

Formulas for calculating pheromones

The final pheromone was calculated as:

$$Pheromone = \varphi_{Fit} + \varphi_{Rel} + \varphi_{Val}$$

Where φ_{Fit} was calculated based on both fit indices:

$$\varphi_{Fit} = \frac{\varphi_{CFI} + \varphi_{RMSEA}}{2}$$

Where φ_{CFI} was modelled to increase with higher values, whereas φ_{RMSEA} was modelled to decrease with higher values:

$$\varphi_{CFI} = \frac{1}{1 + e^{(0.95 - CFI) \cdot 100}}$$
$$\varphi_{RMSEA} = 1 - \frac{1}{1 + e^{(0.05 - RMSEA) \cdot 100}}$$

Where φ_{Rel} was calculated based on both reliability indices, i.e. McDonald's Omega and minimal factor loadings:

$$\varphi_{Rel} = \frac{\varphi_{OMEGA} + \varphi_{LAMBDA}}{2}$$

Where φ_{OMEGA} was modelled to increase logistically with higher values, and φ_{LAMBDA} was based on the minimal factor loading (λ) of the selected n items:

$$\varphi_{OMEGA} = \frac{1}{1 + e^{(0.7 - OMEGA) \cdot 100}}$$
$$\varphi_{LAMBDA} = \frac{1}{1 + e^{(0.5 - \lambda) \cdot 100}}$$

Where φ_{Val} was calculated based on the external validity criterion, i.e. the logistic transformation of the adjusted R^2 derived from a regression model in which the external criterion was the dependent variable.

$$\varphi_{R^2} = \frac{1}{1 + e^{(0.4 - R^2) \cdot 100}}$$

The figure below illustrates logistic functions that were used to transform measures of model fit (CFI, RMSEA), reliability (Mc Donald's Omega), external validity (adjusted r squared of a linear regression model predicting personality disorder vs. no personality disorder), as well as factor saturation (minimal factor loadings).

