

Introduction to R

Using slides adapted from R4All 2017 Beckerman, Petchey, Childs and Cooper



Preamble

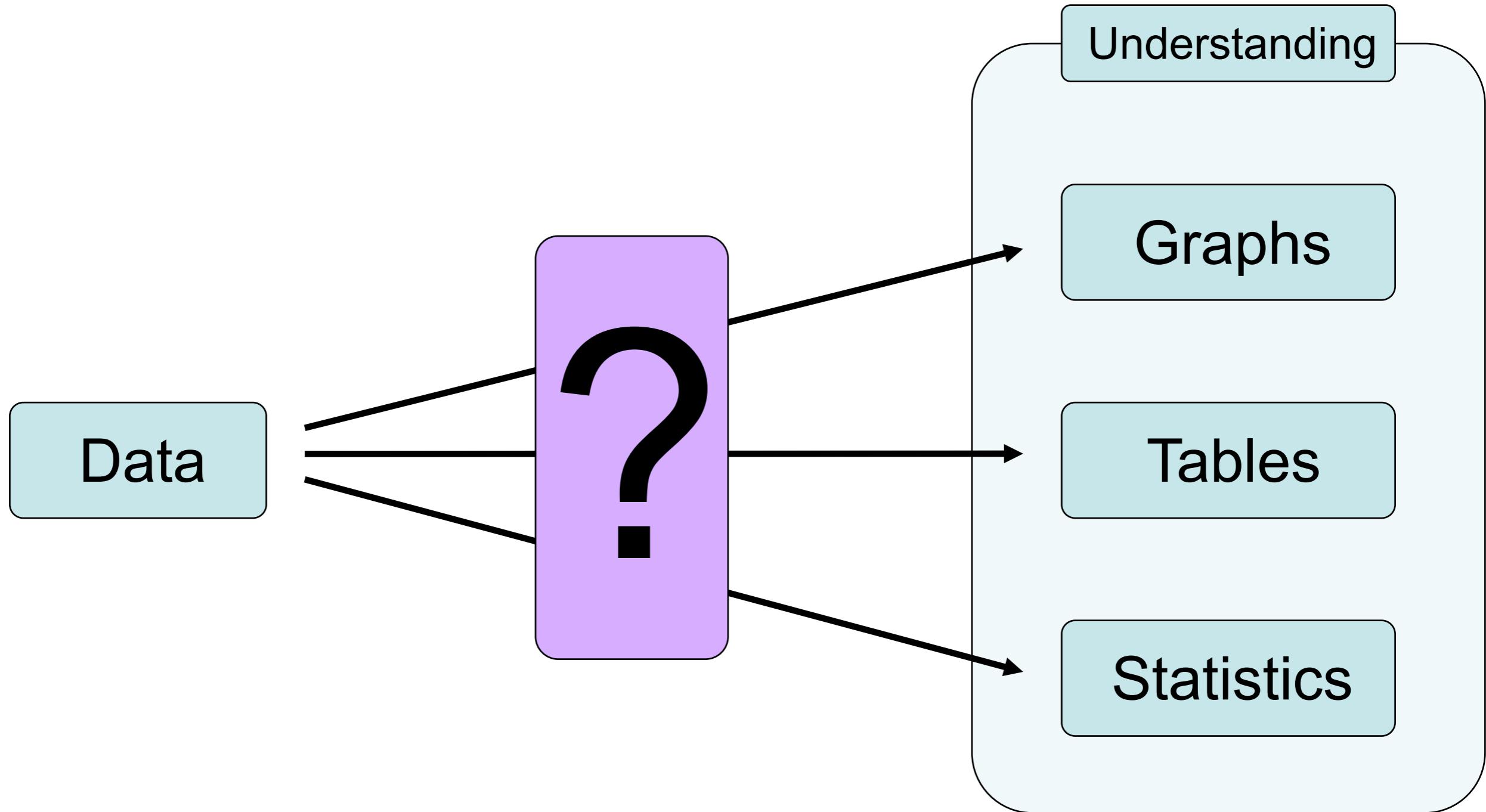
- Who has used R before?
- Who has used other programming languages before?
- Has everyone downloaded R and RStudio?
- Don't be afraid to ask questions. Interrupt us! Chat to us over coffee/lunch! We are here to help (and we really love R!)

Intro to R

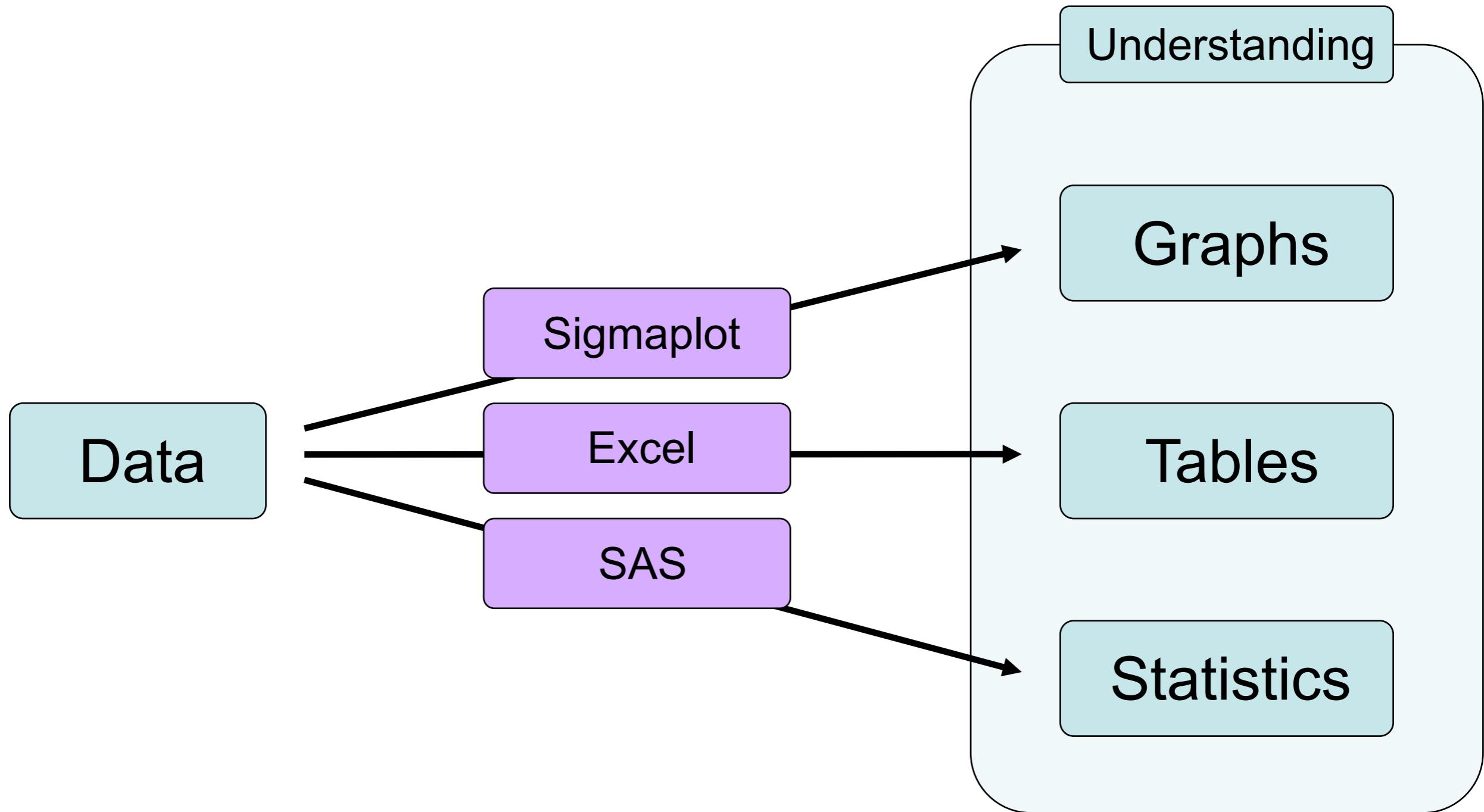
- Why use R?
- Getting help
- RStudio
- Using scripts and RNotebooks
- Installing packages
- Importing data into R

Why use R?

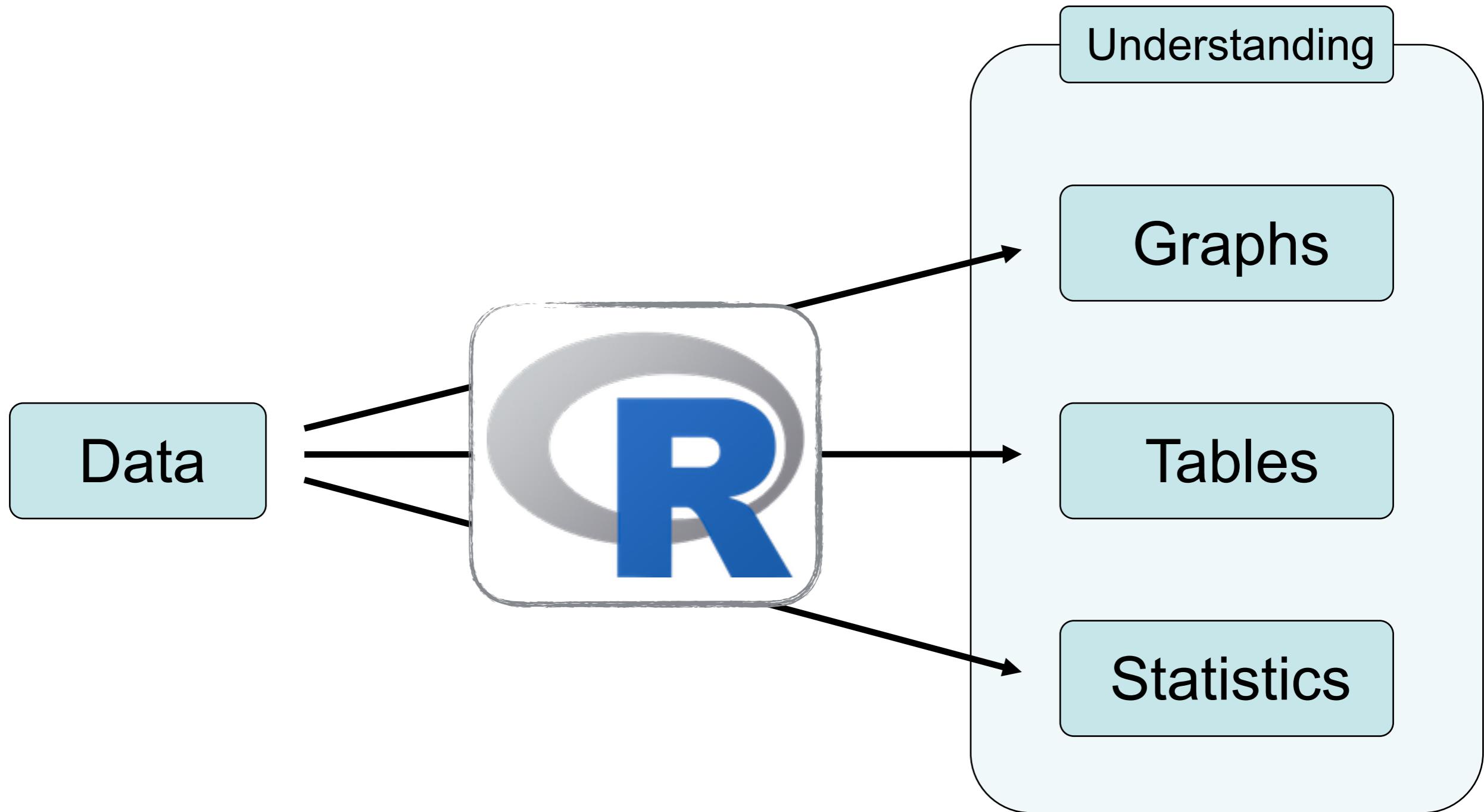
What are your goals?



