# Welcome!

Data Science in a Box datasciencebox.org



## [1] '0.26'

class: middle

# Hello world!



## **Data science**

- Data science is an exciting discipline that allows you to turn raw data into understanding, insight, and knowledge.
- We're going to learn to do this in a tidy way -- more on that later!
- This is a course on introduction to data science, with an emphasis on statistical thinking.

# **Course FAQ**

### Q - What data science background does this course assume?

A - None.

#### Q - Is this an intro stat course?

A - While statistics  $\neq$  data science, they are very closely related and have tremendous of overlap. Hence, this course is a great way to get started with statistics. However this course is *not* your typical high school statistics course.

### Q - Will we be doing computing?

A - Yes.

## **Course FAQ**

### Q - Is this an intro CS course?

A - No, but many themes are shared.

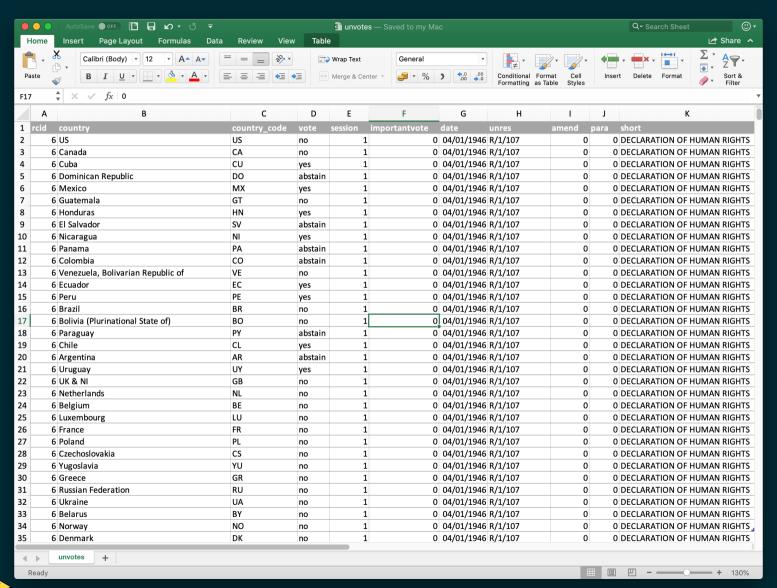
### Q - What computing language will we learn?

A - R.

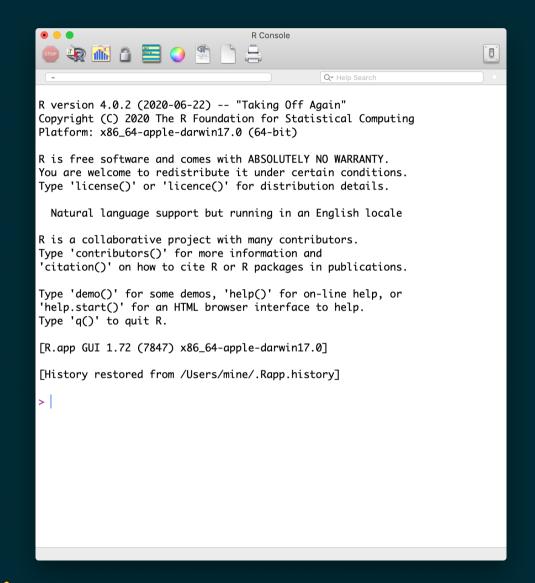
### Q: Why not language X?

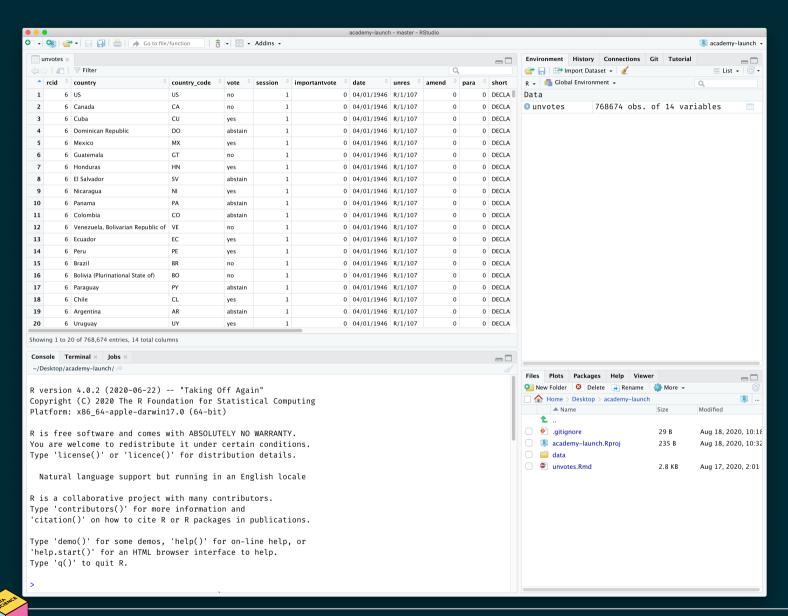
A: We can discuss that over 🛎 .

