



Advanced RMarkdown

Going Deeper with R



Advanced Markdown Text Formatting



Links

This is a [link to the Rest for the Rest of Us website](#)

This is a [link to the Rest for the Rest of Us website](<http://rfortherestofus.com/>)



Images





Block quotes

Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.

> Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.



Footnotes

^[This is a footnote]



remedy



LEARN MORE ABOUT REMEDY



My Turn

Working in my RMarkdown report created in the data visualization section, I'll do the following:

1. Add a link
2. Add an image
3. Add a block quote
4. Add a footnote



Your Turn

- Add the Oregon Department of Education logo to the top of your report. You can find it at <https://github.com/rfortherestofus/going-deeper/raw/master/slides/images/ode-logo.jpg>
- Add the following text (make sure you include the link, which points to <https://www.oregon.gov/ode/pages/default.aspx>):

This is a report for the Oregon Department of Education on diversity in Oregon school districts.



Your Turn (continued)

- Add the following text as a block quote:

The Oregon Department of Education fosters equity and excellence for every learner through collaboration with educators, partners, and communities.

- Add a link to the source for mission statement above (<https://www.oregon.gov/ode/about-us/Pages/default.aspx>) as a footnote.



Tables





Don't Use the Default

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4
Mazda RX4 Wag	21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4
Datsun 710	22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1
Hornet 4 Drive	21.4	6	258.0	110	3.08	3.215	19.44	1	0	3	1
Hornet Sportabout	18.7	8	360.0	175	3.15	3.440	17.02	0	0	3	2
Valiant	18.1	6	225.0	105	2.76	3.460	20.22	1	0	3	1



Data Frame Printing

```
---
```

```
title: "Snazzy Report"
output:
  html_document:
    df_print: tibble
---
```

```
## # A tibble: 53,940 x 10
##   carat cut      color clarity depth table price     x     y     z
##   <dbl> <ord>    <ord> <ord>   <dbl> <dbl> <int> <dbl> <dbl> <dbl>
## 1 0.23  Ideal     E     SI2     61.5   55   326  3.95  3.98  2.43
## 2 0.21  Premium   E     SI1     59.8   61   326  3.89  3.84  2.31
## 3 0.23  Good      E     VS1     56.9   65   327  4.05  4.07  2.31
## 4 0.290 Premium   I     VS2     62.4   58   334  4.2    4.23  2.63
## 5 0.31  Good      J     SI2     63.3   58   335  4.34  4.35  2.75
## 6 0.24  Very Good J     VVS2    62.8   57   336  3.94  3.96  2.48
## 7 0.24  Very Good I     VVS1    62.3   57   336  3.95  3.98  2.47
## 8 0.26  Very Good H     SI1     61.9   55   337  4.07  4.11  2.53
## 9 0.22  Fair       E     VS2     65.1   61   337  3.87  3.78  2.49
## 10 0.23 Very Good H     VS1     59.4   61   338  4     4.05  2.39
## # ... with 53,930 more rows
```



Data Frame Printing

```
---
```

```
title: "Snazzy Report"
```

```
output:
```

```
  html_document:
```

```
    df_print: kable
```

```
--
```

Sepal Length	Sepal Width	Petal Length	Petal Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa



Data Frame Printing

```
---
```

```
title: "Snazzy Report"
output:
  html_document:
    df_print: paged
---
```

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	►
Mazda RX4	21.0	6	160.0	110	3.90	2.620	16.46	0	1	
Mazda RX4 Wag	21.0	6	160.0	110	3.90	2.875	17.02	0	1	
Datsun 710	22.8	4	108.0	93	3.85	2.320	18.61	1	1	
Hornet 4 Drive	21.4	6	258.0	110	3.08	3.215	19.44	1	0	
Hornet Sportabout	18.7	8	360.0	175	3.15	3.440	17.02	0	0	

