

Visualisation in R

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February 2010



Friday, 12 February 2010

HELLO

my name is

Hadley

<http://had.co.nz/rice-vis>

1. Preview of today

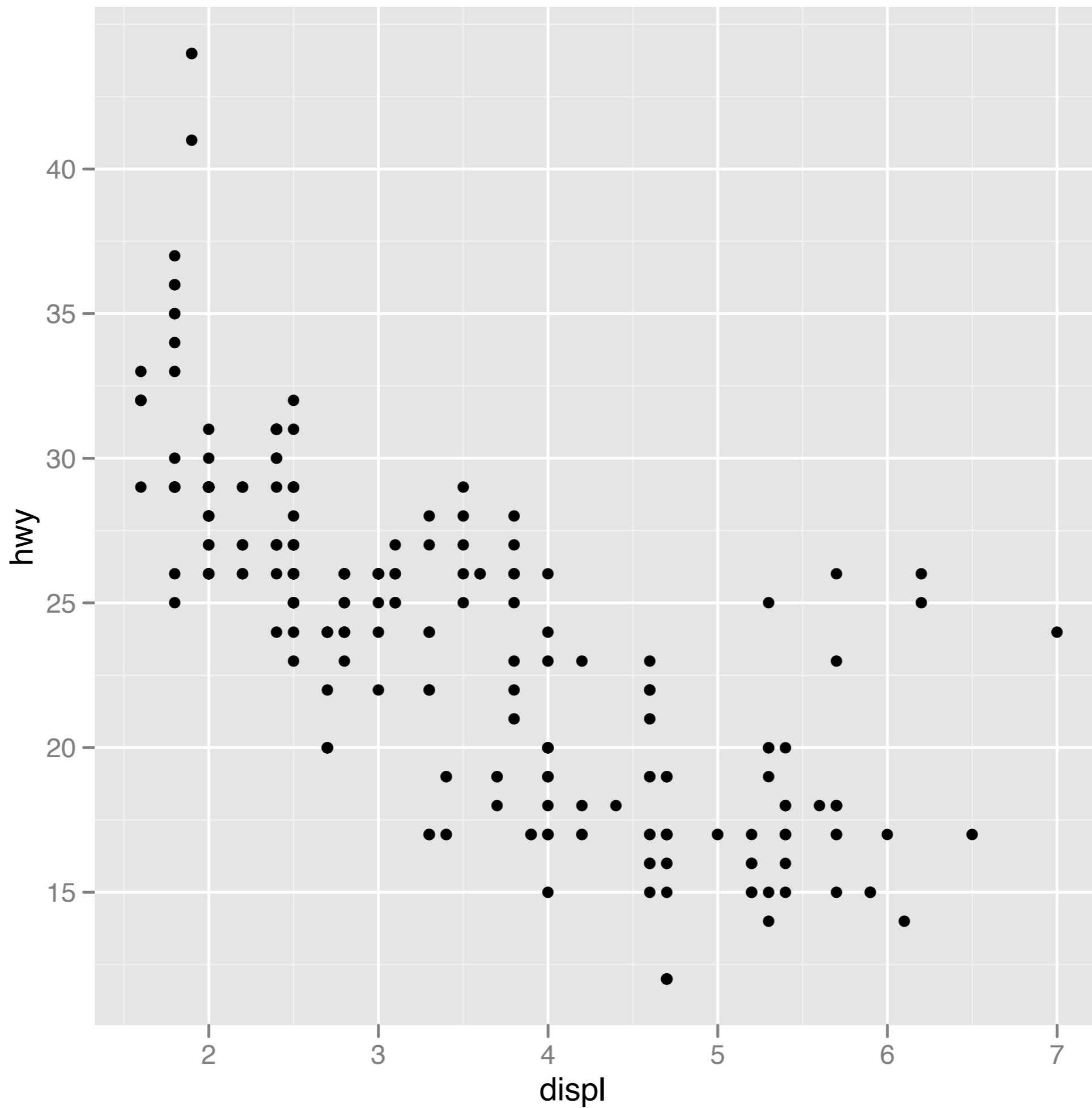
2. About ggplot2

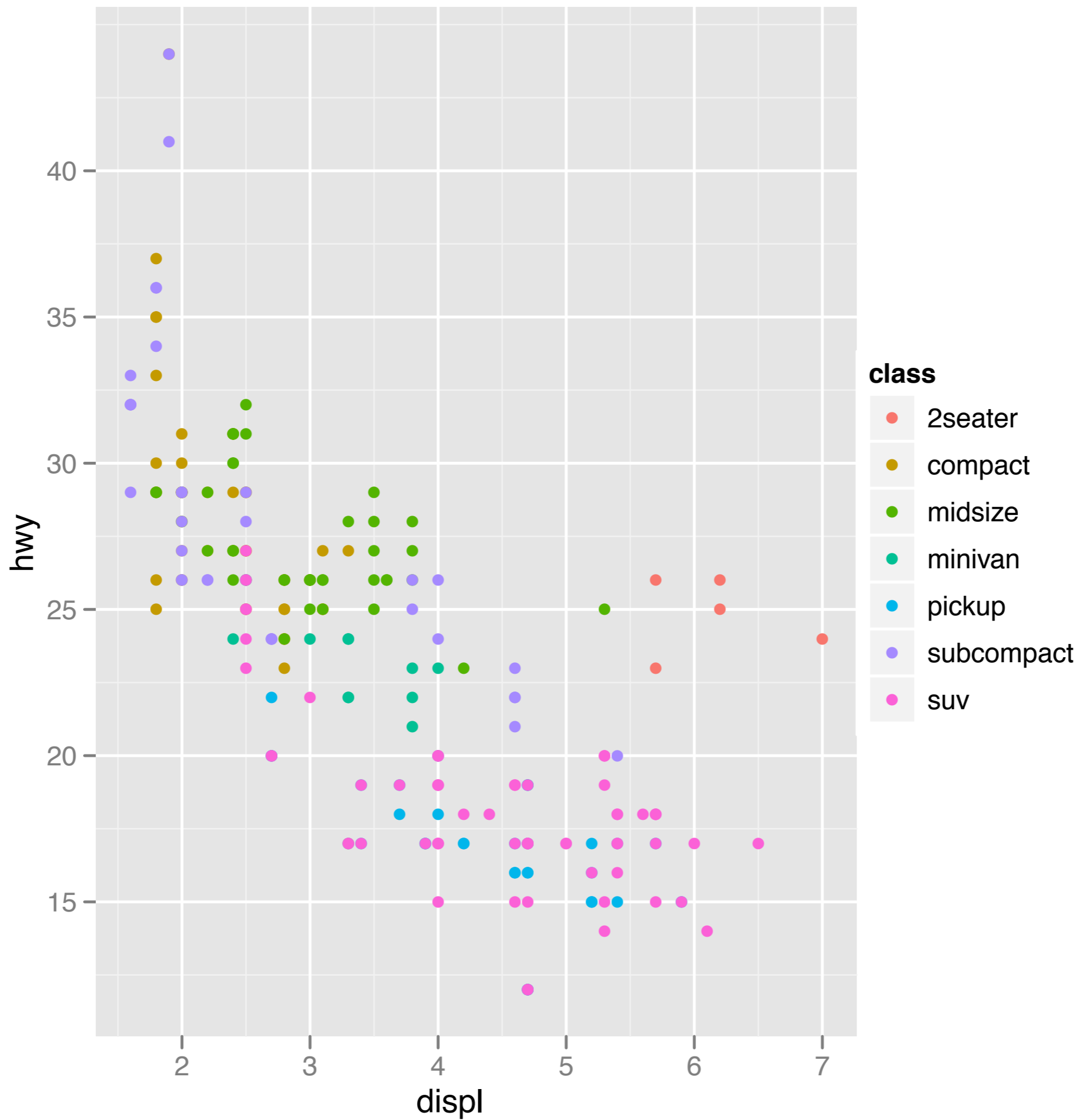
3. More resources

4. Diving in

Fuel economy

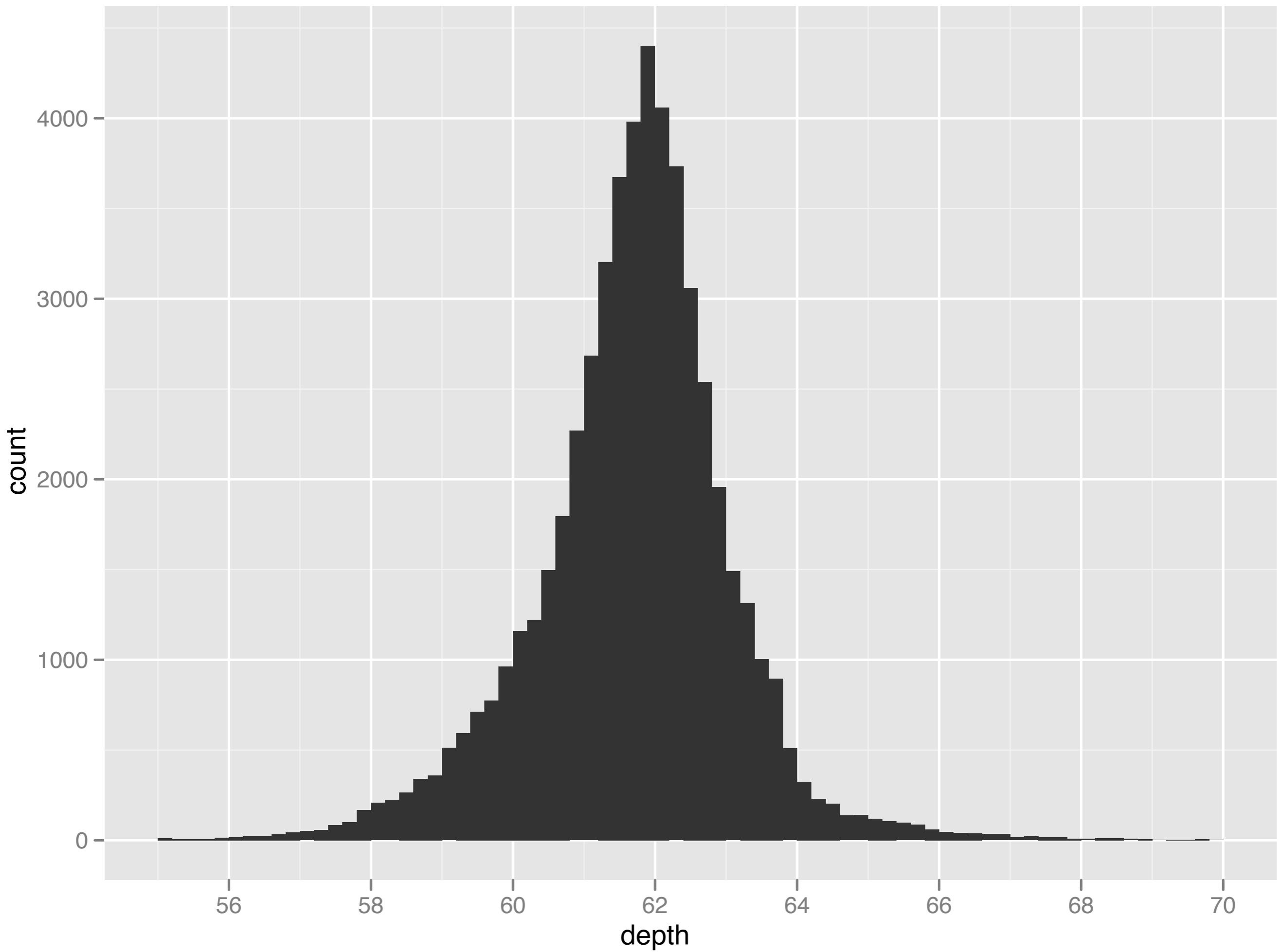
Basic graphics

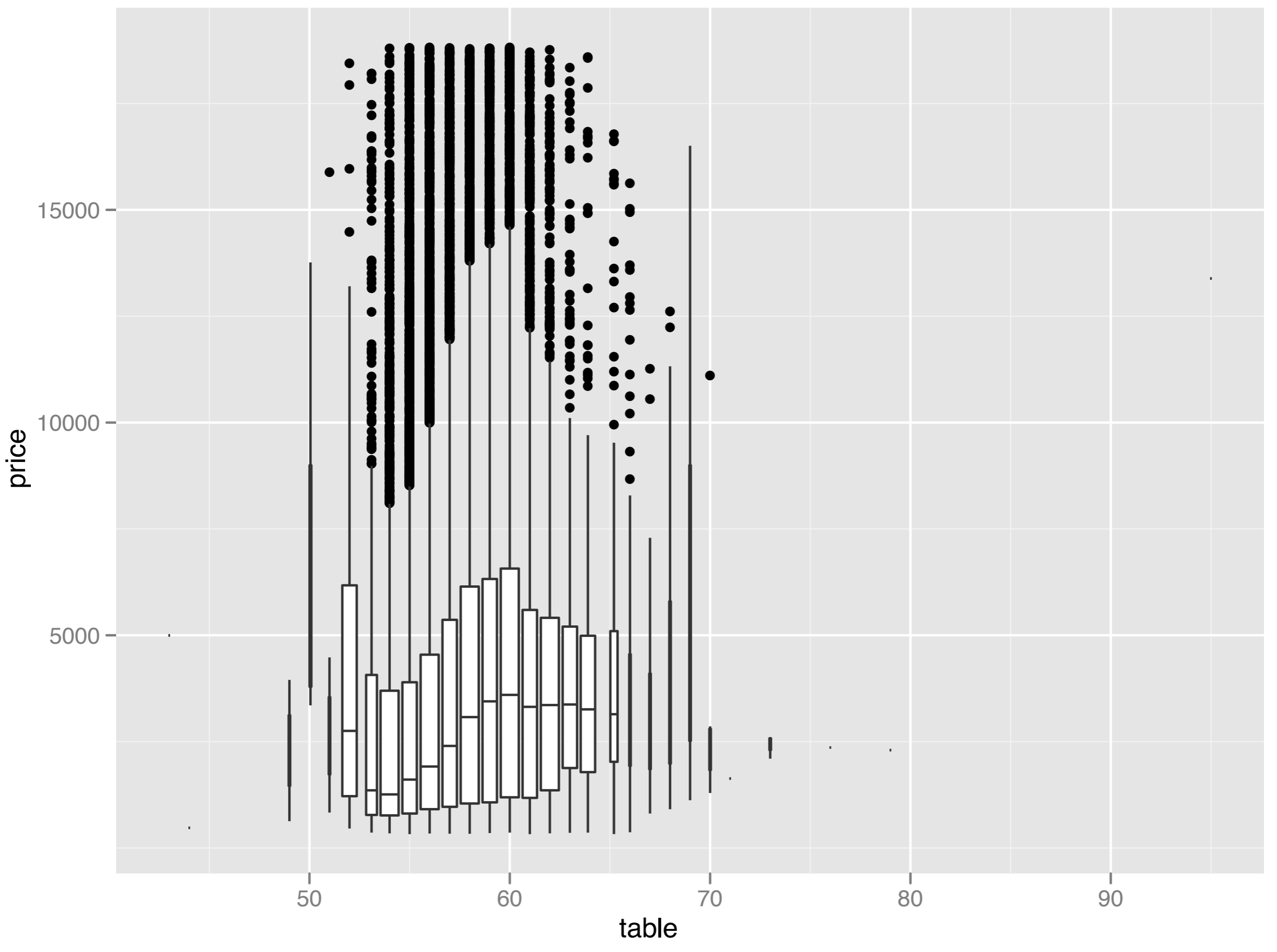


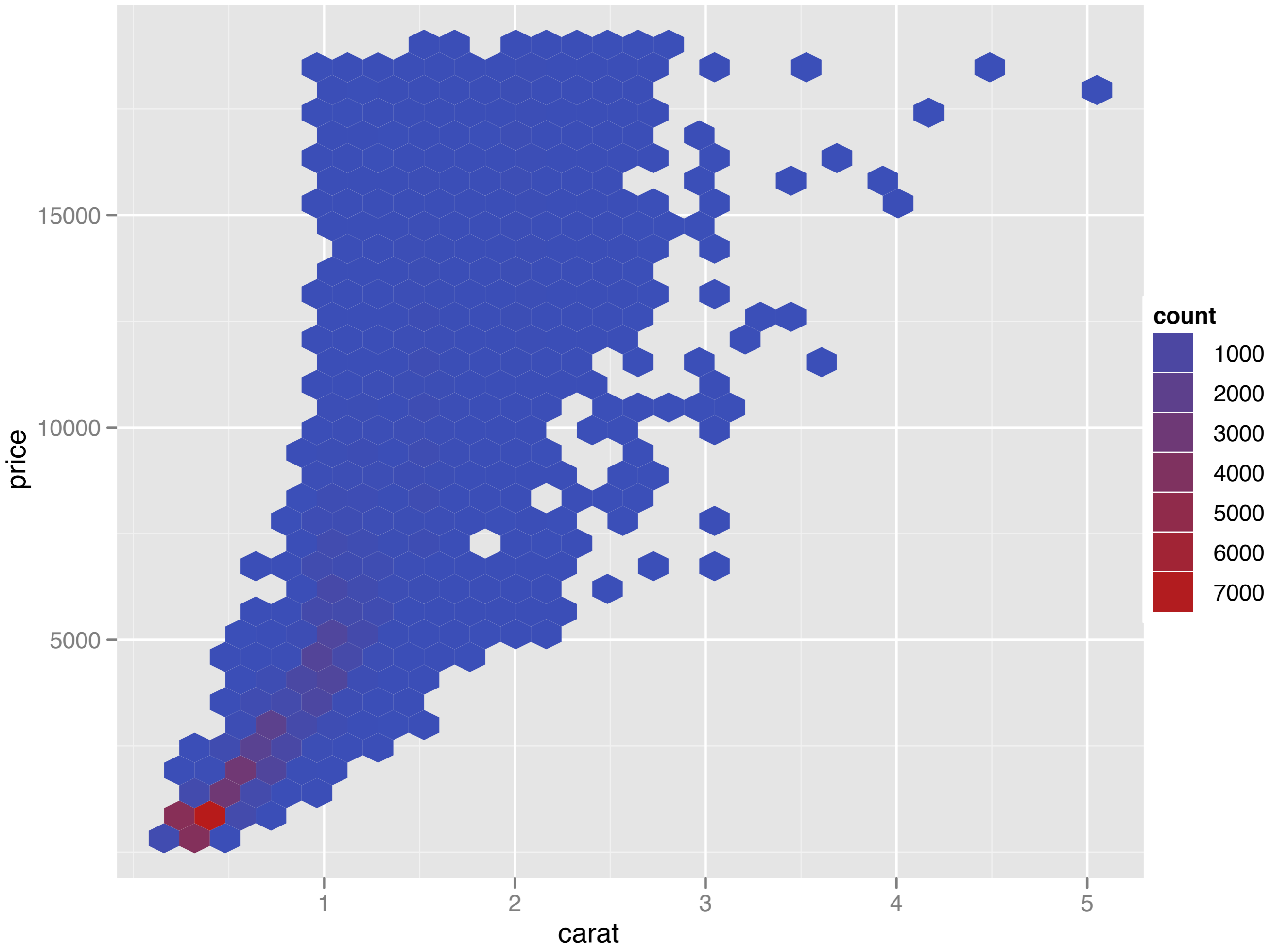


Diamond prices

Displaying large data

