PROGRAM ABSTRACTS/ALGORITHMS

Orthogonal comparisons

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The present program is used to determine orthogonal comparisons, which are used in an a priori statistical approach to multiple comparisons (e.g., Guilford & Fruchter, 1978, pp. 236-239; Kirk, 1982, pp. 92-101). The program starts by presenting the following main menu options: (A) Display tutorial on orthogonal comparisons. (B) Display all possible comparisons (all comparisons are not orthogonal). (C) Enter a comparison and display all sets of orthogonal comparisons involving the comparison. (D) Enter two or more comparisons and determine if the comparisons are orthogonal. Display all complete sets of orthogonal comparisons involving these comparisons. If option A is chosen, the user is provided with the option of sending the tutorial to the monitor screen or sending the tutorial to the printer. The tutorial has sections on designating a comparison, reasons for using orthogonal comparisons, calculating t ratios for orthogonal comparisons, and describing what the program does.

Input and Output. When the user chooses option B, the program requests the number of groups in the experiment. If the user enters 4, the computer displays coefficients for the 25 possible comparisons. The user is provided with the option of displaying the coefficients on the monitor screen or printing the coefficients.

If the user selects option C, the program requests the coefficients for a comparison. Then the program generates all sets of $k-1$ orthogonal comparisons involving this comparison. The user is provided with the option of printing the sets of orthogonal comparisons or showing the comparisons on the monitor screen. The coefficients for the comparison that is entered are selected from a menu. This ensures that appropriate coefficients are entered. Af-

ter a coefficient is entered, coefficients that are no longer possible are removed from the menu.

Selecting option D allows the user to enter up to $k-1$ comparisons. A given comparison is not accepted if it is not orthogonal to the preceding comparisons that were entered. The user can stop entering comparisons after any comparison is entered. The computer then prints or displays all complete sets of orthogonal comparisons involving the orthogonal comparisons that were entered.

Limitations. The program determines orthogonal comparisons for experiments that have three to seven groups. A seven-group experiment has 901 comparisons that can be involved in sets of orthogonal comparisons. The program takes a longer time to run as number of groups increase and as number of comparisons entered by the user decrease. If the user enters one comparison for a six- or seven-group experiment, the slow computer output should be directed to the printer.

A system with one disk drive and 128K of memory is required. Once BASIC is loaded, the interpreter version of the program is loaded by entering LOAD "ORTHO-GON" <RETURN>. Then the user enters RUN <RETURN> to start the program. The interpreter version of the program can be modified by the user. The compiler version of the program is loaded by entering ORTHOGON <RETURN> next to the A prompt that is provided by the disk operating system. This version of the program is in compiled BASIC and runs more than twice as fast as the interpreter version of the program. However, the compiled version of the program cannot be modified by the user.

Availability. The program is written in the Microsoft version of BASIC that is used with IBM-compatible microcomputers and can easily be adapted to other versions of BASIC. A free printed listing of the seven subprograms is available from the first author for \$1. The program is available on disk in an interpreted or a compiled version of BASIC. The programs will be supplied free of charge if disk(s) are supplied.

REFERENCES

- GUILFORD, J. P., & FRUCHTER, B. (1978). *Fundamental statistics in psychology and education* (6th ed.). New York: McGraw-Hill.
KIRK, R. E. (1982). *Experimental design: Procedures for the behavioral sciences* (2nd ed.). Belmont, CA: Brooks/Cole.

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