Part 6: Putting your project on Github

In the previous chapters, we've set up a Github account, learned how to download the files from a Github repository, upload files into RStudio.Cloud, create and run R code, and commit changes using Git.

In this final chapter, we are going to create some figures and graphs for this project, then put these changes on Github in a way for people to find and share.

Moving R code into the .Rmd file

In the last chapter, we used the `README.Rmd` file to upload our data into RStudio. We'll continue using this file to add the contents from one additional `.R` scripts, `02-wrangle.R`. We will then create new section and script for visualizing the data (`03-visualize.R`).

We've provided a lot of code and comments in the `02-wrangle.R` script for you to explore, revise, and adapt to your liking. In the next few sections, we are going to move the code from the `02-wrangle.R` script into two new sections of the `README.Rmd` (you probably guessed it "`Wrangle`").

A quick lesson in compassionate programming

Your code will always be communicating to at least two audiences: your computer, and your future self. Be nice to both of them!*

Things like the pipe `%>%` in R can help with clarity. The pipe is part of the `magrittr` package and it takes code written like this:

```
outer_function(inner_function(Data_X), Data_Y)
```

And makes it look like this:

```
Data_X %>% # do this
   inner_function() %>% # then do this
   outer_function(Data_Y)
```

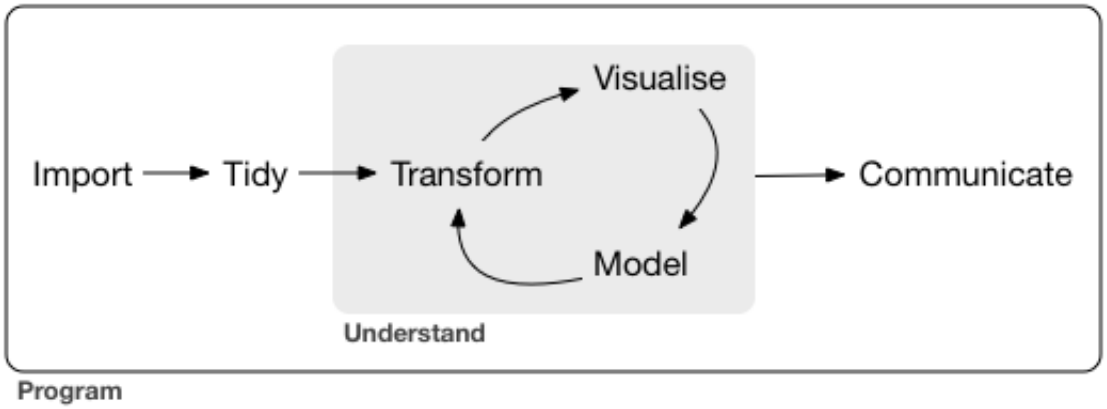
`%>%` is a form of syntactic sugar, which is a fancy way of saying "*something that helps us communicate better.*"

You'll see the pipe throughout the project's R code files, and you can always read it as, "*do this, then do this.*"

Wrangling code

Data wrangling (or cleaning, or munging) is whatever steps need to be taken to take the raw data (which we always remember not to change) into something we can use to create a table, visualization, model, etc.

The `02-wrangle.R` script prepares the data from the `01-import.R` so that they can be used for the visualizations. If you think back to the process outlined in the figure in R for Data Science, you will notice that wrangle isn't listed explicitly. This is because both '**Tidy**' and '**Transform**' would be considered wrangling steps (both of these need to happen before any visualizations or models can be properly run).

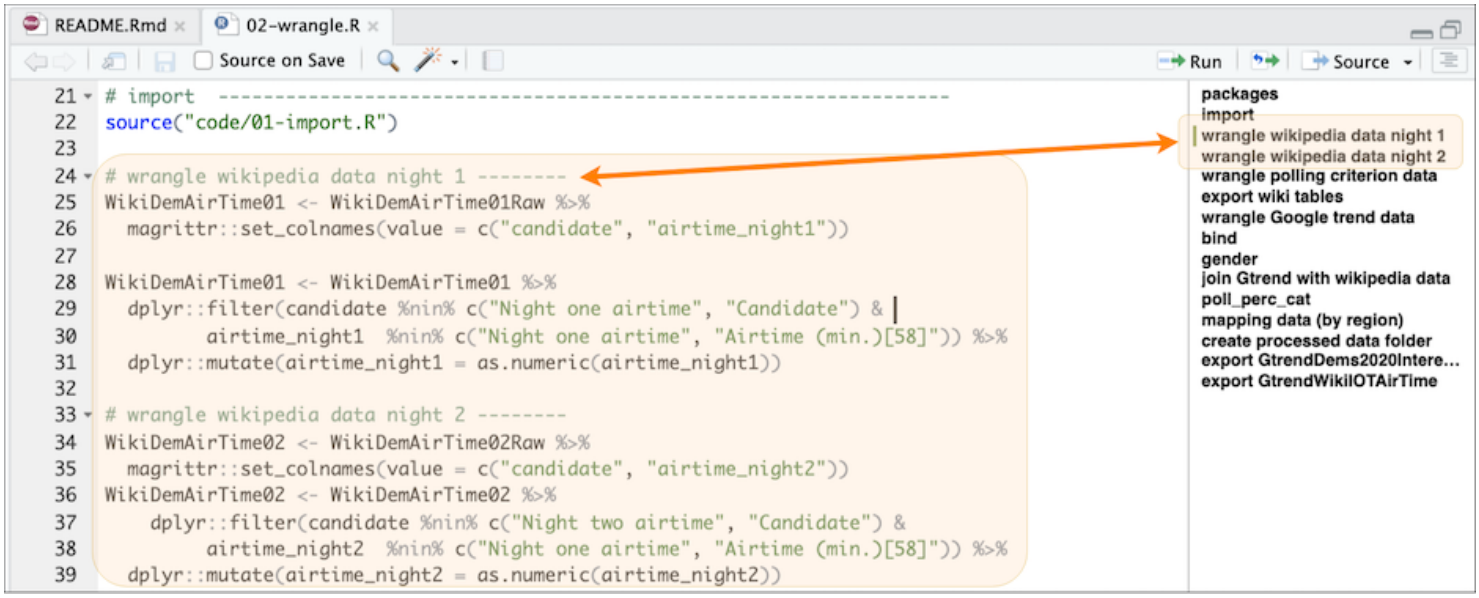


The simplest way to include this script in the README.Rmd file is to create a code chunk, insert the `base::source()` function, and enter the path to the `02-wrangle.R` file.