1-5 of 32 rows | 1-10 of 12 columns

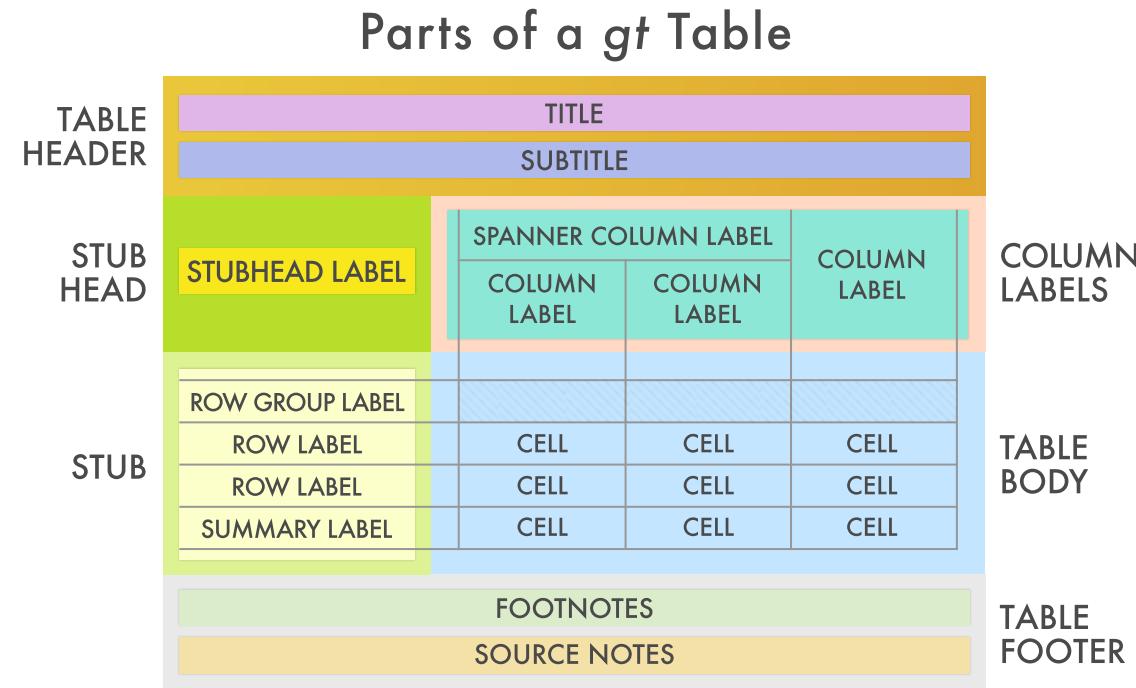
Previous [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [Next](#)



Table Packages



gt



LEARN MORE ABOUT GT



kable + kableExtra

Table 3.5: Graduates of Ontario French-language RN programs: First-attempt pass rates by program and language of exam

Ontario RN university, program, collaborative partner, and language of instruction	Exam written in:	2015		2016		2017		2018	
		Writes	Pass Rate						
Laurentian University Full (French)	French	1	0.0%	0	—	2	0.0%	0	—
	English	18	55.6%	19	78.9%	40	62.5%	54	74.1%
	Total	19	52.6%	19	78.9%	42	59.5%	54	74.1%
University of Ottawa Full with La Cité collégiale (French)	French	29	41.4%	13	38.5%	7	57.1%	3	33.3%
	English	20	80.0%	56	80.4%	49	83.7%	62	83.9%
	Total	49	57.1%	69	72.5%	56	80.4%	65	81.5%
University of Ottawa Specified for RPN with La Cité collégiale (French)	French	7	0.0%	2	50.0%	4	25.0%	2	50.0%
	English	2	50.0%	1	0.0%	5	80.0%	1	0.0%
	Total	9	11.1%	3	33.3%	9	55.6%	3	33.3%
University of Ottawa Compressed (English and French)	French	9	44.4%	1	0.0%	1	0.0%	0	—
	English	25	88.0%	27	100.0%	0	—	0	—
	Total	34	76.5%	28	96.4%	1	0.0%	0	—
University of Ottawa Compressed (French)*	French			0	—	1	0.0%	0	—
	English			1	100.0%	8	87.5%	8	87.5%
	Total			1	100.0%	9	77.8%	8	87.5%
Grand Total	French	46	34.8%	16	37.5%	15	33.3%	5	40.0%
	English	65	75.4%	104	84.6%	102	75.5%	125	79.2%
	Total	111	58.6%	120	78.3%	117	70.1%	130	77.7%

* In 2016, CNO split the University of Ottawa Compressed (English and French) program into two programs: University of Ottawa Compressed (English) and University of Ottawa Compressed (French). Now CNO will only use the original combined program for applicants who graduated when the original combined program was still in effect.

Source: [Sharla Gelfand](#)

LEARN MORE ABOUT KABLEEXTRA



formattable

id	name	age	grade	test1_score	test2_score	final_score	registered
1	Bob	28	C	8.9	9.1	9.00 (rank: 06)	✓ Yes
2	Ashley	27	A	9.5	9.1	9.30 (rank: 03)	✗ No
3	James	30	A	9.6	9.2	9.40 (rank: 02)	✓ Yes
4	David	28	C	8.9	9.1	9.00 (rank: 06)	✗ No
5	Jenny	29	B	9.1	8.9	9.00 (rank: 06)	✓ Yes
6	Hans	29	B	9.3	8.5	8.90 (rank: 08)	✓ Yes
7	Leo	27	B	9.3	9.2	9.25 (rank: 04)	✓ Yes
8	John	27	A	9.9	9.3	9.60 (rank: 01)	✗ No
9	Emily	31	C	8.5	9.1	8.80 (rank: 09)	✗ No
10	Lee	30	C	8.6	8.8	8.70 (rank: 10)	✗ No

LEARN MORE ABOUT FORMATTABLE



DT

```
library(DT)
datatable(iris)
```

Show 10 entries Search:

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa
7	4.6	3.4	1.4	0.3	setosa
8	5	3.4	1.5	0.2	setosa
9	4.4	2.9	1.4	0.2	setosa
10	4.9	3.1	1.5	0.1	setosa

