# R you ready?
# IntRo to RStudio and R Markdown
# for open data and reproducibility

Unit 1:

# Introduction to RStudio

**Mason A. Wirtz**

@WirtzMason

# Welcome

Mason A. Wirtz


@WirtzMason


I'LL HAVE YOU KNOW THAT I USED
R STUDIO
AND ONLY CRIED 10 TIMES


GOALS

# What is this workshop about?

Introduction to RStudio

Introduction to RMarkdown for open data and reproducibility

Set up file management systems with R

Keep your code tidy and readable

# Topics

- **Basic coding** in RStudio (we will largely use the `Tidyverse`)
- Types of **variables** (vectors, factors, data frames)
- Importing data
- Setting up an **R Markdown** document
- Ensuring **reproducible** and **understandable code**
- Structuring an **R project** (folders, files, project management etc.)
- Using **OSF** (Open Science Framework) to store data

## Rationale

**In disciplines such as psychology, the problem of replicability has migrated to the forefront of discussions, and large-scale replication attempts have produced largely disheartening results.**

# Rationale

**However, these replication failures have inspired rich discussions about methodological and practical standards, including in the field of linguistics. Reforms proposed in reaction to the so-called 'replication crisis' have recommended improving the quality of empirical evidence via e.g. pre-registrations, registered reports and, of course, open data.**

# Rationale

**The guiding idea behind open data is to make it easier to verify published results, and this includes making the raw data available as well as the analysis procedures in their entirety (e.g. by providing the necessary R or Python scripts).**

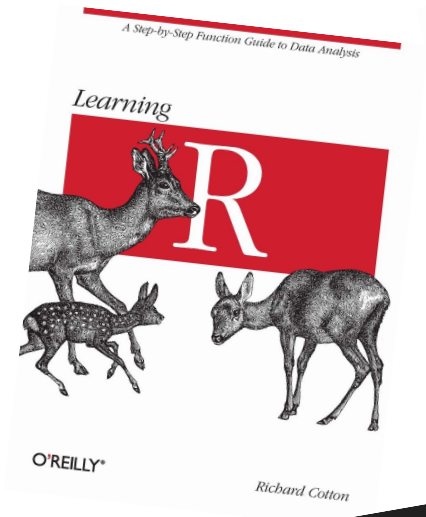
# Resources

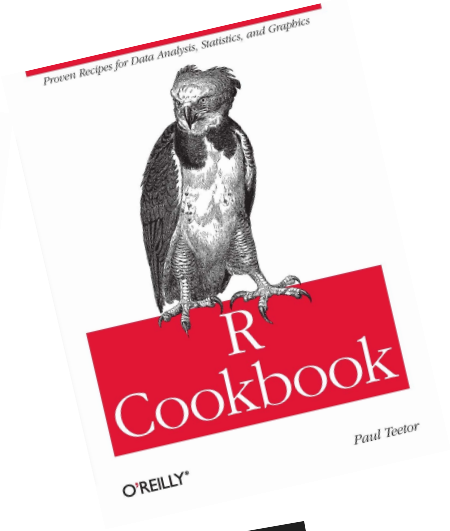
**When you can't figure something out (and this will happen), your first steps should be to look at:**


**Chances are, someone will have had the same problem and someone smarter than us will have solved the problem**

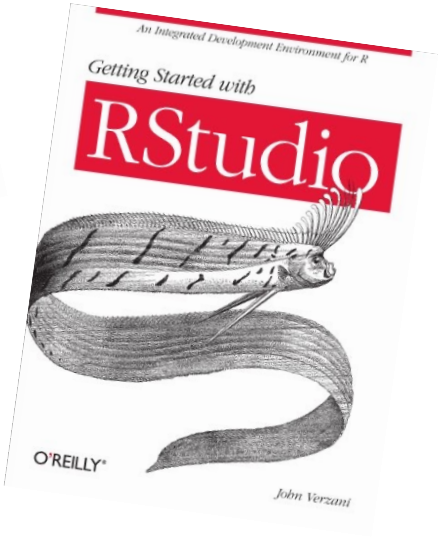
# Literature

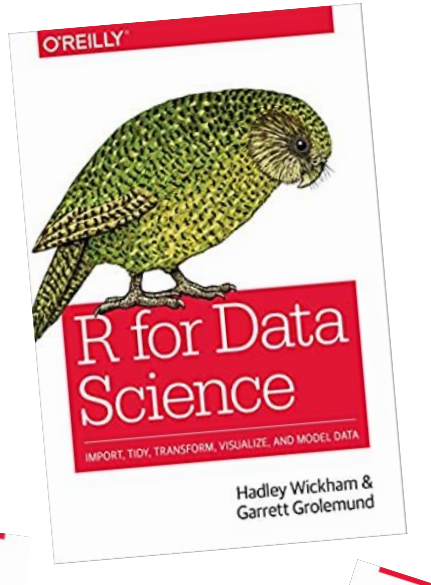
## I can recommend the following works:

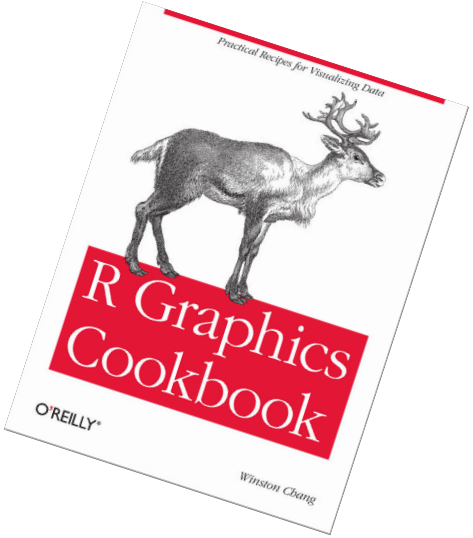




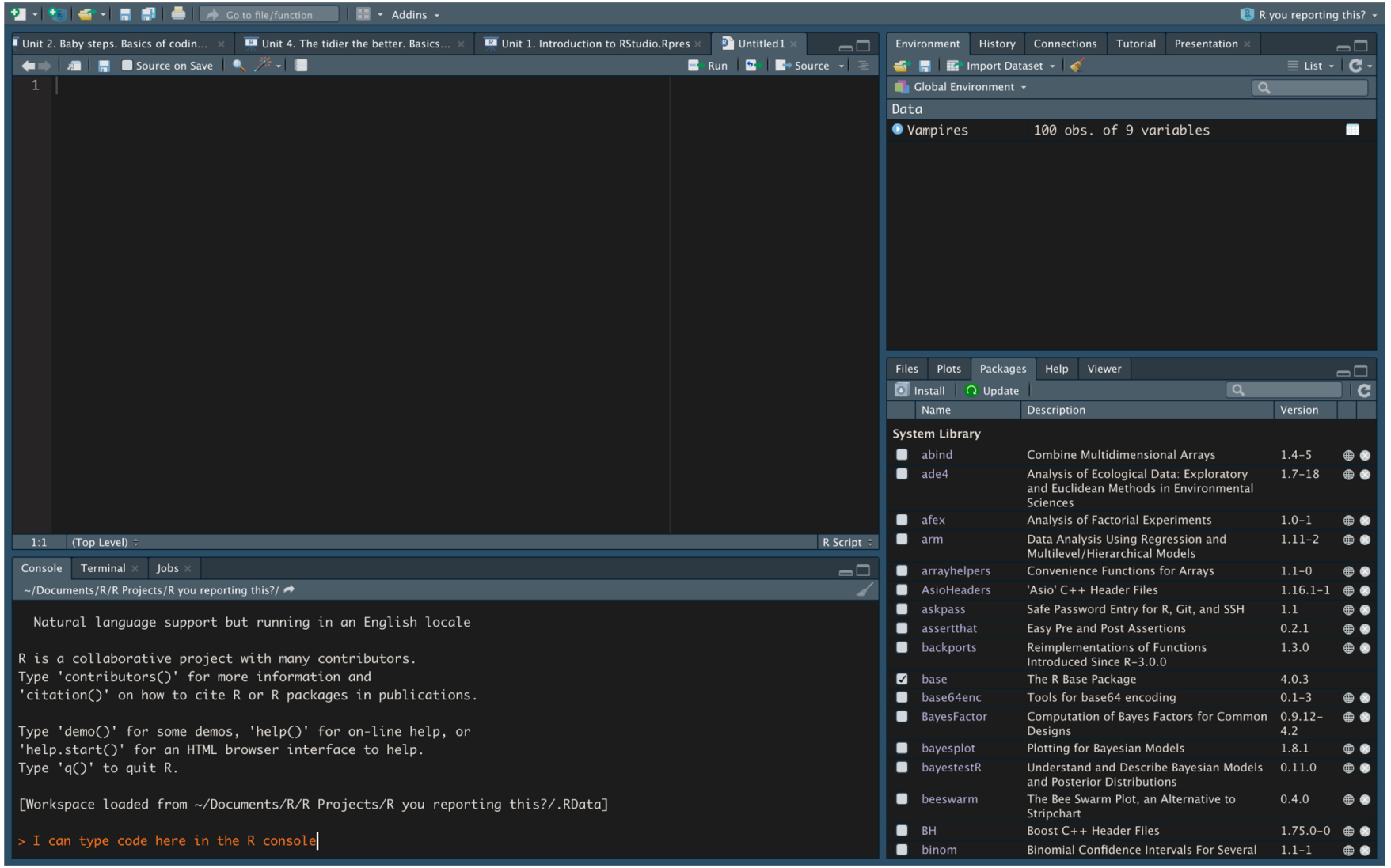


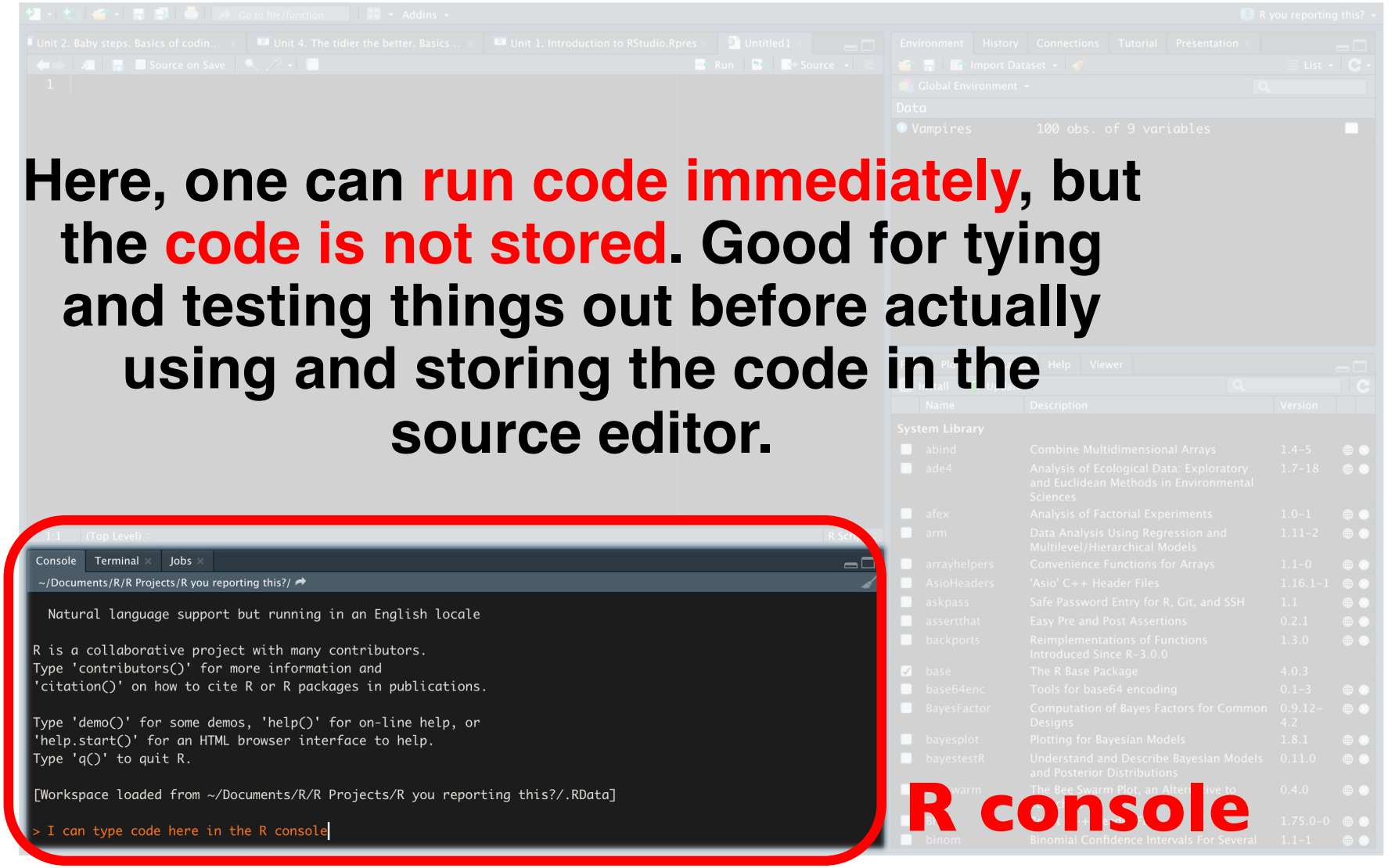



# Getting to know RStudio

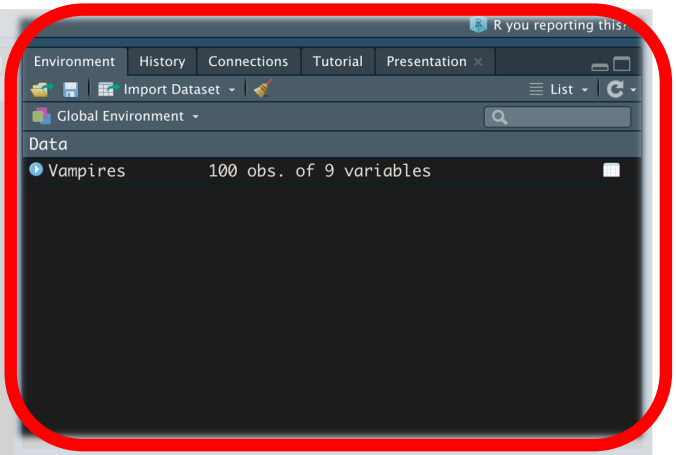
## The panes


Go to file/function
Addins
R you reporting this?
Unit 2. Baby steps. Basics of codin...
Unit 4. The tidier the better. Basics...
Unit 1. Introduction to RStudio.Rpres
Untitled1
Source on Save
Run
Source
1
1:1
(Top Level)
R Script
Console
Terminal
Jobs
~/Documents/R/R Projects/R you reporting this?/
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 ~/Documents/R/R Projects/R you reporting this?/.RData]
> I can type code here in the R console
Environment
History
Connections
Tutorial
Presentation
Import Dataset
List
Global Environment
Data
Vampires
100 obs. of 9 variables
Files
Plots
Packages
Help
Viewer
Install
Update
Name
Description
Version
System Library
abind
Combine Multidimensional Arrays
1.4-5
ade4
Analysis of Ecological Data: Exploratory and Euclidean Methods in Environmental Sciences
1.7-18
afex
Analysis of Factorial Experiments
1.0-1
arm
Data Analysis Using Regression and Multilevel/Hierarchical Models
1.11-2
arrayhelpers
Convenience Functions for Arrays
1.1-0
AsioHeaders
'Asio' C++ Header Files
1.16.1-1
askpass
Safe Password Entry for R, Git, and SSH
