

Introduction to Quarto

RStudio

Warning

If you're new to R, follow the online ModernDrive chapter <https://moderndive.netlify.app/1-getting-started.html>

Using Project

https://github.com/marklhc/teaching_assets/raw/main/rstudio_project.gif

RStudio Layout

Locate the following panes:

- Console
- Source
- History
- Help

Recommended Options

- Tools -> Global Options ->
- Set "Save workspace to .RData on exit" to "No".

https://github.com/marklhc/teaching_assets/raw/main/rstudio_not_save_workspace.gif

R Basics

Install R Packages

```
# Install the tidyverse "meta" package
# install.packages("tidyverse")
# Install the here package
# install.packages("psych")
```

!!! Don't you dare include any `install.packages()` statements in your homework !!!

Load a Package

```
# Uncomment the code below to load the tidyverse package
# library(tidyverse)
```

Built-In Data

```
data(bfi, package = "psych") # make the "bfi" data set available for use
head(bfi, 10) # show the first 10 rows of data
```

	A1	A2	A3	A4	A5	C1	C2	C3	C4	C5	E1	E2	E3	E4	E5	N1	N2	N3	N4	N5	O1	O2	O3	O4
61617	2	4	3	4	4	2	3	3	4	4	3	3	3	4	4	3	4	2	2	3	3	6	3	4
61618	2	4	5	2	5	5	4	4	3	4	1	1	6	4	3	3	3	3	5	5	4	2	4	3
61620	5	4	5	4	4	4	5	4	2	5	2	4	4	4	5	4	5	4	2	3	4	2	5	5
61621	4	4	6	5	5	4	4	3	5	5	5	3	4	4	4	2	5	2	4	1	3	3	4	3
61622	2	3	3	4	5	4	4	5	3	2	2	2	5	4	5	2	3	4	4	3	3	3	4	3
61623	6	6	5	6	5	6	6	6	1	3	2	1	6	5	6	3	5	2	2	3	4	3	5	6
61624	2	5	5	3	5	5	4	4	2	3	4	3	4	5	5	1	2	2	1	1	5	2	5	6
61629	4	3	1	5	1	3	2	4	2	4	3	6	4	2	1	6	3	2	6	4	3	2	4	5
61630	4	3	6	3	3	6	6	3	4	5	5	3	NA	4	3	5	5	2	3	3	6	6	6	6
61633	2	5	6	6	5	6	5	6	2	1	2	2	4	5	5	5	5	5	2	4	5	1	5	5
	05 gender education age																							
61617	3		1					NA	16															
61618	3		2					NA	18															
61620	2		2					NA	17															
61621	5		2					NA	17															

61622	3	1	NA	17
61623	1	2	3	21
61624	1	1	NA	18
61629	3	1	2	19
61630	1	1	1	19
61633	2	2	NA	17

Quarto

<https://quarto.org/>

- Open-source scientific and technical publishing system
- Next-generation version of R Markdown

Elements of Quarto

See <https://quarto.org/docs/get-started/hello/rstudio.html>

- YAML header
- Code cells
- Markdown text

YAML

Exercise 1

- Update your name in the `author` field
- Change the option from `toc: false` to `toc: true`
- Insert today's date using the `date` field

Markdown Text

See <https://quarto.org/docs/authoring/markdown-basics.html>

- **Bold** `**Bold**`
- *italic* `*italic*`
- code ``code``
- [Link to USC](https://www.usc.edu) [Link to USC] (<https://www.usc.edu>)

- Header

```
# Level 1  
## Level 2  
### Level 3
```

Unordered list

- item 1
- item 2
- item 2a

Ordered list

1. item 1
2. item 2
- a. item 2a

Equations (LaTeX)

Inline: $Y_i = \beta_0 + \beta_1 X_i + e_i$

Display:

$$\rho = \frac{\tau^2}{\tau^2 + \sigma^2}$$

Inline Code

```
The value of  $\pi$  is `r pi`
```

The value of π is 3.1415927

Code Cells

Content to be interpreted by R engine

```
1 + 1
```

```
[1] 2
```

```
v1 <- c(1, 2, 6, 8) # create a vector `v1`  
v1[3] # extract 3rd element of v1
```

```
[1] 6
```

```
# extract the `A2` column, and compute the median  
median(bfi$A2)
```

```
[1] NA
```

Cell Options

- `echo`: `false`: Do not show the input command
- `fig-width`, `fig-height`: Size of figure

```
library(ggplot2)  
ggplot(bfi, aes(x = A2)) +  
  geom_bar()
```

Warning: Removed 27 rows containing non-finite values (``stat_count()``).

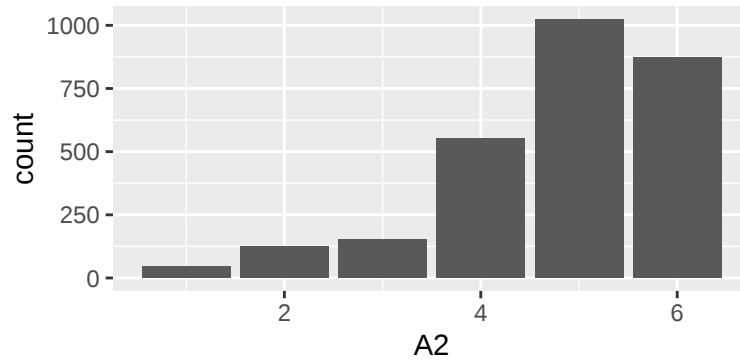


Figure 1: Bar plot of item A2.

i Exercise 2

Change the aspect ratio of the graph above to 1:1

Cross-Reference

Figure 1 shows a bar plot of item A2.

Rendering

- format: html, pdf, docx, etc
 - If running into problems for PDF, enter the following to the **Terminal**:

Listing 1 Terminal

```
quarto install tool tinytex
```

- Try also revealjs!

Note: Different R sessions are used for the console and for rendering

Exercise

Download the qmd file, then do the following

1. Complete Ex1 above.

2. Complete Ex2 above.

-
3. Type this equation in LaTeX: https://www.gstatic.com/education/formulas2/472522532/en/cronbach_s_alpha.svg. Make sure you get all the subscripts right.
4. Install and load the `modelsummary` package, run the following, and change the `tbl-cap` option to indicate what the cell does. You'll need to set `eval: true` (or remove the line) so the cell runs.

```
# Install and load the modelsummary package first; otherwise, it won't run
library(dplyr)
library(modelsummary)
datasummary(O1 + O2 + O3 + O4 + O5 ~
             Factor(gender, levelnames = c("Males", "Females")) *
             (Mean + SD),
             data = bfi)
```

5. Run the following and find out what the code cell does.

```
bfi |>
  select(A1:C5) |>
  datasummary_correlation()
```

6. Run the following and find out what the code cell does.

```
bfi |>
  select(E1:E5) |>
  psych::alpha()
```

7. Run the following and find out what this code cell does.

```
library(tidyr)
bfi |>
  select(N1:N5) |>
  pivot_longer(cols = N1:N5, names_to = "item", values_to = "score") |>
  ggplot(aes(x = score)) +
  geom_bar() +
  facet_wrap(~ item)
```

-
8. Render the document to a PDF output.
 9. Submit the rendered PDF to Brightspace.