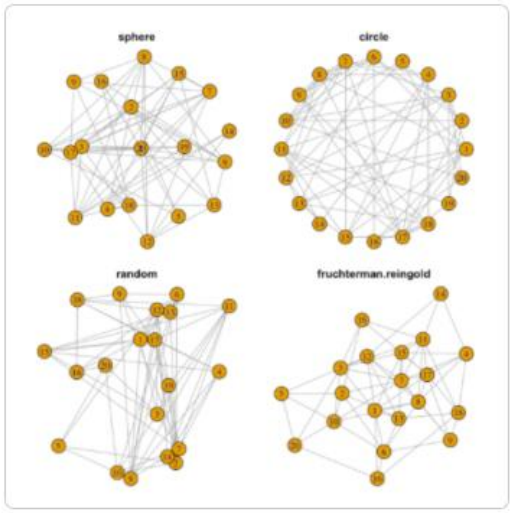
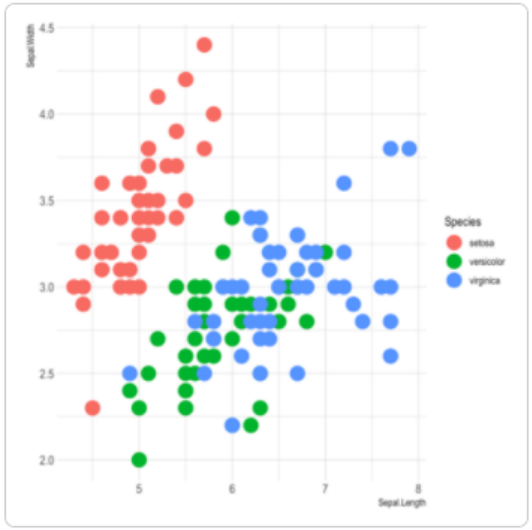
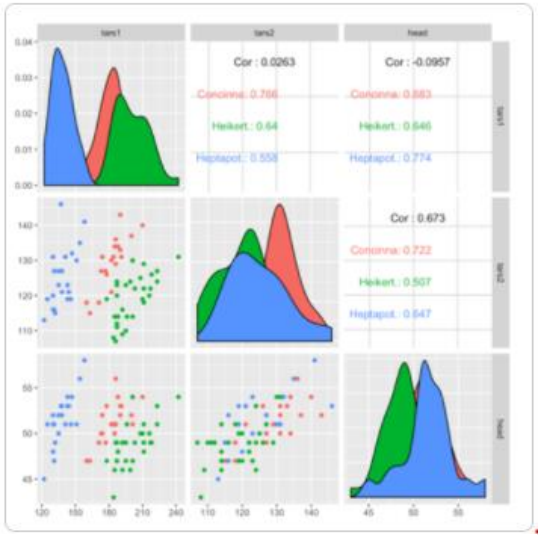
Графика в R

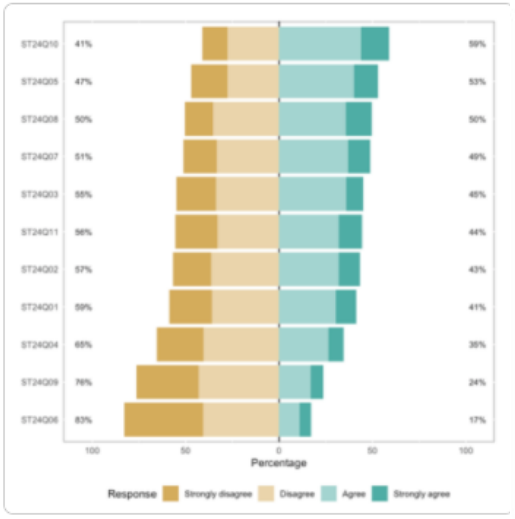
Можно рисовать просто, а можно красиво

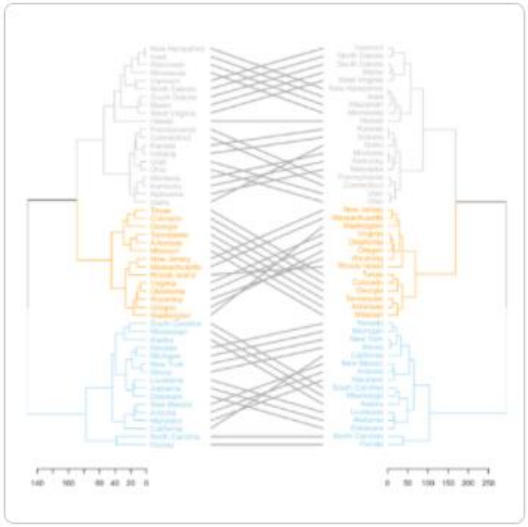
https://www.r-graph-gallery.com/

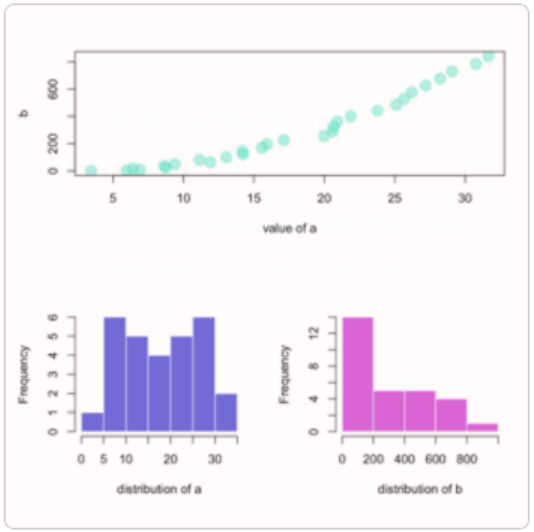












Из рисунка должно быть понятно что нарисовано и зачем:

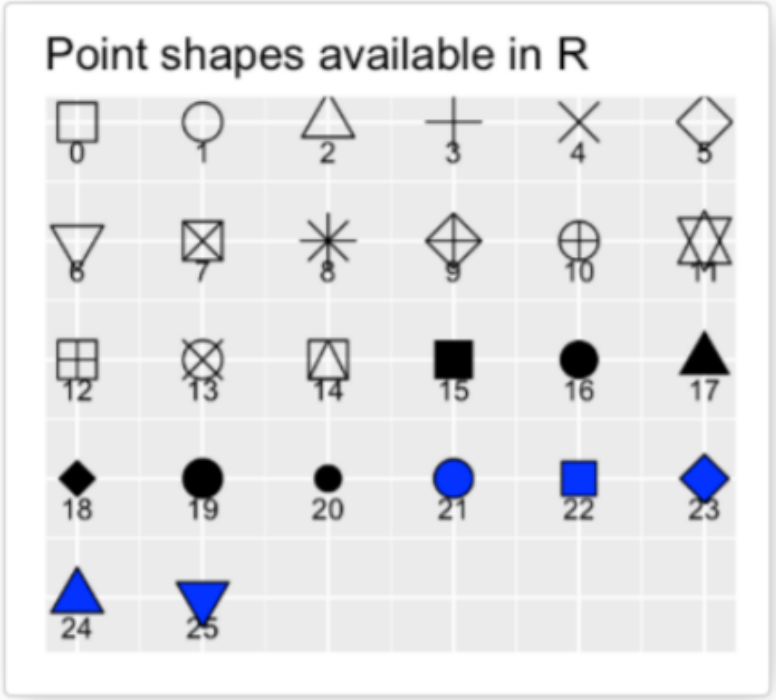
- Заголовок и подзаголовок
- Подписи осей с размерностями (проценты, метры, количество клеток, …)
- Деления на осях
- Уместно количество дополнительных осей
- Легенда при необходимости
- Цвета, если это необходимо для понимания
- Любые надписи должны быть читаемы (шрифт, размер, расположение)
- …

