

Intro to R

RStudio

Working with R – RStudio

RStudio is an Integrated Development Environment (IDE) for R

- It helps the user effectively use R
- Makes things easier
- Is NOT a dropdown statistical tool (such as Stata)
 - See [Rcmdr](#) or [Radiant](#)
- All R Studio snapshots are taken from <http://ayeimanol-r.net/2013/04/21/289/>



source(<https://www.rstudio.com/>)

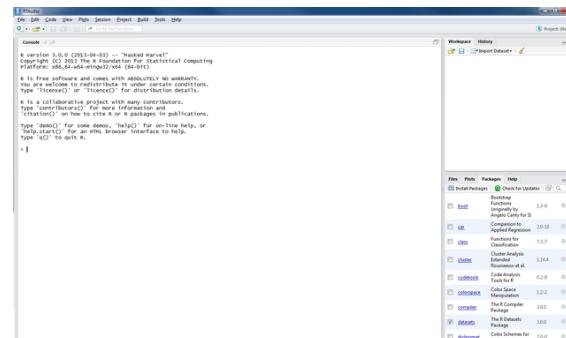
RStudio

Easier working with R

- Syntax highlighting, code completion, and smart indentation
 - Easily manage multiple working directories and projects

More information

- Workspace browser and data viewer
 - Plot history, zooming, and flexible image and PDF export
 - Integrated R help and documentation
 - Searchable command history



Working with R in R Studio - 2 major panes:

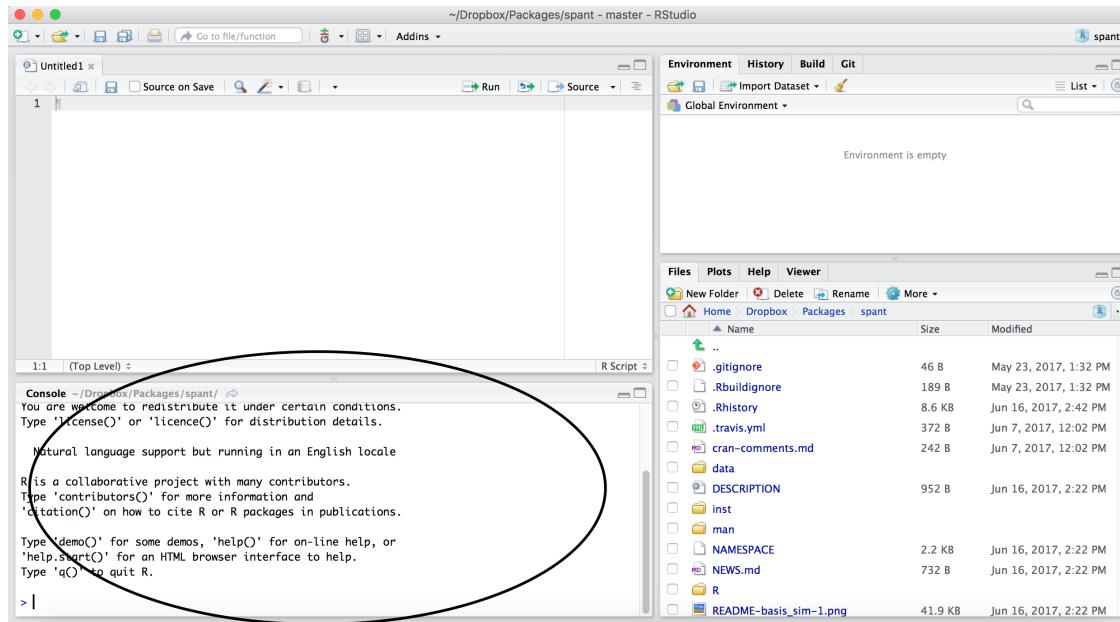
1. The **R Console**: “interprets” whatever you type

- Calculator
- Creating variables
- Applying functions

2. The **Source/Editor**: “Analysis” Script + Interactive Exploration

- Static copy of what you did (reproducibility)
- Try things out interactively, then add to your script