1.1
assertthat
Easy Pre and Post Assertions
0.2.1
backports
Reimplementations of Functions Introduced Since R-3.0.0
1.3.0
base
The R Base Package
4.0.3
base64enc
Tools for base64 encoding
0.1-3
BayesFactor
Computation of Bayes Factors for Common Designs
0.9.12-4.2
bayesplot
Plotting for Bayesian Models
1.8.1
bayestestR
Understand and Describe Bayesian Models and Posterior Distributions
0.11.0
beeswarm
The Bee Swarm Plot, an Alternative to Stripchart
0.4.0
BH
Boost C++ Header Files
1.75.0-0
binom
Binomial Confidence Intervals For Several
1.1-1


Source editor
The source editor is good for opening, editing and executing different programs, codes etc. and lets you store your code in a neat fashion.


Here, one can run code immediately, but the code is not stored. Good for tying and testing things out before actually using and storing the code in the source editor.
Console
Terminal
Jobs
~/Documents/R/R Projects/R you reporting this?/
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 ~/Documents/R/R Projects/R you reporting this?/.RData]
> I can type code here in the R console
R console

# Environment and history panes

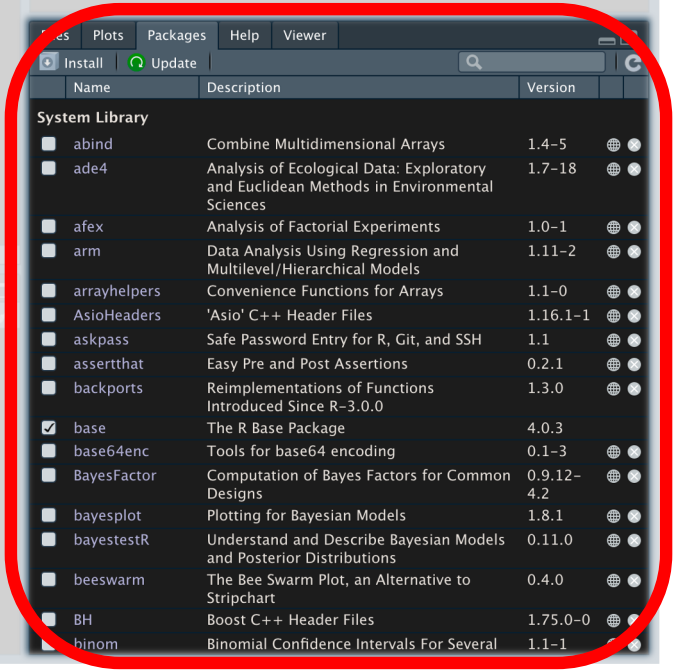



The environment pane directly shows you which data frame are stored, which variables, arrays, functions etc.

