Scale Construction and Application in Social Science Research

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Social science research frequently employs measuring instruments consisting of multiple components, such as questions, items, problems or tasks, which are administered to sampled respondents from studied populations of interest. These instruments, often known alternatively as scales, questionnaires, surveys, self-reports, inventories, subscales, tests, testlets or test-batteries, aim to provide multiple converging pieces of information about underlying latent constructs (traits, factors, latent variables, latent dimensions) which typically represent theoretical concepts of main relevance and concern in these and related sciences.

The development of high-quality social science measuring instruments is a multi-stage process that is frequently referred to as scale construction and development (SCD). This process can become in empirical applications rather complicated, need not necessarily follow specific prescriptions, and may involve phases where a researcher needs to address key issues using what may be seen as an iterative process of improving initial or tentative versions of an instrument under consideration. Major criteria for quality of measuring instruments (scales, surveys, questionnaires, inventories, self-reports, etc.) are reliability and validity, as well as the examination of the latent structure underlying putative or preliminary scale versions that is of special relevance in efforts aimed at quantifying and in particular enhancing instrument quality.

The goal of this 5-day course is to provide its participants with thorough knowledge about and skills needed for the application of various approaches to scale construction and application in the social science disciplines, which are aimed at enhancing the quality of measuring instruments to be used with respondent populations of research interests. As a main vehicle of scale construction and application, the popular latent variable modeling (LVM) methodology is employed throughout the workshop. The course aims to introduce and thoroughly discuss statistical methods that are useful for any researcher involved in multi-component measuring instrument construction, development, revision, and application in a social science discipline. The workshop will

also provide knowledge and skills needed in the process of application and evaluation of existing psychometric scales, questionnaires, surveys, self-reports, or inventories when these are considered for use in an empirical study. The course covers classical factor analysis and its modern versions for categorical items, classical test theory and models based on it that are widely used in the process of SCD, as well as sophisticated and more recent extensions of these frameworks to address complicated situations that social scientists are increasingly more frequently confronted with in empirical research, including in particular population heterogeneity. Substantial emphasis is placed also on the concepts of reliability, validity, and latent structure underlying a measuring instrument.

At the software level, numerous uses are made of the highly popular and widely circulated LVM software Mplus. Knowledge of the software is beneficial but not needed for the course participants. The package will be introduced in the necessary detail during the course, and its applications for SCD purposes will be thoroughly discussed, as will the command files needed, ensuing results, and associated outputs. (The demo version of Mplus that is freely available suffices for many examples used in the course; access to the full version during the course will be provided to the attendees as well.)