

## Introduction to Multilevel Modeling

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Multilevel models (also known as Hierarchical Linear Models, Random Effect Models, Mixed Model, Mixed Effect Models, and so on) are statistical models designed for hierarchical (or nested, clustered) data. Data sets in public opinion researches often have a hierarchical structure. Researchers collect hierarchical data when they use multistage sampling. For example, they take a sample of cities as the primary units and then take a sample of respondents as the secondary units from each primary unit. In this case, the respondents are nested within cities. It is known that application of traditional statistical analysis methods such as regression analysis and ANOVA, which ignore hierarchical data structure, to hierarchical data cause not only descriptive but also inferential problems. One of the descriptive problems is that statistical characteristics of the whole sample might not represent any subgroup. And one of the inferential problems is underestimation of standard errors, which cause inappropriate  $p$ -values in statistical testing, as a consequence of violating the assumption of statistical independence. Multilevel modeling is a solution of these problems and is spreading in many fields of social science.

This workshop will provide an introduction to multilevel modeling. The topics will include as follows:

1. Meaning of hierarchical (or nested) data structure
2. Problems arising from nesting
3. Basic concepts of multilevel models
4. Process of developing multilevel models
5. Application and interpretation

The participants are supposed to have basic knowledge of regression analysis and statistical testing.