# **Software**



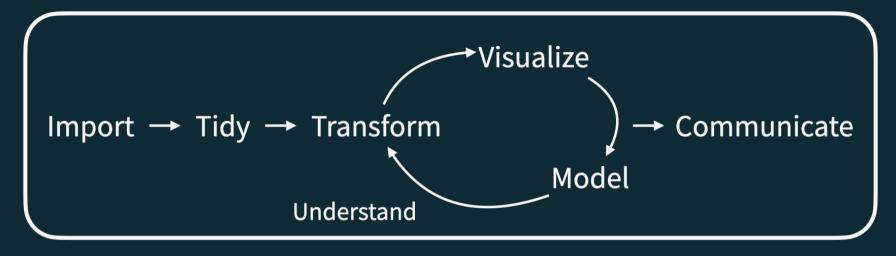


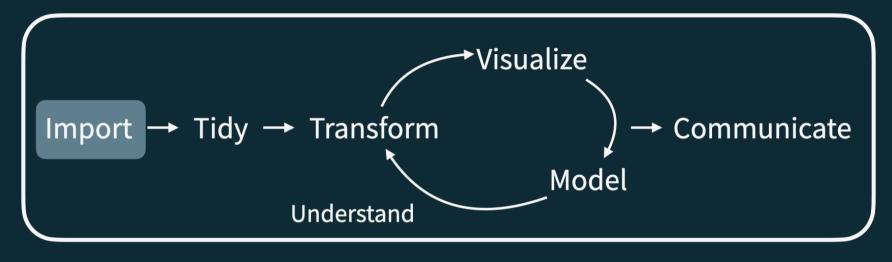


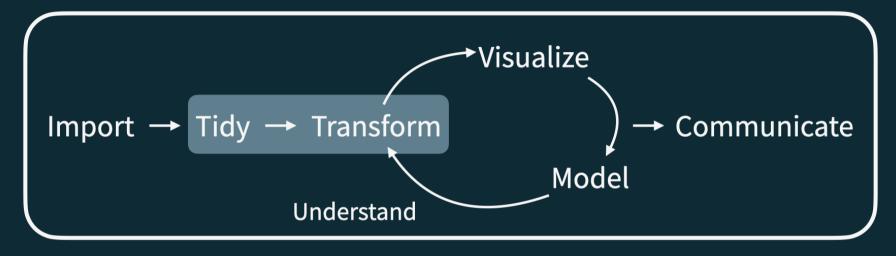


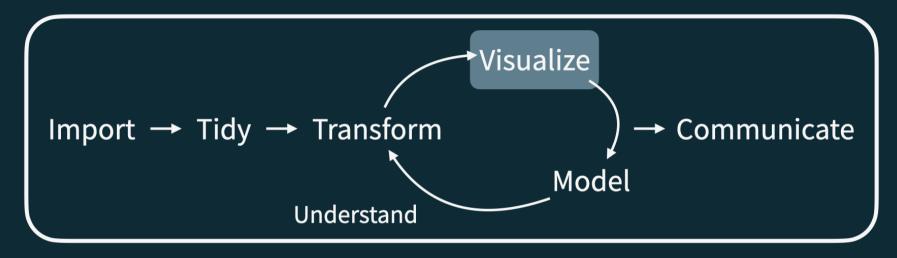
# Data science life cycle

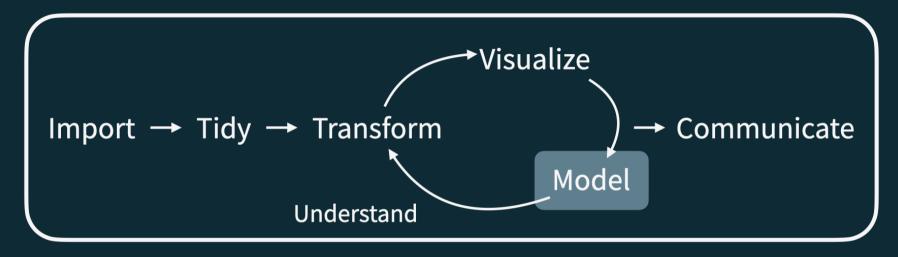


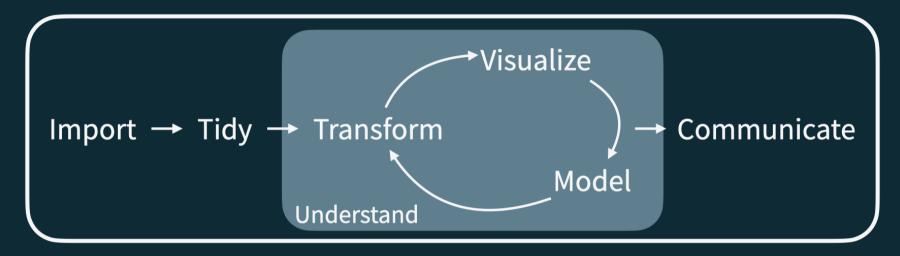




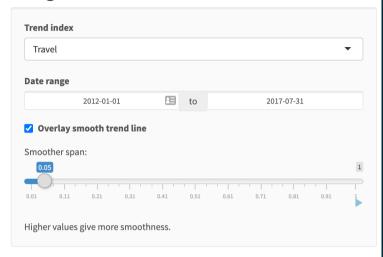


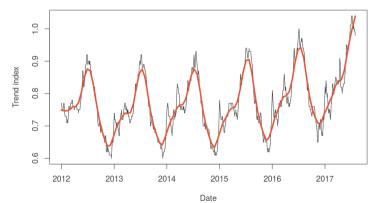






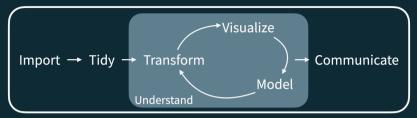
#### Google Trend Index





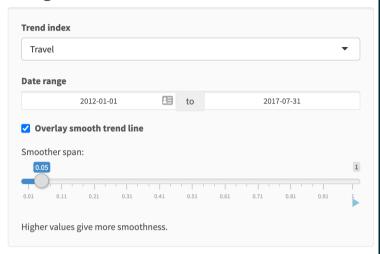
