Lecture 6 - Consolidation Lab

Andrew Stewart

Andrew.Stewart@manchester.ac.uk

@ajstewart_lang

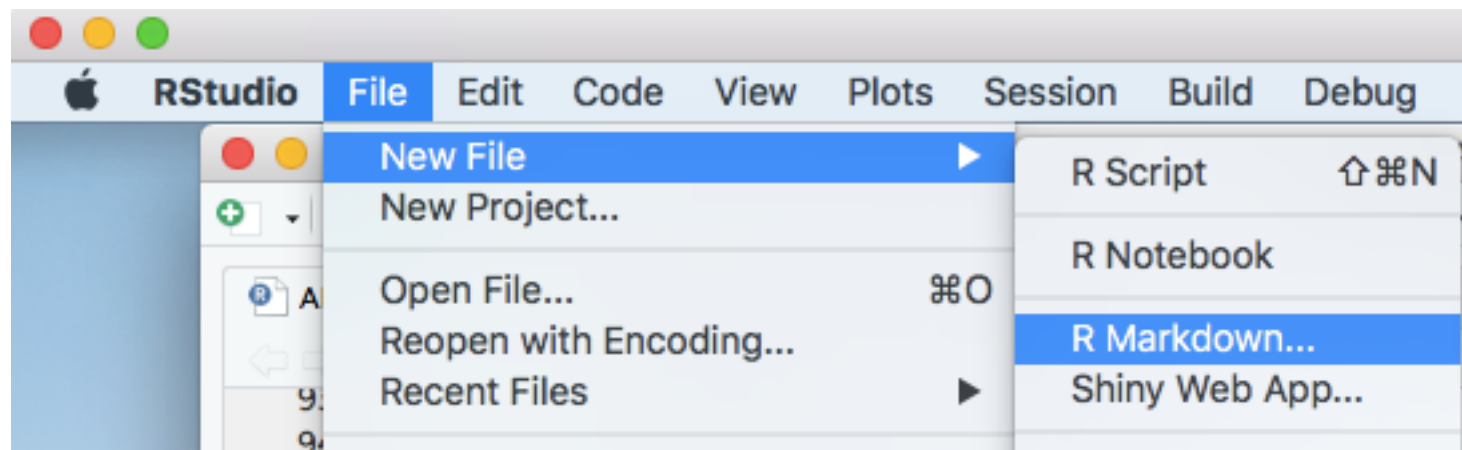| Week	Topic
1	Introduction, Open Science, and Power
2	Introduction to R
3	Data Wrangling and Visualisation
4	General Linear Model - Regression
5	General Linear Model - Regression
6	No Timetabled Lecture - Reading Week
7	Consolidation Lab
8	General Linear Model - ANOVA
9	General Linear Model - ANOVA
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 around the end of November

ANOVA – Due around mid-January

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	**Title:** ANOVA example
📊 Presentation	**Author:** Andrew Stewart
ⓡ Shiny	
🖼 From Template	**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.

