Week 7 - Consolidation Lab

Andrew Stewart

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https://github.com/ajstewartlang

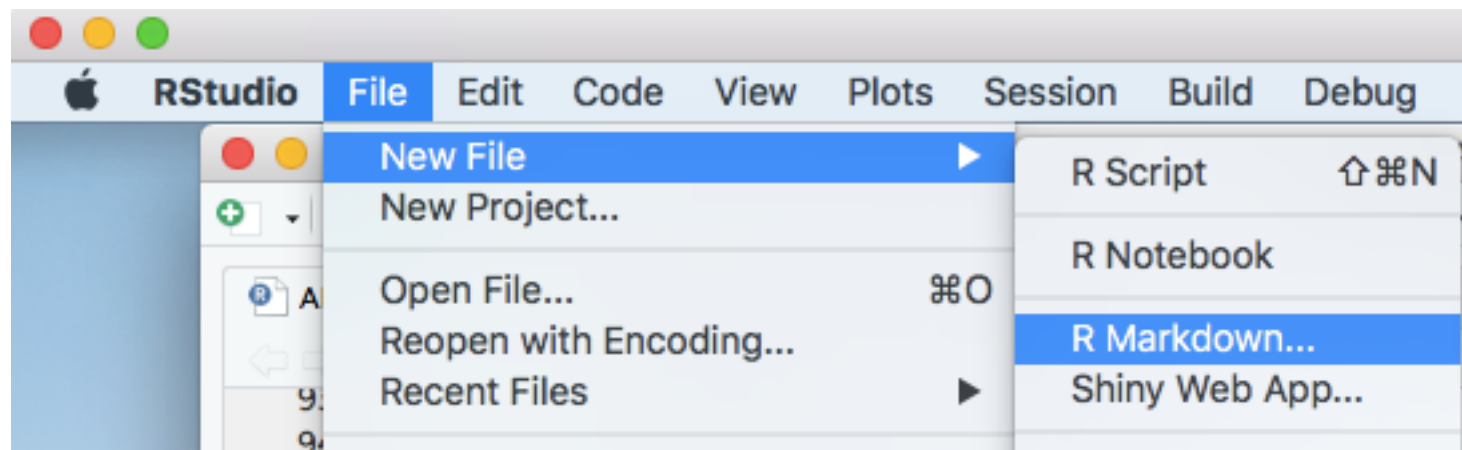| Week	Topic
1	Introduction, Open Science, and Power
2	Introduction to R
3	Data Wrangling and Visualisation
4	General Linear Model - Regression
5	General Linear Model - Regression
6	No Timetabled Lecture - Reading Week
7	Consolidation Lab
8	General Linear Model - ANOVA
9	General Linear Model - ANOVA
10	Tidy Thursday Data Wrangling & Visualisation Challenge
11	Reproducing your Computational Environment using Binder
12	Dynamic, Reproducible Presentations Using xaringan

Semester 1 Assignments

Data wrangling and visualisation – Due December 5th

ANOVA/ANCOVA – Due January 17th

R Markdown

- R Markdown is a language in and of itself that allows you to produce documents in many formats (e.g., .html, .pdf, .doc) that contain your R code, the output of that code, and narrative that you write describing what you are doing (and why).

- R Markdown documents can be produced from within RStudio.

- R Markdown cheat sheet is in the R documentation folder on Blackboard.

- Your assignments need to be created using R Markdown.

- First we need to create a new R Markdown file:

Type the title of your document here.

New R Markdown

Document

Presentation

Shiny

From Template

Title: ANOVA example

Author: Andrew Stewart

Default Output Format:

⦿ HTML

Recommended format for authoring (you can switch to PDF or Word output anytime).

○ PDF

PDF output requires TeX (MiKTeX on Windows, MacTeX 2013+ on OS X, TeX Live 2013+ on Linux).

○ Word

Previewing Word documents requires an installation of MS Word (or Libre/Open Office on Linux).

OK   Cancel

Important - replace your name here with your student ID number.

Select the kind of file you want to be generated by your Markdown - you can change this later btw.

