

()

R (visualizing) . tidyverse ggplot2 .
tidyverse .

```
library(tidyverse)
```

ggplot2 mpg .

```
mpg
```

A tibble: 234 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~	f	18	29	p	comp~
2	audi	a4	1.8	1999	4	manu~	f	21	29	p	comp~
3	audi	a4	2	2008	4	manu~	f	20	31	p	comp~
4	audi	a4	2	2008	4	auto~	f	21	30	p	comp~
5	audi	a4	2.8	1999	6	auto~	f	16	26	p	comp~
6	audi	a4	2.8	1999	6	manu~	f	18	26	p	comp~
7	audi	a4	3.1	2008	6	auto~	f	18	27	p	comp~
8	audi	a4 quattro	1.8	1999	4	manu~	4	18	26	p	comp~
9	audi	a4 quattro	1.8	1999	4	auto~	4	16	25	p	comp~
10	audi	a4 quattro	2	2008	4	manu~	4	20	28	p	comp~

i 224 more rows

11 .

- displ:
- hwy:
- class:

0.1 (aesthetic mappings)

displ hwy class

```
ggplot(mpg, aes(x = displ, y = hwy, color = class)) +  
  geom_point()
```

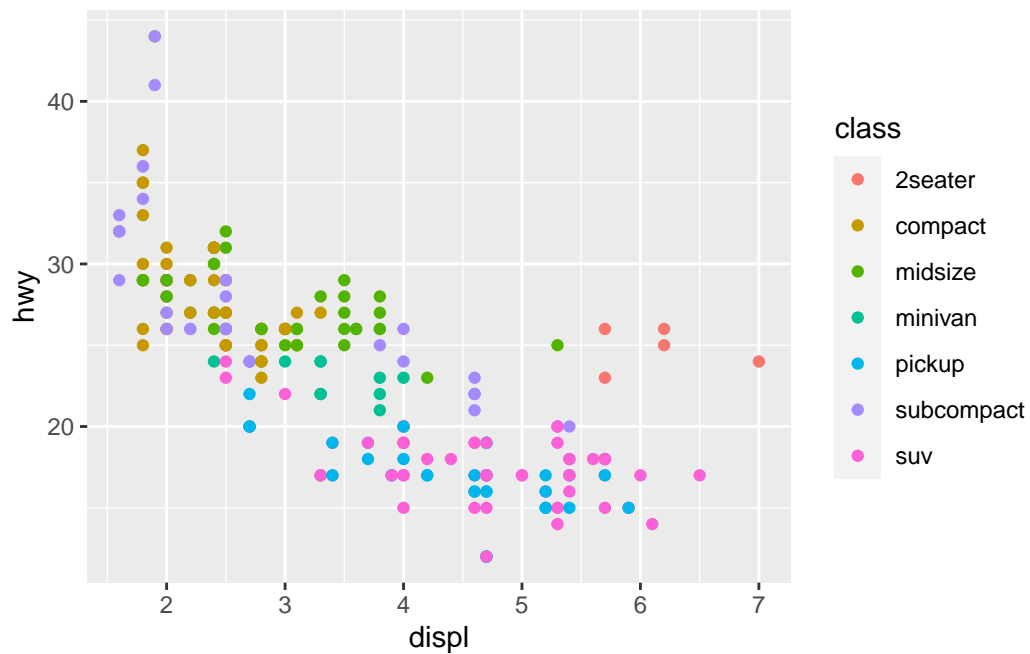


Figure 1: :

```
ggplot(mpg, aes(x = displ, y = hwy, shape = class)) +  
  geom_point()
```