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 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.
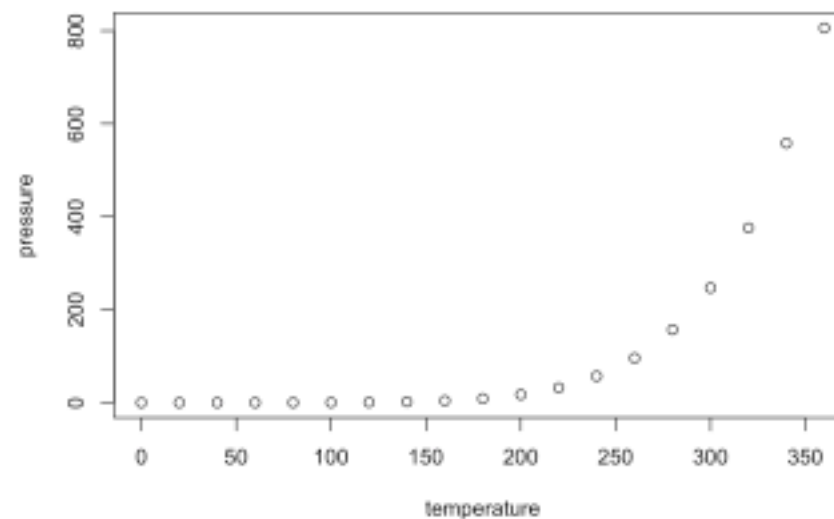
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
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
```
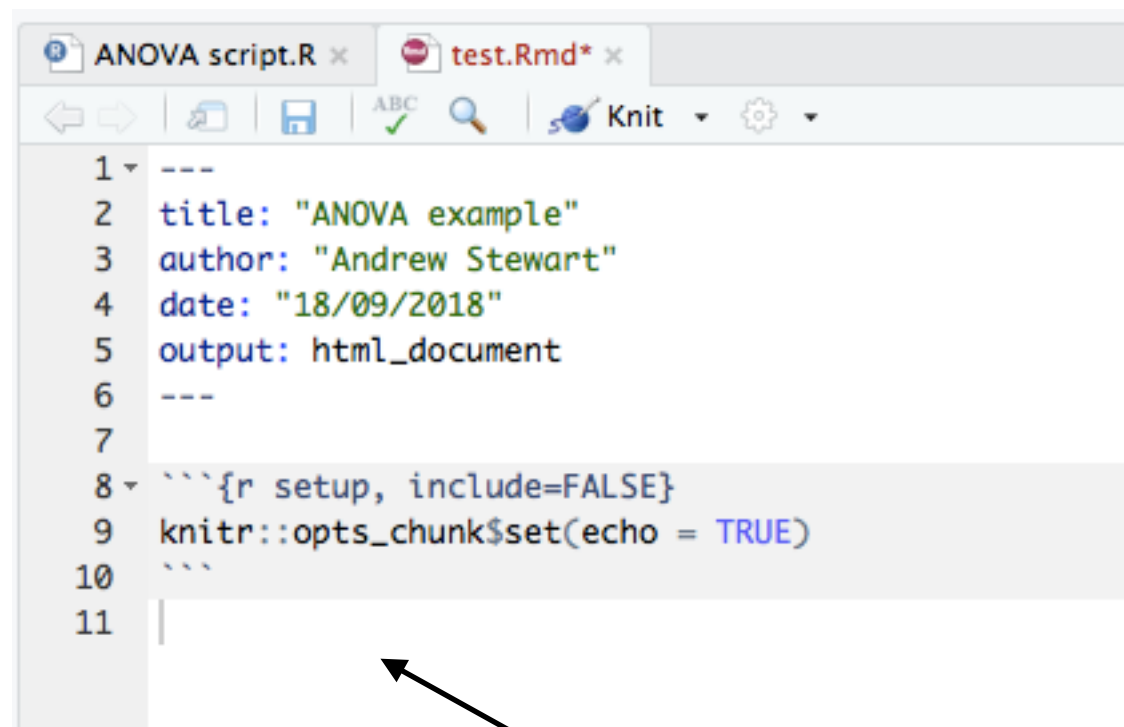
Including Plots

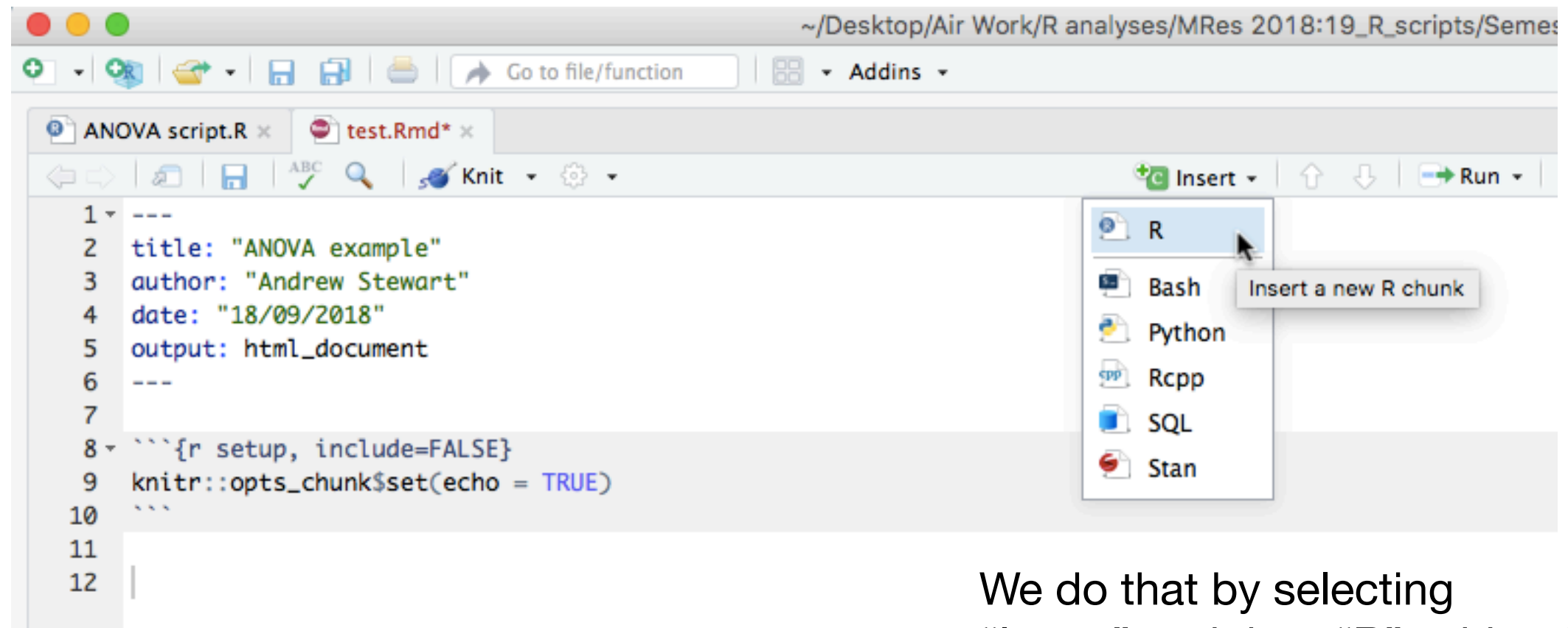You can also embed plots, for example:

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

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.

