

Advanced course in questionnaire research

Ph.D. course

Exercise IRT in Stata

The datafile “exercise IRT data.dta” contains the data used in the EFA exercise on Monday day 1. It consist of the following variables: a01: person id number, items f32a to f32u , gender and age. The following exercises uses 9 items found to belong to the “depression” factor of the 3 factor solution from the EFA exercise (f32a f32b f32c f32d f32f f32j f32l f32o f32u).

Exercise 1

Estimate a 1-parametric logistic model in Stata and plot the ICC curves.
Do any items appear redundant?

Commands:

```
irt 1pl f32a f32b f32c f32d f32f f32j f32l f32o f32u  
irtgraph icc
```

Exercise 2

Estimate a 2-parameter logistic model in Stata and again plot the ICC curves.
Do the slopes differ?

Commands:

```
irt 2pl f32a f32b f32c f32d f32f f32j f32l f32o f32u  
irtgraph icc
```

Exercise 3

Test if the slopes can be equal for all items. Is a 1pl model adequate?

Commands:

```
irt 1pl f32a f32b f32c f32d f32f f32j f32l f32o f32u  
estimates store model_1pl  
irt 2pl f32a f32b f32c f32d f32f f32j f32l f32o f32u  
estimates store model_2pl  
lrtest model_1pl model_2pl
```

Exercise 4

Explore whether there is DIF for age above or below 55 years on any for the items using the Mantel-Haenszel method.

Commands:

```
egen age55=cut(age), at(18,55,100) label  
difmh f32a f32b f32c f32d f32f f32j f32l f32o f32u, group(age55)
```

Exercise 5

Investigate for DIF for age above and below 55 years using the logistic regression method. Are there any changes? Use the ORs to evaluate the magnitude.

Commands:

```
diflogistic f32a f32b f32c f32d f32f f32j f32l f32o f32u, group(age55)
```

Exercise 6

Investigate the overall impact for one of the items by calculating the difference in pseudo R2

Commands with item f32f as example:

```
logit f32f b1.sex##c.sumscore_9dep  
display as text " R2 full dif= " as result e(r2_p)  
logit f32f c.sumscore_9dep  
display as text " R2 no dif= " as result e(r2_p)
```

Exercise 7

Examine whether items f32a and f32b display signs of local dependence when using the partial correlation method. Do you come to similar conclusions when applying the logistic regression method?

Commands:

```
egen sumscore_8dep_f32a=rowtotal(f32b f32c f32d f32f f32j f32l f32o f32u)  
egen sumscore_8dep_f32b=rowtotal(f32a f32c f32d f32f f32j f32l f32o f32u)  
pcorr f32a f32b sumscore_8dep_f32a  
pcorr f32a f32b sumscore_8dep_f32b
```