Showing 1 to 10 of 150 entries Previous ... Next

LEARN MORE ABOUT DT



reactable

2019 Women's World Cup Predictions

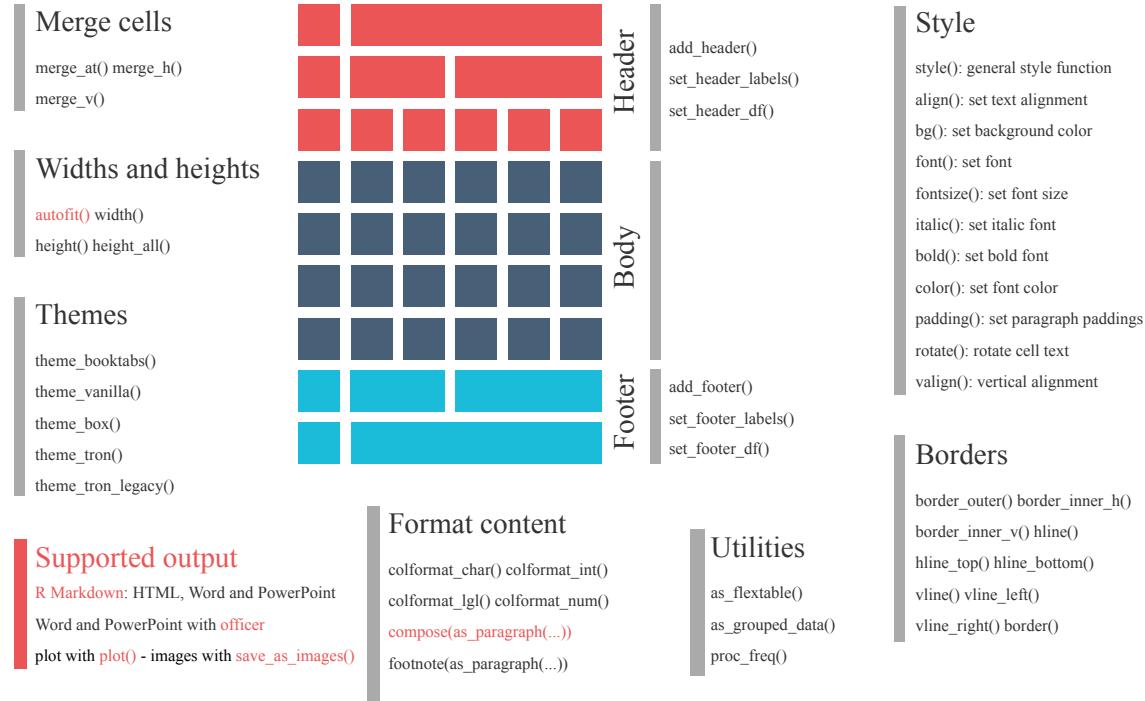
Soccer Power Index (SPI) ratings and chances of advancing for every team

TEAM	GROUP	Team Rating			Chance of Finishing Group Stage In ...			Knockout Stage Chances				
		SPI	OFF.	DEF.	1ST PLACE	2ND PLACE	3RD PLACE	MAKE ROUND OF 16	MAKE QTR-FINALS	MAKE SEMIFINALS	MAKE FINAL	WIN WORLD CUP
USA 6 pts.	F	98.3	5.5	0.6	83%	17%	—	✓	78%	47%	35%	24%
France 6 pts.	A	96.3	4.3	0.5	>99%	<1%	<1%	✓	78%	42%	30%	19%
Germany 6 pts.	B	93.8	4.0	0.7	98%	2%	—	✓	89%	48%	28%	12%
Canada 6 pts.	E	93.5	3.7	0.6	39%	61%	—	✓	59%	36%	20%	9%
England 6 pts.	D	91.9	3.5	0.6	71%	29%	—	✓	69%	43%	16%	8%
Netherlands 6 pts.	E	92.7	3.9	0.7	61%	39%	—	✓	59%	37%	19%	8%
Australia 3 pts.	C	92.8	4.2	0.9	13%	54%	34%	>99%	54%	26%	10%	5%

LEARN MORE ABOUT REACTABLE



flextable



LEARN MORE ABOUT FLEXTABLE



My Turn

I'll demonstrate making an effective table using `gt`



Your Turn

Do the following:

1. Change the default data frame printing method to use kable
2. Choose one of the table packages and make an attractive table that shows the top 10 districts with the highest percentage of Hispanic/Latino students (hint: use the `slice_max()` function to get the top 10 and the `fmt_percent()` function if you're using `gt` or the `percent()` function otherwise to display the percentage of Hispanic/Latino students in each)



Advanced YAML



Table of Contents

```
---
```

```
title: "Snazzy Report"
```

```
output:
```

```
  html_document:
```

```
    toc: TRUE
```

```
    toc_depth: 2
```

```
    toc_float: TRUE
```

```
---
```



Table of Contents

```
---
```

```
title: "Snazzy Report"
```

```
output:
```

```
  html_document:
```

```
    toc: TRUE
```

```
    toc_depth: 2
```

```
    toc_float: TRUE
```

```
---
```



