

2020 – 01

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June 19, 2020

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Abstract

Reference test (or computerized classification testing) that classifies an examinee into a category (e.g., pass/fail) based on his/her responses has been widely applied in test practice, such as certification and licensure testing. In general, reference test is delivered by computer in a sequential mode; that is, items are sequentially and independently administered to an examinee based on his/her current status (e.g., classifiable/unclassifiable) until a stopping criterion is met. However, in some test scenarios (e.g., reading comprehension tests), items may share the same stimulus (e.g., an article), and their item responses may no longer be independent. Under the circumstances, traditional methods (e.g., two-parameter logistic model) for reference tests that do not take the dependency among item responses into consideration may generate biased trait estimation and become inappropriate. To overcome the problem, the study employed the general estimation equation (GEE) for trait estimation, where the GEE is an estimation method often applied to the generalized linear model with correlated responses. We study the sequential test conditions under GEE with testlet test setup, and found that GEE can effectively improve test efficiency by administering less items without obvious loss in classification accuracy. In general, the GEE methods seem promising in developing testlet-based reference tests in test practice.

Keywords: general estimation equation, testlet, reference tests