ABC   Q   Knit ▾ ⚙ ▾   ⊕C Insert ▾ ⇧ ⇩   ⟶ Run ▾   ⟳ ▾ ≡

```
 1 ▾ ---
 2   title: "ANOVA example"
 3   author: "Andrew Stewart"
 4   date: "18/09/2018"
 5   output: html_document
 6   ---
 7
 8 ▾ ```{r setup, include=FALSE}                                        ⚙ ▶
 9   knitr::opts_chunk$set(echo = TRUE)
10   ```
11
12 ▾ ## R Markdown
13
14   This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word
     documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.
15
16   When you click the **Knit** button a document will be generated that includes both content as well as the
     output of any embedded R code chunks within the document. You can embed an R code chunk like this:
17
18 ▾ ```{r cars}                                                        ⚙ ⊼ ▶
19   summary(cars)
20   ```
21
22 ▾ ## Including Plots
```

2:1   # ANOVA example ⇕   R Markdown ⇕

You will now see a document like the above - it contains lots of example narrative (with a white background) and R code (with a grey background). We could actually 'knit' this document by clicking on 🖋 Knit to see what is produced…

What you will get is an html file (because that's the type of document we asked to be produced) that contains the R code, the associated output, plus the narrative. Notice how the ## symbols increasing the font size to allow us to generate headings in our narrative.

