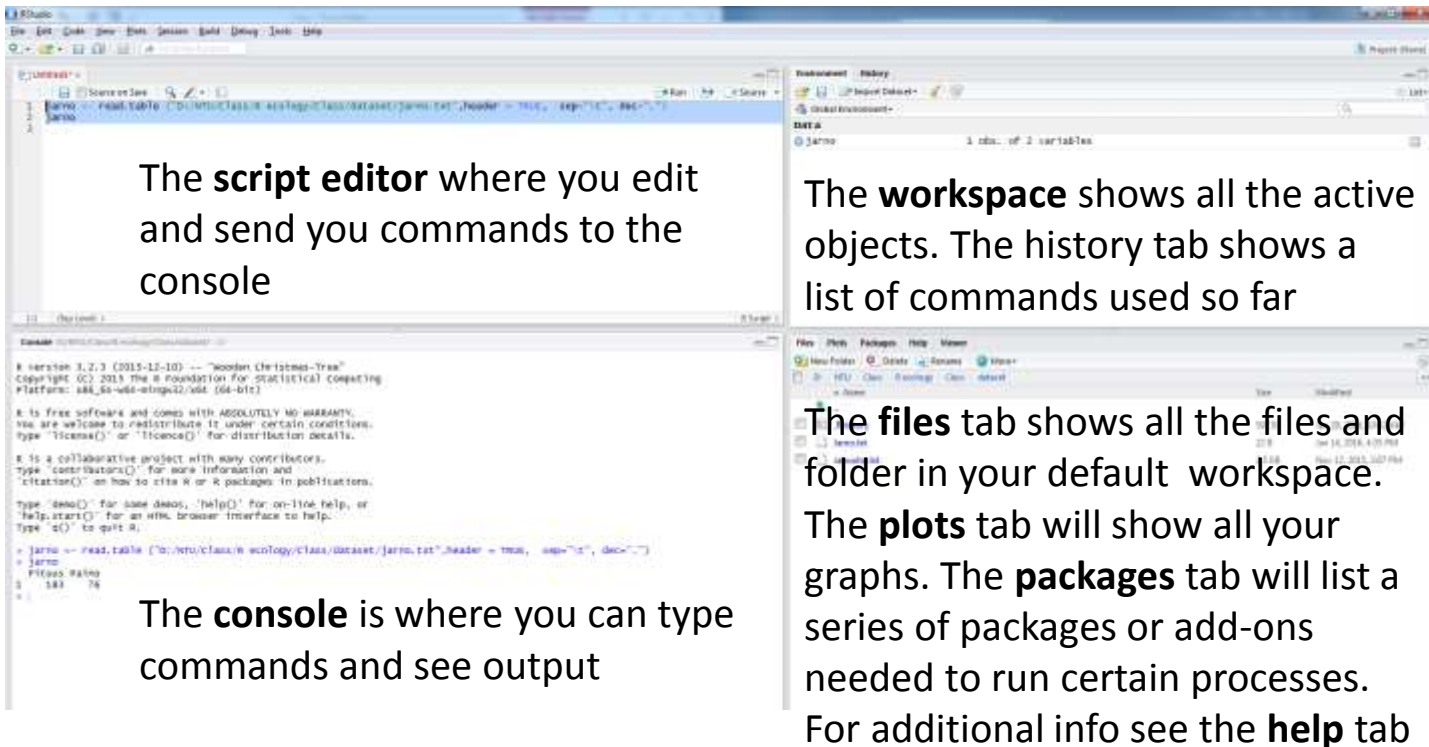


RStudio

- RStudio allows the user to run R in a more user-friendly environment. It is open-source (i.e. free) and available at <http://www.rstudio.com/>

Rstudio screen



The **script editor** where you edit and send you commands to the console

The **workspace** shows all the active objects. The history tab shows a list of commands used so far

The **files** tab shows all the files and folder in your default workspace. The **plots** tab will show all your graphs. The **packages** tab will list a series of packages or add-ons needed to run certain processes. For additional info see the **help** tab

The **console** is where you can type commands and see output

RStudio

- Auto-synthax

```
1 getw ()
```

- Suggestion functions {package} + description functions

```
1 getw
```

◆ getwd	{base}
◆ getWindowTitle	{utils}
◆ getwindowsHandle	{utils}
◆ getwindowsHandles	{utils}
◆ getWinProgressBar	{utils}
◆ getAnywhere	{utils}