Table of Contents

```
---
```

```
title: "Snazzy Report"
```

```
output:
```

```
  html_document:
```

```
    toc: TRUE
```

```
    toc_depth: 2
```

```
    toc_float: TRUE
```

```
---
```



Figure Options

```
---
```

```
title: "Snazzy Report"
```

```
output:
```

```
  html_document:
```

```
    fig_width: 7
```

```
    fig_height: 6
```

```
    fig_caption: TRUE
```

```
---
```



Figure Options

```
---
```

```
title: "Snazzy Report"
```

```
output:
```

```
  html_document:
```

```
    fig_width: 7
```

```
    fig_height: 6
```

```
    fig_caption: TRUE
```

```
---
```



Figure Options

```
---
```

```
title: "Snazzy Report"
```

```
output:
```

```
  html_document:
```

```
    fig_width: 7
```

```
    fig_height: 6
```

```
    fig_caption: TRUE
```

```
---
```



Parameters

```
---
```

```
title: "Snazzy Report"
```

```
output: html_document
```

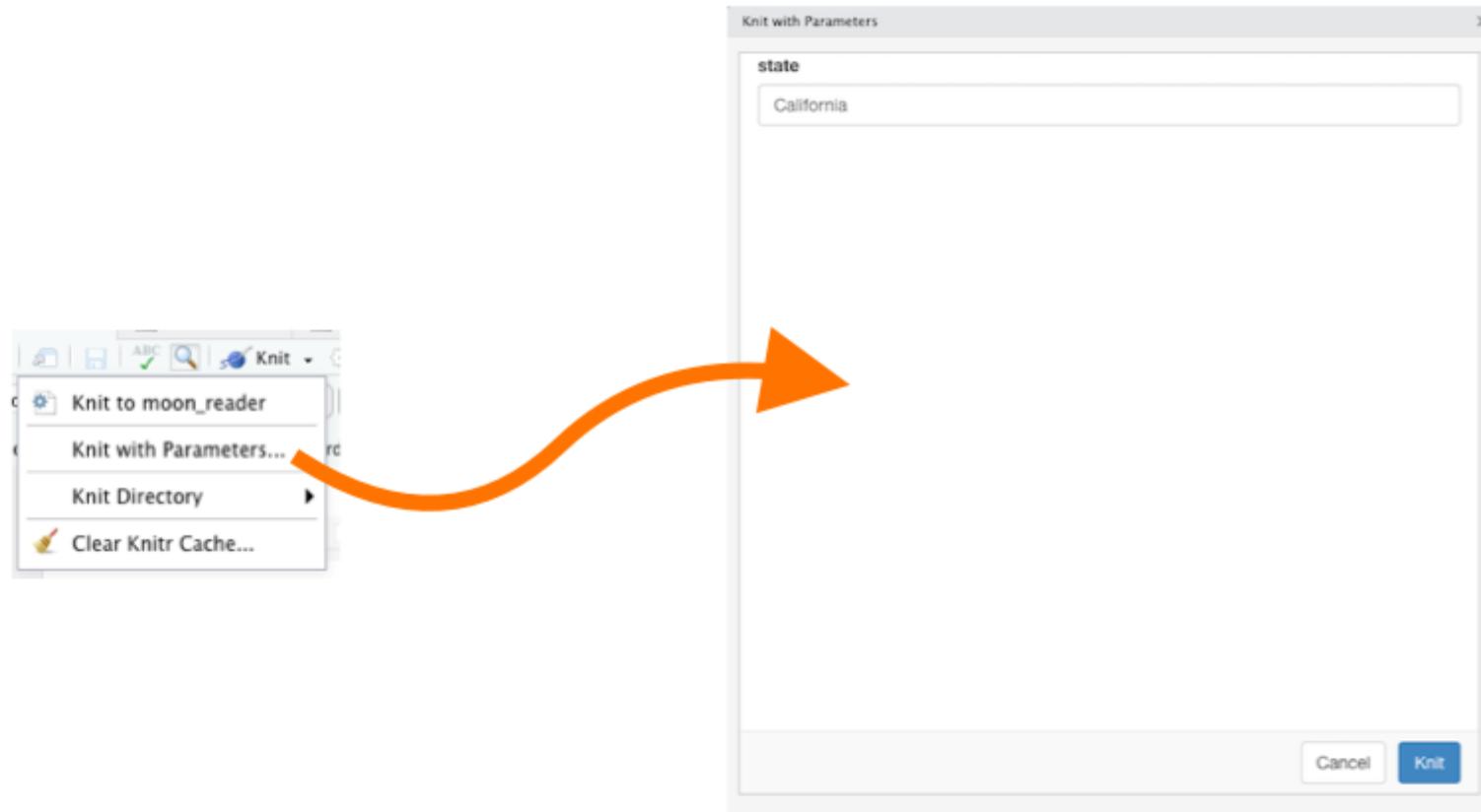
```
  params:
```

```
    state: "California"
```

```
---
```

