Structural Equation Modeling

P.13 - Common Method Bias

06.12.2021

Lab Description

In this assignment you will learn how to fit *Structural Equation Models* (SEM) while accounting for *Common Method Bias.* For this practical you will need the following packages: `lavaan`, `semPlot`, and `haven`. You can install and load these packages using the following code:

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

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

Please note that the data for following assignment are kindly provided by dr. Pieter de Rooij from *Breda University of Applied Sciences.* We acquired permission to use the data in the course *Research Master: Structural Equation Modeling and Analysis of Longitudinal Data.* Should you want to use the data outside the scope of this course, please make sure to obtain written approval from dr. Pieter de Rooij (at rooy.h@buas.nl).

More about the data

This dataset contains 27 items that seek to measure 9 dimensions (i.e., constructs) of visitors' experiences when they attend a performance in the performing arts sector (e.g., drama, dance, musical, stand up comedy, opera, classical music). Each construct is indicated by 3 items as shown in *Table 1.* Scales were rated on 5 point *Likert* scales (i.e. from 1 = totally disagree to 5 = totally agree).

Table 1: Latent constructs and manifest variables in `data.sav`.

Dimensions	Variable	Item text
Artistic value	artval1	The concert/ show had artistic value.
	artval2	The concert/ show was a form of art.
	artval3	The concert/ show was of a high artistic level.
Beauty	beauty1	The concert/ how was beautiful.
	beauty2	I enjoyed the concert/ show.
	beauty3	The concert/ how was a beautiful experience.
Cultural relaxation	relax1	Through my visit to the concert/ show I had a nice evening out.
	relax2	Through my visit to the concert/ show I had the feeling I was away from it all.
	relax3	Through my visit to the concert/ show I have been able to relax.
Cultural stimulation	stim1	Through my visit to the concert/ show I got food for thought.
	stim2	Through my visit to the concert/ show I felt intellectually stimulated.
	stim3	Through my visit to the concert/ show I have been challenged to think about certain things.
Cultural transmission	trans1	Through my visit to the concert/ show I transmitted my cultural interests to important others (children, grandchildren, family, friends.)
	trans2	Through my visit to the concert/ show I have shared my cultural interests with important others (children, grandchildren, family, friends.)
	trans3	Through my visit to the concert/ show I have brought people that are important to me into contact with this form of art.
Social attraction	attr1	During my visit to the concert/ show I was with people that like the same things as I do.
	attr2	During my visit to the concert/ show I had the feeling I was with like-minded people.
	attr3	During my visit to the concert/ show I was with people that have similar interests as me.
Social bonding	bond1	My visit to the concert/ show was a nice opportunity to be together with family and friends.
	bond2	Through my visit to the concert/ show I had a nice evening out with family or friends.
	bond3	Through my visit to the concert/ show I have been able to strengthen the bonds with family or friends.
Social distinction	dist1	My visit to the concert/ show is a good topic for conversation at drinks or other social activities.
	dist2	I like to tell other people how I experienced the concert/ show.
	dist3	People in my social environment appreciate a visit to this concert/ show.

Table 1 – continued

Dimensions	Variable	Item text
Social duty	`duty1`	Through my visit to the concert/ show I spent a pleasant time with colleagues or business relations.
	`duty2`	Through my visit to the concert/ show I met interesting people from my professional network.
	`duty3`	Through my visit to the concert/ show I strengthened my professional network.

Start by loading the *SPSS* dataset `data.sav` into R using the `haven` package.

- *Hint.* Check out the `read_spss` function from the R package `haven`.

Questions

1. Estimate a *CFA* model for the 9 constructs. Evaluate the fit of this model.

2. Estimate a *CFA* model for the 9 constructs together with a *method factor* to control for potential *common method bias*. Model the *common method variance* with a single *latent method variable*. Implement equality constraints on the loadings of the method factor and also implement the necessary constraints for the associations between method and content factors.

3. Test both models against each other using the *Likelihood Ratio Test* (LRT). What do you conclude?

4. Do you see other possibilities to improve the fit of the model?