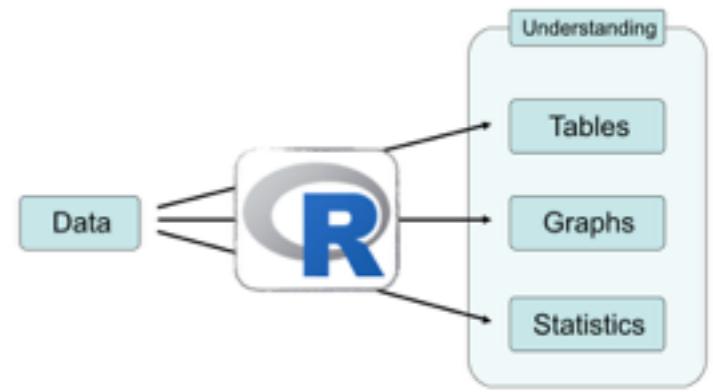
What are your goals?



What are your goals?



Why use R?



1. It can do the statistics you need

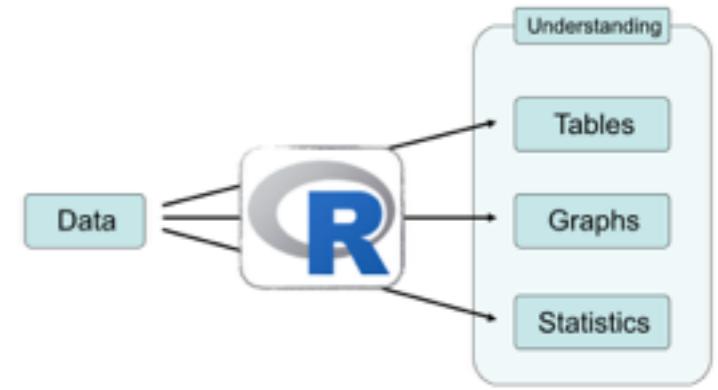
t-tests
chi-square
contingency tables
non-parametrics

linear models
regression
multiple regression
anova
ancova

generalised linear
models
poisson
binomial/logistic

mixed effects, random effects, bayesian, survival, time series

Why use R?

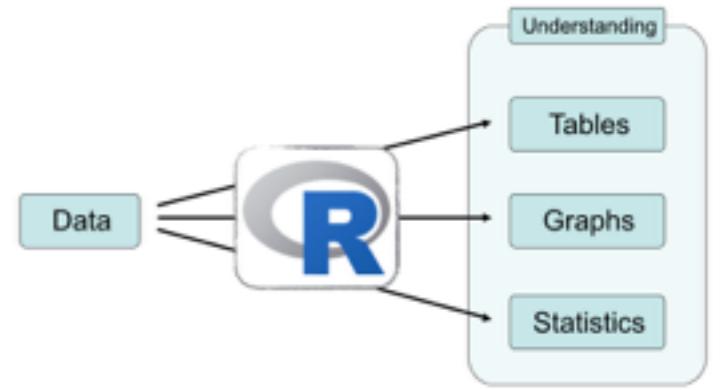


2. It is freely available and platform independent.

You will always have access to it, so will everyone you work with and teach.

Mac, Windows, Linux, Unix, anything, anywhere.

Why use R?

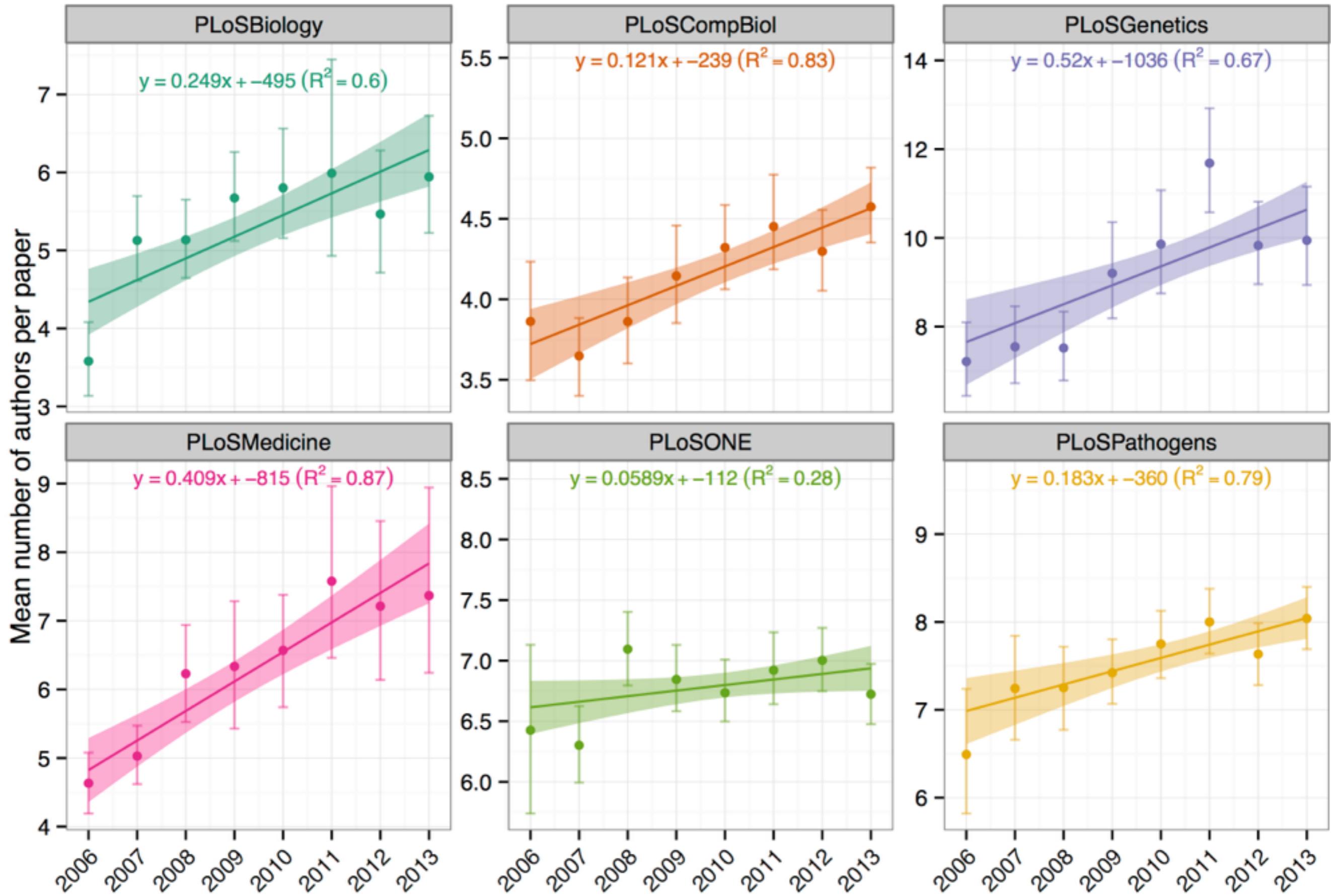


3. Any graphical output of publication quality

It is a complete graphing solution.

