R for Psychology Research

Week 3 - Exercises

Marcus Lindskog

1. Packages, Package management and the `Tidyverse`

1. What are the R functions that installs and loads a R package?
2. What is the R function that detaches/unloads a R package from your current session?
3. You can install multiple packages in a single function call. Write a line of code with a single function call to install the packages `nlme`, `BayesFactor`, `psych`, and `broom`.
4. Find and install two packages that can help you run *Linear Mixed-Effects Models*.
5. For each package, find an example of how to fit a simple generic linear mixed-effects model, and include that example in your script.
6. The package `psych` includes a lot of useful functions for psychologists. Install and load the package. What does the `alpha` and `rescale` functions of this package do?
7. The `psych` package also includes several data sets, for example the `bfi` data set that we have explored previously. Have a look at the `iqitems` and `msq` data sets and give a short description of what they include.
8. What function call would you use to have access to a data set in a package in your work environment?
9. Load the `iqitems` data set to your work environment and use the `alpha` function to calculate Cronbach's alpha for the four first variables.
10. Find and install the package `BayesFactor` that can help you run *Bayesian t-tests*.
11. Write a script that simulates 1000 experiments with 100 participants each that produce values on a single normally distributed variable `simdata` with mean .2 and standard deviation 1 (Hint: use the function `rnorm`). For each experiment, do a Bayesian t-test (`ttestBF`) and a classical t-test (`t.test`) and evaluate for how many experiments that the two types of tests come to the conclusion that $\mu_{simdata} > 0$. For this exercise, we will say that a Bayesian t-test comes to this conclusion if $bf > 1$ and that the classical t-test does so if $p < .05$. (Hint: To access the Bayes factor `bf` from an object called `BF_test` use `BF_test@bayesFactor$bf`. To access the p value `pvalue` from an object called `t_test` use `t_test$p.value`).

2. Examination Exercises

The solution to the exercises in this section should be handed in as a part of the examination. Your solution should be contained in a single R-script that is emailed to `marcus.lindskog@psyk.uu.se`. Your code should be well commented and easy to follow. Answers to any questions below should be written as a comment in the R-script after the code that produces the answer.

For this exercise you will write one (1) script that does all of the below described tasks.

1. Load 5 (five) packages that are not a part of base R. Make sure to comment your code to give a short description of what each packages does.
2. Give an example of the functionality of one (1) function each from your five loaded packages. Comment your code such that it is clear what the function does.

3. Load the collection of packages called `Tidyverse`.
4. Which packages are attached when you load the `Tidyverse`? What version of the `Tidyverse` and each separate package is loaded?
5. Install and load the package `plyr`. You get an error message that some objects are **masked**. What does that mean and what do you need to do i you want to use functions from both `plyr` and `dplyr`?
6. What version of R are you currently running and on which platform? What packages, other than base packages, are attached to your current R session? Write a line of code that gives you this information.