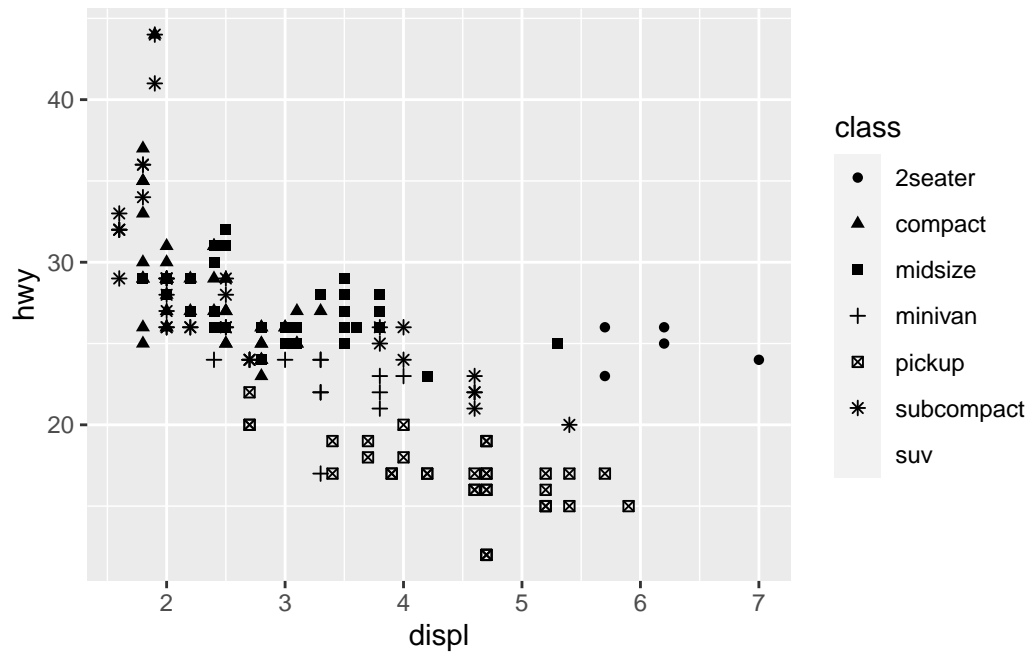


Figure 2: :

Figure 1 Figure 2 ? (color) (shape) (size) (alpha)

```
ggplot(mpg, aes(x = displ, y = hwy, size = class)) +
  geom_point()
```

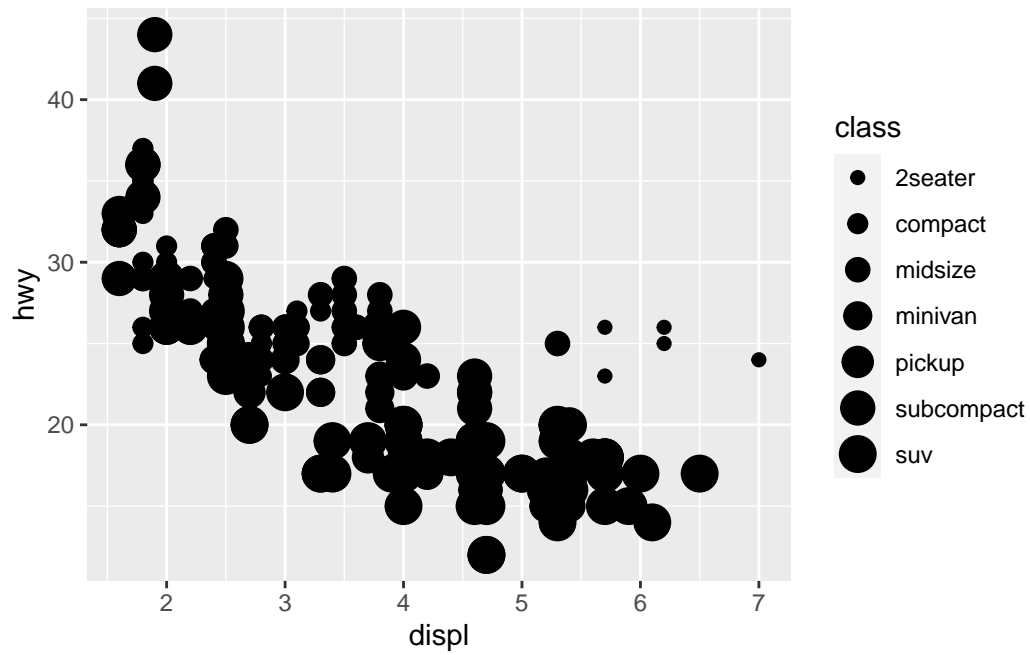


Figure 3: :

```
ggplot(mpg, aes(x = displ, y = hwy, alpha = class)) +  
  geom_point()
```

