Assignment 1

Network Analysis 2018

Please submit your answers in a `.pdf` file containing your report and a `.R` file containing your codes (use comments to indicate where you are answering each question) to Canvas *before* 13:00 Thursday November 8. .

Please work through the (very) short introduction to R (on Canvas and available at `https://cran.r-project.org/doc/contrib/Torfs+Brauer-Short-R-Intro.pdf`) *before* starting this assignment. You can skip section 11 on programming.

Practical questions

Question 1:

```
a <- c(8, NA, 20, 5, 7, 9)
mean(a)


## [1] NA
```

a. This gives `NA`, why? Compute the mean using an argument of the `mean()` function. *[0.25p]*

b. Now, remove the `NA` from the vector instead and compute the mean. *[0.25p]*

Question 2:

a. Create the following matrix in `R` and store the result in an object *[0.5p]*

$$\begin{bmatrix} 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

b. Install and load the qgraph package and run the function `qgraph(input)` with the object containing your matrix as input. Copy the resulting plot in your report. *[0.5p]*

Question 3:

a. Install and load the R package `psych` into R. Once `psych` is loaded, load the 'bfi' dataset:

```
# Load bfi dataset:
data(bfi)

# Look at data:
View(bfi)
```

Where can you find more information about this dataset and what the variables represent? *[0.25p]*

b. How many men are in the sample? And how many women? *[0.5p]*

c. What is the mean age of the subjects? *[0.25p]*

d. Create a separate dataset containing only the first 25 columns (the items). Use the psych package to perform an "Exploratory Factor Analysis" (EFA) on this dataset with 5 factors, using "promax" rotation. Where did you find the information needed to perform a EFA using the psych package? *[1.5p]*

e. Make a plot of the estimated factor loadings using the `qgraph.loadings` function of the *qgraph* package. Tip, you might need the `loadings` function. *[1p]*

Question 4

A company wants to know how job performance relates to IQ, motivation and social support. They collect data from 60 employees, which you can find in the file `job_performance.sav` on Canvas.[1] The company made the crucial mistake of asking academics to analyze the data, who cannot afford a copy of SPSS. Hence, we need to analyze the data using R.

a. To load the data, we need to set the working directory. What is a working directory? And how do we set it? *[0.25p]*

b. Load the data into R as a data frame. Tip, the *foreign* package contains a function for this, but it requires an argument `to.data.frame=TRUE`. There are also other packages you can use. *[0.25p]*

c. Compute and report the correlation matrix of the four numeric items *[0.5p]*

---

[1] I have taken this example from https://www.spss-tutorials.com/linear-regression-in-spss-example/

d. Run the following command:

```
fit <- lm(perf ~ iq + mot + soc, data = mydata)
```

Where `mydata` is the object containing your dataset. What analysis did you perform? *[0.25p]*

e. Investigate the object `fit` to see if IQ is a significant predictor of performance. *[0.5p]*

Question 5

Now that you learned how to easily read spss files into R, read the `PTSDdata.sav` (the data is available on Canvas). The dataset has been used in the paper by Epskamp & Fried (2018), which is also available on Canvas. This paper explains methods we will use later in the course, so you could read it if you want to work ahead, but you don't have to read it for the current assignment.

a. Load the data into R (remember the tip in the previous exercise!), then create a new subset of the data, called *PTSDsubset*, which includes only the columns 10 to 30. *[0.25p]*

b. Rename the variables in your new dataset (PTSDsubset) according to the table below. Tip: your first column represents lifetime trauma, while the rest represent symptoms. *[0.25p]*

Variable	Description
1	Lifetime trauma
2	Intrusive thoughts
3	Nightmares
4	Flashbacks
5	Emotional cue reactivity
6	Psychological cue reactivity
7	Avoidance of thoughts
8	Avoidance of reminders
9	Trauma-related amnesia
10	Negative beliefs
11	Blame of self or others
12	Negative trauma-related emotions
13	Loss of interest
14	Detachment
15	Restricted affect
16	Irritability/anger
17	Self-destructive/reckless behavior
18	Hypervigilance
19	Exaggerated startle response
20	Difficulty concentrating
21	Sleep disturbance

c. Compute and report the correlation matrix of *only* the symptoms, rounded by two digits *[0.5p]*

d. Calculate the sum-score of the symptoms *nightmares* and *sleep disturbance.* *[0.25p]*

e. Find a way to investigate the correlation between *lifetime trauma* and the symptom *nightmares.* Is the correlation significant? Report both the correlation and the *p*-value. *[1p]*

f. Find a way to investigate the *partial correlation* between *lifetime trauma* and *nightmares*, after controlling for *negative trauma-related emotions.* Again, report both the correlation and the *p*-value. What happened? Can you explain why this happened? *[1p]*

Bonus Question

On Canvas you can find the file `studentdata.csv`, which includes the data we collected from all of you. Use R to make a nice visualization of the data. You can use the entire dataset or only a part of the dataset and any packages or means of visualization you would like to use. *[1p extra]*