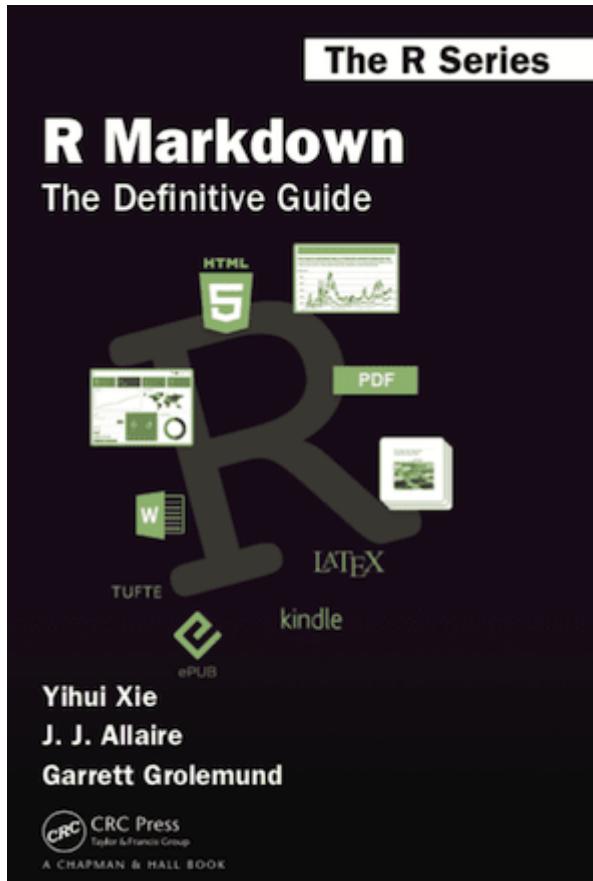


Parameters





Additional Options



R for the Rest of Us

ymlthis | 0.1.2.9000 [Home](#) Reference Articles ▾ News ▾

ymlthis: write YAML for R Markdown, bookdown, blogdown, and more

ymlthis makes it easy to write YAML front matter for R Markdown and related documents. `yml_*`() functions write functions and `use_*`() functions let you write the resulting YAML to your clipboard or to .yml files related to your project.

Installation

You can install ymlthis from CRAN with:

```
install.packages("ymlthis")
```

Or you can install the development version of ymlthis from GitHub with:

```
# install.packages("remotes")
remotes::install_github("r-lib/ymlthis")
```

Example

`yml()` creates a basic `yml` object returns simple YAML with the author and date.

```
library(ymlthis)

yml()
#> ---
#> author: Malcolm Barrett
#> date: `r format(Sys.Date())``
#> ---
```



My Turn

I'll do the following:

1. Add a table of contents
2. Adjust default figure height, width, and captions
3. Add a parameter to the YAML and use it in the body of my report
4. Knit to make sure everything works



Your Turn

1. Add a table of contents and make it floating
2. Adjust default figure height, width, and captions
3. Add a parameter to the YAML and use it in the body of your report to dynamically create a table of the top 10 districts by various race/ethnicity categories.



Inline R Code



Inline R code

These two bits of text look identical, right?

In 2019, there were 854 German speakers in California.

In 2019, there were 854 German speakers in California.



Inline R code

They're not identical!

In 2019, there were 854 German speakers in California.

In 2019, there were `r california_german_speakers` German speakers in California.



Inline R code

In 2019, there were `r california_german_speakers` German speakers in California.



My Turn

I'll add a line to my report that uses inline R code



Your Turn

Add a line to your report that uses inline R code



Format Tools Table Window Help



Making Your Reports Shine: Word Edition



Making Your Reports Shine: Word Edition

```
---
```

```
title: "Snazzy Report"
```

```
output:
```

```
  word_document:
```

```
    reference_docx: my-word-template.docx
```

```
--
```

👍 .docx .dotx 👎



My Turn

I'll do the following:

1. Use a reference document to change the look and feel of my reports that are knitted to Word



Your Turn

Use a reference document to change the look and feel of your report when knitted to Word



Making Your Reports Shine: HTML Edition



My Turn

I'll convert my report to distill format



Your Turn

Change the theme of your report by adding a theme option to your YAML. Use any of the following options: “cerulean”, “cosmo”, “flatly”, “journal”, “lumen”, “paper”, “readable”, “sandstone”, “simplex”, “spacelab”, “united”, and “yeti”



Making Your Reports Shine: PDF Edition



Making Your Reports Shine: PDF Edition



Jeff Littlejohn
@jefflittlejohn

▼

Potential cause of death: troubleshooting Latex errors
from knitting rmarkdown. [#rstats](#)



Making Your Reports Shine: PDF Edition



Andrew Heiss
@andrewheiss

▼

Which program gives the most obscure and maddeningly difficult-to-decipher logs and messages?

