

PSYC3361 internship

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2024-05-18

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Let's learn to code in R

This book contains the coding modules (slides, videos, RStudio cloud links, self test challenges) for PSYC3361 Research Internship.

how to use this book

This book lives online so you might want to bookmark in your browser for easy access.

There is one chapter dedicated to Weeks 1-5; you can navigate the chapters using the side bar on the left.

In each chapter, there are links to...

 Slides

 Videos

 RStudio Cloud projects

 Self test resources

Each week we recommend that you...

- watch the videos
- do the exercises that Danielle recommends within them
- AND test yourself by trying the self test challenges

Learning to code is an active process. You cannot learn to code by watching someone else do it

The exercises and self test challenges are KEY LEARNING EXPERIENCES.

Please try and complete the WATCH part of your learning before you attend your lab. Then you can spend your lab time DOING; lab time should be spent trying the exercises and self test challenges because your tutor will be there to help when you get stuck.

1 Week 1

2 Welcome to coding in R!



Figure 2.1: art by Allison Horst

This week we are going to start by getting familiar with RMarkdown and end up reading some data into RStudio. There are a total of 10 videos to watch and each video is 10-15 min long so you can dip in and out across the week.

The idea is for you to code along with the videos, stopping and starting and troubleshooting as you go. Try the exercises Danielle recommends AND to see whether you are really getting

it, have a go at the SELF TEST challenge.

For this reason, you should allocate ~ 3 hours to your coding this week.

NOTE: Your first learning log should include a knitted .Rmd document published to Rpubs. Don't know what that means? no problem! Danielle covers how to do that in the sharing your document video (video 7) below.

2.1 Resources

 [Slides](#)

 [YouTube playlist](#)

2.2 Learning outcomes

By the end of this module you will be able to...

- Find your way around RStudio and RMarkdown
- Read data into RStudio
- Use the pipe (`%>%`) to string together `group_by` and summarise commands
- Write data to a .csv file

2.3 Getting started in RMarkdown

2.3.1 The beginning

In this video, Danielle shows you how to set up an RStudio Cloud account and gives a brief intro of RMarkdown.

[Video 1](#)

2.3.2 Stating the problem

In this video, Danielle talks about why word documents can be problematic and why Markdown is a good solution if you want to write about science reproducibly. She also shows you how to create a new RStudio Cloud project.

[Video 2](#)

2.3.3 Starting markdown

In this video, Danielle shows you how to create a plain Markdown document and create some text. She shows you how to format your text with bold and italics, make lists, and add headings.

[Video 3](#)

2.3.4 More markdown

In this video, Danielle shows you how to insert hyperlinks, block quotes, and nested lists into your plain Markdown document.

[Video 4](#)

2.3.5 RMarkdown

In this video, Danielle shows you how to use RMarkdown. She shows you how to insert both text and R “chunks” and “knit” your document.

[Video 5](#)

2.3.6 Custom documents

In this video, Danielle shows you how to edit the yaml to change the kind of document that your Rmd knits to. She shows you how to knit to pdf, change the theme of your document and include a table of contents.

[Video 6](#)

2.3.7 Inserting equations & sharing your document

In this video, Danielle shows you how to use LaTeX to insert equations into your Rmd . She also shows you how to share your knitted document by publishing to RPubS.

[Video 7](#)

2.4 Say hello to data

 [Slides](#)

 [YouTube playlist](#)

 [RStudio Cloud project](#)

 [Self Test challenge](#)

Now that you have your head around RMarkdown, lets get some data into R.

2.4.1 Read and glimpse your data

In this video, Danielle introduces the “reasoning” data set that she will go on to use in upcoming videos, talks about how to read data into R using `read_csv()` and view it with `print()` and `glimpse()`

[Video 8](#)

2.4.2 What is the “pipe”?

The pipe operator is a key component of the tidyverse. Here Danielle introduces the pipe along with some examples using `group_by()` and `summarise()`.

[Video 9](#)

2.4.3 How to write data

A quick wrap up of the section, an example of using `write_csv()`, and pointers to more resources.

[Video 10](#)

3 Week 2

4 Welcome back to coding in R!



Figure 4.1: art by Allison Horst

This week we are going to explore one of the most powerful functions of R, that is data visualisation. The ggplot package has revolutionised how we visualise data, making it really easy to plot raw data (by participant or trial) and summarised data, in a way that is reproducible.

This week, there are a total of 8 videos to watch and each video is 10-15 min long so you can dip in and out across the week.

