

# Themes

## Session 5

PMAP 8921: Data Visualization with R  
Andrew Young School of Policy Studies  
Fall 2023

# Plan for today

**CRAP and ggplot**

**The anatomy of a ggplot theme**

# CRAP and ggplot

# Universal principles

**Contrast**

**Repetition**

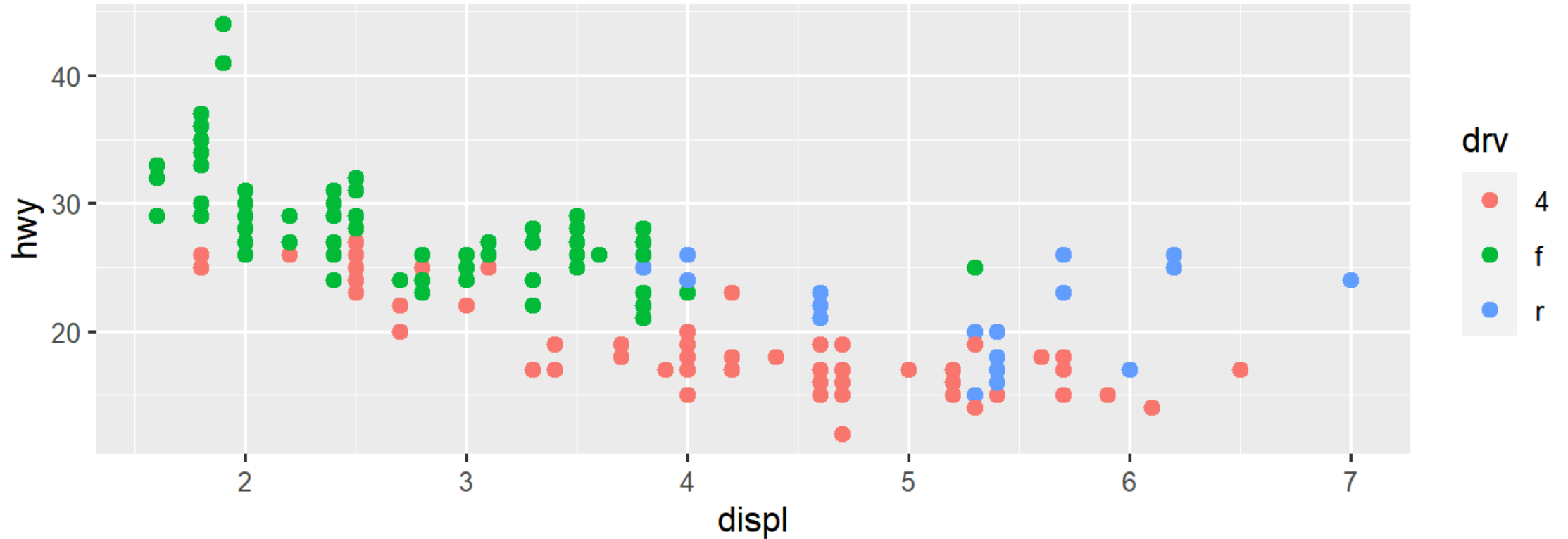
**Alignment**

**Proximity**

**These design principles apply everywhere!**

Graphic design, art, music, architecture... and graphs!