R Console

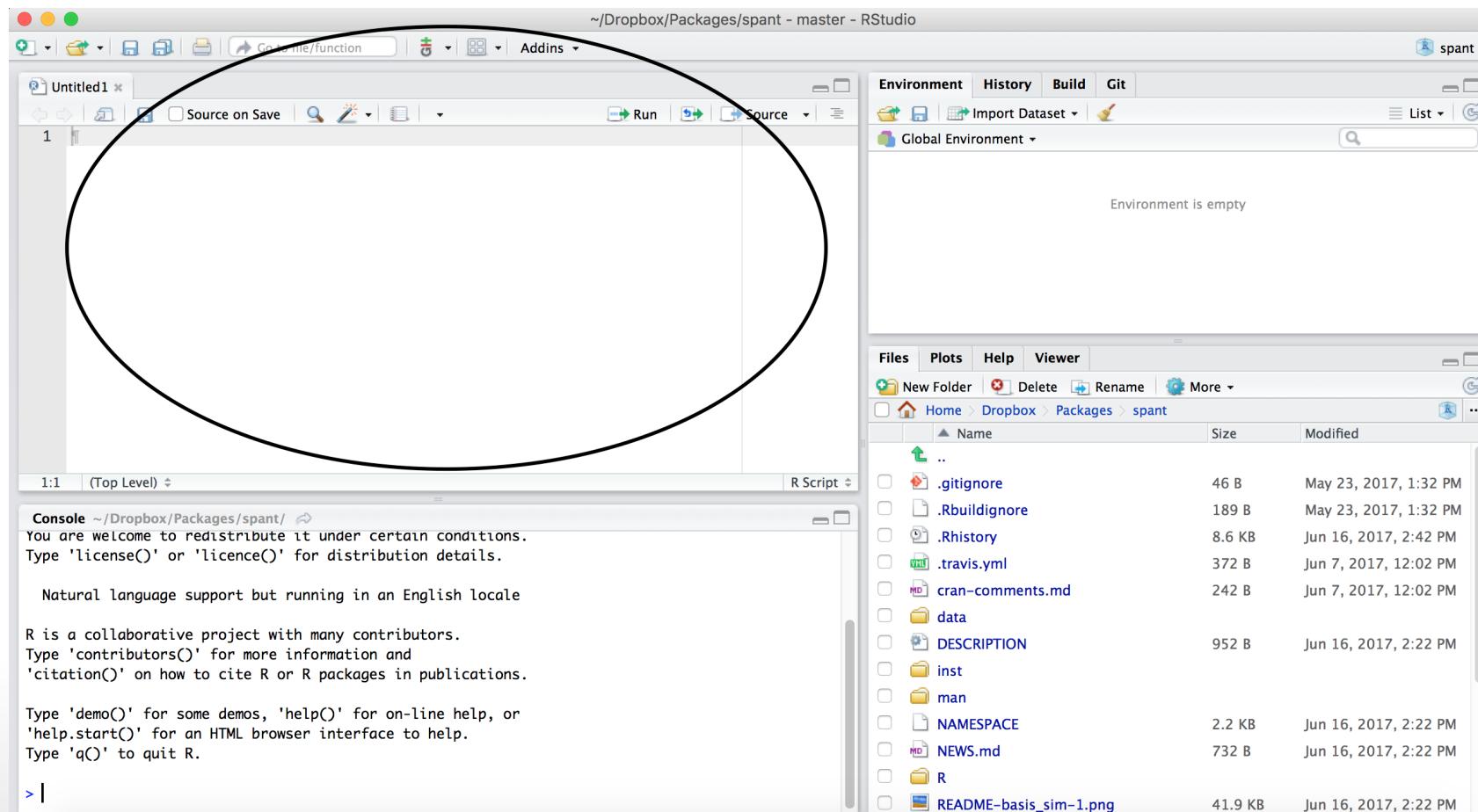


- Where code is executed (where things happen)
- You can type here for things interactively
- Code is **not saved** on your disk

