R Programming For Natural Resource Professionals

Lecture 10
ggplot2 pt 2

Paper discussions

- Open this link now by typing it into a browser: https://bit.ly/3GVPwuV
- Talk with your group to identify one or two thoughts, questions, and epiphanies that resonate then record them in the Google Doc.
- Read through the list as it updates.

Learning objectives for this week

1. Further develop ggplot skills
2. Control ggplot outputs in RMarkdowns
3. Explore non-Tidyverse ggplot packages

List arguments inside or outside aes()?

Inside aes (): Aesthetic determined by a variable from your data.

- aes(..., color = Var1)

Outside aes(): Aesthetic determined a constant value.

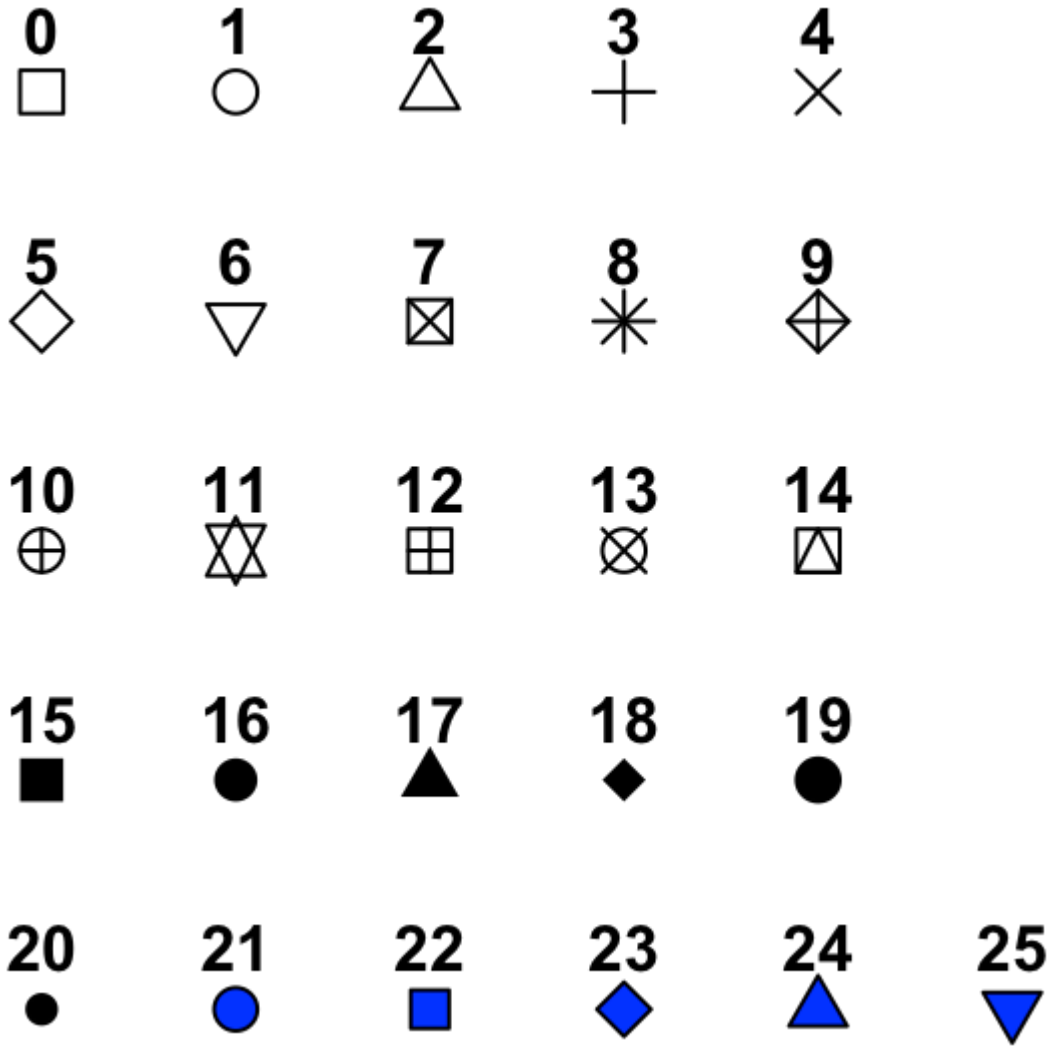
- color = "blue"

In class plotting exercise 1

- Data set: lterdatasampler::ntl_icecover
- Create a scatterplot for ice duration across years
- Add custom x and y labels
- Add a loess smoothed trend line with a "span" value of 1.5
- Clean it up using a theme of your choosing

ggplot2 – symbol types

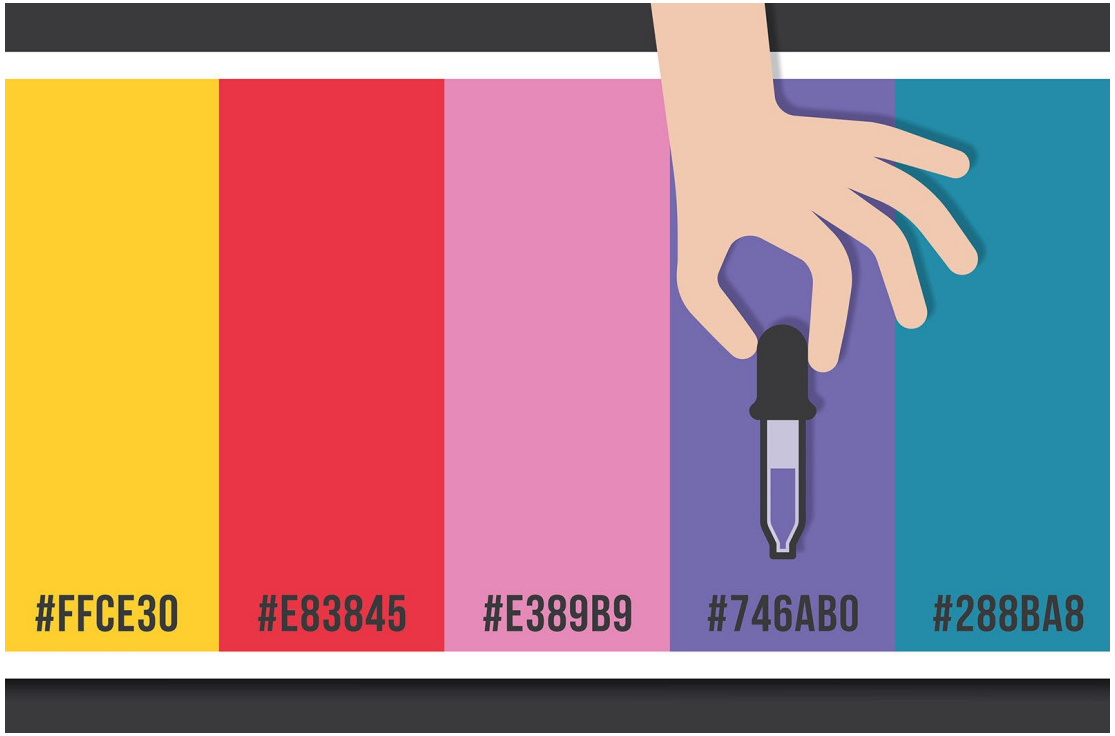
- aes(shape = …) to establish distinct symbols based on a specific variable
- scale_[shape or size]_manual()