LaTeX

63.2%

LaTeX

36.8%



Making Your Reports Shine: PDF Edition



Matt Cowgill
@MattCowgill

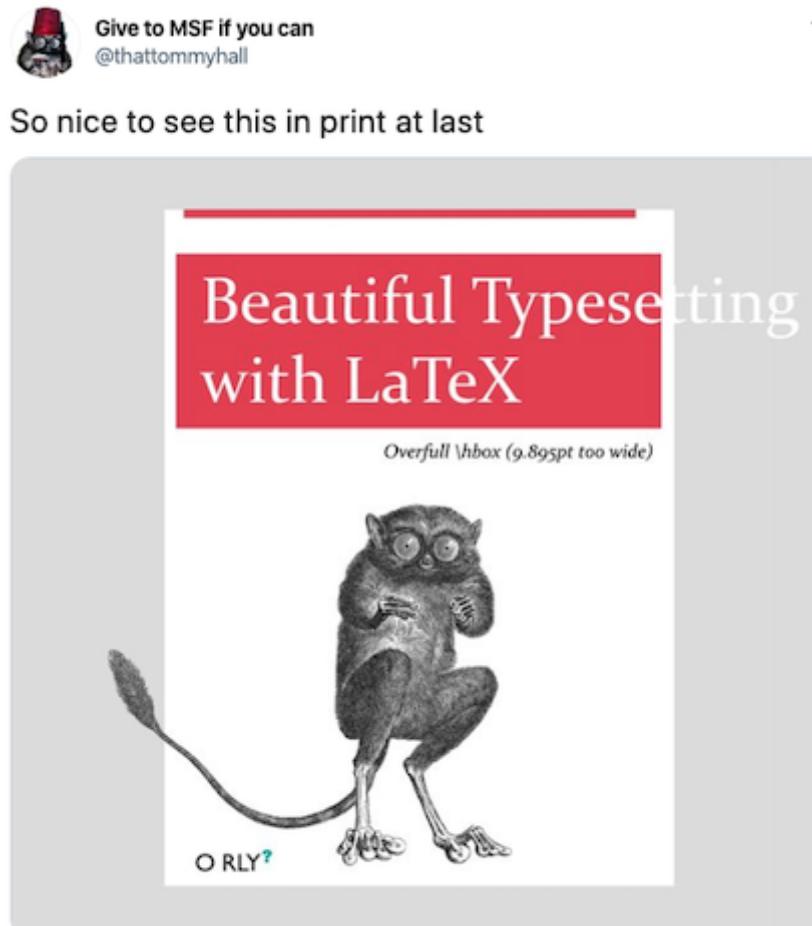
▼

making tables in LaTeX is enough to make me take back
every bad thing I ever said about Microsoft Office

9:21 PM · Apr 11, 2020 · [Twitter Web App](#)



Making Your Reports Shine: PDF Edition





Making Your Reports Shine: PDF Edition



Making Your Reports Shine: PDF Edition

```
---
```

```
title: "Snazzy Report"
```

```
output:
```

```
 pagedown::html_paged:
```

```
  toc: TRUE
```

```
  number_sections: FALSE
```

```
---
```



Making Your Reports Shine: PDF Edition

```
---
```

```
title: "Snazzy Report"
```

```
knit: pagedown::chrome_print
```

```
output:
```

```
  pagedown::html_paged:
```

```
    toc: TRUE
```

```
    number_sections: FALSE
```

```
--
```



Making Your Reports Shine: PDF Edition

Use the `chrome_print()` function from `pagedown` to turn any HTML document into a PDF.

```
library(pagedown)  
chrome_print("slides.html")
```



My Turn

I'll convert my report to pagedown



Your Turn

Convert your report to pagedown



Presentations



Presentations: Powerpoint

New R Markdown

Document

Presentation

Shiny

From Template

Title: Untitled

Author: David Keyes

Default Output Format:

HTML (ioslides)
HTML presentation viewable with any browser (you can also print ioslides to PDF with Chrome).

HTML (Slidy)
HTML presentation viewable with any browser (you can also print Slidy to PDF with Chrome).

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

PowerPoint
PowerPoint previewing requires an installation of PowerPoint or OpenOffice.