The Google Travel Index tracks queries related to airlines, hotels, beach, southwest, las vegas, flights, etc. The index is set to 1.0 on January 1, 2004 and is calculated only for US search traffic.

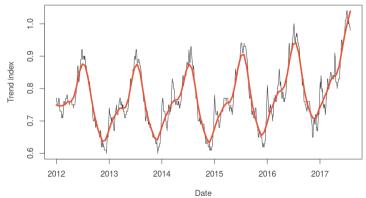
Source: Google Domestic Trends



Program

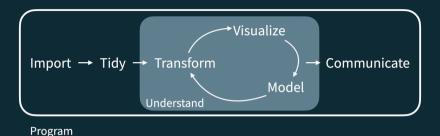
#### Google Trend Index



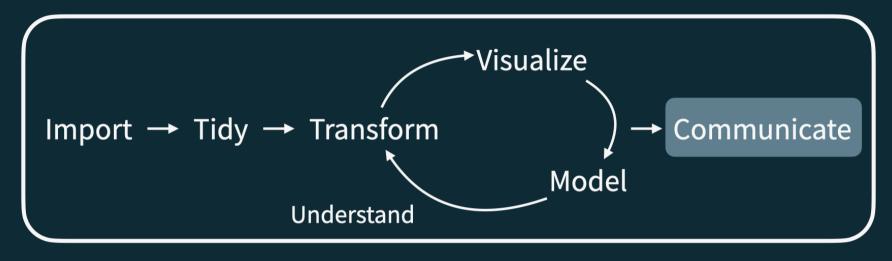


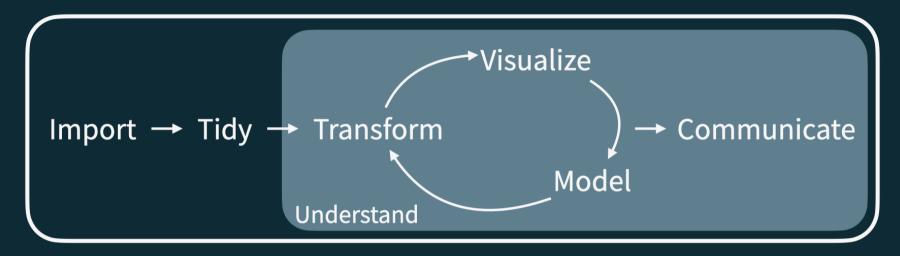
The Google Travel Index tracks queries related to airlines, hotels, beach, southwest, las vegas, flights, etc. The index is set to 1.0 on January 1, 2004 and is calculated only for US search traffic.

