Factor structure – extended description

To obtain the first-order structure, a three-step approach was utilized for each of the subscales "personality," "cognitive abilities," and "activities and interests" using the "psych" package in R 3.2.2. (Revelle, 2016) based on sample data from Subset 1. We set the number of factors to values obtained from EFA with the "nFactors" package (Version 1.6.4; Raiche, & Magis, 2010) and used the unweighted least squares method (ULS) with an oblimin rotation to obtain the factor structure of each subscale. The unweighted least squares method has been suggested for ordinal data, which do not follow a multivariate normal distribution (Bentler & Dudgeon, 1996; Schumacker & Lomax, 2004). In this step, we excluded items with (a) loadings < .30 on any factor or (b) loadings > .30 on more than one factor. Second, the remaining structure was used to specify and estimate a confirmatory factor analytic model using the ULS estimator with the R package "lavaan" (Version 0.6-1; Rosseel, 2018). To account for the ordinal scaling, CFA models were based on the polychoric correlation matrix and asymptotic covariance matrix. If this model showed a CFI < .95 or an RMSEA > .075, additional items were excluded in accordance with the modification indices. Thereby, we excluded the items for which multiple modifications were suggested with the restriction that (a) a minimum of three items were to remain on each factor and (b) an equal number of masculine and feminine items should remain in the final model. Third, measurement invariance of these models was established between men and women; because of the sample size (N < 300), strict criteria were used for the measurement invariance analyses as recommended by Chen (2007). Measurement invariance for loadings and residuals was assumed if the reduction in the CFI did not exceed .01 and the reduction in the RMSEA did not exceed .015. Because measurement invariance for ordered data can be obtained only if each category is chosen at least once in each group, the two most extreme categories were collapsed prior to the factor analyses (i.e., on the Likert scale ranging from 1 to 7, ratings 1 and 2 were collapsed into category 2, and ratings 6 and 7 were collapsed into category 6. This

step was necessary because no men showed extremely high ratings on the item “boastful,” and no women showed extremely low ratings on the item “compassionate.” Both of these were maintained in the final model.

To test the models with higher-order factors, latent factor scores were exported using the lavPredict function and assigned to overarching factors. Thereby, a one-factor model assuming a bipolar sex-role factor was tested against a two-factor model with separate factors for Masculinity and Femininity. Further, the resisting second-order model was tested against a third order model containing the facets as first-order, the subscales PS, CS and AIS as second-order, and Masculinity and Femininity as third-order factors. Factor loadings were screened to determine the relevance of the three subscales for the overall Masculinity and Femininity scores. In a second step, the models were confirmed in CFAs using the second subset as well as in the data that were collected in Study 2. Values of CFI > .90, RMSEA < .10 and SRMR < .10 were set as thresholds for model fit for all higher-order models obtained in the exploratory approach (Blunch, 2008; Loehlin, 2004).

References

Bentler, P. M., & Dudgeon, P, (1996). Covariance Structure Analysis: Statistical practice, theory and directions. *Annual Review of Psychology,* 47, 563-592. doi:10.1146/annurev.psych.47.1.563

Blunch, N. J. (2008). *Introduction to structural equation modelling using SPSS and AMOS.* Thousand Oaks, CA: Sage. doi:10.1111/j.1744-6570.2009.01143_6.x

Chen, F. F. (2007). Sensitivity of Goodness of Fit Indexes to Lack of Measurement Invariance. *Structural Equation Modeling: A Multidisciplinary Journal,* 14, 464-504. doi:10.1080/10705510701301834

Loehlin, J.C. (2004). *Latent variable models* (4th ed.). Hillsdale, NJ: Lawrence Erlbaum.

Raiche, G., & Magis, D. (2010). *nFactors: Parallel Analysis and Non Graphical Solutions to the Cattell Scree Test.* R package version 2.3.3.

Revelle, W. (2016*). Psych: Procedures for Personality and Psychological Research.* R package version 1.6.4.

Rosseel, Y. (2018). *Lavaan: An R Package for Structural Equation Modeling.* R package version 0.6-1.

Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling.* New Jersey: Lawrence Erlbaum Associates.