ANOVA example

Andrew Stewart

18/09/2018

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.
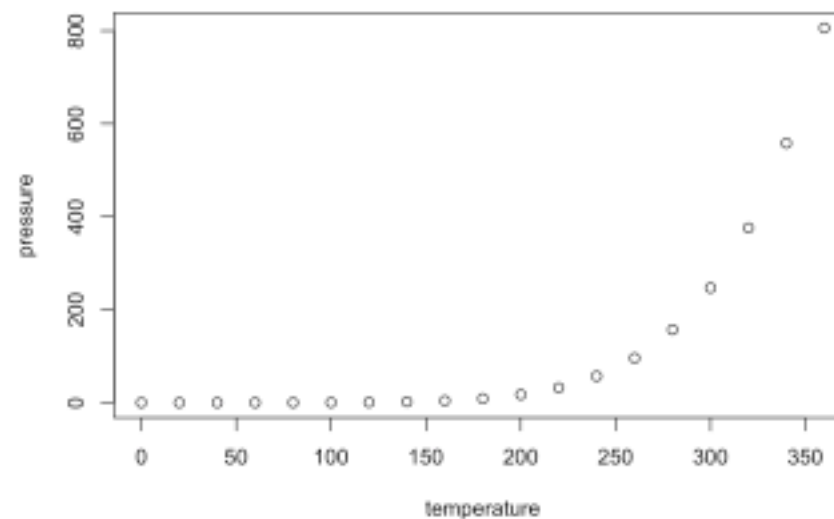
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed           dist
## Min.   : 4.0   Min.   :  2.00
## 1st Qu.:12.0   1st Qu.: 26.00
## Median :15.0   Median : 36.00
## Mean   :15.4   Mean   : 42.98
## 3rd Qu.:19.0   3rd Qu.: 56.00
## Max.   :25.0   Max.   :120.00
```
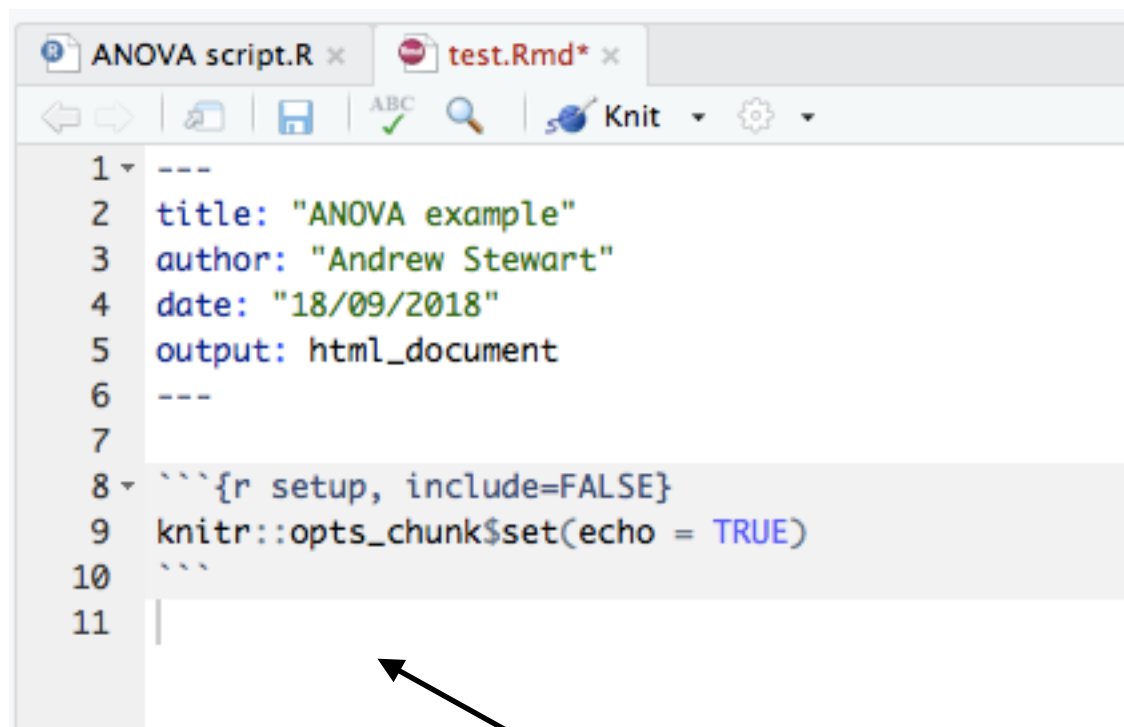
Including Plots

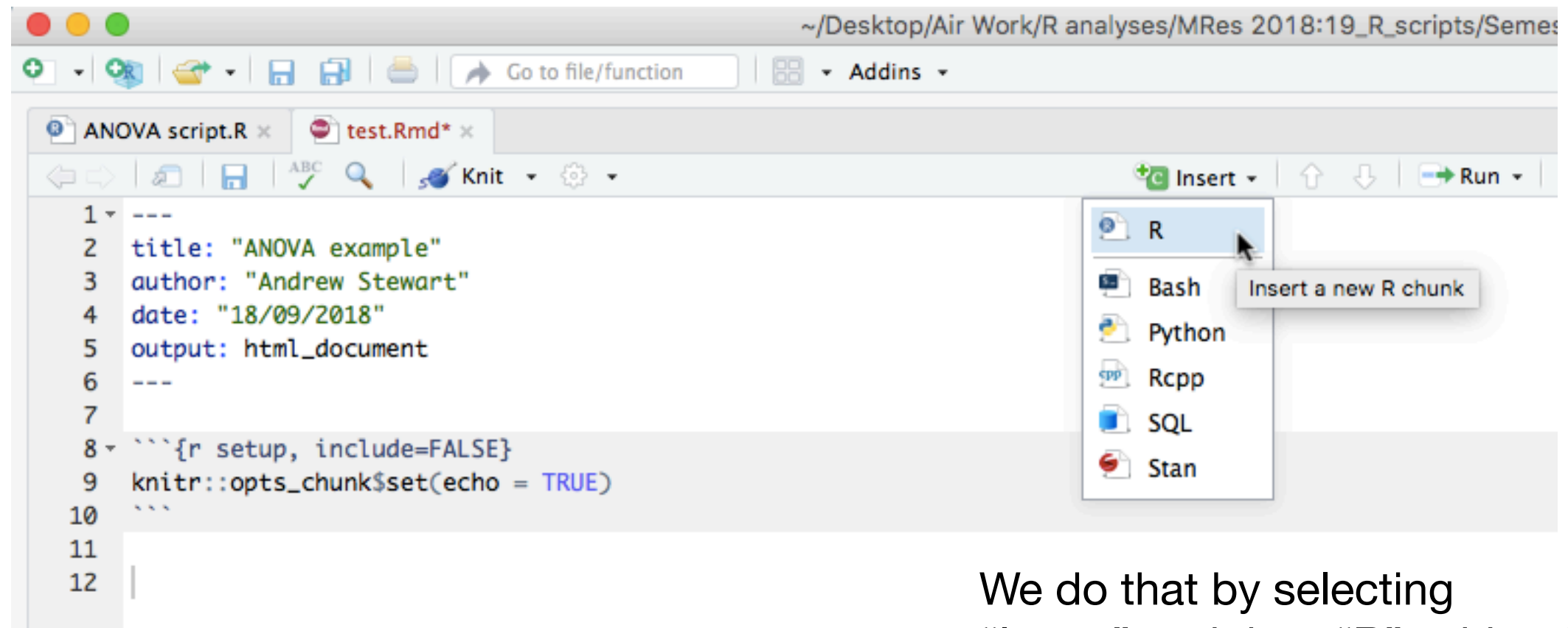You can also embed plots, for example:

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

When you come to create a document using R Markdown, you'll first want to delete a lot of the example code that appears when you first start a new Markdown file:

We now want to paste in chunks of our R code here

