

Use of prior or concurrent measures of educational attainment when studying comparability of examinations using multilevel models

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In this research, statistical comparability investigates how the relationship between examination performance and a measure of prior/concurrent attainment varies by subject. A series of multilevel logistic regression models can be fitted to study the probability of obtaining certain grades in comparable subjects. It is possible then to generate curves indicating how the probability of obtaining a particular grade changes with different values of the ability measure. This paper discusses the advantages and disadvantages of using prior or concurrent attainment measures in these comparability analyses.

For studies involving children and adolescents using a concurrent measure means that some of the factors that influence performance are being controlled. Also, the effectiveness of the prediction increases as the time difference decreases (less time for other determinants on performance to have an impact). It was found, fitting different multilevel models and computing the DIC statistic, that concurrent attainment measures have greater explanatory power than prior attainment ones. The underlying issue with the use of prior attainment data is that there are many factors that affect performance and some of these change differentially over time.

Furthermore, in some statistical comparability studies, the analyses based on prior attainment measures suggested problems with grading vocational subjects and the differences between them and their traditional comparators were larger when prior attainment was used. It can be argued that prior attainment does not control for changes in motivation; motivation might change after the prior measurement was made if, for example, students become disenchanted with schooling in general. This is a particular issue if comparability between vocational subjects and their traditional comparators is studied given that the vocational subjects are more likely to be offered to disenchanted students. One way of investigating this issue is to consider the progress in a common subject (for example, Mathematics) for the 15 year-old students taking a vocational subject against the group taking a traditional-academic subject, which is similar in terms of content and skills. It was found, using multilevel modelling, that the probability of obtaining particular grades in Mathematics at age 15 was lower for those who entered examinations for the vocational subject than for those who entered the traditional comparator, once prior attainment in Mathematics at age 13 had been accounted for. Since the candidates in both groups were entered for the same Mathematics examination it is clear that the progress of the two groups differed.

The overall conclusion of these analyses is that prior attainment is unsuitable for comparability purposes using multilevel logistic models and it could potentially generate misleading results.