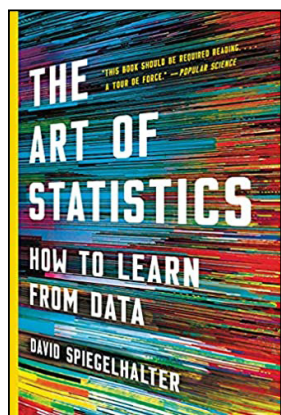# Book Reviews

David Spiegelhalter. *The Art of Statistics: Learning from Data.* London, UK: Pelican, 2019. 426p. Paper, $16.99 (ISBN 978-1-5416-7570-4).

We are presented with statistical claims in the news, on social media, and in the workplace. How can we determine if these claims are trustworthy? University of Cambridge professor David Spiegelhalter describes how real-life problems are solved with statistical analysis as a way of introducing concepts necessary for data literacy. He defines data literacy as "the ability to not only carry out statistical analysis on real-world problems, but also to understand and critique any conclusions drawn by others on the basis of statistics." This book will help readers acquire these abilities.

In addition to the statistical concepts discussed, Professor Spiegelhalter presents 10 questions for readers to ask themselves when faced with a statistical claim. For example, "What is the statistical uncertainty/confidence in the findings?" Readers are advised to consider margins of error, statistical significance, sample size, and bias. He also applies a practical framework to approach problems that readers can use. Problems discussed in the book are approached through the PPDAC cycle, which stands for explaining the Problem, creating a data collection Plan, collecting the Data, performing the Analysis of results, and interpreting the results to form a Conclusion that is communicated to interested parties. The first half of the book covers summarizing and communicating data effectively with tables and graphs, the process of inductive inference (in other words, going from examining collected data to making observations that are generalized to the population), the challenges in determining causation, employing regression to investigate relationships, and the use of algorithms for making predictions. The second half explains margins of error, probability, hypothesis testing, and the Bayesian approach to statistical analysis. The final chapters focus on stories of incorrect statistical analysis and suggestions for how we can improve. The author concludes by summarizing the main issues dealt with in the book, including the following points: statistical analyses should answer specific questions; variability exists in any data collected; researchers should understand why they are employing specific formulas and procedures to analyze the data; the communication of results should be as simple as possible; margins of error should be presented to readers; and statistical analysis should be reported clearly, and in enough detail, to make it reproducible.

This book is written for both students and consumers of statistics. The clarity of the author's explanations makes the subject accessible to a general audience. Professor Spiegelhalter also demonstrates how to communicate concepts that are often reported incorrectly, such as a 95 percent confidence interval. The different problems discussed with their accompanying tables and/or graphs provide a rich source of examples to help librarians in their work, whether it is to help them design a study, analyze a data set, communicate results, or teach students how to read the scientific literature.—*Giovanna Badia, McGill University*