

## ABSTRACT

In an attempt to determine to what extent the variables, Order of difficulty of test items, Length of a test paper and Stress, affect student performance on a test, the researcher selected a 2 x 2 x 2 factorial design for manipulating the variables listed. Each factor had two levels, viz., Order (ordered by difficulty in easy-to-hard sequence, grouped by topics), Length (two short papers, one long paper) and Stress (low, high).

Eighty-eight Ss were selected from three intact groups of first year students at Mico Teachers College, who were being prepared to teach Mathematics in primary schools in Jamaica. They were randomly assigned to eight experimental treatment groups, comprising 10, 11 or 12 Ss each.

The Mitchelmore Placement Test (Parts I and II) in Mathematics for Teachers Colleges in Jamaica, 1978 version, was used as the test instrument (items grouped by topics). A modified version (items ordered by difficulty, easy-to-hard), based on data from a previous administration in the College, September, 1978, was used as the Treatment Test in the experiment.

A paper was Short when it was taken in two parts, I and II, one hour each, with a fifteen minute rest break between them. It was Long when the two parts were taken at one continuous sitting (two hours). High stress was imposed by

telling Ss that their test grades would contribute to their college course grades. Low stress was encouraged by telling Ss that their scores would not contribute to their course grades. Those working under high stress had a different speed orientation to the others. The former were told not to waste any time, while the others were told not to hurry.

The Kuder-Richardson Reliability Coefficients ( $KR_{20}$ ), calculated on the results of the 1978 Mitchelmore Test were 0.93 and 0.83 for Papers I and II respectively, indicating adequate reliability of that test instrument.

A subsample of 20 Ss from the groups previously tested under low stress conditions, were later retested and interviewed, in an attempt to identify any other factors inherent in the testing situation that might affect student performance on the test.

The results of the written tests (raw scores) were analysed by the use of the 3-way ANOVA, using as a covariate the results of the Mathematics Examination for the same first years, June 1979, for control of mathematical ability. The correlations between the covariate and the two parts of the test, separately, were high, approximately 0.70, indicating that the covariate is appropriate.

In Paper I a two-way interaction effect, namely, Order x Length, was significant at the .005 level, but no explanation of cause or effect is possible from the data. In Paper II, Stress exerted a significant main effect at the 0.01 level, and there was (once again) an interaction, Order x Length,

significant at the 0.05 level. However, the Tukey's Test of differences between means revealed no significant differences between the levels of the factors in any of the interactions.

Neither Item Order according to difficulty nor Length of Paper seemed to exert any significant main effect on the performance of these Ss on the test.

Group mean performance on Paper II was significantly better under low stress than under high stress, while on Paper I they were almost similar. Approximately 9 per cent of the total score in Paper II was due to the difference between the group means under high and low stress. This suggests that high stress had a greater debilitating effect after the first hour had passed. Two factors could contribute to this: fatigue during the second hour, and the type of questions on that paper (i.e. multiple-choice plus the requirement to use terms and labels appropriate to the problem, which some students did inaccurately).

The interviews resulted in a 15 per cent increase in correct responses bringing the overall results to 100 per cent correct responses. Prompting was the main technique responsible for this, and the encouragement of low stress conditions was very facilitating.

Caution is therefore required in placing a high degree of reliance upon written examination or test results only, as indicative of students' ability in a subject, since factors like stress (inherent in most test situations, or induced) among other factors, can affect the work of Ss signi-

ificantly, thereby reducing their true performance level. Other methods of estimating student knowledge should complement written tests. Oral tests are strongly recommended.