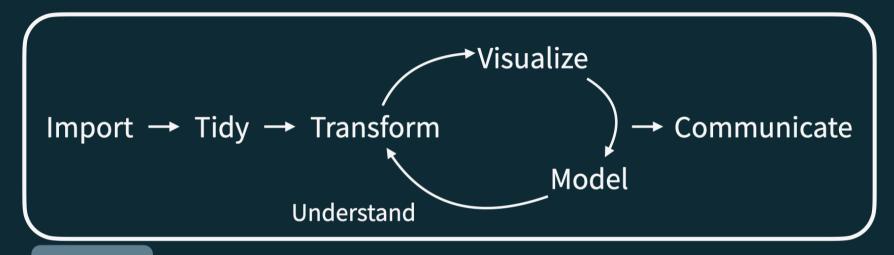
Source: Google Domestic Trends

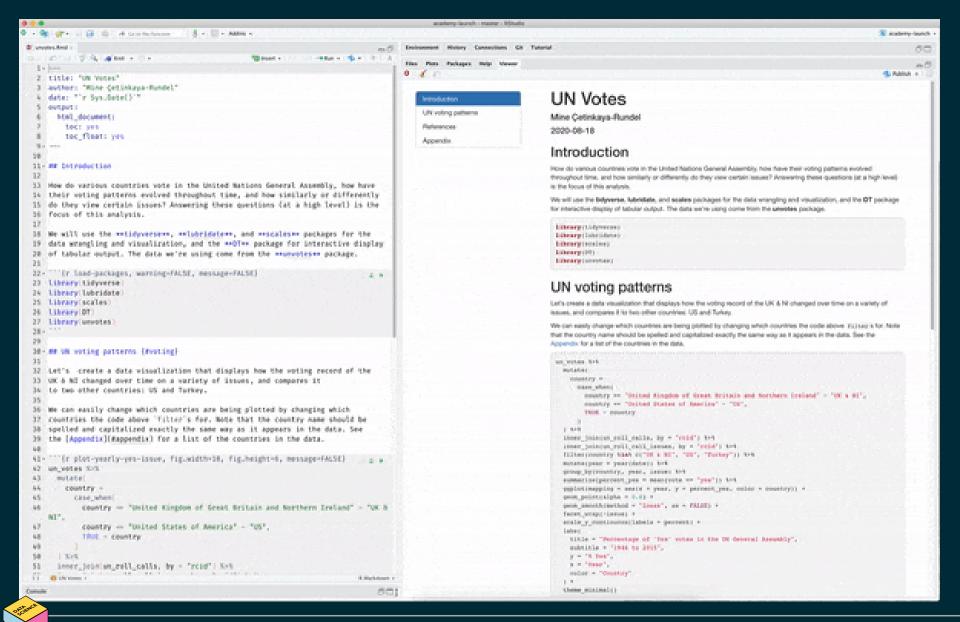


```
## # A tibble: 5 x 2
## date season
## <chr> ## 1 23 January 2017 winter
## 2 4 March 2017 spring
## 3 14 June 2017 summer
## 4 1 September 2017 fall
## 5 ...
```



