Presentation Supplement

Justin Kracht

Symbol Glossary

- $\mathbf{\Omega}_{p \times p}$: Population covariance matrix for p items
- $\mathbf{\Omega}(\boldsymbol{\gamma})$: Matrix-valued function of a vector of free parameters, $\boldsymbol{\gamma}$
- $\mathbf{\Sigma}_{p \times p}$: The population covariance matrix with model error.
- $\mathbf{E}_{p \times p}$: Error (perturbation) matrix
- $\mathbf{\Lambda}_{p \times k}$: Matrix of factor loadings for p items on k factors
- $\mathbf{\Phi}_{k \times k}$: Correlation matrix for the k factors
- $\mathbf{\Psi}_{p \times p}$: Diagonal matrix of item unique variances
- ε: Root mean square error of approximation (RMSEA)
- ε_T: Target RMSEA
- CFI: Comparative Fit Index (CFI)
- CFI_T: Target CFI
- $m = 1/v$: Precision parameter for the inverse-Wishart distribution

References

Beauducel, A., & Hilger, N. (2016). On the correlation of common factors with variance not accounted for by the factor model. *Communications in Statistics - Simulation and Computation*, *45*(6), 2145–2157. https://doi.org/gh64s7

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*(2), 238–246. https://doi.org/dbj

Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research*, *17*(3), 303–316. https://doi.org/cfgdt5

Box, G. E. P., & Draper, N. R. (1987). *Empirical model-building and response surfaces.* (pp. xiv, 669). John Wiley & Sons.

Briggs, N. E., & MacCallum, R. C. (2003). Recovery of weak common factors by maximum likelihood and ordinary least squares estimation. *Multivariate Behavioral Research*, *38*(1), 25–56. https://doi.org/bgnz9w

Cudeck, R., & Browne, M. W. (1992). Constructing a covariance matrix that yields a specified minimizer and a specified minimum discrepancy function value. *Psychometrika*, *57*(3), 357–369. https://doi.org/cq6ckd

de Winter, J. C. F., & Dodou, D. (2016). Common factor analysis versus principal component analysis: A comparison of loadings by means of simulations. *Communications in Statistics - Simulation and Computation*, *45*(1), 299–321. https://doi.org/gh64cn

Gnambs, T., & Staufenbiel, T. (2016). Parameter accuracy in meta-analyses of factor structures. *Research Synthesis Methods*, *7*(2), 168–186. https://doi.org/gcz6x6

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2018). *Multivariate Data Analysis.* Cengage.

Hsu, H.-Y., Kwok, O., Lin, J. H., & Acosta, S. (2015). Detecting misspecified multilevel structural equation models with common fit indices: A Monte Carlo study. *Multivariate Behavioral Research*, *50*(2), 197–215. https://doi.org/gg5fk7

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling* (3rd ed). Guilford Press.

Kracht, J. D., & Waller, N. G. (2020). Assessing dimensionality in non-positive definite tetrachoric correlation matrices: Does matrix smoothing help? *Multivariate Behavioral Research.* https://doi.org/ghq7p7

MacCallum, R. C. (2003). 2001 Presidential Address: Working with imperfect models. *Multivariate Behavioral Research*, *38*(1), 113–139. https://doi.org/bg7vtz

MacCallum, R. C., & O'Hagan, A. (2015). Advances in modeling model discrepancy: Comment on Wu and

Browne (2015). *Psychometrika*, *80*(3), 601–607. https://doi.org/f7qpj3

MacCallum, R. C., Widaman, K. F., Preacher, K. J., & Hong, S. (2001). Sample size in factor analysis: The role of model error. *Multivariate Behavioral Research*, *36*(4), 611–637. https://doi.org/b3v4p6

Ogasawara, H. (2001). Approximations to the distributions of fit indexes for misspecified structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal*, *8*(4), 556–574. https://doi.org/bv4mwk

Pek, J. (2012). *Fungible parameter contours and confidence regions in structural equation models* [PhD thesis, University of North Carolina]. https://doi.org/10.17615/S9V9-5M31

Trichtinger, L. A., & Zhang, G. (2020). Quantifying model error in P-technique factor analysis. *Multivariate Behavioral Research*, *0*(0), 1–16. https://doi.org/gh64s8

Tucker, L. R., Koopman, R. F., & Linn, R. L. (1969). Evaluation of factor analytic research procedures by means of simulated correlation matrices. *Psychometrika*, *34*(4), 421–459. https://doi.org/chcxvf

Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, *38*(1), 1–10. https://doi.org/bcz7k9

Wu, H., & Browne, M. W. (2015). Quantifying adventitious error in a covariance structure as a random effect. *Psychometrika*, *80*(3), 571–600. https://doi.org/gjrkc4

Zhu, C., Byrd, R. H., Lu, P., & Nocedal, J. (1997). Algorithm 778: L-BFGS-B: Fortran subroutines for large-scale bound-constrained optimization. *ACM Transactions on Mathematical Software*, *23*(4), 550–560. https://doi.org/bv55xf