

RStudio

Introduction to R for Public Health Researchers

Working with R

- The R Console “interprets” whatever you type
 - Calculator
 - Creating variables
 - Applying functions
- “Analysis” Script + Interactive Exploration
 - Static copy of what you did (reproducibility)
 - Try things out interactively, then add to your script

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
 - When you download R, it has a “base” set of functions/packages (**base R**)
- Functions are enclosed in packages
 - These written by R users/developers (like us) - **some are bad**
 - Think of them as “R Extensions”

Using Packages

- You **need to know base R** - answers on Google commonly use it
- We will show you some newer and **more intuitive** ways to do things, not in base R
- RStudio (the company) makes a lot of great packages
- **Hadley Wickham** writes a lot of them (Employee and Developer at RStudio)
 - One authority on all things R
 - How to trust an R package: <http://simplystatistics.org/2015/11/06/how-i-decide-when-to-trust-an-r-package/>

RStudio (the software)

RStudio is an Integrated Development Environment (IDE) for R

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

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

RStudio

Super useful “cheat sheet”:

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

RStudio/R Console

The screenshot shows the RStudio interface with the following components:

- Top Panel:** Contains the source editor (Untitled1) and the environment/history/build/git tabs. The environment tab shows "Global Environment" and "Environment is empty".
- Bottom Panel:** Contains the console and the file explorer. The console shows the following text:

```
1:1 (Top Level)
Console ~/Dropbox/Packages/spant/
You are welcome to redistribute it 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.
> |
```
- File Explorer:** Shows the file structure of the "spant" package. The files and folders listed are:

Name	Size	Modified
..		
.gitignore	46 B	May 23, 2017, 1:32 PM
.Rbuildignore	189 B	May 23, 2017, 1:32 PM
.Rhistory	8.6 KB	Jun 16, 2017, 2:42 PM
.travis.yml	372 B	Jun 7, 2017, 12:02 PM
cran-comments.md	242 B	Jun 7, 2017, 12:02 PM
data		
DESCRIPTION	952 B	Jun 16, 2017, 2:22 PM
inst		
man		
NAMESPACE	2.2 KB	Jun 16, 2017, 2:22 PM
NEWS.md	732 B	Jun 16, 2017, 2:22 PM
R		
README-basis_sim-1.png	41.9 KB	Jun 16, 2017, 2:22 PM