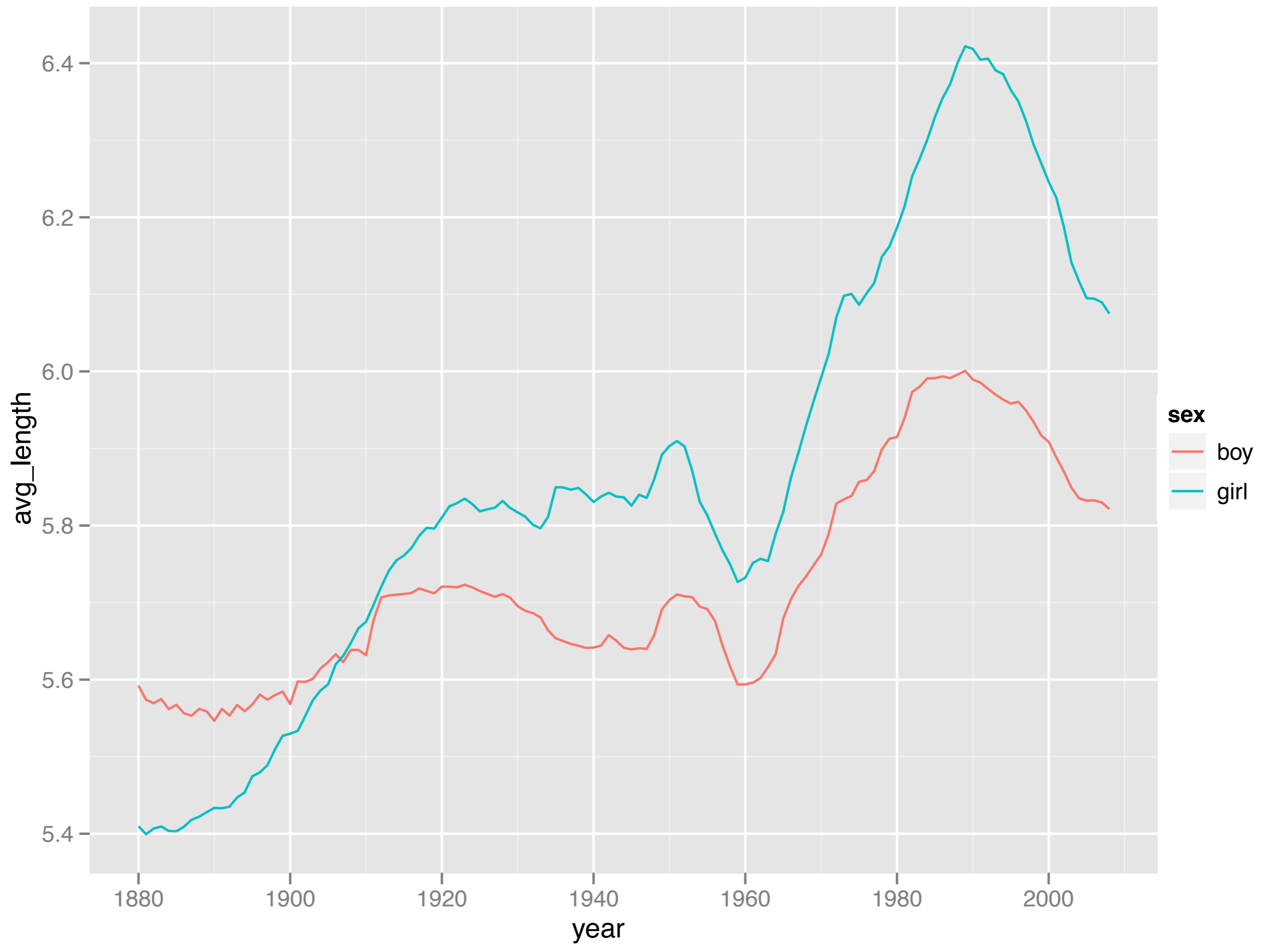


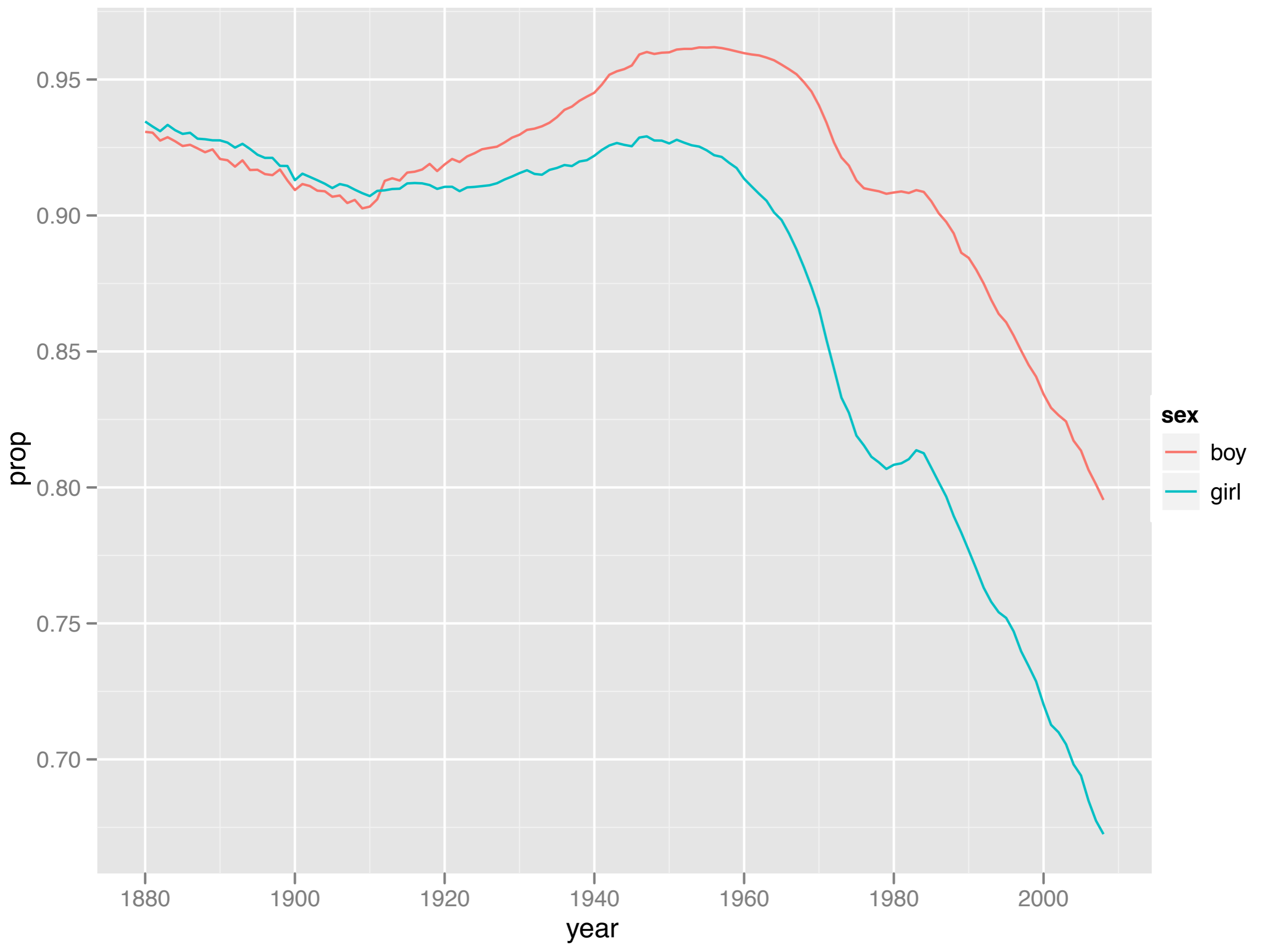




US baby names

Data manipulation and transformation

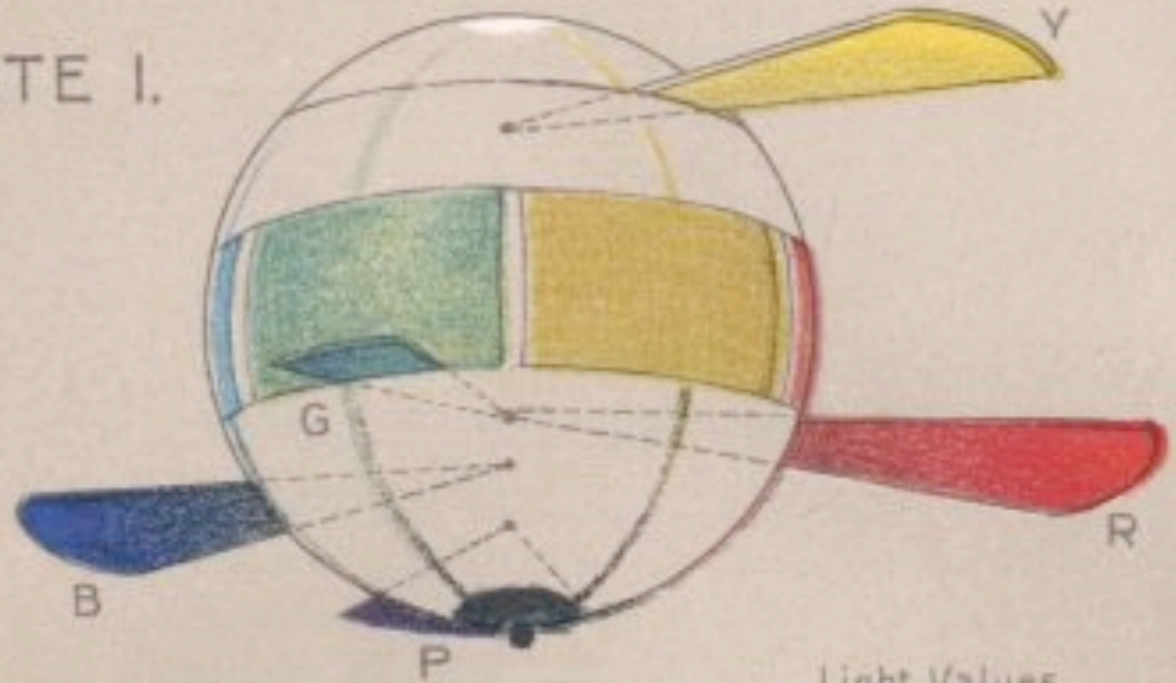




Polishing your plots

1. **Scales:** used to override default perceptual mappings, and tune parameters of axes and legends.
2. **Themes:** control presentation of non-data elements.
3. **Saving your work:** to include in reports, presentations, etc.

PLATE I.



Light Values				
Middle Values				
Dark Values				
P	B	G	Y	R



Copyright 1907 by A. H. Munsell.

ggplot2

About ggplot2

Graphical grammar (domain specific language), based on “The Grammar of Graphics” by Leland Wilkinson.

Specify what you want, not how to create it.
Many fiddly details taken care of.

“Instead of spending time making your graph look pretty, you can focus on creating a graph that bests reveals the messages in your data.”

Useful resources

<http://had.co.nz/ggplot2>

<http://had.co.nz/ggplot2/book>

<http://groups.google.com/group/ggplot2>

<http://learnr.wordpress.com>

<http://ggplot2.wik.is>



Learning a new
language is hard!