OK Cancel



Presentations: xaringan





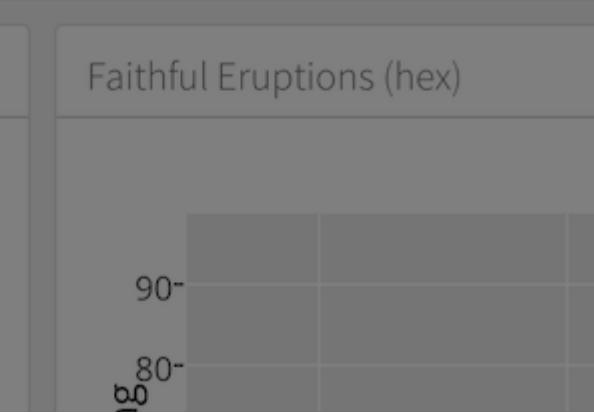
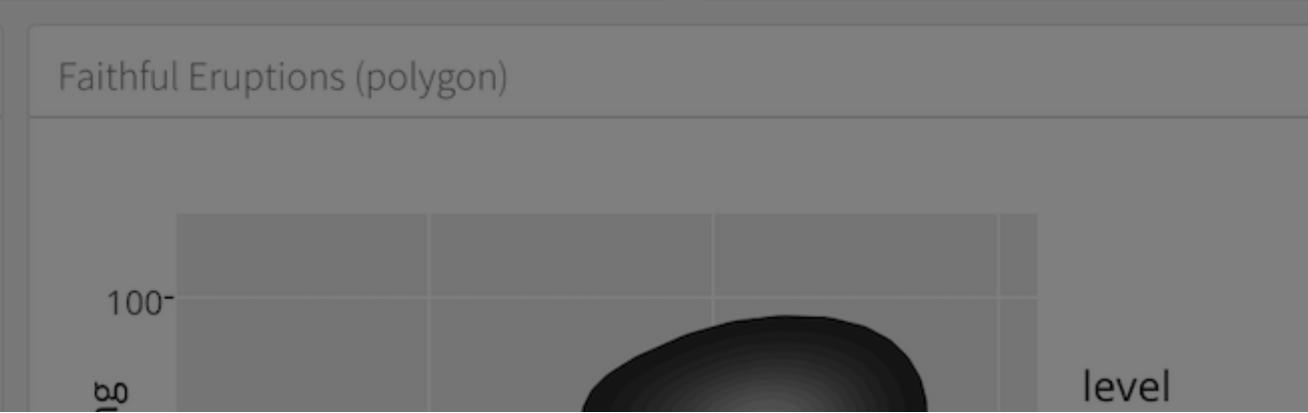
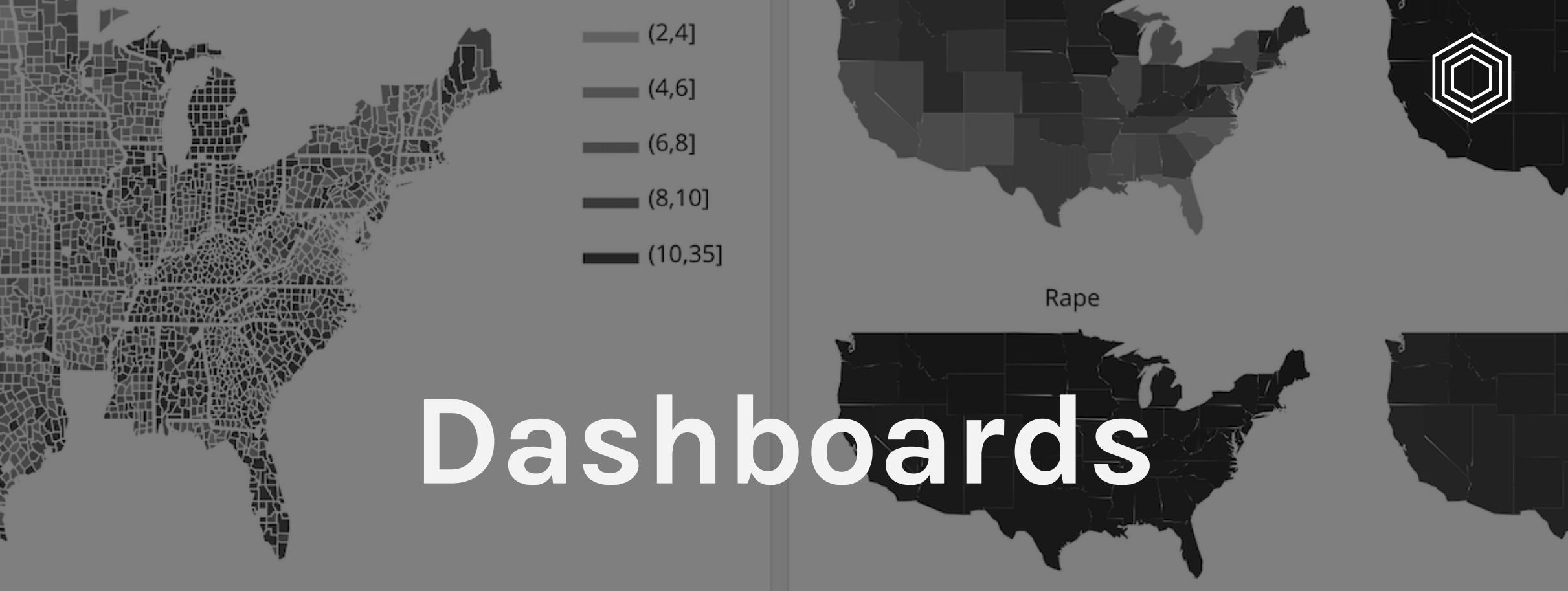
My Turn

I'll convert my report to xaringan



Your Turn

Convert your report to PowerPoint or xaringan and knit it to slides. You'll need to make some adjustments to your formatting to make it work (e.g. adding --- for new slides).





