Dynamic Item- and Teststatistics A shiny GUI for test development

Erik Sengewald,

Department 'Psychological Research and Development', German Federal Employment Agency, Nürnberg

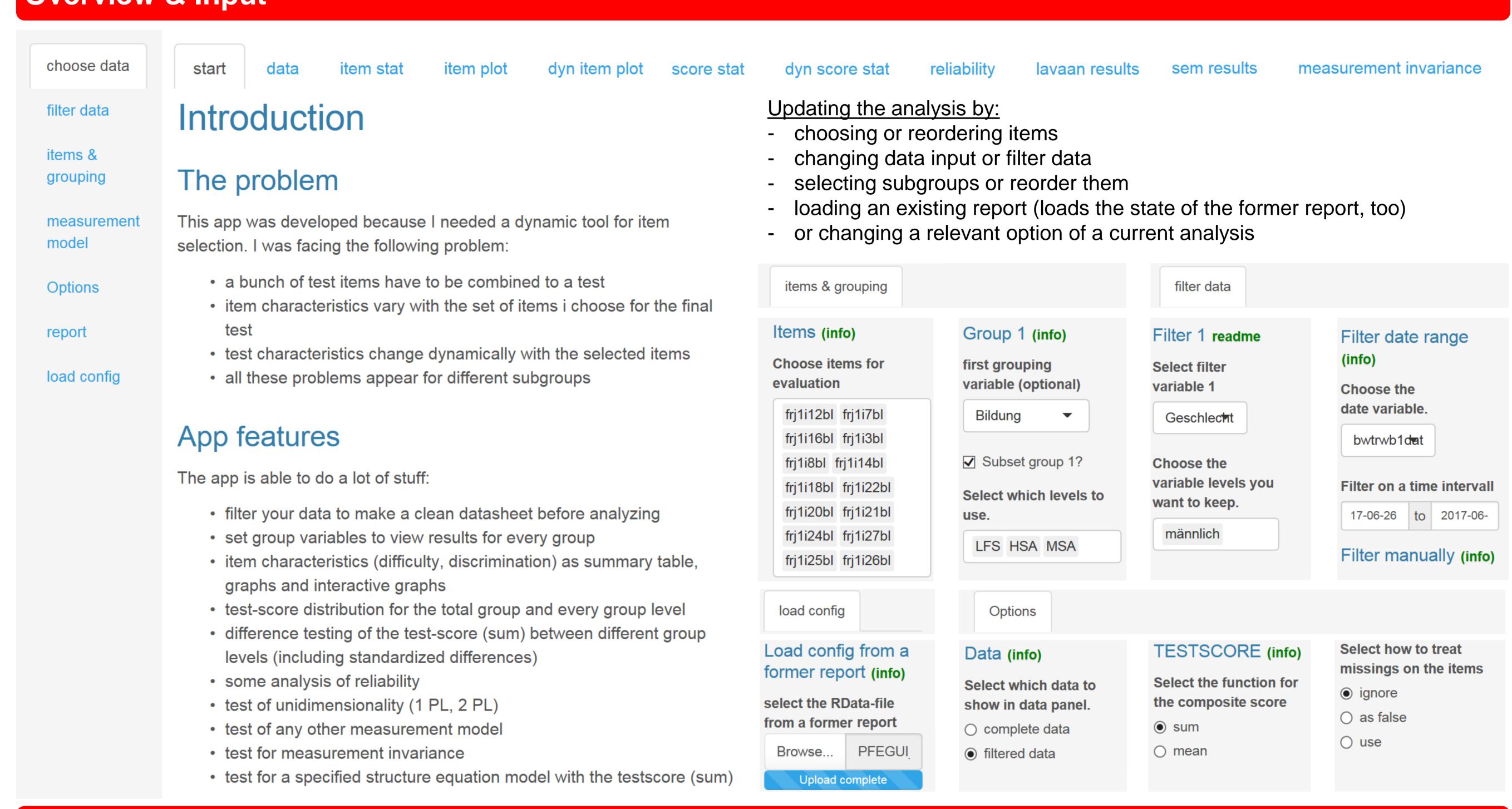
Requirements of the department

Over 70 different tests for psychological diagnostic (e.g. cognitive ability, language, occupational interests and more) are managed by the department and new tests are developed continually.

Standardized procedures may facilitate test development, thus a scientist can focus on project specific tasks and challenges.