# Is that gray background okay?



# Applying CRAP to ggplot

We can follow CRAP principles to make big improvements to our plots

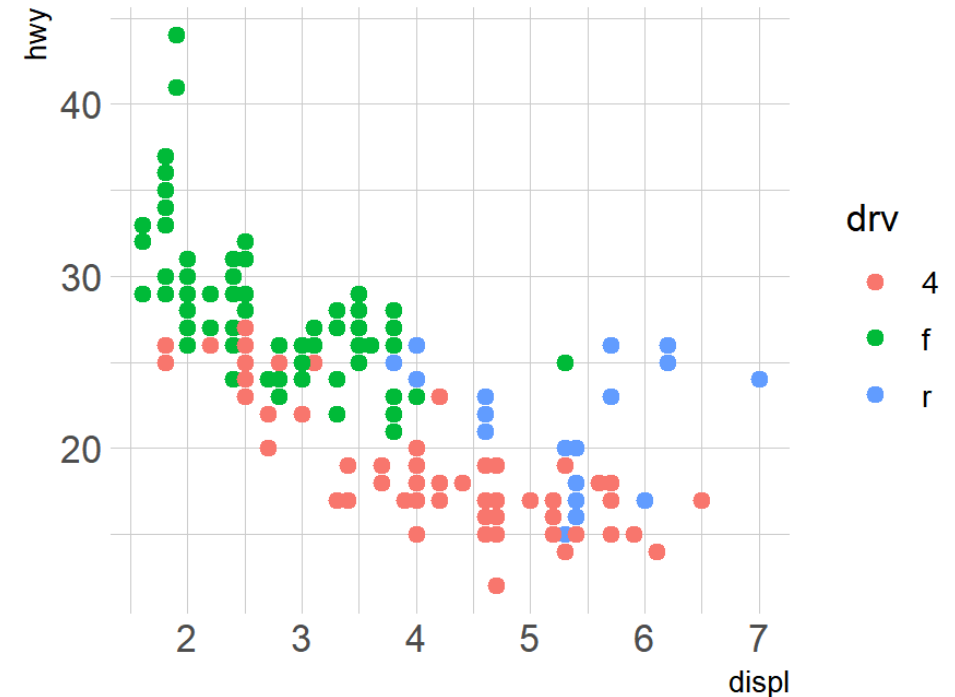
Claus Wilke's chapter covers lots of these graph-specific principles

We can apply these principles to ggplot plots

# Like this!

```
library(hrbrthemes)

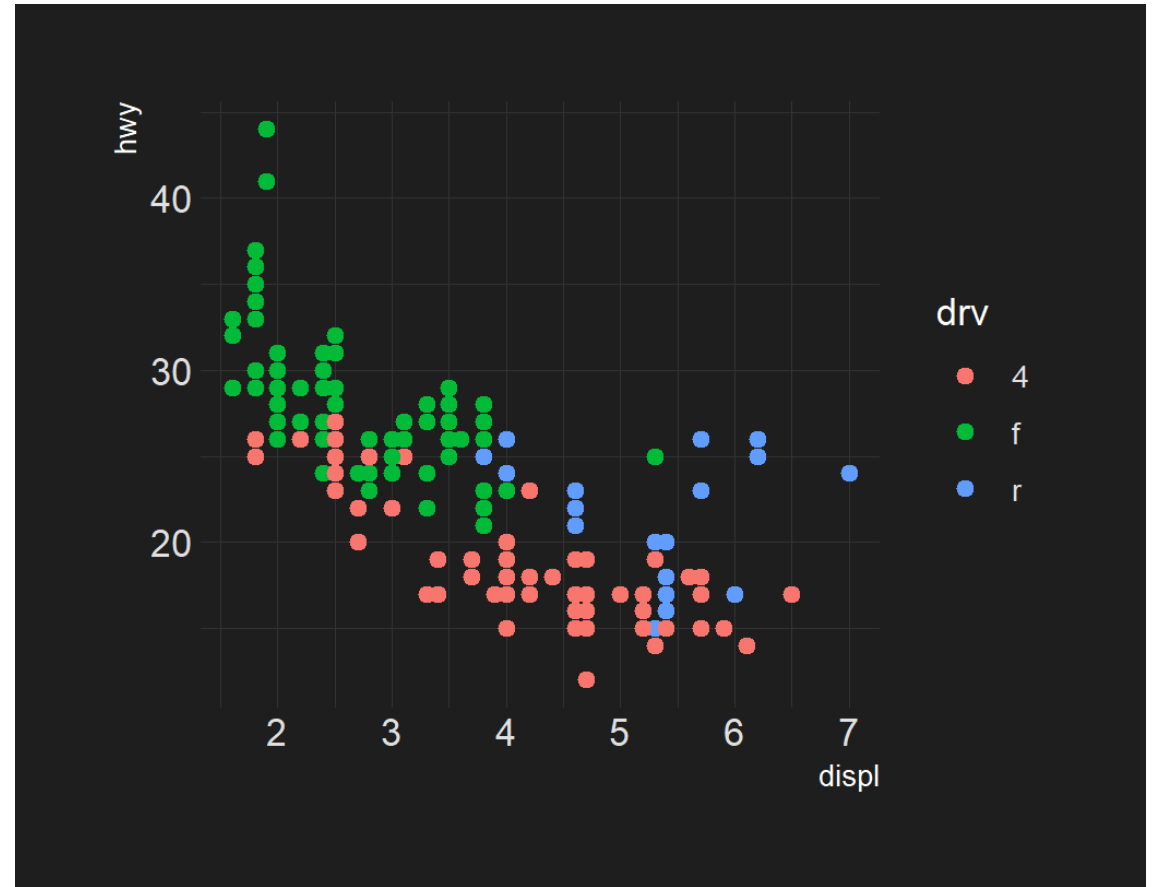
ggplot(mpg, aes(x = displ, y = hwy,
                color = drv)) +
  geom_point(size = 2) +
  theme_ipsum()
```



