



Modern Elementary Statistics. by John E. Freund

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Modern Elementary Statistics. *John E. Freund.* New York: Prentice-Hall, Inc., 1952. Pp. x, 418. \$5.50.

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ATTEMPTS to shift the emphasis in introductory statistics courses from descriptive to inductive statistics have suffered from the absence of suitable textbooks and from the poor preparation in mathematics of most college students. The book reviewed here frankly emphasizes inductive statistics and, according to the preface and the publisher's advertisements, requires only a minimum amount of mathematics. On this basis alone, the book deserves the close attention of those concerned with the introductory statistics course.

The author states that "The order and the emphasis of the material covered follows the modern trend in the teaching of statistics—to include *informally* topics that in the past have often been taught only on an advanced level." At other points, he emphasizes that the meanings of statistical ideas are of greater importance than the formulas.

Despite certain criticisms to be made later, the reviewer's over-all impression is that the book will perform a valuable service in a general introductory course. The concept of a sampling distribution is very well developed and is emphasized whenever a statistic is introduced. Undoubtedly, the student who reads this book carefully will absorb what many believe to be the single most important idea in a beginning course, namely that of variability in the possible outcomes of a sample. The discussion of confidence intervals and their interpretation is also very good, and is strengthened by the construction of intervals for a non-normal distribution. The informal manner of presentation employed and the general tone of the book are consistent with what appears to be a current trend toward the humanizing of statistical ideas, comparable to the current humanism in the natural sciences.

The adoption of an informal manner of presentation, which is virtually a necessity in the introductory course, places upon the author the responsibility of providing enough exposition to insure that the meanings are clear. One of the weaknesses of the book lies in the fact that too often the meaning is subordinate to the formula, too often the elements of the formula are not justified heuristically or intuitively. A few examples will illustrate this criticism.

In the section entitled "Some Rules of Probability," the notions of conditional and joint probability are presented without benefit of any graphical or tabular aids, such as the two-way frequency table, found in the books by Wilks and Duncan. Again, in the discussion of confidence intervals for population means, using small samples, the factor $\sqrt{n-1}$ appears without any mention of degrees of freedom. In fact, the concept of degrees of freedom is not mentioned at any of the three places at which reference is made to the "*t*" distribution. In yet another instance, the χ^2 distribution is discussed in three different applications: first, as employed in the construction of confidence intervals for the population standard deviation; second, as a test for

association in contingency tables; and, third, as a test of goodness-of-fit. In the first application, the notion of degrees of freedom is not mentioned, while in the other two it is. There is no connection made between the two formulas given for χ^2 , and no heuristic justification given either for squaring the difference between observed and expected frequencies or for dividing the square by the expected frequency.

The other general criticism which can be made of the book concerns the omission of some ideas of modern statistics which are important and basic enough to be considered in an introductory course. In the discussion of hypothesis testing the reader is advised to avoid the type II error (accepting the null hypothesis when it is false) by never accepting the null hypothesis at all. By this approach, the author precludes any possible discussion of the theory of statistical decision,⁵ certainly as important a topic in the introductory course as the use of runs in testing for randomness. (The latter gets eleven pages of text and two pages of tables.) The omission is especially disturbing because in each of the two examples used, the decision to reserve judgment on the null hypothesis is also a decision whose consequences should be considered. With the type II error eliminated from consideration, the selection of the level of significance (only two-sided tests are considered) is made by following "the customary rule" of .05. This advice is not at all different in spirit from the 3σ rule found in older textbooks.

Another major omission, in the reviewer's judgment, is the complete absence from the sections on correlation and regression of the concept of a "model" or of any indication of the importance of *a priori* considerations in scientific investigations. According to the text, the treatment accorded the data (linear or curvilinear fit) is determined by inspection of the data itself, and since curvilinear fitting is taken as being outside the scope of the book, there is no need to discuss criteria for choosing between linear and curvilinear regressions. In the discussion of the standard error of estimate (in which no mention is made of degrees of freedom), it is incidentally revealed that X and Y are assumed to be normally distributed [a bivariate normal distribution?]. As usual, no mention is made of the fact that the prediction of Y on the basis of a given X is actually that of the average Y corresponding to the given value of X .

A final comment, lest these criticisms lead the reader to overlook or discount the comments made in the third paragraph: The reviewer has adopted the book for a general introductory course.

Elementary Statistics. Revised. *Morris Myers Blair* (Professor of Economics, University of Tulsa). New York: Henry Holt & Co., 1952. Pp. xiv, 735, \$5.50.

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WHILE reading the first chapter of this book, my pulse quickened in anticipation of a "new" book in the field of elementary statistics. The author states: "Because life is so short that we cannot know all about any-