

Introduction to R

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Fall 2017

Intro to R

Demonstrate the following in R:

- read in and manipulate tabular data
- basic statistics
- graphing

This tutorial assumes you're brand new to R. The goal is to learn getting the data into R and do basic analysis.

A little about R

- A statistical computing environment with its own language
- Released in 2000; an open source implementation of S
- Highly regarded for its statistical and graphical facilities
- Maintained by volunteers
- <https://www.r-project.org/>
- Easy interface with RStudio

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R basics - functions

- R uses *functions* to do things.
- Functions take *arguments* to specify how, or to what, to do those things.
- Example:
 - `read.csv(file="scores.csv")`
- `read.csv` is a function to import a CSV file and `file` is an argument that specifies which file to import.

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R basics - running functions

An R script is a text file that contains all your R code. R scripts allow you to save, edit, reproduce and share your code.

Two common ways to run code:

1. From the command line; type the function and hit Enter
2. In an R script; type the name of an R script, hit Enter to execute all code in the script

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R basics - assignment

- We often need to save a function's result or output. For this we use the assignment operator: `<-`
- For example, when you import a CSV file you need to give it a name:

```
scores <- read.csv(file="scores.csv")
```

- Now we can use `scores` as an argument to other functions. For example, compute summary statistics for each column in the data:

```
summary(scores)
```

- **Note:** Use `Alt + -` (Win) or `Option + -` (Mac) in RStudio to quickly insert `<-`. You can also use `=` for assignment.

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R basics - packages

- All functions belong to *packages*. The `read.csv` function is in the `utils` package.
- R comes with about 30 packages (called "base R"), but as of January 2017 there are close to 10,000 user-contributed packages!
- Example: `ggplot2` is a popular package that adds functions for creating graphs in a different way than what base R provides
- To use functions in a package, the package must be installed and loaded. (They're free)
- You only *install* a package once.
- You *load* a package whenever you want to use its functions.

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Useful ways of getting data into R

- For delimiter-separated files, use `readr` package, <https://cran.r-project.org/web/packages/readr/README.html>
- For reading/writing Excel files, use `openxlsx` package, <https://cran.r-project.org/web/packages/openxlsx/index.html>. Alternatively, `readxl` by Hadley Wickham for Excel reading only, <https://github.com/tidyverse/readxl>
- For reading data from Clipboard, use `psych::read.clipboard.tab` or
- For fixed-width files, use `read.fwf` or `readr::read_fwf` functions

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