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APPLICATION OF HLM TO DATA WITH MULTILEVEL STRUCTURE

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Abstract

Many data sets analyzed in human and social sciences have a multilevel or hierarchical structure. By hierarchy we mean that units of a certain level (also referred micro units) are grouped into, or nested within, higher level (or macro) units. In these cases, the units within a cluster tend to be more different than units from other clusters, i.e., they are correlated. Thus, unlike in the classical setting where there exists a single source of variation between observational units, the heterogeneity between clusters introduces an additional source of variation and complicates the analysis.

Collecting data on Educational Research often does not follow the principles of simple random sample, suspected by classical regression, but rather a sample by nested clusters. Selected to students and also the contextual units to which they belong such as classes, courses, schools, neighborhoods or regions, and so forth.

Using classical regression bias is produced in the typical error of measurement and an increased likelihood of committing errors of inference.

The hierarchical linear or multilevel models are most suitable because they consider the hierarchical relationships and also provide estimates on the contextual variability of regression coefficients.

In practice, often the data structures are not hierarchical, are more complex structures such as cross-classification (level 2 or macro). For example, students (level 1 or micro) to attend different courses at a school while in other schools there are students who attend the same courses.

Two examples of application to academic achievement of students are presented. First, a model of cross-classification of level 2 is used. Second, a hierarchical model of two levels (students and schools) is presented, taking into account the different areas of science - scientific-humanistic courses and technology courses.

Keywords: hierarchical linear model, multilevel model, cross-classification models, academic achievement.

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