

# R1: Download + Intro to R & Rstudio

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# Introduction to R



Artwork by @allison\_horst

# What is R?

- A programming language
- Focus on statistical modeling and data analysis
- Useful for epidemiology, biostatistics, and data science
- Great visualizations



# What is RStudio?

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R: Engine



RStudio: Dashboard



## Modern Dive

- R is a programming language
- RStudio is an integrated development environment (IDE)
  - An interface to use R (with perks!)

# We open RStudio on our computer (not R!)

## 1.1.2 Using R via RStudio

Recall our car analogy from earlier. Much as we don't drive a car by interacting directly with the engine but rather by interacting with elements on the car's dashboard, we won't be using R directly but rather we will use RStudio's interface. After you install R and RStudio on your computer, you'll have two new *programs* (also called *applications*) you can open. We'll always work in RStudio and not in the R application. Figure 1.2 shows what icon you should be clicking on your computer.

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R: Do not open this



RStudio: Open this

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FIGURE 1.2: Icons of R versus RStudio on your computer.

# So let's take some time to download each!

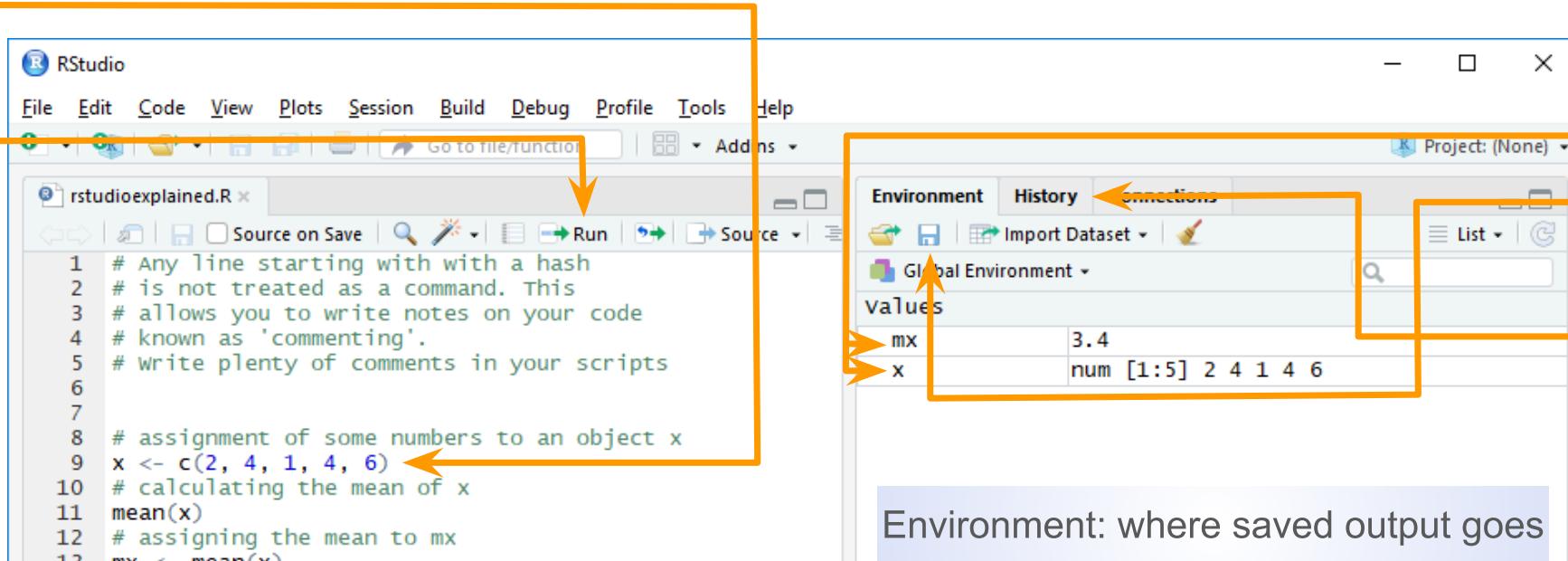
- Use this link to start: <https://posit.co/download/rstudio-desktop/>
- I will click on this link!
- You must install R first
  - Even if you have R installed already, I highly recommend installing the latest version
  - In the future, you will periodically want to update this
- Install RStudio Desktop Open Source License (second)
- If you get them both installed, then you can open up RStudio and start checking it out