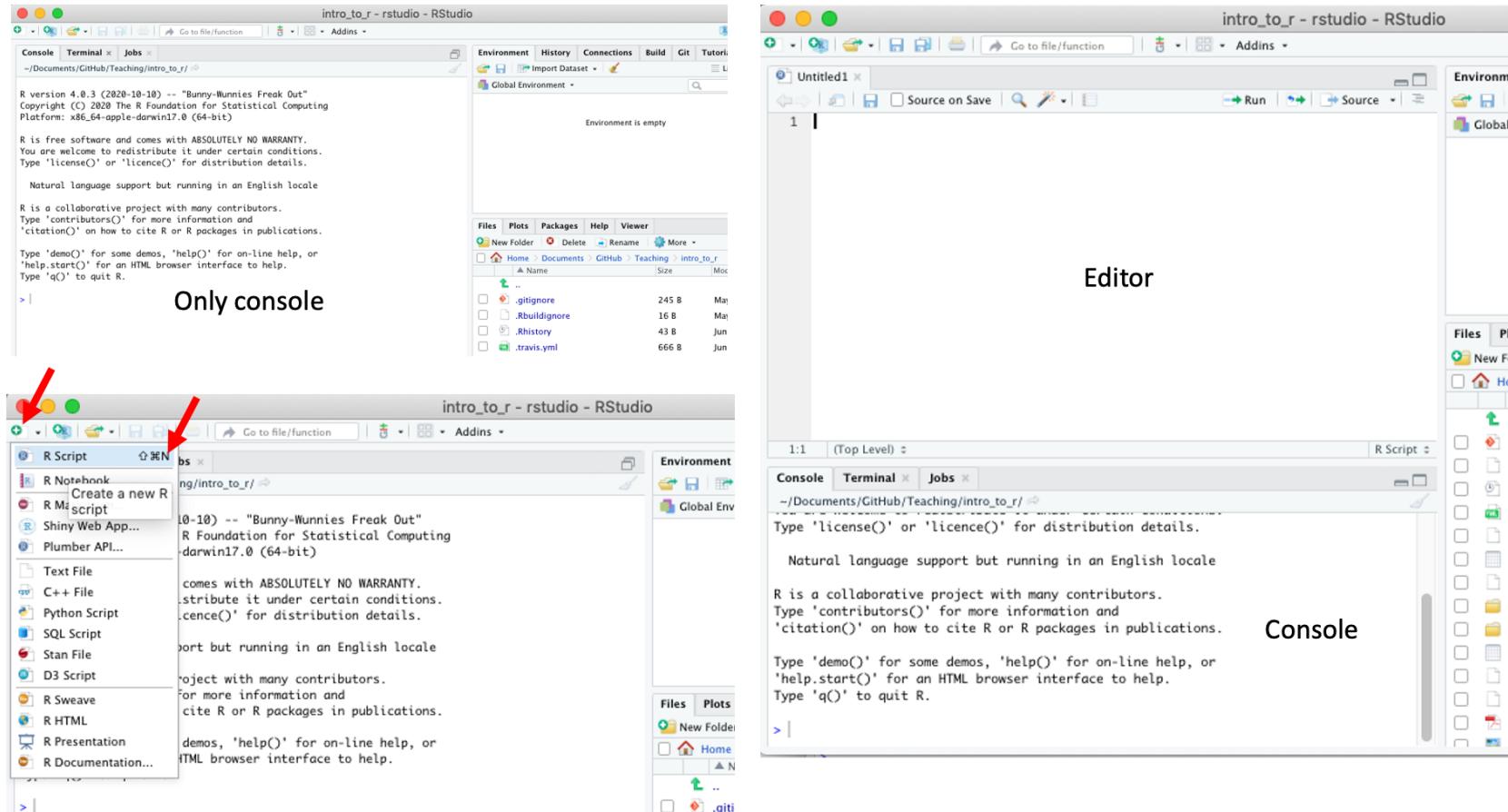
Source Editor

- Where files open to
- Have R code and comments in them
- Can highlight and press (CMD+Enter (Mac) or Ctrl+Enter (Windows)) to run the code