Не пытайтесь на один график вместить абсолютно все

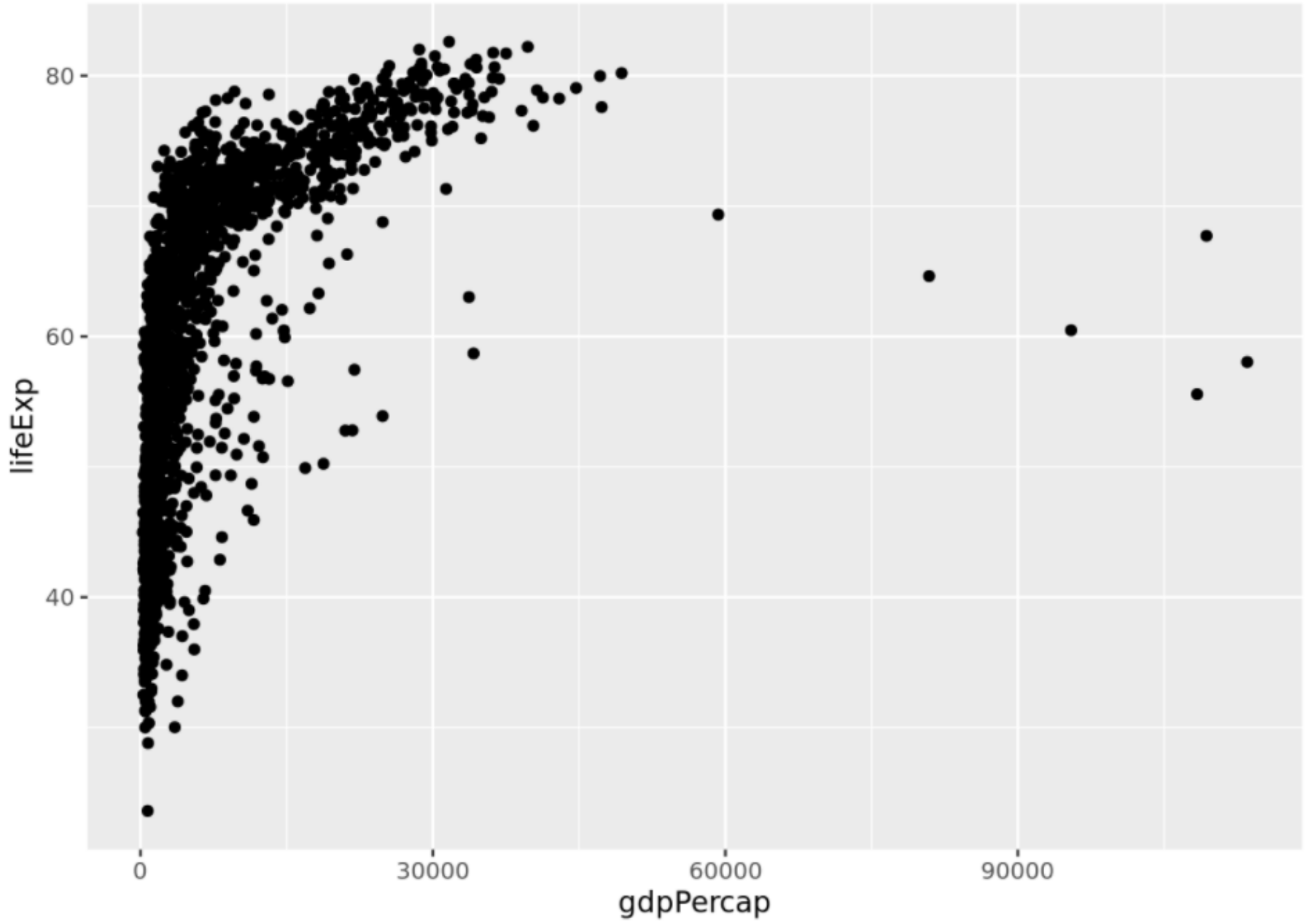
install.packages (“tidyverse”)
library (tidyverse)
https://ggplot2.tidyverse.org/reference/

geom_point()