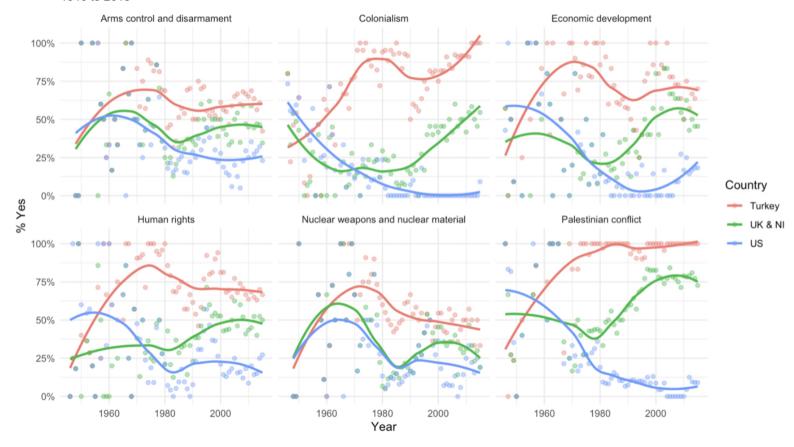


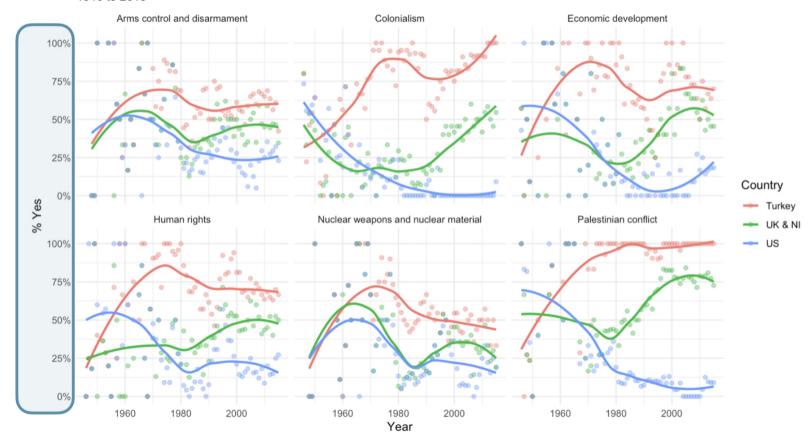


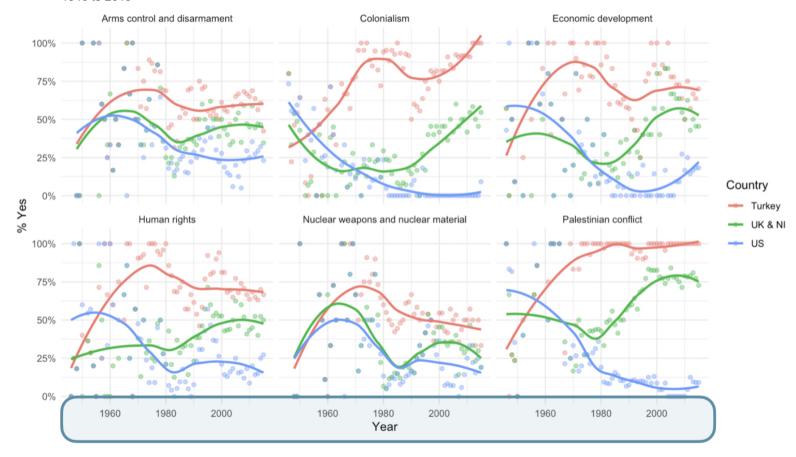


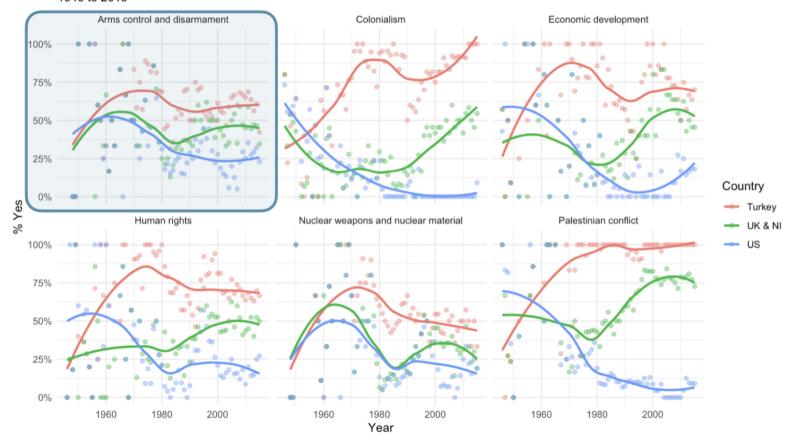
# Let's dive in! You can follow long in AEO1a!

