Lab 3 complete

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Welcome to Lab 3 !!!

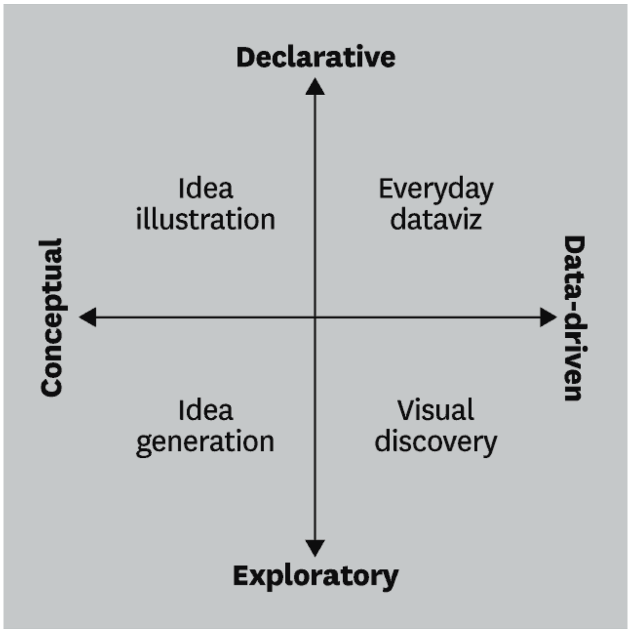
Great article from Harvard Business Review about data visualization that really work.

The R Graph Gallery is an excellent resource for data visualization ideas AND code to accomplish these visualizations.

A nice website detailing many of the tools we've learned already for creating nice tables.

Our World in Data has some great visualizations.

If you're working on your Desktop and want to change up your RStudio Theme, check out these themes made by the community.



Today's goals:

Part 1:

- rotating graphs
- modifying axis limits
- ordering by value
- creating text labels
- adding annotations
- saving plots

Part 2:

- scaling axis (values/time)
- hiding x and y elements

Part 3:

- using functions to "automate" graph creation
- detailed modifying of graph element

Part 1

- rotating graphs
- modifying axis limits
- ordering by value
- creating text labels
- adding annotations

The ggthemes packages has some nice options.

```
gen_plot <- read_csv("data/sample_plot.csv")
```

```
## Warning: Missing column names filled in: 'X1' [1]
```

```
## Parsed with column specification:
## cols(
##   X1 = col_double(),
##   patient_id = col_double(),
##   age = col_double(),
##   race_ethnicity = col_character(),
##   gender_identity = col_character(),
##   height = col_double(),
##   weight = col_double(),
##   visit_id = col_double(),
##   date = col_character()
## )
```

Part 2:

- scaling axis (values/time)
- hiding x and y elements

For the remainder of the lab, we will use data from the (UC Berkeley Safe Campus study)[https://publichealth.berkeley.edu/covid-19/safe-campus-initiative/charts-and-graphs/] that took place from June to August 2020. The goal of the study was to inform the campus of the safest possible way to re-open campus, if at all.

```
df_covid <- read_csv("data/daily_symptoms.csv") %>% mutate(ts_daily = mdy(ts_daily))
```

```
## Parsed with column specification:
## cols(
##   ts_daily = col_character(),
##   Blocked_runny_nose = col_double(),
##   Cough = col_double(),
##   Fatigue = col_double(),
##   Feverish = col_double(),
##   Gastrointestinal_symptoms = col_double(),
##   Loss_of_sense_of_taste_or_smell = col_double(),
##   Muscle_pain_or_body_aches = col_double(),
##   Respiratory_symptoms = col_double(),
##   Sore_throat = col_double()
## )
```

Part 3:

- using functions to "automate" graph creation
- detailed modifying of graph element

Wow! That took a lot of time and lines of code, and it was for only one graph! We have 8 more symptoms to go. Let's make a function.

