1991

Book Review: Modern Elementary Probability and Statistics

Douglas H. Johnson
U.S. Fish and Wildlife Service

Modern Elementary Probability and Statistics, by Edward J. Dudewicz, Pinyuen Chen, and Baldeo K. Taneja, Columbus, OH: American Sciences Press, 1989, ix + 372 pp., $34.50 (paperback).

This is an introductory textbook, "developed for, and class-tested in," first courses in elementary probability and/or statistics. The only prerequisite is high-school algebra. It has some nice features, but shortcomings in both substance and style detract from its value.

The book consists of three parts. Part I develops the basic probability rules and describes some distributions. Part II briefly overviews major statistical practices, such as point and interval estimation, hypothesis testing, and the like. Some topics are touched on only lightly—for example, nine pages for analysis of variance and design, four pages for statistical selection and decision. Worse, little help is given readers who want further references to the material. Part III includes chapters on statistical programming in SAS, Minitab, and BMDP, as well as basic statistical tables. Material on the statistical packages is sometimes presented in too trivial detail, such as "Never put a period after END" in the discussion of BMDP. Moreover, it advises BMDP users to run programs with one error at a time to find out what kind of message gets spewed out. Is that state-of-the-art error detection? There are also hints in Part III on succeeding in elementary probability and statistics that are appropriate for college work in general. The "Selected Answers to Problems" section makes one wonder about the answers that were not selected.

Some matters of substance that troubled me include the use of grouped data to estimate variance, without mention of the bias associated with that procedure and the need for Sheppard's correction (p. 14). Most striking is the statement on page 15 that the central limit theorem applies to *observations*, not just means: "about 95% of the observations are between $\bar{x} - 2s$ and $\bar{x} + 2s$," which "can be shown mathematically if n is large." On page 183, the authors conclude that a tested difference is real, ignoring the possibility that a Type I error might have occurred. Residuals are defined as $\hat{Y} - Y$, the negative of their customary definition, which could cause some confusion.

There are some favorable aspects to the material and its presentation. The authors introduce percentile curves early, on page 17, and make effective use of them as descriptive and comparative tools. The book also advocates the use of the Hsu solution (Scheffé 1970) to the Behrens–Fisher problem of comparing two independent means. As a table is introduced in the text, the relevant portion is shown and annotated so that readers can readily see how to use the table.

The best feature of the book is its choice of examples, which are excellent and should appeal especially to college students. Probability is described not solely in terms of coin tossing, die throwing, and drawing balls from urns but in terms of blood alcohol levels, overbooking on airlines, and rates of indecent-exposure cases. Many examples are drawn from the front page—circumstantial evidence used in an assault trial, why predictions from polls may be wrong, and employment discrimination.

The worst features of the book involve style. It appears to have been printed photographically from typewritten text. A desktop publisher would have been far preferable (and a spell checker could have been used to advantage). About half of the material is double-spaced, and the rest single-spaced, giving an uneven appearance. The double spacing wastes much of the page, which is particularly annoying because the (photographically reduced) print is small. Had the text been printed, the material would be much more readable. Often words or phases have been physically replaced—literally cut and pasted—leaving inappropriate gaps between words (or sometimes no spacing at all), a mixture of fonts, or jagged lines of type. Underlining sometimes is continuous,

sometimes is intermittent, and sometimes (with subscripted material) resembles a step function. The paper is a bit thin, allowing print on one side to interfere with reading the other side. Page numbers are buried between two lines of dashes and on the inside of a page, making them difficult to find quickly. The authors use "data" as a singular noun, a usage favored by some computer types and other untrustworthy guardians of the English language, but one I think we should resist.

With some revision, and true printing, this book could have considerable appeal to students learning introductory probability and statistics.

Douglas H. Johnson
U.S. Fish and Wildlife Service

REFERENCE

Scheffé, H. (1970), "Practical Solutions of the Behrens-Fisher Problem," *Journal of the American Statistical Association*, 65, 1501–1508.