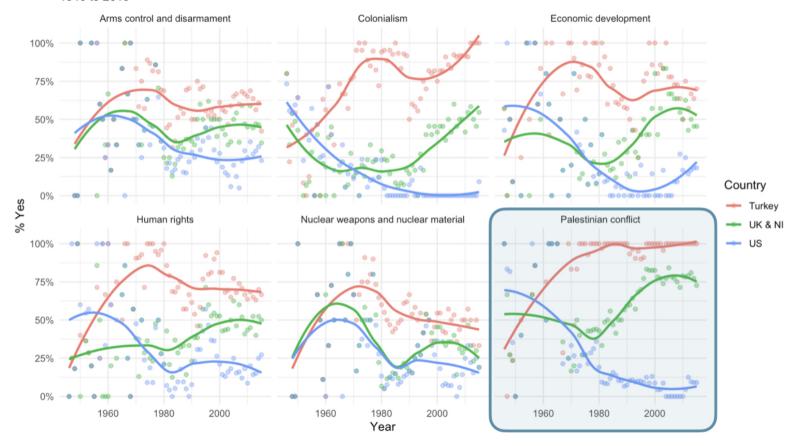




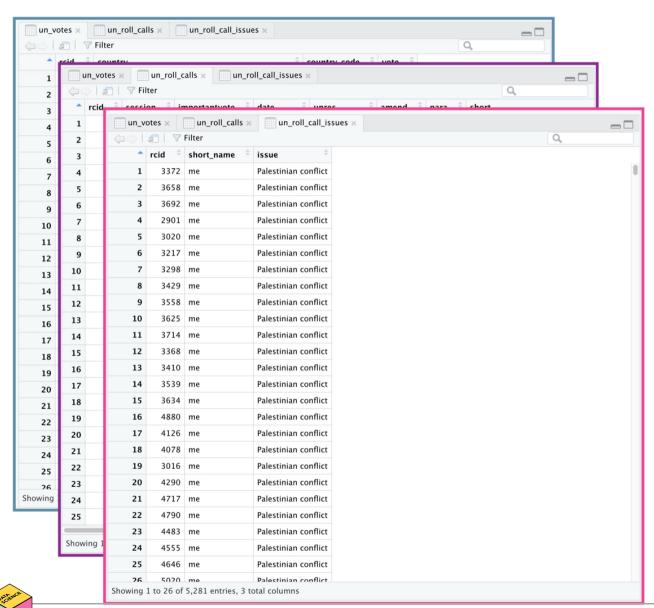












```
unvotes.Rmd ×
(a) I ABC Q & Knit + (b) +
                                                             4 Insert - A A - Run - 4 - - - - A
 36 We can easily change which countries are being plotted by changing which
 37 countries the code above `filter`s for. Note that the country name should be
 38 spelled and capitalized exactly the same way as it appears in the data. See
 39 the [Appendix](#appendix) for a list of the countries in the data.
 40
 41. ```{r plot-yearly-yes-issue, fig.width=10, fig.height=6, message=FALSE}
                                                                                      ⊕ ≖ ▶
 42 un_votes %>%
 43
      mutate(
 44
        country =
 45
          case_when(
 46
            country = "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
 47
            country = "United States of America" ~ "US",
 48
            TRUE ~ country
 49
 50
      ) %>%
      inner_join(un roll calls, by = "rcid") %>%
      inner join un roll call issues, by = "rcid") %>%
      filter(country %1n% c("UK & NI", "US", "Turkey")) %>%
 53
 54
      mutate(year = year(date)) %>%
      group_by(country, year, issue) %>%
      summarize(percent yes = mean(vote = "yes")) %>%
      ggplot(mapping = aes(x = year, y = percent_yes, color = country)) +
      geom_point(alpha = 0.4) +
      geom_smooth(method = "loess", se = FALSE) +
      facet_wrap(~issue) +
      scale_y_continuous(labels = percent) +
 62 labs(
 63
       title = "Percentage of 'Yes' votes in the UN General Assembly",
       subtitle = "1946 to 2015",
       y = "% Yes",
        x = "Year",
 67
        color = "Country"
 68
 69
      theme minimal()
70 - * * * *
 71
 73 - ## References {#references}
32:2 ## UN voting patterns $
```

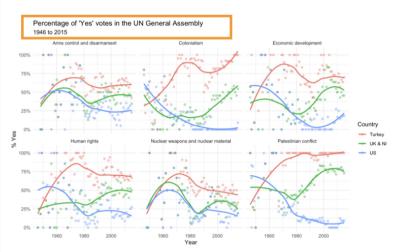
```
unvotes.Rmd ×
(a) I ABC Q & Knit + (b) +
                                                             4 Insert - A A - Run - 4 - - - - A
 36 We can easily change which countries are being plotted by changing which
 37 countries the code above `filter`s for. Note that the country name should be
 38 spelled and capitalized exactly the same way as it appears in the data. See
 39 the [Appendix](#appendix) for a list of the countries in the data.
 40
 41. ```{r plot-yearly-yes-issue, fig.width=10, fig.height=6, message=FALSE}
                                                                                     ⊕ ≖ ▶
 42 un_votes %>%
 43 mutate(
 44
        country =
 45
          case_when(
 46
            country = "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
 47
            country = "United States of America" ~ "US",
 48
            TRUE ~ country
 49
 50
      ) %>%
      inner_join(un_roll_calls, by = "rcid") %>%
 51
 52
     inner join(in roll call issues, by = "rcid") %>%
      filter(country %in% c("UK & NI", "US", "Turkey")) %>%
      mutate(year = year(date)) %>%
      group_by(country, year, issue) %>%
      summarize(percent yes = mean(vote = "yes")) %>%
      ggplot(mapping = aes(x = year, y = percent_yes, color = country)) +
      geom_point(alpha = 0.4) +
      geom_smooth(method = "loess", se = FALSE) +
      facet_wrap(~issue) +
      scale_y_continuous(labels = percent) +
 62 labs(
 63
       title = "Percentage of 'Yes' votes in the UN General Assembly",
       subtitle = "1946 to 2015",
       y = "% Yes",
        x = "Year",
 67
        color = "Country"
 68
 69
      theme minimal()
70 - * * * *
 71
 73 - ## References {#references}
32:2 ## UN voting patterns $
```