*Export or Save or Cut & Paste
(windows and mac)*

pdf, eps, jpeg, png, bitmap, tiff



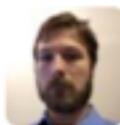
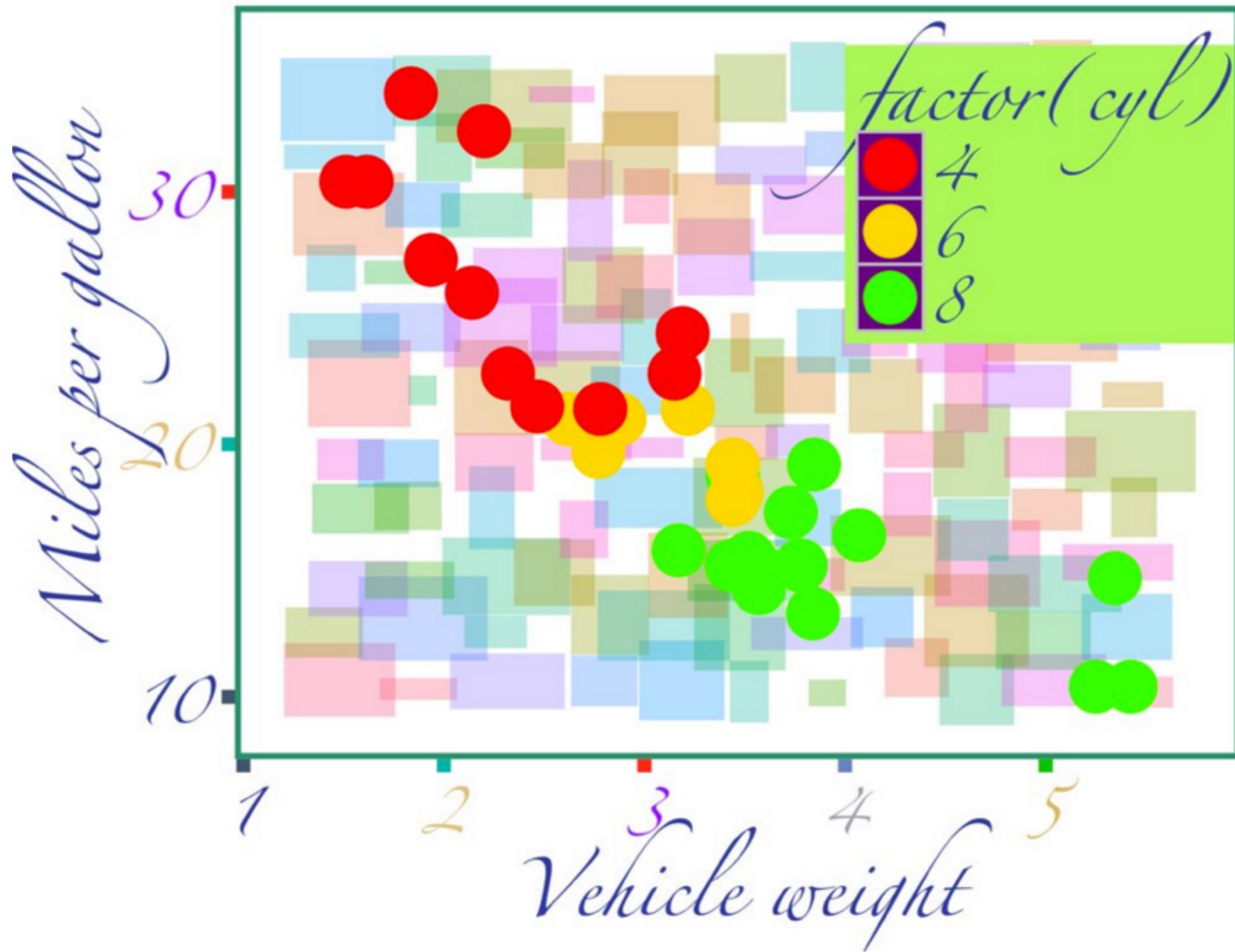


Code

- Fish/Midge
- Midge

Measles



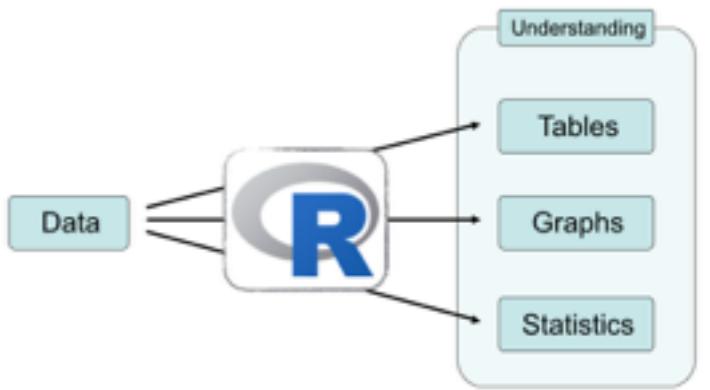


Chris Black @infotroph · Mar 12

Current status: Very proudshamed of this remarkably ill-advised ggplot theme. Code: gist.github.com/infotroph/93a4... #Rstats



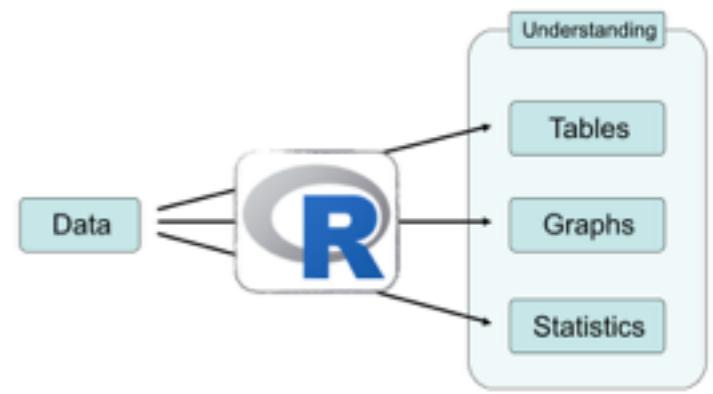
Why use R?



4. Comprehensive simulation based language
Objects, Loops, Vector Based Operations
Interfaces with Fortran, C, C++

5. Used by statisticians to develop new tools
(e.g. packages)

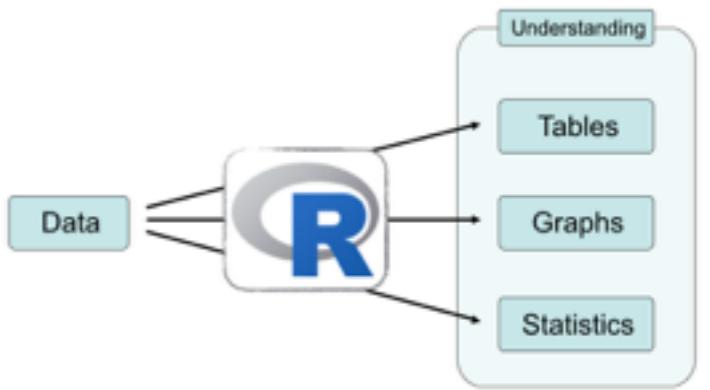
Why use R?



6. Detailed and complete help available.

CAVEAT: You won't think so initially!

Why use R?



7. You write instructions (*not menu driven*)

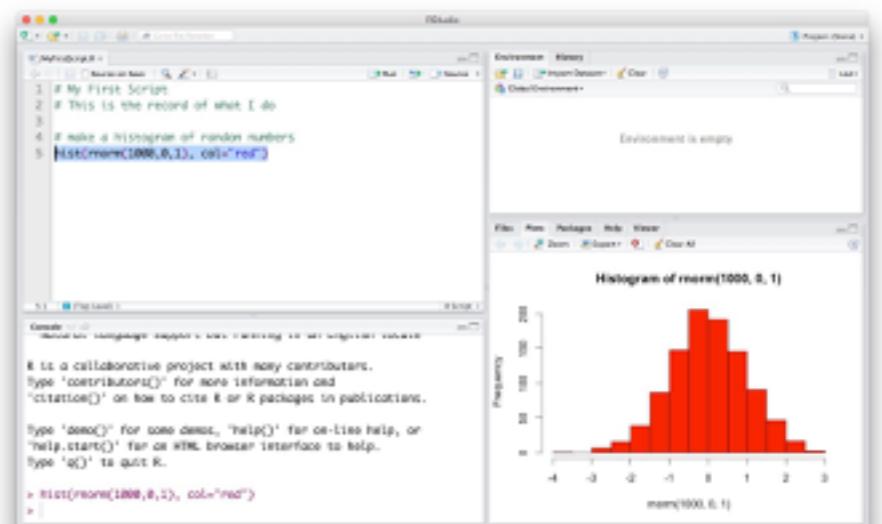
R *will transform* the way you think about data and graphics and statistics.

R makes you ask for what you want

-You need to know what you want to do

-And why you want to do it

-And what you expect



Intro to R

- Why use R?
- Getting help
- RStudio
- Using scripts and RNotebooks
- Installing packages
- Importing data into R

IF YOU KNOW THE R FUNCTION

?

?whateveryouwanthelpabout

?glm = help on *generalised linear models*
(you need to know the R function name)

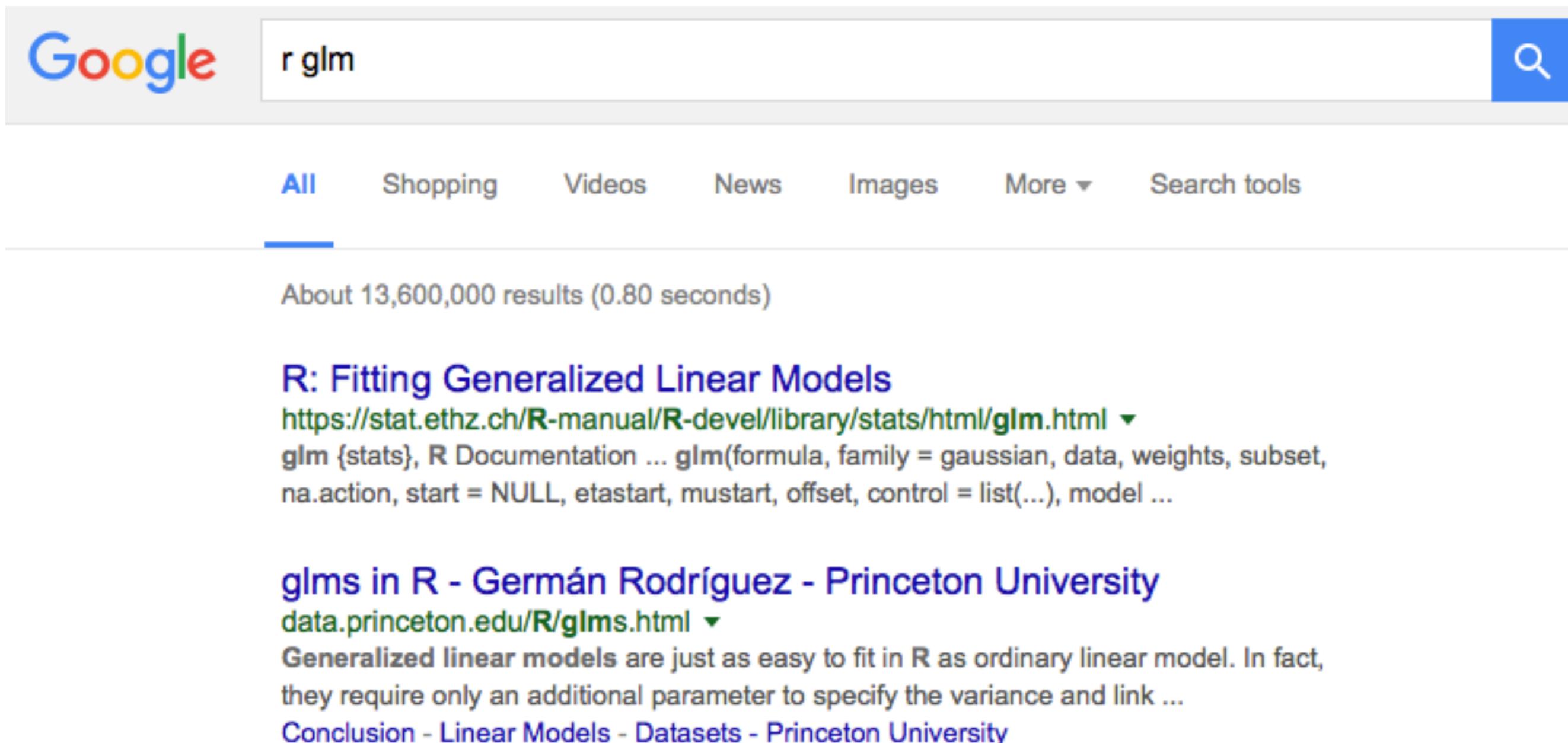
IF YOU DON'T KNOW THE R FUNCTION

help.search("topic")

??topic

help.start()

Google is amazing!



