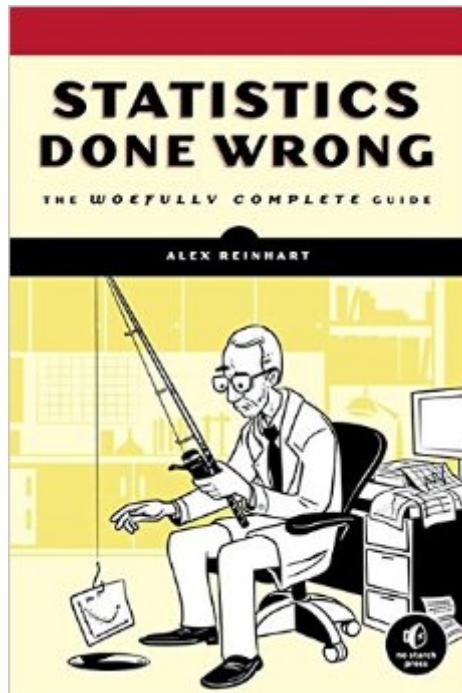# Statistics Done Wrong: The Woefully Complete Guide

Synopsis

Scientific progress depends on good research, and good research needs good statistics. But statistical analysis is tricky to get right, even for the best and brightest of us. You'd be surprised how many scientists are doing it wrong.Statistics Done Wrong is a pithy, essential guide to statistical blunders in modern science that will show you how to keep your research blunder-free. You'll examine embarrassing errors and omissions in recent research, learn about the misconceptions and scientific politics that allow these mistakes to happen, and begin your quest to reform the way you and your peers do statistics.You'll find advice on:Asking the right question, designing the right experiment, choosing the right statistical analysis, and sticking to the planHow to think about p values, significance, insignificance, confidence intervals, and regressionChoosing the right sample size and avoiding false positivesReporting your analysis and publishing your data and source codeProcedures to follow, precautions to take, and analytical software that can helpScientists: Read this concise, powerful guide to help you produce statistically sound research. Statisticians: Give this book to everyone you know.The first step toward statistics done right is Statistics Done Wrong.

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Customer Reviews

Let me front-load the criticism. I wish an experienced statistics instructor had reviewed the manuscript. The book does better in its second half, where it discusses what I would call problems with empirical-research culture, than in its first half, which has more textbook statistics. The author neglects to explain the basics - things like "sample", "statistic", "sampling distribution", "conditional

probability" - and often confuses matters by bringing in issue Y when setting out to discuss issue X. (Appropriately, a section named "Confounding Confounders" is itself confounded: we start talking about "coarsening" data (not what I expected based on the title, by the way; a Y-for-X switch already took place), then get into something else. I will single out the introduction to the "base-rate fallacy" as another weak spot). A choice to be non-technical means that solutions to some problems cannot be effectively presented - although sometimes they are suggested after all. The "woefully complete" part of the title is, I take it, tongue-in-cheek, so no quibbles there.A few "similar" books come to mind, including (a) the drier "Common errors in statistics" by Phillip Good, (b) the three terrific popular books by Ben Goldacre - "Bad science", "Bad pharma" and "I think you'll find it's a bit more complicated than that" - and (c) the elegant "Understanding the new statistics" by Geoff Cumming. (I have not seen "How to lie with statistics" by Huff and Geis). Reinhart's book is more "big-picture" than Good's, and broader than Goldacre's or Cumming's.

The author was an Undergraduate Physics major at the University of Texas, and subsequently became a Statistics Ph.D. student and Instructor at CMU after being surprised by the lack of Statistics knowledge and use of best practices by working scientists. I am a Computer Engineer and MBA with one basic course in Statistics acquired during my stay at the Wharton School 30 some years ago, and seeking a greater knowledge of Statistical Principles for work in Human Computer Interaction and Data Science in my present endeavors. I like the author am distressed by the lack of guidance received by professionals and working scientists in properly applying statistical methods to deciding the conclusions to be drawn from a research investigation. Mr. Reinhart properly points out that most individuals who have been exposed to statistics at all lack a fundamental understanding of such basic concepts as the P-Value--("the probability, under the assumption that there is ...no true difference, of collecting data that shows a difference equal to" or greater than that which you actually observed). The author emphasizes the importance of Statistical Power, the probability that a study "will distinguish an effect of a certain size from pure luck".Many Statistical and Logical Reasoning problems are shown by the author and papers he cites to exist in the work of Scientists, Medical Professionals and Psychologists. He presents an excellent set of recommendations of educational systems and for best practices in research in the last chapter entitled: "What Can Be Done". I highly recommend this humorous and thoroughly researched guide to anyone who must evaluate Business, Scientific or Professional Conclusions based upon Statistics.

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