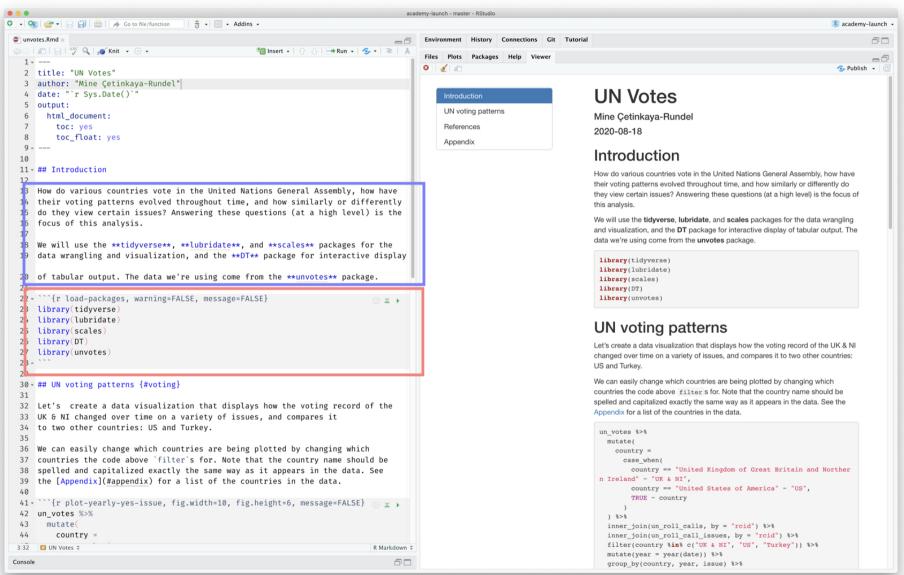
```
unvotes.Rmd ×
(a) I ABC Q & Knit + (b) +
                                                            36 We can easily change which countries are being plotted by changing which
 37 countries the code above `filter`s for. Note that the country name should be
 38 spelled and capitalized exactly the same way as it appears in the data. See
 39 the [Appendix](#appendix) for a list of the countries in the data.
 40
 41. ```{r plot-yearly-yes-issue, fig.width=10, fig.height=6, message=FALSE}
                                                                                   ⊕ ≖ ▶
 42 un_votes %>%
 43 mutate(
 44
        country =
 45
          case_when(
 46
            country = "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
 47
            country = "United States of America" ~ "US",
 48
            TRUE ~ country
 49
 50
      ) %>%
      inner join(un roll calls, by = "rcid") %>%
 52
      inner join(un roll call issues, by = "rcid") %>%
 53
     filter(country %in% c("UK & NI", "US", "Turkey")) %>%
 54
     mutate(year = year(date)) %>%
      group_by(country, year, issue) %>%
     summarize(percent yes = mean(vote = "yes")) %>%
 57
      ggplot(mapping = aes(x = year, y = percent_yes, color = country)) +
      geom_point(alpha = 0.4) +
      geom_smooth(method = "loess", se = FALSE) +
      facet_wrap(~issue) +
      scale_y_continuous(labels = percent) +
 62 labs(
 63
       title = "Percentage of 'Yes' votes in the UN General Assembly",
       subtitle = "1946 to 2015",
       y = "% Yes",
        x = "Year",
 67
        color = "Country"
 68
 69
      theme minimal()
70 - * * * *
 71
 73 - ## References {#references}
32:2 ## UN voting patterns $
```



