

Linear and Equipercentile Methods for Equating PET

Joel Rapp

National Institute for Testing and Evaluation

Abstract

The present study was designed to determine whether there was any justification for replacing the linear equating method currently used for the Hebrew version of the Inter-University Psychometric Entrance Test (PET) with an equipercentile (curvilinear) equating method. Whereas a curvilinear equating function is more general and best represents form-to-form differences in difficulty, equipercentile equating is more complicated than is linear equating. In addition, the curvilinear method requires a larger sample in order to obtain the same range of random error obtained by linear equating.

This study is descriptive in nature and explores the equating relationships between different PET forms. Both the equating and the analysis are performed separately for each of PET's three test domains: Verbal Reasoning, Quantitative Reasoning and English as a foreign language. Data were collected from 19 Hebrew PET forms. For each form, both linear and equipercentile equating were performed on three pairs of sections within each test domain:

(1) the two operational sections, (2) the first operational section and the anchor section and (3) the second operational section and the anchor section. In the first pair, the equatings were based on all examinees who were administered the form, while in the other two pairs, equatings could be based only on the sample of examinees who were administered the anchor section.

In most cases, a convincing similarity was obtained between the linear and equipercentile equating functions. Differences between the two functions rarely exceeded one raw score point, and in most cases did not exceed 0.3 points. These results are quite close to the ranges of typical standard errors of equating. The average of the differences between the equipercentile and linear equating functions was fairly constant in the central range of the score scale and tended to increase towards the ends of the scale. Findings suggest that the differences

between the two functions were caused more by random factors than by typical non-linear relationships that presumably exist between sections.

A linear function thus appears to serve as an adequate estimate of the equating relationship between sections. Furthermore, as equipercentile method is also more complex and requires a larger equating sample, there is little justification, if any, for replacing the linear equating method with the equipercentile method in the Hebrew version of PET.