ggplot2 - colors

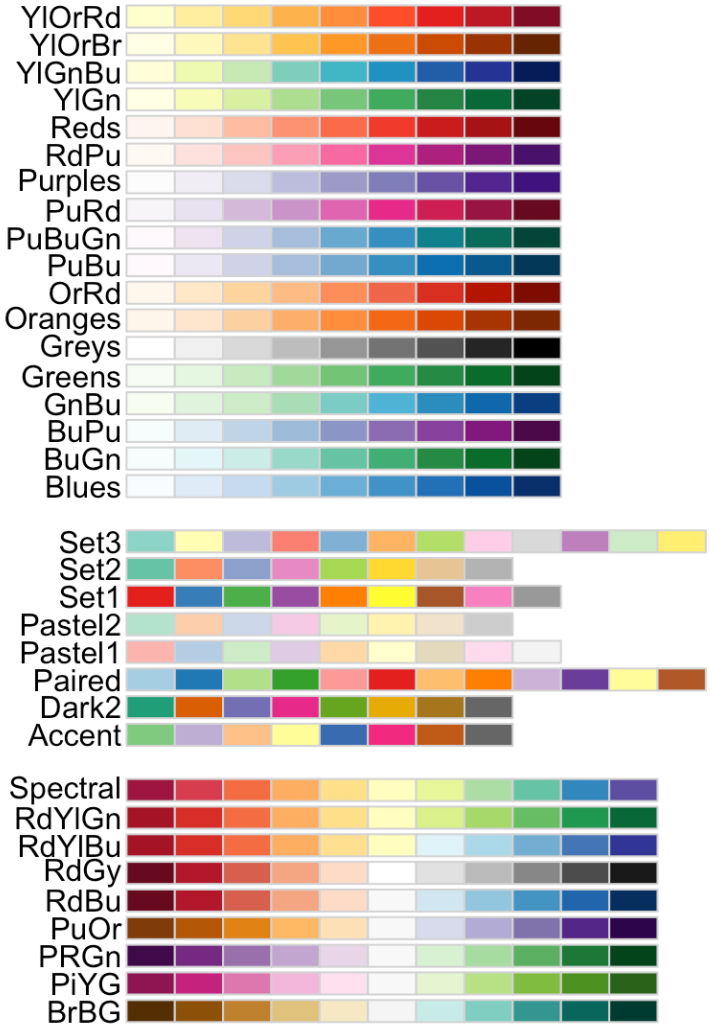
- aes(color = …) to establish distinct colors based on a specific variable

- scale_[color or fill]_manual
  - Declare hex values or words in a vector
  - https://www.color-hex.com/
  - https://www.w3schools.com/colors/colors_picker.asp

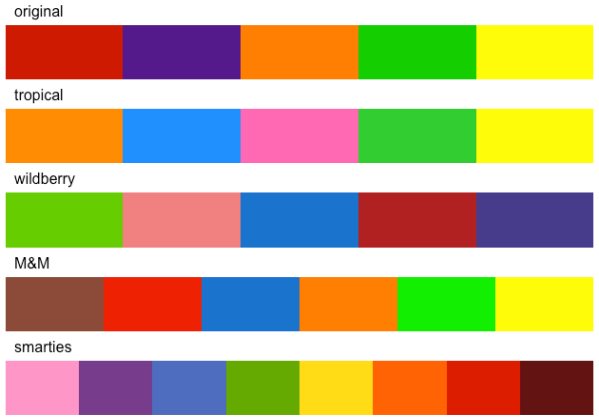


ggplot2 – color packages

rcolorbrewer



RSkittleBrewer



NineteenEightR

LaCroixColoR

ggplot2 – color packages

```r
paletteer_d()
```

ggplot2 – legends

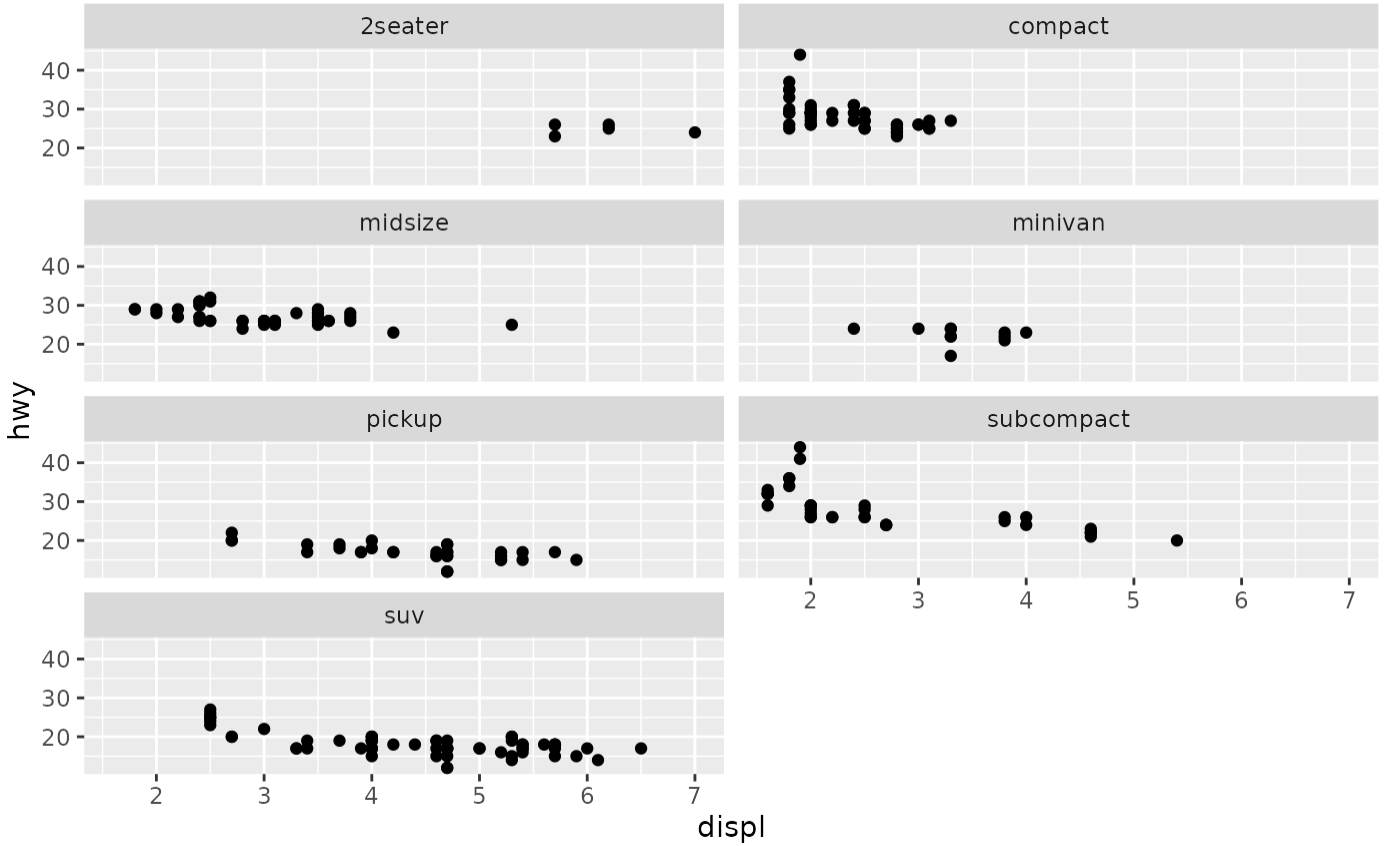
- Most modifications stated using theme() placed at end of ggplot pipe
  - legend.position = “none” or “top” or “bottom” or “c(1,1)” or…
  - legend_title = element_text(color, size, face)
  - legend_text = element_text(color, size, face)
  - legend.background = element_rect(fill, size, linetype)