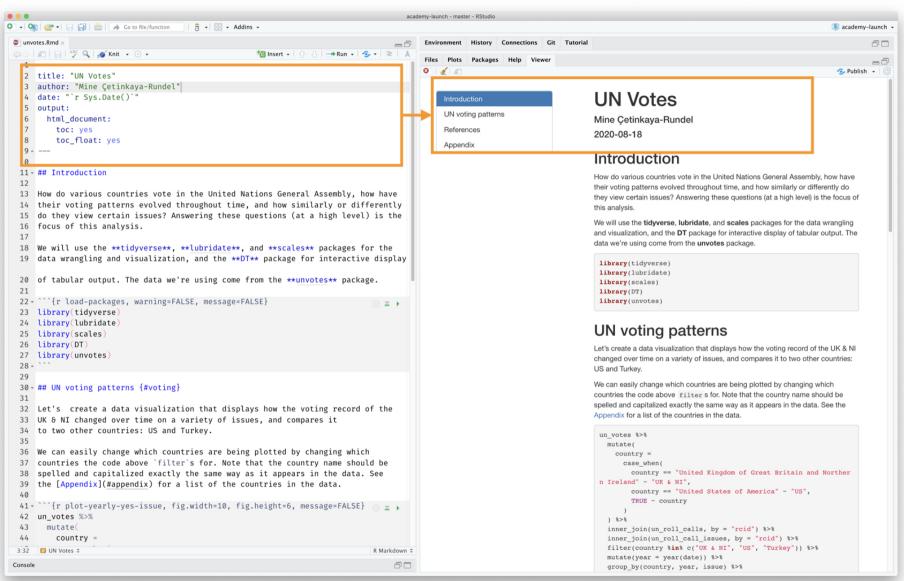
```
unvotes.Rmd ×
(a) I ABC Q & Knit + (b) +
                                                             4 Insert - A A - Run - 4 - - - - A
 36 We can easily change which countries are being plotted by changing which
 37 countries the code above `filter`s for. Note that the country name should be
 38 spelled and capitalized exactly the same way as it appears in the data. See
 39 the [Appendix](#appendix) for a list of the countries in the data.
 40
 41. ```{r plot-yearly-yes-issue, fig.width=10, fig.height=6, message=FALSE}
                                                                                     ⊕ ≖ ▶
 42 un_votes %>%
 43 mutate(
 44
        country =
 45
          case_when(
 46
            country = "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
 47
            country = "United States of America" ~ "US",
 48
            TRUE ~ country
 49
 50
      ) %>%
      inner_join(un_roll_calls, by = "rcid") %>%
      inner join(un roll call issues, by = "rcid") %>%
 53
      filter(country %in% c("UK & NI", "US", "Turkey")) %>%
      mutate(year = year(date)) %>%
      group_by(country, year, issue) %>%
      summarize(percent yes = mean(vote = "yes")) %>%
 57
      ggplot(napping = aes(x = year, y = percent_yes, color = country)) +
      geom_point(alpha = 0.4) +
      geom_smooth(method = "loess", se = FALSE) +
      facet_wrap(~issue) +
      scale_y_continuous(labels = percent) +
 62 labs(
 63
       title = "Percentage of 'Yes' votes in the UN General Assembly",
       subtitle = "1946 to 2015",
       y = "% Yes",
        x = "Year",
 67
        color = "Country"
 68
 69
      theme minimal()
70 - * * * *
 71
 73 - ## References {#references}
32:2 ## UN voting patterns $
```

```
unvotes.Rmd ×
(a) I ABC Q & Knit + 💮 +
                                                            36 We can easily change which countries are being plotted by changing which
 37 countries the code above `filter`s for. Note that the country name should be
 38 spelled and capitalized exactly the same way as it appears in the data. See
 39 the [Appendix](#appendix) for a list of the countries in the data.
 40
 41. ```{r plot-yearly-yes-issue, fig.width=10, fig.height=6, message=FALSE}
                                                                                    ⊕ ▼ ▶
 42 un_votes %>%
 43 mutate(
 44
        country =
 45
          case_when(
 46
            country = "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
            country = "United States of America" ~ "US",
 47
 48
            TRUE ~ country
 49
 50
      ) %>%
      inner_join(un_roll_calls, by = "rcid") %>%
      inner join(un roll call issues, by = "rcid") %>%
      filter(country %in% c("UK & NI", "US", "Turkey")) %>%
 53
 54
      mutate(year = year(date)) %>%
      group_by(country, year, issue) %>%
      summarize(percent_yes = mean(vote = "yes")) %>%
      ggplot(mapping = aes(x = year, y = percent_yes, color = country)) +
      geom_point(alpha = 0.4) +
 59
      geom_smooth(method = "loess", se = FALSE) +
      facet_wrap(~issue) +
      scale_y_continuous(labels = percent) +
 62
 63
       title = "Percentage of 'Yes' votes in the UN General Assembly",
 64
       subtitle = "1946 to 2015",
 65
        y = "% Yes",
        x = "Year",
 67
        color = "Country"
 69
      theme minimal()
 71
 73 - ## References {#references}
32:2 ## UN voting patterns $
                                                                                    R Markdown $
```











## minecr.shinyapps.io/unvotes