Reproducibility and ease of use have to be core features of a statistic tool to meet different levels of experience with R and allow others to collaborate in a concrete test development procedure.

Overview & Input

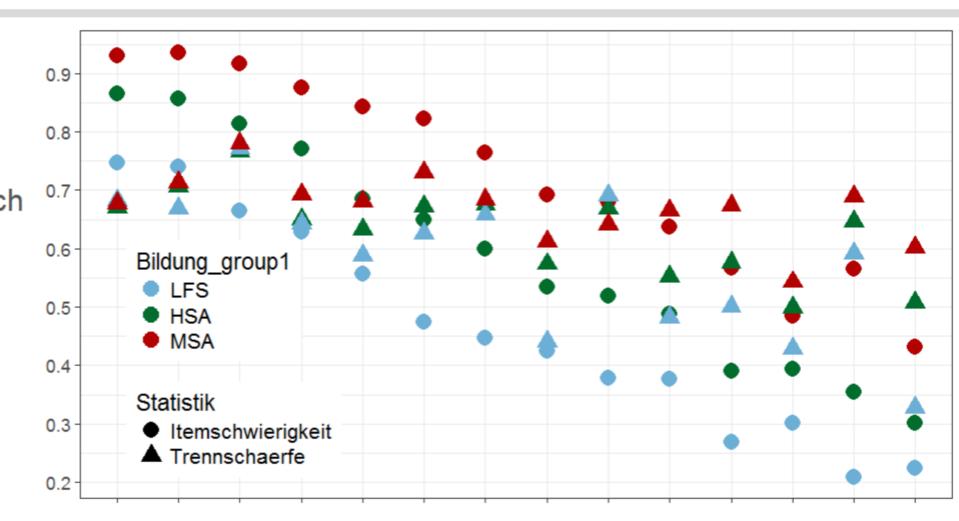


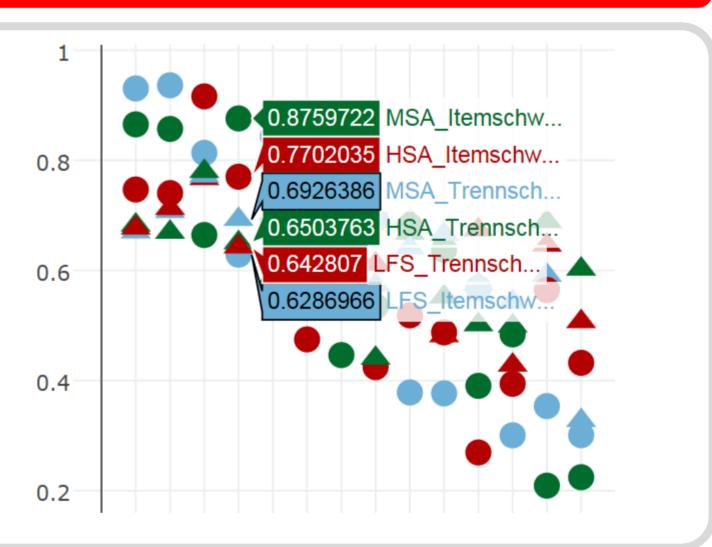
Output

item plot

The panel item plot:

- shows a graph of discrimination and difficulty parameter for each selected item
- ... in the order of the selected items
- ... for each selected group (and group level)