In a .R file (we call a script), code is saved on your disk



Getting the editor



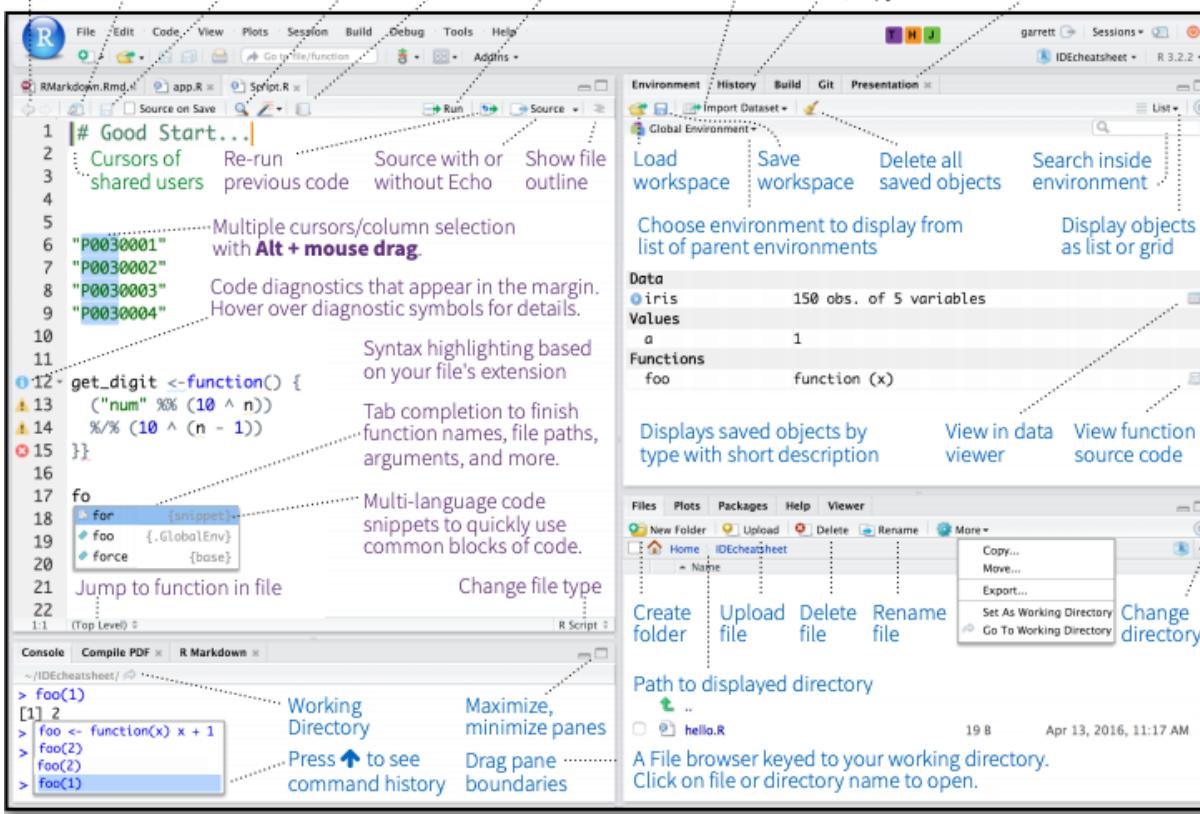
RStudio

Super useful “cheat sheet”:

<https://github.com/rstudio/cheatsheets/raw/master/rstudio-ide.pdf>

Write Code

Navigate tabs Open in new window Save Find and replace Compile as notebook Run selected code



R Support

Import data with wizard History of past commands to run/copy Display .RPres slideshows
File > New File > R Presentation

R essentially is a command line with
a set of functions loaded

R Uses Functions, in Packages

- R revolves around **functions**
 - Commands that take input, performs computations, and returns results
 - Functions are enclosed in **packages**
 - When you download R, it has a “base” set of functions/packages (**base R**)
 - You can install additional packages for your uses from [CRAN](#) or [GitHub](#)
 - These additional packages are written by RStudio or R users/developers (like us)
 - Think of them as “R Extensions”



Using Packages

- You **need to be familiar with base R** - answers on Google commonly use it
- We will focus on newer and **more intuitive** ways to do things (tidyverse), not in base R
- RStudio (the company) makes a lot of great packages
- Not all packages available on CRAN or GitHub are trustworthy
- Who wrote it? **Hadley Wickham** is a major authority on R (Employee and Developer at RStudio)
- How to trust an R package: <http://simplystatistics.org/2015/11/06/how-i-decide-when-to-trust-an-r-package/>



(source: <https://twitter.com/hadleywickham>)

Let's take a look at R Studio
ourselves!