However, we want to be nice to our future selves, so we will include some language that describes what the functions are doing above each code chunk.

Wrangling the data sets

The first data that need to be wrangled are the Wikipedia tables (seen in the `02-wrangle.R` file on the section below).



These data were stored on the web in Wikipedia (`.html`) tables. We will create some new column names, remove some columns that used to be headers, and make the airtime variable numeric.

The polling criterion Wikipedia data starting at the section titled, `wrangle polling criterion data`. This section actually creates a list of candidates (in `cand_names_wiki`) and uses it to `filter` out the observations we want. Check out this webinar to get an understanding of how `dplyr`'s verbs work.

```
# wrangle polling criterion data ----------------------------------------
# create list from names using dput()
# dput(WikiPollCriterionRaw[ 1:11, 1])
```

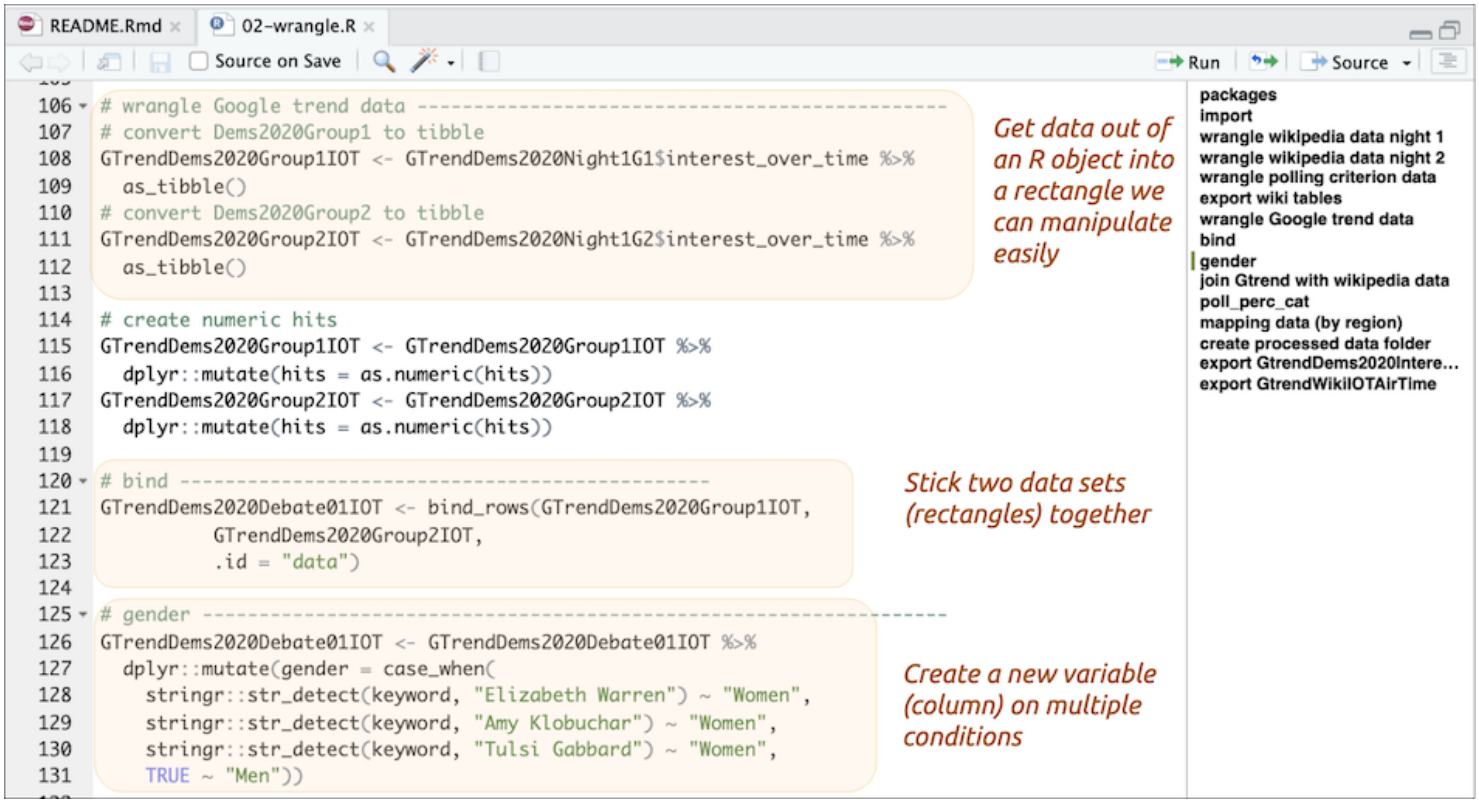
```
cand_names_wiki <- c("Warren[note 2]",
                     "O'Rourke[note 2]",
                     "Booker[note 2]",
                     "Klobuchar[note 2]",
                     "Castro[note 2]",
                     "Gabbard",
                     "Ryan",
                     "Inslee",
                     "de Blasio",
                     "Delaney")
# subset WikiPollCriterionRaw with list from above
WikiPollCriterion <- WikiPollCriterionRaw %>%
  # this will remove all candidates not listed above
  dplyr::filter(`Candidates drawn for the June 26 debate` %in% cand_names_wiki)
```

After the Wikipedia tables have been wrangled, the script exports these files to a new `processed/` folder. This helps ensure they won't be accidentally altered or mistaken for the data files in the `raw/` data folder.

