Abstract

Multiple choice achievement tests comprise a number of items, which are typically binary scored. In order to produce tests, one needs to know how the items behave and thus they are typically modelled with some kind of test theory. In this talk, I discuss nonparametric item response theory scores in terms of optimal scores as an alternative to parametric item response theory scores and sum scores. Optimal scoring is a new version of item response theory which take advantage of the interaction between performance and item impact that is evident in most testing data and that represents test performance over non-negative closed intervals such as [0,100] or [0,n]. The analysis of real and simulated test data suggests that sum-scored tests would need to be longer than an optimally scored test in order to attain the same level of accuracy. It is also demonstrated that optimal scoring of binary test data yield substantial improvements in point-wise root-mean-squared error and bias over number right or sum scoring. These results are extended to optimal scoring with full information, which produce further improvement in these measures of score performance. Because optimal scoring is built on a nonparametric procedure, it offers a flexible alternative for estimating item characteristic curves that can fit items that do not show good fit to parametric item response theory models.