- Change labels and title using scale_[color]_discrete()
  - scale_color_discrete(name = “New title", labels = c(“label1", “label2"))

ggplot2 – Arranging multiple plots

- facet_wrap(~ var, nrow, ncol)
  - Native ggplot approach

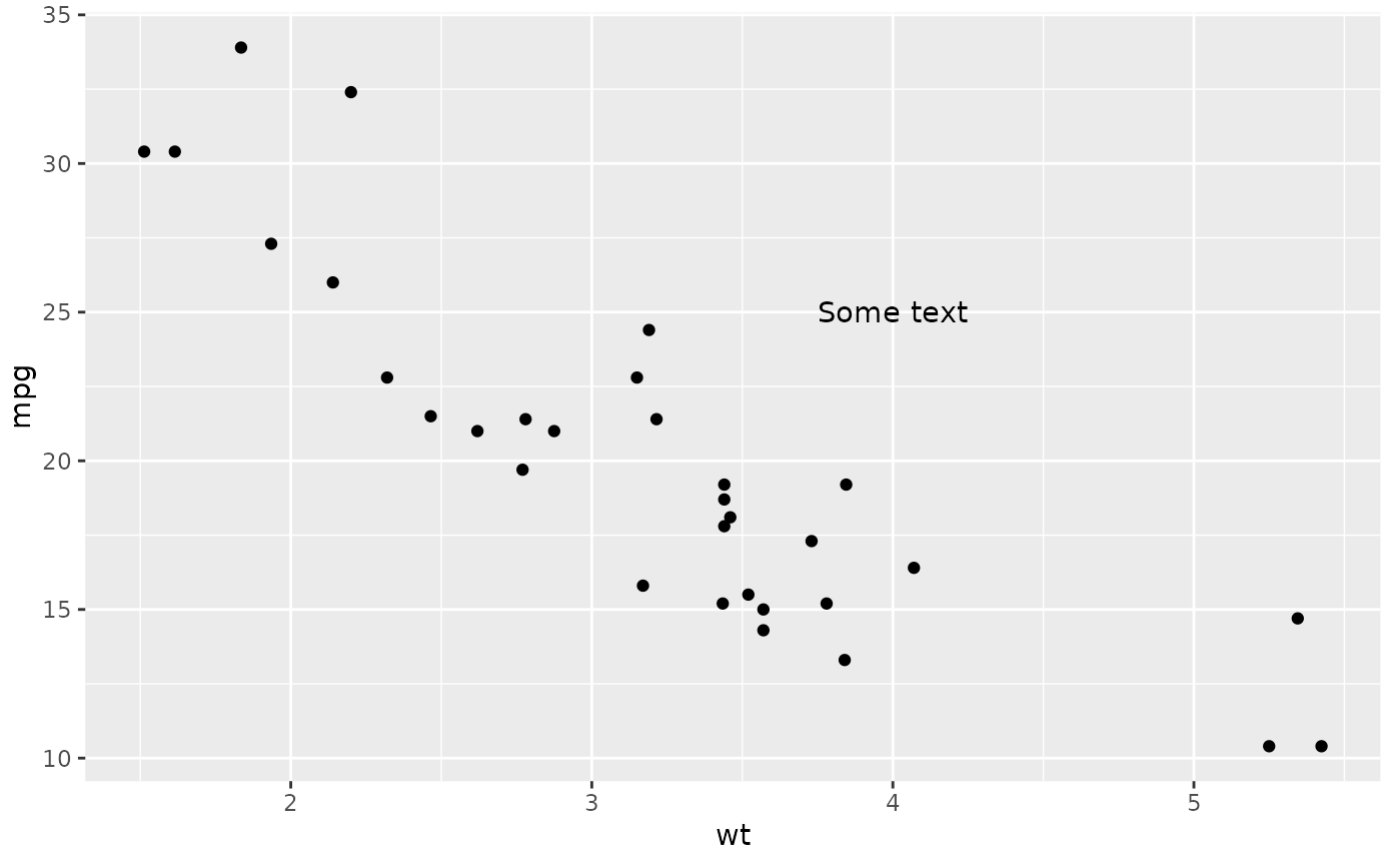
- Also check out:
  - cowplot
  - gridExtra
  - egg
  - patchwork



Annotating plots

annotate(“type", x, y)

- “text”
  - Use ‘parse’ argument for formatting text
- “rect”
- “segment”