The history pane lets you go back through your execution history and see which lines of code and functions you previously executed.

You can load in files, plots, packages, find help (which is also possible via the commands `?` or `??`) etc.

Files, Plots, Packages etc. Panes



# Reading in data

# Working directory

The Working Directory is the place where R puts files that you SAVE

The Working Directory is the place where R puts files that you READ IN

# How do I find out where my working directory is?

```
> getwd()
```

```
[1] "/Users/masonwirtz/Documents/R/R Projects/R you reporting this?"
```

# Working directory

**Let's make a new project folder for our working directories**

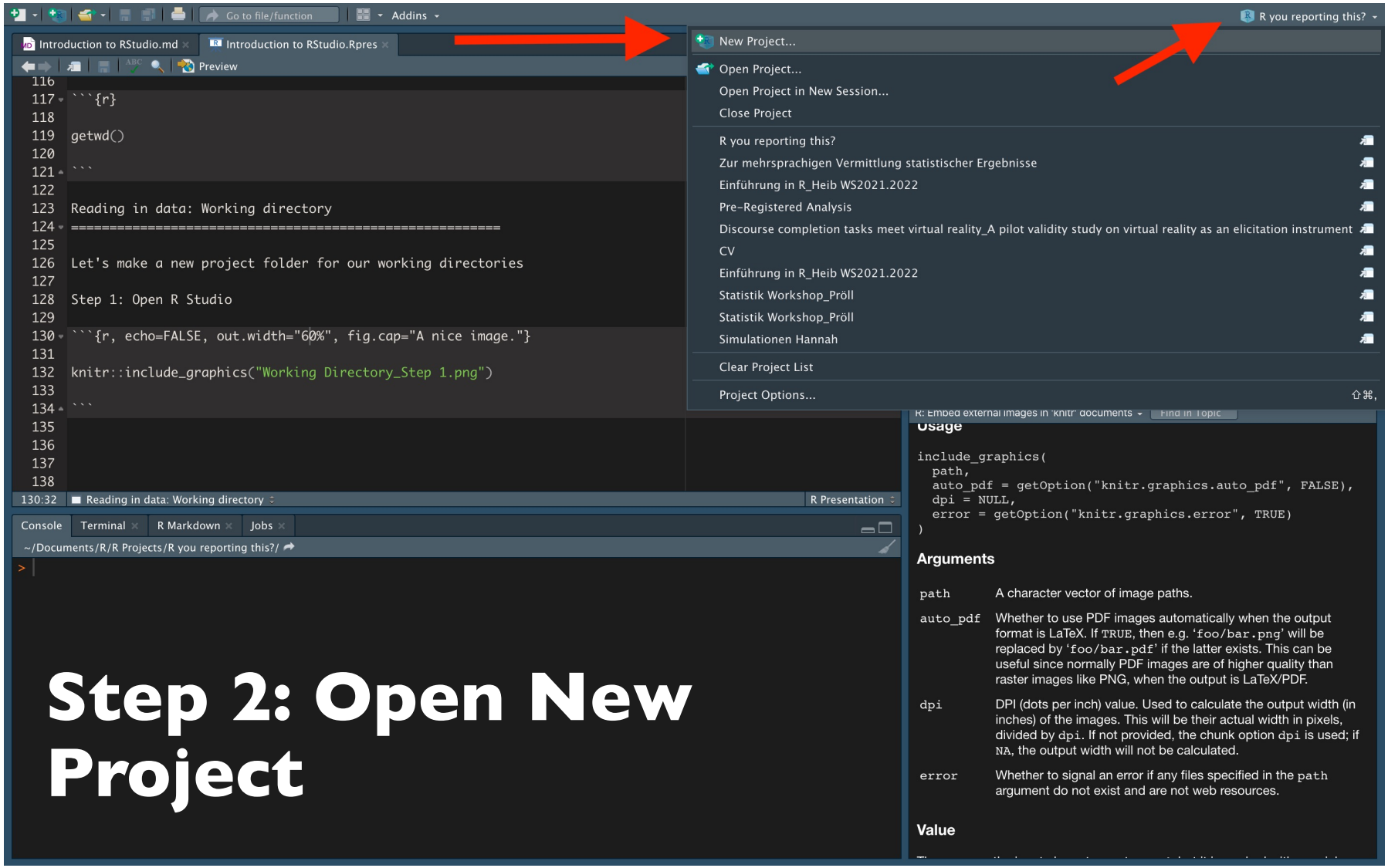
**Pre-steps 1:**

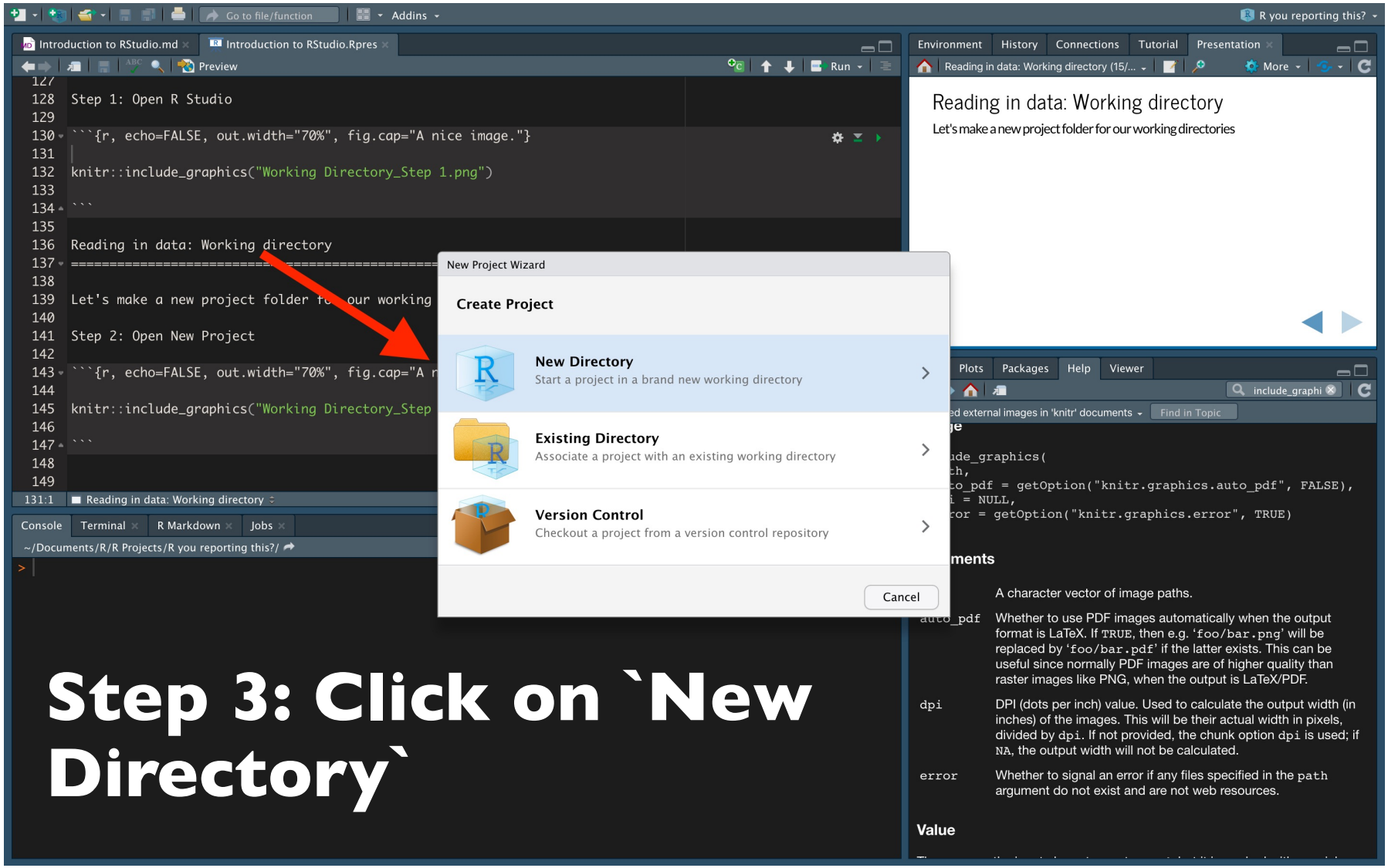
**• Open your finder window, create a folder `R`.**

**Pre-steps 2:**

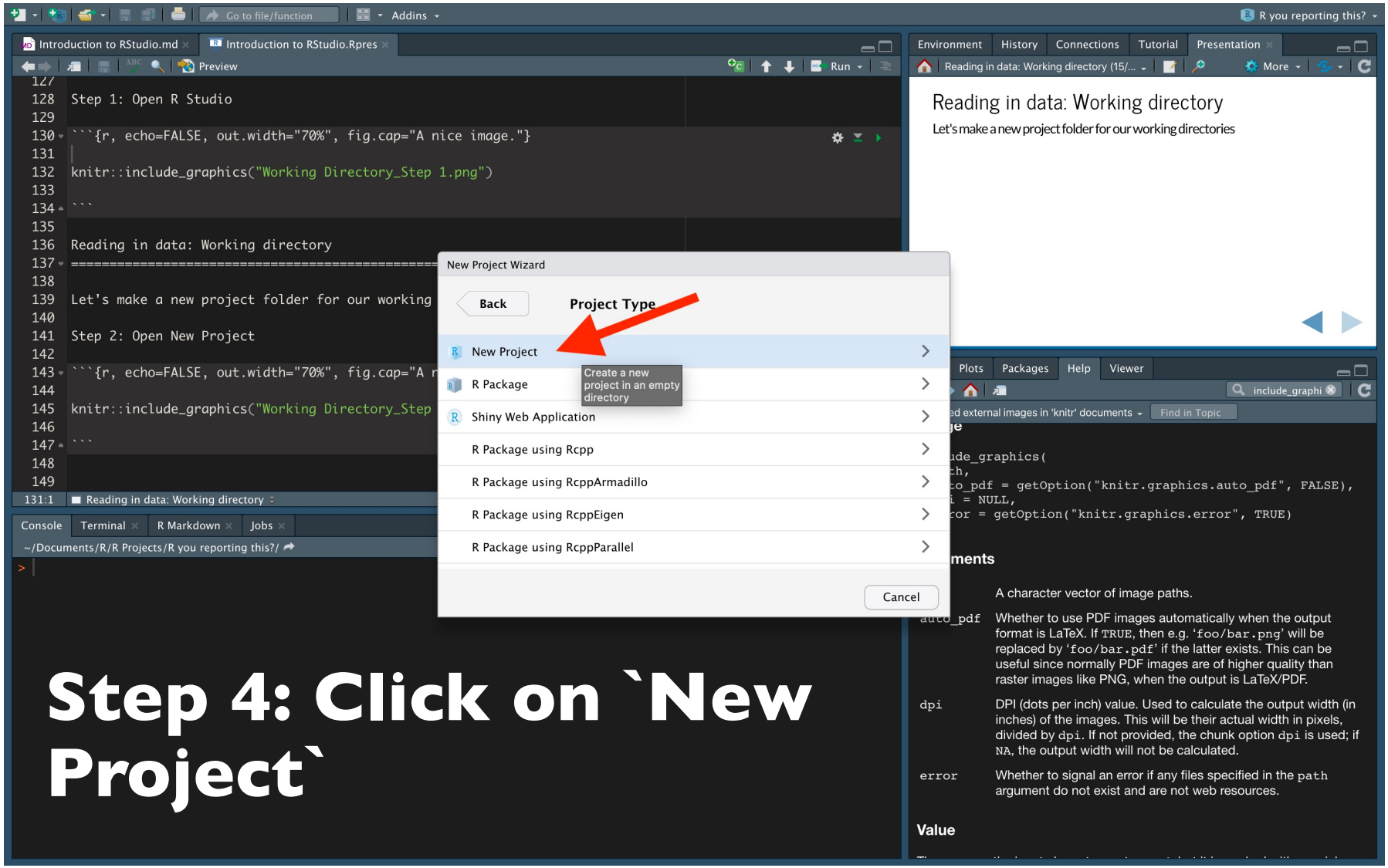
**• In the folder `R` we created, create a folder `R Projects`.**