```
~/Desktop/Air Work/R analyses/MRes 2018:19_R_scripts/Semes
Go to file/function        Addins

   ANOVA script.R ×        test.Rmd* ×

                                                            Knit                          Insert            Run
     1   ---
     2   title: "ANOVA example"                                              R
     3   author: "Andrew Stewart"                                                    Insert a new R chunk
     4   date: "18/09/2018"                                                  Bash
     5   output: html_document                                               Python
     6   ---
     7                                                                       Rcpp
     8   ```{r setup, include=FALSE}                                         SQL
     9   knitr::opts_chunk$set(echo = TRUE)
    10   ```                                                                 Stan
    11
    12   |
```

We do that by selecting "Insert" and then "R" - this will allow us to add some new R code. On a Mac, alt + CMD + I will also insert a chunk of R code.

```
   ANOVA script.R ×        Untitled1* ×

                                                            Knit

     1   ---
     2   title: "ANOVA"
     3   author: "Andrew Stewart"
     4   date: "18/09/2018"
     5   output: html_document
     6   ---
     7
     8   ```{r setup, include=FALSE}
     9   knitr::opts_chunk$set(echo = TRUE)
    10   ```
    11
    12   ```{r}
    13   |
    14   ```
    15
    16
```
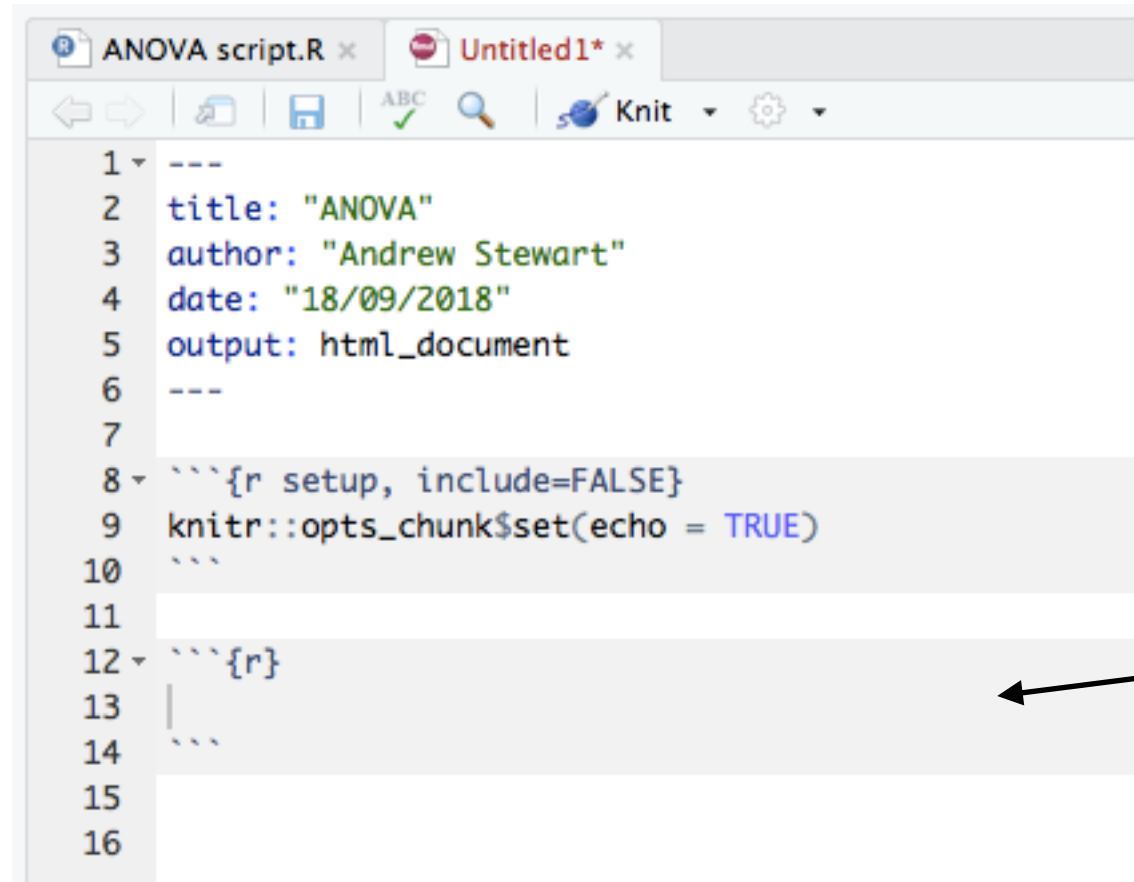
We can now insert our new R code here.

ANOVA script.R | Untitled1*

