Tutorial 1 Factor analysis(http://tbates.github.io/Multivariate-Stats-Course)

1. Find and load the dataset (in the psych package).
    - what columns contain the Big-Five Inventory data?
2. Find a package in R that does parallel analysis
    - What is it's name?
    - What is the name of the function?
    - *tutor note*: Share the package and function we wish to work with to the group.
3. Read the help
    - What parameters does this parallel analysis function take?
    - What do they do?
4. Use the function to determine how many factors are in the bfi dataset
    - Do rows with missing data break paran?
    - Does parallel analysis function need to be given *just* the columns you need to analyse?
    - How many complete.cases exist in these personality data?

    - Run the function?
    - How many factors exist in these personality data?
    - What is a scree plot and how do you plot it with this function?
5. Find R's built in factor analysis function
    - What is it?
    - *tutor note* - share this answer with the class if they don't get it
    - What parameters does this function need?
    - What are its options? Discuss.
6. Run an fa, extracting the predicted number of factors from paran
    - What does uniqueness mean?
    - Are items fairly unique in general?
    - Was what you ran by default oblique or orthogonal?
    - What is the name of an oblique rotation?

    - *tutor-note* share the correct answer before continuing.
7. Use the oblique rotation
    - Is the structure "simple" now?
    - What does that mean?
    - What are the factors? (Name them based on high loadings)
    - What do the empty cells mean?
8. Try and alter how the result prints out
    - The factor analysis object has a special print method, which supports sorting and hiding small values!

    - Are the factors independent?
    - What component of the print out tells us this?
9. Create scores for each subject (hint, the factor analysis function has a scores parameter)
10. Add these to the dataset.

Bravo!

Extra credit if you finish early

1. Try doing all of this with IQ data set Holzinger from
2. Do an FA on some of your own data, or… anything else: practise creates skill.
3. Play with the options to paran and factanal

To prepare for next week's tutorials and lectures

1. Install the package
2. Read the help, and run one model from its help examples
3. Advanced credit: Try and re-run one of the factor analyses using

Scientific as opposed to statistical Questions:

1. Do you think personality has 5 or 6 major domains?
2. Is the BFI data good?
3. What would happen to the parallel analysis if we sampled facets better?
4. What could go wrong if the data have a hierarchical structure like we know personality does?