Cisco Webex Meetings File Edit View Window Help
73 % Wed 16:43
Step 1: Open R Studio
RStudio
R you reporting

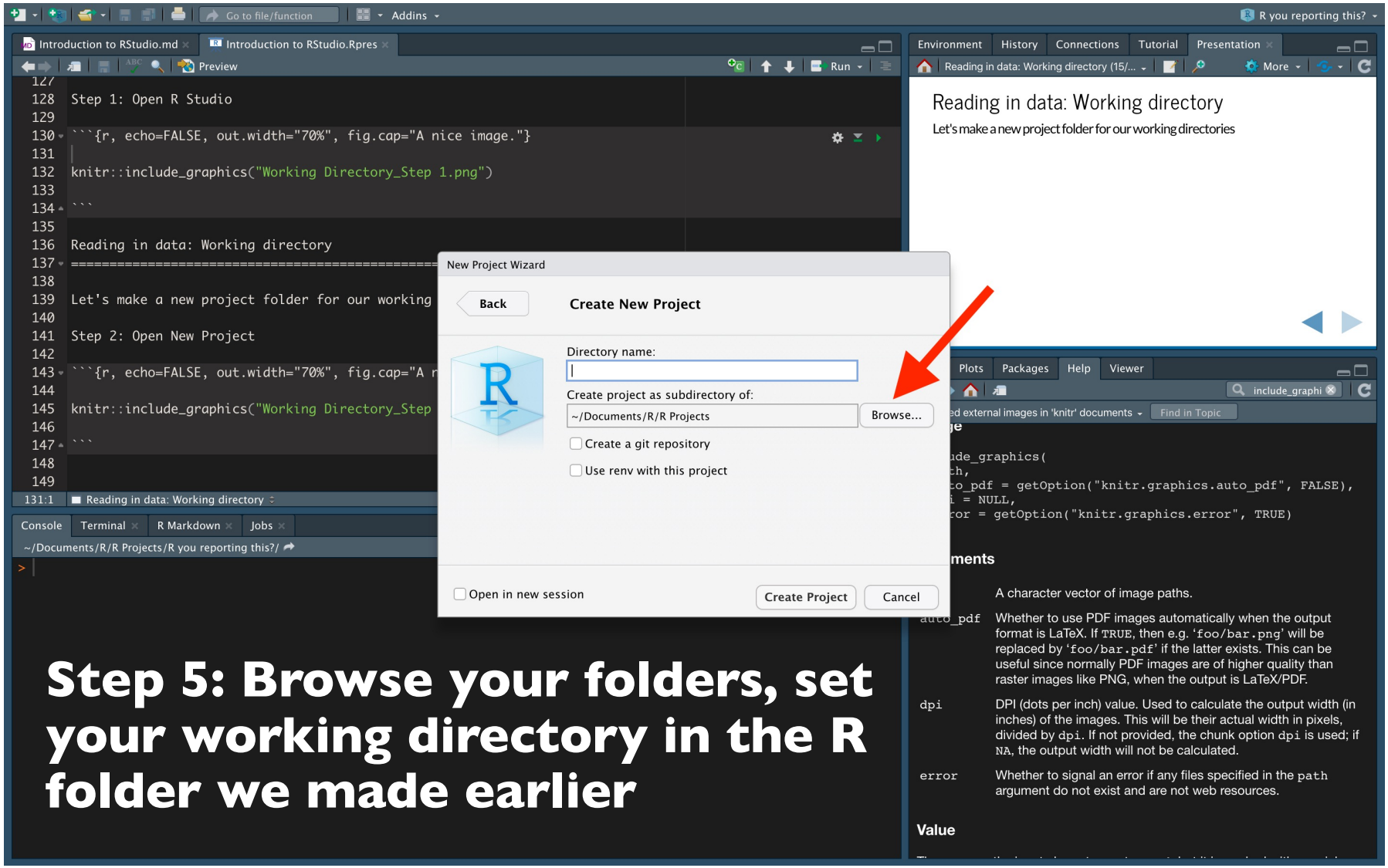

Go to file/function
Addins
R you reporting this?
Introduction to RStudio.md
Introduction to RStudio.Rpres
Preview
New Project...
Open Project...
Open Project in New Session...
Close Project
R you reporting this?
Zur mehrsprachigen Vermittlung statistischer Ergebnisse
Einführung in R_Heib WS2021.2022
Pre-Registered Analysis
Discourse completion tasks meet virtual reality_A pilot validity study on virtual reality as an elicitation instrument
CV
Einführung in R_Heib WS2021.2022
Statistik Workshop_Pröll
Statistik Workshop_Pröll
Simulationen Hannah
Clear Project List
Project Options...
116
117 ```{r}
118
119 getwd()
120
121 ```
122
123 Reading in data: Working directory
124 ==========
125
126 Let's make a new project folder for our working directories
127
128 Step 1: Open R Studio
129
130 ```{r, echo=FALSE, out.width="60%", fig.cap="A nice image."}
131
132 knitr::include_graphics("Working Directory_Step 1.png")
133
134 ```
135
136
137
138
130:32
Reading in data: Working directory
R Presentation
Console
Terminal
R Markdown
Jobs
~/Documents/R/R Projects/R you reporting this?/
>
R: Embed external images in 'knitr' documents
Find in Topic
Usage
include_graphics(
path,
auto_pdf = getOption("knitr.graphics.auto_pdf", FALSE),
dpi = NULL,
error = getOption("knitr.graphics.error", TRUE)
)
Arguments
path
A character vector of image paths.
auto_pdf
Whether to use PDF images automatically when the output format is LaTeX. If TRUE, then e.g. 'foo/bar.png' will be replaced by 'foo/bar.pdf' if the latter exists. This can be useful since normally PDF images are of higher quality than raster images like PNG, when the output is LaTeX/PDF.
dpi
DPI (dots per inch) value. Used to calculate the output width (in inches) of the images. This will be their actual width in pixels, divided by dpi. If not provided, the chunk option dpi is used; if NA, the output width will not be calculated.
error
Whether to signal an error if any files specified in the path argument do not exist and are not web resources.
Value
Step 2: Open New Project

