

# RStudio

Introduction to R for Public Health Researchers

# RStudio

- ▶ “RStudio is an integrated development environment (IDE) for R.”
- ▶ It helps the user use R.
- ▶ R, in essence is just the a console that takes commands from you typing into it
- ▶ Is NOT dropdown statistical tools (such as Stata)
- ▶ Snapshots taken from  
<http://ayeimanol-r.net/2013/04/21/289/>

# RStudio/R Console

The screenshot shows the RStudio interface with the R Console window active. The console displays the standard R startup message, which is circled with a large black oval. The message includes the R version (3.0.0), copyright information, and instructions on how to use R and its packages. The right-hand pane shows the 'Workspace' and 'History' tabs, and the bottom-right pane shows the 'Files', 'Plots', 'Packages', and 'Help' tabs. The 'Packages' tab is currently selected, displaying a list of installed and available packages.

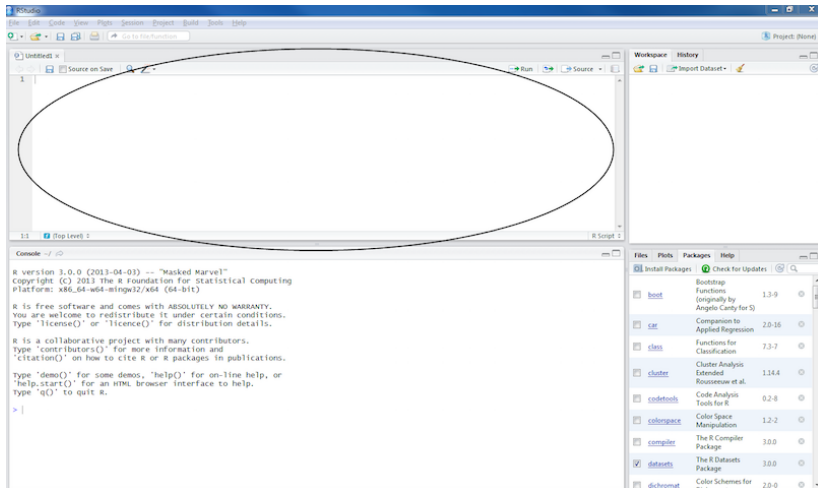
```
R version 3.0.0 (2015-04-03) -- "Masked Marvel"  
Copyright (C) 2015 The R Foundation for Statistical Computing  
Platform: x86_64-w64-mingw32/x64 (64-bit)  
  
R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.  
  
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.  
  
>
```

Package	Description	Version	Update
<a href="#">boot</a>	Bootstrap Functions (originally by Angelo Canty for S)	1.3-9	○
<a href="#">car</a>	Companion to Applied Regression	2.0-16	○
<a href="#">class</a>	Functions for Classification	7.3-7	○
<a href="#">cluster</a>	Cluster Analysis Extended	1.14.4	○
<a href="#">codetools</a>	Code Analysis Tools for R	0.2-8	○
<a href="#">colorspace</a>	Color Space Manipulation	1.2-2	○
<a href="#">compiler</a>	The R Compiler Package	3.0.0	○
<a href="#">datasets</a>	The R Datasets Package	3.0.0	○
<a href="#">dichromat</a>	Color Schemes for Dichromats	2.0-0	○

# RStudio/R Console

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

# Script/Editor



RStudio

File Edit Code View Plots Session Project Build Tools Help

Go to File/Function

Untitled1.R

Source on Save Run Source

1

1:1 (Top Level) R Script

Console

```
R version 3.0.0 (2013-04-03) -- "Masked Marvel"
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Type 'q()' to quit R.

> |
```

Workspace History

Import Dataset

Files Plots Packages Help

Install Packages Check for Updates

Package	Version	Update
<a href="#">boot</a>	1.3-9	○
<a href="#">car</a>	2.0-16	○
<a href="#">class</a>	7.3-7	○
<a href="#">cluster</a>	1.14.4	○
<a href="#">codetools</a>	0.2-8	○
<a href="#">colspace</a>	1.2-2	○
<a href="#">compiler</a>	3.0.0	○
<a href="#">datasets</a>	3.0.0	○
<a href="#">dichromat</a>	2.0-0	○

# RStudio/R Script/Rmarkdown files

- ▶ 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
- ▶ Code is saved on your disk

# Workspace/Environment

The screenshot displays the RStudio interface with three main panels:

- Source Editor:** Contains R code for loading packages and creating a ggplot. Lines 19 and 20 are highlighted in blue.
- Console:** Shows the execution of the code, including package attachment messages and the final plot command.
- Plots Panel:** Displays a scatter plot of mpg vs wt.

**Source Editor Code:**

```
1  
2  
3  
4 # load libraries of packages #####  
5  
6  
7 library(languageR)  
8 library(lme4)  
9 library(ggplot2)  
10 library(rms)  
11 library(plyr)  
12 library(reshape2)  
13 library(psych)  
14  
15  
16  
17 # plotting demonstration #####  
18  
19 p <- ggplot(mtcars, aes(wt, mpg))  
20 p + geom_point()  
21
```

**Console Output:**

```
Attaching package: 'plyr'  
  
The following object is masked from 'package:rmisc':  
  ls.discrete, summarize  
  
> library(reshape2)  
> library(psych)  
  
Attaching package: 'psych'  
  
The following object is masked from 'package:rmisc':  
  describe  
  
The following object is masked from 'package:ggplot2':  
  %>%  
  
> p <- ggplot(mtcars, aes(wt, mpg))  
> p + geom_point()  
>
```

**Workspace Panel:** A circle highlights the 'Values' section, showing the variable 'p' with the value 'gg[9]'.

**Plots Panel:** A scatter plot showing the relationship between weight (wt) on the x-axis and miles per gallon (mpg) on the y-axis. The plot shows a negative correlation, with mpg values ranging from approximately 10 to 35 and wt values ranging from approximately 1.6 to 5.4.

# Workspace/Environment

## Workspace/Environment

- ▶ Tells you what **objects** are in R
- ▶ What exists in memory

## History

- ▶ Shows previous commands. Good to look at for debugging, but **don't rely** on it as a script. Make a script!



## 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

## Other Panes - packages

- ▶ **Packages** - list of R packages that are loaded in memory
  - ▶ Packages are a set of functions written by R users
  - ▶ We write packages - some are good, some are not so good
- ▶ Think of them as “R Extensions”
- ▶ If they extend R, when you download R from CRAN, we (and others) refer to things as “base R”
  - ▶ We will show you how to do some things in base R, but also show you some newer (and more intuitive) ways to do things
  - ▶ You need base R, however, because when you Google for answers, they are commonly answered without any additional packages.

# Hadley Wickham

- ▶ Previous Assistant Professor of Statistics at Rice University
- ▶ Writes many R packages
- ▶ One authority on all things R
- ▶ Employee and Developer at RStudio
- ▶ I (John) trust almost all his packages
  - ▶ How to trust an R package:  
[http://simplystatistics.org/2015/11/06/  
how-i-decide-when-to-trust-an-r-package/](http://simplystatistics.org/2015/11/06/how-i-decide-when-to-trust-an-r-package/)