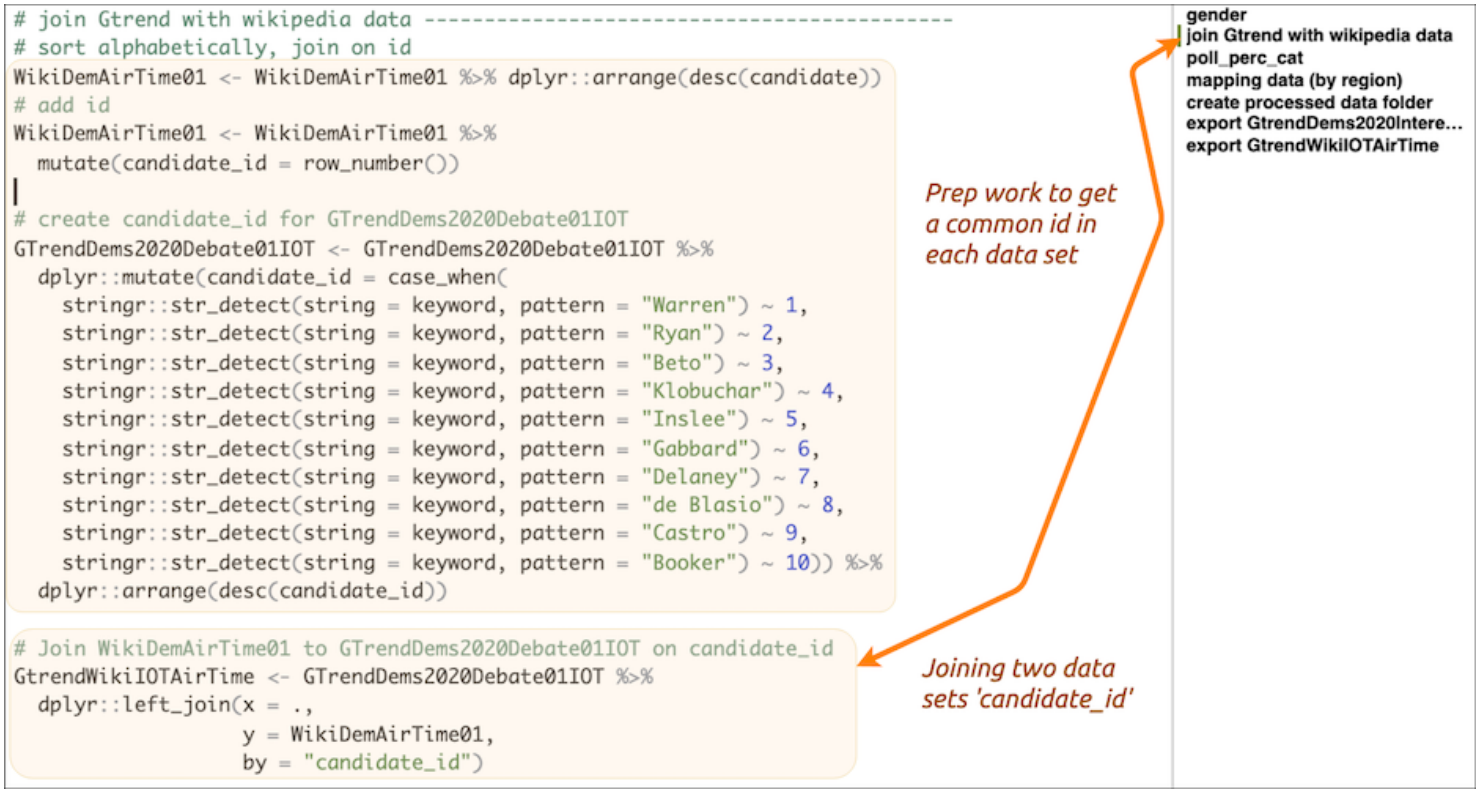
The export section also timestamps each file so we know the last time it was created. Read more about importing and exporting data in this RStudio cheatsheet.

The Google trend data are a little more complicated because they come into RStudio.Cloud as a list, which is a data container in R that doesn't have to be rectangular.

The image below outlines what each portion of code is doing. These are fairly common wrangling tasks, so we recommend going back or bookmarking these files as a reference.



We have different sources of data in RStudio right now (Wikipedia and Google trend data). They both have information on Candidates though. Often times we'll want to join two (or more) data sets on a common column (like candidates). We will perform an example of this in the section outlined below.




```
# join Gtrend with wikipedia data ------------------------------------------
# sort alphabetically, join on id
WikiDemAirTime01 <- WikiDemAirTime01 %>% dplyr::arrange(desc(candidate))
# add id
WikiDemAirTime01 <- WikiDemAirTime01 %>%
  mutate(candidate_id = row_number())

# create candidate_id for GTrendDems2020Debate01IOT
GTrendDems2020Debate01IOT <- GTrendDems2020Debate01IOT %>%
  dplyr::mutate(candidate_id = case_when(
    stringr::str_detect(string = keyword, pattern = "Warren") ~ 1,
    stringr::str_detect(string = keyword, pattern = "Ryan") ~ 2,
    stringr::str_detect(string = keyword, pattern = "Beto") ~ 3,
    stringr::str_detect(string = keyword, pattern = "Klobuchar") ~ 4,
    stringr::str_detect(string = keyword, pattern = "Inslee") ~ 5,
    stringr::str_detect(string = keyword, pattern = "Gabbard") ~ 6,
    stringr::str_detect(string = keyword, pattern = "Delaney") ~ 7,
    stringr::str_detect(string = keyword, pattern = "de Blasio") ~ 8,
    stringr::str_detect(string = keyword, pattern = "Castro") ~ 9,
    stringr::str_detect(string = keyword, pattern = "Booker") ~ 10)) %>%
  dplyr::arrange(desc(candidate_id))

# Join WikiDemAirTime01 to GTrendDems2020Debate01IOT on candidate_id
GtrendWikiIOTAirTime <- GTrendDems2020Debate01IOT %>%
  dplyr::left_join(x = .,
                   y = WikiDemAirTime01,
                   by = "candidate_id")
```

The process usually isn't so involved, but we included extra to give more explicit instructions. Be sure to check out the relational data chapter the R for Data Science book.

