Altman DG, Machin D, Bryant TN, Gardner MJ eds 2000: Statistics with confidence, 2nd edn. London: BMJ Books. 240 pp + diskette, £19.95 (PB). ISBN 0 7279 1375 1.

This is the second edition of this popular and useful book. It is written to encourage and facilitate the correct use of confidence intervals when reporting results of medical experiments.

The first edition of this book, published in 1988, was based largely on a series of expository articles from the British Medical Journal (BMJ). This second edition reflects more recent developments in statistical methodology for calculating confidence intervals. The book describes methods which can be used to compute confidence intervals on treatment effects. All the common situations in medical statistics are covered, including differences in means, medians, proportions and analyses of time-to-event data.

Clear recommendations are given on suitable methods for computing confidence intervals. Generally, the recommended methods can be implemented with a pocket calculator. However, more computationally demanding methods, including exact and bootstrap confidence intervals are also discussed.

The book contains an interesting discussion on methods for proportions. The recommended method in the second edition uses Wilson scores, which appear to give reasonable coverage in simulation studies even with small samples. The first edition had recommended methods based on mean ± a multiple of the standard error, which are invalid for small samples. Exact methods are described but not recommended as (i) they are over-conservative for small samples and (ii) they are difficult to compute without specialist software. This may, very occasionally give rise to a slight anomaly in which the 95% confidence interval does not include zero, but the hypothesis test is non-significant at the 0.05 level.

Although the methods for computing confidence intervals are generally feasible with a pocket calculator, a Windows computer program, CIA, is supplied with the book which will calculate confidence intervals using the methods in the book. It is notable that some of the methods recommended in this book for calculating confidence intervals are not readily available in SAS and other well-featured statistics packages.

A slight weakness of the book is that although clear algorithms are given to compute confidence intervals, the conceptual and theoretical basis for them is sometimes missing. Mathematically curious readers, like me, have to consult the excellent bibliography to find these details.

Anybody who reports medical statistics or writes papers for medical journals needs to have access to this book. Owners of the first edition will find lots of new material here, better software and confidence interval methods which are valid for small samples which easily justifies the purchase price.

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Chernick MR 1999: Bootstrap methods: a practitioner’s guide. New York: John Wiley. 264 pp, $74.95 (HB). ISBN 0 471 34912 7.

In the last decade there has been a tremendous improvement of bootstrap techniques and their applications in a variety of problems and scientific fields. Books describing solely bootstrap approaches have been published and they are very popular among statisticians, researchers and students. The book of Efron and Tibshirani is still the standard textbook, written in a comprehensive and easy style for all those starting on bootstrap. Davison and Hinkley give a rigorous technical treatment, with a wealth of theoretical results. The book of Chernick succeeds in filling the gap from the angle of a practitioner who is not involved in the mathematics of bootstrap and does not want to know why it works but how it works. The delay in publishing this book (it was scheduled to be published before 1995, but due to the illness of the author we had to wait until 1999) might have helped the material to mature.

Like the book of Efron and Tibshirani, this book is not a textbook, but it can be quite a useful book for postgraduate students, as well as undergraduate students who want to go deep into the topic; in particular, it is an excellent tool for researchers from diverse disciplines. The author clearly states that this is the targeted audience of his book. They will find the extended bibliography very helpful as well as the discussion at the end of each chapter, where some
problems not treated in the book are discussed briefly. This book is not intended for starting the 'bootstrap adventure' but for exploring new dimensions of this adventure.

The book contains a comprehensive historical account starting from the genesis of resampling schemes and the bootstrap appearance in the late 70s through to the achievements in bootstrap methodologies up to recent years when the impact of powerful computer machines have made bootstrap approaches feasible for almost all problems.

Throughout the book the mathematics are kept at a low level and technical treatment is avoided. Each chapter ends with a 'Historical Notes' section, which provides the interested reader with sources of more details about the topics covered. This layout is quite helpful and supports the practical profile of the book. Problems or exercises are not provided. The first chapter, in addition to the history of bootstrap, contains a very brief introduction to the topic as well as some applications. The main idea behind bootstrap is briefly introduced and the wealth of applications of the bootstrap is mentioned. Chapter 2 discusses estimation with emphasis on error rate estimation in discriminant analysis as well as bias estimation. Point estimates of location and dispersion are also discussed. Hypothesis testing and confidence intervals are covered in Chapter 3. Problems occurring in hypothesis testing are also mentioned. Chapters 4 and 5 discuss the application of bootstrap in special topics like regression (in a general setting allowing for the standard linear model as well as non-linear and non-parametric regression) and time series and forecasting. Chapter 6 contains a comparison between various resampling schemes and guidelines for their proper use. Variants of standard bootstrap, like parametric bootstrap, double bootstrap, Bayesian bootstrap, and smoothed bootstrap are described here. Chapter 7 is devoted to computational topics related to the implementation of the bootstrap, including the number of replications needed and variance reduction techniques. Some special topics are treated in Chapter 8 as expositions, such as kriging for spatial data, determination of the number of components in a mixture, missing data, process capability indices, and p-value adjustments. Finally, Chapter 9 illustrates the cases where bootstrap fails.

Perhaps the most important and the most useful part of the book is the bibliography provided (84 pages, almost 1700 references). The majority of them have not been referenced in the book but they have been scrupulously collected by the author and make up the most complete list of bootstrap references that I am aware of. In addition, many of them are from non-statistical journals illustrating a wide range of interdisciplinary applications of bootstrap methodology. These 619 references to applications are indicated adequately in the reference list.

To conclude, this book is helpful for those who want to gain insight into sensible choices when bootstrapping. The plethora of the references can be a guide for existing applications in several distinct topics and disciplines.

Reviewed by Dimitris Karlis, Department of Statistics, Athens University of Economics, Greece.

References

1 Efron B, Tibshirani RJ. An Introduction to the bootstrap, Monographs on Statistics and Applied Probability, No. 57, New York: Chapman & Hall/CRC, 1994.

2 Davison AC, Hinkley DV. Bootstrap methods and their application, Cambridge Series in Statistical and Probabilistic Mathematics, No. 1, Cambridge: Cambridge University Press, 1997.

Hougaard P 2000: Analysis of multivariate survival data. New York: Springer. 542 pp, $84.95 (HB). ISBN 0 387 98873 4.

Methods for the analysis of multivariate failure time data have been accessible to a relatively limited number of statisticians. The book by Hougaard represents the first major attempt at making these techniques more widely accessible. At the beginning of the book, he presents a wide variety of examples of multivariate survival data from the scientific literature. Hougaard also makes the important distinction between the two predominant types of multivariate survival data: parallel data and longitudinal data. Parallel data represent univariate survival data measured on a related set of individuals; such data would occur in twin studies, for example. Longitudinal data, on the other hand, represent multiple events that could potentially happen to one individual. The data examples presented in Chapter 1 are used repeatedly in the later chapters to illustrate applications of several methods.

To learn about techniques used for analysing multivariate survival data, it is very important to understand the methods for univariate failure time data. Hougaard provides a nice review of these methodologies in Chapter 2. I especially enjoyed the discussion on parametric methods, truncation and