

Choosing and Using Statistics: A Biologist's Guide, 2nd edition

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Compressing data generally results in lost information but makes the remainder easier to comprehend. It is a common issue in statistical analysis, and it applies equally to statistics textbooks. This relatively slim volume provides practical instructions for selecting statistical tests and carrying them out using any of three different computer packages: SPSS, MINITAB, and Excel. For the more complex tests, there is no option in Excel, and sometimes not in MINITAB. Even in SPSS, some tests need special tricks or partial computation by hand. There are four sets of information for each test, and any one reader will generally use only two, or around 120 pages in all.

To describe two dozen tests and a dozen or so variants in a hundred-odd pages, the author presents only the most critical information for each: how to choose the test, how to input data, which menu options to click in the program, and which outputs mean what. This is effective, but it leaves a lot unanswered. Undergraduate biology students will no doubt be delighted, but research scientists and postgraduates will still need access to more comprehensive statistics texts and the SPSS or MINITAB manuals. It is not very helpful to be told, for example (p. 169), 'ignore the other lines in this table'.

The philosophy of this text is set out in the preface (p. x): '. . . most students do not really care how or why the test works', but only that 'they are using an appropriate test and interpreting the results properly. This is a fair aim'. As the book is in its second edition, the first edition presumably was well received.

There are the usual exhortations to consider statistical tests before collecting data. Well of course – but the story does not always pan out how you expected. This author suggests you make up dummy data to check which tests will work. Indeed, he implores you (p. 1) in Item 4 of his 8-point program. Point 1, incidentally is 'decide what you are interested in' – another valuable reminder.

‘This is not a book to read cover to cover’, says the author (p. xii) – but I did so anyway. I tested the key to statistical procedures (pp. 8–21) using some tricky issues raised recently by my postgraduates. It’s a useful start, but it could be risky to depend on it too heavily. I checked some of the SPSS instructions, which seemed accurate. I tried out the glossary on various biologists. Winsorize? Schierer-Ray-Hare test? ‘Ignore him’ they said to each other. I asked our statistics lecturer for an opinion. He was not entirely impressed.

There are nine chapters, plus a glossary, a list of assumptions, a list of symbols, and a useful collection of ‘hints and tips’. The first six chapters are short, and cover sampling, distributions and descriptive statistics. The three main chapters are headed ‘tests to look at the differences’, ‘tests to look at relationships’ and ‘tests for data exploration’ respectively. Some individual tests thus appear more than once.

The focus is on data which can be expressed either as frequencies or real numbers. Few options are suggested for multivariate, categorical or ordinal data. There is also a confusing peculiarity in the layout: the subheadings in the text itself are smaller than the headers for sample output tables, so it can be hard to see where new sections start.

Overall, *Choosing and Using Statistics* is good as far as it goes. It is certainly worth considering as a first year statistics textbook in biology degree courses. But as the author says himself (p. xi) – ‘don’t throw away your copies of Zar, Sokal and Rohlf, or equivalent’. Or, I would add, your SPSS manual.