Getting Started with R

How are R and R Studio Related?

- R is a statistical programming language that runs data and statistical analysis.

- RStudio is a powerful user interface to R with many convenient features that makes the use of R easier.

- We will use R with RStudio, but there are other user interfaces that some people use.

- Unless you have prior programming experience (or have a preference for another text editor), it is recommended that you use RStudio.

- At its simplest, you can think the difference between R and R Studio with the help of a useful analogy: R is like a car's engine while RStudio is like a car's dashboard!
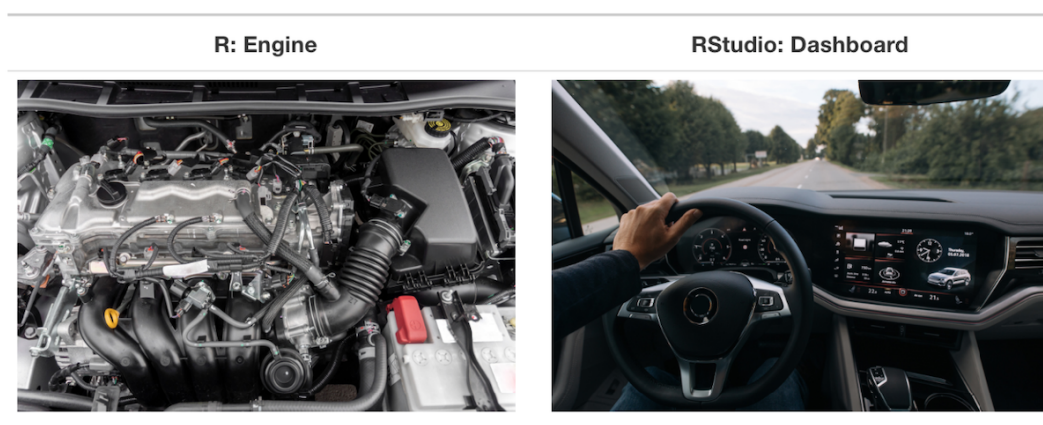

Figure A1: The Difference Between R and R Studio, *Source: Modern Dive*

Installing R and R Studio

- We need to install R *before* installing RStudio.

- Please make sure to select the installer appropriate for your operating system.

Video Tutorials

- Chris Bail at Duke University has an instructive video that shows how to install R and RStudio step by step. You can find Bail's video here.

- If you have difficulty in following Bail's video tutorial for installation, you can find Rutgers Data Librarian Ryan Womack's video useful, which goes at a slower pace. You can find Womack's video here.

Written Tutorial

- If you instead want a written tutorial for installation the following links will be helpful:
    - **For installing R:** Go to Cran and follow the instructions for installing R.
    - **For installing RStudio:** Go to RStudio and follow the instructions for installing RStudio.

Using R via RStudio: Opening R Studio

- After installing R and R Studio, you'll have two new programs/applications you can open on your computer.

- To work in R, we'll *always* open RStudio.

- When you first open RStudio, you will see something similar to Figure A2 with three main windows:
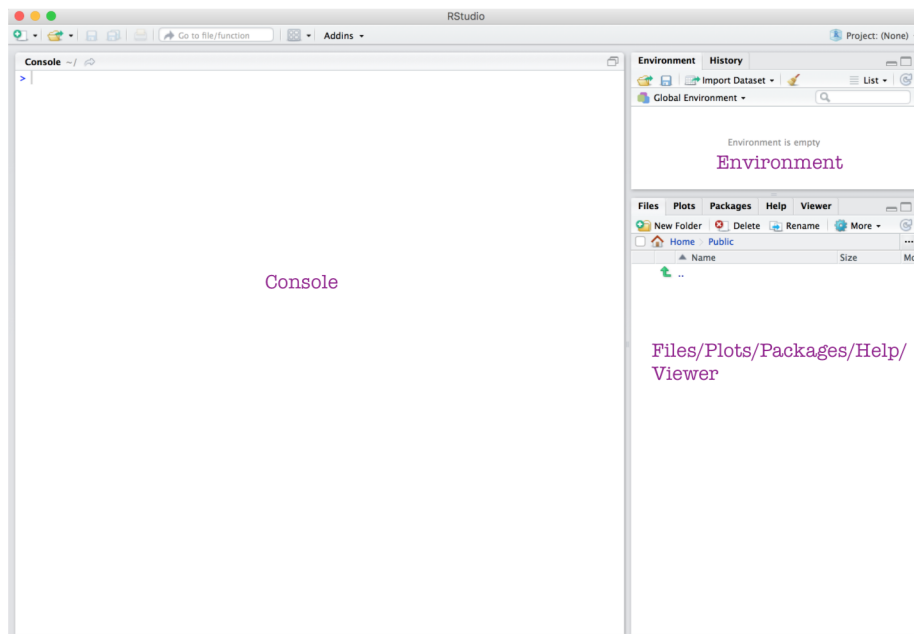

