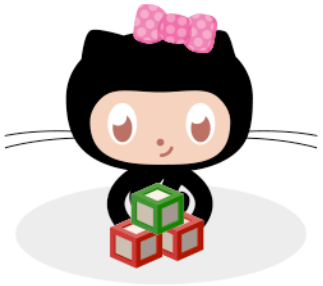
R Markdown

Markdown



- Plain text formatting
- Easy to read

"...a simple little **humane** markup language"
–Jeff Atwood, *Coding Horror*

WIKIPEDIA
The Free Encyclopedia

Markup

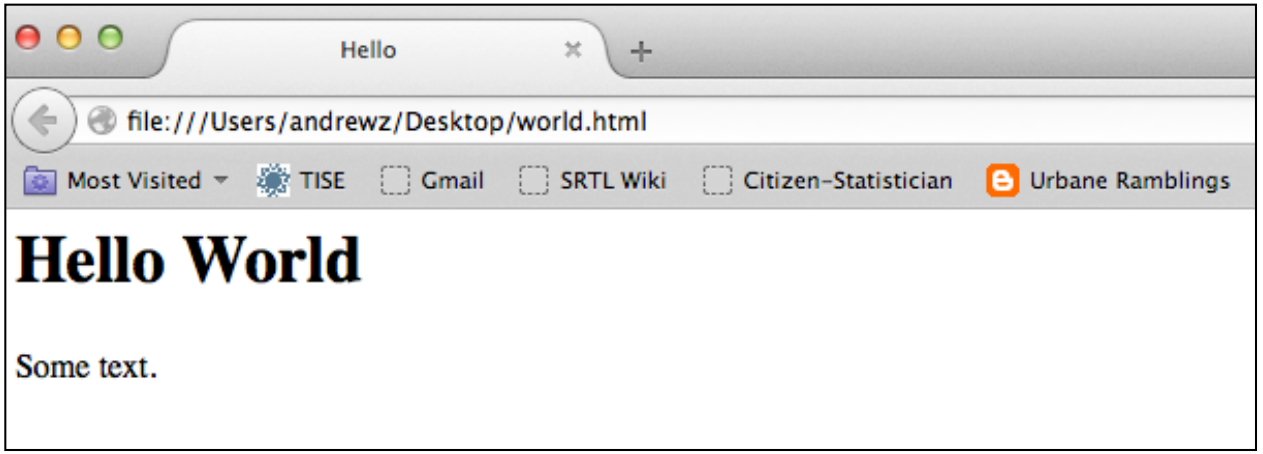
```
<html>
  <head>
    <title>Hello</title>
  </head>
  <body>
    <h1>Hello World</h1>
    <p>Some text.</p>
  </body>
</html>
```

Markdown

```
---
title: Hello
---

# Hello World

Some text.
```



Markdown Editors

Mou

Marked 2

Scrivener

Sublime Text

http://mashable.com/2013/06/24/markdown-tools/

Mou (*for Mac*): http://mouapp.com/

Mou alternatives (*for Windows*): http://alternativeto.net/software/mou/?platform=windows

Mou

```
### Meeting (December 5, 2013): Espresso Royale

- No items on Probabilities like Probability of A and B, where A and B are
independent. Classic genetic question.
- Since we are changing questions up, maybe have some still open-ended.

### Meeting (December 19, 2013): Conference Call

- We plan to make multiple choice questions.
- Sooner rather than later we need to discuss if our assessment is unique and
important to other biologist instructors.
- Pre versus post test
    - If we do pre and post we are interested in "gains" which is different. So, we
would want the data matched.
    - Maybe this needs more time to discuss so talk about it in the meeting in
January.
- We need to make changes before spring, including making multiple choice options.
Changes need to happen by end of January, a couple of weeks after our meeting.
- If people want to be authors of the instrument, then they need IRB approval. That
might happen then in next Fall.
- *Laura Z.*, *Greg*, and *Paul* will put together something for a review of the
assessment/blueprint.  We don't want it to take more than 10 minutes. Put something
up on Qualtrix.
- *Paul* is going to have a meeting with his colleagues and will talk about the
SQuaRE in addition to doing formal reviews. We would not share results with the
reviewers.
- The other quantitative test emailed yesterday is more like 7th and 8th grade math.
SQuaRE is more specific.
- It seems like we are still confused on what the purpose of the test is. Someone
(*Greg?*) thought that it was to determine how well they are prepared for a second
course.
- They still want demographic information. We need to make categories for major and
math course. We need to talk more at our meeting about whether this is really needed
and for what purpose.
- *Andy:* maybe we can have someone from IRB come talk with Paul you and Me and LL
```