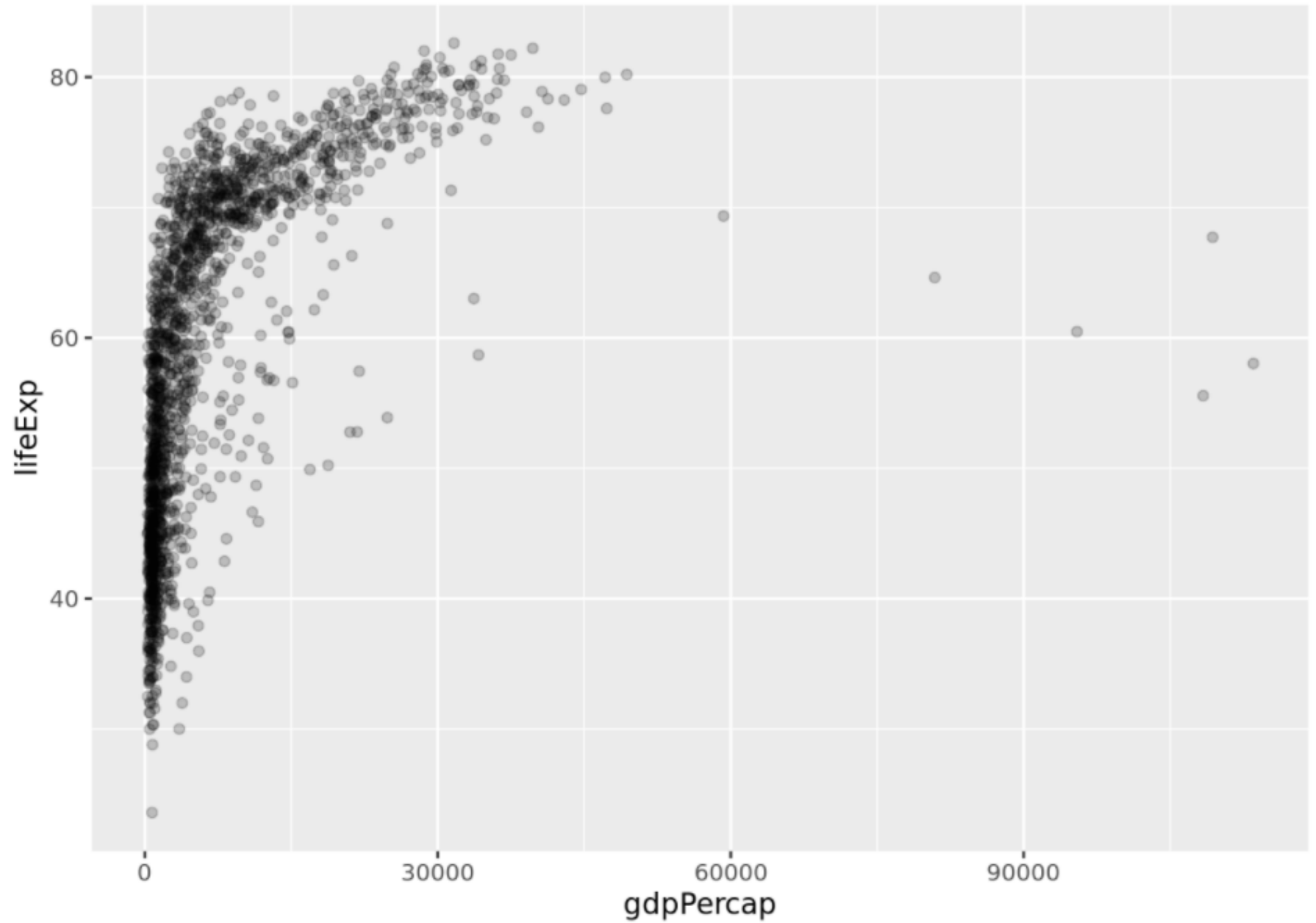
alpha – степень прозрачности цвета точек
colour – цвет линий, окаймляющих точки
fill – цвет точек
size – размер точек
shape – форма точек
stroke – толщина линий, окаймляющих точки



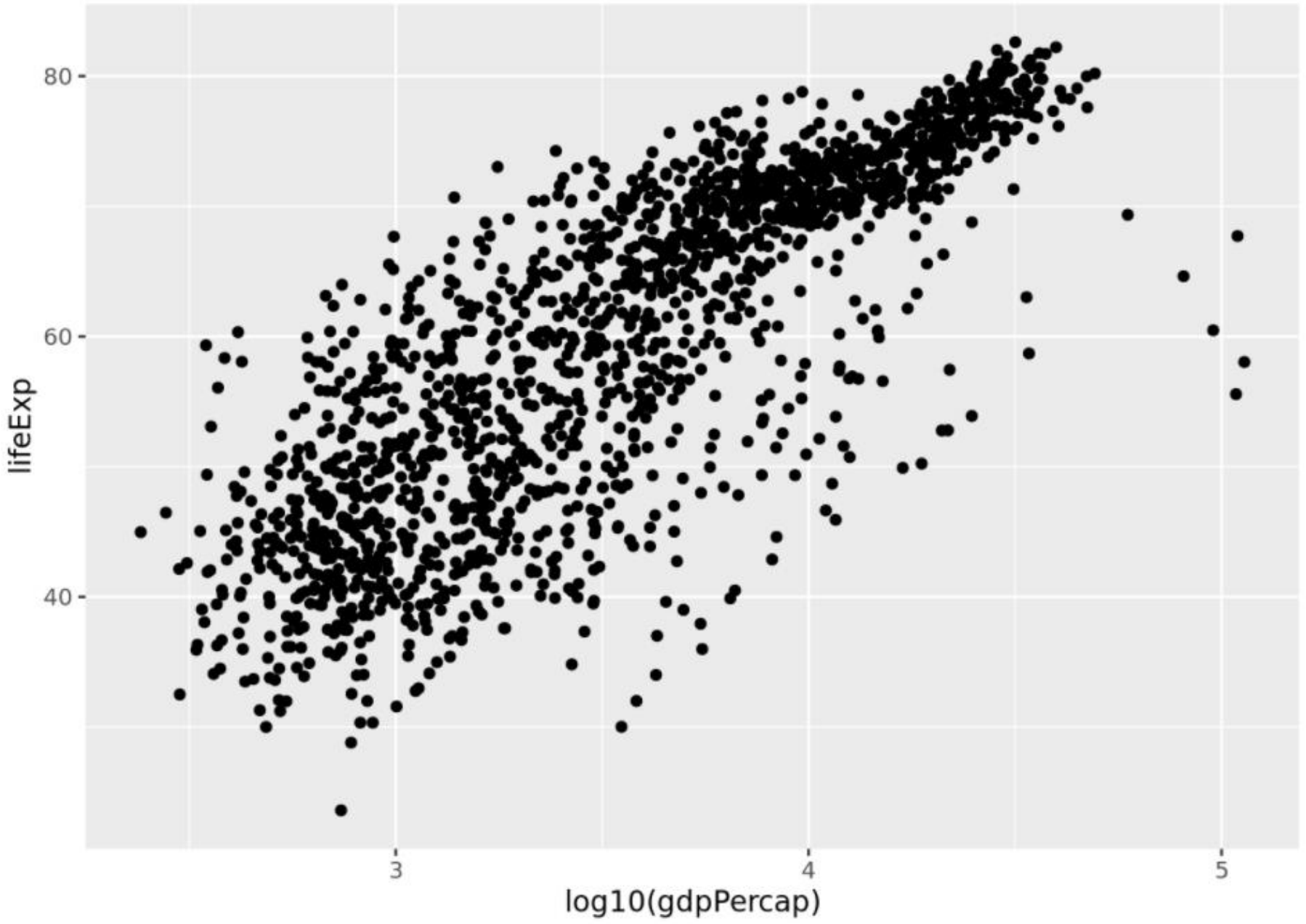
```
ggplot(gapminder, aes(x = gdpPercap, y = lifeExp)) + geom_point()
```