Figure A2: RStudio interface to R, three main windows

- Once you open files, such as R scripts, a text editor window will also open in the top left.

- If you only see three main windows, let's open a new R script file, which will activate the text editor window. To do this click File → New File → R Script.

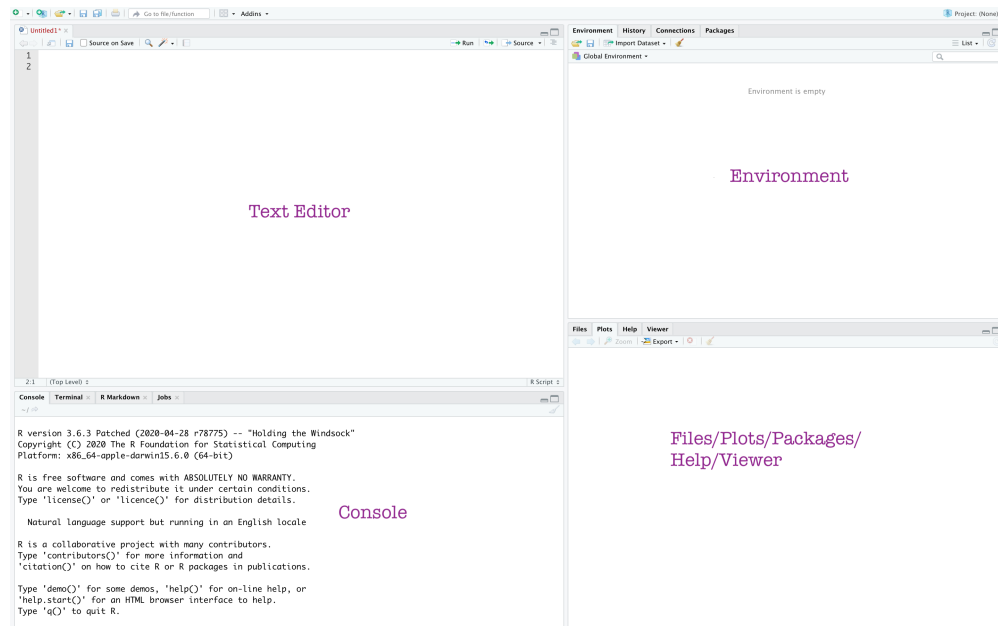- You should see something similar to Figure A3 with four main windows:

Figure A3: RStudio interface to R, opening the Text Editor Window/R Script, four main windows

How do I begin using R?

- Statistical software programs like Excel, or SPSS provide *point-and-click interfaces.*

- Unlike these programs, R is an *interpreted language.* This means that we have to type in commands written in R code.

- We will explore these in detail in the workshop, but you can do some quick tryouts to get familiar with the structure of R.

Console Window (bottom left window)

- Console window is the bottom left window in your RStudio.

- You can think this window as your scratch paper. Here, you can do some quick computations by using R as a calculator or try out some commands.