ggplot2 – Rmarkdown plotting

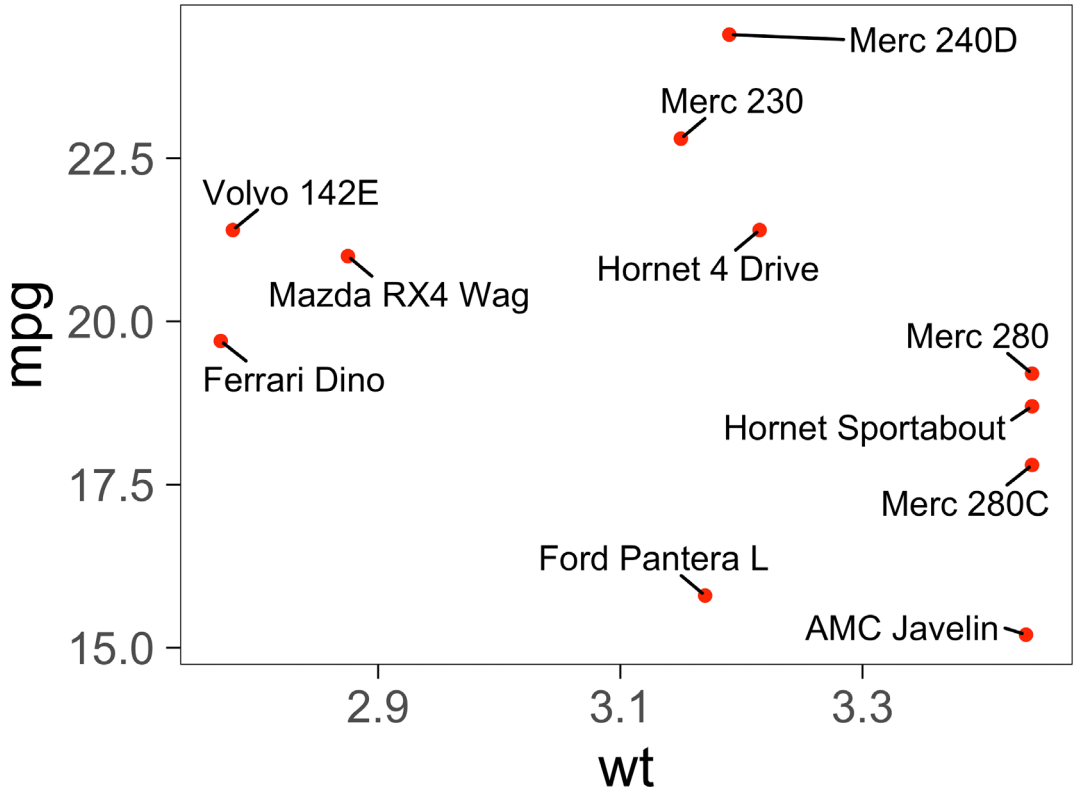
Code chunk header arguments

- fig.show
- fig.width
  - In inches. E.g., fig.width = 7
- fig.height
  - In inches. E.g., fig.height = 5
- dpi
  - Dots per inch. E.g., dpi = 72
- fig.align
  - ‘left’, ‘right’, ‘center’
- fig.cap
  - Figure caption. E.g., fig.cap = “This is the caption”

ggrepel

- geom_text_repel(aes(label))
- geom_label_repel(aes(label))

- Lots and lots of other options
  - https://ggrepel.slowkow.com/articles/examples.html



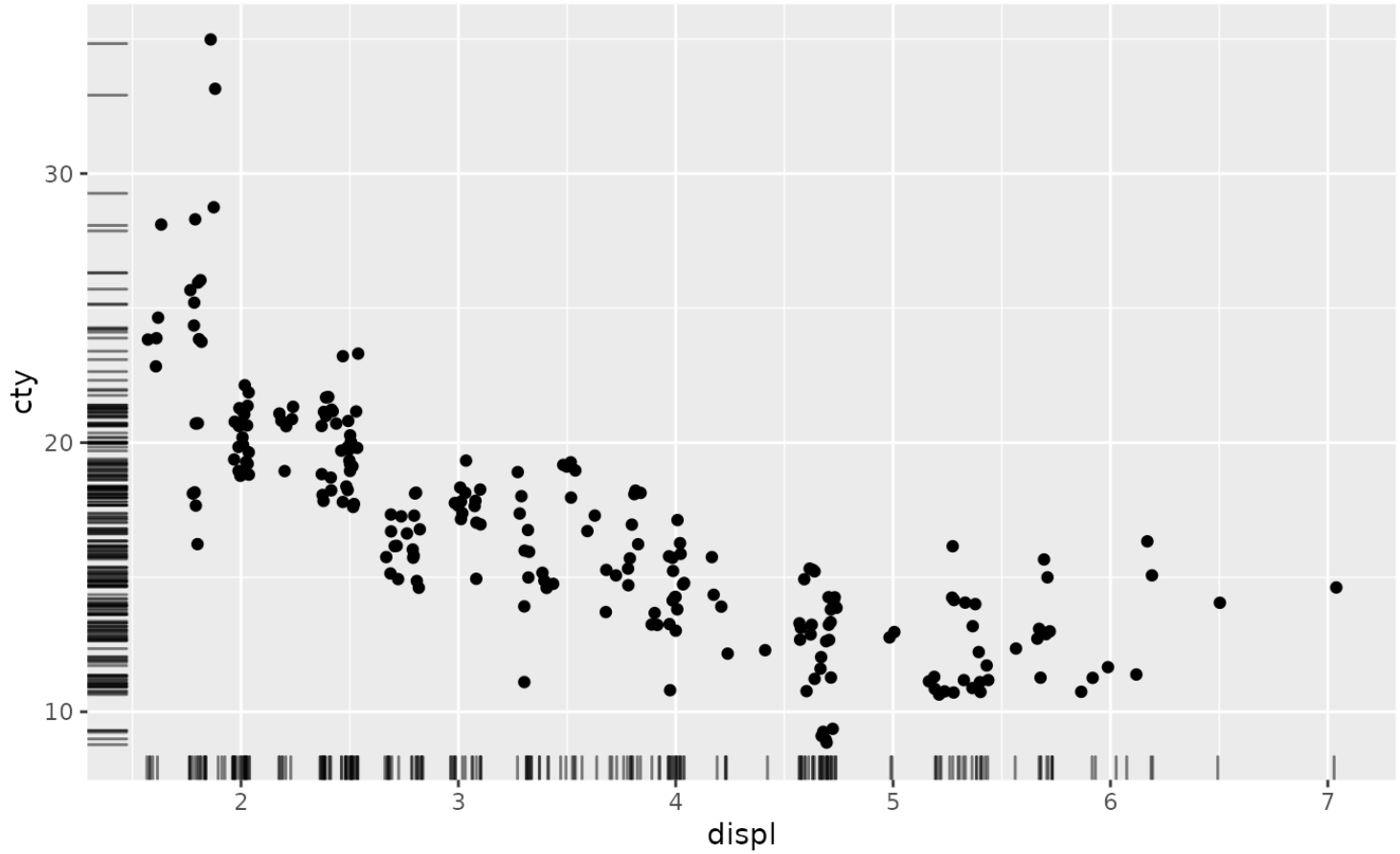
In class plotting exercise 2

- Data set: lterdatasampler::and_vertebrates
- Filter to just cutthroat trout
- Create a density plot of weight_g
- Add custom x and y labels
- Clean it up using a theme of your choosing