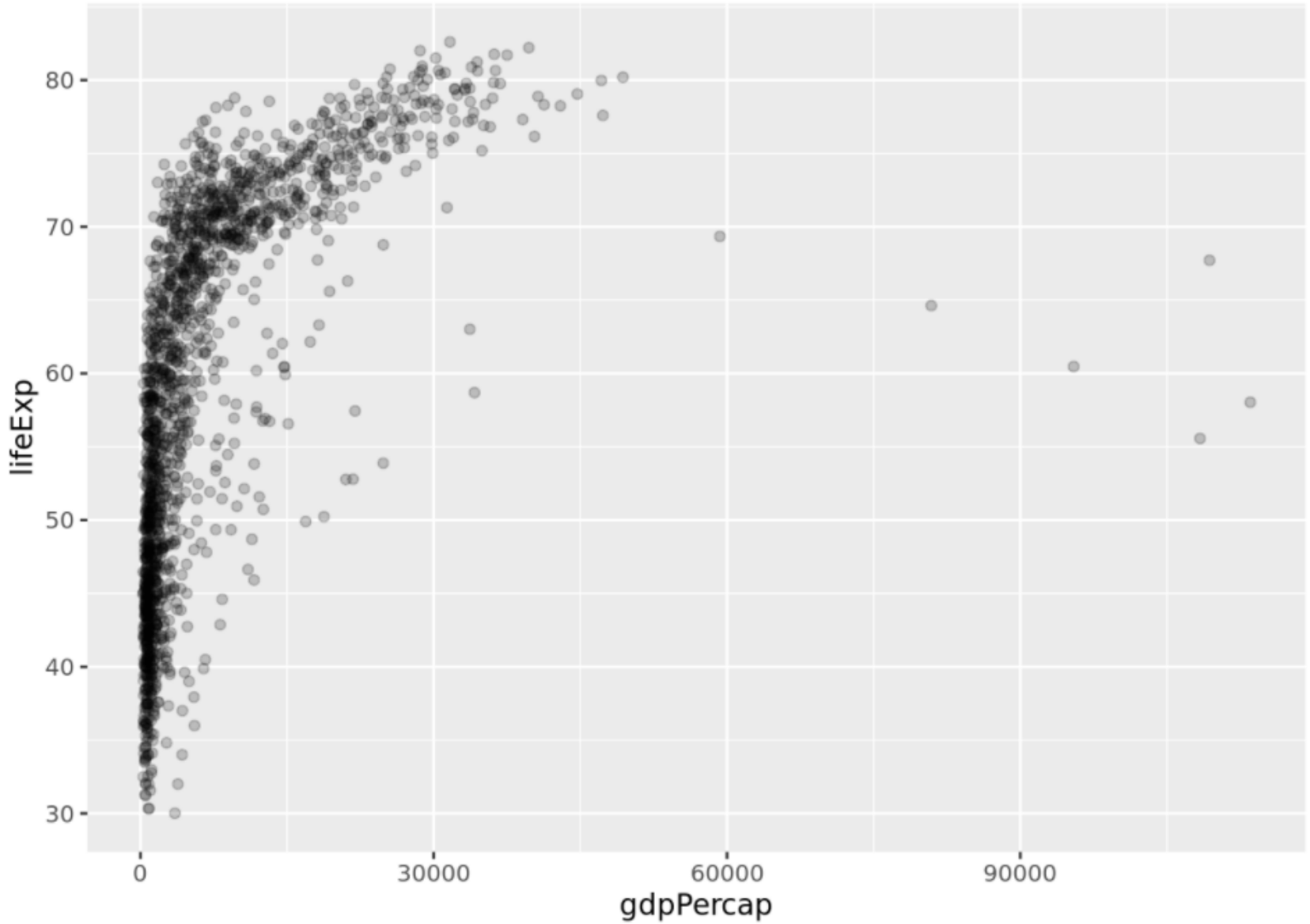
```
ggplot(gapminder, aes(x = gdpPercap, y = lifeExp)) + geom_point(alpha=0.2)
```



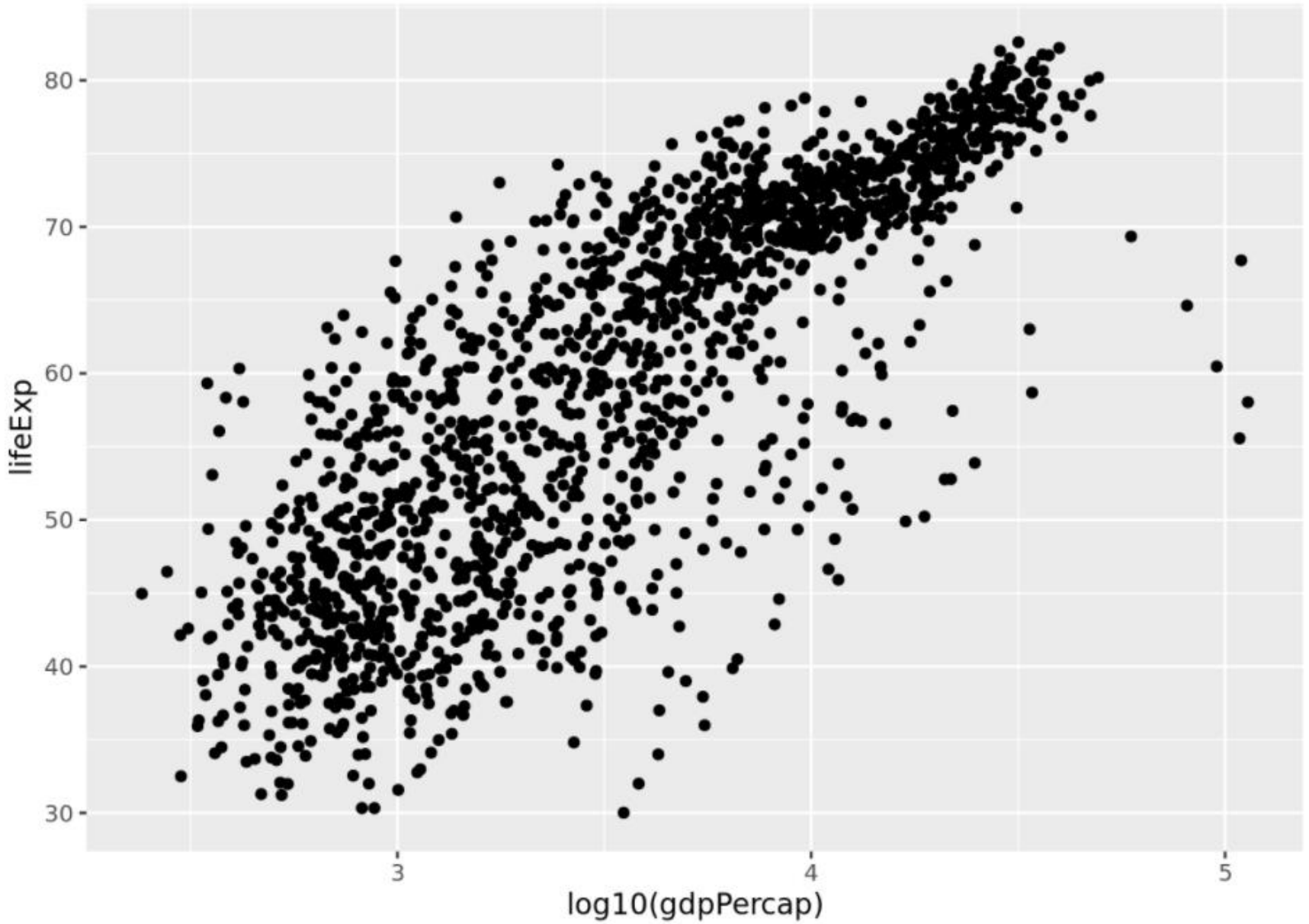
```
ggplot(gapminder, aes(x = log10(gdpPercap), y = lifeExp)) + geom_point()
```