A screenshot of a Google search results page. The search query "r glm" is entered in the search bar. The "All" tab is selected, showing approximately 13,600,000 results. The first result is a link to the R manual on generalized linear models, titled "R: Fitting Generalized Linear Models". The second result is a link to a Princeton University page on "glms in R" by Germán Rodríguez.

Google r glm

All Shopping Videos News Images More ▾ Search tools

About 13,600,000 results (0.80 seconds)

R: Fitting Generalized Linear Models
<https://stat.ethz.ch/R-manual/R-devel/library/stats/html/glm.html> ▾
glm {stats}, R Documentation ... glm(formula, family = gaussian, data, weights, subset, na.action, start = NULL, etastart, mustart, offset, control = list(...), model ...

glms in R - Germán Rodríguez - Princeton University
data.princeton.edu/R/glms.html ▾
Generalized linear models are just as easy to fit in R as ordinary linear model. In fact, they require only an additional parameter to specify the variance and link ...
[Conclusion - Linear Models - Datasets - Princeton University](#)

stackoverflow.com/tags/r/info

TUoS ▾ Teaching ▾ News ▾ Bank ▾ R ▾ GRANT ▾ Cite ▾ Mine ▾ Blogs ▾ Lib ▾ Genome ▾ T_F_Web ▾ Scholarfy Google URL +

Tag Info

info newest 4 featured frequent votes active unanswered

120,670 questions tagged

About r

R is a free, open-source programming language and software environment for statistical computing, bioinformatics, and graphics. Please supplement your question with a minimal reproducible example. For statistical questions please use <http://stats.stackexchange.com>.

R Programming Language

R is a free, open-source programming language and software environment for [statistical computing](#), [bioinformatics](#), and [graphics](#). It is a multi-paradigm language and dynamically typed. R is an implementation of the [S programming language](#) combined with lexical scoping semantics inspired by [Scheme](#). R was created by [Ross Ihaka](#) and [Robert Gentleman](#) and is now developed by the [R Development Core Team](#). The R environment is easily extended through a packaging system on [CRAN](#), the Comprehensive R Archive Network.

Scope of questions

This tag should be used for programming-related questions about R. If your question is more statistically focused, use [Cross Validated](#). If your question contains a lot of biology, use [Bioconductor Support](#).

Official CRAN Documentation

- [An Introduction to R](#) (PDF, epub), a basic introduction for beginners.
- [R Data Import/Export](#) (PDF, epub), a data import and export guide.
- [R Installation and Administration](#) (PDF, epub), an installation guide (from R source code).
- [Writing R Extensions](#) (PDF, epub), a development guide for R.

Synonyms

rstats r-language

Stats

created 7 years ago by [David Locke](#)
viewed 35682 times
active 24 days ago
editors 52

Top Answerers

	Dirk Eddelbuettel 181k • 17 • 326 • 422
	42- 145k • 5 • 112 • 225
	akrun 131k • 7 • 33 • 72
	Ananda Mahto 106k • 11 • 121 • 201

www.rseek.org

Screenshot of a web browser showing search results for "glm" on rseek.org.

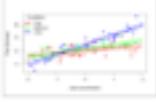
The search bar contains "glm". Below it, a navigation menu includes "All", "Support", "Books", "Packages", "Articles", and "For Beginners".

About 2,720,000 results (0.37 seconds) were found, sorted by Relevance.

Powered by Google™ Custom Search.

glm {stats} | inside-R | A Community Site for R
www.inside-r.org/r-doc/stats/glm
glm is used to fit generalized linear models, specified by giving a symbolic description of the linear predictor and a description of the error distribution.

Quick-R: Generalized Linear Models
www.statmethods.net/advstats/glm.html
 See help(glm) for other modeling options. See help(family) for other allowable link functions for each family. Three subtypes of generalized linear models will be ...
Labeled [For Beginners](#) [Support](#)

Plotting regression curves with confidence intervals for LM, GLM and ...
www.r-bloggers.com/plotting-regression-curves-with-confidence-intervals-for-lm-glm-and-glmm-in-r/
 Oct 8, 2015 ... Once models have been fitted and checked and re-checked comes the time to interpret them. The easiest way to do so is to plot the response ...
Labeled [Articles](#)

Trimming the Fat from glm() Models in R | R-bloggers
www.r-bloggers.com/trimming-the-fat-from-glm-models-in-r/
 May 30, 2014 ... With R, though, glm models are not so concise; we noticed this to our dismay when we tried to automate fitting a moderate number of models ...
Labeled [Articles](#)

B. Generalized Linear Model Theory
data.princeton.edu/wws509/notes/a2.pdf
File Format: PDF/Adobe Acrobat
Appendix B. Generalized Linear Model. Theory. We describe the generalized linear model as formulated by Nelder and Wedderburn (1972), and discuss ...

Calculate Leave-One-Out Prediction for GLM | R-bloggers

33 CRAN TASK VIEWS



[CRAN
Mirrors](#)
[What's new?](#)
[Task Views](#)
[Search](#)

[About R](#)
[R Homepage](#)
[The R Journal](#)

[Software](#)
[R Sources](#)
[R Binaries](#)
[Packages](#)
[Other](#)

[Documentation](#)
[Manuals](#)
[FAQs](#)
[Contributed](#)

CRAN Task Views

Bayesian	Bayesian Inference
ChemPhys	Chemometrics and Computational Physics
ClinicalTrials	Clinical Trial Design, Monitoring, and Analysis
Cluster	Cluster Analysis & Finite Mixture Models
DifferentialEquations	Differential Equations
Distributions	Probability Distributions
Econometrics	Computational Econometrics
Environmetrics	Analysis of Ecological and Environmental Data
ExperimentalDesign	Design of Experiments (DoE) & Analysis of Experimental Data
Finance	Empirical Finance
Genetics	Statistical Genetics
Graphics	Graphic Displays & Dynamic Graphics & Graphic Devices & Visualization
HighPerformanceComputing	High-Performance and Parallel Computing with R
MachineLearning	Machine Learning & Statistical Learning
MedicalImaging	Medical Image Analysis
MetaAnalysis	Meta-Analysis
Multivariate	Multivariate Statistics
NaturalLanguageProcessing	Natural Language Processing
NumericalMathematics	Numerical Mathematics
OfficialStatistics	Official Statistics & Survey Methodology
Optimization	Optimization and Mathematical Programming
Pharmacokinetics	Analysis of Pharmacokinetic Data
Phylogenetics	Phylogenetics, Especially Comparative Methods
Psychometrics	Psychometric Models and Methods
ReproducibleResearch	Reproducible Research
Robust	Robust Statistical Methods
SocialSciences	Statistics for the Social Sciences
Spatial	Analysis of Spatial Data

www.r-project.org/mail.html



The screenshot shows a web browser window displaying the R Project's mailing lists page. The URL in the address bar is www.r-project.org/mail.html. The page features a large title "Mailing Lists" and several sections describing different mailing lists: "R-announce", "R-help", and "R-package-devel". A sidebar on the left contains links to various R Project resources like "Download", "CRAN", "R Project", "About R", etc.

Please read the [instructions](#) below and the [posting guide](#) before sending anything to any mailing list!

Thanks to Martin Maechler (and ETH Zurich), there are five general mailing lists devoted to *R*.

R-announce

This list is for *major announcements* about the development of *R* and the availability of new code. It has a *low volume* (typically only a few messages a month) and everyone mildly interested should consider subscribing, but note that *R-help* gets everything from *R-announce* as well, so you don't need to subscribe to both of them.

Note that the list is *moderated* to be used for announcements mainly by the *R Core Development Team*. Use the [web interface](#) for information, subscription, archives, etc.

R-help

The 'main' *R* mailing list, for discussion about problems and solutions using *R*, announcements (not covered by '*R-announce*' or '*R-packages*', see above), about the availability of new functionality for *R* and documentation of *R*, comparison and compatibility with *S-plus*, and for the posting of nice examples and benchmarks. Do read the [posting guide](#) before sending anything!

This has become quite an active list with dozens of messages per day. An alternative is to subscribe and choose daily digests (in plain or MIME format). Use the [web interface](#) for information, subscription, archives, etc.

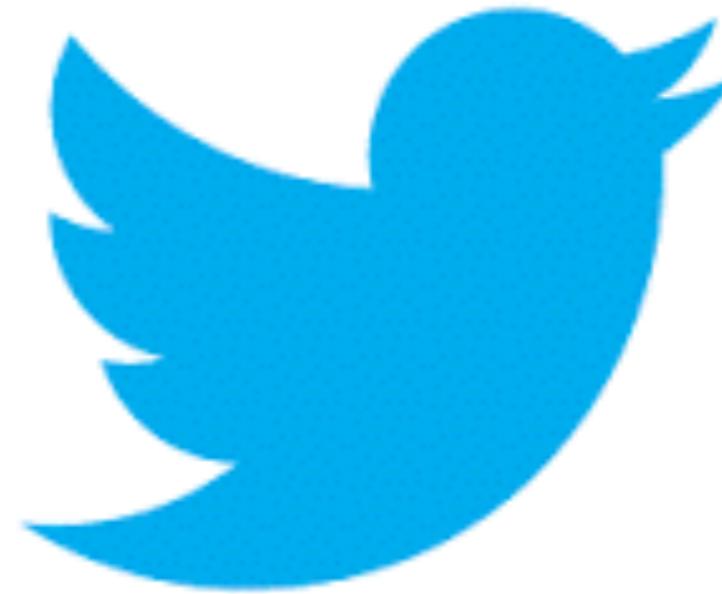
R-package-devel

is to get help about *package development* in *R*, i.e., to provide a forum for learning about the package development process, a community of *R* package developers who can help each other solve problems, and reduce some of the burden on the [CRAN](#) maintainers. If you are having problems developing a package or passing *R CMD check*, this is the place to ask!