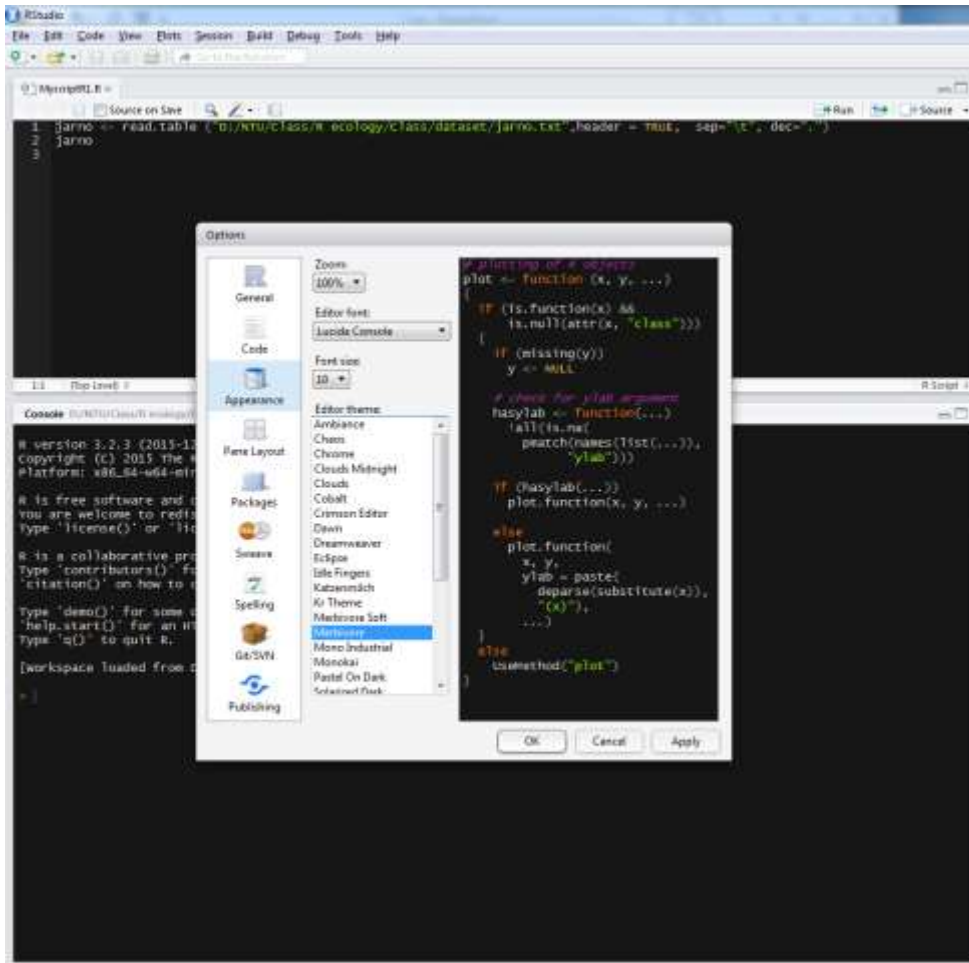
```
getwd()
```

getwd returns an absolute filepath representing the current working directory of the R process; `setwd(dir)` is used to set the working directory to `dir`.