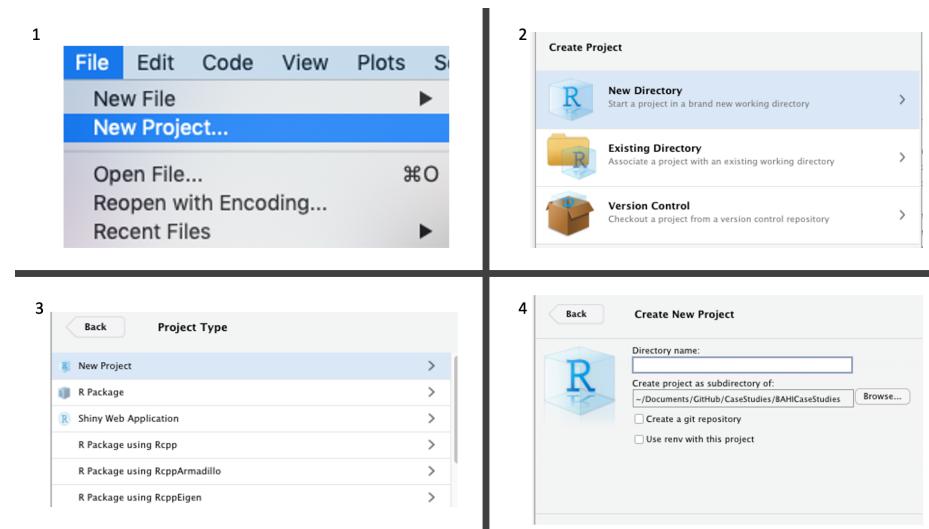
RStudio

Let's start by making an RStudio "Project".

1. Helps you organize your work.
2. Helps with working directories (discussed later).
3. Allows you to easily know which project you're on.

Go to File → New Project → New Directory → New Project

Call your Project "Intro_to_R"



R Markdown file

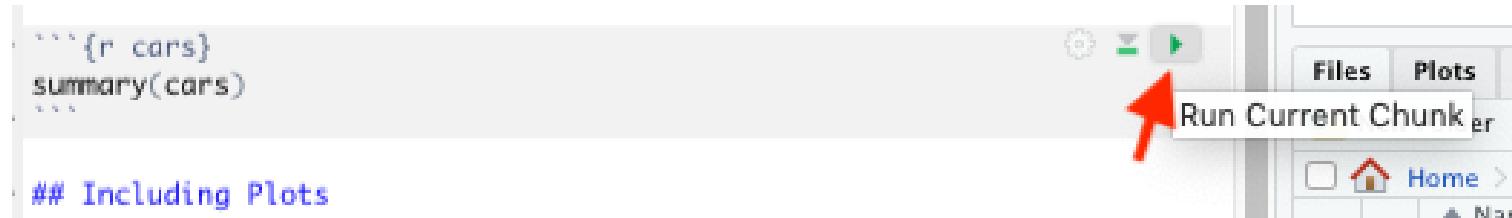
R Markdown files (.Rmd) help generate reports that include your code and output. Think of them as fancier scripts.

1. Helps you describe your code
2. Allows you to check the output
3. Can create many different file types

Code chunks

Within R Markdown files are code “chunks”

This is where you can type R code and run it!