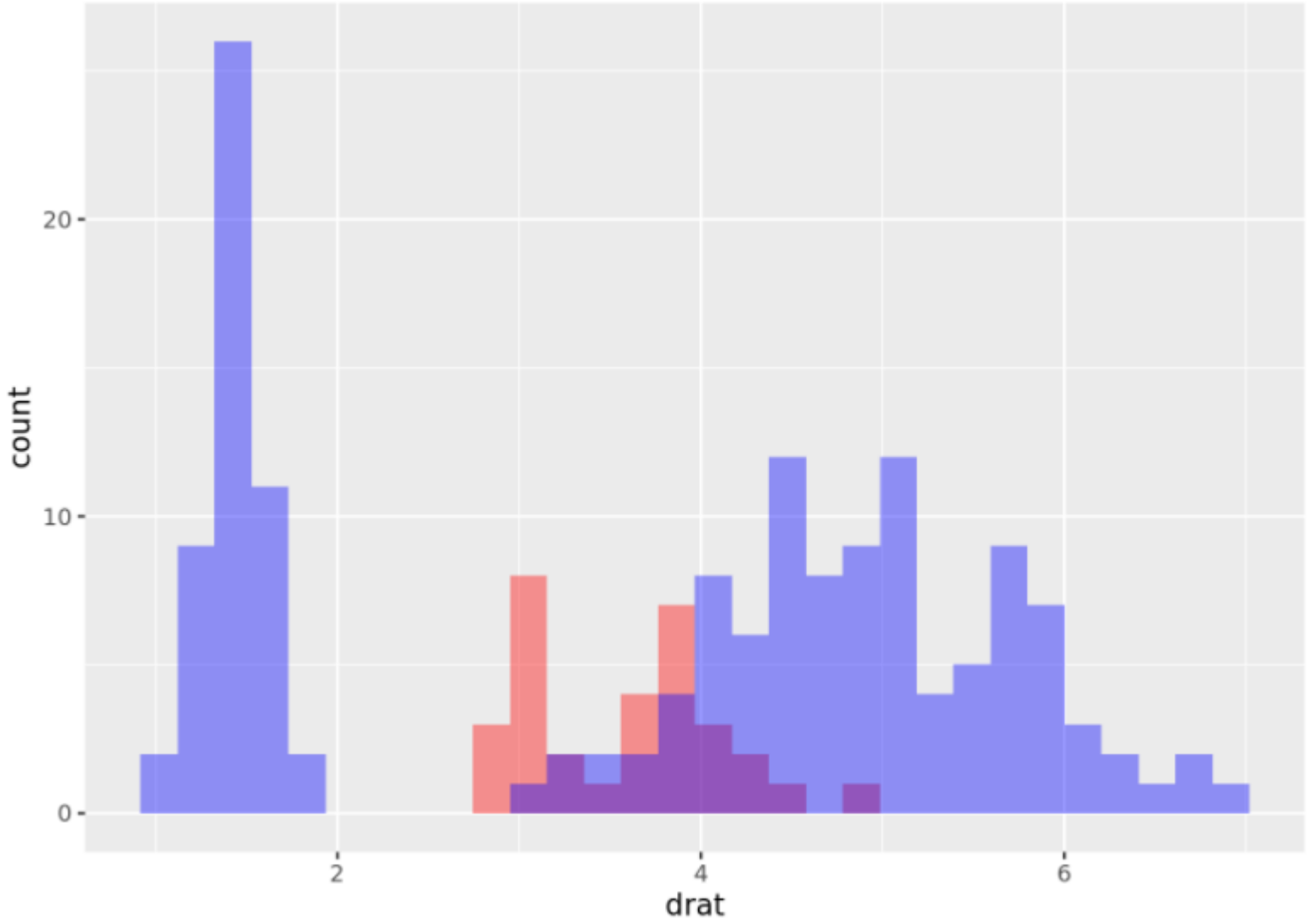
```
gapminder %>%
  filter (lifeExp > 30) %>%
  ggplot(aes(x = gdpPercap, y = lifeExp)) + geom_point(alpha=0.2)
```



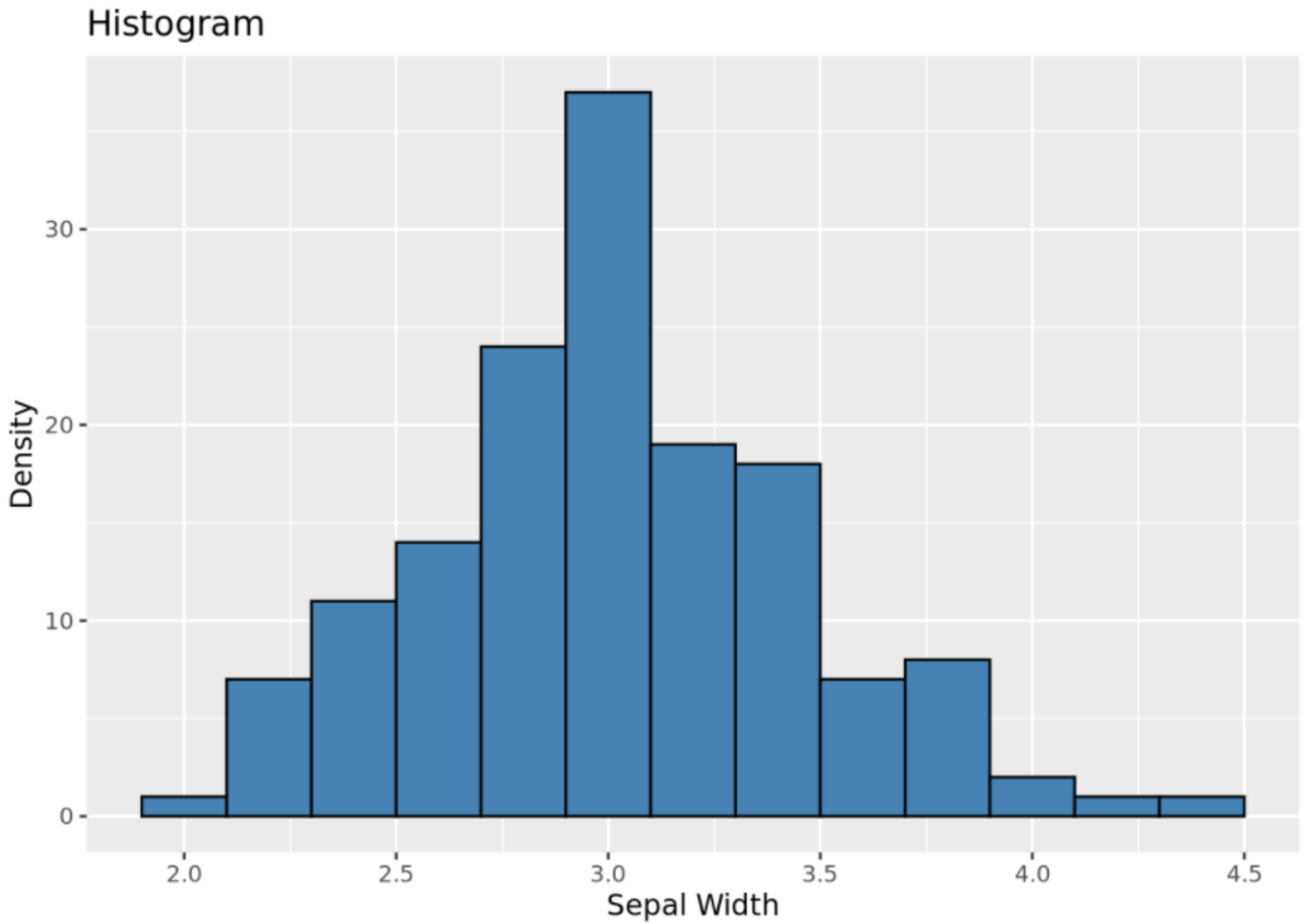
```
ggplot(gapminder[gapminder$lifeExp > 30,], aes(x = log10(gdpPercap), y = lifeExp)) +
geom_point()
```