Press F1 for additional help

- User-adjustable

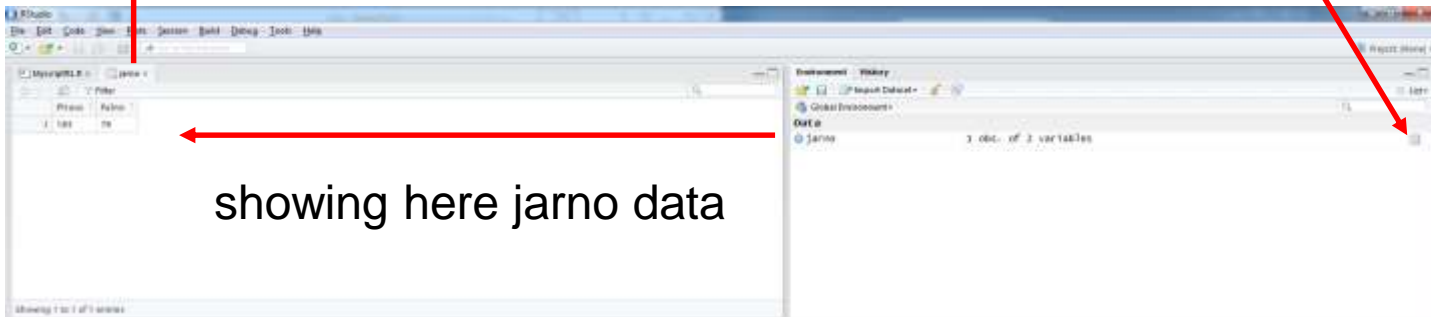
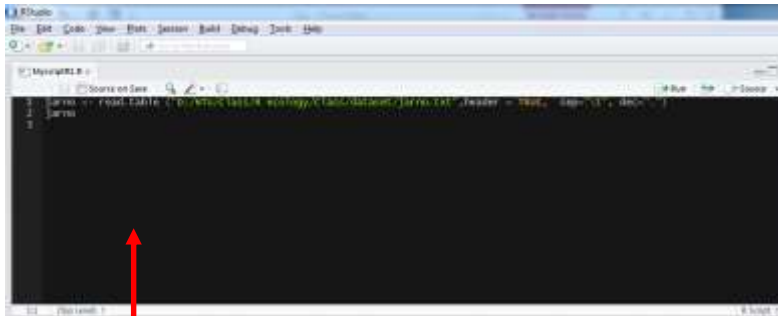
RStudio



- Go in the options to personalize appearance and layout

Rstudio: environment

The environment tab / global stores any object, value, function or anything you create during your R session. In the example below, if you click on the dotted squares you can see the data on a screen to the left.



Rstudio: environment

Here is another example on how the workspace looks like when more objects are added. Notice that the data frame `house.pet.chat` is formed from different individual values or vectors.

```
1 pets <- c("cat", "bunny", "dog")
2 weight <- c(1, 2, 10)
3 feed <- c("yes", "no")
4 run <- c(10, 10, 10)
5 talk <- c("yes", "no", "yes")
6 house.pet.chat <- data.frame(pets, weight, feed, run, talk)
```

The screenshot shows the RStudio interface. The top pane displays the R console with the code from the previous block. The bottom-left pane shows a preview of the data frame `house.pet.chat` with the following data:

	pets	weight	feed	run	talk
1	cat	1	yes	10	yes
2	bunny	2	no	10	no
3	dog	10	no	10	yes

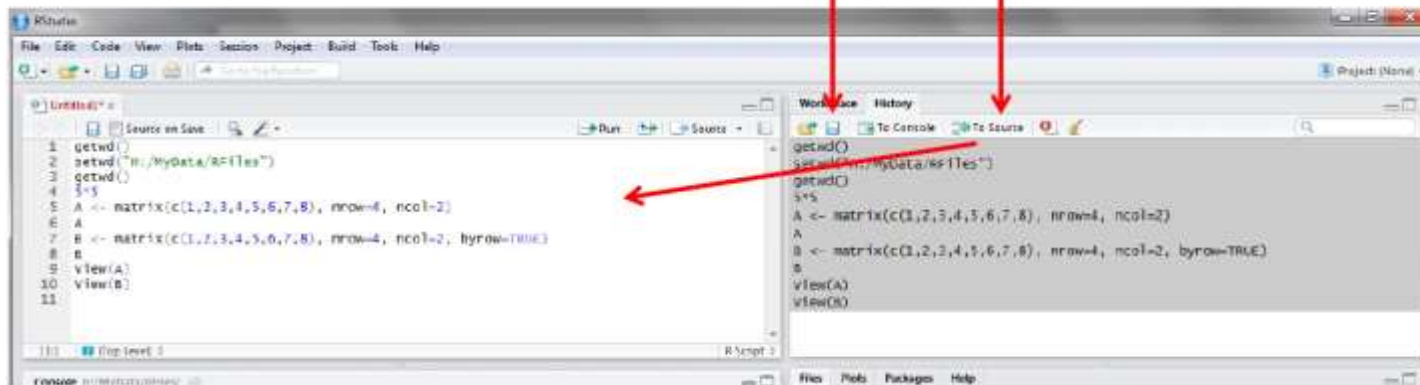
The bottom-right pane shows the Environment window with the following data:

```
Data
@house.pet.chat      3 obs. of 5 variables
Values:
feed      chr [1:3] "yes" "no" "no"
pets      chr [1:3] "cat" "bunny" "dog"
run       num [1:3] 10 10 10
talk      chr [1:3] "yes" "no" "yes"
weight    num [1:3] 1 2 10
```