Scatterplot basics

```
install.packages("ggplot2")  
library(ggplot2)
```

```
?mpg
```

```
head(mpg)
```

```
str(mpg)
```

```
summary(mpg)
```

```
qplot(displ, hwy, data = mpg)
```

Scatterplot basics

```
install.packages("ggplot2")  
library(ggplot2)
```

```
?mpg
```

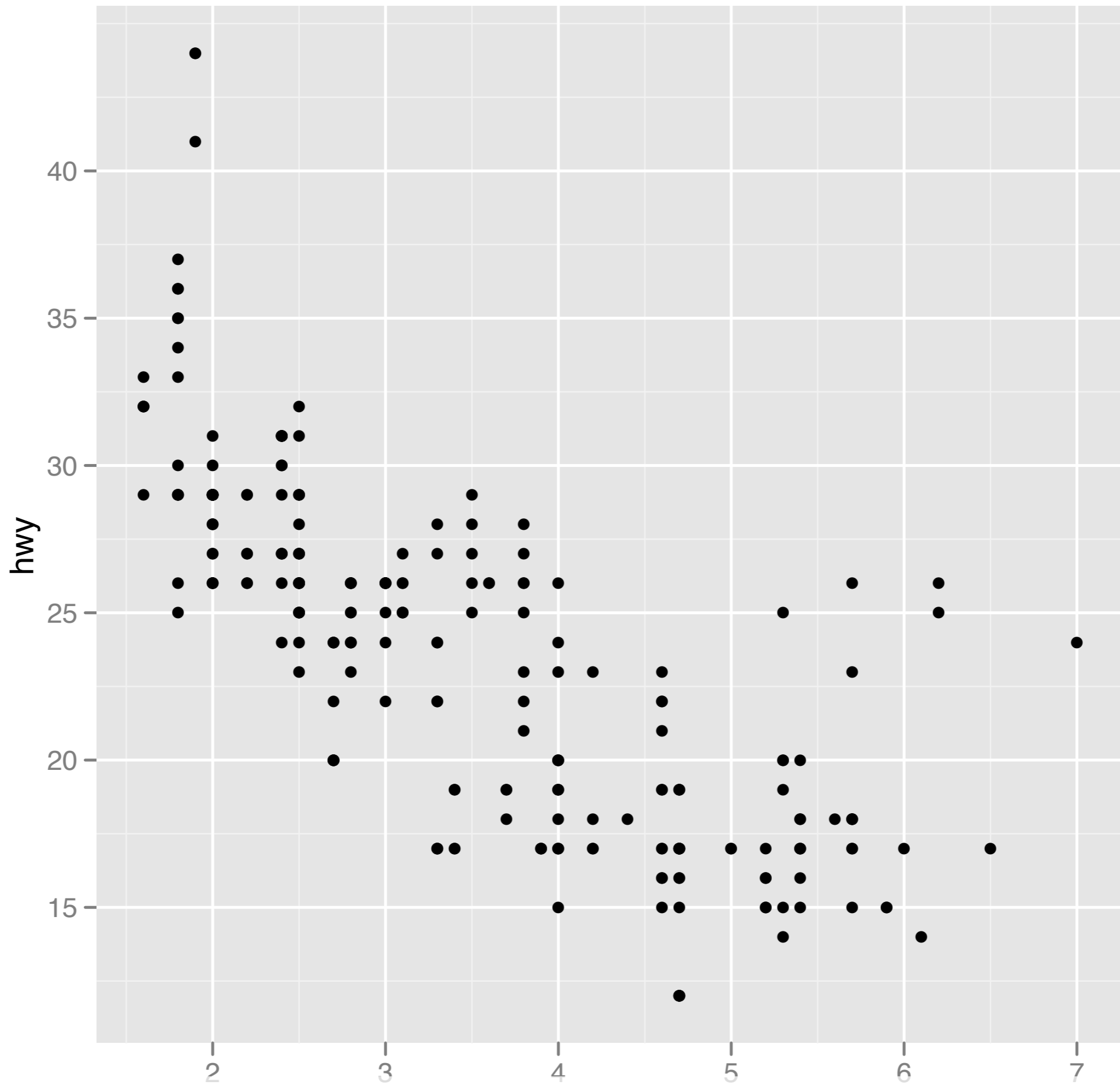
```
head(mpg)
```

```
str(mpg)
```

```
summary(mpg)
```

In ggplot2, we
always explicitly
specify the data

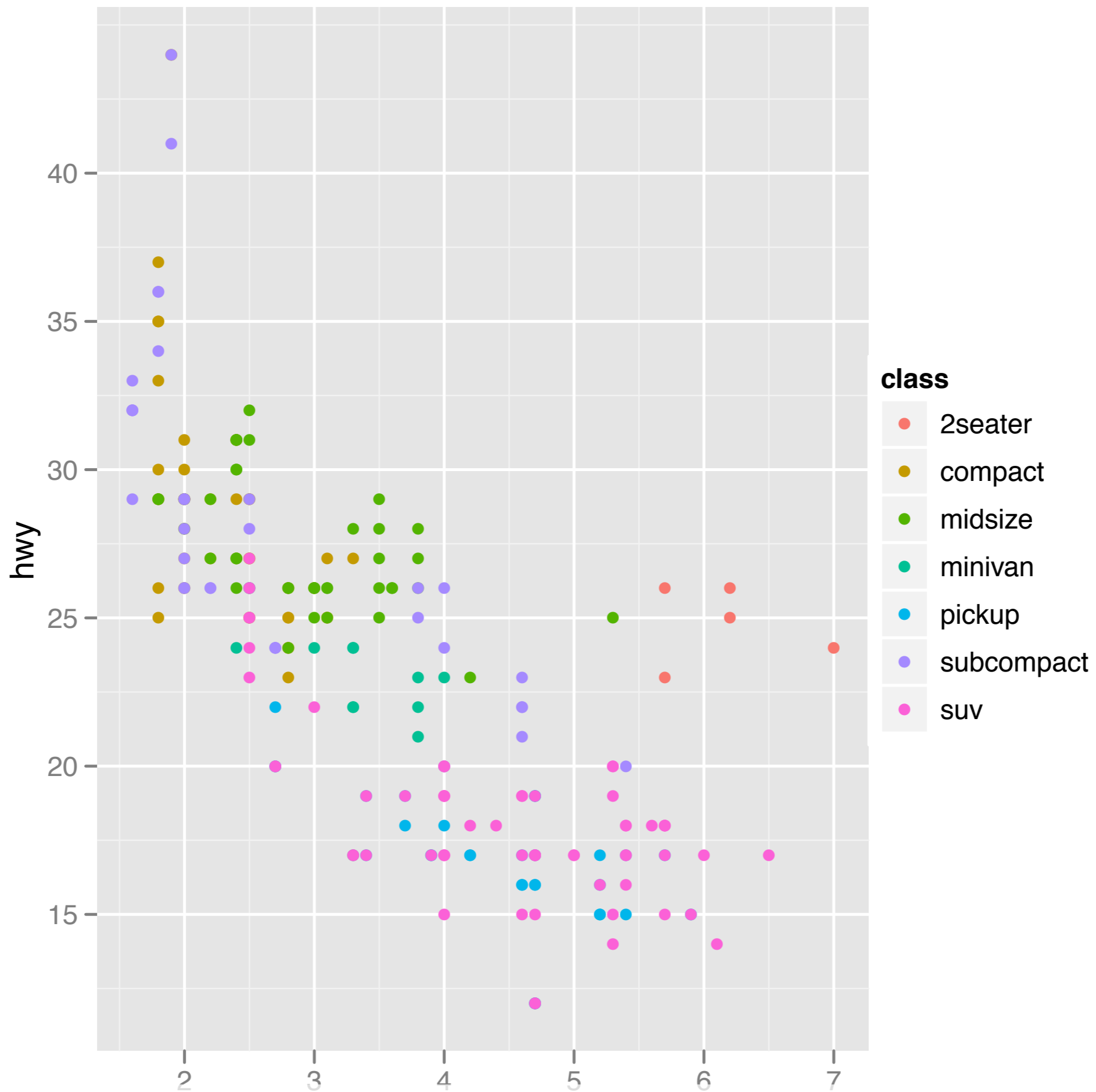
```
qplot(displ, hwy, data = mpg)
```



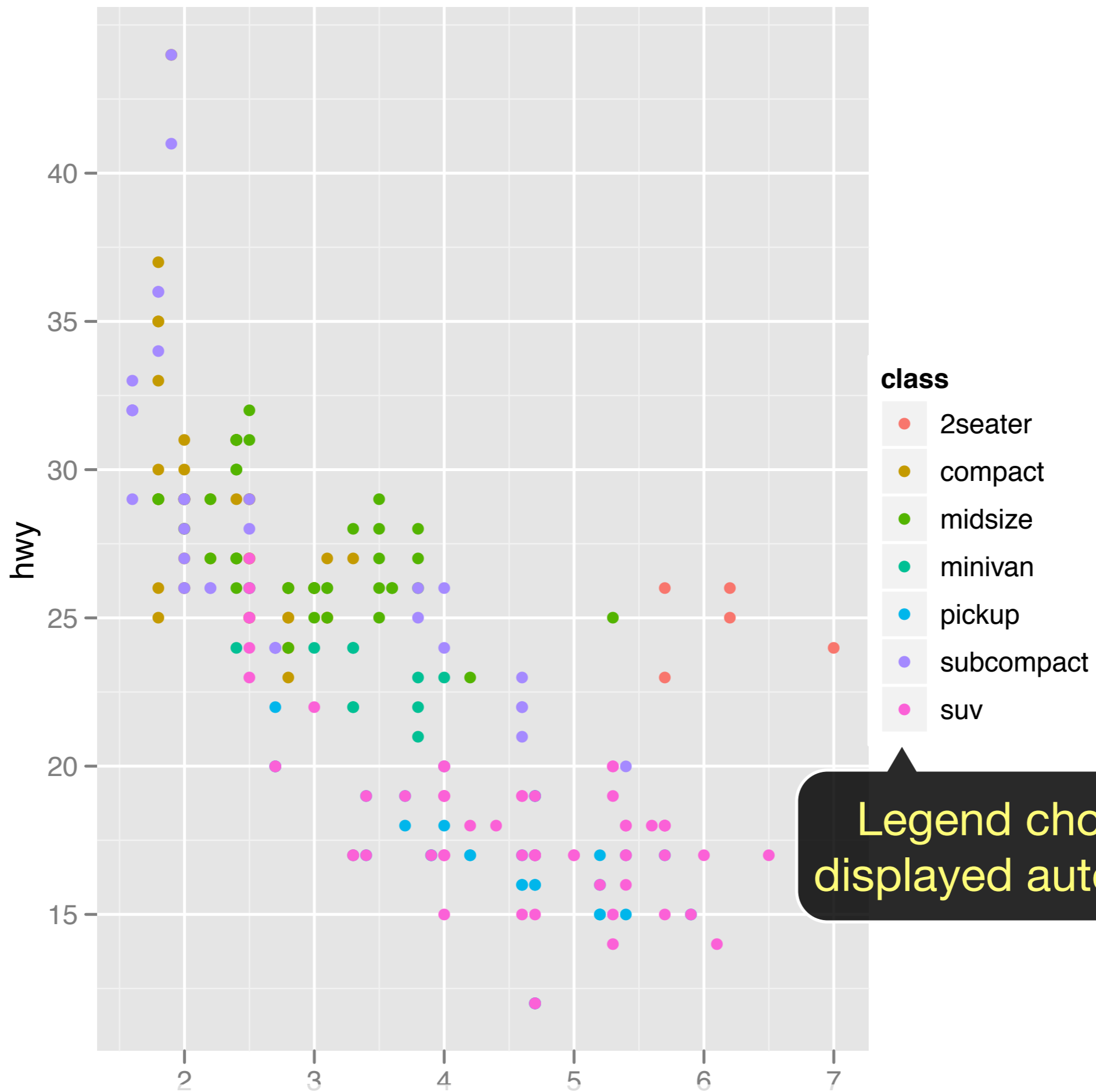
```
qplot(displ, hwy, data = mpg)
```

Additional variables

Can display additional variables with **aesthetics** (like shape, colour, size) or **facetting** (small multiples displaying different subsets)



```
qplot(displ, hwy, colour = class, data = mpg)
```



Legend chosen and displayed automatically.

```
qplot(displ, hwy, colour = class, data = mpg)
```

Your turn

Experiment with colour, size, and shape aesthetics.