319 Words

Meeting (December 5, 2013): Espresso Royale

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- *Andy:* maybe we can have someone from IRB come talk with Paul you and Me and LL

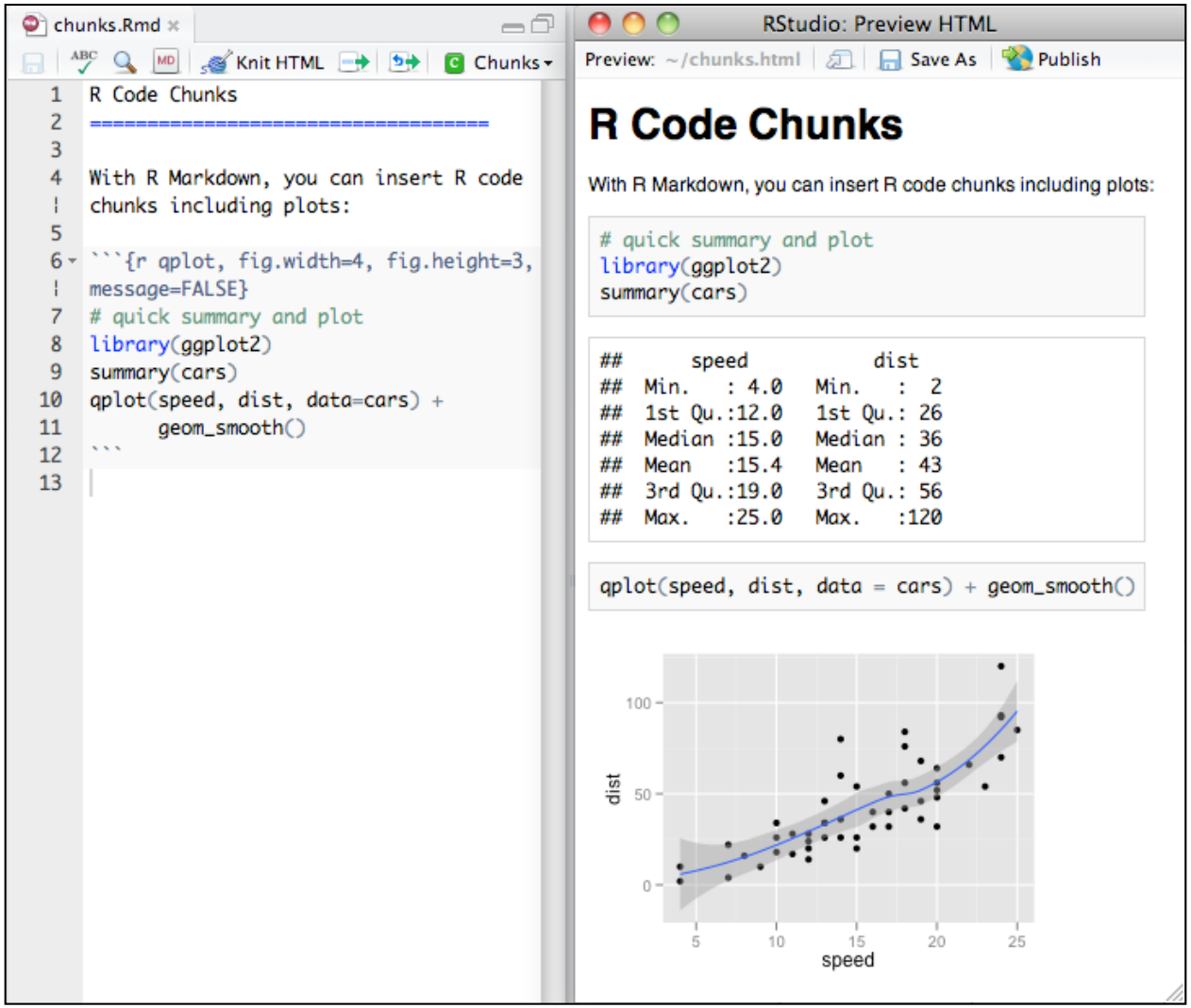
What can be marked?