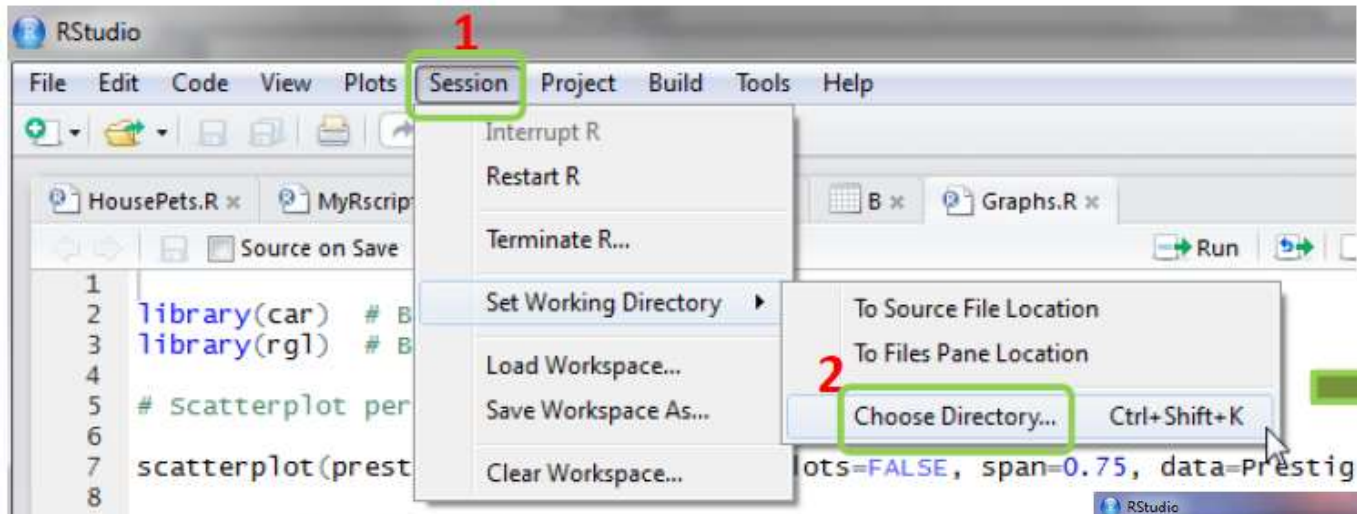
Red arrows indicate the flow of information: one arrow points from the code in the console to the data frame preview, and another points from the Environment window back to the code in the console.

Rstudio: history

The history tab keeps a record of all previous commands. It helps when testing and running processes. Here you can either save the whole list or you can select the commands you want and send them to an R script to keep track of your work. In this example, we select all and click on the “To Source” icon, a window on the left will open with the list of commands. Make sure to save the ‘untitled1’ file as an *.R script.