There may be some overlap of topics with the [R-devel](#) mailing list, as before the existence of [R-package-devel](#) many package developers had used [R-devel](#) instead. Beware that cross-posting to

Twitter

- #rstats
- @GSwithR
- @rstudiotips
- @RLangTip
- @Rbloggers
- @rstudio
- @rOpenSci



Michael J.Crawley

Statistics

An Introduction using R

WILEY

Statistics and Computing

Peter Dalgaard

Introductory Statistics with R

CRAWLEY

THE
R
BOOK

THE R BOOK
MICHAEL J CRAWLEY



WILEY

Statistics and Computing

W.N. Venables
B.D. Ripley

Modern Applied Statistics with S

Fourth Edition

Statistics and Computing

José C. Pinheiro
Douglas M. Bates

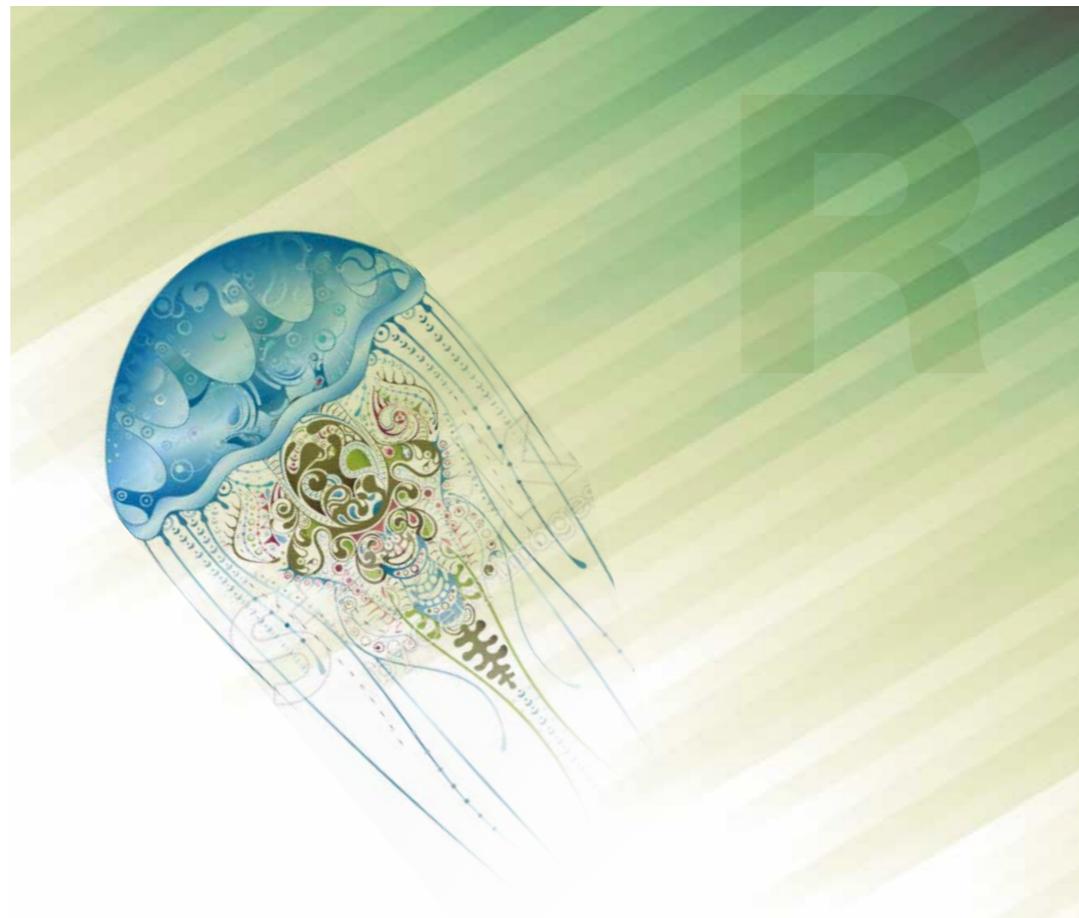
Mixed-Effects Models in S and S-PLUS



Springer

@GSwithR

www.r4all.org



GETTING STARTED WITH R

Second Edition

ANDREW P. BECKERMAN,
OWEN L. PETLEY, AND
DYLAN Z. CHILDS



Cheatsheets!

Intro to R

- Why use R?
- Getting help
- RStudio
- Using scripts and RNotebooks
- Installing packages
- Importing data into R



Welcome to RStudio

RStudio™ is a free and open source integrated development environment (IDE) for R. You can run it on your desktop (Windows, Mac, or Linux) or even over the web using RStudio Server.

[Download RStudio for Windows, Mac or Linux](#)

Screencast
RStudio in 2 minutes

Powerful productivity tools

- Syntax highlighting, code completion, and smart indentation
- Execute R code directly from the source editor
- Easily manage multiple working directories using projects
- Quickly navigate code using typeahead search and go to definition

An IDE built for R

- Workspace browser and data viewer
- Plot history, zooming, and flexible image and PDF export
- Integrated R help and documentation
- Sweave authoring including one-click PDF preview
- Searchable command history

Open and compatible

- Works with any version of R (2.11.1 or greater)
- Runs on Windows, Mac, Linux, and even over the web using RStudio Server
- Integrated with Git and Subversion for version control
- Free and open source (AGPLv3 license)

R version 3.2.3 (2015-12-10) -- "Wooden Christmas-Tree"
Copyright (C) 2015 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin13.4.0 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
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.

[Workspace loaded from ~/.RData]

>

Environment is empty

Files Plots Packages Help Viewer

R: The Default Scatterplot Function Find in Topic

plot.default {graphics}

R Documentation

The Default Scatterplot Function

Description

Draw a scatter plot with decorations such as axes and titles in the active graphics window.

Usage

```
## Default S3 method:  
plot(x, y = NULL, type = "p", xlim = NULL, ylim = NULL,  
     log = "", main = NULL, sub = NULL, xlab = NULL, ylab = NULL,  
     ann = par("ann"), axes = TRUE, frame.plot = axes,  
     panel.first = NULL, panel.last = NULL, asp = NA, ...)
```

Arguments

x, y the x and y arguments provide the x and y coordinates for the plot. Any reasonable way of defining the coordinates is acceptable. See the function [xy.coords](#) for details. If supplied separately, they must be of the same length.

The Script *ctrl - 1*

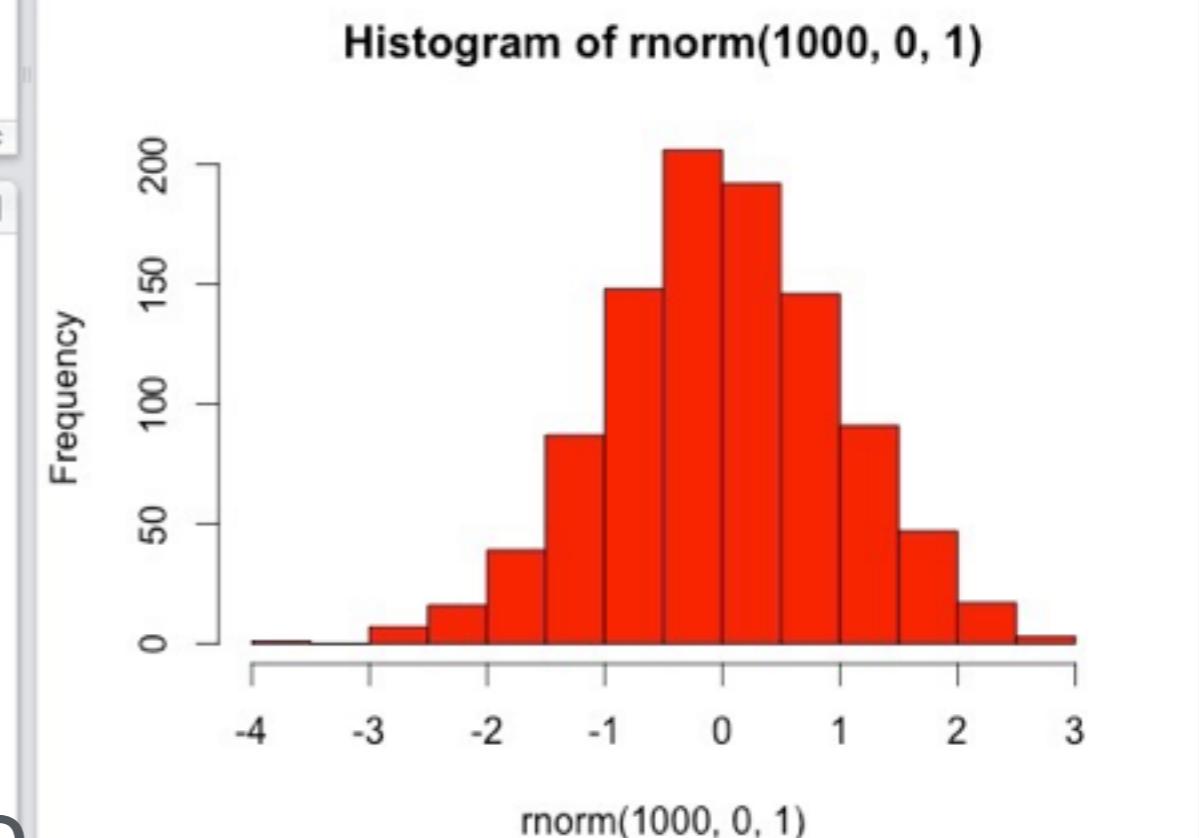
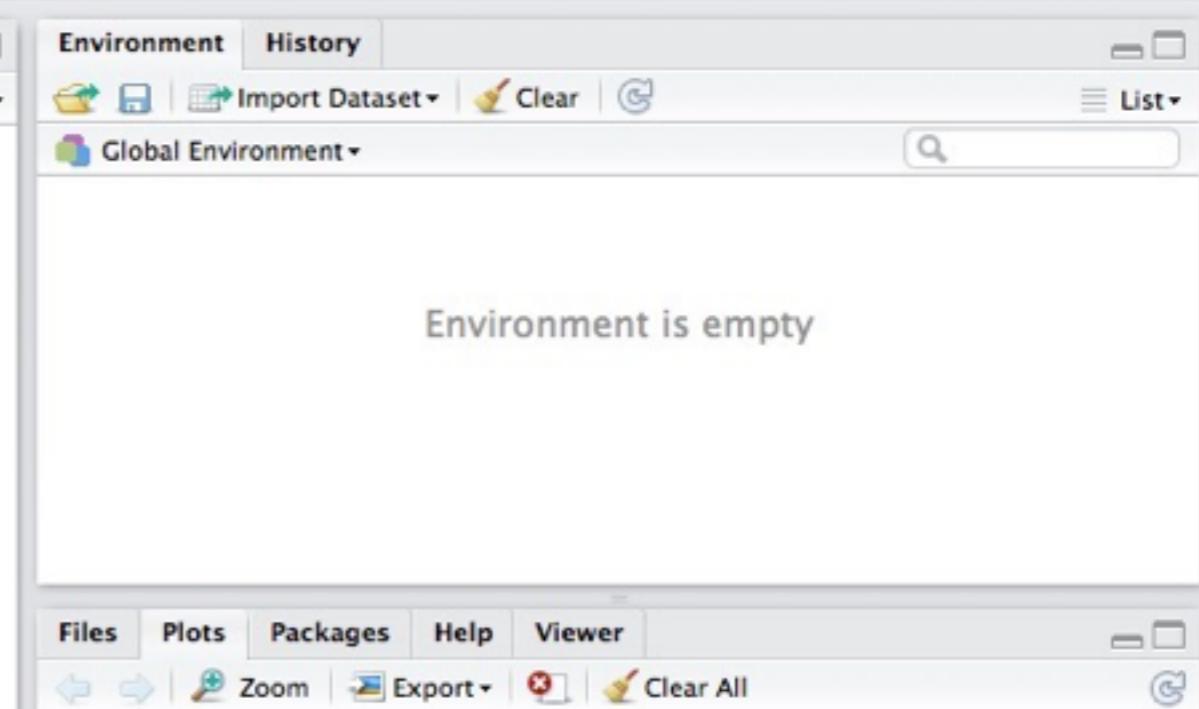
```
RStudio
MyFirstScript.R *
Source on Save | Run | Source
1 # My First Script
2 # This is the record of what I do
3
4 # make a histogram of random numbers
5 hist(rnorm(1000,0,1), col="red")
```

```
5:1 f (Top Level) R Script
Console ~/ 
Natural language support not 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.

> hist(rnorm(1000,0,1), col="red")
>
```