- Headers: *Six sizes*
- Text Emphasis: *Bold and italics*
- Lists: *Ordered or unordered; also nesting*
- Blockquotes
- Code: *Inline and block code*
- Fenced Code Blocks (non-indented blocks)
- Horizontal Rules
- Images
- Links and Email
- Footnotes
- Strikethrough
- Tables
- Anchors
- Equations: *Inline and block equations*

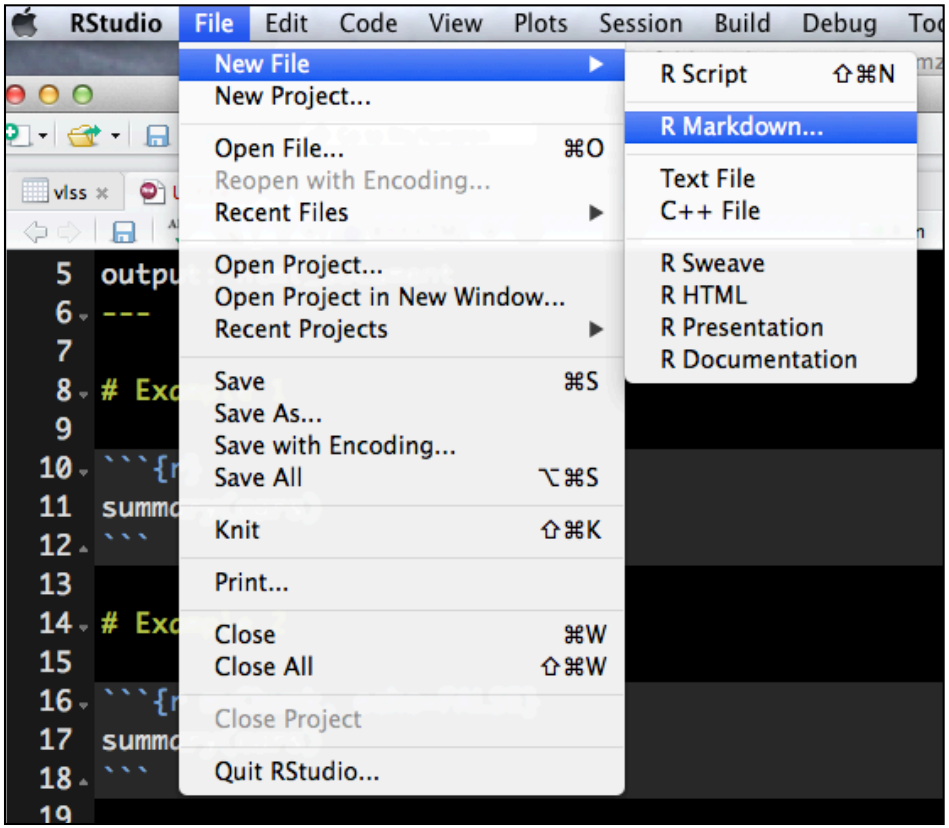
R Markdown

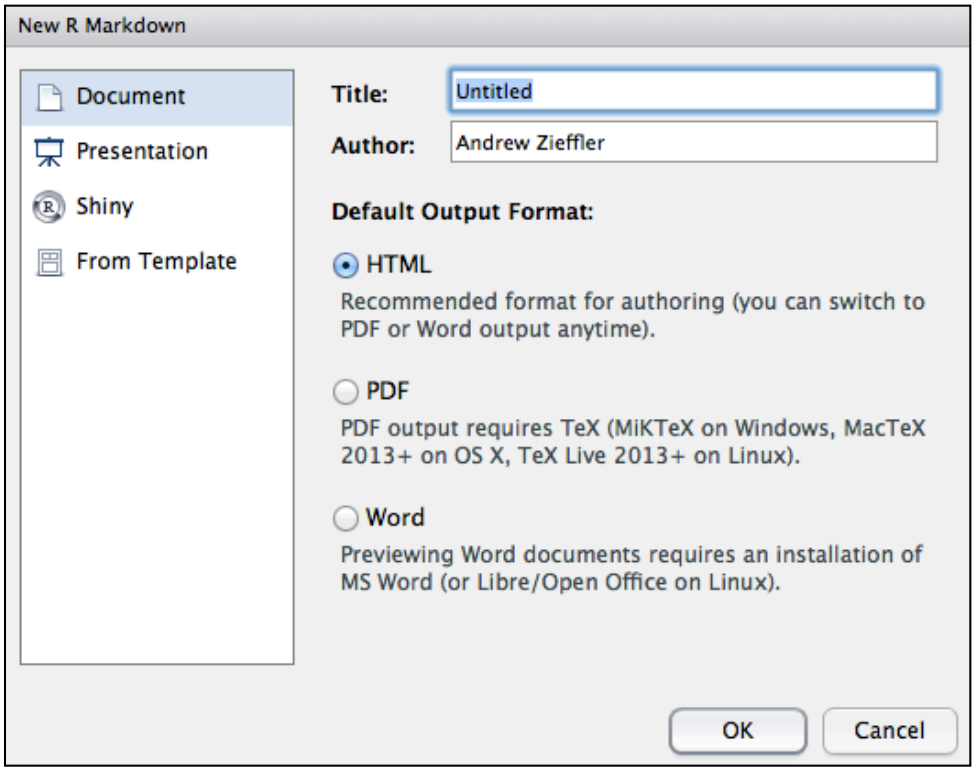