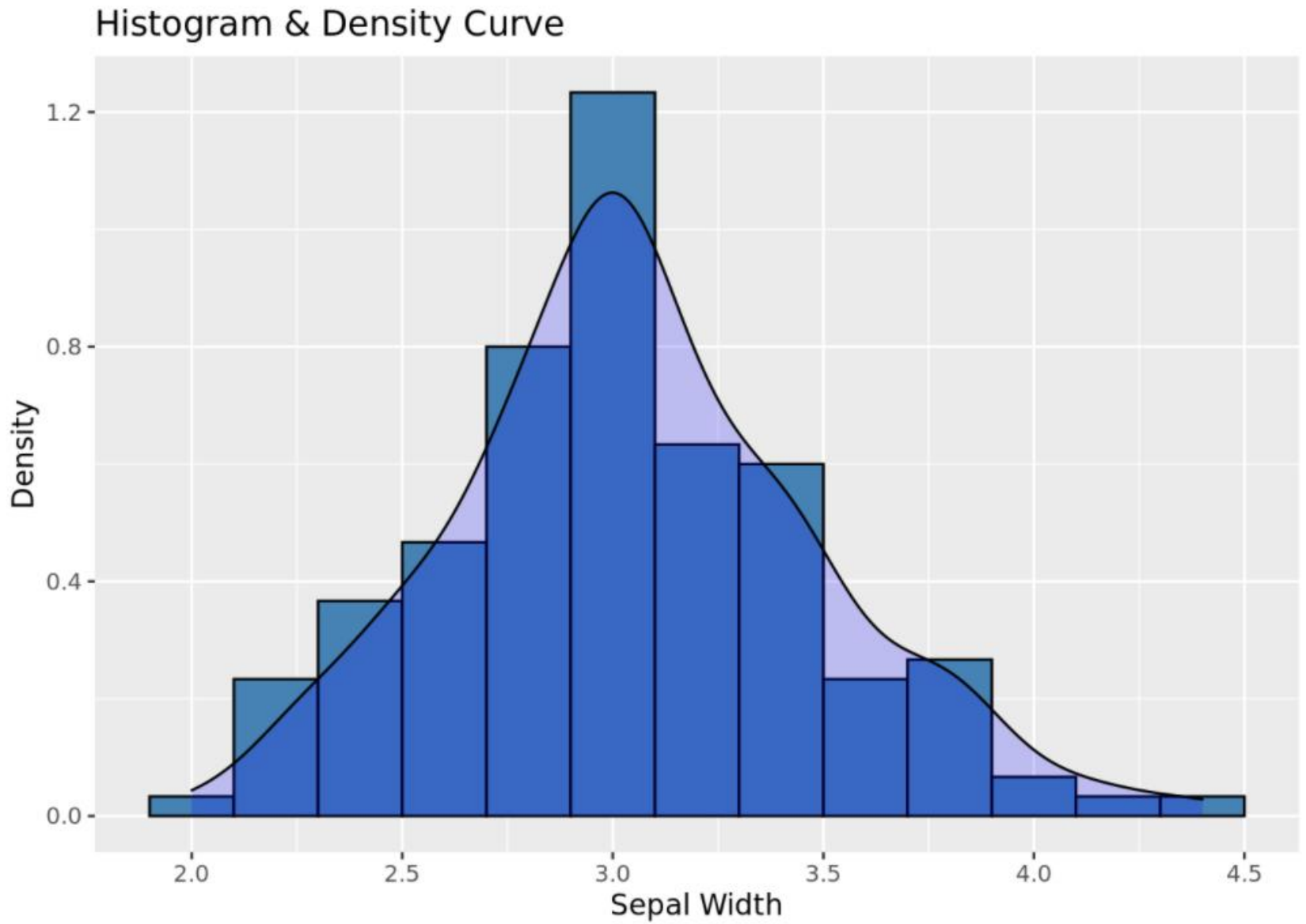
```
ggplot() +
  geom_histogram(data=mtcars,aes(drat),fill='red',alpha=0.4) +
  geom_histogram(data=iris,aes(Petal.Length),fill='blue',alpha=0.4)
```



```r
density <- ggplot(data=iris, aes(x=Sepal.Width))
density + geom_histogram(binwidth=0.2, color="black", fill="steelblue") +
  xlab("Sepal Width") +  ylab("Density") + ggtitle("Histogram")
```



```r
density <- ggplot(data=iris, aes(x=Sepal.Width))
density + geom_histogram(binwidth=0.2, color="black", fill="steelblue", aes(y=..density..)) +
  geom_density(stat="density", alpha=(0.2), fill="blue") +
  xlab("Sepal Width") +  ylab("Density") + ggtitle("Histogram & Density Curve")
```



Широкий и длинный формат данных

ID	Product1	Product2	Product3	Product4
1	1	NA	1	1
2	1	1	NA	1
3	1	1	NA	NA
4	1	1	1	1

ID	Product	value
1	Product1	1
1	Product3	1
1	Product4	1
2	Product1	1
2	Product2	1
2	Product4	1
3	Product1	1
3	Product2	1
4	Product1	1
4	Product2	1
4	Product3	1
4	Product4	1

