Structural Equation Modeling

P.13 - Common Method Bias

November 15, 2022 (15:16:09)

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:

```
# 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.

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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?