# And this!

```
library(hrbrthemes)

ggplot(mpg, aes(x = displ, y = hwy,
                color = drv)) +
  geom_point(size = 2) +
  theme_modern_rc()
```

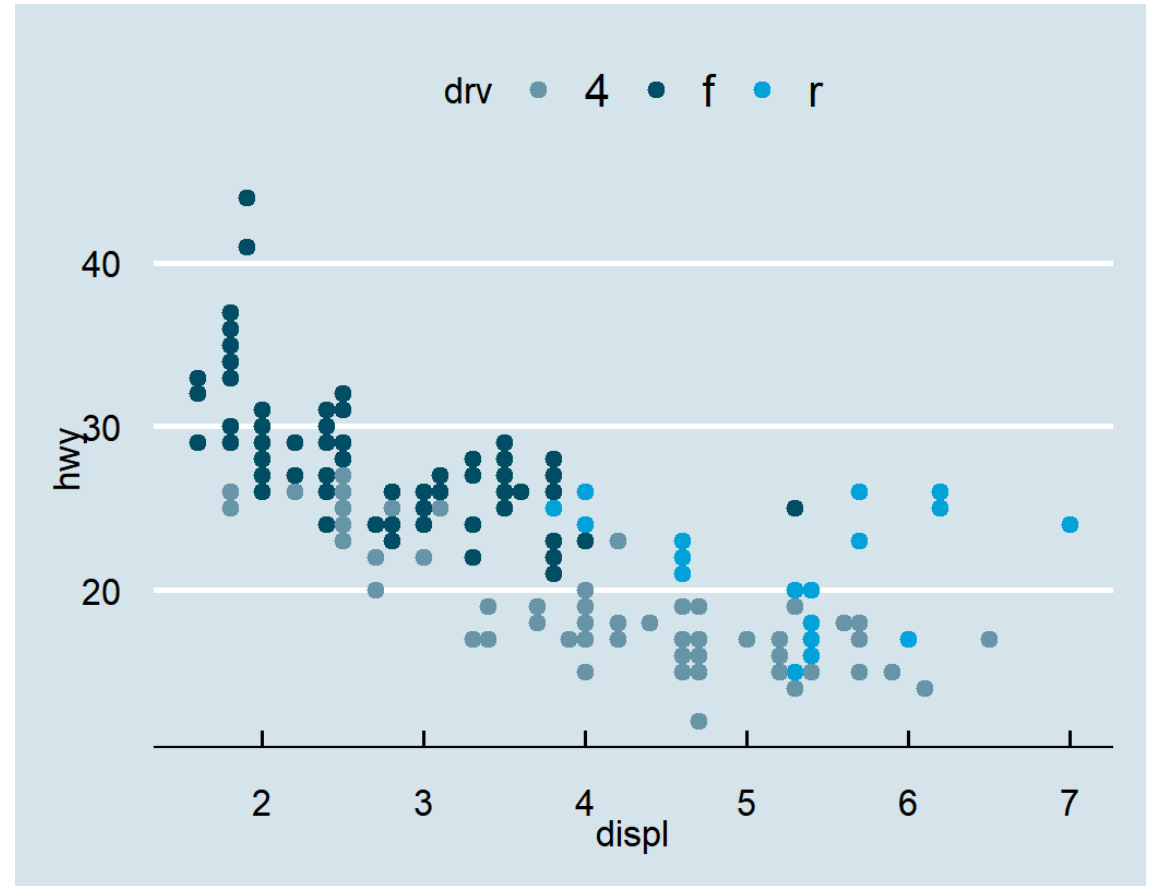




# Or this!

```