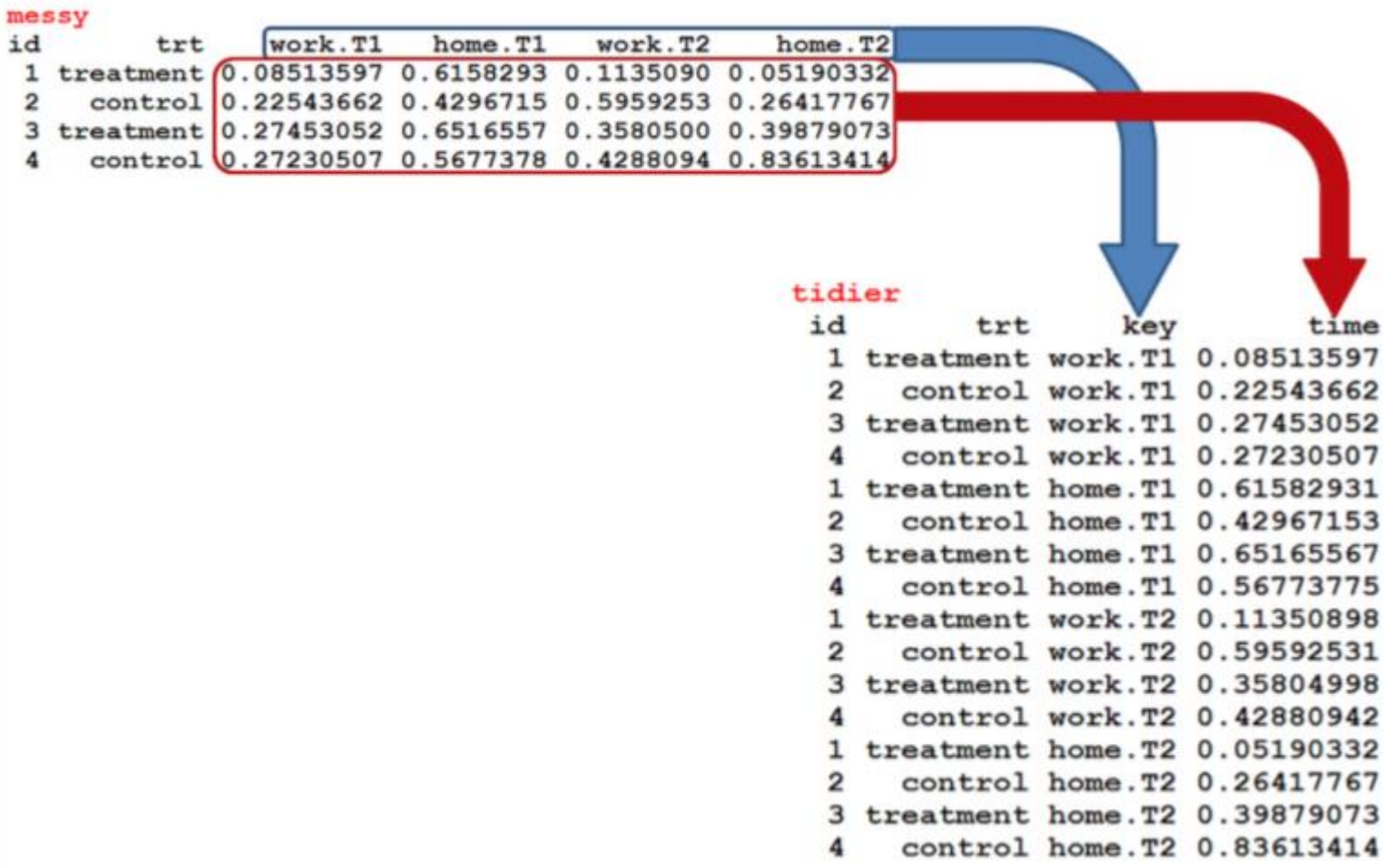
ID variables (left side of formula)	Variable to swing into column names (right side of formula)	Values (`value.var`)

Long-format data

month	day	variable	value
5	1	ozone	41
5	2	ozone	36
5	3	ozone	12
5	4	ozone	18
5	5	ozone	NA
5	6	ozone	28

Wide-format data

month	day	ozone	solar.r	wind	temp
5	1	41	190	7.4	67
5	2	36	118	8.0	72
5	3	12	149	12.6	74
5	4	18	313	11.5	62
5	5	NA	NA	14.3	56
5	6	28	NA	14.9	66


messy
id trt work.T1 home.T1 work.T2 home.T2
1 treatment 0.08513597 0.6158293 0.1135090 0.05190332
2 control 0.22543662 0.4296715 0.5959253 0.26417767
3 treatment 0.27453052 0.6516557 0.3580500 0.39879073
4 control 0.27230507 0.5677378 0.4288094 0.83613414
tidier
id trt key time
1 treatment work.T1 0.08513597
2 control work.T1 0.22543662
3 treatment work.T1 0.27453052
4 control work.T1 0.27230507
1 treatment home.T1 0.61582931
2 control home.T1 0.42967153
3 treatment home.T1 0.65165567
4 control home.T1 0.56773775
1 treatment work.T2 0.11350898
2 control work.T2 0.59592531
3 treatment work.T2 0.35804998
4 control work.T2 0.42880942
1 treatment home.T2 0.05190332
2 control home.T2 0.26417767
3 treatment home.T2 0.39879073
4 control home.T2 0.83613414

```
beav=read.table('beavers.tab',header=T)
head(beav)
```

```
##   beaver day1 day2 day3 day4  loc
## 1     b1    2    4    0    6 loc1
## 2     b1    1    6    1    2 loc2
## 3     b1    3    5    1    2 loc3
## 4     b2    5    6    8    9 loc1
## 5     b2    7    5    6    4 loc2
## 6     b2    3    4    9    2 loc3
```

