Abstract

Title: Grappling with Complexity of the Multi-Thread narrative: Coordinated Analysis with Replication of 9 longitudinal studies.

The applied modeling workshop in Portland OR in February 2015 united 9 longitudinal studies (EAS, ELSA, HRS, ILSE, RADC/MAP, NuAge, OCTO-Twin, and SATSA) in coordinated analysis with replication (Hofer & Piccinin, 2009) of concomitant decline of physical and cognitive functioning in later life. Using the bivariate growth curve model as the common statistical form, we have collected over 1700 outputs of models fitted in M*plus* against the person-level data of the respective studies, with no sensitive data leaving the possession of the studies’ representatives.

The parsing and processing of such vast amount of results could not be handled manually and required programmatic solution. While the engineering of such a solution has been successfully implemented (see Koval et al, 2016), the amount of models and idiosyncratic features of the studies presented challenges for discovering and interpreting the trends. During our session we will demonstrate how such massive meta-analytic efforts can benefit from the latest developments in data science and reproducible research.

Disparate (and at times conflicting) stories found in different studies did not produce a unanimous, or even a well-shaped narrative that could render itself to a meaningful simplification (e.g. “as cognition declines, so does physical functioning”). At the same time, if plucked out of the replication context, a subset of results could be used to argue *either* the presence *or* the absence of concomitant decline in physical and cognitive functioning. After attending this session, participants will be able to A) perceive the dangers of basing conclusions regarding longitudinal processes on a single study B) familiarize themselves with the best practices in data science for undertaking coordinated analyses with replication and C) examine novel data visualizations custom designed to address the complexities of meta-analytic strategies.

Koval, A.V., Beasley, W.H., Piccinin A., Muniz-Terrera, G., & Hofer S. Big Data, Big Analysis: A Collaborative Modeling Framework for Multi-study Replication. Poster presented at Canadian Psychological Association convention on June 10, 2016.

Hofer, S. M., & Piccinin, A. M. (2009). Integrative data analysis through coordination of measurement and analysis protocol across independent longitudinal studies. Psychological Methods, 14(2), 150.

In this session we demonstrate

the best practices of data science for reproducible research