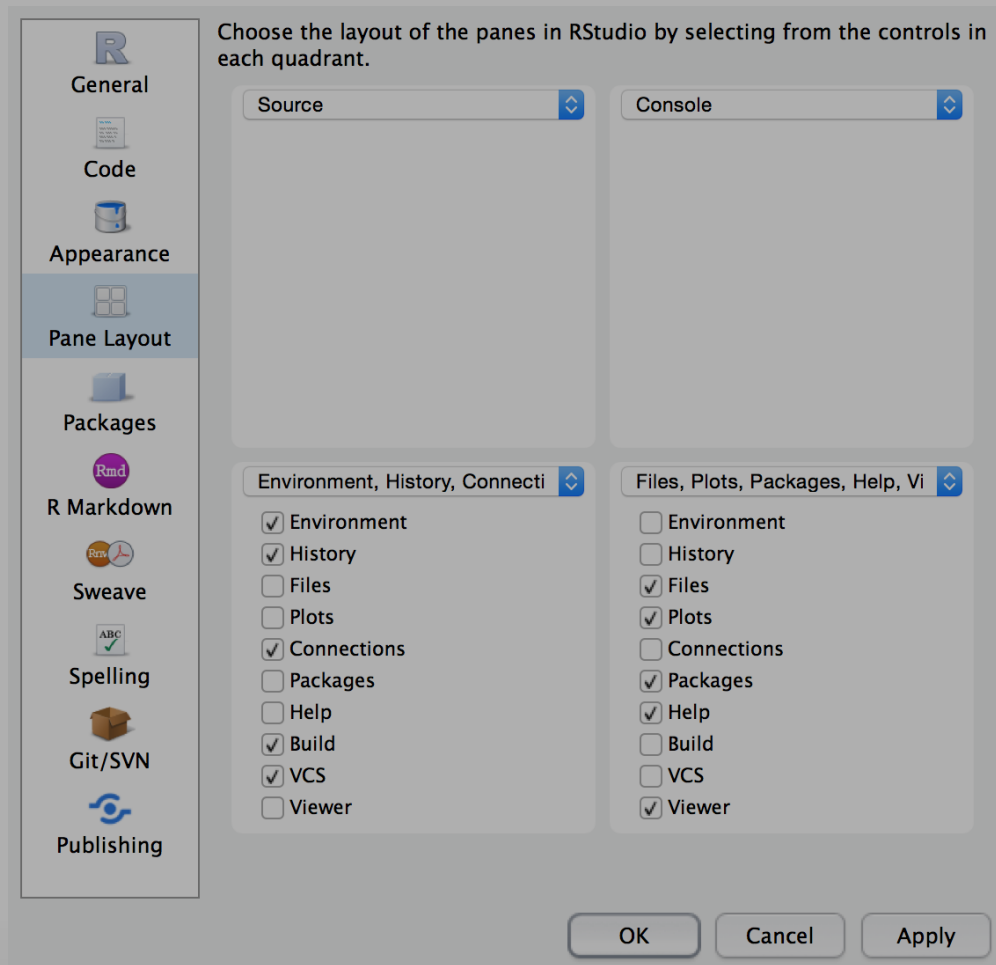
RStudio/R Console

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

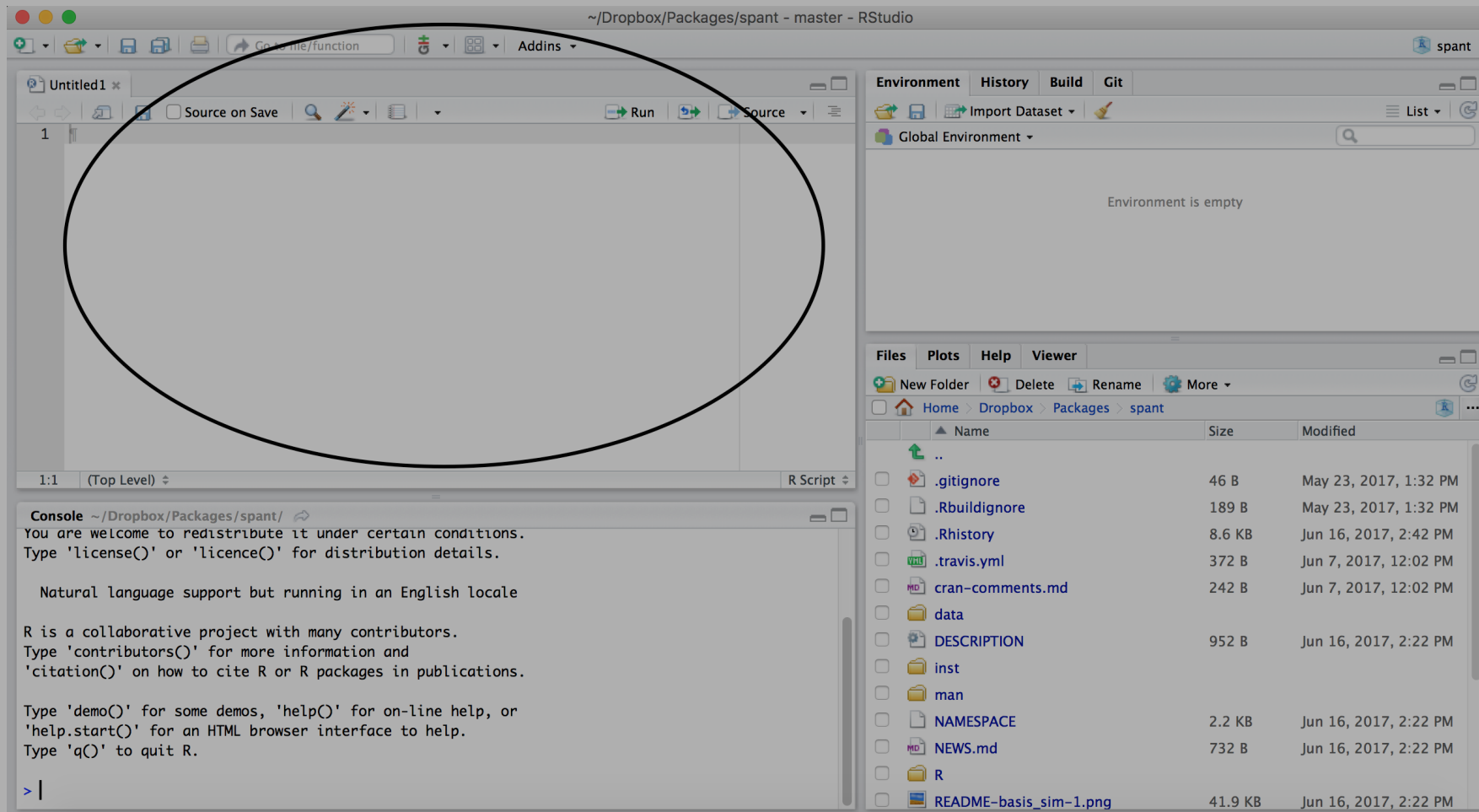
RStudio Layout

If RStudio doesn't look like this (or our RStudio), then do:

RStudio → Preferences → Pane Layout



Source/Editor



The screenshot shows the RStudio Source/Editor window. The main editor area is empty and circled in black. The console shows the R startup message. The file explorer on the right shows the project structure.

