Data I/O

Data Wrangling in R

R Basics

Explaining output on slides

In slides, a command (we'll also call them code or a code chunk) will look like this

```
head(mtcars)
```

```
                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

And then directly after it, will be the output of the code.

These slides were made in R using `knitr` and `R Markdown` (covered later today when we discuss reproducible research)

R variables

A few reminders: * You can create variables from within the R environment and from files on your computer * Use “<-” to assign values to a variable name * Variable names are case-sensitive, i.e. X and x are different

```
x <- 2
x
```

```
[1] 2
```

```
x * 4
```

```
[1] 8
```

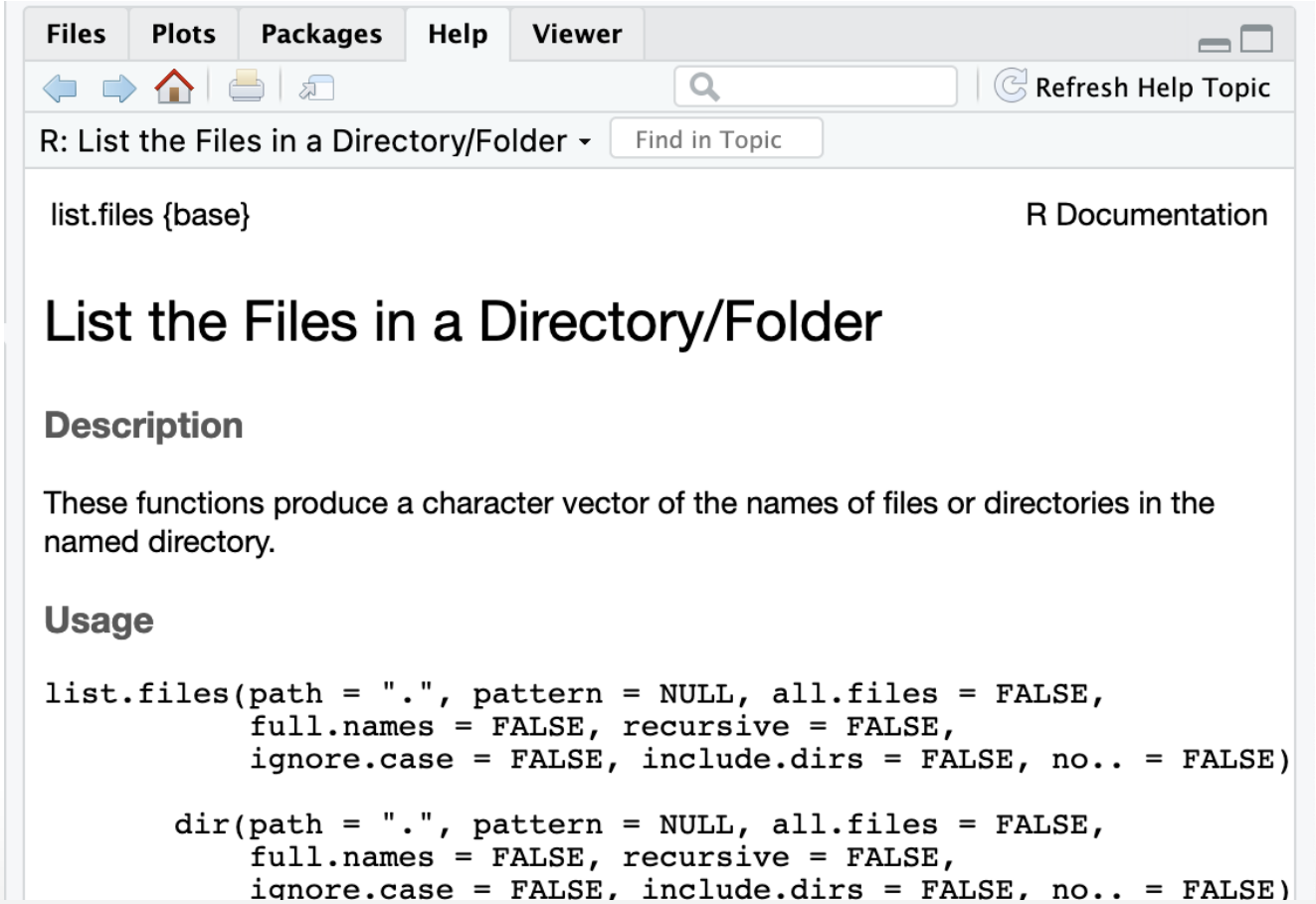
```
x + 2
```

```
[1] 4
```

Help

For any function, you can write `?FUNCTION_NAME`, or `help("FUNCTION_NAME")` to look at the help file:

```
?dir
help("dir")
```



Packages

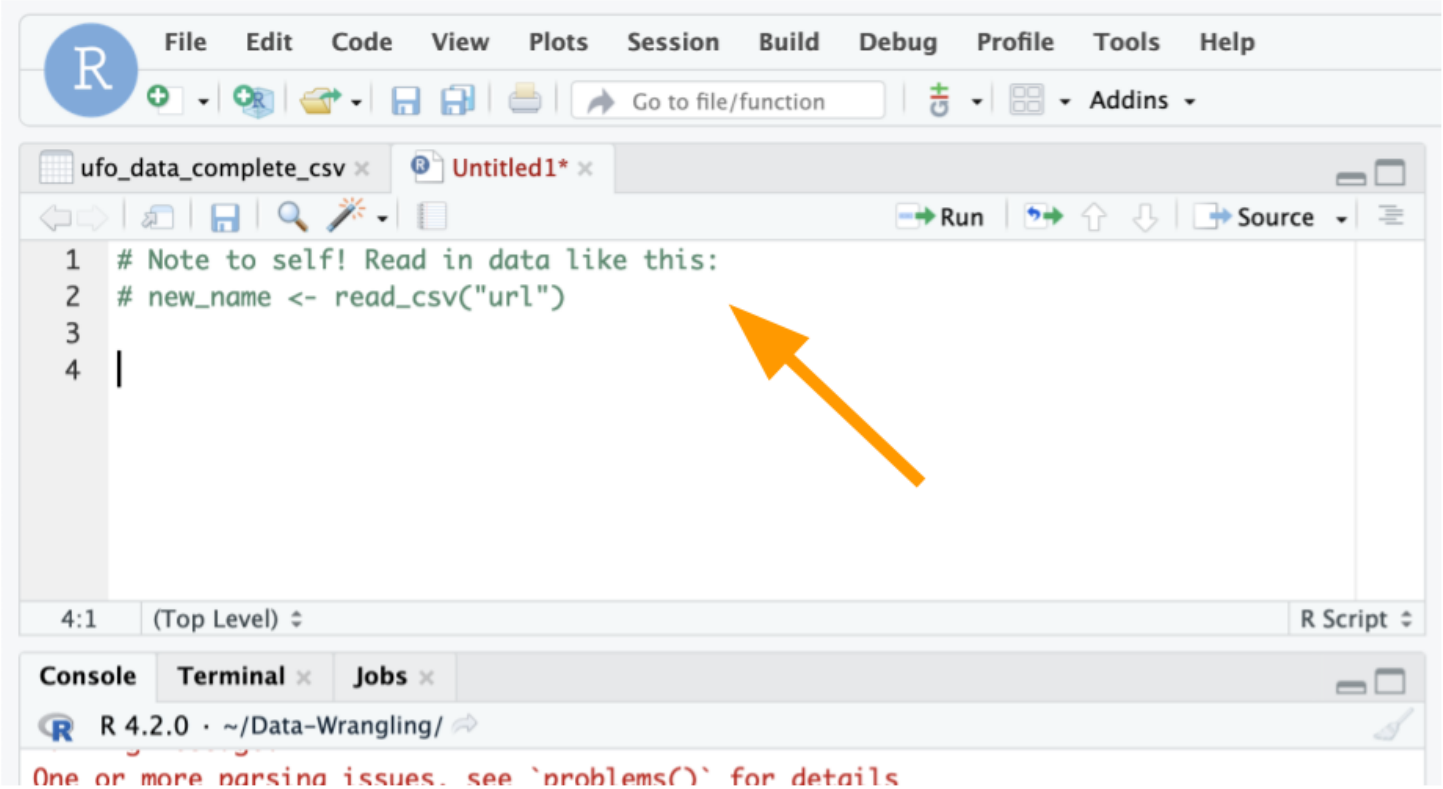
Not all packages are available by default.