The Console *ctrl-2*



RStudio File Edit Code View Plots Session Build Debug Tools Window Help

Import Dataset

Install Packages...

Check for Package Updates...

Version Control

Shell...

Project Options...

Global Options... 

```
1 # My First Script
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5 hist(rnorm(1000,0,1), col="red")
```

Files Plots Package

← → ⌂ ⌂ ⌂ ⌂

R: Express File Paths in Ca

normalizePath {base}

Express File

Description

Convert file paths to car
understandable form and

Usage

normalizePath(pat)

Console ~ / ↵
natural language support but running in an English locale

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Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

RSStudio File Edit Code View Plots Session Build Debug Tools Window Help

Import Dataset
Install Packages...
Check for Package Updates...
Version Control
Shell...
Project Options...
Global Options...

MyFirstScript.R x

```
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```

Files Plots Package

R: Express File Paths in Ca
normalizePath(base)

5.1 (Top Level) R Script

Console ~ / ~ Natural language support due to running in an English locale

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Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Options

R General

Code Editing

Appearance

Pane Layout

Packages

Sweave

Spelling

Git/SVN

Editor font: Monaco

Font size: 14

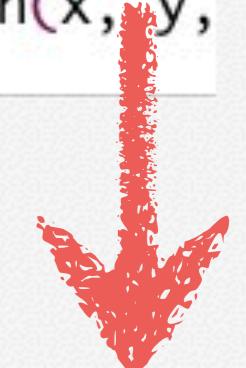
Editor theme: TextMate
Eclipse
Tomorrow
Cobalt
Idle Fingers
Twilight
Tomorrow Night
Tomorrow Night Blue
Tomorrow Night Bright
Tomorrow Night 80's
Solarized
Solarized Dark

```
# plotting of R objects
plot <- function(x, y, .
{
  if (is.function(x) &&
    is.null(attr(x, "cl
  {
    if (missing(y))
      y <- NULL

# check for ylab argu
hasylab <- function(.!
all(is.na(
  pmatch(names(list
    "ylab"))))

if (hasylab(.))
  plot.function(x, y,
```

OK Cancel Apply



Type into the
CONSOLE...

7 * 9

log(9)

hist(rnorm(100), col = "deeppink")

Practical II

- 1:10
- seq(from = 1, to = 10, by = 1)
 - Adjust the numbers to see what happens
 - what are the words ‘from’, ‘to’ and ‘by’?
- seq(from = 1, to = 10, length = 20)
- x <- 1:10
 - How do you “see” x?
- y <- 1:10
- x+Y

Did anyone look at ?seq

Quick note on syntax

- Let's say we want a sequence from 1 to 10, with 2 unit increments.
 - `seq(from = 1, to = 10, by = 2)`
 - `seq(1, 10, 2)` - check out the help file
 - `seq(10, 2, 1)`
 - `seq(by = 2, to = 10, from = 1)`

Intro to R

- Why use R?
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- RStudio
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Why use a script?

- We can do everything in the console, why bother with a script?
 - Record of what you did and WHY (R ignores comments after #).
 - Allows you to quickly repeat the analysis and make changes.
 - The code in the console will not be saved so that you can read it. But you can save the script.

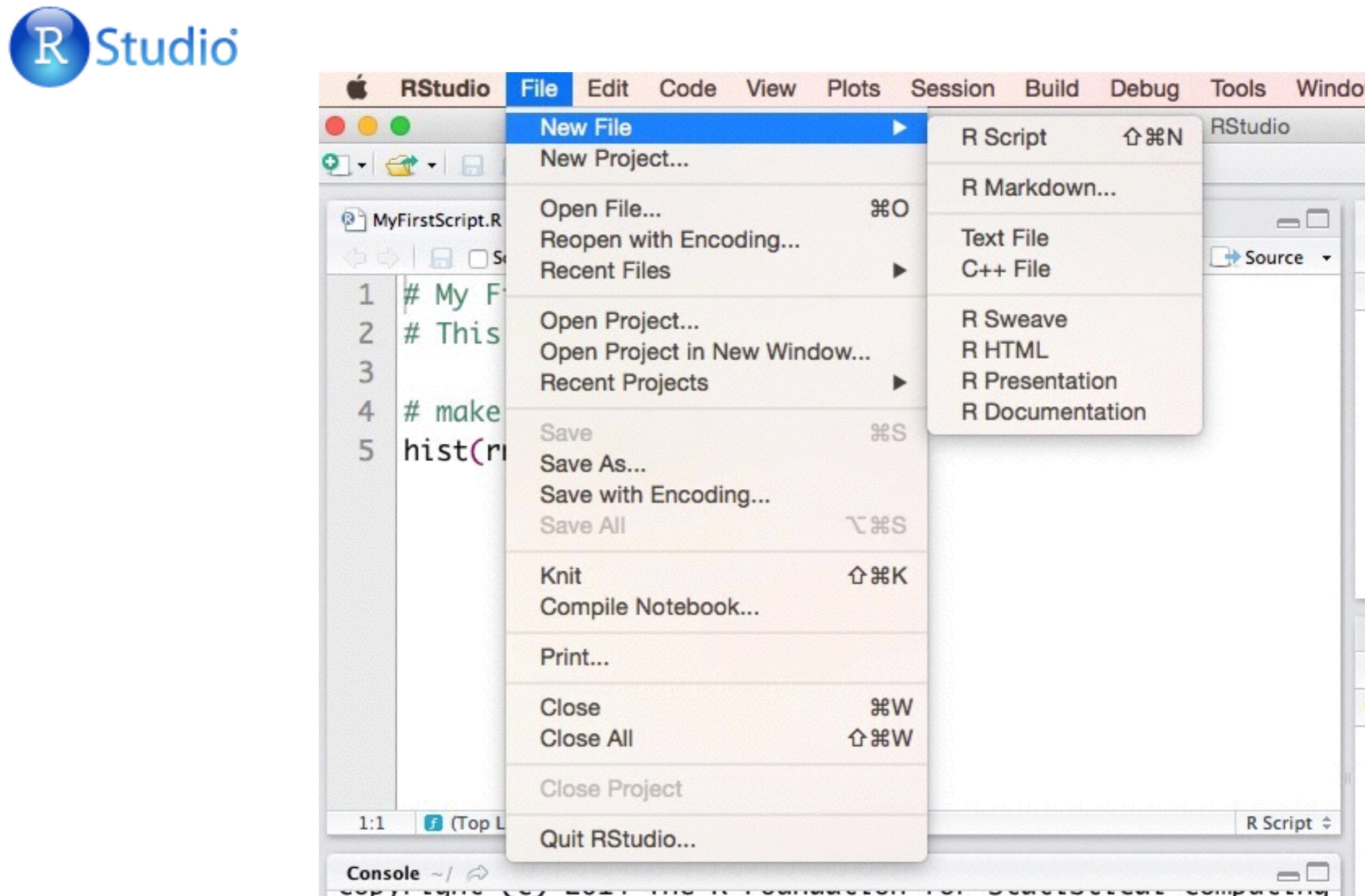
Ideal workflow...

1. Type code into the SCRIPT.
2. Add notes after # so you know what you were trying to achieve with that bit of code.
3. Run the code in the R CONSOLE (**Select it then Ctrl R or Ctrl ENTER**).
4. If it doesn't work, edit the SCRIPT and then try to run it again.
5. Keep repeating until it works.
6. SAVE the SCRIPT. This results in a messy CONSOLE (who cares!) and a tidy perfect SCRIPT (yay!)