# RStudio anatomy

## BuzzR

### Script file

Write code here  
To run code put your cursor on the line and click the **run button**  
Edit to correct errors  
    ⇒ record of commands that worked  
Save scripts with the **.R** extension  
    ⇒ syntax will be highlighted  
    ⇒ good practice  
**<-** is the assignment operator  
    ⇒ puts what is on the right in to the object on the left  
    ⇒ Assign results if you want to use them again

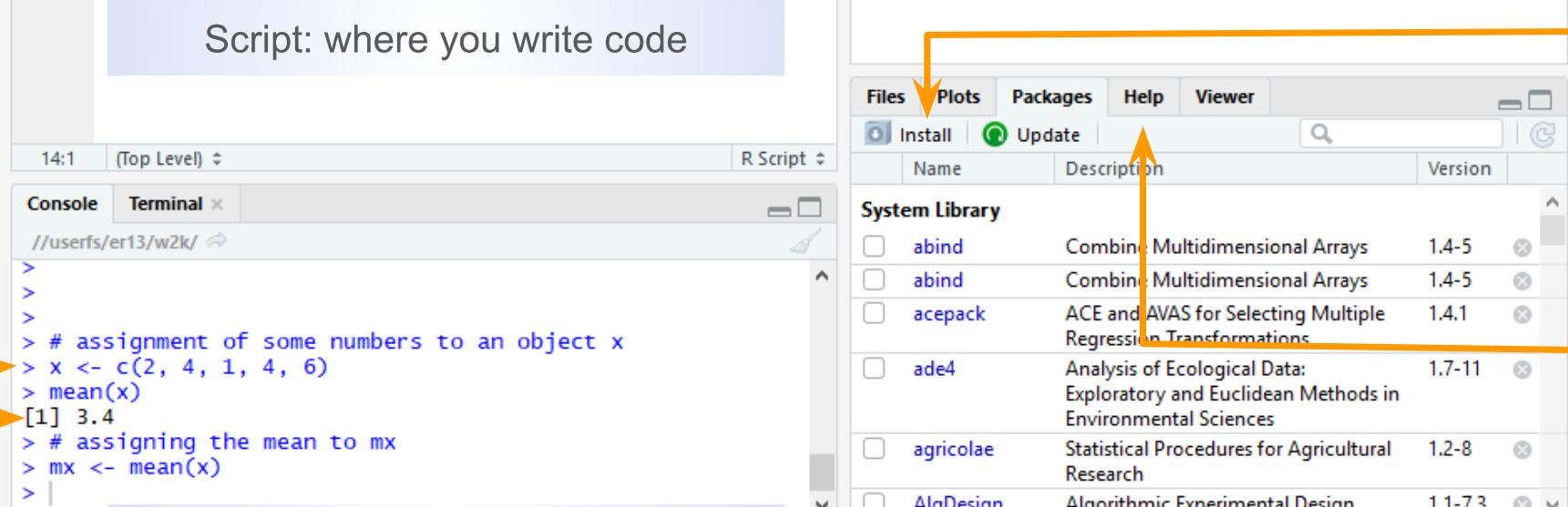


```
1 # Any line starting with a hash
2 # is not treated as a command. This
3 # allows you to write notes on your code
4 # known as 'commenting'.
5 # write plenty of comments in your scripts
6
7
8 # assignment of some numbers to an object x
9 x <- c(2, 4, 1, 4, 6)
10 # calculating the mean of x
11 mean(x)
12 # assigning the mean to mx
13 mx <- mean(x)
14
```

### Script: where you write code

When you click run, code is sent to the console and executed  
**>** is the prompt  
    ⇒ do not type it  
    ⇒ appears when R is ready for next command  
Command output goes here by default  
    ⇒ output is in a different colour  
    ⇒ [1] indicates 3.4 is the first element of the output  
    ⇒ many commands will not have output, the prompt just reappears

