PSYCHOMETRIKA—VOL. 43, NO. 3.
SEPTEMBER, 1978
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Robert J. Sternberg. *Writing the Psychology Paper.* Woodbury, N.Y.: Barron's Educational Series, Inc., 1977, Pp. x + 243. $2.95.

When this delightful, short book arrived for review, I judged (by its cover) that it was unsuited to *Psychometrika*, so instead of sending it along to the review editor, I took it home. I picked it up that evening and couldn't put it down. It is a concise, cogent collection of suggestions for preparing psychology papers. Although aimed at the advanced undergraduate or beginning graduate student audience, it is nevertheless appropriate to anyone writing a paper for a journal.

Sternberg organizes his discussion of writing around 8 misconceptions about psychology papers, 25 rules for writing a paper, and 8 standards for evaluating papers. As examples, Misconception #4 is, *"The main purpose of a psychology paper is the presentation of facts, . . ."*. Rule #12 is, *"Prefer simpler to more complicated sentences."* Standard #4 is, *"The interpretation of results is umambiguous."* Some of his rules, standards, and misconceptions could be debated, but they are all very relevant. The book includes a fine chapter on word usage, reminiscent of Strunk and White [1959], but specifically focused on psychology. A brief resumé of the APA style manual is also provided, along with an annotated list of all the major journals in psychology.

Sternberg can't quite decide whether he is advising undergraduates doing term papers, or graduate students writing papers for publication. The book starts with a focus on term papers, but quickly veers toward publication. Of course most of the advice is relevant to both, but term papers may need more detail, and a more detached attitude than prospective publications. Sternberg advocates the soft-sell approach to writing. The author's task, he claims, is to persuade the readers that the author's view is valid, and is supported by the data. Competing viewpoints, or theories, should be acknowledged, and their shortcomings stated softly, but should never be belittled, in case the reader espouses one of these competing viewpoints. This is probably better advice for professionals than for undergraduates.

Anyone who pays attention to the suggestions in this book will be a better writer for it. Poor writers or poor students may not learn much from such a book for they may not take writing seriously. But the average professional writer, a class that includes most persons who submit articles to psychology journals, will certainly get a great deal from it. Even top-notch authors will pick up pointers from Sternberg.

The book is appropriately written for the intended audience and some of the material is therefore well-known to professionals. There is a chapter on how to prepare a library review paper, and another on how to design, execute, and write up an experiment. But it is a handy book to give to students who need help and it is handy to have nearby when you are writing. It is also fun to read. Sternberg writes well, and follows his own dicta. I recommend that you buy it and place it alongside your copy of Strunk and White [1959].

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## REFERENCE

Strunk, W. J. & White, E. G. *The elements of style.* New York: MacMillan, 1959.

James V. Beck and Kenneth J. Arnold. *Parameter Estimation in Engineering and Science.* New York, N.Y.: John Wiley and Sons, Inc., 1977. xix + 501. $24.95

Most, if not all psychometric model constructions involve parameter estimation, and there are various considerations which enter into this process.

Observed data are typically not error free. The role of data analysis is to separate systematic components of variation in data from random components. Systematic components are identified with representation models of data, and random components with error models. Representation models should presumably capture empirically meaningful structures in data, while error models should reflect essential characteristics of data generating processes. Parameter estimation procedures are constructed based on some plausible statistical assumptions about the nature of errors. Preferably those statistical assumptions are also mathematically tractable enough to permit various statistical inferences about the estimated parameters and models. These include provisions of information concerning the statistical behavior of estimates, and availability of criteria for its optimal control as well as of those for (optimal) model discrimination.

For students and for those of us whose major research concern is the development of psychometric models,

Beck and Arnold's *Parameter Estimation in Engineering and Science* is a very welcome volume. It deals with virtually all important aspects of parameter estimation. Although the book is primarily intended as a textbook, my general impression is that it should well serve as a handy reference manual for engineers, applied statisticians, data analysts, and many other researchers in various substantive areas of empirical science who out of necessity have to deal with parameter estimation problems. Descriptions of various estimation methods are lucid enough to overcome the tediousness of the illustrative examples, which are taken from heat transfer experiments. On the whole the book is highly readable, though there are several figures without adequate explanation. (For example, I have found Figs. 7.3 and 7.4 most difficult to understand.)

As the authors themselves note, the book can be used as a textbook for at least two different levels. A course at an introductory level may focus on the first five chapters, which provide the basic preliminaries of the parameter estimation problems (including the required statistical background), followed by the exposition of the simplest type of parameter estimation (i.e., linear estimation) at an elementary level. A more advanced course may consist of the first chapter (survey of parameter estimation) and the last three chapters (linear estimation in matrix notation, nonlinear estimation and design of optimal experiments). Of course, one full year course can be taught to cover the whole book.

One of the unique features of the book is its explicit treatment of statistical assumptions underlying various methods (criteria) of estimation. Eight standard assumptions are identified regarding errors: additive errors, zero mean errors, constant error variance, uncorrelated errors, normal errors, known statistical parameters, non-stochastic independent variables, and no prior information as to model parameters. Depending on which assumptions are tenable, different estimation methods must be employed. The explicit statements of assumptions under which particular estimation methods are most effective serve as general guidelines for the appropriate choice of methods in particular situations.

From the perspective of my own research, the exposition of nonlinear estimation (Chapter 7) with particular reference to the MAP (Maximum A Posteriori) estimation and the sequential estimation were most stimulating. I could not help constantly relating their potential implications to my own research. The treatment of the MAP estimation as the minimization of a sum of square function with the modified or unmodified Gauss Newton method for optimization will undoubtedly be useful in many ways. The sequential estimation method with optimality considerations on the design of experiments will be very useful in certain interactive types of scaling methods.

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