Less common but useful plot types

Rug plots

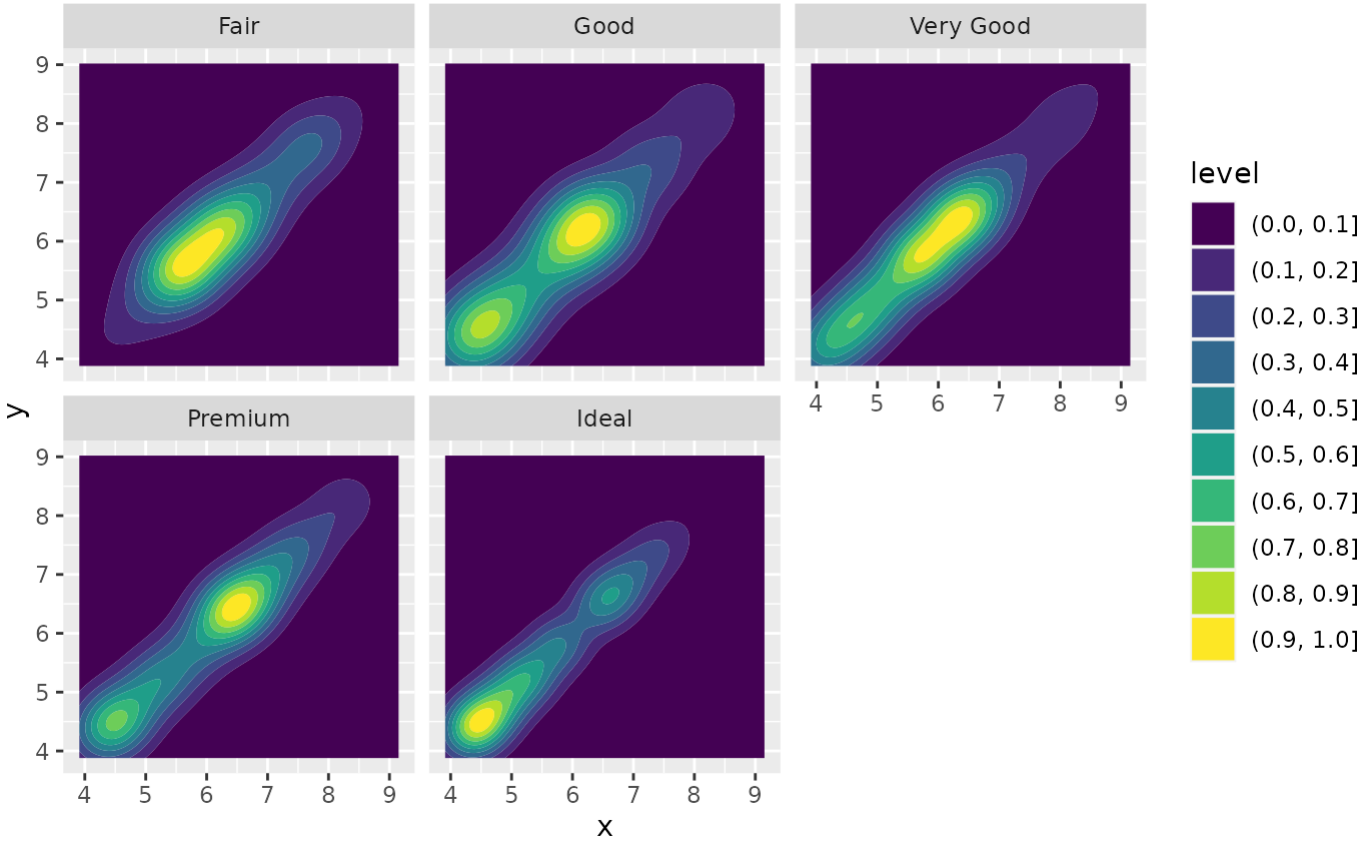
- geom_rug()



Less common but useful plot types

2D density

- geom_density_2d_filled()
- geom_density_2d



In class plotting exercise 3

- Data set: lterdatasampler::hbr_maples
- Create a scatter plot of leaf1area vs leaf2area
- Polish it up!

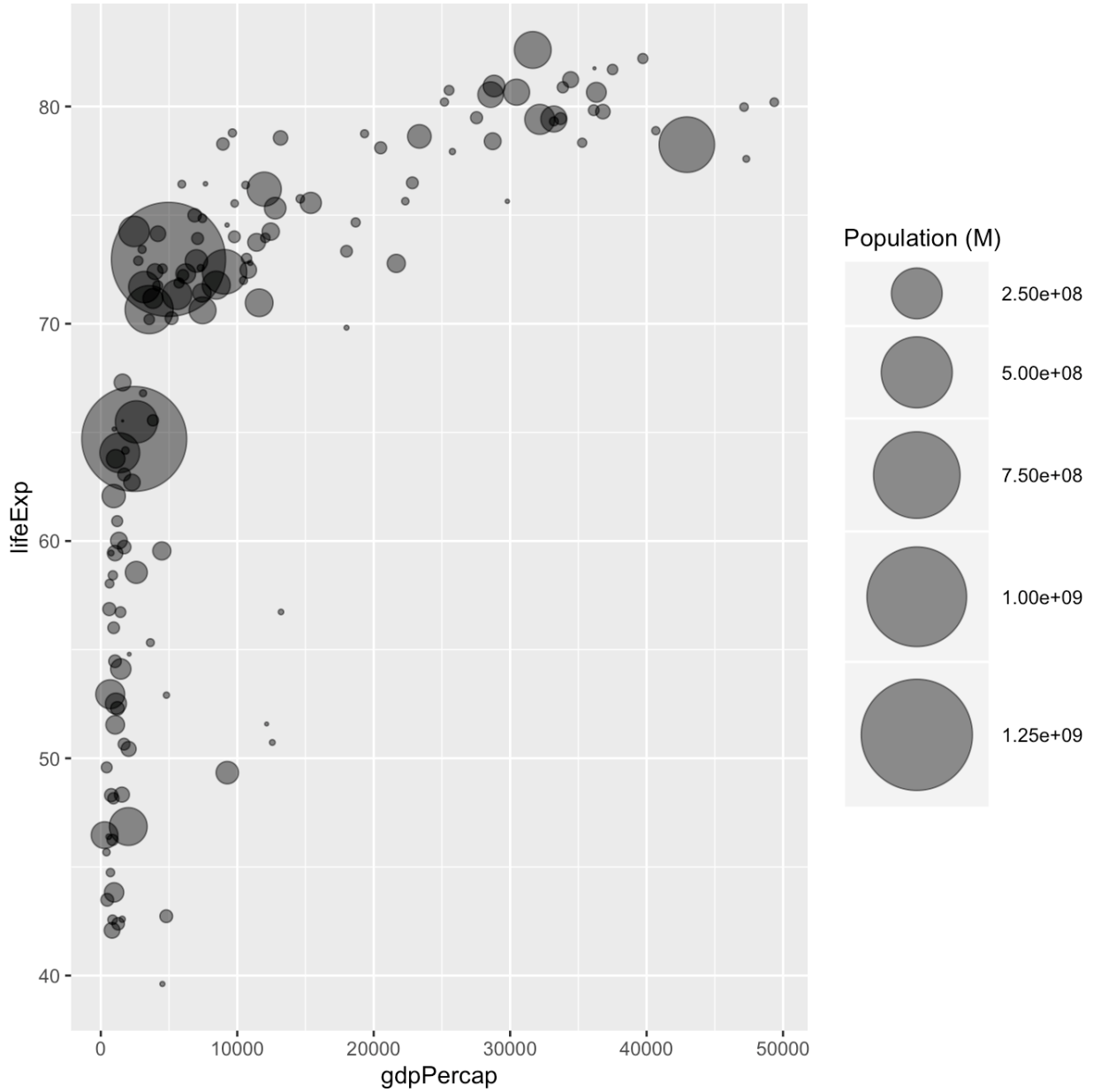
Less common but useful plot types

Bubble plot

ggplot(aes(x, y, size)) +

geom_point() +

scale_size(range = c(min, max))