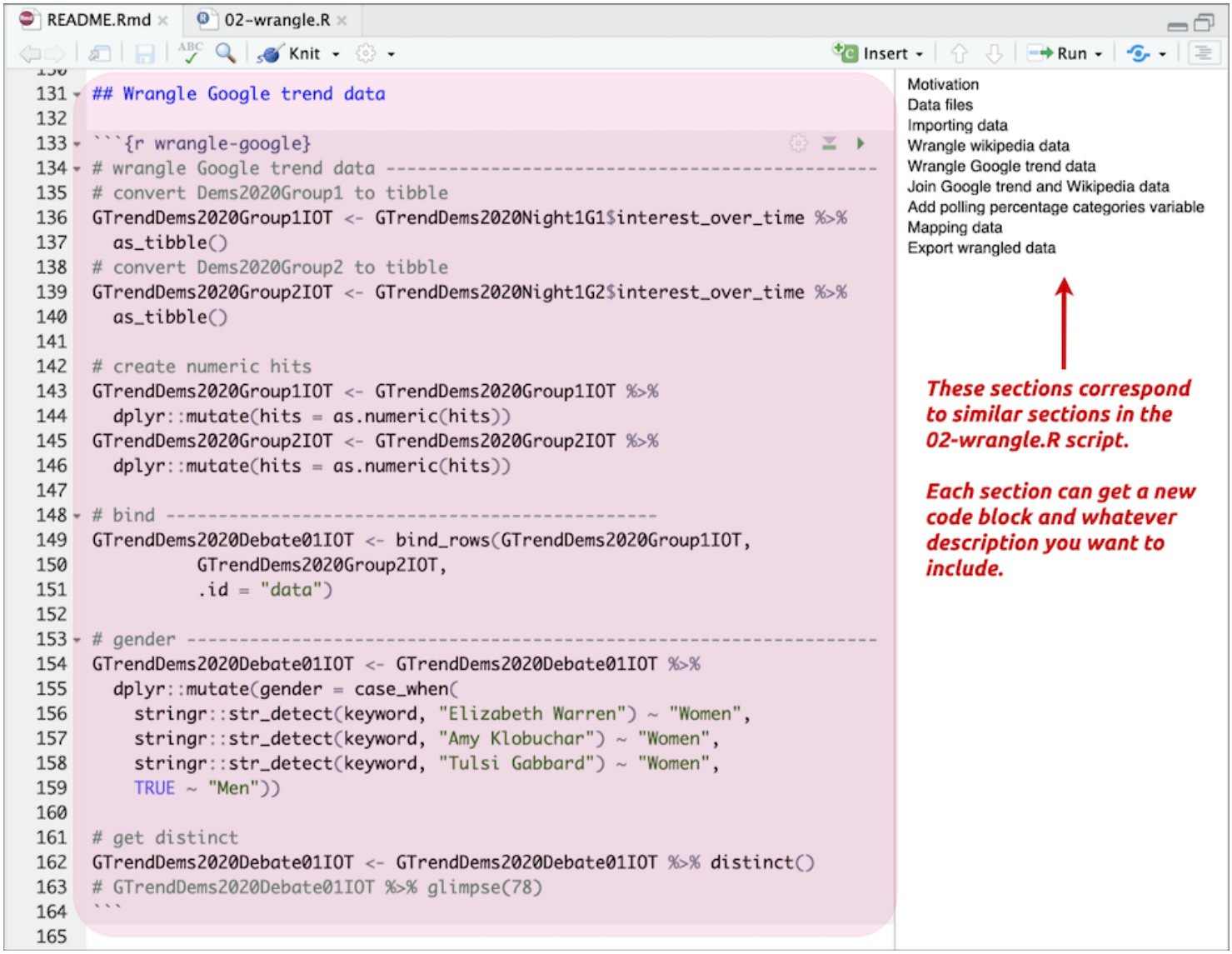
We'll also be creating a map with the Google (or Twitter) data. Doing this requires another common task, which is loading a dataset from a package in R. The code below loads a state-level map into RStudio.Cloud and joins it to the Google trend data.


```
# mapping data (by region) -------------------------------------------------
# convert to tibble (another data structure in R)
GtrendDems2020IBRGroup1 <- tibble::as_tibble(GTrendDems2020Night1G1$interest_by_region)
GtrendDems2020IBRGroup2 <- tibble::as_tibble(GTrendDems2020Night1G2$interest_by_region)
# bind Dems2020IBRGroup1 Dems2020IBRGroup2 together
GtrendDems2020IBR <- bind_rows(GtrendDems2020IBRGroup1,
                       GtrendDems2020IBRGroup2, .id = "data")

# convert the region to lowercase
GtrendDems2020InterestByRegion <- GtrendDems2020IBR %>%
  dplyr::mutate(region = stringr::str_to_lower(location))

# create a data set for the states in the US
statesMap = ggplot2::map_data("state")
# now merge the two data sources together
GtrendDems2020InterestByRegion <- GtrendDems2020InterestByRegion %>%
  dplyr::inner_join(x = .,
                    y = statesMap,
                    by = "region")
```

The Google trend data are also exported with time-stamp into the `processed/` folder. We should continue adding the code into the `README.Rmd` file until we're confident all the functions will run and we don't see any errors.