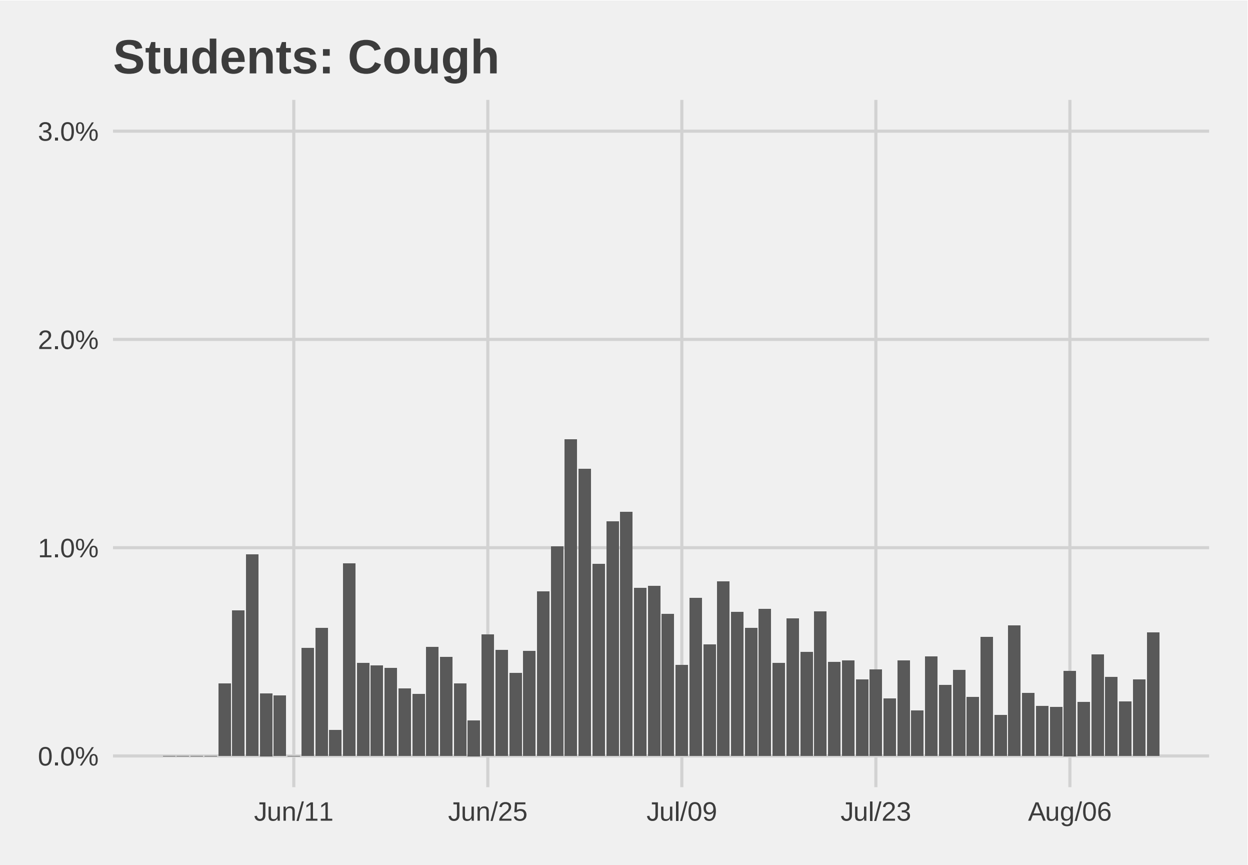
There's a slight variation in the syntax for dyplr when using it within a custom function.

```r
symptoms_covid <- function ( data, var ) {
  # create string of variable to later to create column marker
  var.name <- gsub( "_", " ", as.character(substitute( var ) ))
  data %>%
    mutate( var = ifelse( {{ var }} < 0, NA, {{ var }} )) %>%
    # filter out NAs to remove from denominator
    filter( !is.na( var ) ) %>%
    # pair down to variables of interest
    select( ts_daily, var ) %>%
    # group by time
    group_by( ts_daily ) %>%
    summarize( num = sum( var ),          # numerator
               total = n(),               # get total
               prop = num / total ) %>%   # calculate
    # add variable column marker
    mutate(var.name = var.name)
}
```

We can now create the same graph quite quickly for a different symptom:

```r
symptoms_covid(df_covid, Cough) %>%
  ggplot( aes(x = ts_daily, y = prop) ) +
    # creating bars
    geom_col() +
    # change x axis to show month/day, separated by 14 days
    scale_x_date( date_labels = "%b/%d", date_breaks = "14 day" ) +
    # change y axis into percent and limit between 0, 0.03
    scale_y_continuous( limits = c(0, 0.03), labels = scales::percent ) +
    # remove x and y titles, and add overall title
    labs(x = element_blank(),
         y = element_blank(),
         title = "Students: Cough") +
    # take advantage of available themes!
    theme_fivethirtyeight()
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```


Students: Cough
3.0%
2.0%
1.0%
0.0%
Jun/11
Jun/25
Jul/09
Jul/23
Aug/06