Console:

```
~/Dropbox/Packages/spant/
You are welcome to redistribute it 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.

> |
```

File Explorer:

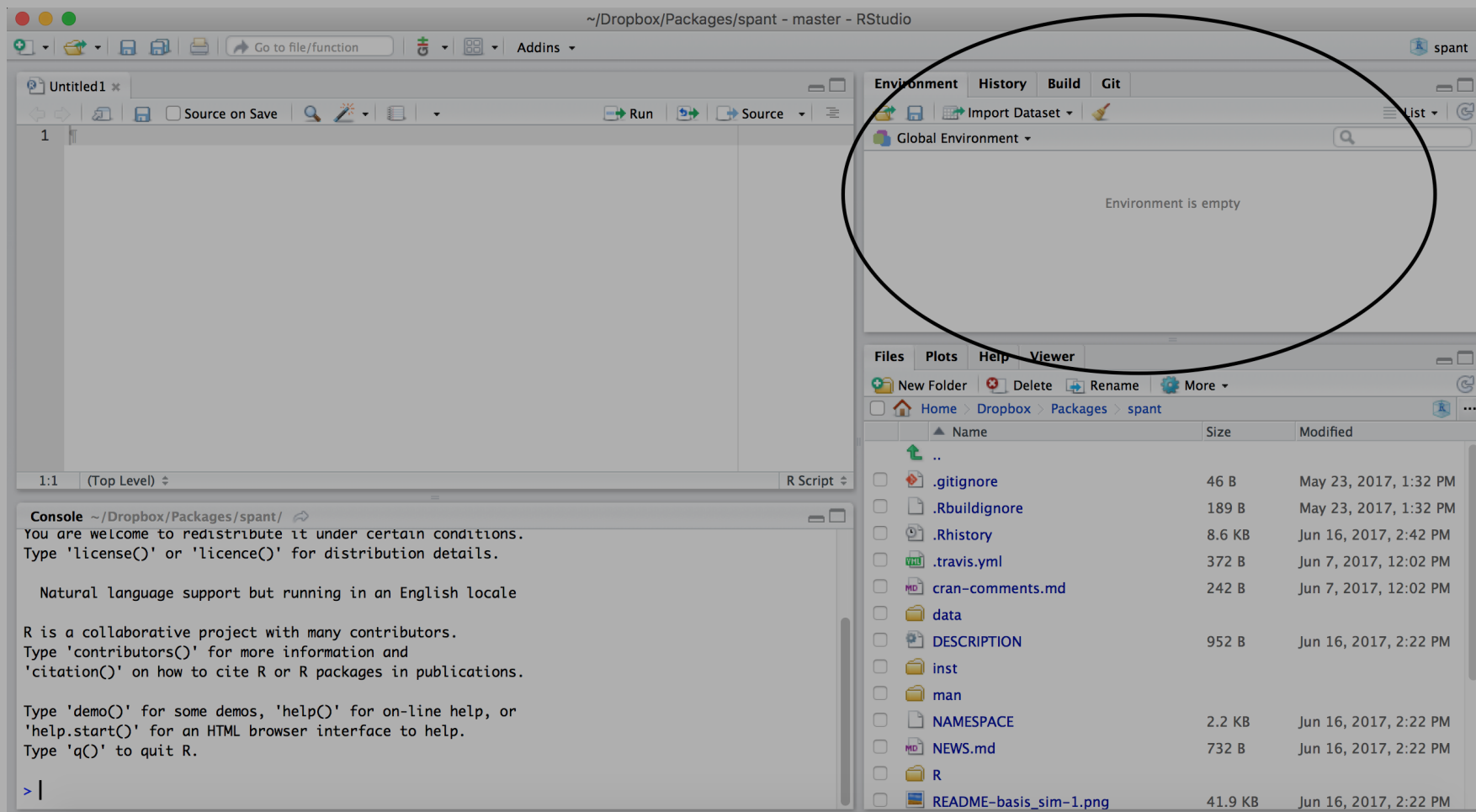
Name	Size	Modified
..		
.gitignore	46 B	May 23, 2017, 1:32 PM
.Rbuildignore	189 B	May 23, 2017, 1:32 PM
.Rhistory	8.6 KB	Jun 16, 2017, 2:42 PM
.travis.yml	372 B	Jun 7, 2017, 12:02 PM
cran-comments.md	242 B	Jun 7, 2017, 12:02 PM
data		
DESCRIPTION	952 B	Jun 16, 2017, 2:22 PM
inst		
man		
NAMESPACE	2.2 KB	Jun 16, 2017, 2:22 PM
NEWS.md	732 B	Jun 16, 2017, 2:22 PM
R		
README-basis_sim-1.png	41.9 KB	Jun 16, 2017, 2:22 PM

Source

- 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

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 of the directory you are working in
- **Viewer** - can view data or R objects
- **Help** - shows help of R commands
- **Plots** - pretty pictures
- **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

Website

Website