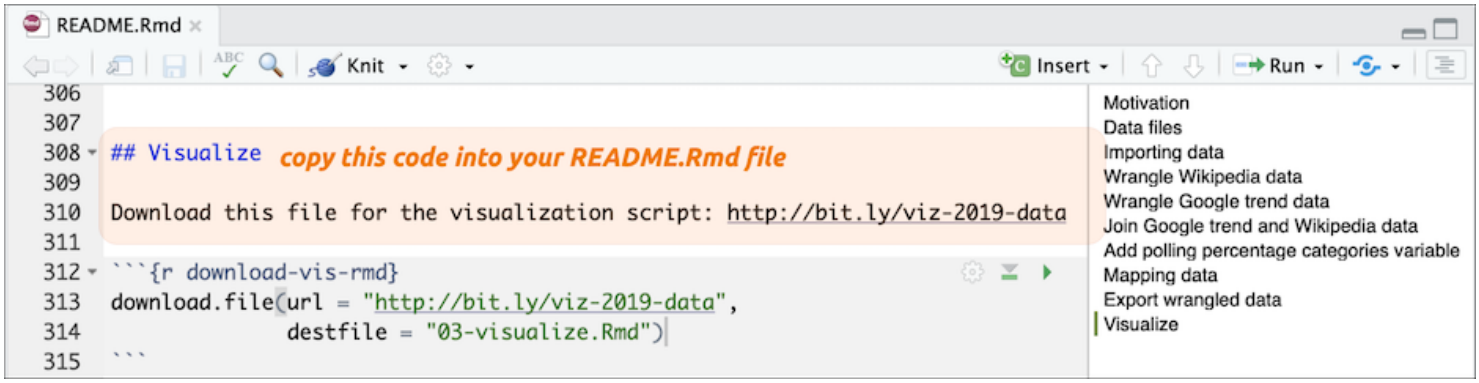


Note: The `02-wrangle.R` file is in the `code/` folder, but you won't have to alter the file paths because you're using an RStudio project file. Read more about how these are so helpful to your workflow here.

Visualizations

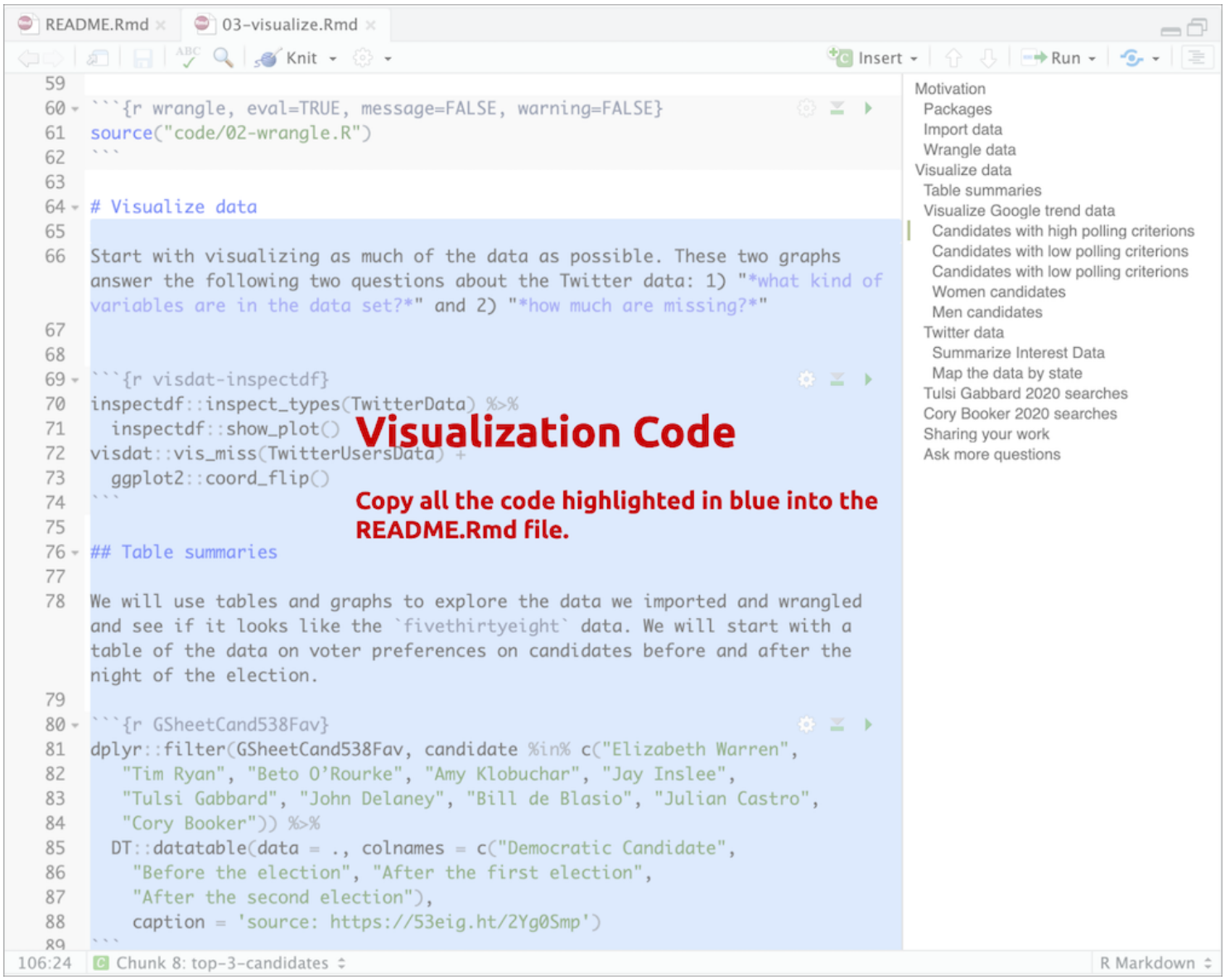
OK, we've completed our section for the wrangling the data. We are going to insert a divider (`***`) and start a new visualize section (`## Visualize`) in the `README.Rmd` file.

