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A MICROCOMPUTER BASIC PROGRAM TO CALCULATE UNIVARIABLE REGRESSION MODEL ANALYSIS OF TEST BIAS

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There has been increased concern over the question of whether various educational and psychological tests may be biased against certain groups. A regression-based model such as the one described by Potthoff (1966) is presently considered one of the most tenable procedures for appraising bias in psychological testing. This paper presents a BASIC microcomputer program which calculates a regression model based analysis of predictive bias.

RECENTLY, there has been extensive debate on the issue that many educational and psychological tests are biased when used with culturally or economically disadvantaged populations (Golden, 1978). This concern has led to a federal mandate of "unbiased assessment" (Note 1, Education for All Handicapped Children Act of 1975), to litigation in the Larry P. et al. vs. Wilson Riles et al. case (Note 2) over the use of intelligence tests to place minority school children in special education classes, and to the appointment of an American Psychological Association committee to study the use of psychological and educational tests with disadvantaged students (Cleary, Humphreys, Kendrick, and Wesman, 1975).

The definition of test bias offered by Cleary et al. (1975) placed par-

ticular emphasis on the equality of predictive validity, without diminishing the role of content and construct validity, and suggested that components of test fairness are "directly translatable into regression statistics" (p. 25). After reviewing a number of test bias models, Peterson and Novick (1976) described the regression model as the most logically tenable and widely used model of selection fairness within the predictive context. Although not without criticism (Thorndike, 1971), the regression model for analyzing psychological test bias has been widely accepted. It is being cited with increasing frequency in the professional literature (Reynolds and Hartlage, 1979; Reschly and Sabers, 1979).

Purpose

Potthoff (1966) described a procedure based on a regression model for analyzing test bias—a model which provides both simultaneous and separate tests of regression slopes and intercepts. If a significant F results from the simultaneous test, one may conclude that predictive bias exists and may then conduct separate tests of slopes and intercepts to ascertain whether the resulting bias in prediction is constant (intercepts differ) or varies relative to the distance of scores from the mean (slopes differ). The intent of this paper is to present a computer program that calculates the regression model tests of predictive bias developed by Potthoff (1966) for the case of a single independent variable used to predict a single dependent variable.

Description

The program is an interactive one written in Applesoft BASIC for the Apple II microcomputer. Residing in 4.3K of RAM memory, it requires approximately 1.5K of additioinal RAM for each 100 subjects. The analysis of a 500 subject problem, for example, would require approximately 12K of user Ram memory. The program, which is fully documented with variables in mnemonic form, should be readily adapted to other popular microcomputers.

Program input consists of the number of groups, as well as raw predictor (X) and criterion (Y) scores for each group member. Output provides group and total means for X and Y, three F ratios ($F1$= simultaneous test of slopes and intercepts, $F2$= separate test of slopes, $F3$= separate test of intercepts), and the approximate probability value associated with each F ratio.

Availability

A listing of the program, a reprint of this paper, and a complete set of sample input and output data are available without charge from Dr. Marley W. Watkins, 1313 West Latham, Phoenix, Arizona 85007, upon receipt of a self-addressed envelope with forty cents postage affixed.

Reference Notes

1. The Education for All Handicapped Children Act of 1975, Pub. L. No. 94–142, 89 stat. 773.
2. Larry P. et al. vs. Wilson Riles et al., 343 F Supp. 1306 (D.C.N.D. Cal., June 20, 1972).

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