

Michaelmas TERM 2009

Advanced Quantitative Research Methods Special Interest Group (Quant SIG)

Meetings are held weekly during term times on Mondays starting at 12:15, in Seminar Room J (computer lab), 28 Norham Gardens. The abstracts for some of the presentations follow this list; more details will be sent closer to each seminar.

Topics for weeks 1-8

Week 1, 12th October: Jari-Erik Nurmi, Department of Psychology and Finnish Center of Excellence in Learning and Motivation Research University of Jyväskylä

Modeling Developmental Dynamics of Individual Cases Across Time by Using Time-series Analysis

Week 2. 19th October: Ioulia Televantou, University of Oxford

Solving bias in value - added models: A simulation study on Mathew effects.

Week 3. 26th October: Prof. Herb Marsh, University of Oxford

Students' Evaluations of University Teaching: Dimensionality, Reliability, Validity, Potential Biases and Usefulness

Week 4. 2nd November: Prof. David Andrich, University of Western Australia

Estimating person proficiency parameters in the Rasch model independently of all test parameters and their maximum scores

Week 5. 9th November: Dr. Benjamin Nagengast, University of Oxford

"Who took the "X" out of expectancy-value theory?" - Student Engagement in Science in PISA 2006 - Cross-cultural analyses

Week 6. 16^h November: Man (Kate) Xu, University of Oxford

Big fish little pond effect: Negative effects of school-average ability on academic self-concept – Generalisation and moderation

Week 7. 23rd November: John Fletcher, University of Oxford

Unmasking the Phantom: Design of a simulation study to measure bias in multi-level systems with measurement and aggregated constructs

Week 8. 30th November: Dr. Lars Malmberg, University of Oxford

Variability and change in 17 teachers' classroom quality during teacher education and two years of professional practice. A three-level multilevel model

Abstracts

Week 1

Modeling Developmental Dynamics of Individual Cases Across Time by Using Time-series Analysis

Jari-Erik Nurmi

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In the traditional framework of investigating development across time, the analyses are based on a sample of individuals, and the models used rely on comparing the values of an individual in some variables to the values of other individuals in the sample. Consequently, in this inter-individual approach development is typically described as one model for whole sample, although sometimes different developmental trajectories can be identified as well. In an alternative approach to modeling development and change, the values of an individual participant is modeled across time. In this intra-individual framework, the covariance matrix is not calculated across individuals but across consecutive time-lags in long series of measurements. In this presentation I will introduce some examples of research questions in which time series analyses are useful, provide some basic statistical concepts related to such analyses, and give a few examples of research findings of individual cases across time by using this particular method.

Week 3

Prof. Herb Marsh, University of Oxford

Students' Evaluations of University Teaching: Dimensionality, Reliability, Validity, Potential Biases and Usefulness

Students' evaluations of teaching effectiveness (SETs) have been the topic of considerable interest and a great deal of research in universities all over the world. Although SETs have a solid research base stemming largely from research conducted in the 1980s, it is surprising that research conducted in the last decade has not done more to address critical limitations previously identified and incorporate exciting methodological advances that are relevant to SET research. Perhaps the most damning observation is that most of the emphasis on the use of SETs is for personnel decisions rather than on improving teaching effectiveness. Although much work is needed on how best to improve teaching effectiveness, it is clear that relatively inexpensive, unobtrusive interventions based on SETs can make a substantial difference in teaching effectiveness. This is not surprising, given that university teachers typically are given little or no specialized training on how to be good teachers and apparently do not know how to fully utilize SET feedback without outside assistance. Why do universities continue to collect and disseminate potentially demoralising feedback to academics without more fully implementing programs to improve teaching effectiveness? Why is there not more SET research on how to enhance the usefulness of SETs as part of a program to improve university teaching? Why have there been so few intervention studies in the last decade that address the problems identified in reviews of this research conducted a decade ago? These, and other issues, are addressed in this Public Lecture.

Week 4

Prof. David Andrich, University of Western Australia

Estimating person proficiency parameters in the Rasch model independently of all test parameters and their maximum scores

Rasch models of modern test theory are characterized by sufficient statistics. However, the facility to eliminate the item parameters when estimating the person parameters this provides has not been exploited. This paper shows that it is possible to do so by transforming the problem into estimating parameters of simple Bernoulli variables. In particular, estimates of the relative proficiencies of any number of persons independently of all item parameters and their maximum scores, and with different persons having scores on different tests, are obtained. This permits the application of the Rasch model at the level of tests where tests require equating. Because tests generally have many scores with zero frequencies, current software, in which item parameters are estimated, cannot handle such cases. In applying the formulation presented in this paper, such a property of the data is no impediment to estimation. An example in which 300 persons have scores on six tests scored from 0 to 100 illustrates the application. The presentation will show the principles of the approach, and not technical details.

Week 5

Dr. Benjamin Nagengast, University of Oxford

"Who took the "X" out of expectancy-value theory?"

Student Engagement in Science in PISA 2006 – Cross cultural analyses

Expectancy-value theory (EVT) is one of the most influential theories to explain achievement motivation and behaviour. Classically (e.g., Atkinson, 1957; Feather, 1982), expectancy of success and task value are assumed to combine multiplicatively in predicting achievement behaviour – an interaction effect. However, this interaction is conspicuously missing from the prevalent model of EVT for achievement motivation in education (e.g., Eccles & Wigfield, 2002) without an explicit theoretical justification. Indeed, this omission was most likely due to the use of inappropriate methodology, notably scale scores and structural equation models without interactions. Recent advantages in structural equation models with latent interactions (Klein & Moosbrugger, 2000; Klein & Muthén, 2007; Marsh, Wen, & Hau, 2004) allow more appropriate and powerful tests of the core tenet of classical EVT.

Using these models and the PISA 2006 database we were able to uncover an interaction between expectancy- and value-measures in science on future motivation and science-related activities in nationally representative samples of 15-year-old students from 57 countries. Taking further advantage of the cross-cultural nature of the PISA database, we tested the generalisability of the interaction effect across the 57 countries with multigroup structural equation models and identified country-level predictors of the effect.