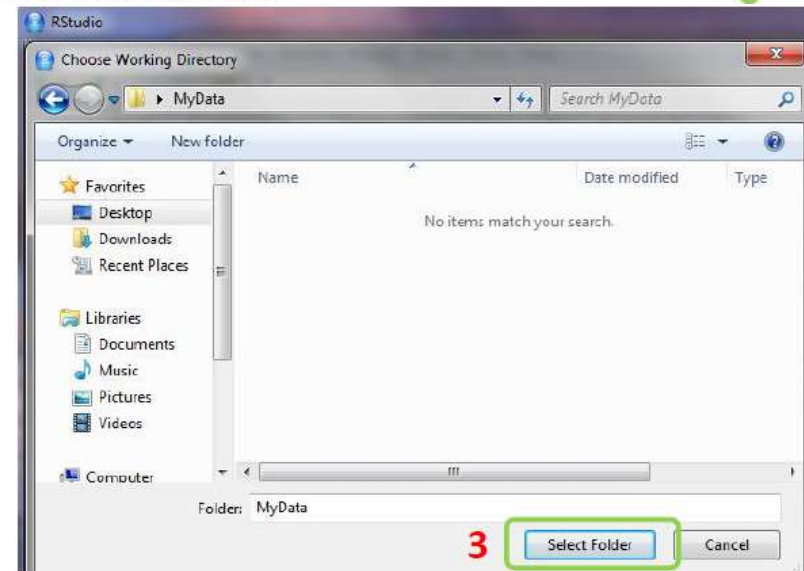
Rstudio: wd



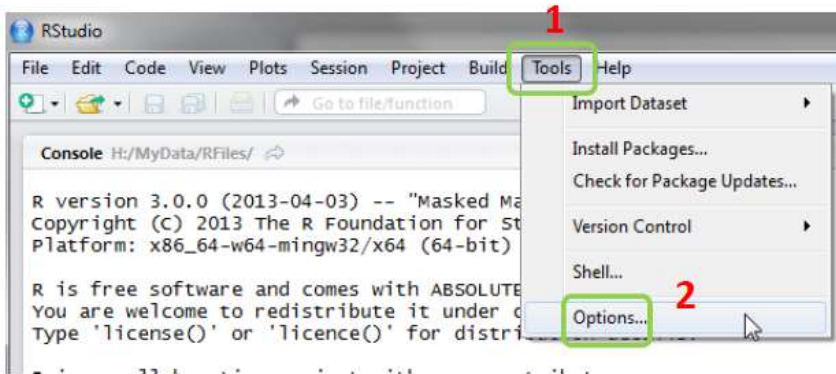
If you have different projects you can change the working directory for that session, see above. Or you can type:

```
# Shows the working directory (wd)  
getwd ()
```

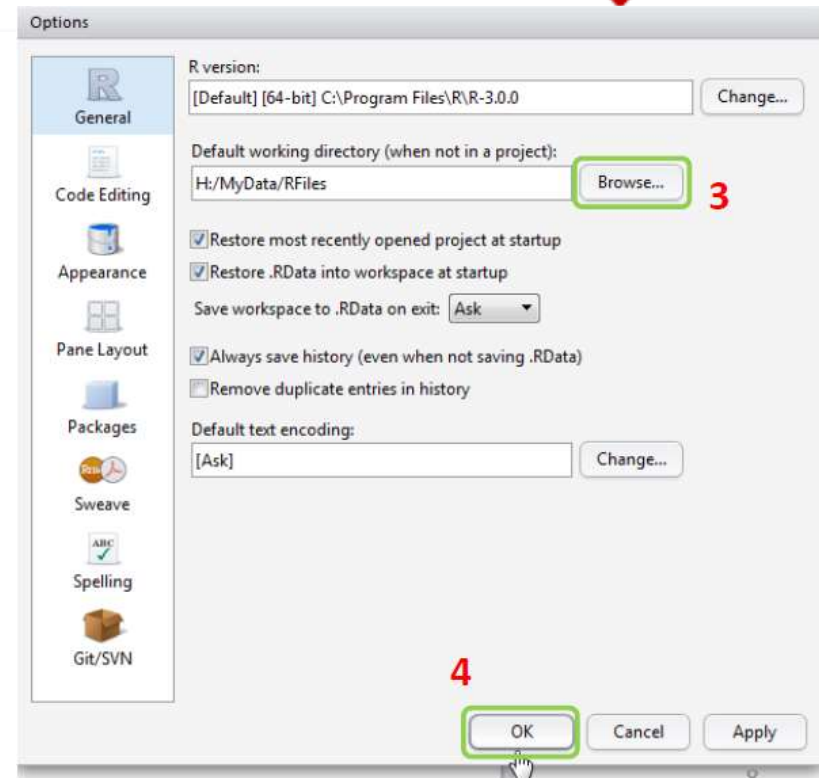
```
# Changes the wd  
setwd("C:/myfolder/data")
```