- Uses Markdown syntax
- Embeds R syntax

http://rmarkdown.rstudio.com/



R Markdown Document





RStudio v0.98.1062

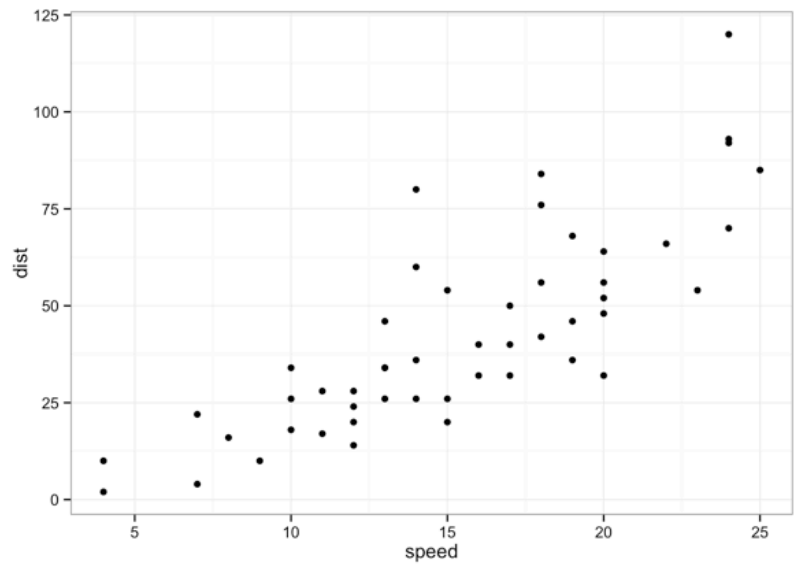
- **Document:** Web document, PDF file or MS Word file
- **Presentation:** ioslides (*html*), Slidy (*html*), Beamer (*PDF*)
- **Shiny:** Interactive apps (slides *or* document)
- **From Template:** Use a template for custom documents