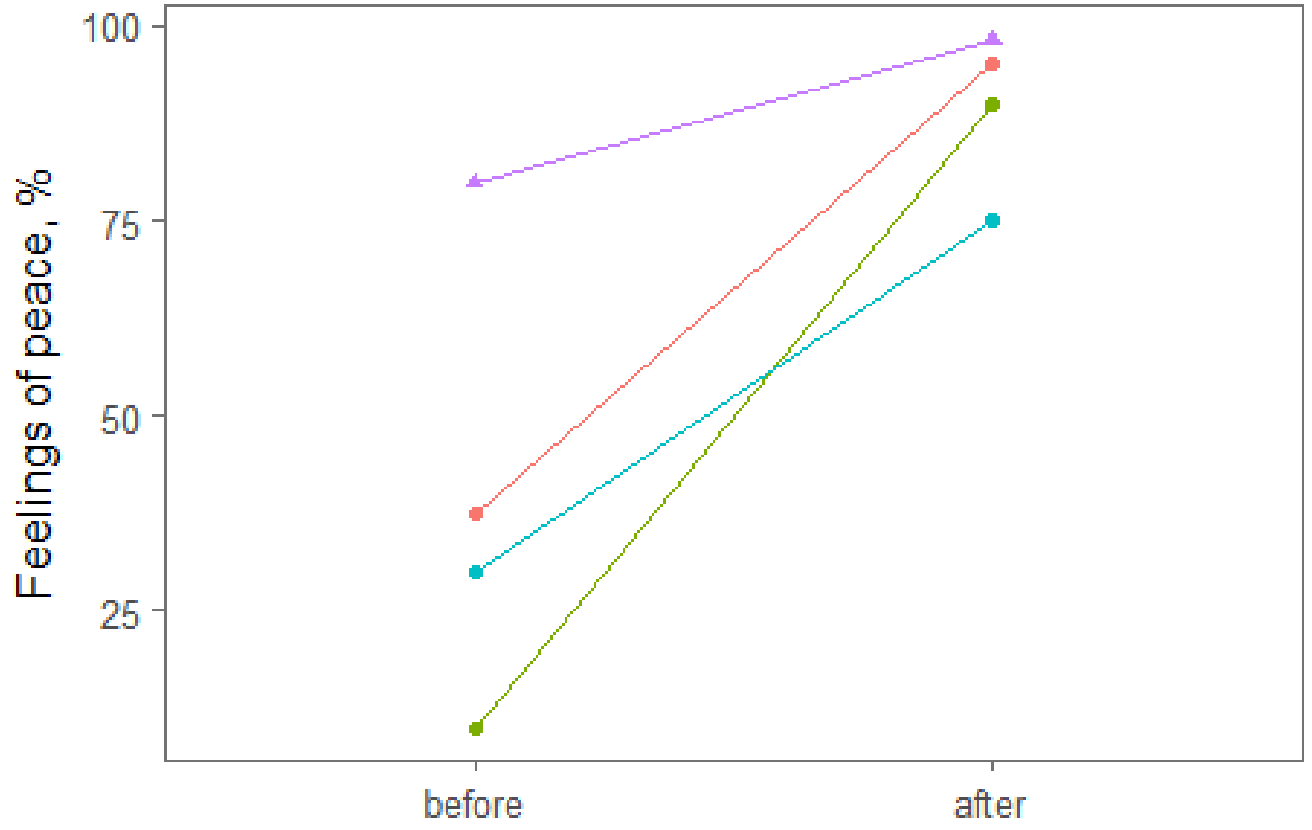
In class plotting exercise 4

- Data set: lterdatasampler::knz_bison
- Filter data to include only rec_year of 1994 and 1998
- Add a column that is the count of the number of times each bison was observed in the filtered data set
- Filter to only bison observed 2 times in the filtered data set
- Make a scatterplot of rec_year vs animal_weight
  - Have the symbol vary by the sex of the animal

Less common but useful plot types

Before/After plot

```
ggplot(aes(x,  y, group)) +
  geom_line() +
  geom_point()
```

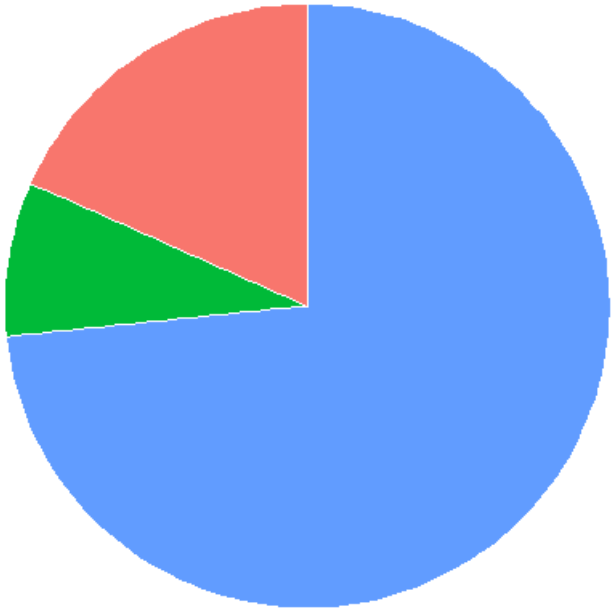


Less common but useful plot types

Piecharts

- Note words of warning: https://www.data-to-viz.com/caveat/pie.html

```
ggplot(aes(x="", y, fill)) +
  geom_bar(stat = "identity", color = "white") +
  coord_polar("y", start = 0) +
  theme_void()
```

