

Homework assignment

L4: Traditional item analysis

Assignment date: 22.10.2019
Deadline: 28.10.2019 23:59
Slides: <http://www.cs.cas.cz/martinkova/NMST570>
Note: Send answers and R script to hladka@cs.cas.cz
Name:

Run `ShinyItemAnalysis` (online or locally) and change data to HCI.

1 Traditional item analysis

Ex. 1.1 For HCI dataset answer following questions:

1. Which item is the most difficult? [0.25]
2. Which item is the easiest? [0.25]
3. Which item does have the largest discrimination? (use ULI) [0.25]
4. Which item does have the smallest discrimination? (use ULI) [0.25]

Ex. 1.2 Describe properties of items from Ex. 1.1 using Traditional item analysis table.

1. What is the correlation between these items and total score? Briefly comment. [0.75]
2. What is the correlation between these items and rest of items? Briefly comment. [0.75]
3. What is Cronbach's alpha of test without given items? Compare with Cronbach's alpha of the test and briefly comment. [0.75]

Ex. 1.3 Try different **number of groups** and different **groups to compare** for generalized ULI (gULI). Answer following questions:

1. What does happen with gULI when considering 5 groups (comparing the first and the fifth) instead of 3 groups (comparing the first and the third)? Try to explain. [0.5]
2. What does happen with gULI when considering 5 groups and comparing the fourth and the fifth group instead of the first and the fifth group? Try to explain. [0.5]

3. When it would be desired to compare the fourth and the fifth group instead of the first and the fifth (and vice versa)? [0.25]
4. Consider 5 groups and calculate gULI for items 7, 17 and 18 comparing following groups

Groups to compare	Item 7	Item 17	Item 18
First - Second			
First - Third			
First - Fourth			
First - Fifth			
Second - Fifth			
Third - Fifth			
Fourth-Fifth			

Briefly comment the results and try to explain. [2.5]

HINT: You can also calculate discriminations in R using function `gDiscrim()`.

2 Distractor analysis

Ex. 2.1 Choose two items, one with some well functioning distractors and one with some not-so-well functioning distractors. Their wording can be found in a supplemental material of the following paper:

<https://doi.org/10.1187/cbe.16-10-0305>

Display distractor plots of chosen items and try to describe the functioning of the distractors with respect to their wording.

Besides description, attach also distractor plots of these items (you can use Download button under the figure in application) and wording of the items. [1]

3 Try it in R

Ex. 3.1 Using **Selected R code** from application, create R script including:

1. Loading of HCI data [0]
2. Discrimination/Difficulty plot for 5 groups and comparing the second group and fourth group [0.5]
HINT: Use function `DDplot()` from `ShinyItemAnalysis` package.
3. Traditional item analysis table including gULI with the same setting as previously [0.5]
HINT: Use function `ItemAnalysis()` from `ShinyItemAnalysis` package.
4. Distractor plots for items from Ex. 2.1. [0.5]
HINT: Use function `plotDistractorAnalysis()` from `ShinyItemAnalysis` package.

4 Provide feedback

Here you can provide feedback on lecture, lab session and/or materials (slides, HW assignment, `ShinyItemAnalysis` manual) [1pt bonus] :)