VISUALISING DATA: INTERACTIVE REPORTS WITH KNITR

National Workshop

Accra, Ghana

OECD PARIS21

Outline

1. Report writing with interactive graphs
2. Application to the HIES data

1. Report writing with interactive graphs

Data analysis reports

- Figures/tables
- Static Word document
- knitr + Markdown → Web page

- What if the data change?
- What if you used the wrong version of the data?

knitr code chunks

- Input to knitr:

~~~
We see that this is an intercross with `r nind(sug)` individuals. There are `r nphe(sug)` phenotypes , and genotype data at `r totmar(sug)` markers across the `r nchr(sug)` autosomes. The genotype data is quite complete.
```{r summary_plot , fig.height=8}
plot(sug)
```
~~~

- Output from knitr:

~~~
We see that this is an intercross with 163 individuals. There are 6 phenotypes, and genotype data at 93 markers across the 19 autosomes. The genotype data is quite complete.
```r
plot(sug)
```

![plot of chunk summary_plot](RmdFigs/summary_plot.png)
~~~

html

```
<!DOCTYPE html>
<html>
<head>
<meta charset=utf-8"/>
<title>Example html file</title>
</head>

<body>
<h1>Markdown example </h1>
<p>Use a bit of <strong>bold</strong> or <em>italics </em>. Use
backticks to indicate <code>code</code> that will be rendered
in monospace.</p>
<ul>
<li>This is part of a list</li>
<li>another item</li>
</ul>
</body>
</html>
```

Markdown

~~~
# Markdown example
Use a bit of **bold** or _italics_. Use backticks to indicate `code` that will be rendered in monospace.

- This is part of a list
- another item

Include blocks of code using three backticks:
```
x <- rnorm(100)
```
Or indent four spaces:

mean(x)
sd(x)

And it's easy to create links, like to
[Markdown](http://daringfireball.net/projects/markdown/).
~~~

R Markdown

- R Markdown is a variant of Markdown, developed at RStudio.com
- Markdown + knitr + extras
- A few extra marks
- LATEX equations
- Bundle images into the final html file

Code chunks, again

~~~
```{r knitr_options , include=FALSE}
knitr::opts_chunk$set(fig.width=12, fig.height=4,
fig.path='Figs/', warning=FALSE ,
message=FALSE)
set.seed (53079239)
```
### Preliminaries
Load the R/qtl package using the `library ` function:
```{r load_qtl}
library(qtl)
```
To get help on the read.cross function in R, type the
following:
```{r help , eval=FALSE}
?read.cross
```
~~~

Chunk options

echo=FALSE	Don't include the code
results="hide"	Don't include the output
include=FALSE	Don't show code or output
eval=FALSE	Don't evaluate the code at all
warning=FALSE	Don't show R warnings
message=FALSE	Don't show R messages
fig.width=#	Width of figure
fig.height=#	Height of figure
fig.path="Figs/"	Path for figure files

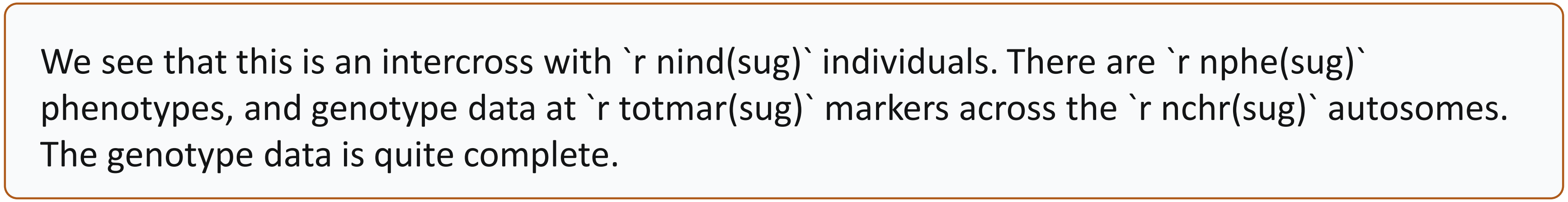
There are lots of chunk options.

Global chunk options

~~~
```{r knitr_options , include=FALSE}
knitr::opts_chunk$set(fig.width=12, fig.height=4,
fig.path='Figs/', warning=FALSE ,
message=FALSE , include=FALSE ,
echo=FALSE)
set.seed (53079239)
```
```{r make_plot , fig.width=8, include=TRUE}
x <- rnorm (100)
y <- 2*x + rnorm (100)
plot(x, y)
```
~~~

- Use global chunk options rather than repeat the same options over and over.
- You can override the global values in specific chunks.