We can now insert our new R code here.

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  library(tidyverse)
14  ```
15
16
```
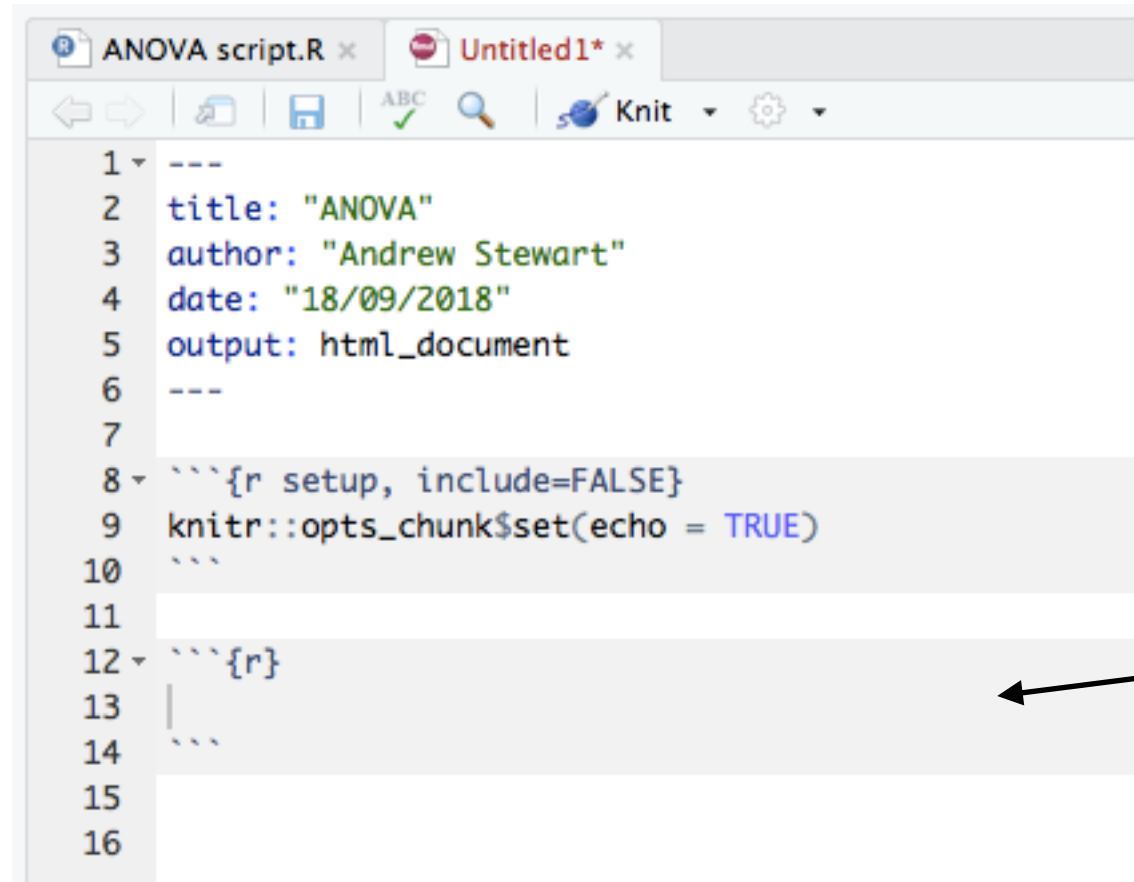
We load the tidyverse
packages first.

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

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  ## This is my first R Markdown document
13
14  First we load the tidyverse.
15  ```{r}
16  library(tidyverse)
17  ```
18
```

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...