Rstudio: default wd

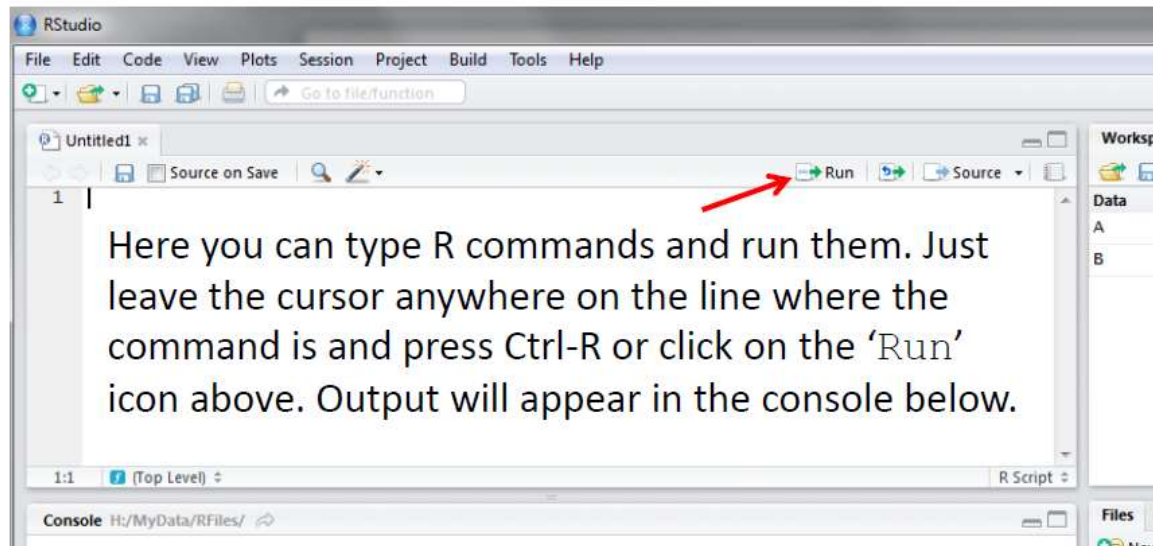
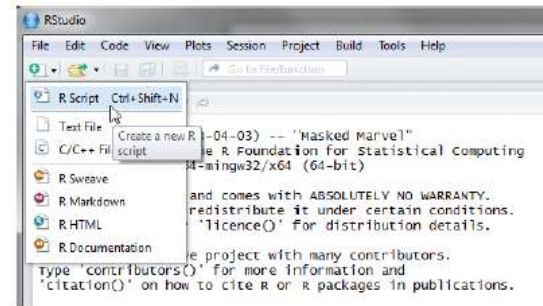
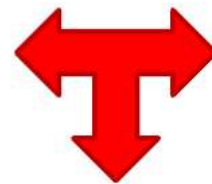
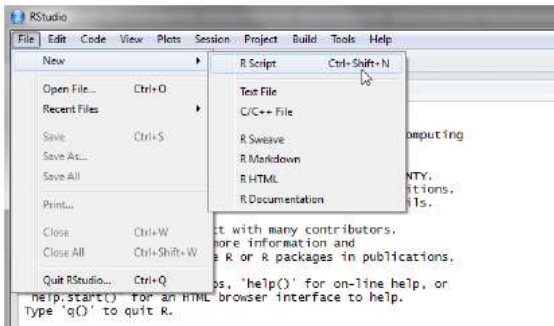


Setting a default working directory. Every time you open RStudio, it goes to a default directory. You can change the default to a folder where you have your datafiles so you do not have to do it every time. In the menu go to Tools -> Options