```
## ‘summarise()‘ ungrouping output (override with ‘.groups‘ argument)
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```
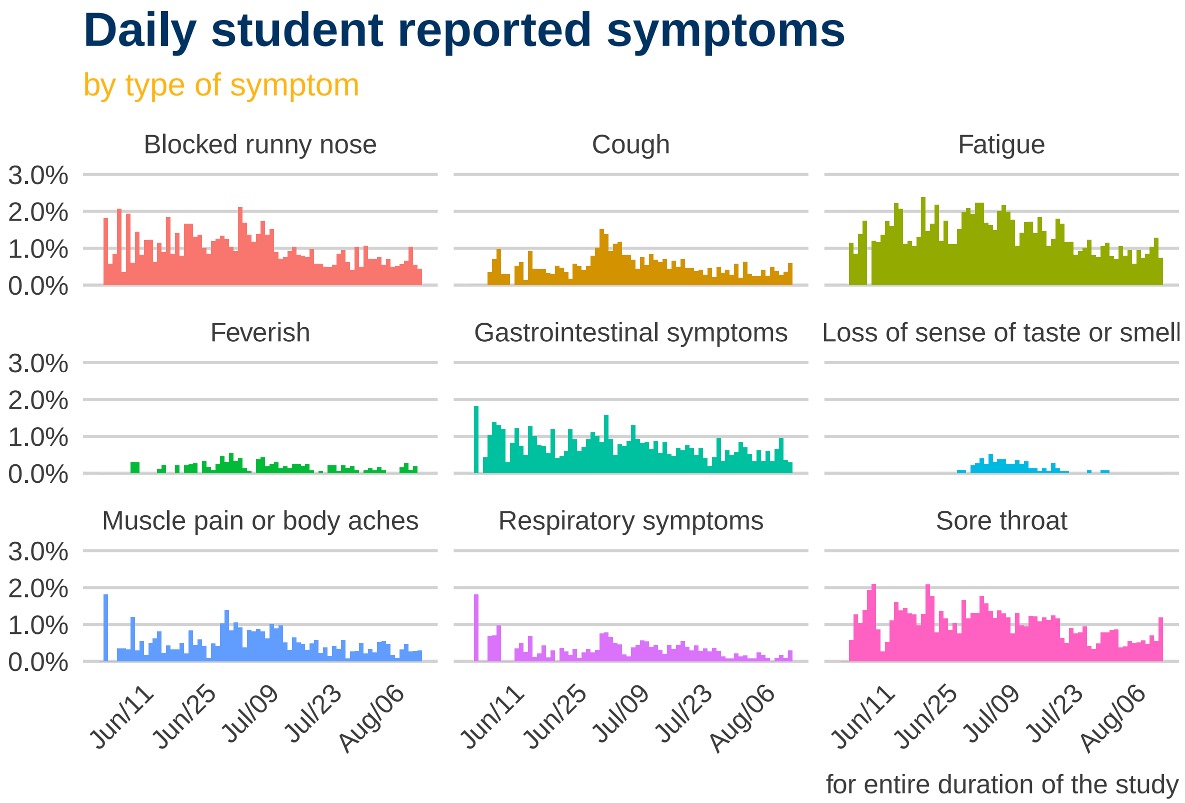

Final product:

```
ggplot(symp_plot, aes(x = ts_daily, y = prop, fill = var.name)) +
  geom_col() +
  facet_wrap(~ var.name) +
  scale_x_date(date_labels = "%b/%d", date_breaks = "14 day") +
  scale_y_continuous(limits = c(0, 0.03), labels = scales::percent) +
  labs(x = element_blank(),
       y = element_blank(),
       title = "Daily student reported symptoms",
       subtitle = "by type of symptom",
       caption = "for entire duration of the study",
       color = element_blank()) +
  theme_fivethirtyeight() +
  theme(plot.title = element_text(color = "#003262"),
        plot.subtitle = element_text(color = "#FDB515"),
        panel.grid.major.x = element_blank(),
        plot.background = element_rect(fill = "white", colour = "white"),
        panel.background = element_rect(fill = "white", colour = "white"),
        strip.background = element_rect(colour = "white", fill = "white"),
        legend.position = "none",
        axis.text.x = element_text(angle= 45, hjust = 1),
        axis.text.y = element_text()) +
  guides(colour = guide_legend(nrow = 3))
```

```
## Warning: Removed 3 rows containing missing values (position_stack).
```


Daily student reported symptoms
by type of symptom
Blocked runny nose
Cough
Fatigue
Feverish
Gastrointestinal symptoms
Loss of sense of taste or smell
Muscle pain or body aches
Respiratory symptoms
Sore throat
Jun/11
Jun/25
Jul/09
Jul/23
Aug/06
for entire duration of the study