

# Lesson 2: chp 3

Hao Wang

1/19/2022

## 1. Review Chp 4 and 6

### Chp 4.

Exe. 2 used ggplot function. We will discuss it today.

### Chp 6.

Good to learn some R Studio tricks.

## 2. Chp 3 Data visualization

### 2.1 Some build-in datasets in R: mpg

To get information about the dataset mpg.

```
?mpg
```

Data structure

```
str(mpg)
```

```
## tibble [234 x 11] (S3: tbl_df/tbl/data.frame)
## $ manufacturer: chr [1:234] "audi" "audi" "audi" "audi" ...
## $ model       : chr [1:234] "a4" "a4" "a4" "a4" ...
## $ displ       : num [1:234] 1.8 1.8 2 2 2.8 2.8 3.1 1.8 1.8 2 ...
## $ year        : int [1:234] 1999 1999 2008 2008 1999 1999 2008 1999 1999 2008 ...
## $ cyl         : int [1:234] 4 4 4 4 6 6 6 4 4 4 ...
## $ trans       : chr [1:234] "auto(l5)" "manual(m5)" "manual(m6)" "auto(av)" ...
## $ drv         : chr [1:234] "f" "f" "f" "f" ...
## $ cty         : int [1:234] 18 21 20 21 16 18 18 18 16 20 ...
## $ hwy         : int [1:234] 29 29 31 30 26 26 27 26 25 28 ...
## $ fl         : chr [1:234] "p" "p" "p" "p" ...
## $ class       : chr [1:234] "compact" "compact" "compact" "compact" ...
```

First few records

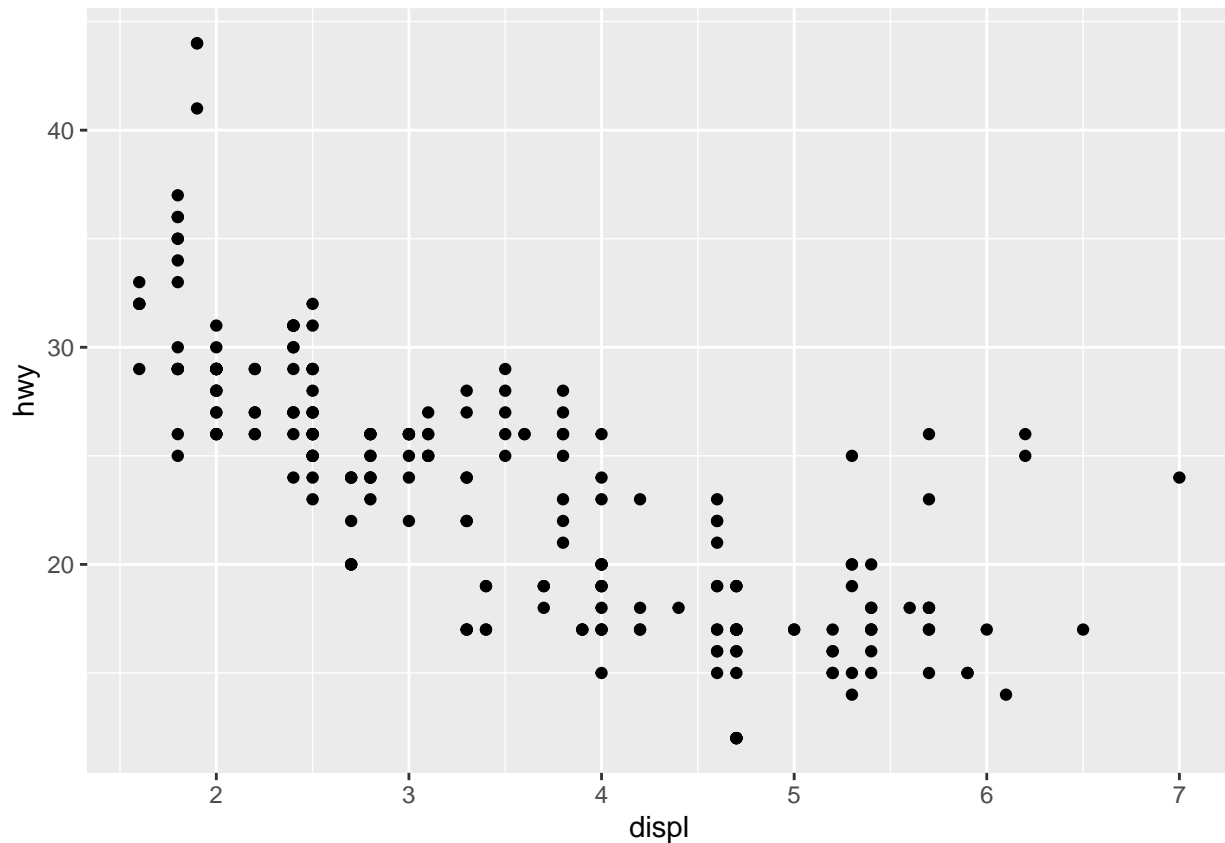
```
head(mpg)
```

```
## # A tibble: 6 x 11
##   manufacturer model displ  year   cyl trans      drv   cty   hwy fl   class
##   <chr>          <chr> <dbl> <int> <int> <chr>    <chr> <int> <int> <chr> <chr>
## 1 audi          a4      1.8  1999     4 auto(l5)  f     18    29 p   compa~
## 2 audi          a4      1.8  1999     4 manual(m5) f     21    29 p   compa~
## 3 audi          a4      2    2008     4 manual(m6) f     20    31 p   compa~
## 4 audi          a4      2    2008     4 auto(av)   f     21    30 p   compa~
## 5 audi          a4      2.8  1999     6 auto(l5)  f     16    26 p   compa~
## 6 audi          a4      2.8  1999     6 manual(m5) f     18    26 p   compa~
```

## 2.2 ggplot

- Data, Aesthetics, and Geometries layer

```
ggplot(data = mpg) +  
  geom_point(mapping = aes(x = displ, y = hwy))
```



- Change color and shape of the dots.

**- Facets layer**

`facet_wrap()`

`facet_grid()`

**- Statistics layer**

`geom_smooth()`

`stat__`

**- Coordinates layer**

`coord__`

**- Theme layer**

`theme()`

**- Summary**

Chp 3.10 is a good place to summarize the chapter.

Below is a graph of showing all layers of ggplot.

### **3. Exercises**

\$3.2.4: 4, 5

\$ 3.3.1

\$ 3.5.1

\$ 3.6.1

\$ 3.7.1

\$ 3.8.1



Figure 1: an image to explain the layers of ggplot