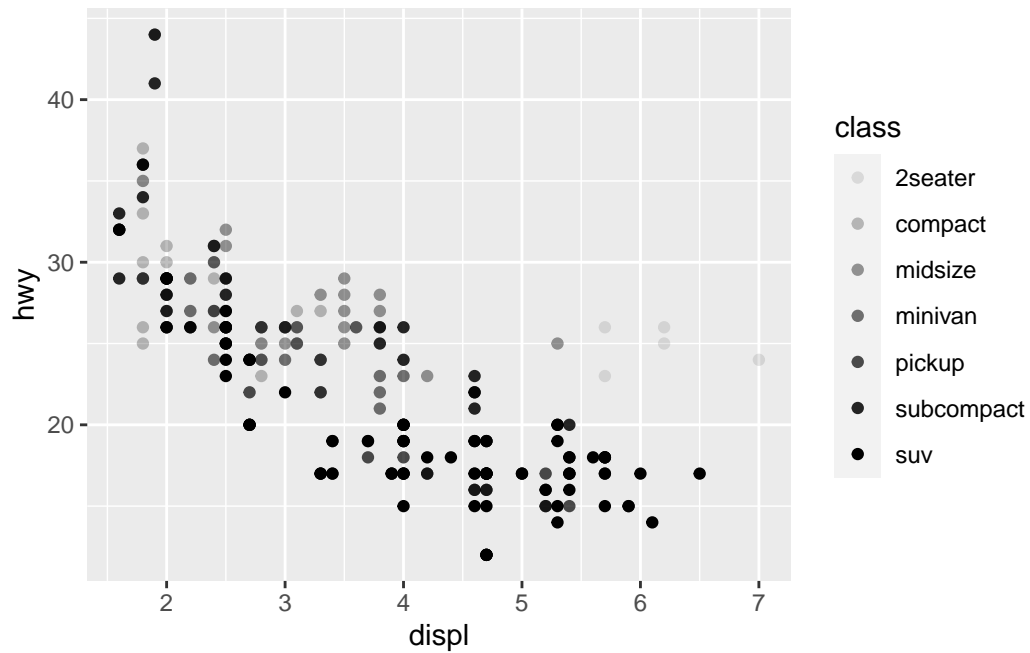


Figure 4: :

class

(visual variable)

0.2 (geometric objects)

. Figure 5 Figure 6 (point)

(smooth) .

