

Purifying the ability from external variables.

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Poster

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Abstract

In social sciences, measuring constructs and evaluating their relationships with other variables is often complicated by external factors. These external variables can bias estimates and provide alternative explanations for results. This creates a demand for quantitative methods that correct estimates of the relationships between variables. The aim of this study is to investigate methods for purifying the target ability, measured by the target test, from external variables. Three methods are used for purifying abilities: (1) linear regression, (2) orthogonal and (3) oblique bifactor models. To investigate the functioning of these methods, we conduct a simulation study. The simulations demonstrate that it is possible to purify the target ability in two ways: by completely removing (via regression and orthogonal bifactor models) or by partially retaining (via oblique bifactor models) the confounding variance. We also provide a real-data example: the assessment of mathematical literacy in the first grade of elementary school. At this age, children experience difficulties with reading, so the tasks have to be voiced. In this case, phonological literacy interferes with the success of solving items. The differences in interpretation of these methods are discussed in application to the real-data example.

Keywords

bifactor models, purifying ability

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