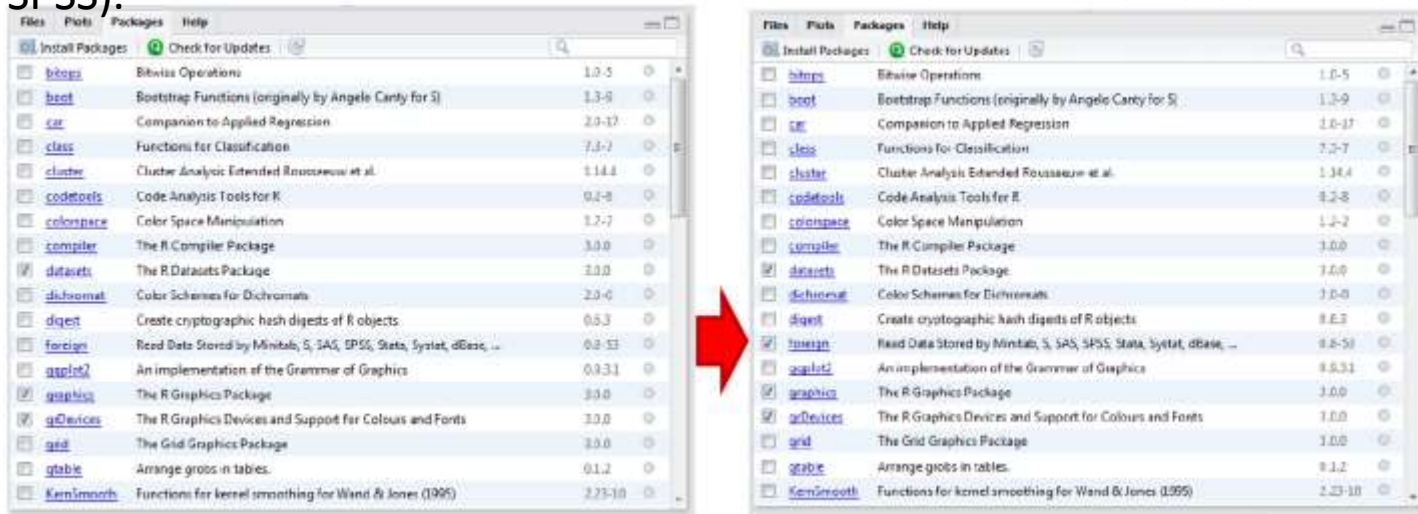
Rstudio: script

To create a new R script you can either go to File -> New-> R Script, or click on the icon with the “+” sign and select “R Script”, or simply press Ctrl+Shift+N. Make sure to save the script.



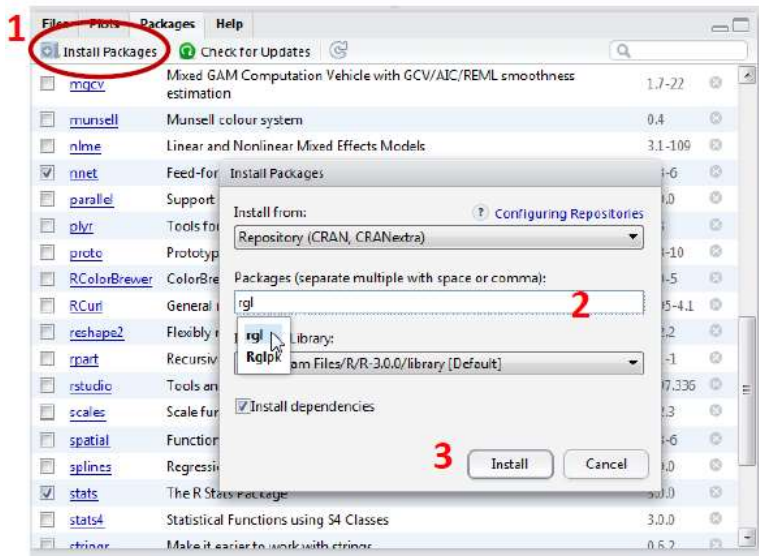
Rstudio: packages

The package tab shows the list of add-ons included in the installation of RStudio. If checked, the package is loaded into R, if not, any command related to that package won't work, you will need select it. You can also install other add-ons by clicking on the 'Install Packages' icon. Another way to activate a package is by typing, for example, `library(foreign)`. This will automatically check the --> foreign package (it helps bring data from proprietary formats like Stata, SAS or SPSS).



Rstudio: installing packages

<input type="checkbox"/>	RCurl	General network (HTTP/FTP/...) client interface for R	1.95-4.1	⊗
<input type="checkbox"/>	reshape2	Flexibly reshape data: a reboot of the reshape package.	1.2.2	⊗
<input type="checkbox"/>	rpart	Recursive Partitioning	4.1-1	⊗



We are going to install the package – `rgl` (useful to plot 3D images). It does not come with the original R install. Click on “Install Packages”, write the name in the pop-up window and click on “Install”.