The idea is for you to code along with the videos, stopping and starting and troubleshooting as you go. Try the exercises Danielle recommends AND to see whether you are really getting it, have a go at the SELF TEST challenge.

For this reason, you should allocate ~ 3 hours to your coding this week.

4.1 Resources

 [Slides](#)

 [RStudio Cloud project](#)

 [YouTube playlist](#)

 [Self Test challenge](#)

4.2 Learning outcomes

By the end of this module you will be able to...

- Use the ggplot package to make informative plots
- Use colour to make your plots pretty (and more informative)
- Add layers to your plot
- Use jitter, boxplot, and violins to illustrate data distributions
- Use facets to plot data by group

4.3 Data visualisation with ggplot

4.3.1 Setting up RStudio Cloud

In this video, Danielle shows you how to set up an RStudio Cloud account.

[Video 1](#)

4.3.2 Make a scatterplot

In this video, covers basic mechanics of typing R commands, and takes the learner through the process of constructing a scatterplot.

[Video 2](#)

4.3.3 Writing a script

In this video, Danielle recreates the exact same plot as last time, but uses a script, and explains a few weird concepts like “sourcing a script” and “printing a plot object”.

[Video 3](#)

4.3.4 What are aesthetics?

In this video, Danielle explains aesthetics in the context of ggplot.

[Video 4](#)

4.3.5 Aesthetics vs parameters

In this video, Danielle talks about aesthetics, the difference between aesthetics and parameters, and introduces concepts behind plot layers.

[Video 5](#)

4.3.6 Global and local

In this video, Danielle shows you that even R experts suffer from technical failures! She also talks about global and local mappings in ggplot.

[Video 6](#)

4.3.7 Named and unnamed argument

In this video, Danielle discusses named and unnamed arguments in R.

[Video 7](#)

4.3.8 Facets and prettifying

In this video, Danielle shows you how to split plots using facets, and gives you some tips to make plots pretty.

[Video 8](#)

5 Week 3

6 Welcome back to coding in R!



Figure 6.1: art by Allison Horst

R and RStudio make data cleaning fast and reproducible. The module this week is all about the dplyr package, which has lots of functions that make data wrangling fun! This week, there are a total of 8 videos to watch and each video is 10-15 min long so you can dip in and out across the week. The idea is for you to code along with the videos, stopping and starting and troubleshooting as you go. Try the exercises Danielle recommends AND to see whether you are really getting it, have a go at the SELF TEST challenge.

For this reason, you should allocate ~ 3 hours to your coding this week.

6.1 Resources

 [Slides](#)

 [RStudio Cloud project](#)

 [YouTube playlist](#)

 [Self Test challenge](#)

6.2 Learning outcomes

By the end of this module you will be able to...

- Quickly clean and `rename` variables
- Use `filter` to look subsets of your dataframe and arrange to order by a given variable
- Use `select` to make your dataframe smaller
- Use `mutate` to create new variables
- Join dataframes by row and common columns
- Convert data from wide to long and back again using pivot functions

6.3 dplyr, dance with data

6.3.1 dealing with variable names

In this video, Danielle introduces the small world of words dataset and shows you how to deal with variable names.

[Video 1](#)

6.3.2 subset using `filter()`

In this video, Danielle introduces how to subset your dataset using the `filter()` function.

[Video 2](#)

6.3.3 sort using `arrange()`

In this video, Danielle shows you how to sort your data using the `arrange()` function.

[Video 3](#)

6.3.4 make your data smaller using `select()`

In this video, Danielle explains the `select()` function for selecting columns in a data set.

[Video 4](#)

6.3.5 make new variables with `mutate()`

In this video, Danielle talks about how to make new variables using the `mutate()` function, and also a weird digression into measurement issues in psychology.

[Video 5](#)

6.3.6 join data using `bind_rows()`

In this video, Danielle provides an introduction to the `bind_rows()` function in dplyr.

[Video 6](#)

6.3.7 make wide data long with pivot functions

In this video, Danielle's unnecessarily long ramble about `pivot_longer()` and `pivot_wider()`, wherein it is obvious that the lecturer is very tired, but also manages to talk a little more about the pipe, order of operations, and other neat things.

[Video 7](#)

6.3.8 joining data with `left_join()`

In this video, Danielle gives a brief wrap up to the dplyr series, in which `left_join()` is briefly discussed. She also gets grumpy about sexism in language, and provides pointers to other resources.

[Video 8](#)

7 Week4

8 Week5