

Supplementary Digital Content

In this study, we used Exploratory Structural Equation Modeling (ESEM) analysis for factor extraction. ESEM is a recently-developed variation of Exploratory Factor Analysis (EFA) that provides parameter estimates, indices of model fit and other statistics thus far only available with Confirmatory Factor Analysis [1,2]. Because all diagnoses were coded dichotomously as “present” or “absent”, we factored tetrachoric correlations among the diagnoses of chronic conditions using Weighted Least Square with Mean and Variance (WLSMV) adjustment estimation [3]. We determined the number of factors to extract by relying on a range of complementary criteria as recently recommended [4]. ESEM involve a “rotation” step whose role is to facilitate result interpretation. We used Geomin oblique rotation to minimize the extent to which some clinical conditions may load substantially on more than one factor [5].

In ESEM, the three-factor model fitted the data best. The chi-square test of goodness-of-fit was highly significant ($P<0.001$), but a well-known limitation of this test is that results can spuriously suggest poor model fit when the sample size is large. All the other indices and results supported an excellent model fit (RMSEA, 0.020; TLI, 0.957; CFI, 0.974; 43 residual correlations <0.10 out of 45). There was a modest positive correlation between the first and the second factor (0.31; $P<0.001$), a weak negative correlation between the first and the third factor (-0.21; $P<0.001$), and virtually no correlation between the second and the third factor (0.09; $P=0.05$).

Several conditions had significantly weaker standardized loadings on a second factor; tobacco abuse loaded significantly on all three factors (see table below). Standardized loadings have the interpretation of correlations between factors and conditions.

Table 1. Standardized loadings of the 15 conditions with each of the three factors identified

Condition	Factor 1 (Metabolic)	Factor 2 (Behavioral)	Factor 3 (Substance use)
Hypertension	0.84***	-0.01	-0.01
Gout	0.41***	0.07	0.10
Diabetes mellitus	0.47***	0.19**	-0.14*
Chronic kidney disease	0.59***	-0.03	0.08
Mood disorders	-0.12***	0.57***	0.14**
Dyslipidemia	0.25***	0.47***	-0.18***
COPD	-0.07	0.32***	0.18**
Chronic ulcer disease	0.07	0.52***	0.03
Osteoarthritis	0.00	0.52***	0.18***
Obstructive sleep apnea	0.24**	0.41***	-0.05
Cardiac disorders	0.17*	0.49***	-0.14*
Alcohol abuse	0.10*	0.08	0.58***
Substance abuse	-0.04	-0.04	0.89***
Tobacco abuse	0.12**	0.27***	0.53***
HCV infection	0.13*	-0.08	0.53***

Note: Standardized loadings have the interpretation of correlations between factors and conditions (loadings <0.30 - 0.20 are generally interpreted as small to negligible).

*** $P\leq 0.001$; ** $P\leq 0.01$; * $P\leq 0.05$

References

1. Asparouhov T MB. Exploratory structural equation modeling. Structural equation modeling : a multidisciplinary journal **2009**; 16:397-438. □
2. Marsh HW, T. A, Ludtke O, Robitzsch A, Morin AJ, Trautwein U. Exploratory structural equation modeling, integrating CFA and EFA: application to students' evaluations of university teaching. Structural equation modeling : a multidisciplinary journal **2009**; 16:439-76.
3. Beauducel A, Herzberg YP. On the performance of maximum likelihood versus means and variance adjusted least squares estimation in CFA. Struct Equat Model 2006;13:186-203.
4. Suderus E, Gamma A, Vollenweider FX. Psychometric evaluation of the Altered States of Consciousness Rating Scale (OAV). Plos One 2010;5(8):e12412.
5. DA S, TA S. A comparative investigation of rotation criteria within exploratory factor analysis. Multivariable Behavioral Research **2010**; 45:73-103.