- Let's do some quick trials. Type the following in your console and and hit <enter> or <return>:

- The console will show the output of any commands you type.

```
5 + 82
```

```
5 + 82
```

```
5 - 3
```

```
50 * 4
```

```
10^2
```
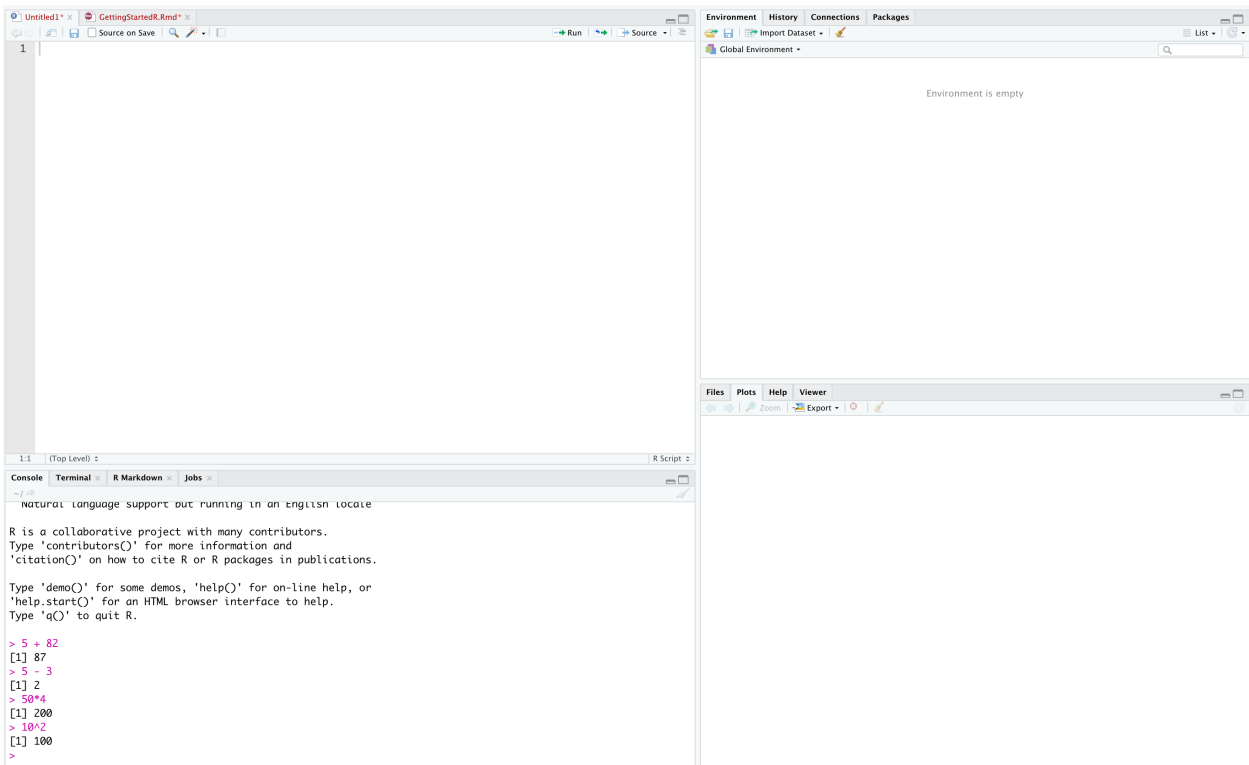
- Your screen should look like Figure A4:

Figure A4: RStudio interface to R, Console

Text Editor Window (upper left window)

- Once we open an R script file in RStudio, the text editor will appear as one of the windows. It can then be used to write our code.

- Text editor window is the main place where we will tell R what we want to do.

- You can think this as your main notebook. When we are conducting an analysis in R, we will save our R Script and work inside of it.

- Let's do some quick trials. Type the following in your text editor window:

```
2 + 2
```

```
sum22 <- 2 + 2
```

- To run a command on your R script:

  - Place your cursor at the end of the line of code (far right), and hit <command + return> on a Mac; <control + return> on Windows.