We've created a `03-visualize.Rmd` file for you to download from Github. You can do this by typing the following code into your `README.Rmd` file:



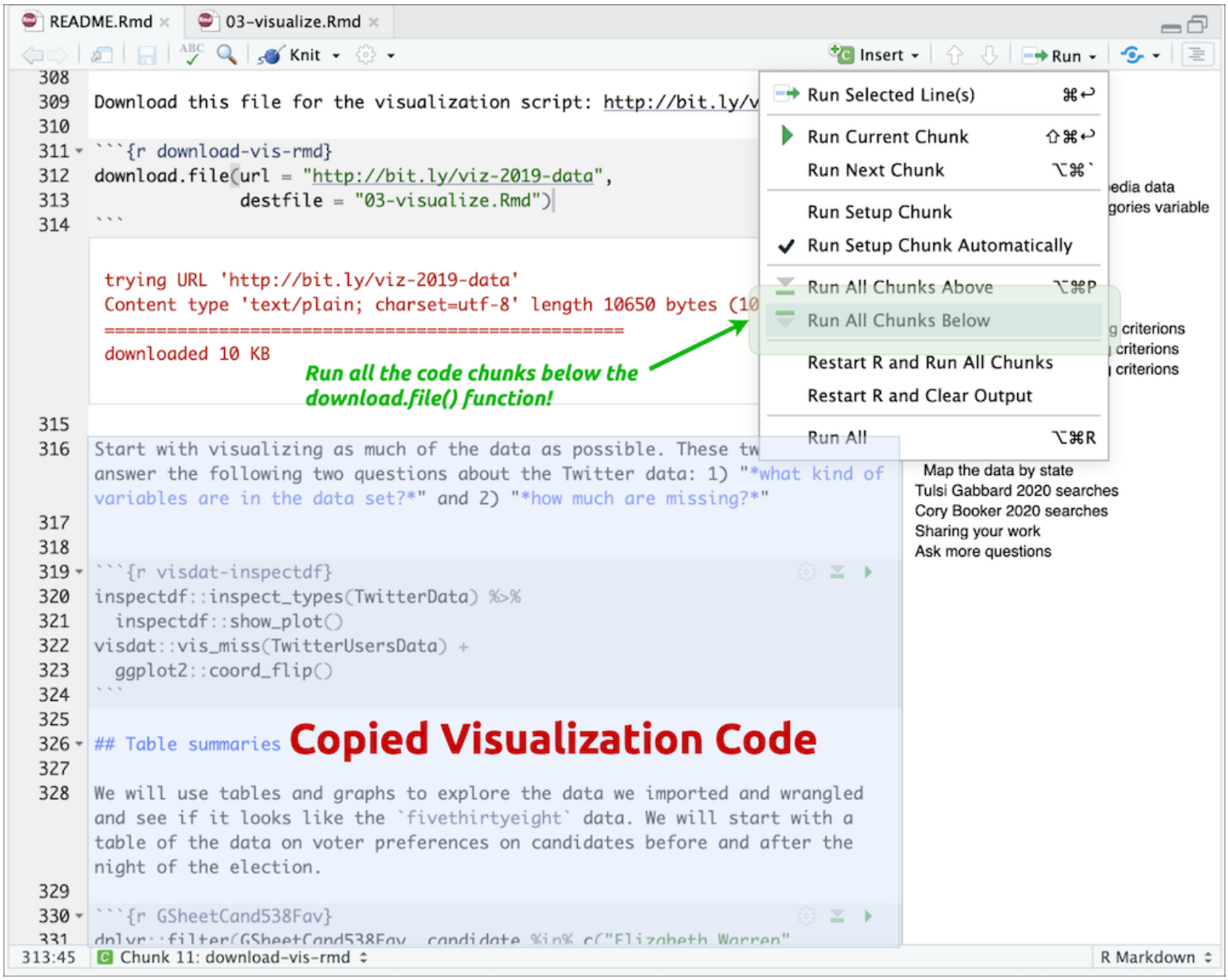
The hyperlink is here: `http://bit.ly/viz-2019-data`

After we've downloaded our `03-visualize.Rmd` file, we can open this file and copy the code starting from the line just below the `# Visualize data` heading (it should be on about line `65`) and extending all the way to the end of the file.



After selecting the code from `03-visualize.Rmd`, we should click on the line directly under the previous code chunk we used to download the `.Rmd` file.

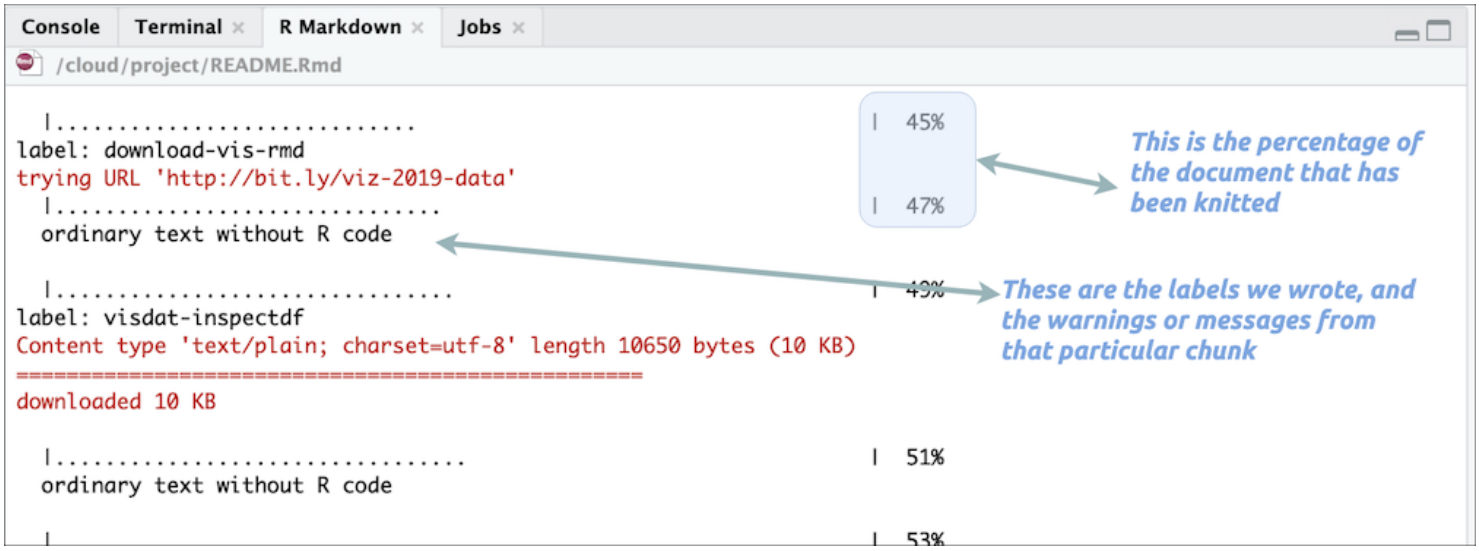
After pasting the code from `03-visualize.Rmd` into the `README.Rmd` file, we can click on the *Run* > *Run All Chunks Below* (this will run all the code starting at line `319` until the end of the document).