Dashboards

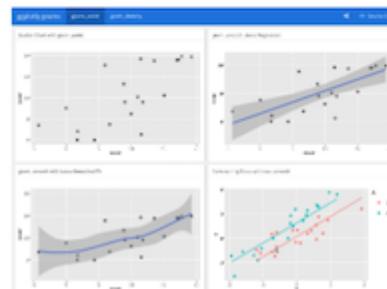
flexdashboard for R Home Using Shiny Layouts Examples

flexdashboard Examples

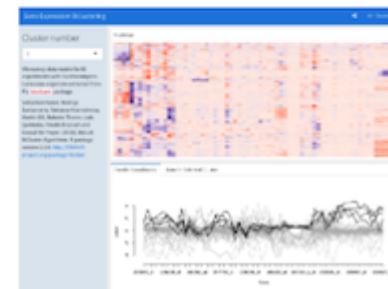
The examples below illustrate the use of flexdashboard with various packages and layouts. If you want to learn more about how the dashboards were created each example includes a link to it's source code.



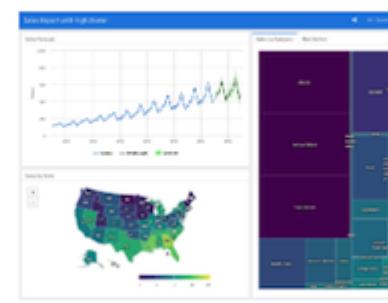
NBA scoring with d3heatmap



ggplot2: ggplot2 geoms



Shiny: biclust example





My Turn

I'll convert my report to a dashboard



Your Turn

Convert your report to a dashboard



Other Formats



bookdown

How I Use R

≡ ⌂ A ⌂ i

1 Introduction

2 Setting Myself up for Success

 2.1 Software

 2.2 Code Style

 2.3 Working with Files

 2.4 Packages

 2.5 Workflow

 2.6 Git/GitHub

3 Working with Data

 3.1 Importing Data

 3.2 Data Wrangling and Analysis

 3.3 General Practices

4 Reporting Results with RMarkdown

 4.1 General Practices

 4.2 What Format I Knit To When

5 Visualizing Data

 5.1 Themes

 5.2 Using Fonts in Plots

 5.3 ggplot extensions

≡ ⌂ A ⌂ i

Twitter Facebook Print

How I Use R

David Keyes // *R for the Rest of Us*

1 Introduction

Since 2018, I've been teaching people to use R through my company, [R for the Rest of Us](#). It's an incredibly rewarding experience to see people learn to use this powerful piece of software, but it can also be frustrating.

One of the hardest parts of learning R (or any language) is taking knowledge from exercises and applying it to an actual project you're working on. Concepts that make sense in the classroom suddenly become muddled when you're back at your desk trying to use R to write a report.

One of the biggest challenges I've had as a teacher is helping people in this stage right after they learn some fundamental R skills. After I teach folks R fundamentals through my [online courses](#), [workshops](#), or [custom training sessions](#), I struggle to find resources for them to help them apply their new knowledge to their daily work.

There are many great learning resources at the beginner stage and some incredible tutorials to master complex tasks in R. But, drawing from a concept in urban planning, there are far fewer resources in the middle.



Websites

 Early Learning Hub of Washington County Map Composite Map Priority Populations ▾ Child Care Capacity Notes

Early Learning Hub of Washington County Map

The mission of The Early Learning Hub of Washington County (ELWC) is to bring together the Washington County Early Learning Community partners in order to develop and implement an early learning system that provides opportunities, services, and supports needed to ensure children ages birth through six and their families are prepared for educational and life success. The maps and tables are designed to help the ELWC identify priority populations in order to effectively conduct its work.

For all of the maps below, the shapes show the elementary school catchment areas for schools in Washington County (the data comes from the [State of Oregon](#)). The schools included come from the following districts: Banks, Beaverton, Forest Grove, Gaston, Hillsboro, Sherwood, and Tigard-Tualatin.



Websites

BLOG TALKS PROJECTS ABOUT / CONTACT



Alison Hill
Data Scientist & Professional Educator
RStudio

I am a Data Scientist & Professional Educator at RStudio PBC. I am an [international keynote speaker](#), and I regularly lead workshops and develop online learning materials on topics like [reproducible research](#), [machine learning](#), and [data visualization](#). My teaching materials have been used by [NASA](#), [Pew Research Center](#), [University of Oregon](#), and now [RStudio](#). I am also a co-author of the book [blogdown: Creating Websites with R Markdown](#).

I received my PhD in psychology and quantitative methods from Vanderbilt University in 2008. Prior to joining RStudio, I was an Assistant Professor at Arizona State University, and an Associate Professor at Oregon Health & Science University (OHSU). While at OHSU, I was an NIH-funded Principal Investigator and the Assistant Director of the *Center for Spoken Language Understanding*. I was nominated for a distinguished faculty award for outstanding teaching, and was awarded an [excellence in graduate education award](#) from the OHSU School of Medicine. My [research](#) has been published in [Pediatrics](#), [Autism Research](#), and [other peer-reviewed journals](#).

Interests

- Data science
- Statistics
- Predictive modeling & machine learning
- Reproducible research

Education

- PhD in Developmental Psychology & Quantitative Methods, 2008
Vanderbilt University
- MSc in Developmental Psychology, 2005
Vanderbilt University

[View profile](#) [View GitHub profile](#)



My Turn

I'll convert my report to bookdown



Your Turn

Convert your report to bookdown