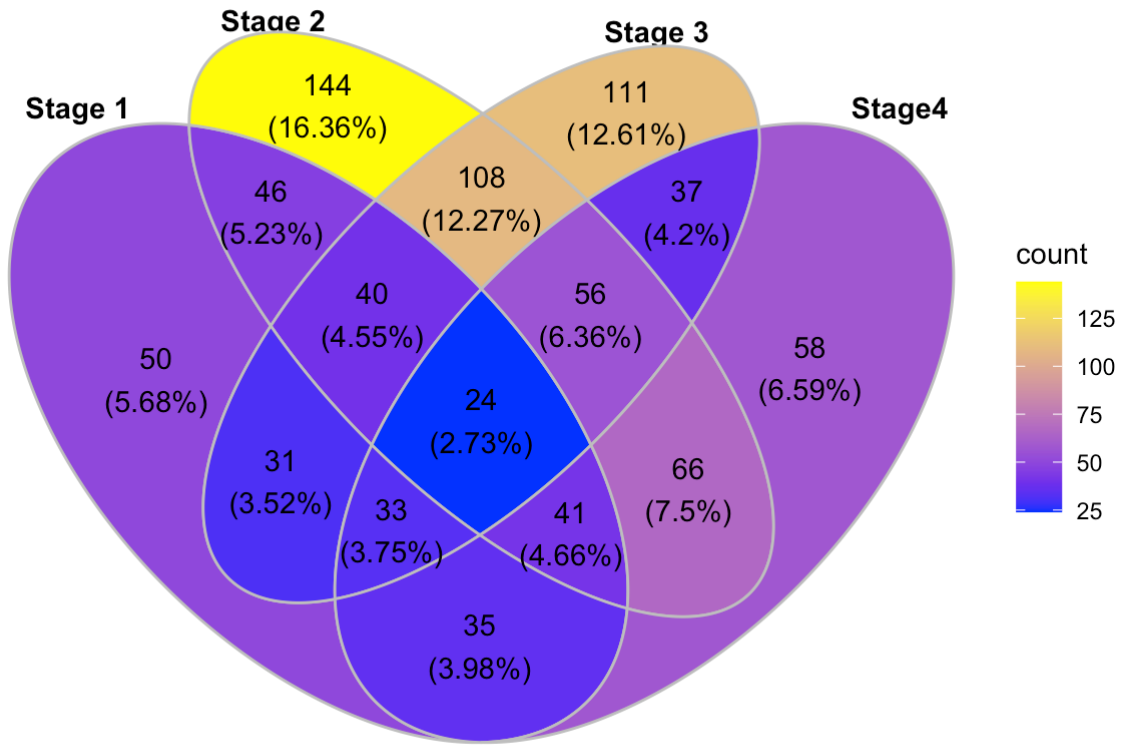


Less common but useful plot types

Venn diagrams

- library(ggVennDiagram)

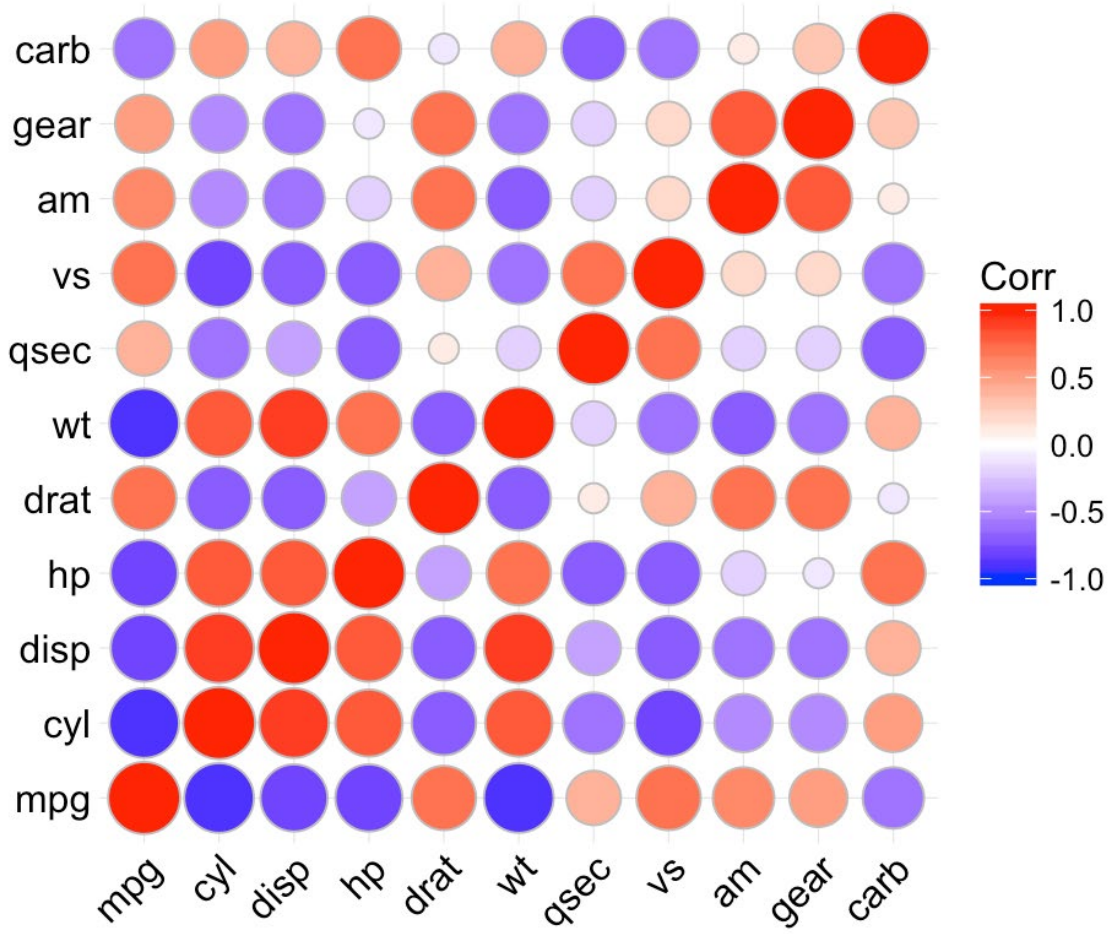
- Requires a list of vectors
  - Can be made in tidyverse using lst()
  - Each vector is one circle



Less common but useful plot types

Correlation plots

- library(ggcorrplot)
- Requires a correlation matrix as input
  - Select relevant variables then pipe into cor(.)