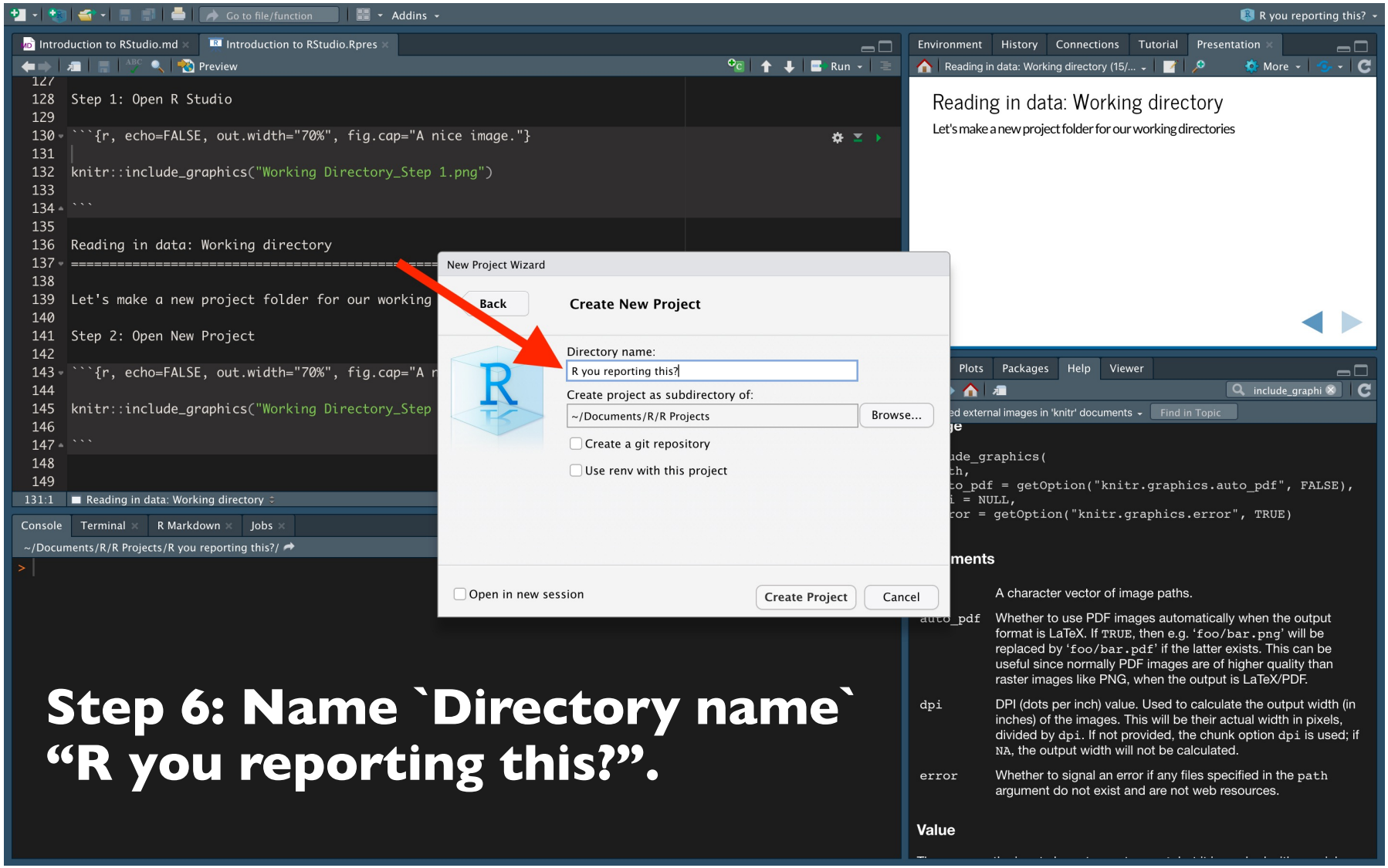



# Step 3: Click on `New Directory`




# Step 4: Click on `New Project`


Introduction to RStudio.md
Introduction to RStudio.Rpres
Preview
Run
Step 1: Open R Studio
```{r, echo=FALSE, out.width="70%", fig.cap="A nice image."}
knitr::include_graphics("Working Directory_Step 1.png")
```
Reading in data: Working directory
Let's make a new project folder for our working
Step 2: Open New Project
```{r, echo=FALSE, out.width="70%", fig.cap="A
knitr::include_graphics("Working Directory_Step
```
Reading in data: Working directory
Console
Terminal
R Markdown
Jobs
~/Documents/R/R Projects/R you reporting this?/
New Project Wizard
Back
Create New Project
Directory name:
Create project as subdirectory of:
~/Documents/R/R Projects
Browse...
Create a git repository
Use renv with this project
Open in new session
Create Project
Cancel
Environment
History
Connections
Tutorial
Presentation
Reading in data: Working directory
Let's make a new project folder for our working directories
Plots
Packages
Help
Viewer
Find in Topic
A character vector of image paths.
Whether to use PDF images automatically when the output format is LaTeX. If TRUE, then e.g. 'foo/bar.png' will be replaced by 'foo/bar.pdf' if the latter exists. This can be useful since normally PDF images are of higher quality than raster images like PNG, when the output is LaTeX/PDF.
DPI (dots per inch) value. Used to calculate the output width (in inches) of the images. This will be their actual width in pixels, divided by dpi. If not provided, the chunk option dpi is used; if NA, the output width will not be calculated.
Whether to signal an error if any files specified in the path argument do not exist and are not web resources.
Value
Step 5: Browse your folders, set your working directory in the R folder we made earlier




