COS-D419 Factor Analysis and Structural Equation Models 2023, Assignment 3

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2023-02-02

CFA & teacher burnout

Exercise 3.1

Specify and test the hypothesis given on the pages 2 and 3 of the lecture material.

Use 1) ML estimator, 2) MLM estimator.

Compare the fit indices and draw conclusions concerning the model fit.

Visualize the model.

Read in the data set:

Start by downloading the data file from Moodle to your Project folder!

1.1 Read in the data set

Start by downloading the data file from Moodle to Project folder.

```
library(tidyverse)
library(readr)

mbi <- read_csv("ELEMM1.CSV", show_col_types = FALSE)
```

1.2 Write functions

Write some functions to improve the fluency of reporting by minimizing paragraphs frequently interrupted by long codes.

1.2.1 to check unique values

```
unique.levels <-  function(sc){
  values <- lapply(sc, function(x)sort(unique(x)))
for(x in 1:ncol(sc)){
  a <- paste(c("Variable ",
```

```
                names(values)[x],
                " has values of ",
                paste(values[[x]],
                      collapse = ",")),
              collapse = "")
  print(a)
  }
}
```

1.2.2 to generate CFA results with improved readability

1.3 Inspect the data

Have a quick overview of the data.

```
library(finalfit)
library(kableExtra)
inspect.table <- ff_glimpse(mbi)$Continuous
inspect.table$label <- NULL
inspect.table %>%
  mutate('Q1Q3' = paste(quartile_25,
                        quartile_75,
                        sep = " ~ ")) %>%
  select(n,
         'n of NA' = missing_n,
         'Mean' = mean,
         'Median' = median,
         'SD' = sd,
         'Min' = min,
         'Max' = max,
         'Q1~Q3' = Q1Q3) %>%
  kable(booktabs = T,
        align = "r",
        longtable = T,
        linesep = "") %>%
  add_header_above(c(" ",
                     " " = 2,
                     "Central tendency" = 2,
                     "Dispersion tendency" = 4)) %>%
  kable_styling(latex_options = c("striped", "repeat_header")) %>%
  column_spec(1, width = "3cm")
```

			Central tendency		Dispersion tendency			
	n	n of NA	Mean	Median	SD	Min	Max	Q1~Q3
ITEM1	372	0	4.4	4.0	1.7	1.0	7.0	3.0 ~ 6.0
ITEM2	372	0	4.9	5.0	1.5	1.0	7.0	4.0 ~ 6.0
ITEM3	372	0	3.5	3.0	1.7	1.0	7.0	2.0 ~ 5.0
ITEM4	372	0	6.3	7.0	1.0	2.0	7.0	6.0 ~ 7.0
ITEM5	372	0	2.2	2.0	1.5	1.0	7.0	1.0 ~ 3.0
ITEM6	372	0	2.7	2.0	1.6	1.0	7.0	2.0 ~ 4.0

(continued)

			Central tendency		Dispersion tendency			
	n	n of NA	Mean	Median	SD	Min	Max	Q1~Q3
ITEM7	372	0	6.3	6.0	0.8	2.0	7.0	6.0 ~ 7.0
ITEM8	372	0	3.0	2.0	1.7	1.0	7.0	2.0 ~ 4.0
ITEM9	372	0	6.0	7.0	1.3	1.0	7.0	6.0 ~ 7.0
ITEM10	372	0	2.2	2.0	1.4	1.0	7.0	1.0 ~ 3.0
ITEM11	372	0	2.2	2.0	1.5	1.0	7.0	1.0 ~ 3.0
ITEM12	372	0	5.7	6.0	1.2	1.0	7.0	5.0 ~ 6.0
ITEM13	372	0	3.6	3.5	1.7	1.0	7.0	2.0 ~ 5.0
ITEM14	372	0	4.0	4.0	1.7	1.0	7.0	3.0 ~ 5.0
ITEM15	372	0	1.8	1.0	1.3	1.0	7.0	1.0 ~ 2.0
ITEM16	372	0	2.5	2.0	1.4	1.0	7.0	1.0 ~ 3.0
ITEM17	372	0	6.4	7.0	0.9	2.0	7.0	6.0 ~ 7.0
ITEM18	372	0	5.7	6.0	1.3	1.0	7.0	5.0 ~ 7.0
ITEM19	372	0	5.9	6.0	1.2	1.0	7.0	6.0 ~ 7.0
ITEM20	372	0	2.2	2.0	1.4	1.0	7.0	1.0 ~ 3.0
ITEM21	372	0	5.9	6.0	1.3	2.0	7.0	5.0 ~ 7.0
ITEM22	372	0	2.6	2.0	1.6	1.0	7.0	1.0 ~ 3.0