What's the difference between discrete or continuous variables?

What happens when you combine multiple aesthetics?

	Discrete	Continuous
Colour	Rainbow of colours	Gradient from red to blue
Size	Discrete size steps	Linear mapping between radius and value
Shape	Different shape for each	Doesn't work

Faceting

Small multiples displaying different subsets of the data.

Useful for exploring conditional relationships. Useful for large data.

Your turn

```
qplot(displ, hwy, data = mpg) +  
facet_grid(. ~ cyl)
```

```
qplot(displ, hwy, data = mpg) +  
facet_grid(drv ~ .)
```

```
qplot(displ, hwy, data = mpg) +  
facet_grid(drv ~ cyl)
```

```
qplot(displ, hwy, data = mpg) +  
facet_wrap(~ class)
```

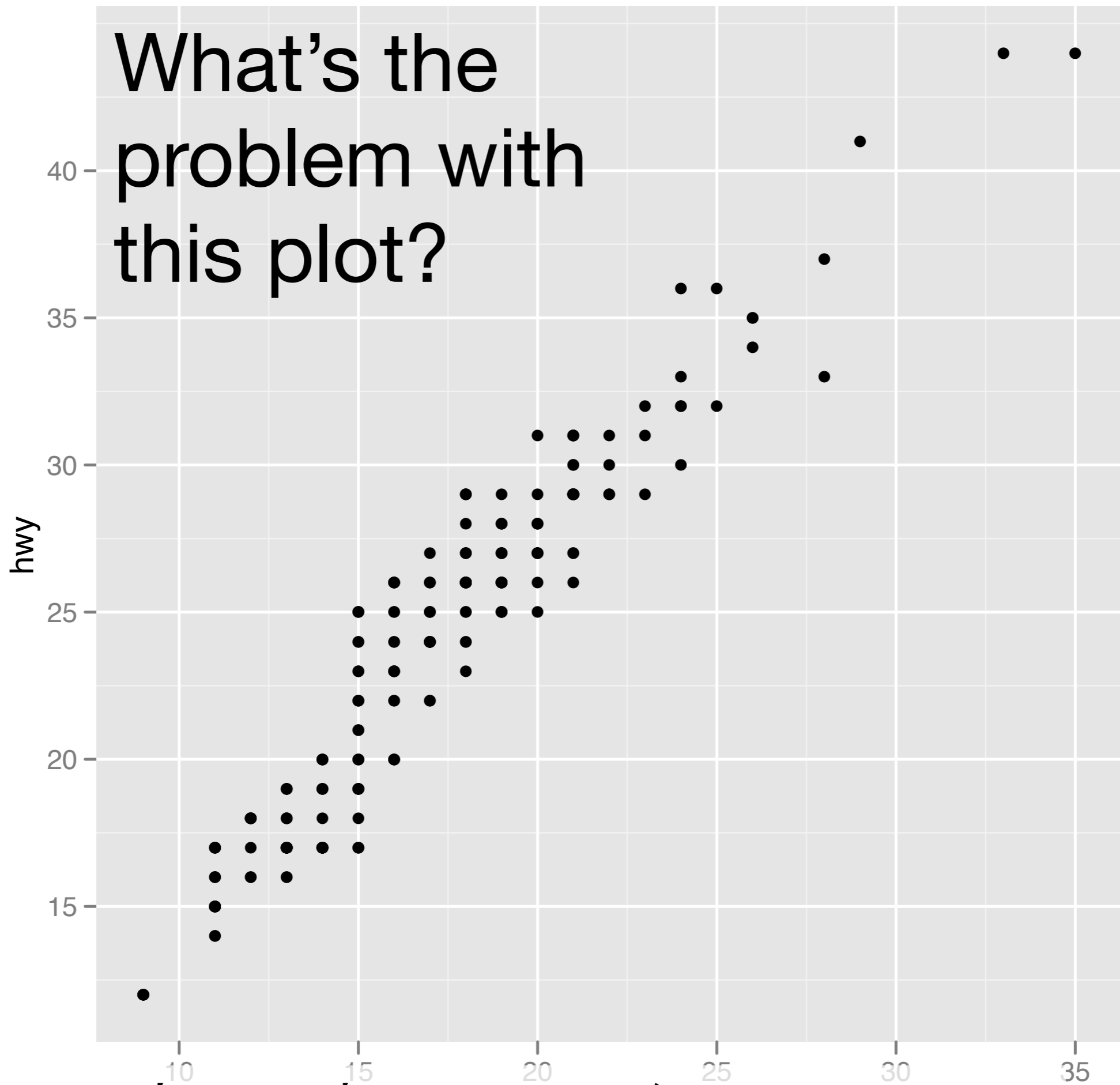
Summary

`facet_grid()`: 2d grid, rows ~ cols, . for no split

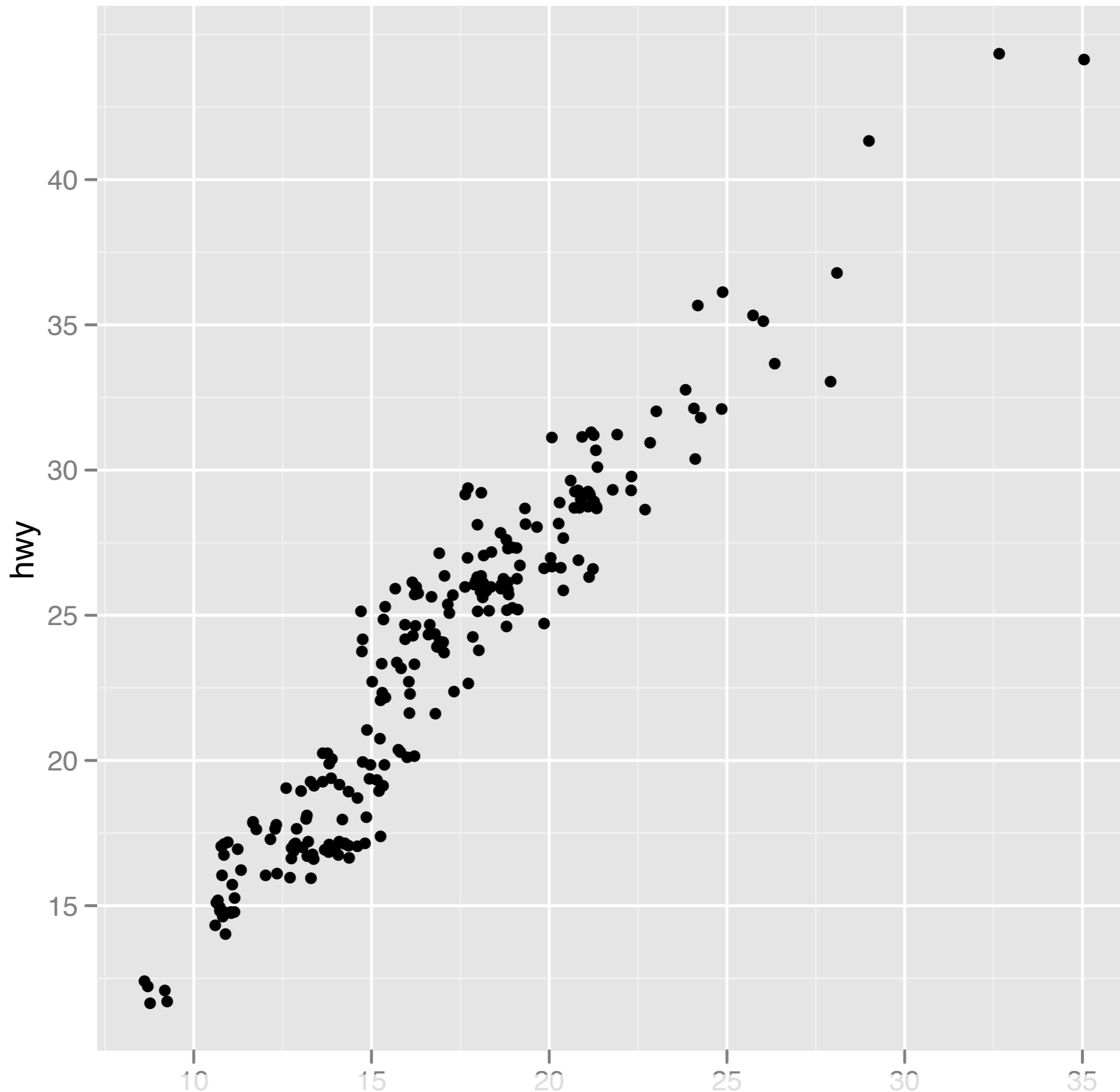
`facet_wrap()`: 1d ribbon wrapped into 2d

`Scales` argument controls whether position scales are fixed or free.