Code Chunks

```
```{r}
Your R syntax goes here
```
```

Code chunk:

```
```{r}
summary(cars)
```
```

Output:

```
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2
##  1st Qu.:12.0   1st Qu.: 26
##  Median :15.0   Median : 36
##  Mean   :15.4   Mean   : 43
##  3rd Qu.:19.0   3rd Qu.: 56
##  Max.   :25.0   Max.   :120
```

Code Chunk Options

```
```{r  name, option1, option2, ...}
  Your R syntax goes here
```
```

Code chunk:

```
```{r myChunk, echo=FALSE}
summary(cars)
```
```

Output:

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2
##  1st Qu.:12.0   1st Qu.: 26
##  Median :15.0   Median : 36
##  Mean   :15.4   Mean   : 43
##  3rd Qu.:19.0   3rd Qu.: 56
##  Max.   :25.0   Max.   :120
```

Figures

Code chunk:

````
```{r fig1, out.width='600px', out.height='600px',fig.cap='Here
is my figure caption.', fig.align='center'}
library(ggplot2)
ggplot(data=cars, aes(x=speed, y=dist)) +
  geom_point() +
  theme_bw()
```
````

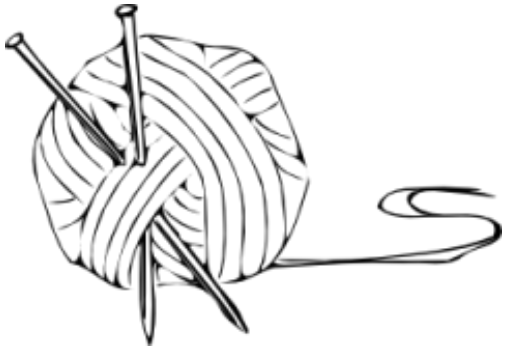
Output:

```
library(ggplot2)
ggplot(data=cars, aes(x=speed, y=dist)) +
  geom_point() +
  theme_bw()
```



Other Options

- `echo = TRUE` (logical)
- `warning = TRUE` (logical)
- `message = TRUE` (logical)
- `tidy = FALSE` (logical)
- `cache = TRUE` (logical)



knitr

- `fig.cap = 'caption'` (character)
- `fig.align = default` (character; 'left', 'right', 'center')
- `fig.width = 7` (numeric; in inches)
- `fig.height = 7` (numeric; in inches)
- `out.width = NULL` (character)
- `out.height = NULL` (character)

Many others. Find all of them and their descriptions at
http://yihui.name/knitr/options#chunk_options

Inline Code Chunks

`` `r Your R syntax goes here` ``

Code chunk:

Here is an example of an inline code chunk. The mean speed is `` `r mean(cars$speed)` ``.

Output:

Here is an example of an inline code chunk. The mean speed is 15.4.

Equations

Inline equation: `$equation$`
Display equation: `$$equation$$`
MathML equation: `<math ...>equation</math>`

Code chunk:

```
$$
\hat{Y_{ij}} = \beta_{0} + \beta_{1}(X_{1}) + \epsilon_{ij}
$$
```

Output:

$$\hat{Y}_{ij} = \beta_0 + \beta_1(X_1) + \epsilon_{ij}$$

Unless you use MathML, there is no equation numbering support in RStudio currently....although it has already been added as a feature request.

YAML: The Header

YAML (*YAML ain't markup language*) is a human-friendly standard for describing the structure of data and embedded this structure within the data being described.

