Computation of Model Diagnostic Statistics for Measurement Models

("Experiential Learning and Presidential Management of the U.S. Federal Bureaucracy: Logic and Evidence from Agency Leadership Appointments")

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I. EXTRACTED VARIANCE (EV) STATISTIC:

$$EV_{k_i} = \textbf{Standardized Factor Loading}^2_{k_i}$$

Standardized factor loadings for each *i* indicator for a given factor *k* are reported in Mplus statistical output under the heading ***"STANDARDIZED MODEL RESULTS"*** under the subheading ***"STDYX Standardization"*** listed under the ***"ESTIMATES"*** column.

II. AVERAGE VARIANCE EXTRACTED (AVE) STATISTIC (*ASSESSMENT OF CONVERGENT VALIDITY*):

$$AVE_{F_k} = \frac{\sum_{i=1}^{j}\left(EV_{k_i}^2\right)}{\sum_{i=1}^{j}\left(EV_{k_i}^2\right)+TFRV} \quad ,$$

where **AVE** is equal to the ratio of the sum of the squared extracted variance (**EV**) statistics across all *j* indicators for a given factor *k* divided over this quantity, plus the total factor residual variance (i.e., sum of the residual variance estimates for each latent factor). The total factor residual variance **(TFRV)** statistics are reported in the Mplus statistical output under the ***"MODEL RESULTS"*** under the subheading ***"VARIANCES"*** listed under the ***"ESTIMATES"*** column – just preceding the ***"STANDARDIZED MODEL RESULTS"*** heading.

III. CONSTRUCT RELIABILITY (CR) STATISTIC: (*ASSESSMENT OF CONVERGENT VALIDITY*):

$$CR_{F_k} = \frac{\sum_{i=1}^{j} \left(EV_{k_i} \right)^2}{\sum_{i=1}^{j} \left(EV_{k_i} \right)^2 + TFRV}$$

where **CR** is equal to the ratio of the squared sum of extracted variance statistics across all *j* indicators for a given factor *k* divided over this quantity, plus the total factor residual variance (i.e., sum of the residual variance estimates for each latent factor). *Note: This statistic uses the same statistical information as the AVE statistic, except that it computes the extracted variance (EV) statistics differently.*

IV. AVERAGE VARIANCE EXTRACTED (AVE): SQUARED INTERCORRELATION (SIC) STATISTIC COMPARISONS (*ASSSESSMENT OF DISCRIMINANT VALIDITY*)

$$AVE_{F_k} = \frac{\sum_{i=1}^{j} \left(EV_{k_i}^2 \right)}{\sum_{i=1}^{j} \left(EV_{k_i}^2 \right) + TFRV} \quad ,$$

where **AVE** is equal to the ratio of the sum of the squared extracted variance (**EV**) statistics across all *j* indicators for a given factor *k* divided over this quantity, plus the total factor residual variance (i.e., sum of the residual variance estimates for each latent factor). The total factor residual variance **(TFRV)** statistics are reported in the Mplus statistical output under the ***"MODEL RESULTS"*** under the subheading ***"VARIANCES"*** listed under the ***"ESTIMATES"*** column – just preceding the ***"STANDARDIZED MODEL RESULTS"*** heading.

$$SIC_{F_X F_Y} = \left(\rho_{SFRV_{F_X F_Y}} \right)^2$$

The standardized factor residual variance correlation **(SFRVC)** statistics are reported in the Mplus statistical output under the ***"STANDARDIZED MODEL RESULTS"*** heading listed under the ***"ESTIMATES"*** column – just preceding the ***"THRESHOLDS"*** subheading (denoted by "***F# WITH***" text).

V. STANDARDIZED FACTOR RESIDUAL VARIANCE CORRELATION (SFRVC) BETWEEN PAIRWISE FACTORS (*ASSESSMENT OF NOMOLOGICAL VALIDITY*)

The **SFRVC** statistics are reported in the Mplus statistical output under the ***"STANDARDIZED MODEL RESULTS"*** heading listed under the ***"ESTIMATES"*** column – just preceding the ***"THRESHOLDS"*** subheading (denoted by "***F# WITH***" text).

$$SFRVC_{F_X F_Y} = \rho_{SFRV_{F_X F_Y}}$$