```
install.packages("tidyverse")
library(tidyverse)
```

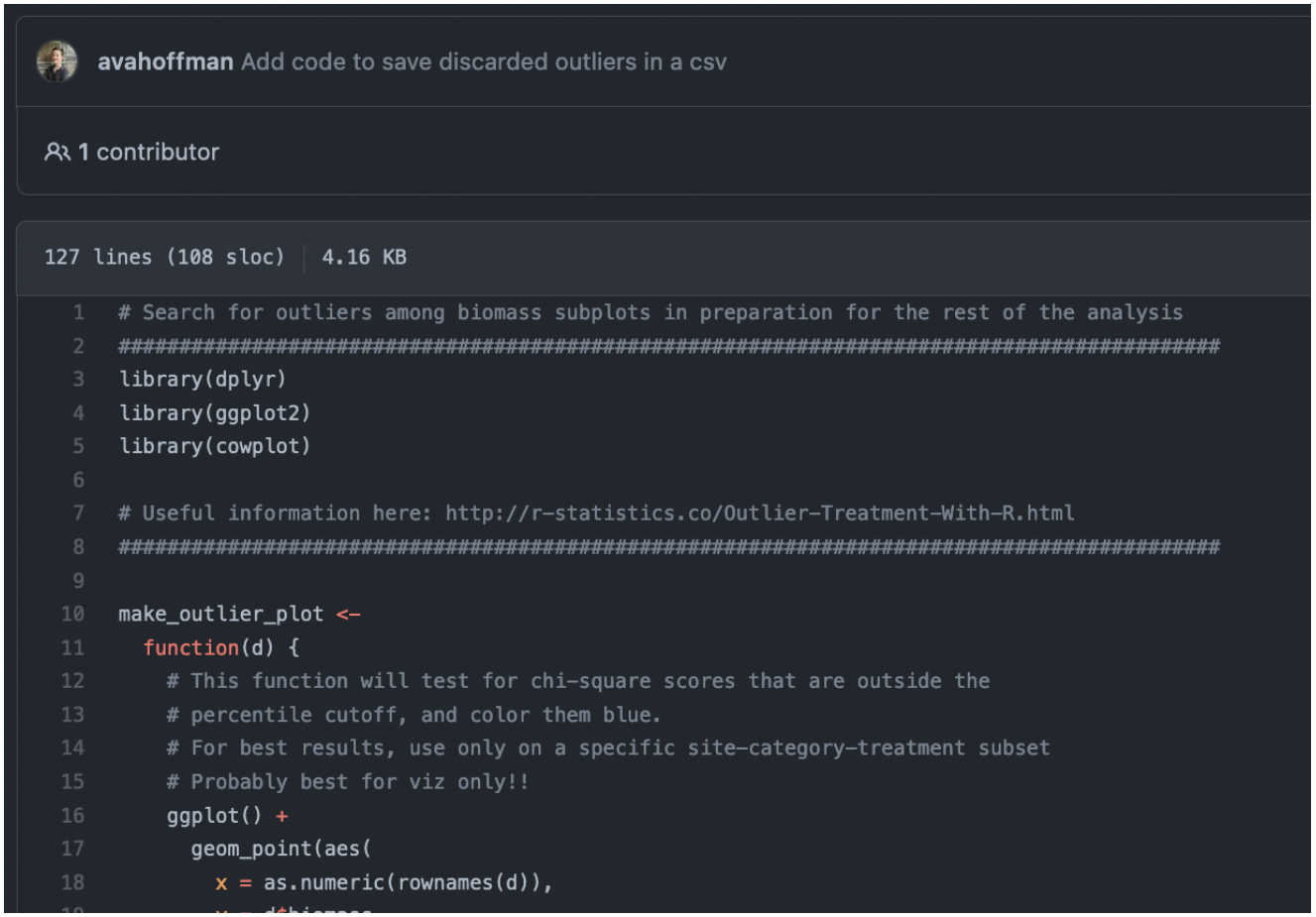
Images sourced from https://www.wikihow.com/Change-a-Light-Bulb

Commenting in Scripts

Commenting in code is super important. You should be able to go back to your code years after writing it and figure out exactly what the script is doing. Commenting helps you do this. Also handy for notes!



Commenting in Scripts



avahoffman Add code to save discarded outliers in a csv

1 contributor

127 lines (108 sloc) | 4.16 KB

```
# Search for outliers among biomass subplots in preparation for the rest of the analysis
##############################################################################################
library(dplyr)
library(ggplot2)
library(cowplot)

# Useful information here: http://r-statistics.co/Outlier-Treatment-With-R.html
##############################################################################################