```
---
title: "R Markdown Example File"
author: "Andrew Zieffler"
date: "September 21, 2014"
output: html_document
---
```

Adding to the document's metadata allows document formatting, etc.

YAML: Options

```
---
title: "R Markdown Example File"
author: "Andrew Zieffler"
date: "September 21, 2014"
output:
  html_document:
      toc: true
      highlight: zenburn
      theme: united
---
```

Correctly structured YAML needs to be indented

Bibliography

Add a bibliography to the document metadata

```
---
title: "R Markdown Example File"
author: "Andrew Zieffler"
date: "September 21, 2014"
output: html_document
bibliography: myBibliography.bib
---
```

Create myBibliography.bib

Insert a level-1 heading called "References"

```
# References
```

.bib Files

A *.bib* file is a plain-text file that contains a BibTeX database. The database is a list of references and their metadata. Reference managers (e.g., Papers, Zotero, Mendelay) can produce BibTex entries.

```
@book{agresti,
     author = {Alan Agresti},
     title = {Categorical Data Analysis},
     publisher={Wiley},
     year={2002},
     edition={2nd},
     address={New York},
     }

@article{algina,
     author = {J. Algina and H. J. Keselman and R. D. Penfield},
     title = {An Alternative to {C}ohen's Standardized Mean Difference Effect
              Size: A Robust Parameter and Confidence Interval in the Two
              Independent Groups Case},
     journal={Psychological Methods},
     year={2005},
     volume={10},
     number={3},
     pages={317--328},
     }
```

Place the .bib file in the same folder as your RMD document.

Including Citations

Citations go inside square brackets and are separated by semicolons. Each citation must have a key, composed of '@' + the citation identifier from the database.

```
Here is some text and a citation [@agresti; @algina].
```

Citations

Here is some text and a citation (Agresti 2002; Algina, Keselman, and Penfield 2005).

References

Agresti, A. 2002. *Categorical Data Analysis*. 2nd ed. New York: Wiley.

Algina, J., H. J. Keselman, and R. D. Penfield. 2005. "An Alternative to Cohen's Standardized Mean Difference Effect Size: A Robust Parameter and Confidence Interval in the Two Independent Groups Case." *Psychological Methods* 10 (3): 317–28.

Citations may optionally have a prefix, a locator, and a suffix.

```
Here is some text and a citation [see @agresti; @algina, p. 317].
```

Here is some text and a citation (see Agresti 2002; Algina, Keselman, and Penfield 2005, 317).

A minus sign (-) before the @ will suppress mention of the author in the citation.

```
Agresti says that this is cool stuff [-@agresti].
```

Agresti (2002) says that this is cool stuff .

Use APA Formatted Citations and References

By default, pandoc uses Chicago style (author-date format) for citations and references. To use another style, you will need to specify a CSL 1.0 style file in the `csl` metadata field.

```
---
title: "R Markdown Example File"
author: "Andrew Zieffler"
date: "September 21, 2014"
output: html_document
bibliography: myBibliography.bib
csl: apa-single-spaced.csl
---
```

You will need to download the *apa-single-spaced.csl* file from https://zotero.org/styles. Place the CSL file in the same folder as your RMD document.

Find Out More

- **Markdown Syntax:** http://daringfireball.net/projects/markdown/syntax
- **R Markdown:** http://rmarkdown.rstudio.com/
- **Knitr:** http://yihui.name/knitr/
- **BibTeX:** http://en.wikibooks.org/wiki/LaTeX/Bibliography_Management
- **Create a custom template:** http://rmarkdown.rstudio.com/tufte_handout_format.html

One Last Thing

Use Markdown in your email messages for quick, easy formatting.

Markdown Here: http://markdown-here.com/

New Message

Goldy Gopher (redacted)

Subject

```
Name | Lunch order | Spicy     | Owes
------- | ---------------- | ---------- | ---------:
Joan  | saag paneer | medium | $11
Sally  | vindaloo       | mild      | $14
Erin   | lamb madras | HOT     | $5

There are **multiple syntax highlighting themes** to choose from. Here's one of
them:

```javascript
// All the code you will ever need
var hw = "Hello World!"
alert(hw);
```

--
--
Andrew Zieffler, Ph.D.
Educational Psychology
University of Minnesota
```

New Message

Goldy Gopher (redacted)

Subject

Name	Lunch order	Spicy	Owes
Joan	saag paneer	medium	$11
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Andrew Zieffler, Ph.D.