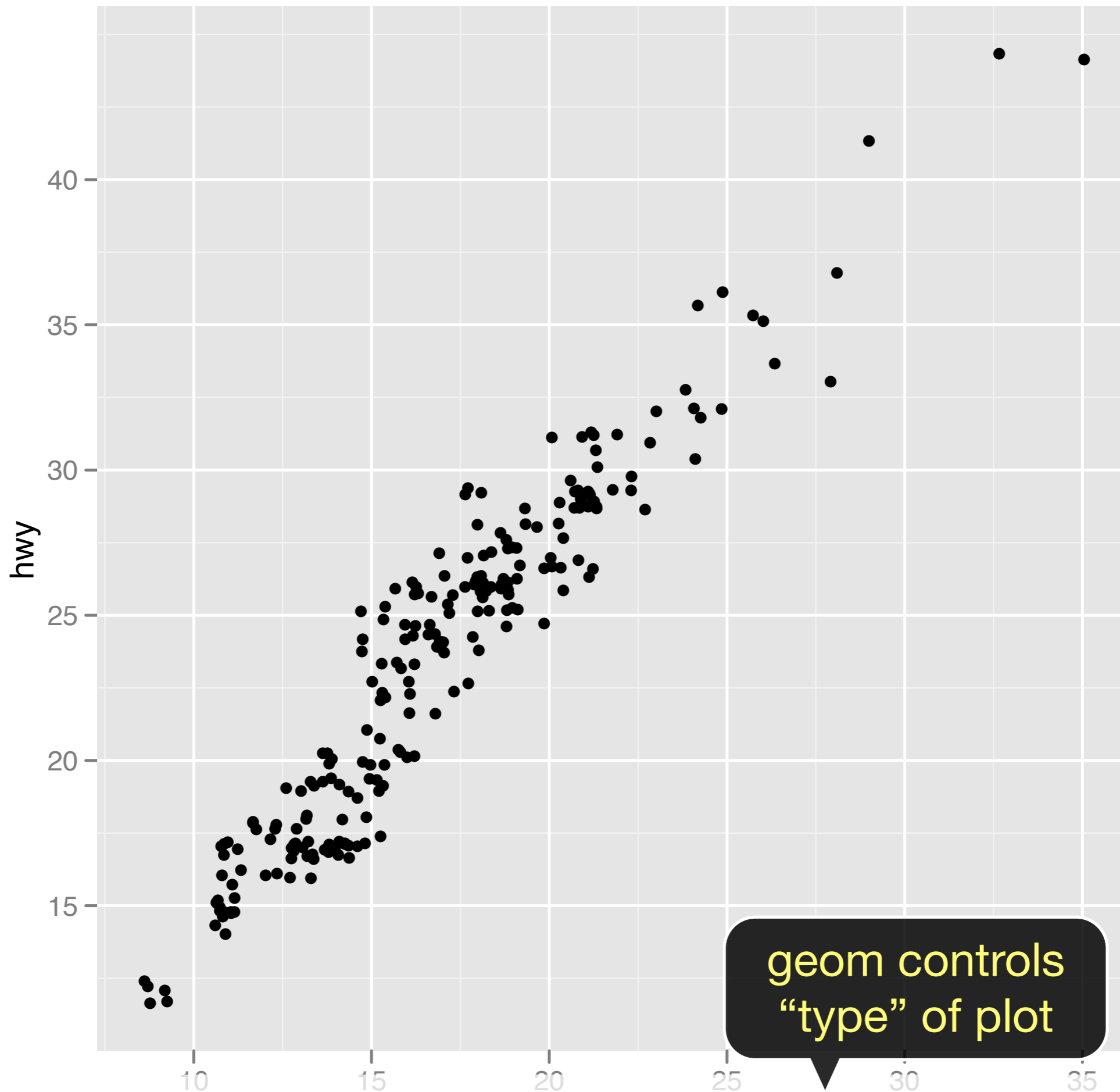
What's the
problem with
this plot?



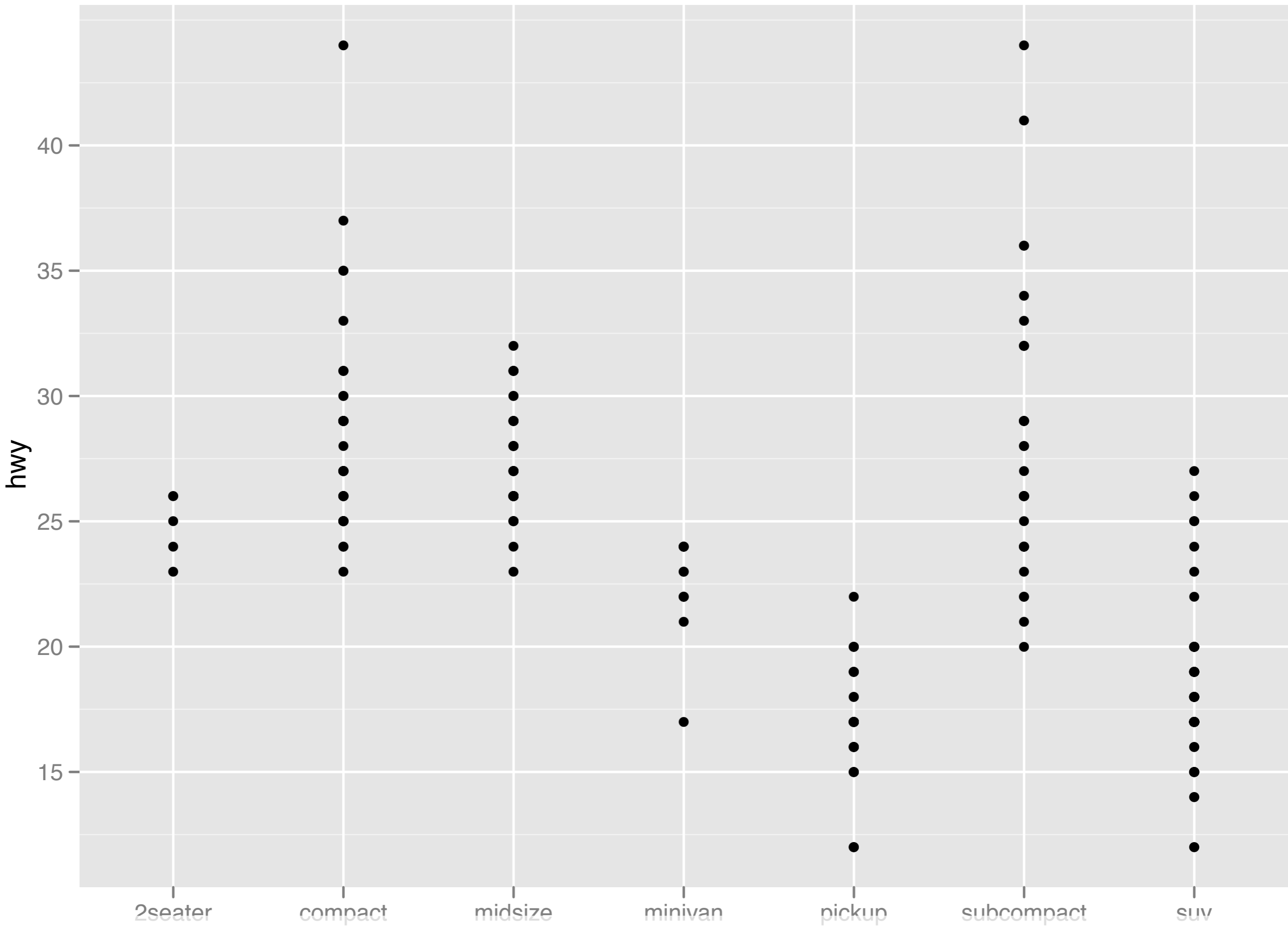
```
qplot(cty, hwy, data = mpg)
```



```
qplot(cty, hwy, data = mpg, geom = "jitter")
```



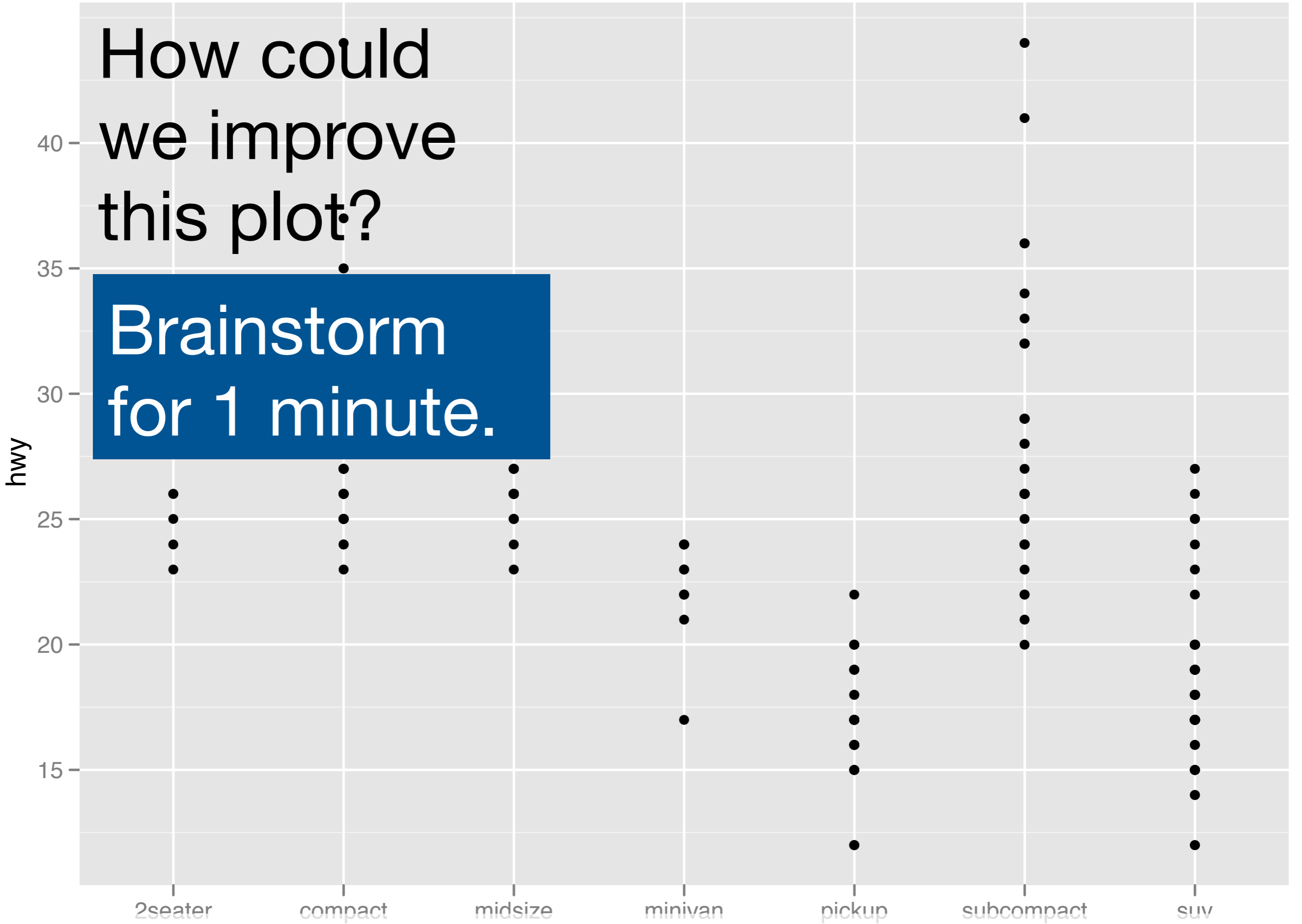
```
qplot(cty, hwy, data = mpg, geom = "jitter")
```