In class plotting exercise 5

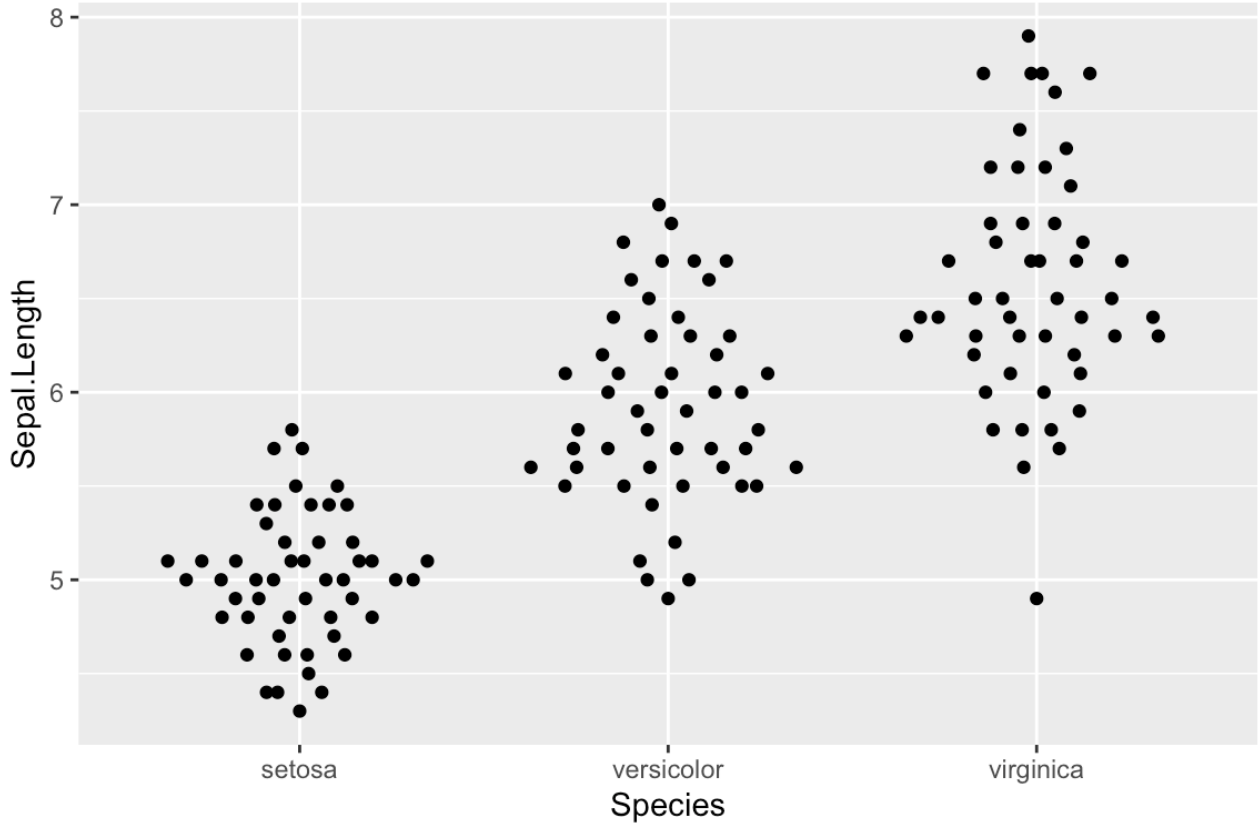
- Data set: lterdatasampler::knz_bison
- Create a new variable for the each bison’s age
- Filter to retain only age 3, 4, and 5 individuals
- Make a boxplot of males vs. females
- Polish it up!

Less common but useful plot types

Beeswarm plots

- library(ggbeeswarm)

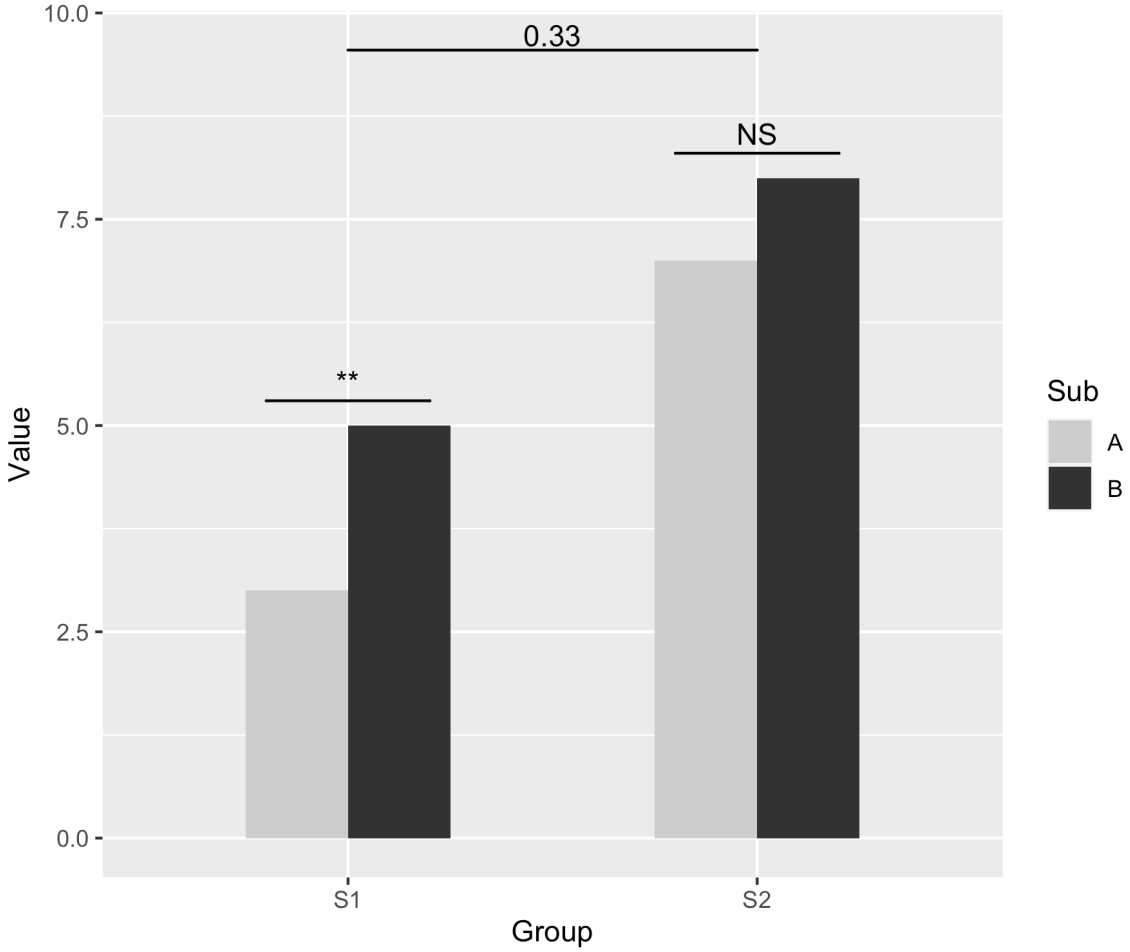
- geom_quasirandom()
- geom_beeswarm()



Less common but useful plot types

Add significance lines

- library(ggsignif)
- geom_signif(comparisons = list(c("var1", "var2")), map_signif_level)



gganimate

- https://gganimate.com/articles/gganimate.html

...

transition_states(changeVariable, transition_length, state_length) +

enter_fade() +

exit_shrink() +

ease_aes()

...