make_outlier_plot <-
  function(d) {
    # This function will test for chi-square scores that are outside the
    # percentile cutoff, and color them blue.
    # For best results, use only on a specific site-category-treatment subset
    # Probably best for viz only!!
    ggplot() +
      geom_point(aes(
        x = as.numeric(rownames(d)),
```

Data Input

Outline

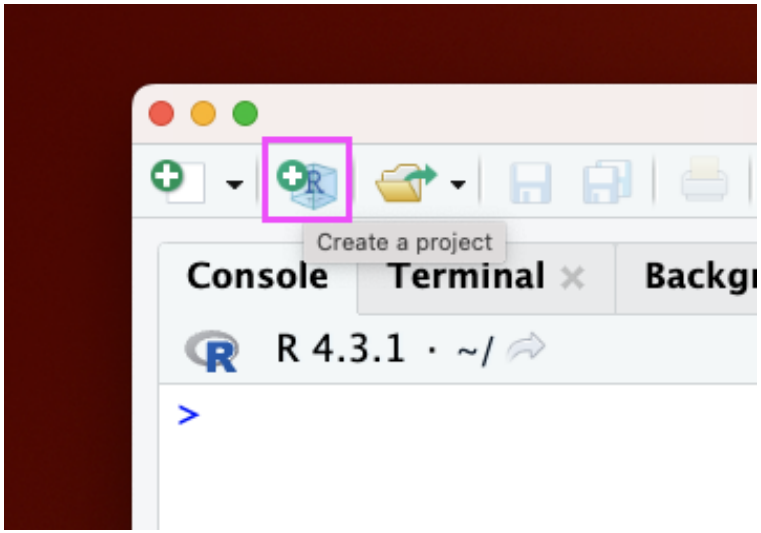
- Part 0: A little bit of set up!
- Part 1: reading in manually (point and click)
- Part 2: reading in directly & working directories
- Part 3: checking data & multiple file formats

Part 0: Setup - R Project

New R Project

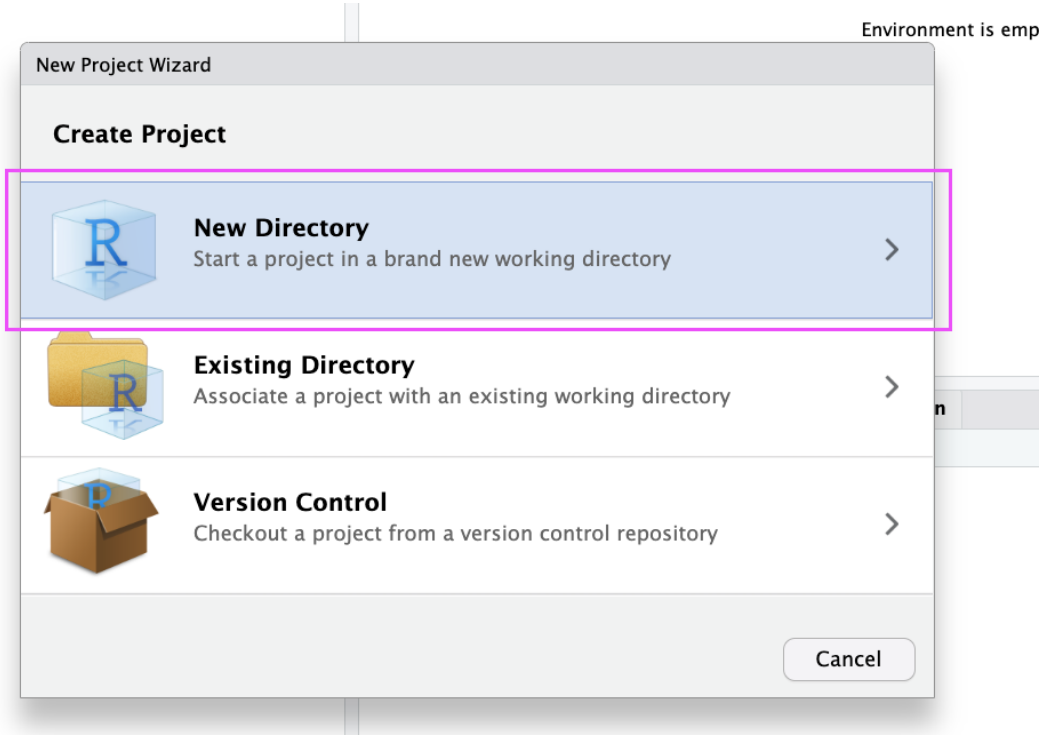
Let's make an R Project so we can stay organized in the next steps.

Click the new R Project button at the top left of RStudio:



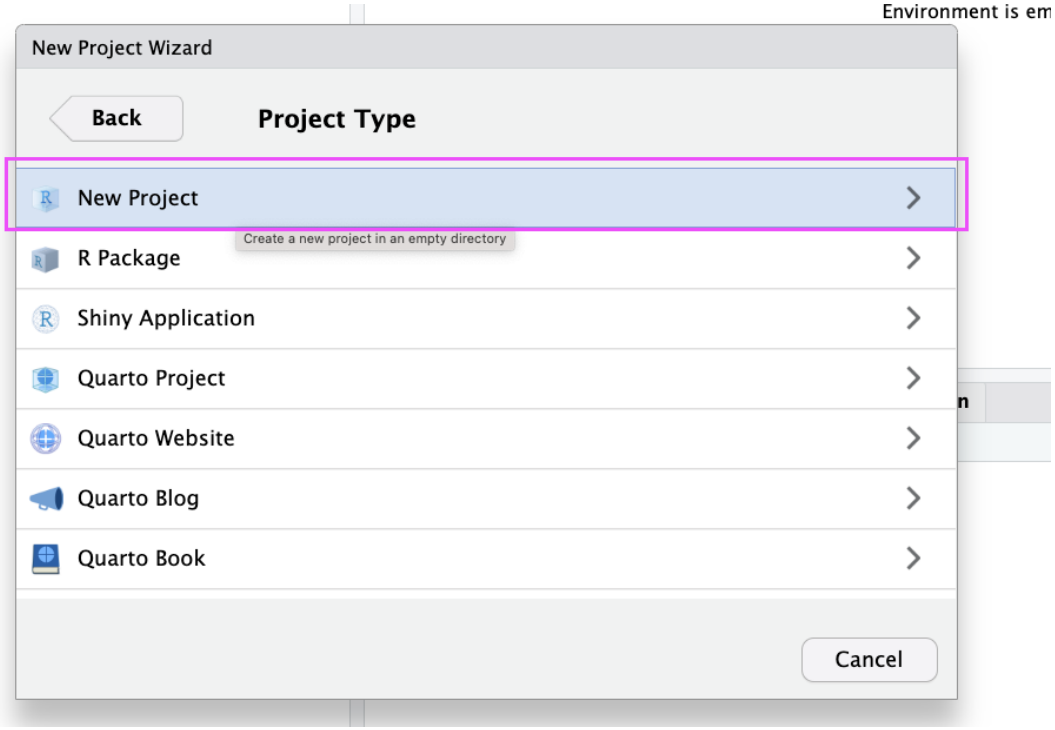
New R Project

In the New Project Wizard, click “New Directory”:



New R Project

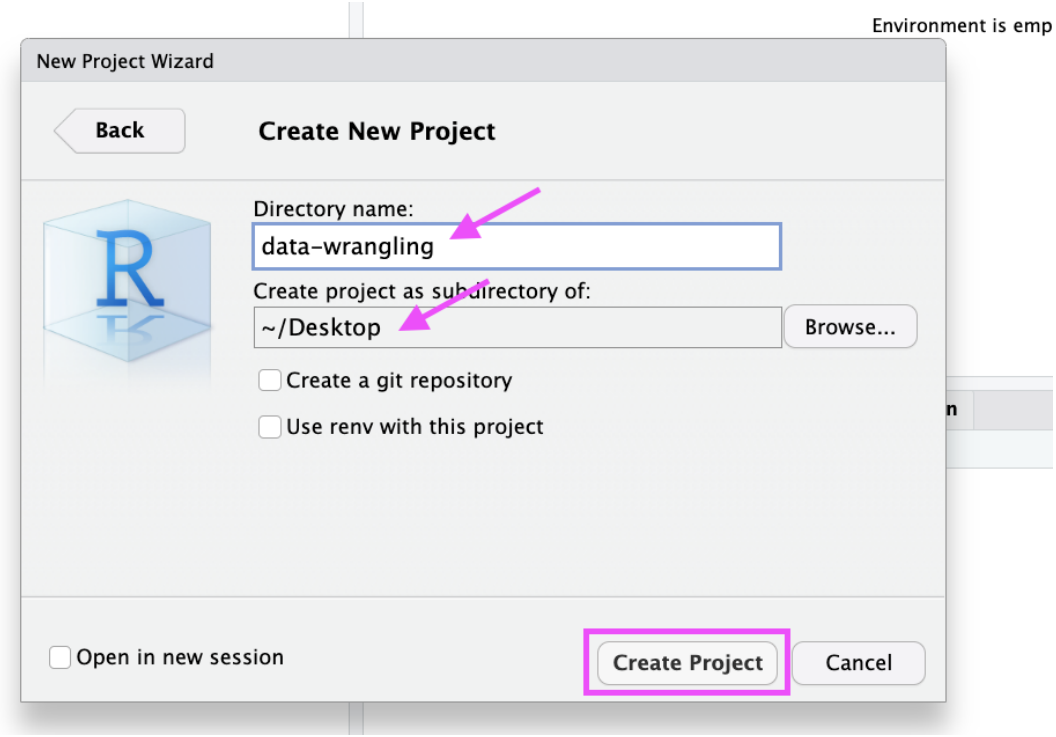
Click “New Project”:



New R Project

Type in a name for your new folder.

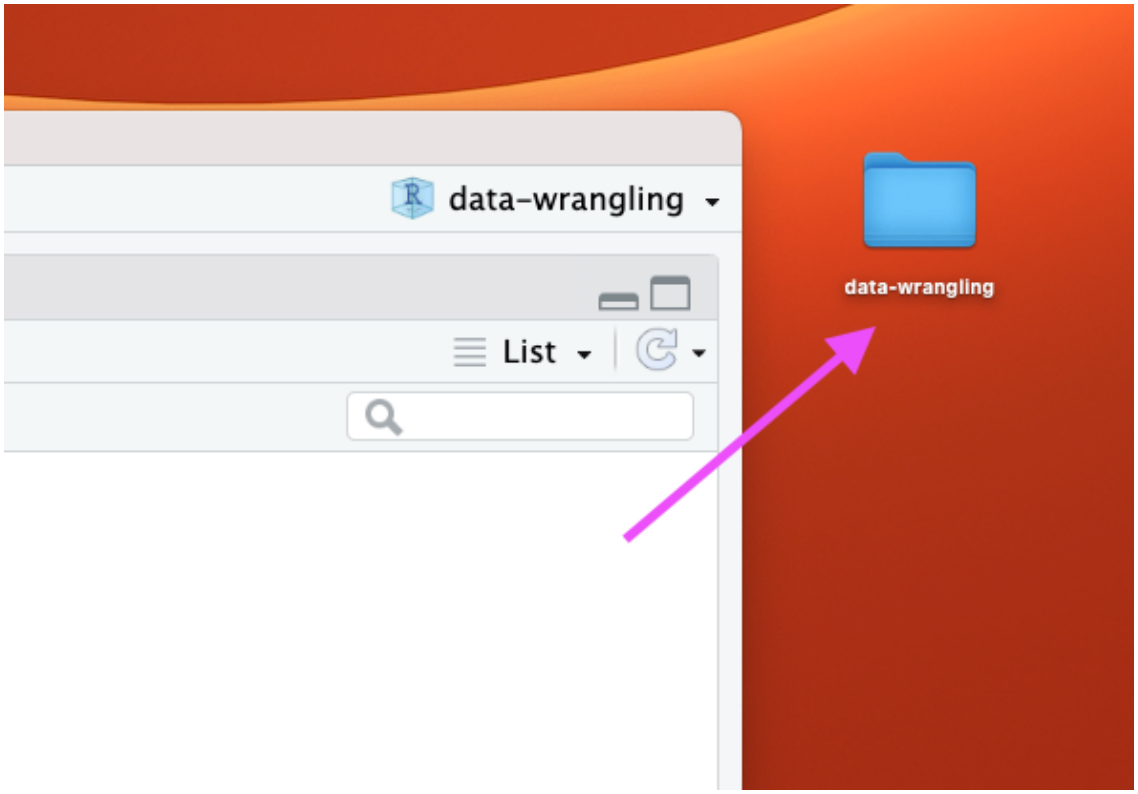
Store it somewhere easy to find, such as your Desktop:



New R Project

You now have a new R Project folder on your Desktop!

Make sure you add any scripts or data files to this folder as we go through today's lesson. This will make sure R is able to "find" your files.



Part 1: Getting data into R (manual/point and click)

Data Input

- 'Reading in' data is the first step of any real project/analysis
- R can read almost any file format, especially via add-on packages