Running the code will create multiple tables and figures in the `README.Rmd` file. We'll go over these in more depth below. For now, we'll follow the directions at the bottom of the pasted code and "*Click `knit` to get the markdown file to share.*"

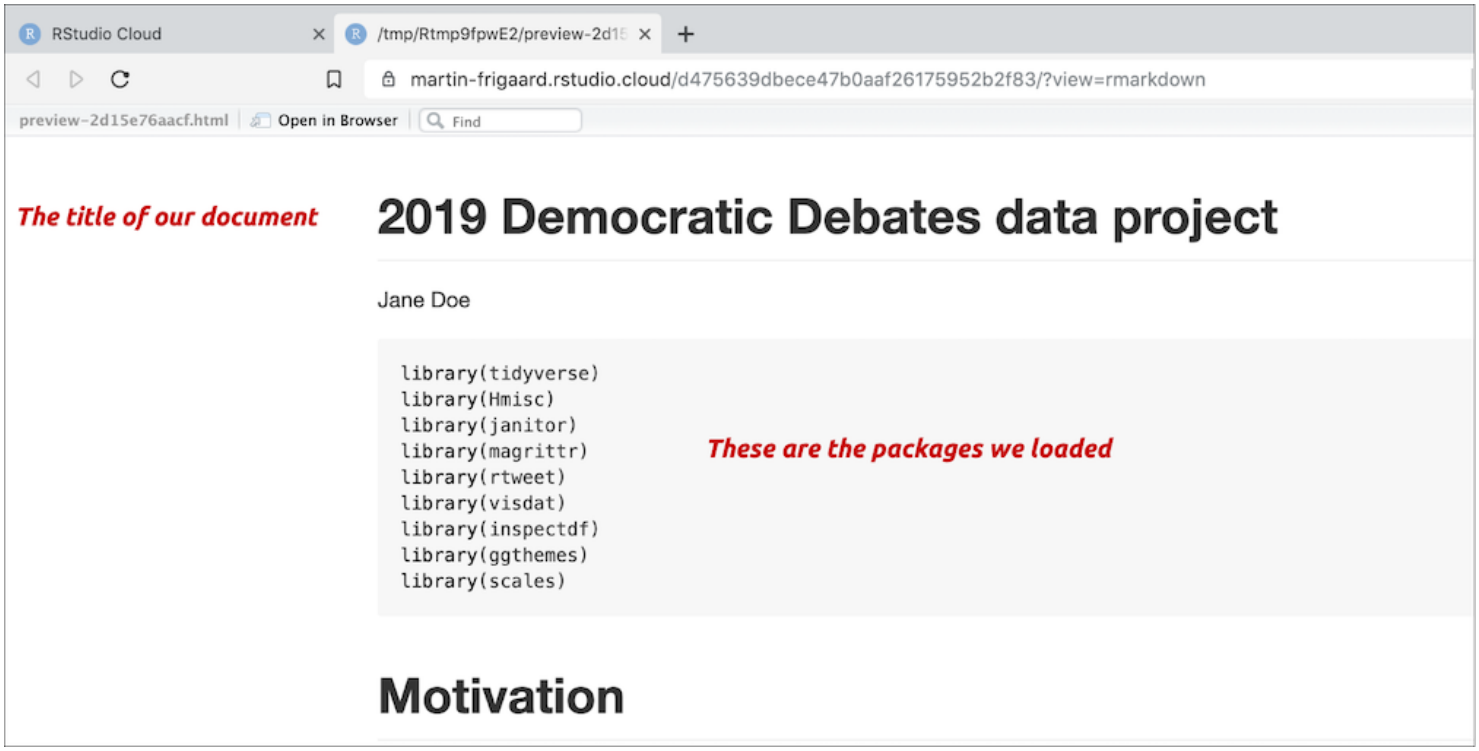
Knitting RMarkdown files

Clicking *Knit* (or clicking `shift+cmd+k`) activates the **Markdown** pane in RStudio.Cloud, and we see the code chunks being run for the entire document.



When the knitting process completes, a new browser window will pop up with our `README.md` document. The `README.md` will have sections of formatted text (from the Markdown), R code, and the various outputs.

The top of the file should list the title and the packages:



Lets scroll down to the visualize section and look at the section titled, **Candidates with high polling criterions)**. We can see the different parts of the Rmarkdown file in the image below:

Header & text for this section

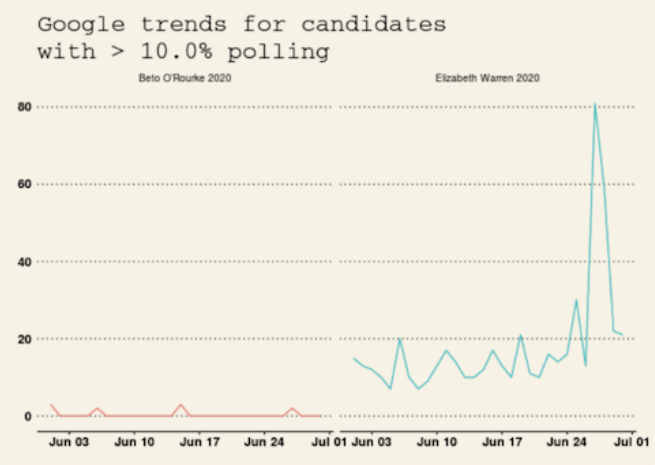
Candidates with high polling criterions

When we look at the candidates with the highest percent of polling criterion on the 26th, we see the following:

Code and comments for this graph

```
GtrendWikiIOTAirTime %>%
    # limit to only the candidates with more than 10% of voters
  dplyr::filter(poll_perc_fct == "> 10.0% of voters") %>%
    # put data on the x,
  ggplot2::ggplot(aes(x = date,
                      # hits on the y
                      y = hits,
                      # color it by keyword
                      color = keyword)) +
    # use a line
  ggplot2::geom_line(aes(group = keyword), show.legend = FALSE) +
    # labels
  ggplot2::labs(
    x = "Date",
    y = "Google search hits",
  subtitle = "Google trends for candidates \nwith > 10.0% polling") +
    # add themes from ggthemes
  ggthemes::theme_wsj(base_size = 9.5,
                      title_family = "mono") +
    # use facets for both candidates on the same graph
  ggplot2::facet_wrap(~ keyword, ncol = 2)
```

Graph output

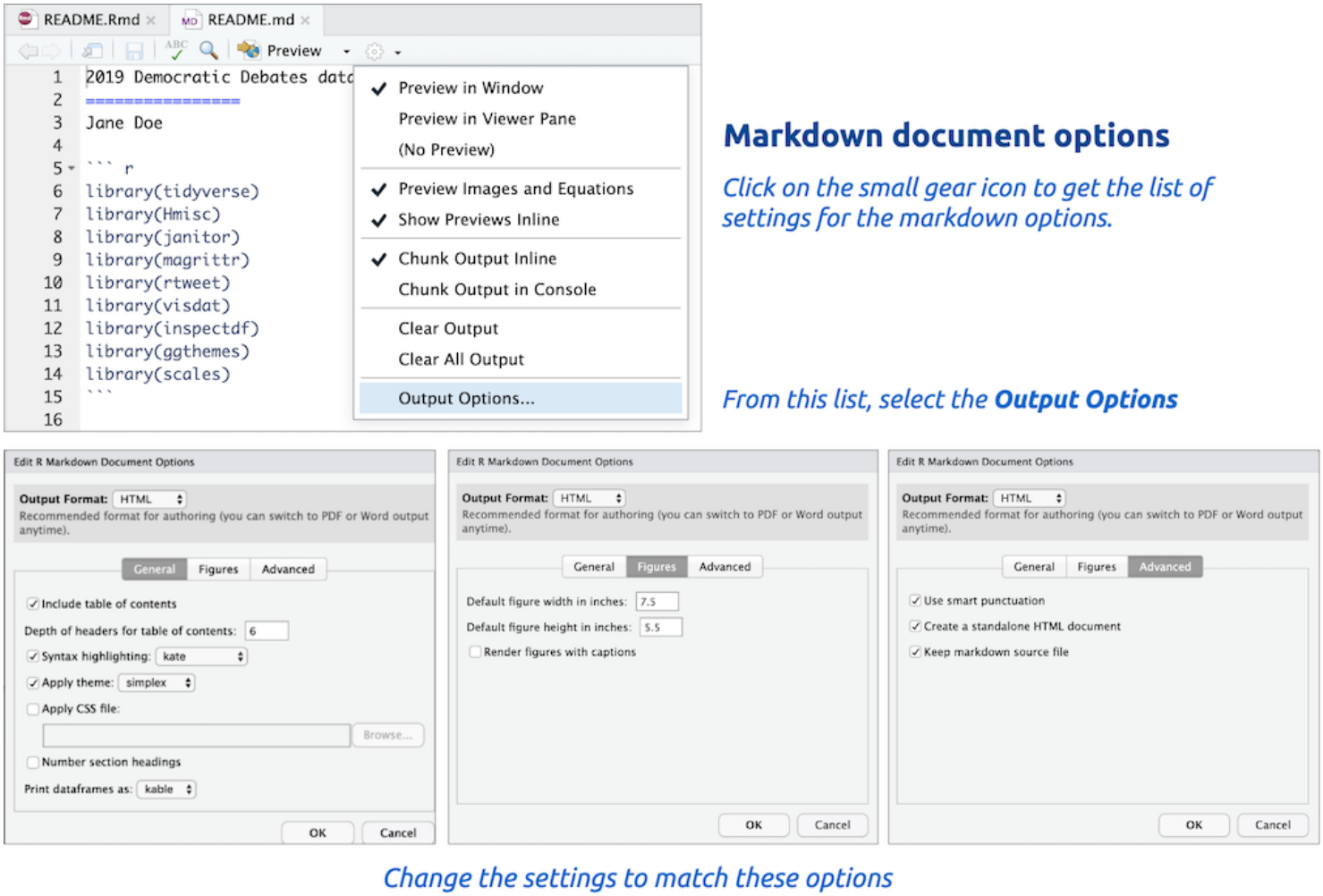


More text interpreting the output

This shows Warren doing well after the first night. If we narrow this down to the week of the debates and widen the list of candidates, we see the following:

The file output is actually a *Preview* of our markdown file (`README.md`). Our browser renders the markdown as a webpage (`README.html`).

Let's keep a version of this file in `.html`. We can do this by opening the `README.md` file in the **Source** pane, and clicking on the small gear next to the *Preview* button. Follow the directions in the figure below to setup the `.html` output file.



When we click *Ok* and look at the top of the `README.md` file we see another `YAML` header.

```
---
output:
  html_document:
    df_print: kable
    fig_height: 5.5
    fig_width: 7.5
    highlight: kate
    keep_md: yes
    theme: simplex
    toc: yes
    toc_depth: 6
---
```

The settings displayed above are some of the ways we can customize our `.Rmd` files. Read more about the html documents here in the Rmarkdown guide.

To see what these settings do, we will click *Preview* on the `README.md` file.

This conversion is incredibly handy for weaving formatted text, code, and media (tables, images, and graphs).

Extracting the .R from the .Rmd

But now we have all our visualize code in the `03-visualize.Rmd` file–what if we wanted this code in an .R script?

We can run the following code in the **Console** pane.

```
knitr::purl("03-visualize.Rmd")
```

We'll see the following script file is generated.

```

```

Push the changes to Github