

VALIDATION OF THE INTELLIGENCE AND DEVELOPMENTAL TESTS
FOR EAST AFRICA (IDEA) USING KENYAN POPULATION

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BY

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ABSTRACT

The primary focus of the investigation was to determine the psychometric efficiency of the Intelligence and Development tests for East Africa (IDEA) test battery, in measuring scholastic ability of the individuals who had been grouped by the following variables: a) urbanisation level (Urban/Rural); b) quality of schooling High/Low. More specifically, the study was designed to assess the extent to which the observed performance differences in the Certificate of Primary Education (CPE) examinations would be reflected in the P7-IDEA test scores.

The psychometric method is two-fold. The first was to assess the functional equivalence of the P7-IDEA test battery; and the second was to identify biased items and evaluate the item equivalence of the four reasoning tests in the battery.

The IDEA test battery, which is composed of 15 tests, was administered to 571 Standard VII pupils from 16 different primary schools. The pupils were characterised by the following group membership: Urban (N = 286); Rural (N = 285); High (N = 315) and Low (N = 256).

To overcome the problem of metric inherent in factor analyses from separate correlation matrices, the test scores were standardised using the pooled variance of the total group. Separate factor analyses were performed

for each subgroup. Five interpretable factors were extracted from each set of data. To determine the similarity of the factor structures for each condition of comparison (Urban/Rural and High/Low), Procrustus rotation to a target matrix-orthogonal case was used. The coefficient of the total stress and column stress was used to assess the degree of congruency between factor structure and individual factors. The correlation matrices, were also assessed for equivalence for each condition of comparison.

Four item bias techniques were used to describe internal test bias of Figure Exclusion, Symbol Exclusion, Word Exclusion and Word Analogies tests. The four item bias techniques used were: a) comparison of item difficulty (p_i -values); b) Mellenbergh's chi-square method; c) judgemental analysis that addresses the issue of face validity by obtaining the opinion of primary school teachers; and d) the Distractor Response Analysis. The judgemental analysis procedure was only used for the two verbal tests.

The correlation matrices of the IDEA tests were found to be equivalent for the High/Low subgroups and significantly different for the Urban/Rural subgroups. The total stress coefficient concurs the above findings. Greater congruency between the factor structure of the High/Low subgroups was observed compared to the Urban/Rural subgroups. At individual factor level, the column stress values indicate that three factors: $v:ed$, ideational fluency and memory were similarly described in each condition of comparison.

The comparison of p_i -values did not show any shift in the order of item difficulty in each condition of comparison.

Internal test bias, at individual item level, was identified by the remaining three item detection techniques. However, these three approaches did not always identify the same items as biased; and none of these items were found to be significantly biased in both the conditions of comparison.

Based on the above findings it was concluded that the P7-IDEA test battery was not functionally equivalent for the Urban/Rural condition of comparison. The failure of the battery to describe an independent spatial and perceptual speed factor in the Rural and Low subgroups was also noted. The four reasoning tests were found to be item equivalent for both the conditions of comparison. Potential applications of these findings to future use of the P7-IDEA test battery in education and validation studies of intelligence batteries were discussed.