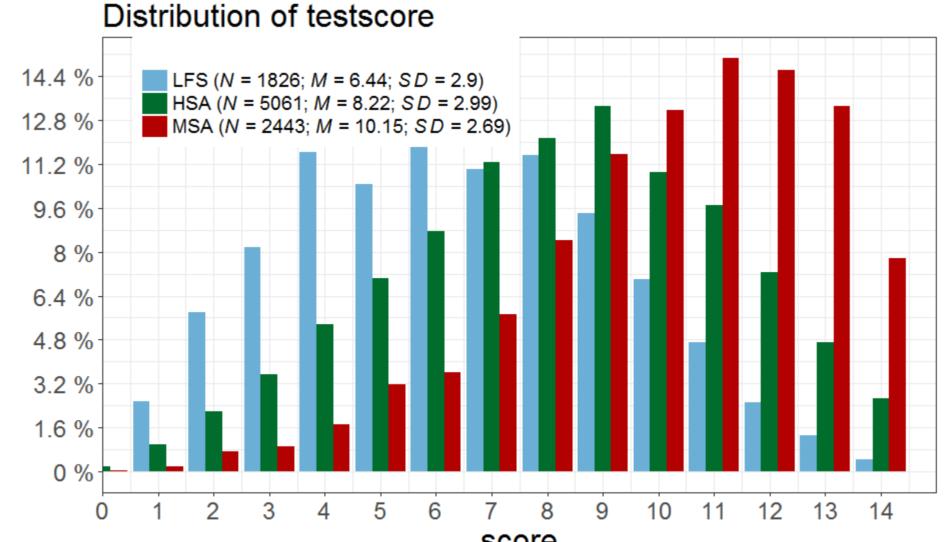


score stat

The panel score stat:

- shows the distribution of the testscore which is the sum of itemscores (ignoring missings)
- can be viewed as relative barplot or density
- shows the results of difference tests (t-tests)
- ... and a standardized mean difference between group levels

N1 	NZ ₩	n1 ₩	n2 ₩	W11 ₩	IVIZ ₩	รบา 🤻	202 €	conens_a =
1826	5061	0.167	0.462	6.441	8.221	2.904	2.987	0.600
5061	2443	0.462	0.223	8.221	10.146	2.987	2.691	0.665



reliability

The panel *reliability*:

- shows some parameter of reliability

 (unidimensional) and among (4 factors)
- (unidimensional) and omega (4 factors))
- shows an indicator of model fit
- everything for each level of all specified groups

group	N	NItems	rmsea	alpha	G2	omegat
LFS	1826	14	0.03	0.69	0.69	0.69
HSA	5061	14	0.04	0.73	0.73	0.73
MSA	2443	14	0.03	0.73	0.73	0.73

lavaan results

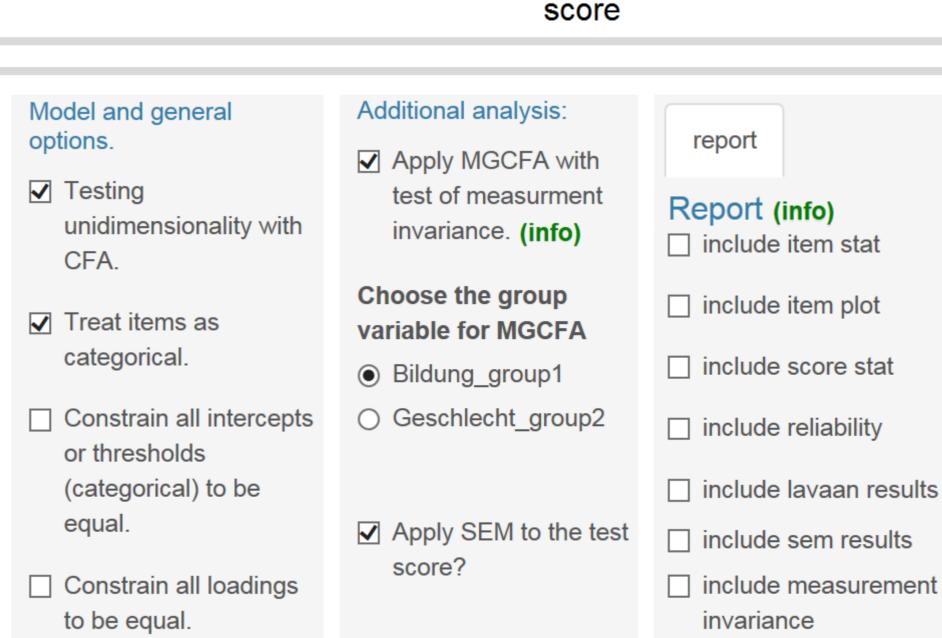
The panel lavaan results:

- shows the results of the applied measurement model
- uses the lavaan package and syntax
- changes directly, when items are added

measurement invariance

The panel measurement invariance:

- shows the result of measurement invariance tests
- uses the appropriate function of the semTools package



It is possible to include your analysis in a report (word-file). Just select which parts of the output panels you would like to see in the report. This capability allows reproducible research.

- 1. Select the results you want to include in the report
- Choose which group to include and their order

the report:

- consists of a word file (the report), the corresponding markdown file and a RData-file (with the data frame and an input-object) in a ziparchive
- can be replicated by executing the markdown file in R(Studio)
- incorporates all your settings from the PFE-GUI into the analysis
 can be adapted by changing the parameters in the input-object (see RData-file)