A screenshot of the RStudio interface. On the left, there is a code editor window containing R code:

```
```{r cars}
summary(cars)
```

## Including Plots
```

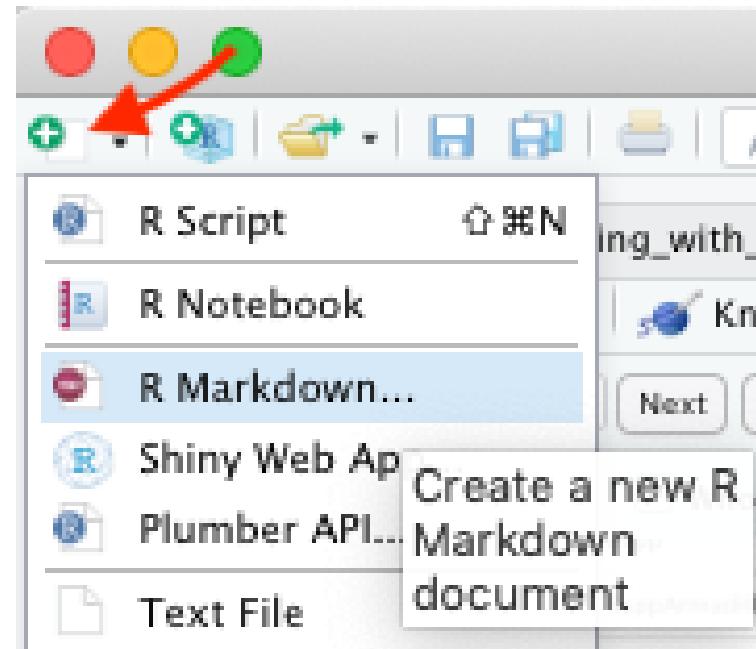
On the right, the RStudio toolbar is visible, featuring several icons. A red arrow points to the "Run Current Chunk" icon, which is a green square with a white play symbol. The toolbar also includes icons for file operations like "New File" and "Save", and plot-related functions like "Plots" and "View".

Knit

Create an R Markdown file

Go to File → New File → R Markdown

Call your file “first_markdown”



RStudio layout

The screenshot displays the RStudio desktop application window titled "intro_to_r - rstudio - RStudio".

Code Editor: The left pane shows an R Markdown document named "Untitled1". The code includes setup code for knitr, followed by a section titled "# R Markdown". It contains two code chunks: one for generating a GitHub-style README and another for generating a presentation slide.

```
1 ---  
2 title: "first_markdown"  
3 output: html_document  
4 ---  
5  
6 ```{r setup, include=FALSE}  
7 knitr::opts_chunk$set(echo = TRUE)  
8 ````  
9  
10 ## R Markdown  
11  
12 This is an R Markdown document. Markdown is a simple formatting syntax for  
authoring HTML, PDF, and MS Word documents. For more details on using R  
Markdown see <http://rmarkdown.rstudio.com>.  
13  
14 When you click the **Knit** button a document will be generated that includes  
both content as well as the output of any embedded R code chunks within the  
document. You can embed an R code chunk like this:  
15  
16 ```{r cars}  
2:23 # first_markdown
```

Environment: The top right pane shows the Global Environment, which is currently empty.

File Browser: The bottom right pane shows the file structure under "GitHub > Teaching > intro_to_r".

| Name | Size | Modified |
|-------------------------------------|---------|------------------------|
| .. | | |
| .gitignore | 245 B | May 18, 2021, 11:11 AM |
| .Rbuildignore | 16 B | May 18, 2021, 11:11 AM |
| .Rhistory | 43 B | Jun 10, 2021, 11:11 AM |
| .travis.yml | 666 B | Jun 9, 2021, 11:11 AM |
| all_functions.xlsx | 13.4 KB | Jun 8, 2021, 3:11 PM |
| all_the_functions.csv | 57.3 KB | Jun 8, 2021, 3:11 PM |
| all_the_packages.txt | 211 B | May 18, 2021, 11:11 AM |
| Arrays_Split | | |
| Basic_R | | |
| Best_Model_Coefficients.csv | 587 B | May 18, 2021, 11:11 AM |
| Best_Model_Coefficients.xlsx | 3.8 KB | May 18, 2021, 11:11 AM |
| bibliography.bib | 599 B | May 18, 2021, 11:11 AM |
| black_and_white_theme.pdf | 45.1 KB | May 18, 2021, 11:11 AM |
| bloomberg_logo_small_horizontal.png | 25.4 KB | May 18, 2021, 11:11 AM |