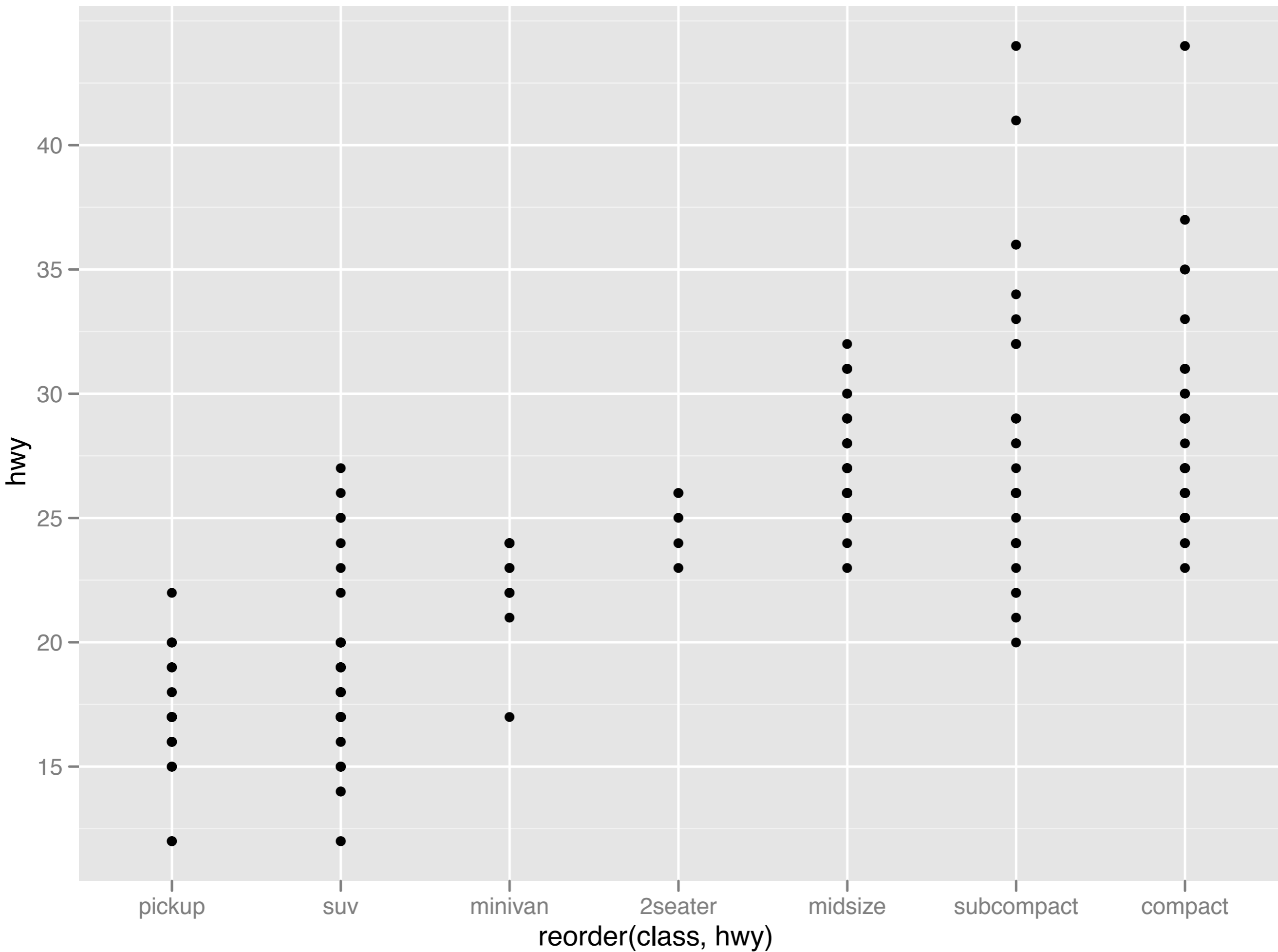
`qplot(class, hwy, data = mpg)`

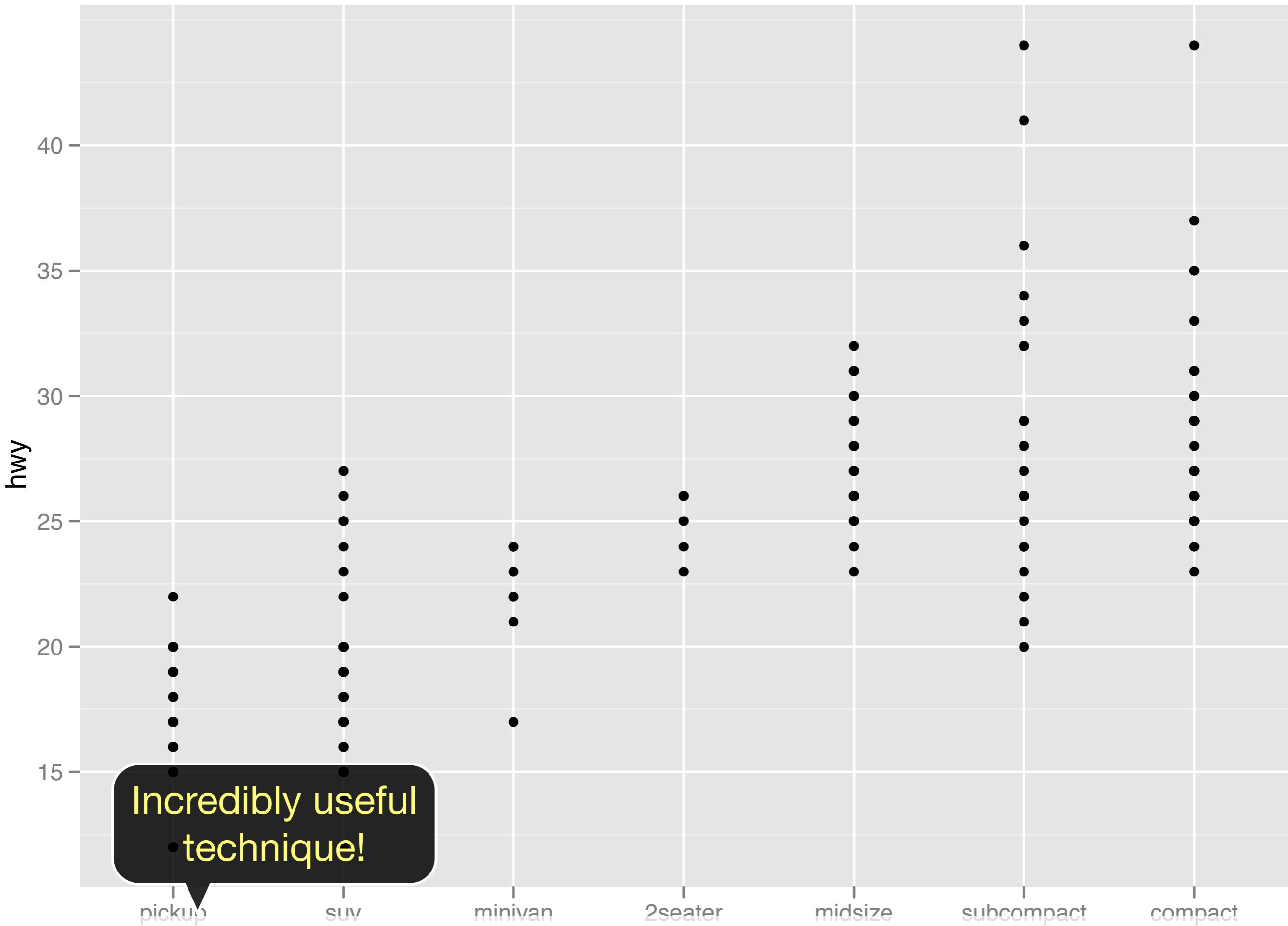
How could we improve this plot?

Brainstorm for 1 minute.