```
1  ---
2  title: "ANOVA"
3  author: "Andrew Stewart"
4  date: "18/09/2018"
5  output: html_document
6  ---
7
8  ```{r setup, include=FALSE}
9  knitr::opts_chunk$set(echo = TRUE)
10 ```
11
12 ```{r}
13 library(tidyverse)
14 ```
15
16
```

We load the tidyverse packages first.

ANOVA script.R | Untitled1*

```
1  ---
2  title: "ANOVA"
3  author: "Andrew Stewart"
4  date: "18/09/2018"
5  output: html_document
6  ---
7
8  ```{r setup, include=FALSE}
9  knitr::opts_chunk$set(echo = TRUE)
10 ```
11
12 ## This is my first R Markdown document
13
14 First we load the tidyverse.
15 ```{r}
16 library(tidyverse)
17 ```
18
```

But maybe we should precede that with some narrative (and a heading) explaining what we're doing.

What happens if we now knit this short document?

ANOVA

Andrew Stewart

18/09/2018

This is my first R Markdown document

First we load the tidyverse.

```
library(tidyverse)
```

```
## ── Attaching packages ──────────────────────────────────── tidyverse 1.2.1 ──
```

```
## ✔ ggplot2 3.0.0     ✔ purrr   0.2.5
## ✔ tibble  1.4.2     ✔ dplyr   0.7.6
## ✔ tidyr   0.8.1     ✔ stringr 1.3.1
## ✔ readr   1.1.1     ✔ forcats 0.3.0
```

```
## ── Conflicts ─────────────────────────────────────── tidyverse_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
```

Hmm, so we get some messages and warnings in our
document - how can we get rid of these?

```
14   First we load the tidyverse.
15 ▾ ```{r, message=FALSE}
16   library(tidyverse)
17   ```
18
```

We can set the option for this chuck of R code not to display any messages by setting messages=FALSE within the first curly bracket. There are lots of other options available to use (e.g., warnings=FALSE).

Everything you need (and probably lots you don't) can be found in this cheatsheet here:

http://www.rstudio.com/wp-content/uploads/2016/03/rmarkdown-cheatsheet-2.0.pdf

and here is the 'R Markdown: The Definitive Guide':

https://bookdown.org/yihui/rmarkdown/

Like this...

To the worksheet...