reader intends to access the computational tools. This is a simple example of enhancement that certainly would be appreciated by students if available on a dedicated website.

Overall, the book is a valuable addition to the growing introductory educational literature on data analytics methods in finance. It can be utilised as an in-classroom textbook and is highly recommended for this purpose.

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**Observation & Experiment: An Introduction to Causal Inference**
Paul R. Rosenbaum
Harvard University Press, 2017, 374 pages, £25.95, hardcover
ISBN: 978-0-674-97557-6

*Readership*: Graduate students and applied researchers in all fields dealing with observational data as well as randomised designs.

As the author states in his preface, the purpose of 'this book is to present the concepts of causal inference clearly, with reasonable precision, but with a minimum of technical material' (page viii). He fulfils his purpose by having most chapters (or groups of chapters) begin with an introduction to a commonly used research design followed by definitions of statistical terms necessary to analyse data using that design. He then gives a short understandable summary of a fairly simple case study which used that design. He follows up with a discussion of the conditions under which the research design can lead to valid causal inference, even though it is not a completely randomised experiment. Other chapters, also with clear examples, deal with important topics when discussing non-randomised research designs, such as bias, matching and sensitivity.

The style of the book is a bit unusual, but effective. Most of the main text of the book is written without formulas or how to implement them in R. These technical details are, however, given in 59 pages of footnotes at the end of the book, which also contain references for further study.

While the book is a very valuable contribution, I have a few quibbles. At times, the author uses idiosyncratic language. For example, he uses the word 'device' rather 'design' throughout the book and defines an 'instrument' as 'a random push toward receiving one treatment rather than another' (Page 258). Such language can be potentially confusing to readers uninitiated in the terminology of causal inference.

In addition, while implied throughout the book, more emphasis should be given to the necessity for researchers using non-randomised designs to make sure that they, and those reading the results of their research, clearly distinguish between causal and correlational results.

Further, since the book uses fairly simple examples, the reader may miss some of the big and important ideas related to certain topics. For example, in the chapter 'Between Observational Studies and Experiments', the author introduces the topic of Simpson's Paradox with an example that only records the group (treatment versus control), gender and a nominal outcome (alive versus dead). A more detailed example with three or more independent variables, such as the one given in Bickel, Hammel, & O'Connell (1975) (which the author mentions in a footnote) or the one in Novick (1982) would have helped the reader understand this concept much better.

The book is accessible to undergraduates and master's degree students who have completed three or more statistics courses. It is highly recommended for advanced master's degree statistics students and teachers of secondary school statistics and should be required reading for doctoral students in any area of theoretical or applied statistics.

## References

Bickel, P. J., Hammel, E. A. & O'Connell, J. W. (1975). Sex bias in graduate admissions: Data from Berkeley. *Science*, **187**, 398–404.

Novick, M. R. (1982). Educational testing: Inferences in relevant subpopulations. *Educational Researcher*, **11**, 4–10.

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## Errors, Blunders, and Lies: How to Tell the Difference

David S. Salsburg
ASA-CRC Series on Statistical Reasoning in Science and Society. Chapman & Hall/CRC, 2017, 154 pages, £77.00, hardcover
ISBN: 978-1-138-72698-7

*Readership:* General public interested in science and statistics with basic understanding of high school level algebra.

Many people may consider statistics as complicated. Even if it may be true, it should be possible to explain many of the ideas in a way that is easily understood. That is what David Salsburg aims to do in this book. The title of the book somehow reminds one of the old and annoying saying about lies, bigger lies, statistics, but fortunately this book offers something totally different.

In Chapter 1, Salsburg tells an interesting history related to determining the distance from the Earth to the Sun. In that story, there is random errors in measurement (it was difficult to make exact observations) blunders that were not inherent in the act of measuring (the measurers did not know that they had determined their geographical position erroneously) and lies that were due to fraud in claimed scientific activity (one of the measurers had been caught lying before). These three issues (errors, blunders and lies) will each then form a section in the book. There is also a summary at the end of each chapter that repeats the key points presented in a comprehensive way.

The errors section (Chapters 2–8) is actually an introduction to statistical modelling. Salsburg deals with probability and likelihood, measurement, multilinear models, correlation and causation, and big data. Everything is written very clearly incorporating interesting (historical) stories in appropriate places. Even though a few details feel like a slight oversimplification from a statistician's point of view, the decision to keep things straightforward is certainly justified and results in an excellent overview of the complex techniques and ideas.

The section considering blunders (Chapters 9–12) contains discussion about contaminated distributions and robustness where blunders are a nuisance and cases in which blunders may