

**Walt Davis**

National Institute for Applied Statistics Research Australia (NIASRA), UoW

**Identification and specification testing for complicated factor analysis models**

Despite a long history, there remain challenges for identifying factor analysis models featuring both highly saturated coefficient matrices (loadings) and highly saturated measurement error covariance structures. By establishing a link between any linear factor analysis model and a system of linear equations in observed variables, I build off of earlier work on identification and estimation of latent variable models via instrumental variables to identify such models. Sufficient conditions of identification based on rank tests of the coefficient matrix, conditional on the a priori error structure, are derived.

The identification of such models also bridges much of the conceptual gap between the “exploratory” and “confirmatory” approaches to factor analysis, allowing them to be “fairly” compared. It also implies a new specification testing or exploratory strategy when a sparse coefficient matrix is hypothesized. Some simulation results will be presented demonstrating that the standard available exploratory rotations have high false discovery rates and poor coverage rates. My proposed alternative does better in both regards, although its efficiency can be sensitive to the choice of restrictions that are retained.