models (e.g., when the subject effects are considered random), and certain covariance components models, when cross-over effects are modelled by correlations. Questions concerning the design of the experiment are discussed in detail, mainly along the cases of two and three treatments. Special attention is given to the 2×2 case (two treatments and two time periods). Here a chapter dealing with binary or categorial responses is included. Throughout the book many references are given to previous publications, and many different approaches and results are sketched. In this way the reader gets a broad impression of previous and current work on cross-over experiments.

The style of the book is imprinted by the numerous real data examples with extensive discussion. Mostly the theory is presented along the examples and numerical calculations. This may correspond to the authors' intention, that "the book has been written from a practical point of view" and "to make the methods of design and analysis available to the practitioner who does not want to get into the more detailed theory", as mentioned in the preface. This group of readers (and others) will certainly enjoy the illustrative examples. On the other hand the authors do present a great deal of theoretical details, which in my view are difficult to understand without having a stronger theoretical framework.

Augsburg *N. Gaffke*