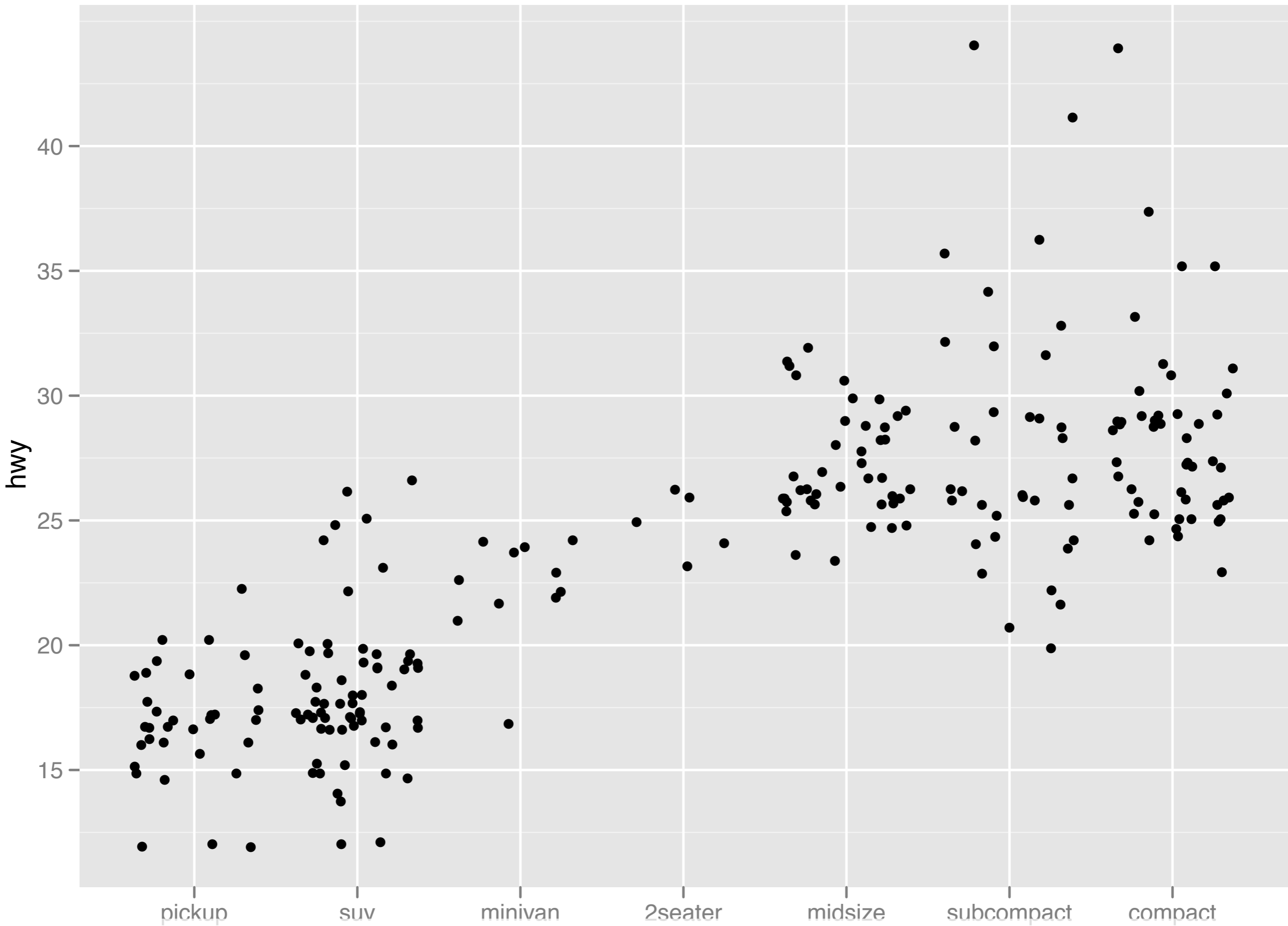
```
qplot(class, hwy, data = mpg)
```



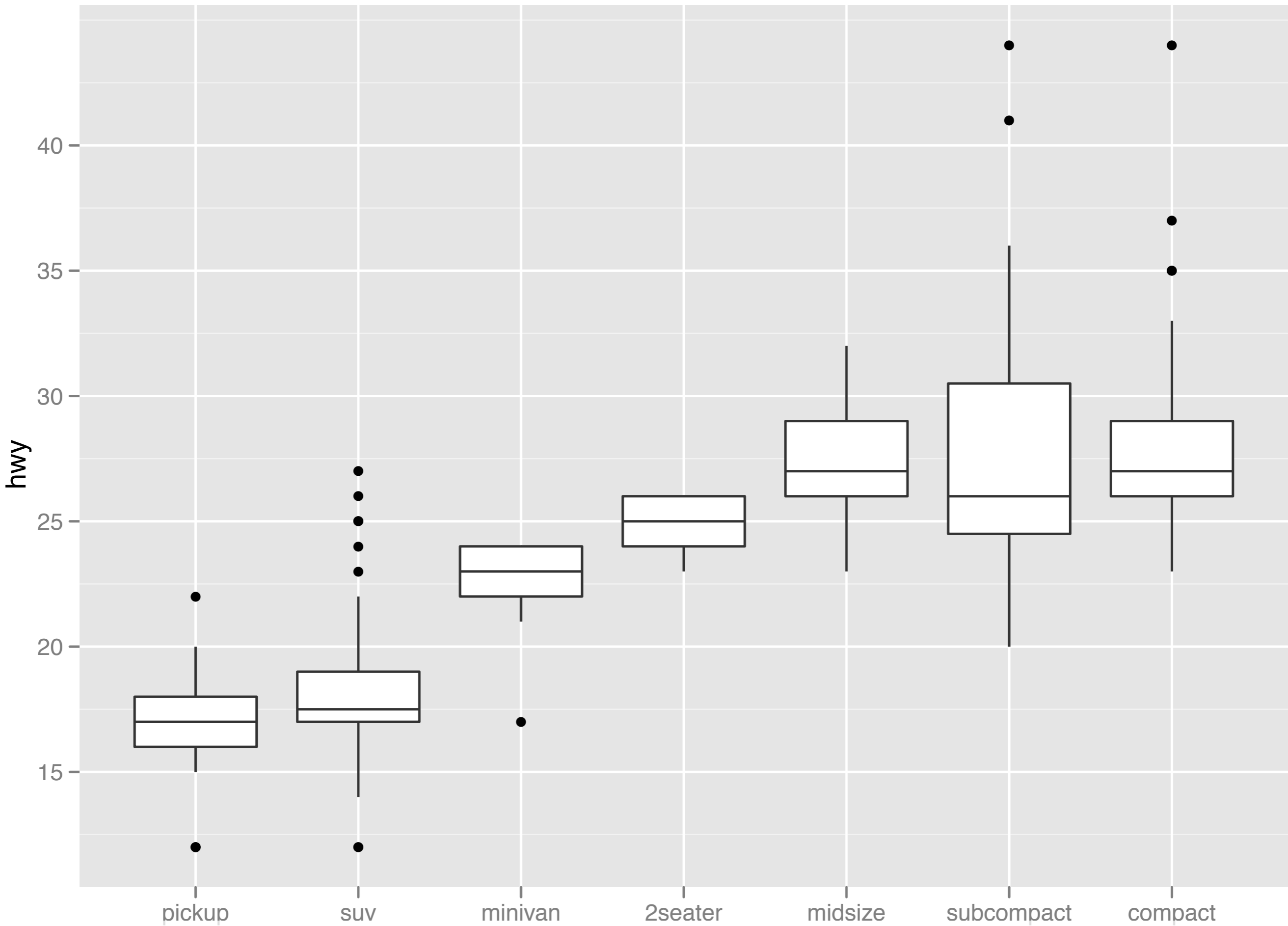


Incredibly useful
• technique!

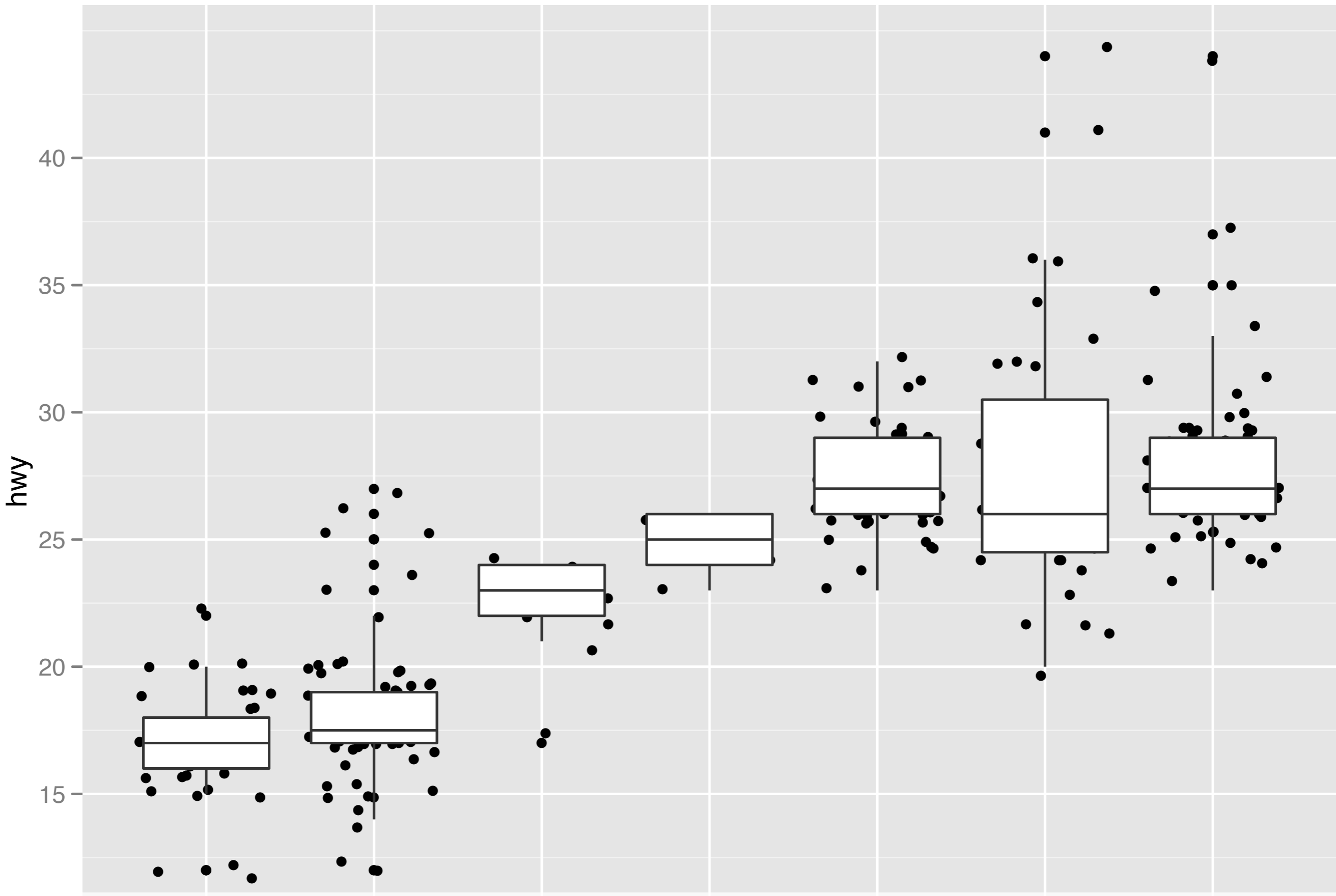
```
qplot(reorder(class, hwy), hwy, data = mpg)
```



```
qplot(reorder(class, hwy), hwy, data = mpg, geom = "jitter")
```



```
qplot(reorder(class, hwy), hwy, data = mpg, geom = "boxplot")
```



```
qplot(reorder(class, hwy), hwy, data = mpg,  
      geom = c("jitter", "boxplot(reorder(class, hwy))"))
```

Your turn

Read the help for reorder. Redraw the previously plots with class ordered by median hwy.

How would you put the jittered points on top of the boxplots?

Aside: coding strategy

At the end of each interactive session, you want a summary of everything you did. Two options:

1. Save everything you did with `savehistory()` then remove the unimportant bits.
2. Build up the important bits as you go.
(this is how I work)

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