

The distribution of person-fit indices conditional on the estimated proficiency level and the detection of underachievement at a placement test

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Abstract

With some placement tests, many students are seemingly unconcerned with true performance and prefer to underachieve in order to be placed in a less demanding course. Can we detect them? In order to study this problem, we considered three indices frequently used in person-fit research, I_z , Zeta and W , as well as three others conceived specifically for the underachievement detection, I_r , I_i , and I_u . One thousand administrations of the placement test TCALS II were simulated for proficiency levels, θ , varying between -2.00 and 2.00 , by increments of 0.25 . A recently developed variation of Bock and Mislevy's EAP estimation with adaptive a priori and adaptive integration interval, was used to estimate the proficiency level. The obtained adaptive EAP estimator seems to be even less biased than Warm's weighted maximum likelihood estimator. Of all the studied indices, I_z was the most efficient to detect underachievement response patterns. I_r , I_i , and I_u , were less effective than hoped. At the levels where the students are most likely to be interested in being underplaced, the detection rate is higher than 97% when we consider a pattern of 10% hypothetical targeting underachievement aberrant responses. At a 20% aberrance response pattern, the detection is always successful.

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