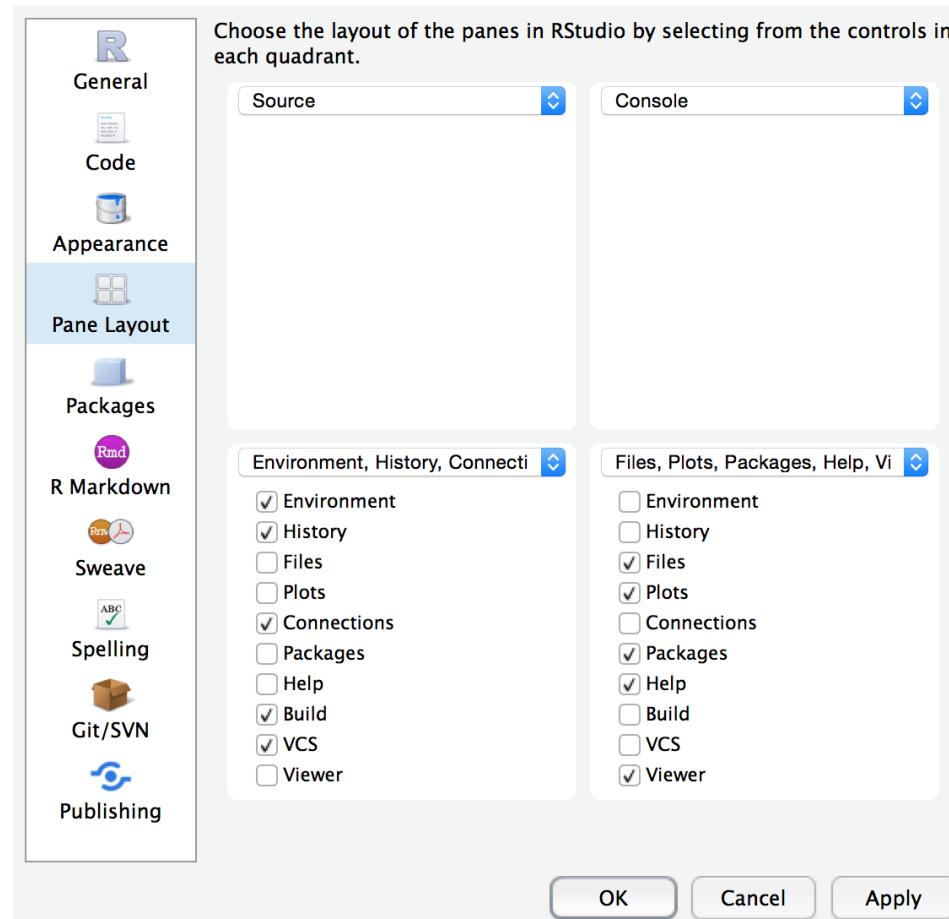
Console: The bottom left pane shows the R console output, including the R welcome message and basic help information.

```
~/Documents/GitHub/Teaching/intro_to_r /  
You are welcome to read source/late.R under certain conditions.  
Type 'license()' or 'licence()' for distribution details.  
  
Natural language support but running in an English locale  
  
R is a collaborative project with many contributors.  
Type 'contributors()' for more information and  
'citation()' on how to cite R or R packages in publications.  
  
Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.  
> |
```