In-line code



```
We see that this is an intercross with `r nind(sug)` individuals. There are `r nphe(sug)`
phenotypes, and genotype data at `r totmar(sug)` markers across the `r nchr(sug)` autosomes.
The genotype data is quite complete.
```

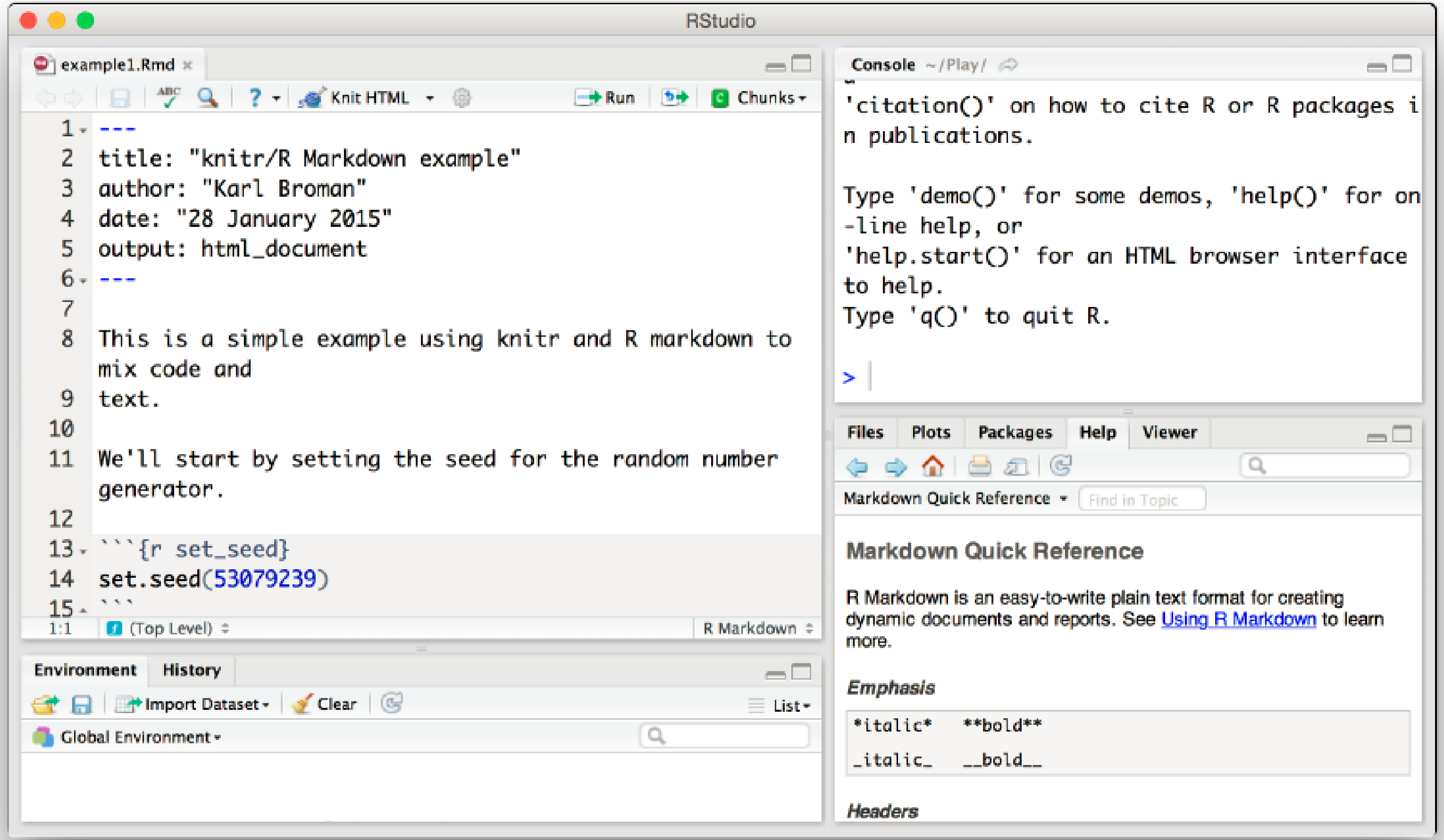
- Each bit of in-line code needs to be within one line; they can't span across lines.
- I'll often precede a paragraph with a code chunk with include=FALSE, defining various variables, to simplify the in-line code.
- Never hard-code a result or summary statistic again!

YAML header

```
---
title: "knitr/R Markdown example"
author: “Thilo Klein"
date: "2 November 2015"
output: html_document
---
```

```
---
title: "Another knitr/R Markdown example"
author: "[Thilo Klein](http://klein.uk)"
date: "`r Sys.Date()`"
output: word_document
---
```

R Markdown -> html, in RStudio



~~~
---
title: "knitr/R Markdown example"
author: "Karl Broman"
date: "28 January 2015"
output: html_document
---

This is a simple example using knitr and R markdown to mix code and
text.

We'll start by setting the seed for the random number generator.

```{r set_seed}
set.seed(53079239)
```
~~~

```
'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.

>
```

Markdown Quick Reference

R Markdown is an easy-to-write plain text format for creating dynamic documents and reports. See Using R Markdown to learn more.

Emphasis

```
*italic*   **bold**

_italic_   __bold__
```

Headers

2. Application to the HIES data

A worked example

- check folder: **\project\permanent\4_Report**