<input type="checkbox"/>	RCurl	General network (HTTP/FTP/...) client interface for R	1.95-4.1	⊗
<input type="checkbox"/>	reshape2	Flexibly reshape data: a reboot of the reshape package.	1.2.2	⊗
<input type="checkbox"/>	rgl	3D visualization device system (OpenGL)	0.93.952	⊗
<input type="checkbox"/>	rpart	Recursive Partitioning	4.1-1	12 ⊗

Rstudio: plots

The **plots** tab will display the graphs. The one shown here is created by the command on line 7 in the script above. See next slide to see what happens when you have more than one graph

```
1 library(car) # By John Fox and Sanford Weisberg
2 library(rgl) # By Daniel Adler and Duncan Murdoch
3
4 # scatterplot per group
5
6 scatterplot(prestige ~ income | type, boxplots=FALSE, span=0.75, data=prestige)
7
8 # scatterplots in matrix form
9
10 scatterplotmatrix(~ prestige + income + education, span=0.7, data=prestige)
11
12 # 3D graph. scatter3D is from the --car package. It will open in a separate window.
13 scatter3D(prestige ~ income + education, ld.n=3, data=ducan)
14
15
```

Console

```
> scatterplot(prestige~income|type, boxplots=FALSE, span=0.75, data=prestige)
>
```

type	income	prestige
bc	5000	0.2
bc	10000	0.4
bc	15000	0.5
bc	20000	0.6
bc	25000	0.7
prof	5000	0.6
prof	10000	0.7
prof	15000	0.8
prof	20000	0.9
prof	25000	1.0
WC	5000	0.3
WC	10000	0.5
WC	15000	0.6
WC	20000	0.7
WC	25000	0.8

Rstudio: plots

The screenshot shows the RStudio interface with the following components:

- Code Editor:** Contains R code for plotting. Line 11 uses `scatterplotmatrix()` to create a matrix of plots for prestige, income, and education.
- Workspace:** Lists objects: Data (A, B), house.pets, Values (food, pets, run, weight).
- Plots Panel:** Displays a 3x3 grid of plots for prestige, income, and education. A red arrow points to the left arrow icon in the top-left corner of the plots panel.
- Console:** Shows the execution of the `scatterplotmatrix()` command.

Here there is a second graph (see line 11 above). If you want to see the first one, click on the left-arrow icon.

Rstudio: plots

To extract the graph, click on “Export” where you can save the file as an image (PNG, JPG, etc.) or as PDF, these options are useful when you only want to share the graph or use it in a LaTeX document. Probably, the easiest way to export a graph is by copying it to the clipboard and then paste it directly into your Word document.

The image shows a screenshot of the RStudio interface. On the left, a plot window displays several plots, including a histogram labeled 'pre' and a scatter plot labeled 'income'. A red arrow points from the 'pre' plot to a 'Copy Plot to Clipboard' dialog box on the right. The dialog box has fields for 'Width: 630' and 'Height: 417', and a 'Maintain aspect ratio' checkbox. It contains a preview of the selected plot. At the bottom, there are radio buttons for 'Copy as: Bitmap Metafile'. A red arrow points from the 'Metafile' option to the text '3 Make sure to select 'Metafile''.

1

2

3 Make sure to select 'Metafile'

4

5 Paste it into your Word document

Rstudio: note on plots

```
RStudio
File Edit Code View Plots Session Project Build Tools Help
HousePets.R x MyRscript.R x house.pets x A x B x Graphs.R x
Source on Save Run Source
1
2 library(car) # By John Fox and Sanford Weisberg
3 library(rgl) # By Daniel Adler and Duncan Murdoch
4
5 # Scatterplot per group
6
7 scatterplot(prestige ~ income|type, boxplots=FALSE, span=0.75, data=Prestige)
8
9 # Scatterplots in matrix form
10
11 scatterplotMatrix(~ prestige + income + education, span=0.7, data=Prestige)
12
13 # 3D graph, scatter3d is from the --car package. It will open in a separate window.
14
15 scatter3d(prestige ~ income + education, id.n=3, data=Duncan)
```

```
151 (Top Level) R Sc
Console H:/MyData/RFiles/
> scatterplot(prestige~income|type, boxplots=FALSE, span=0.75, data=Prestige)
> scatterplotMatrix(~ prestige + income + education, span=0.7, data=Prestige)
> scatter3d(prestige ~ income + education, id.n=3, data=Duncan)
>
```



3D graphs will display on a separate screen (see line 15 above). You won't be able to save it, but after moving it around, once you find the angle you want, you can screenshot it and paste it to your document.