library(ggthemes)

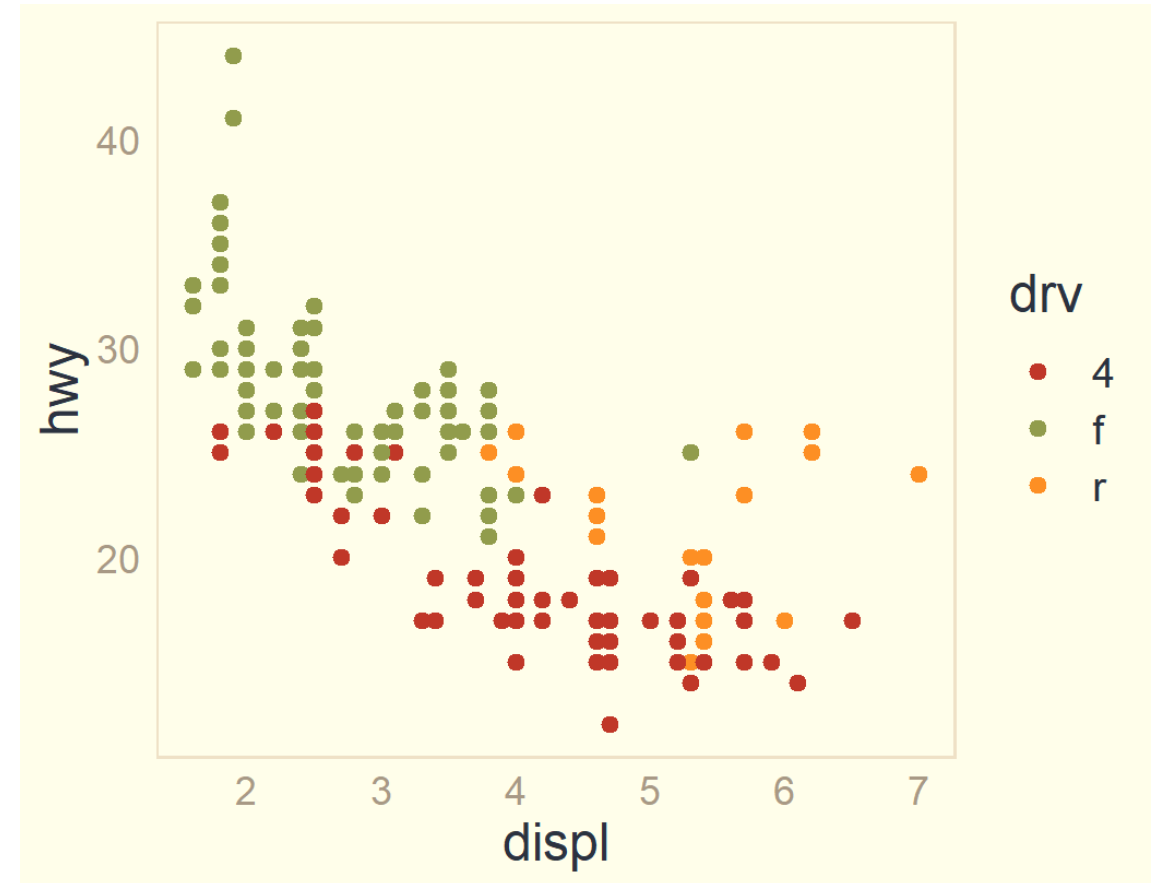
ggplot(mpg, aes(x = displ, y = hwy,
                color = drv)) +
  geom_point(size = 2) +
  scale_color_economist() +
  theme_economist()
```