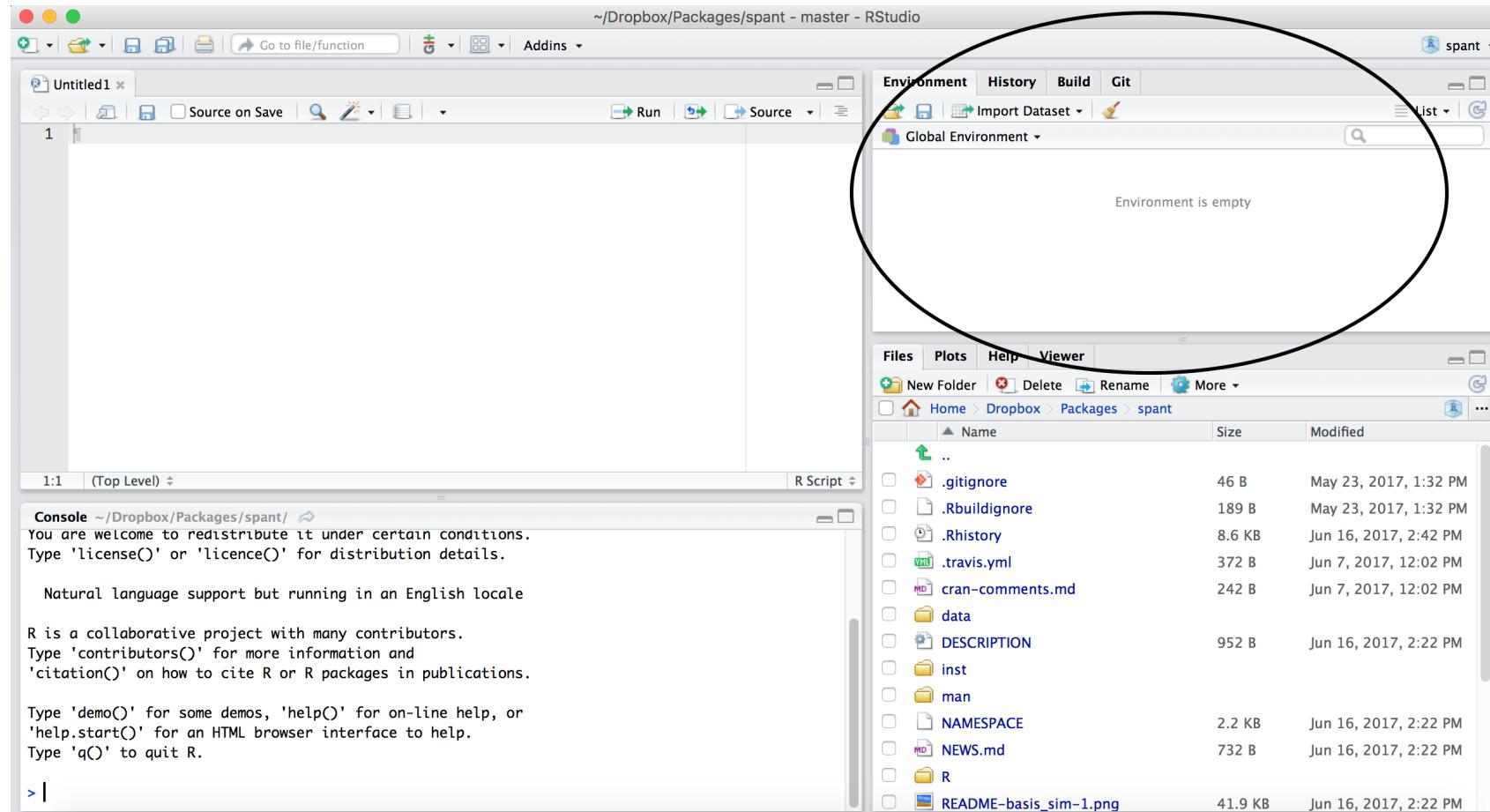
RStudio Layout

If RStudio doesn't look the way you want (or like our RStudio), then do:

RStudio → Preferences → Pane Layout



Workspace/Environment



Workspace/Environment

- Tells you what **objects** are in R
- What exists in memory/what is loaded?/what did I read in?

History

- Shows previous commands. Good to look at for debugging, but **don't rely** on it as a script. Make a script!
- Also type the “up” key in the Console to scroll through previous commands

Other Panes

- **Files** - shows the files on your computer or the directory you are working in
- **Viewer** - can view data or R objects
- **Help** - shows help of R commands
- **Plots** - pretty pictures and figures
- **Packages** - list of R packages that are loaded in memory

Useful R Studio Shortcuts

- Ctrl + Enter (Cmd + Enter on OS X) in your script evaluates that line of code
 - It's like copying and pasting the code into the console for it to run.
- Ctrl+1 takes you to the script page
- Ctrl+2 takes you to the console
- http://www.rstudio.com/ide/docs/using/keyboard_shortcuts

Lab: Starting with R and RMarkdown

[Starting with R](#)

Using the Viewer

The `View` command allows you to view data in a spreadsheet format. Run the following command:

```
View(mtcars)
```

Website

Website