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

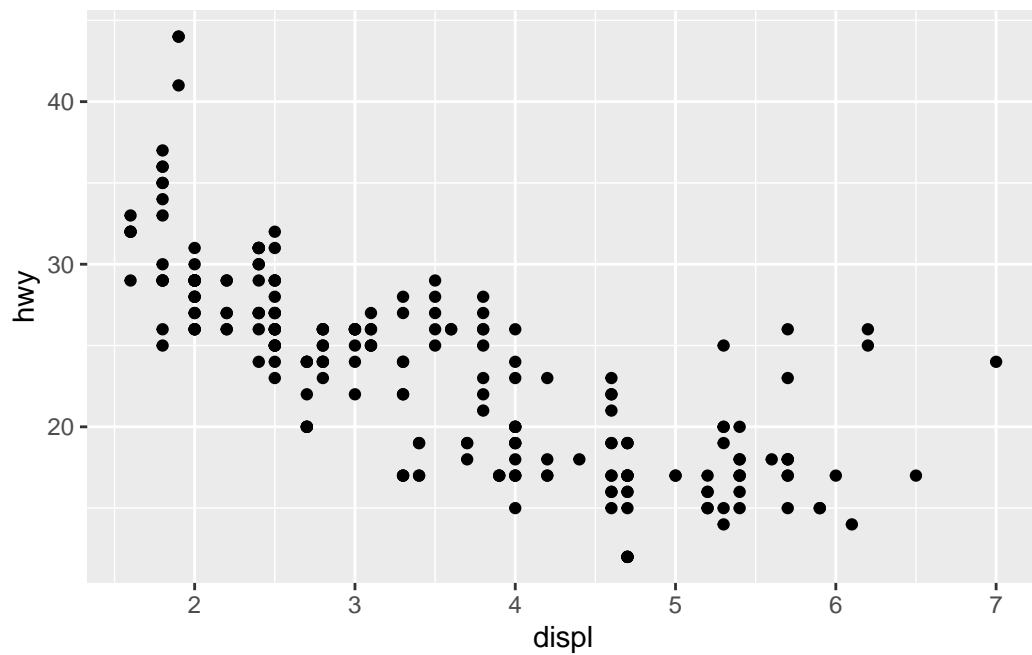


Figure 5: :

```
ggplot(mpg, aes(x = displ, y = hwy)) +  
  geom_smooth()
```

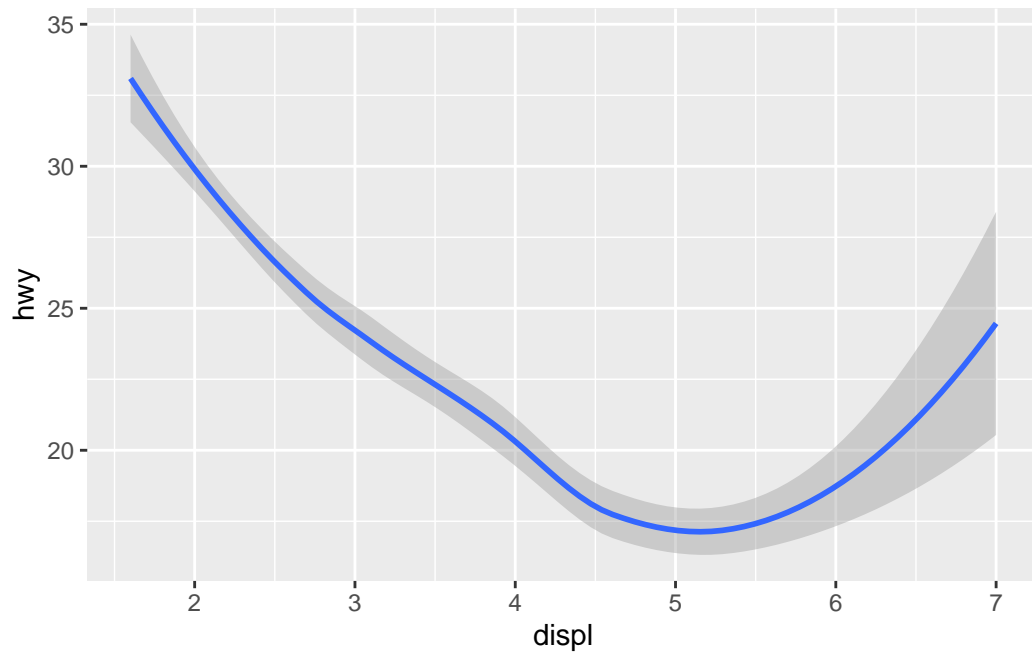


Figure 6: `geom_smooth()`:

Figure 1 Figure 6 `geom_smooth()`.

```
ggplot(mpg, aes(x = displ, y = hwy, color = class)) +  
  geom_point() +  
  geom_smooth()
```

