

Structural Equation Modeling

P.05 - Model Fit and Fit Indices

08.11.2021

Lab Description

For this practical you will need the following package: `lavaan` and `semPlot`.

You can install and load this package using the following code:

```
# Install packages.
install.packages(c("lavaan", "semPlot"))

# Load the packages.
library(lavaan)
library(semPlot)
```

Exercise 1

- Import the dataset `ELEMM1.csv` that is available in the course folder for *Lecture 4* on Canvas.
- In *Practical 4*, you estimated the model in Figure 1 (see below), using the Satorra-Bentler estimator and obtained a value for the *MFTS*.
 - Re-estimate this model and now request that the modification indices are also printed in the output.
 - Evaluate the fit of this model using fit indices. *Tip: check the arguments `fit.measures` and `modindices` in `lavaan`. Also check the functions `fitmeasures()` and `modificationIndices()` in `lavaan`.*
- Do you see possibilities to improve the fit of the model? Which one(s)? What would be your strategy for improving the fit of this model?
- Implement the model improvements and test if the improved model is significant using the Likelihood Ratio Test (LRT).
 - Note: strictly speaking, the standard LRT is not correct when the Robust Maximum Likelihood is used because the scaled χ^2 values are not χ^2 distributed. However, for the sake of the exercise we will proceed this way despite of this limitation.*

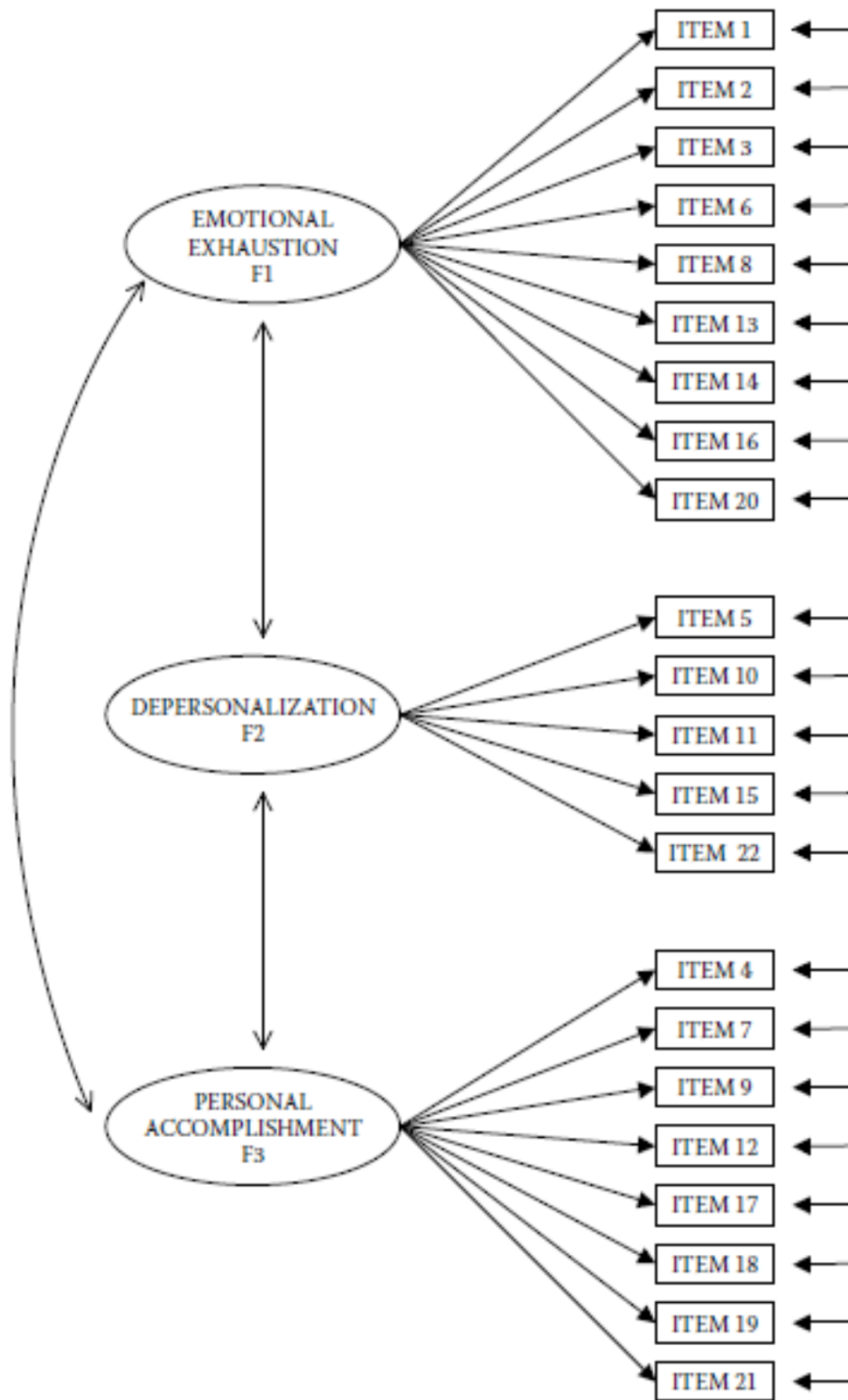
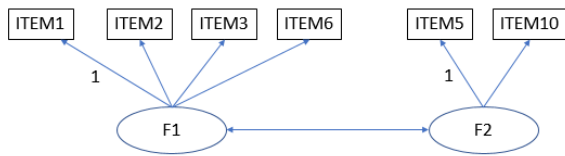


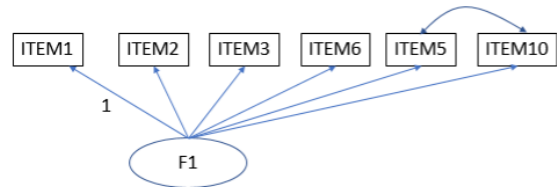
Figure 1: Hypothesized CFA model of factorial structure for the *Maslach Burnout Inventory* (MBI).

Exercise 2

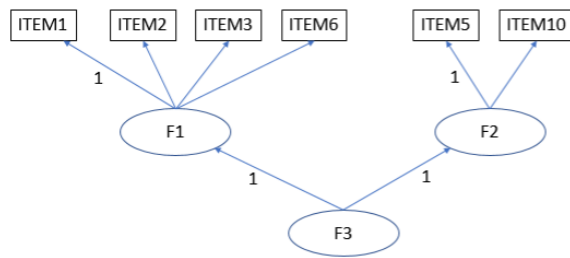
- Estimate and visualize each of the following four models in Figure 2 using the dataset from the previous exercise.
- What do they have in common?



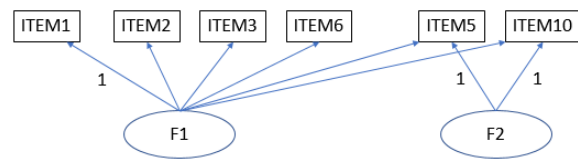
(a) First model.



(b) Second model.



(c) Third model.



(d) Fourth model.

Figure 2: Four models that have something in common.