### Console: where output goes



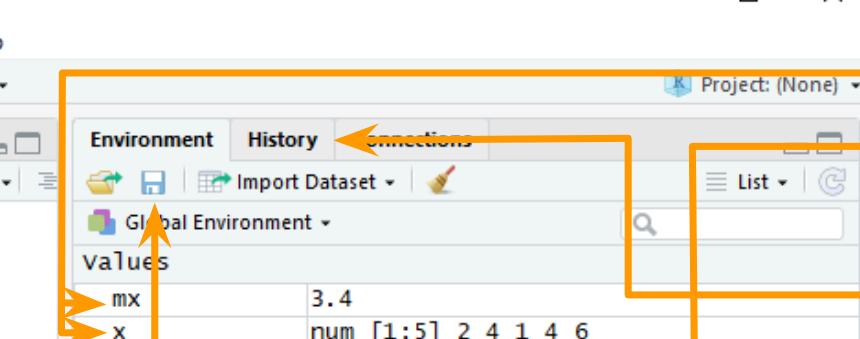
```
14:1 (Top Level) <--> R Script
Console Terminal <-->
> //users/er13/w2k/
>
> # assignment of some numbers to an object x
> x <- c(2, 4, 1, 4, 6)
> mean(x)
[1] 3.4
> # assigning the mean to mx
> mx <- mean(x)
>
```

<https://buzzrbeeline.blog/>

Emma Rand

### Environment

Name objects by assignment to use them again  
All the objects you created in your session  
Saving the environment saves all the objects, but not the code with a **.RData** extension

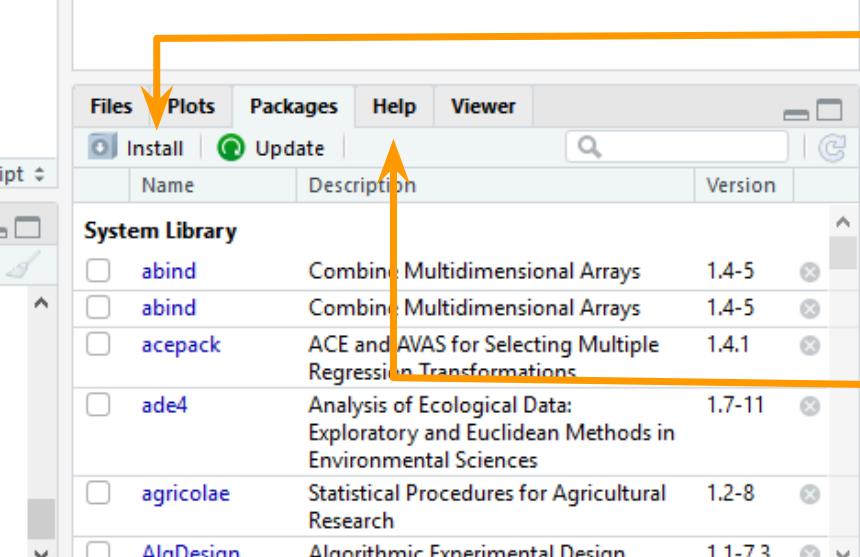


Environment History Connections

Global Environment

Values	mx	3.4
x	num	[1:5] 2 4 1 4 6

### Environment: where saved output goes



Files Plots Packages Help Viewer

Install Update

Name	Description	Version
abind	Combines Multidimensional Arrays	1.4-5
abind	Combines Multidimensional Arrays	1.4-5
acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
ade4	Analysis of Ecological Data: Exploratory and Euclidean Methods in Environmental Sciences	1.7-11
agricolae	Statistical Procedures for Agricultural Research	1.2-8
AlgDesign	Algorithmic Experimental Design	1.1-7.3

### Packages

Many functions come with R  
A huge amount of extra functionality is available in packages  
Packages can be installed by clicking the Install button

### Help

Access to manual pages for all installed packages

### Plots

Figure output appears here