# And even this!

```
library(ggpomological)

ggplot(mpg, aes(x = displ, y = hwy,
                color = drv)) +
  geom_point(size = 2) +
  scale_color_pomological() +
  theme_pomological_fancy()
```



# One magic, powerful function

**theme()**

# The anatomy of a `ggplot()` theme

# Theme system

## ggplot2 Theme Elements

`theme(element_name = element_function())`

- `element_text()`
- `element_line()`
- `element_rect()`
- `element_blank()`

## Axis elements:

`axis.ticks`  
`element_line()`

`axis.title`  
`element_text()`

`axis.text`  
`element_text()`

`axis.line`  
`element_line()`

## Plot elements:

`plot.background`  
`element_rect()`

`plot.title`  
`element_text()`

`plot.margin`  
`margin()`

## Facetting elements:

`strip.background`  
`element_rect()`

`panel.spacing`  
`unit()`

`strip.text`  
`element_text()`

## Legend elements:

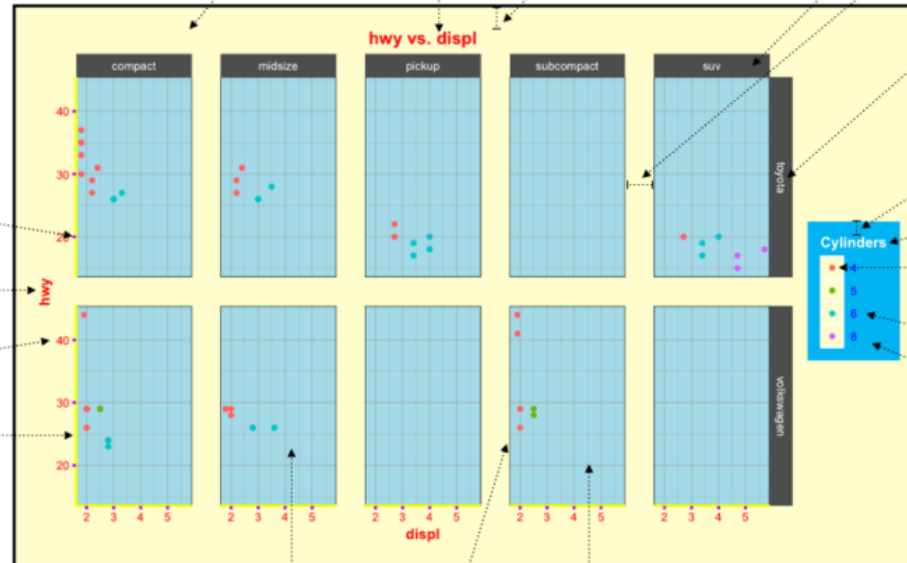
`legend.margin`  
`margin()`

`legend.title`  
`element_text()`

`legend.key`  
`element_rect()`

`legend.text`  
`element_text()`

`legend.background`  
`element_rect()`



`panel.background`  
`element_rect()`

`panel.grid`  
`element_line()`

`panel.border`  
`element_rect(fill = NA)`

## Panel elements:

[henrywang.nl](http://henrywang.nl)

Derived from "ggplot2: Elegant Graphics for Data Analysis"

# Theme elements

Each element in the plot can be targeted

Plot title = `plot.title`

Grid lines = `panel.grid`

Legend background = `legend.background`

# Theme functions

Use special functions to  
manipulate specific elements

Text-based things = `element_text()`

Rectangular things (backgrounds) = `element_rect()`

Line-based things (axis lines, grid lines) = `element_line()`

Disable element completely = `element_blank()`

# How to learn `theme()`

The `theme()` function has  
**94 possible arguments(!!!)**

You can get hyper-specific with things like  
`axis.ticks.length.x.bottom`

The only way to learn how to use `theme()`  
is to use it and tinker with it



# How to learn theme()

**I cannot show you everything**

**That's why we have the lesson, example, and exercise!**