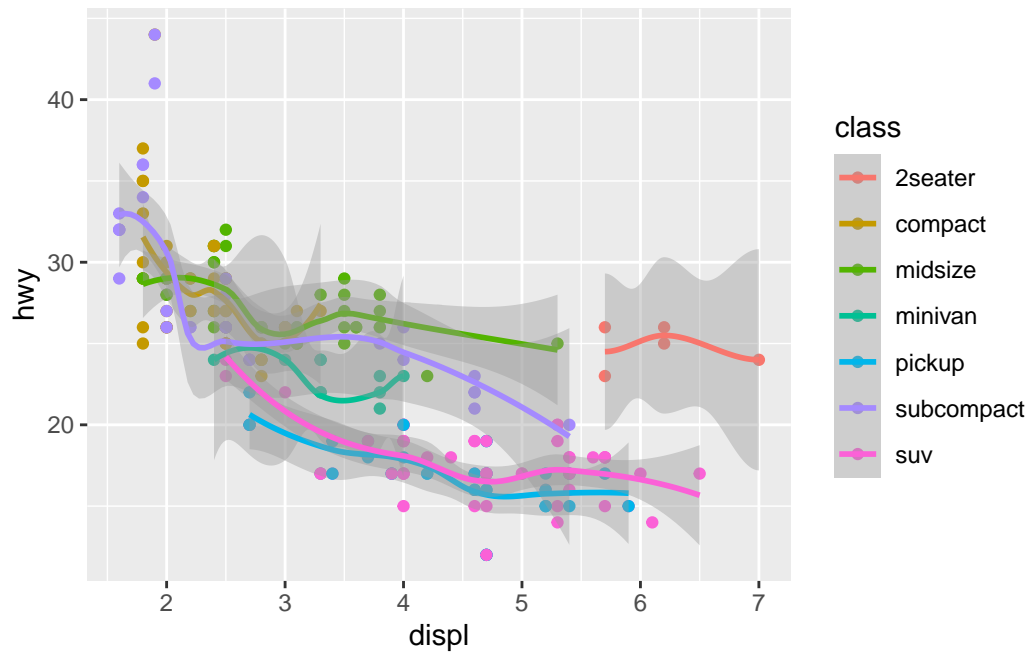


Figure 7: : + 1

```
ggplot(mpg, aes(x = displ, y = hwy)) +
  geom_point(aes(color = class)) +
  geom_smooth()
```

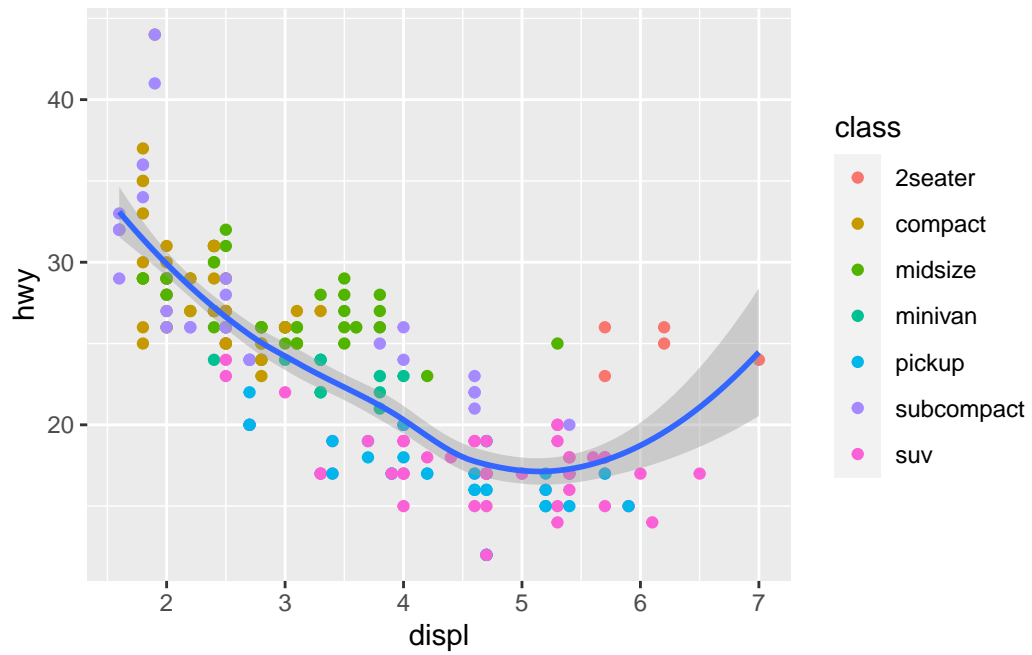



Figure 8: `lm(hwy ~ displ, data = mpg)`

`color` () . `ggplot()` , .