  - Or, place your cursor at the end of the line of code (far right), and click 'Run' in the top right corner of the upper-left window. [1]

- After you execute the code, you will see the result in your console for the first code. You will see the second code in your console and it will also pop up in your environment. We will discuss why this happens in the workshop.

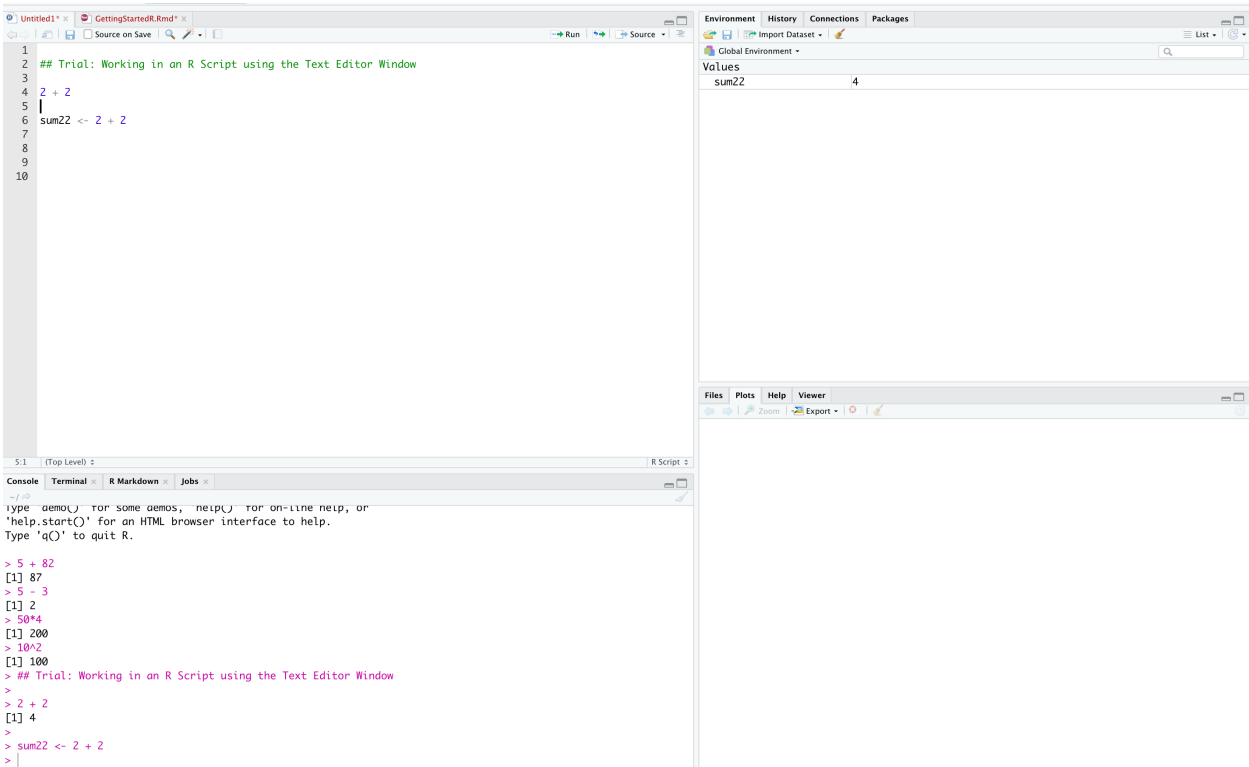- Your screen should look like Figure A5:

Figure A5: RStudio interface to R, Text Editor/R Script

---

[1]Source: Katie McCabe's MLE book

Environment/History Window (upper right window)

- The upper right lists R objects and a history of executed R commands.

Files/Plots/Help/Viewer Window (bottom right window)

- The bottom right will show multiple things: (1) files that are in your working directory, (2) graphs that you create, (3) help documents, (4) other features.

  We will revise these steps and continue with working in and preparing an R script in the workshop. Feel free to send an email and/or post a message on Slack if you have any questions.

  Hope to see you soon!