- We are going to focus on simple delimited files first
  - comma separated (e.g. '.csv')
  - tab delimited (e.g. '.txt')
  - Microsoft Excel (e.g. '.xlsx')

Data Input

Youth Tobacco Survey (YTS) dataset:

“The YTS was developed to provide states with comprehensive data on both middle school and high school students regarding tobacco use, exposure to environmental tobacco smoke, smoking cessation, school curriculum, minors’ ability to purchase or otherwise obtain tobacco products, knowledge and attitudes about tobacco, and familiarity with pro-tobacco and anti-tobacco media messages.”

- Check out the data at: https://catalog.data.gov/dataset/youth-tobacco-survey-yts-data

Data Input: Dataset Location

Dataset is located at https://sisbid.github.io/Data-Wrangling/data/Youth_Tobacco_Survey_YTS_Data.csv

- Download data by clicking the above link
    - Safari - if a file loads in your browser, choose File –> Save As, select, Format “Page Source” and save

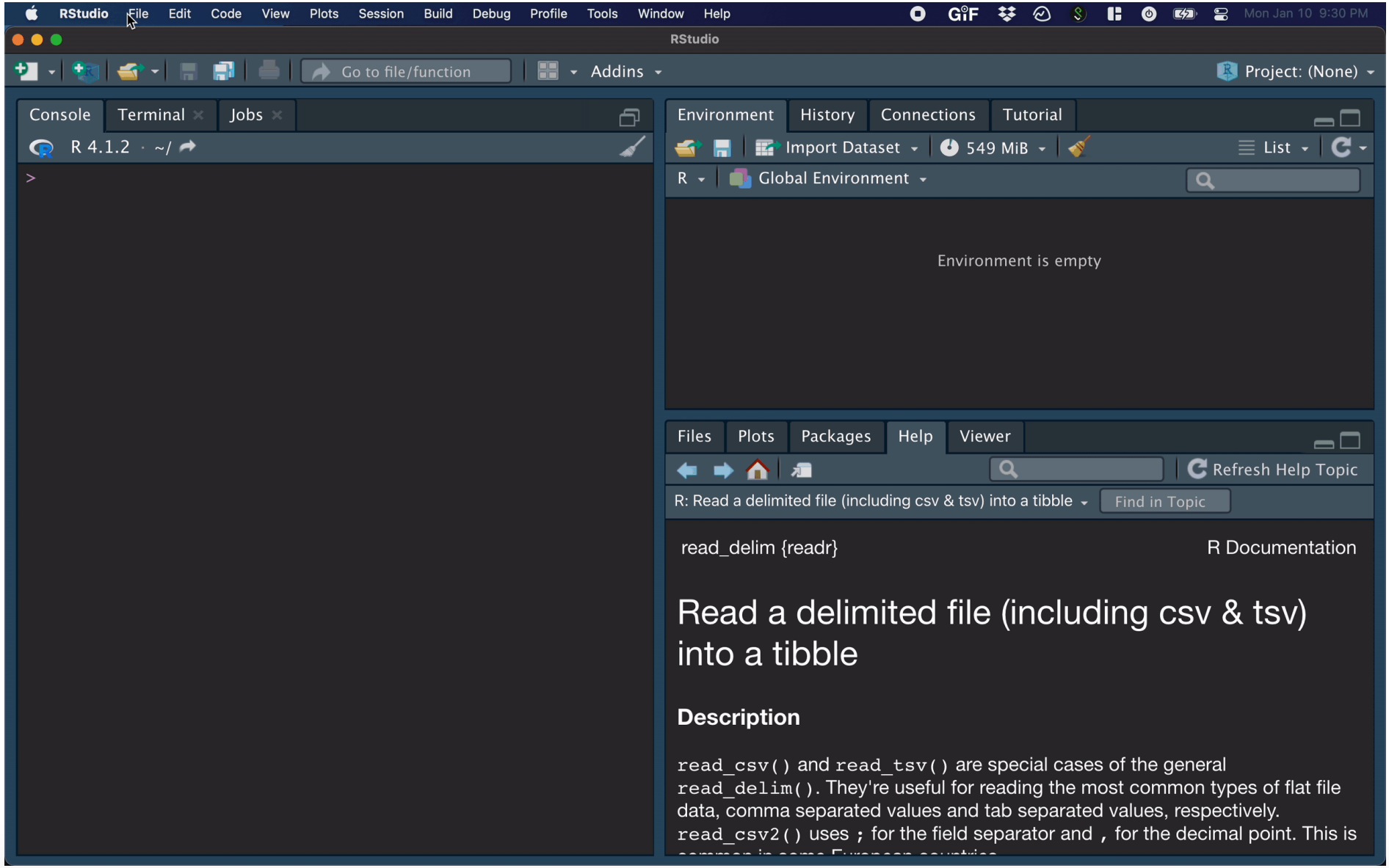
Import Dataset

- > File
- > Import Dataset
- > From Text (`readr`)
- > paste the url (https://sisbid.github.io/Data-Wrangling/data/Youth_Tobacco_Survey_YTS_Data.csv)
- > click “Update” and “Import”

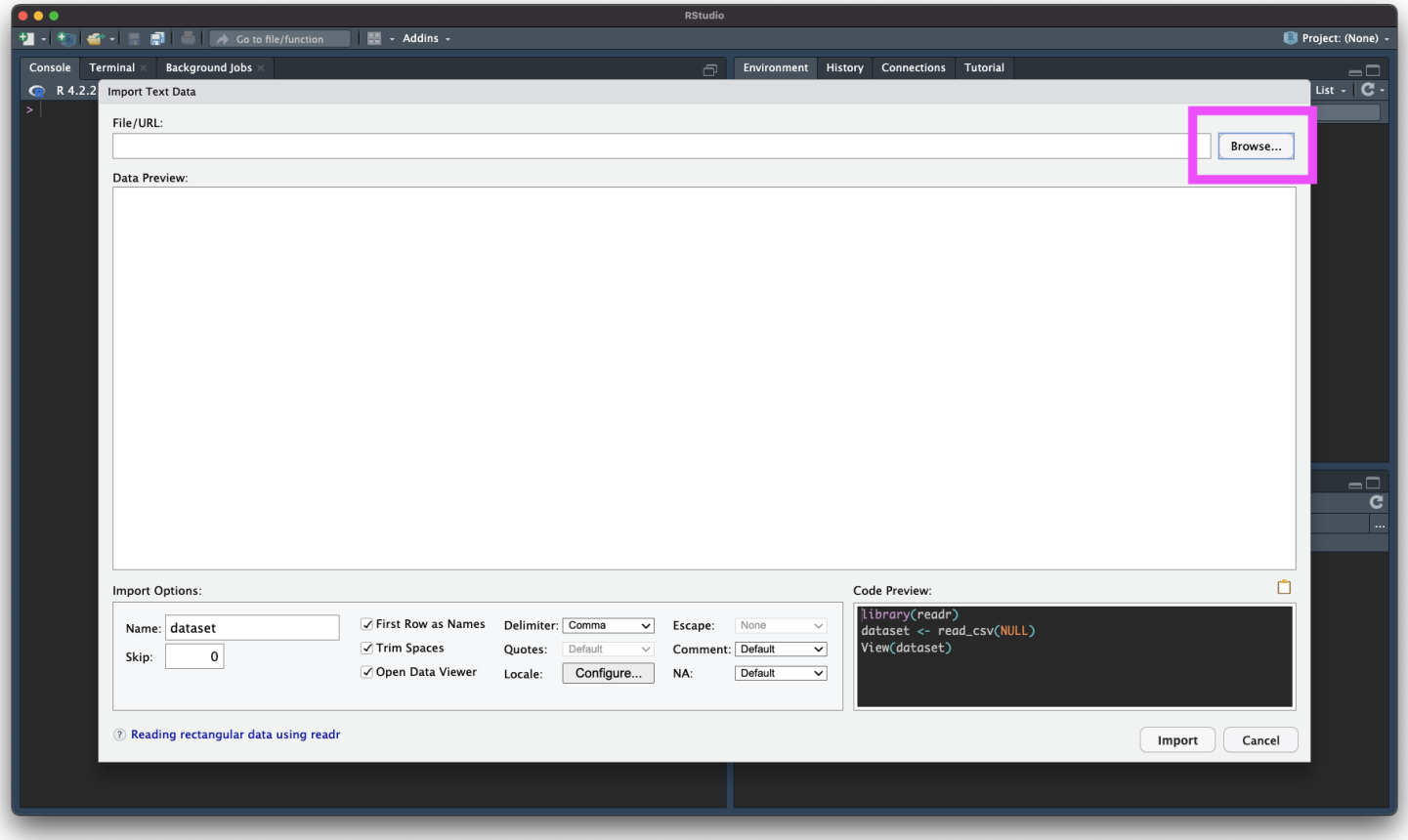
What Just Happened?

- You see a preview of the data on the top left pane.
- You see a new object called `Youth_Tobacco_Survey_YTS_Data` in your environment pane (top right). The table button opens the data for you to view.
- R ran some code in the console (bottom left).

Import Dataset (recap)



Browsing for Data on Your Machine



Example 2: Delimiters

- > File
- > Import Dataset
- > From Text (`readr`)
- > paste the url (https://sisbid.github.io/Data-Wrangling/data/dropouts.txt)
- > select delimiter
- > click “Update” and “Import”

Example 3: Excel

```
library(readxl)
```

- > File
- > Import Dataset
- > From Excel
- > paste the url (https://sisbid.github.io/Data-Wrangling/data/asthma.xlsx)
- > click “Update” and “Import”

Manual Import: Pros and Cons

Pros: easy!!

Cons: obscures some of what's happening, others will have difficulty running your code

Summary & Lab

Review the process: `https://youtu.be/LEkNfJgpunQ`

- > File
- > Import Dataset
- > From Text (`readr`) / From Excel
- > paste the url / browse
- > click “Update” and “Import”

https://sisbid.github.io/Data-Wrangling/labs/data-io-lab-part1.Rmd