# Step 6: Name `Directory name` "R you reporting this?".

# Example data set

# Reading in the data

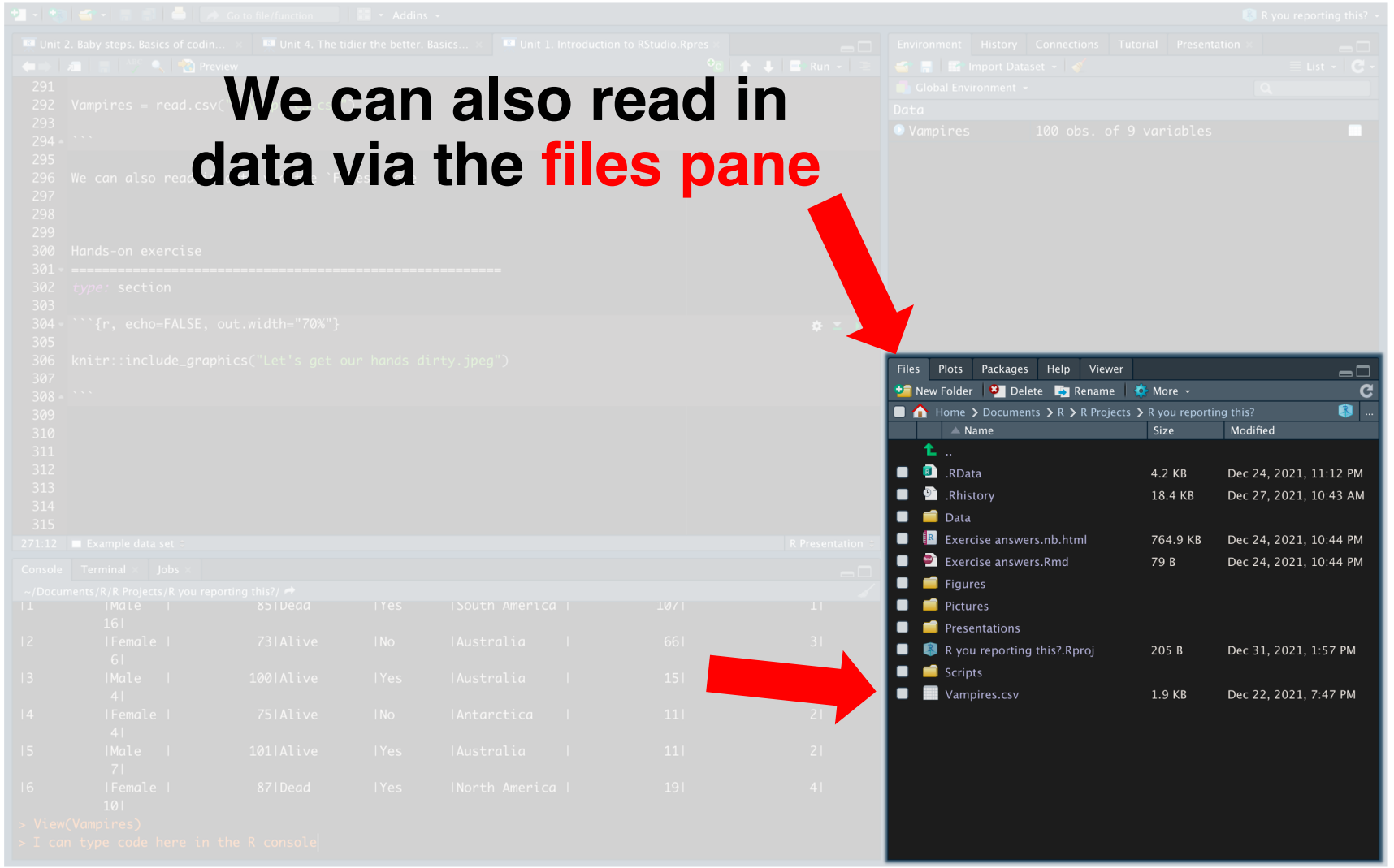
```
Vampires = read.csv("Vampires.csv")
```

**OR**

```
Vampires = read.csv("./Vampires.csv")
```

# A data frame (Vampires)

| | idVampire | gender | ageOfVampire | deadOrAlive | hasFangs | bornIn | visitedCities | numberOfChildren |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Male | 85 | Dead | Yes | South America | 107 | 1 |
| 2 | 2 | Female | 73 | Alive | No | Australia | 66 | 3 |
| 3 | 3 | Male | 100 | Alive | Yes | Australia | 15 | 8 |
| 4 | 4 | Female | 75 | Alive | No | Antarctica | 11 | 2 |
| 5 | 5 | Male | 101 | Alive | Yes | Australia | 11 | 2 |
| 6 | 6 | Female | 87 | Dead | Yes | North America | 19 | 4 |
| 7 | 7 | Male | 82 | Alive | No | North America | 83 | 6 |
| 8 | 8 | Female | 68 | Dead | Yes | Australia | 50 | 5 |
| 9 | 9 | Female | 99 | Dead | No | Australia | 7 | 5 |
| 10 | 10 | Female | 44 | Alive | Yes | Australia | 66 | 1 |
| 11 | 11 | Male | 42 | Alive | Yes | Australia | 9 | 2 |
| 12 | 12 | Female | 72 | Dead | No | Antarctica | 29 | 3 |
| 13 | 13 | Male | 84 | Dead | Yes | Australia | 39 | 3 |
| 14 | 14 | Male | 60 | Alive | No | Antarctica | 65 | 0 |
| 15 | 15 | Male | 129 | Alive | No | South America | 6 | 4 |
| 16 | 16 | Female | 63 | Dead | Yes | South America | 96 | 3 |
| 17 | 17 | Male | 50 | Alive | Yes | Australia | 8 | 6 |
| 18 | 18 | Female | 49 | Alive | No | Antarctica | 56 | 3 |
| 19 | 19 | Female | 41 | Dead | No | Australia | 35 | 4 |


We can also read in data via the files pane
Files
Plots
Packages
Help
Viewer
New Folder
Delete
Rename
More
Home > Documents > R > R Projects > R you reporting this?
Name
Size
Modified
.RData
4.2 KB
Dec 24, 2021, 11:12 PM
.Rhistory
18.4 KB
Dec 27, 2021, 10:43 AM
Data
Exercise answers.nb.html
764.9 KB
Dec 24, 2021, 10:44 PM
Exercise answers.Rmd
79 B
Dec 24, 2021, 10:44 PM
Figures
Pictures
Presentations
R you reporting this?.Rproj
205 B
Dec 31, 2021, 1:57 PM
Scripts
Vampires.csv
1.9 KB
Dec 22, 2021, 7:47 PM


LET'S GET OUR HANDS DIRTY
makeameme.org