PROGRAM ABSTRACTS/ALGORITHMS

BASIC programs for two-way through four-way mixed-design ANOVAs

JAMES G. CORRIGAN

*E. R. Johnstone Training and Research Center
Bordentown, New Jersey 08505*

PHYLLIS J. BONELLI

University of Delaware, Newark, Delaware 19711

and

SUZANNE V. BORYS

*E. R. Johnstone Training and Research Center
Bordentown, New Jersey 08505*

The BASIC mixed-design programs described here were to complement a previously published set of ANOVA programs for small systems (Corrigan, Bonelli, & Borys, 1980). The previously published small-system packages that included mixed-design ANOVA programs in BASIC (e.g., Gilbert, 1979) have an upper limit of three independent variables. The present set of programs permits analysis of mixed designs with all possible combinations of between- and within-subjects variables in designs with two through four factors. Means and standard deviations are also calculated for each treatment combination.

The computational approach of Keppel (1973) is used, and equal sample sizes and the fixed-effects model are assumed throughout. Although the primary emphasis here is on interactive versions of the programs, documentation describing procedures for easy conversion from INPUT to READ-DATA statements is available. The programs are designed for small systems and as such have been dimensioned so as to require a maximum of approximately 16K bytes of memory.

Input. All of the programs begin by interrogating the user about the number of levels of each independent variable (e.g., "HOW MANY LEVELS OF A?" and "HOW MANY LEVELS OF B?"). The number of subjects per treatment is also requested (e.g., "HOW MANY SUBJECTS PER AB TREATMENT COMBINATION?"). Next, raw data entries are cued by presentation of appropriate prompts (e.g., "ENTER SCORE FOR SUBJECT 1 IN TREATMENT A1B1"). After all of the scores for a particular subject have been entered, they are

displayed on the CRT for verification. At this point, the user has the opportunity to correct any erroneous entries before starting data entry for the next subject.

Output. Results of the computations are displayed via a line printer. Subscripted letters label the different treatments (e.g., $A_1 B_1$). Printouts include labeled means and standard deviations for each treatment combination and an analysis of variance summary table. The sources of variance labels are similar to those used by Keppel (1973).

Limitations. The number of levels permitted for each independent variable is restricted by array dimensions, which in turn are limited by the free space available for array variables. Array dimensions are flexible, in that they can be modified to meet the requirements of a particular experimental design or the capacity of a particular system. Simple dimension-modification procedures are included in the documentation.

The programs permit analysis of data from large numbers of subjects, since there is no simple fixed limit on the total number of subjects (N) determined by a particular array dimension. For the interactive (INPUT statement) versions of the programs, the number of subjects allowed is restricted only by the capacity of the system to represent large numbers such as the sum of squares. The number of subjects permitted when using the READ-DATA statement versions is further limited by the amount of memory required for DATA statements.

Language and Computer. The programs are written in BASIC and were developed on a WANG system 2200-B with 32K of memory. Commands peculiar to this form of BASIC include SELECT PRINT and PRINT HEX.

Availability. Photocopying and mailing costs for listings and supporting documentation may be obtained from James G. Corrigan, Research Department, E. R. Johnstone Training and Research Center, Bordentown, New Jersey 08505.

REFERENCES

- CORRIGAN, J. G., BONELLI, P. J., & BORYS, S. V. BASIC programs for one-way through four-way between-subjects and within-subjects ANOVAs. *Behavior Research Methods & Instrumentation*, 1980, 12, 468.
- GILBERT, L. H. PSYCHOSTATS: BASIC programs for data analysis in psychology. *Behavior Research Methods & Instrumentation*, 1979, 11, 464.
- KEPPEL, G. *Design and analysis: A researcher's handbook*. Englewood Cliffs, N.J.: Prentice-Hall, 1973.

(Accepted for publication August 25, 1980.)

Development of these programs was supported in part by National Institute of Child Health and Human Development Research Grant HD 07329.