

S. Porges, et al., on using time-series analyses to investigate respiratory sinus carrythmia and methylphenidate has revealed some intriguing relationships between respiration and cardiac activity using cross-spectrum analyses (*Unpublished manuscript*, 1980, Department of Psychology, University of Illinois; and in *Child Development*, 46, 1975, 727-733). G.C. Galbraith ("Cross-spectral coherence analysis of central nervous system coupling patterns," *Proceedings of the Symposium on Biomedical Engineering*, 1, 1966, 341-344) has contributed very basic information that can be used by biologists, psychologists, internists, as well as chemists.

The above articles serve as a much better introduction to the time and frequency domains than the Bloomfield book. As I point out in a different review, the tables have been turned on psychologists in one of their speciality areas: the chemists have taken factor analysis and greatly improved upon the technique. We need these type of interactions between disciplines of study.

Introduction to Bivariate and Multivariate Analysis

R.H. Lindeman, P.F. Merenda, and R.Z. Gold

Glenview, IL: Scott, Foresman and Company, 1980. 444 pp., \$15.95

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Multivariate analyses have become the rising star in psychological and sociological research. Multivariate courses are now being required as part of graduate training. Computer programs, simple and complex, have been developed specifically to meet, or perhaps encourage, the increased use of multivariate analyses.

The major drawbacks in the use of multivariate statistics have been twofold: (1) the need for a text that is more advanced in depth and breadth of coverage than some quik-texts (e.g., M. Tatsuoka, I.P.A.T., *Selected Topics in Advanced Statistics*, 1970; and *Data Analysis Strategies and Designs for Substance Abuse Research*, 1976, National Institute of Drug Abuse, Research Issues #13), yet, at the same time, introducing the basis of theory and application in a more readable and understandable format than the classics (e.g., Finn, *Multivariate Statistics*, 1971); and (2) the conceptual problem of understanding the

solutions to "designs" that have X-factors with partial repeated measures.

Lindeman, et al., do an excellent job of fulfilling the need for a good intermediate text. The text progresses rapidly with solid examples that can be worked by hand, or a programmable calculator, using simple matrix notation. An appendix is provided that gives a brief but sufficient explanation of the matrix operations needed. The text further develops the matrix solutions so that one feels quite comfortable with the notation and, more importantly, the proofs and examples.

The second criteria presented above concerns how to formulate a problem. The tendency to try and obtain signals that are important from a plethora of partially correlated, possibly linear data, with little experimental or theoretical guidance has ruined the hopes of many anglers, especially if they try to fish in waters where others have found "significant" relationships between and among the different fish. Please note that the red herring appears in univariate statistics as well. Trying to interpret four or five way interactions usually ends up being treated as error terms to account for that extra variance.

The Lindeman book was the subject of discussion prior the the Sixth Annual Maine Biomedical Symposium and was to have been one of the books selected for a discussion session on multivariate text books. Due to time limitations, the book was discussed almost everywhere but at the Symposium. It is the general consensus of those who have read the book that it would be an excellent text for graduate courses or for self-study—the latter can not be easily said of other multivariate texts. I recommend the book without reservation.