```
#-----  
# Create citations through time graphs  
#-----  
  
# Clear R's brain  
rm(list = ls())  
  
# Load required libraries  
library(ggplot2)  
library(reshape)  
  
# Input data  
ds <- read.csv("Data/CitesThruTime.csv")  
type <- read.csv("Data/PaperContents.csv")  
  
# Reshape the data so it's in long format  
data_long <- melt(ds, id = "Year")  
  
# Merge in data explaining what each paper contains  
ds.all <- merge(data_long, type, by.x = "variable", by.y = "Paper")  
  
# Remove Felsenstein 1985 & Harvey&Pagel 1991  
ds.all <- subset(ds.all, variable != "Felsenstein1985"  
  & variable != "HarveyPagel1991")  
  
# Summarise citations for each type of assumption  
dsBrownian <- with(ds.all[which(ds.all$Brownian == "Yes"), ],  
  aggregate(value, by = list(Year),  
    FUN = sum, na.rm = TRUE))
```

Instructions

(script, code)



What you should know

- R is AWESOME
- The **Console** vs. The **Script**
 - *CTRL - 1* vs *CTRL - 2*
- ? or ?? or help() or help.start()
to get help
 - or google it
- > is the **prompt**

Conventions

- <- is the **assignment operator**
- **functions have arguments**
- R is vectorised - when you add two vectors together, it is **element-by-element**
- R is case sensitive, but spaces don't matter

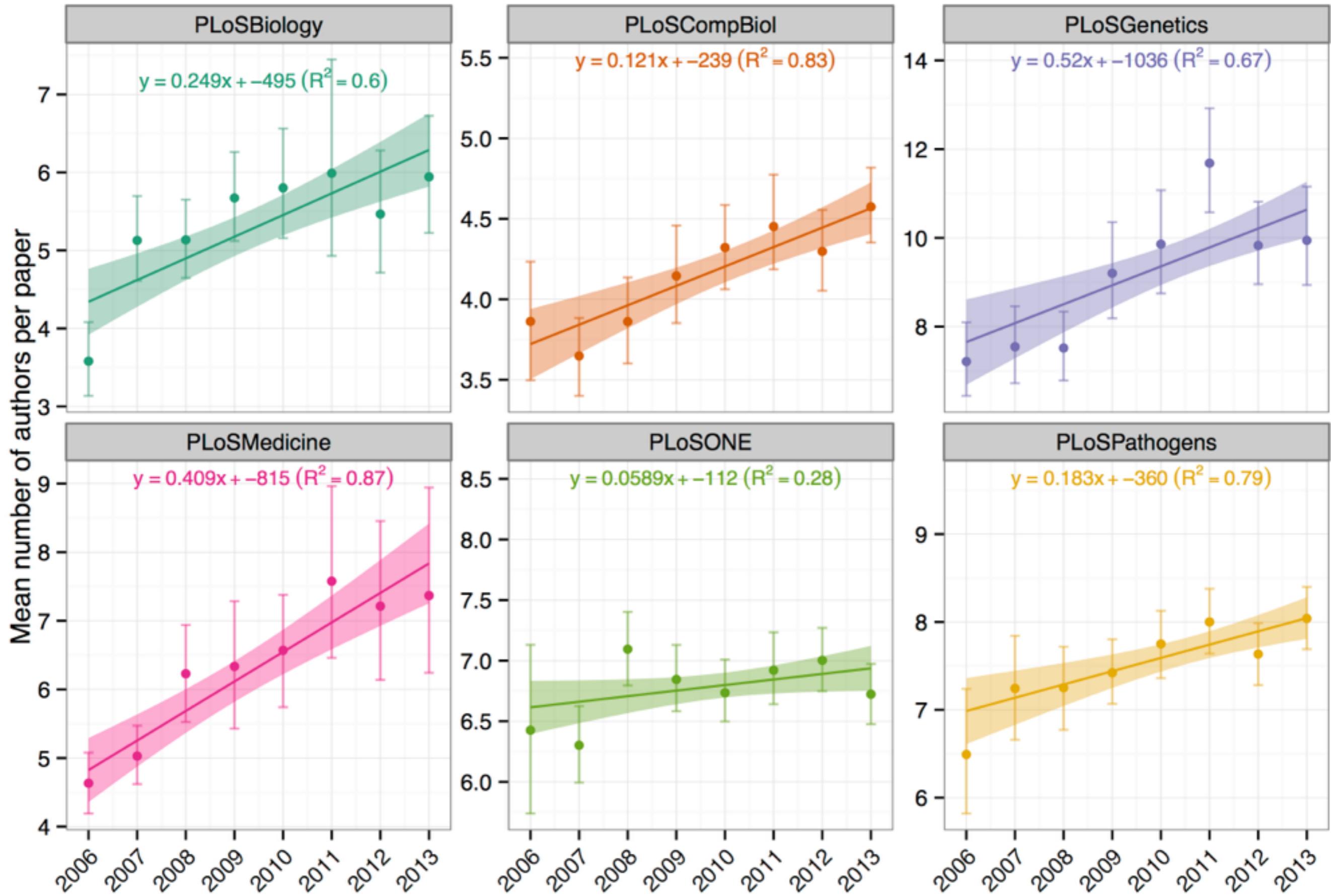
Intro to R

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type <- read.csv("Data/PaperContents.csv")  
  
# Reshape the data so it's in long format  
data_long <- melt(ds, id = "Year")  
  
# Merge in data explaining what each paper contains  
ds.all <- merge(data_long, type, by.x = "variable", by.y = "Paper")  
  
# Remove Felsenstein 1985 & Harvey&Pagel 1991  
ds.all <- subset(ds.all, variable != "Felsenstein1985"  
  & variable != "HarveyPagel1991")  
  
# Summarise citations for each type of assumption  
dsBrownian <- with(ds.all[which(ds.all$Brownian == "Yes"), ],  
  aggregate(value, by = list(Year),  
            FUN = sum, na.rm = TRUE))
```

Packages unlock R's special functions

- Standard R = base R.
- Other packages extend the capabilities of base R.
- >9000 packages.
- To use the functions in these packages we need to install them, and load them into R.

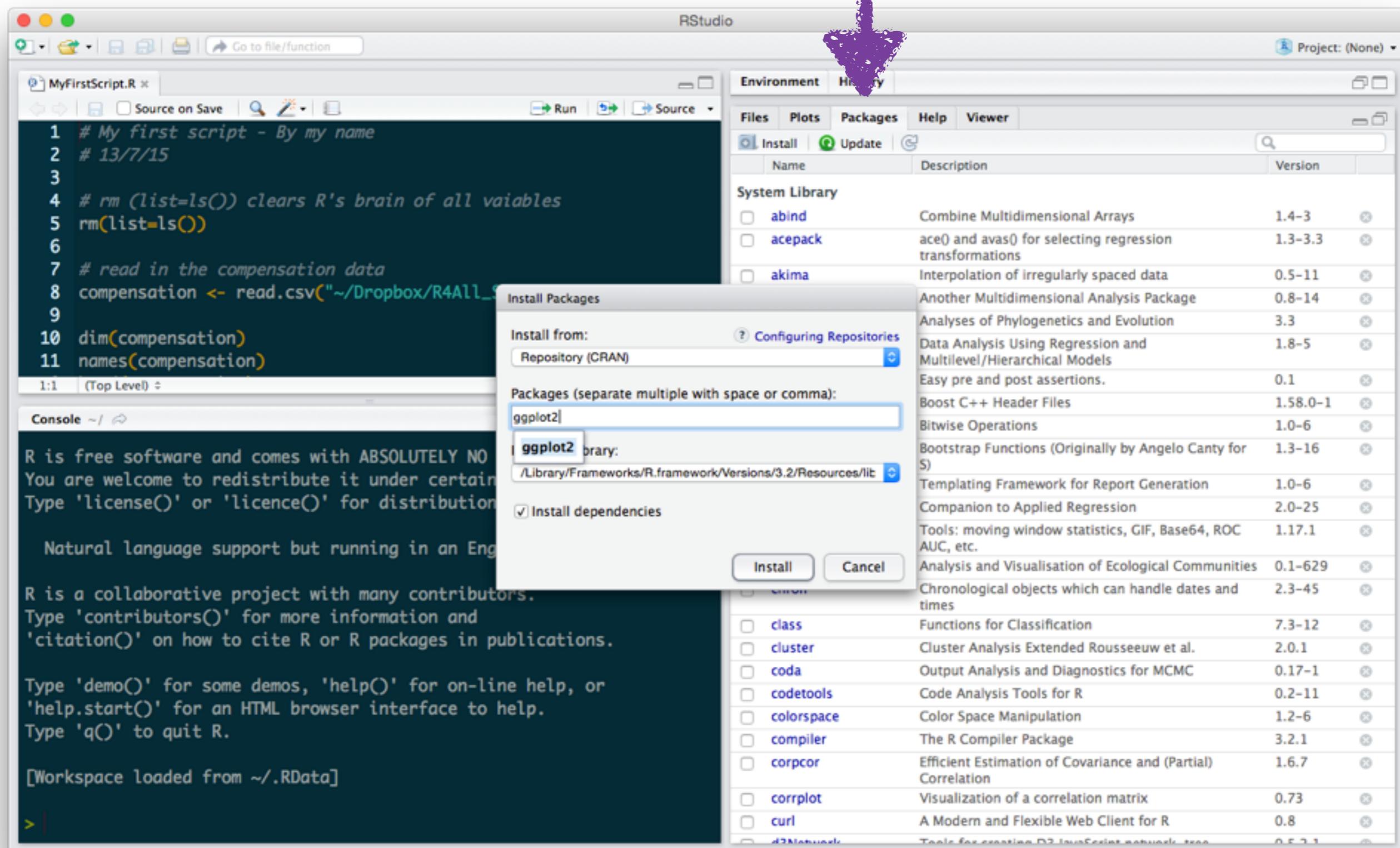


dplyr

tidyr

readr

all part of tidyverse



RStudio

MyFirstScript.R

Source on Save | Run | Source

```
1 # My first script - By my name
2 # 13/7/15
3
4 # rm (list=ls()) clears R's brain of all variables
5 rm(list=ls())
6
7 # read in the compensation data
8 compensation <- read.csv("~/Dropbox/R4All_Share/modules/0 - datasets")
9
10 dim(compensation)
11 names(compensation)
```

1:1 (Top Level) R Script

Console ~ / help.start() for an HTML browser interface to help.

Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

> install.packages("ggplot2")

trying URL 'http://cran.rstudio.com/bin/macosx/mavericks/contrib/3.2/ggplot2_1.0.1.tgz'

Content type 'application/x-gzip' length 2670945 bytes (2.5 MB)

=====

downloaded 2.5 MB

The downloaded binary packages are in

/var/folders/3f/5tldw6fx7gz7_0vcvy88pmdr0000gn/T//RtmpCCDSEw/downloaded_packages

>

FUNCTION: install.packages()

INSTALL THESE

tidyverse

[Can also install these to
use later in the course]

lubridate

ggfortify

**INSTALLATION ≠
LOADING**

No Service 22:13 39%

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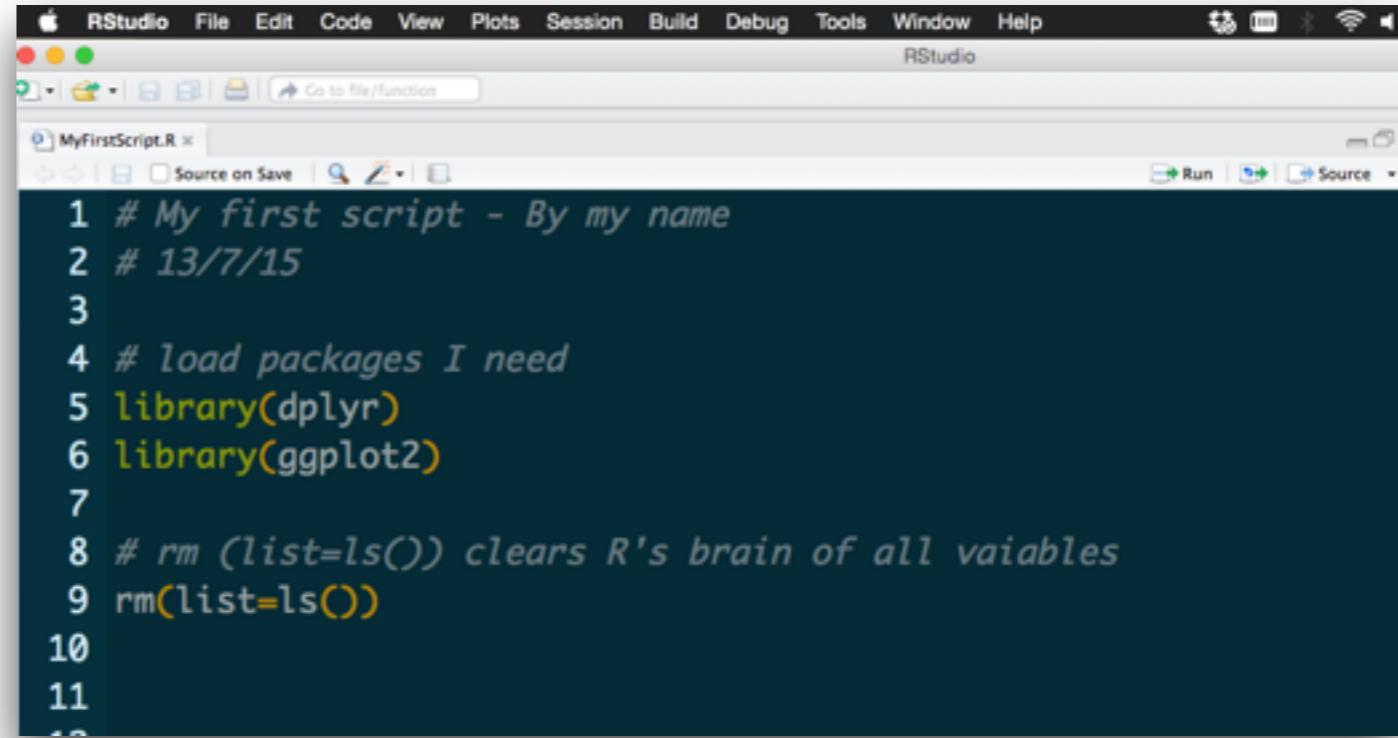
Phone Messages Safari Spark

Available CRAN Packages By Name

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

[A3](#)
[abbyyR](#)
[abc](#)
[ABCanalysis](#)
[abc.data](#)
[abceFBA](#)
[ABCOptim](#)
[abcrf](#)
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[acc](#)
[accelerometry](#)
[AcceptanceSampling](#)
[ACCLMA](#)
[accrual](#)
[accrued](#)
[ACD](#)
[ACDm](#)
[acepack](#)
[acid](#)

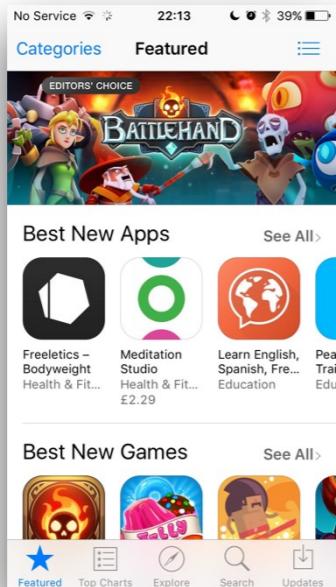
Accurate, Adaptable, and Accessible Error Metrics for Predictive Models
Access to Abbyy Optical Character Recognition (OCR) API
Tools for Approximate Bayesian Computation (ABC)
Computed ABC Analysis
Data Only: Tools for Approximate Bayesian Computation (ABC)
ABCDE_FBA: A-Biologist-Can-Do-Everything of Flux Balance Analysis with this package
Implementation of Artificial Bee Colony (ABC) Optimization
Approximate Bayesian Computation via Random Forests
Tools for ABC Analyses
The Analysis of Biological Data
Load Gap-Free Axon ABF2 Files
Combine Multidimensional Arrays
Modelling Multivariate Data with Additive Bayesian Networks
Angle-Based Outlier Detection
Improved False Positive Control of Gene-Permuting GSEA with Absolute Filtering
Abundant regression and high-dimensional principal fitted components
Functions for Processing and Analyzing Accelerometer Data
Functions for Processing Minute-to-Minute Accelerometer Data
Creation and Evaluation of Acceptance Sampling Plans
ACC & LMA Graph Plotting
Bayesian Accrual Prediction
Data Quality Visualization Tools for Partially Accruing Data
Categorical data analysis with complete or missing responses
Tools for Autoregressive Conditional Duration Models
ace() and avas() for selecting regression transformations
Analysing Conditional Distributions of Income



```
1 # My first script - By my name
2 # 13/7/15
3
4 # load packages I need
5 library(dplyr)
6 library(ggplot2)
7
8 # rm (list=ls()) clears R's brain of all variables
9 rm(list=ls())
10
11
12
```

Use the Package
(press the button)
library()

Install (Download) a Package (from the “R Store”)



Use `library()` to load
packages

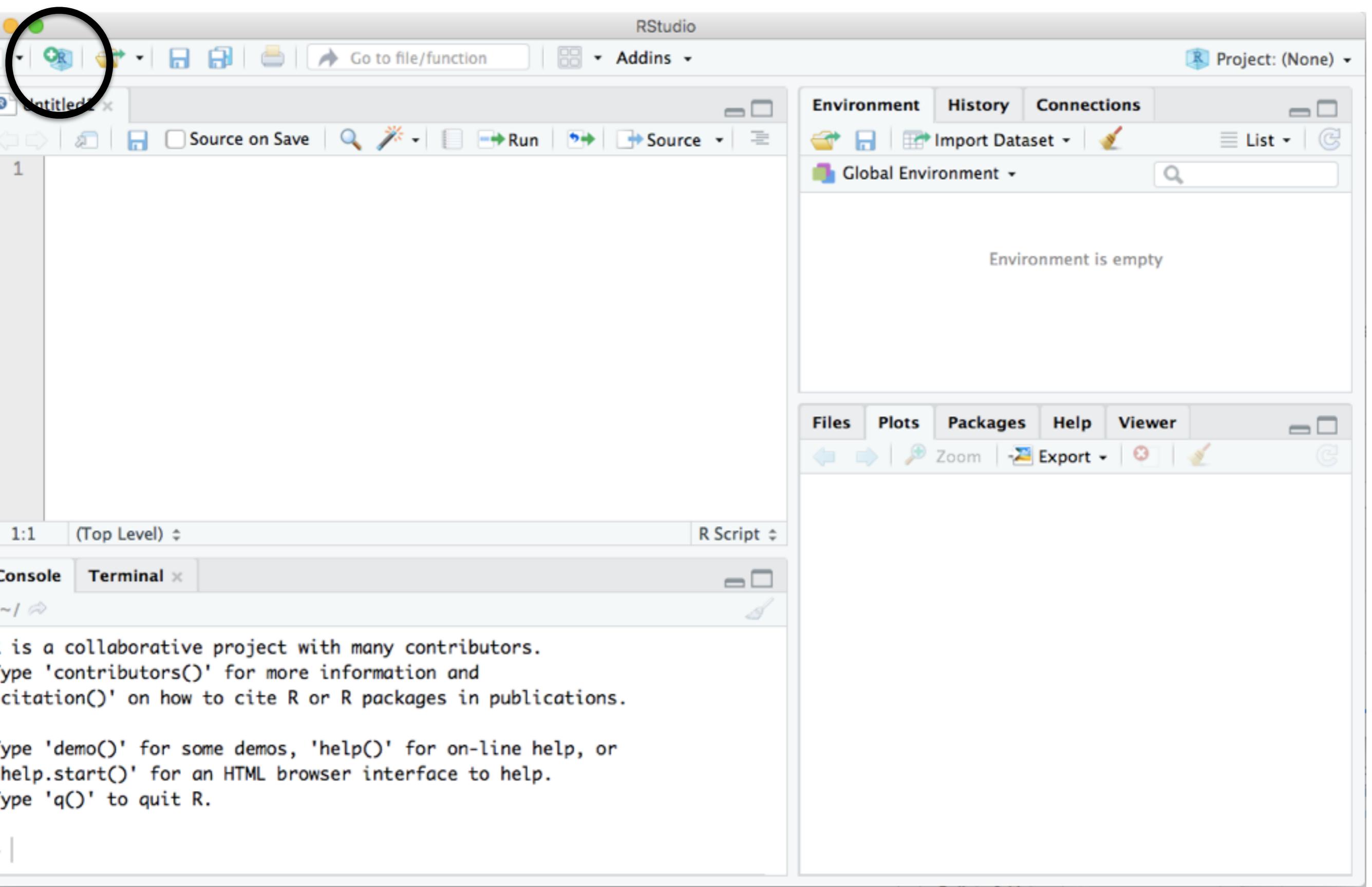
```
library(tidyverse)
```

Intro to R

- Why use R?
- Getting help
- RStudio
- Using scripts and RNotebooks
- Installing packages
- Importing data into R

Where are the data?

- Set working directory
- Give the full path name
- Use R Projects



RStudio

Untitled1 ×

Go to file/function Addins Environment History Connections

Project: (None)

New Project

Create Project

New Directory >
Start a project in a brand new working directory

Existing Directory >
Associate a project with an existing working directory

Version Control >
Checkout a project from a version control repository

Cancel

1

1:1 (Top Level) ▾

Console Terminal

~ /

R is a collaborative project.
Type 'contributors()' for
'citation()' on how to cite.

Type 'demo()' for some demos, 'help()' for on-line help,
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

Import the data

```
compensation <-  
read.csv("compensation.csv")
```

You can call the data whatever you like (but can't have spaces or start with something other than a letter)...

mydata

fruitdata

fred

happysquirrel

Don't trust the computer

ALWAYS Check the data that you imported

