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A BASIC PROGRAM FOR COMPUTING THE KRUSKAL-WALLIS H

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A computer program is described and presented which computes the Kruskal-Wallis H statistic. This program was written in BASIC for the Commodore 64/128 and IBM-PC.

THE Kruskal-Wallis H is a nonparametric statistic. It is similar to the analysis of variance (ANOVA); however, unlike the ANOVA, the Kruskal-Wallis H is based on ranking. Borg states that the Kruskal-Wallis H is "used to determine whether three or more mean scores on a single factor differ significantly from each other" (Borg, 1987, p.222). According to Siegel (1956), this statistic aids the researcher by determining whether the sums of ranks were selected from the same population. In addition, Kirkpatrick (1981) found that the Kruskal-Wallis H statistic was not a substitute for a parametric procedure, but an additional decision making tool.

The purpose of this paper was to present a BASIC computer program which utilizes the Kruskal-Wallis H method. This basic program will enable the user to find the H value for three groups. Users of the Commodore 64/128 or IBM-PC will find this program easy to use.

Input

This program will accept data after it has been rank ordered. If the data consist of raw scores, these scores must be transformed into

ranks. The lowest score would be assigned a rank of one, two to the next score, etc., until all of the scores have been assigned a rank.

For tied scores, an average rank is assigned to each score. If a tie is discovered among the ranks of 12, 13, and 14, for example, then each score would be assigned a rank of 13. The next score would receive a rank of 15 since ranks 12, 13, and 14 have been used.

In addition, this program will accept unequal groups. Suppose that our data consisted of three groups with fifteen scores in groups one and three and fourteen in group two. You would input the values assigned to each group. When you reach the fifteenth score for group two, you would input the numeral "0" and go on to group three. After all of the scores have been entered into the program, type −1 into the input statement.

KRUSKAL-WALLIS H

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 40  INPUT "ENTER RANK OF GROUP 1"; R1
 45  IF R1 = -1 THEN 125
 50  IF R1 = 0 THEN 65
 55  R5 = R5 + R1
 60  N1 = N1 + 1
 65  INPUT "ENTER RANK OF GROUP 2"; R2
 70  IF R2 = -1 THEN 125
 75  IF R2 = o THEN 90
 80  R6 = R6 + R2
 85  N2 = N2 + 1
 90  INPUT "ENTER RANK OF GROUP 3"; R3
 95  IF R3 = -1 THEN 125
100  IF R3 = 0 THEN 120
105  R7 = R7 + R3
110  N3 = N3 + 1
120  GOTO 40
125  B1 = R5*R5
130  B2 = R6*R6
135  B3 = R7*R7
140  N4 = N1 + N2 + N3
142  J = N4 + 1
144  K = J * N4
145  C = (B1/N1) + (B2/N2) + (B3/N3)
147  G = 3 * J
150  M = 12/K
160  H = M * C - G
170  PRINT "THE VALUE of H = "; H
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Output

After entering −1 into the input statement, the program will yield an "H" value. To determine whether the "H" value is significant, you would look up the "H" value in a chi-square table selecting a p=.10, .05, or .01 and the degrees of freedom (df) = 2. If the computer "H" is greater than the table "H" value, the result is significant.

Limitations

There are three major limitations in this program. First, the program requires the user to transform scores (raw scores, derived scores, etc.) into ranks. Second, it requires that tied ranks be averaged before entering them into the computer. Third, there are no post-hoc procedures available if the "H" is significant.

REFERENCES

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