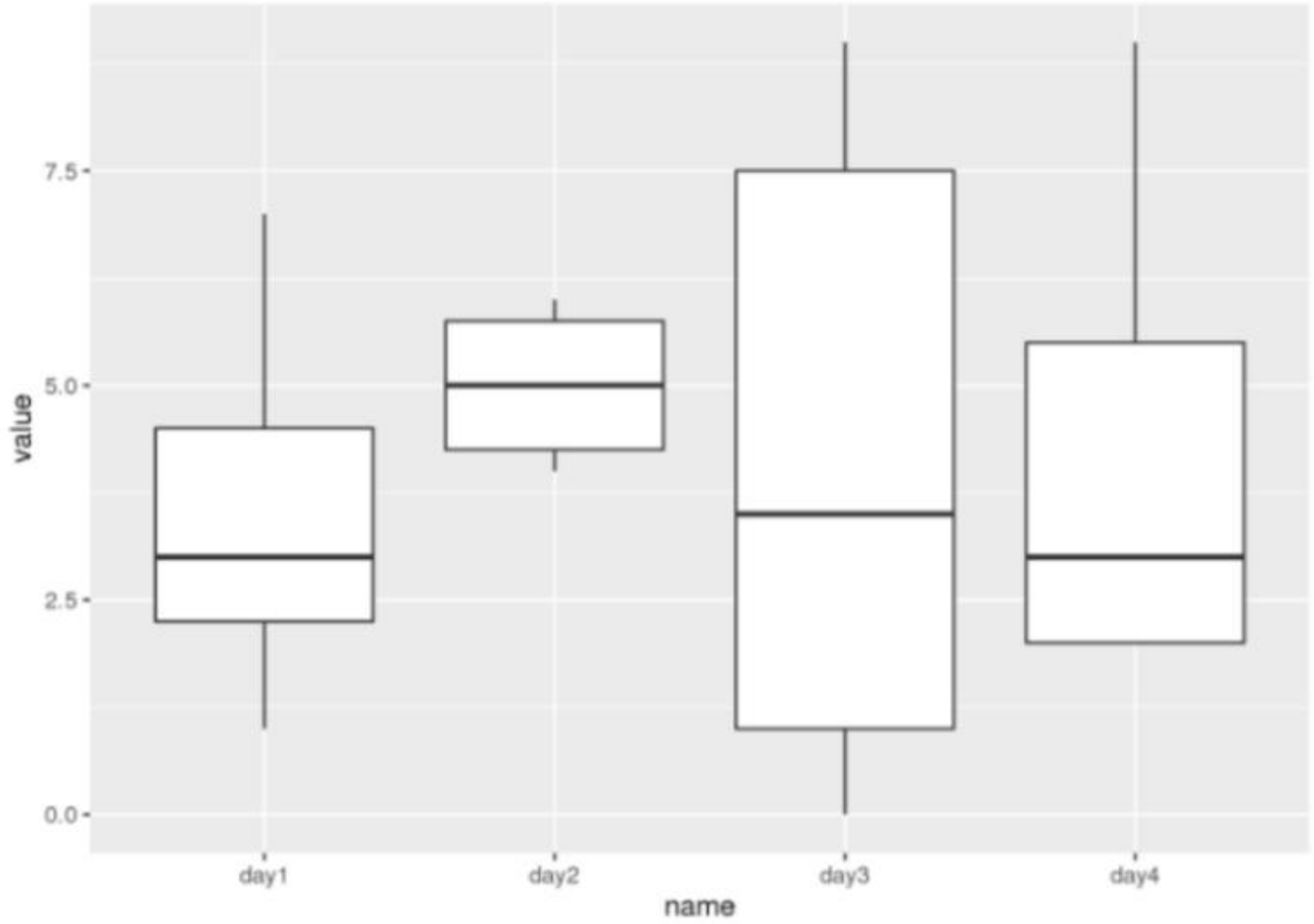
```r
beav_longer <- beav %>%
  pivot_longer(cols = starts_with("day"))
head(beav_longer)
```

```
## # A tibble: 6 x 4
##   beaver loc   name  value
##   <fct>  <fct> <chr> <int>
## 1 b1     loc1  day1      2
## 2 b1     loc1  day2      4
## 3 b1     loc1  day3      0
## 4 b1     loc1  day4      6
## 5 b1     loc2  day1      1
## 6 b1     loc2  day2      6
```

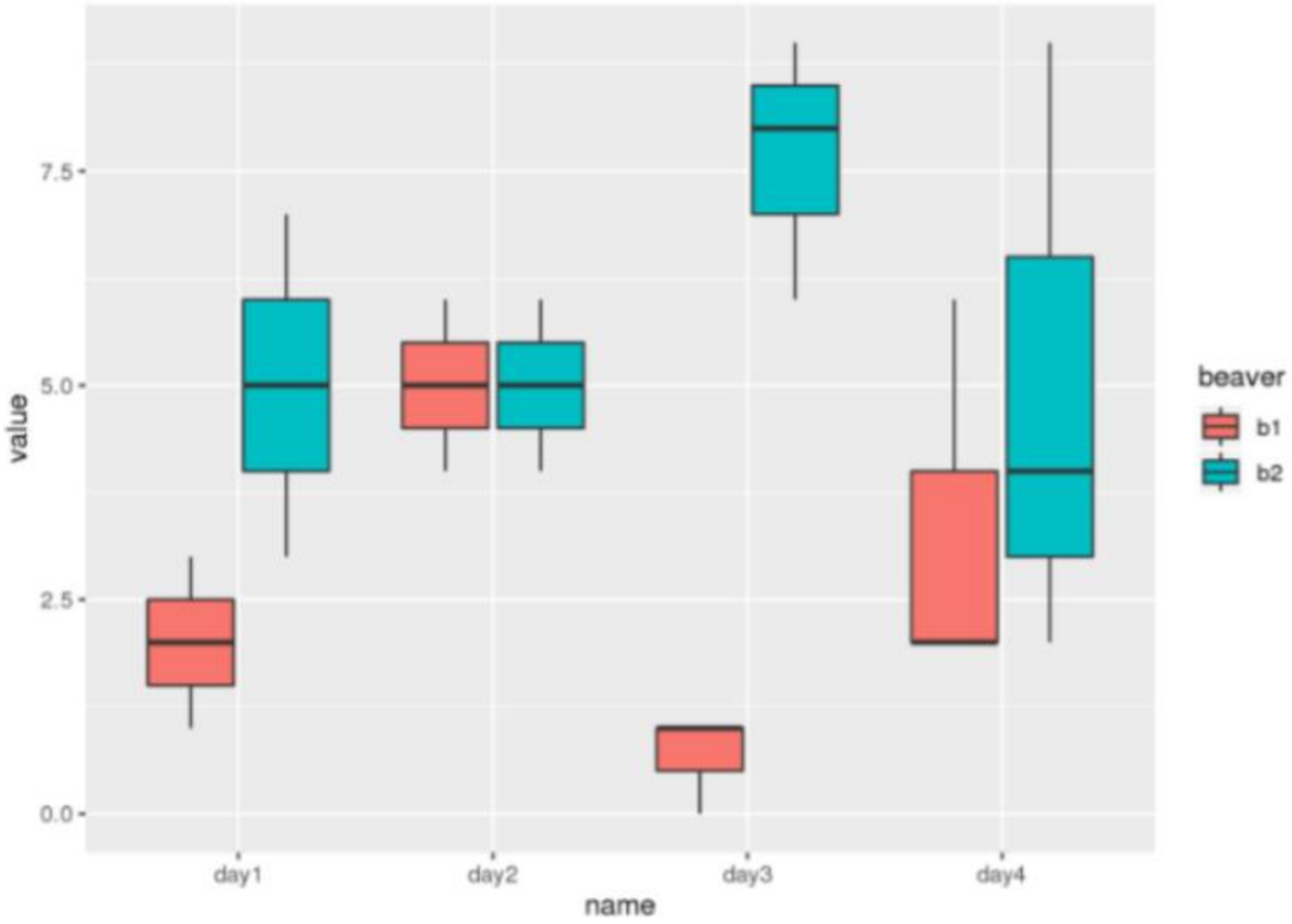
```
beav_wide <- beav_longer %>%
  pivot_wider(names_from = name, values_from = value)
head(beav_wide)
```

```
## # A tibble: 6 x 6
##   beaver loc    day1  day2  day3  day4
##   <fct>  <fct> <int> <int> <int> <int>
## 1 b1     loc1      2     4     0     6
## 2 b1     loc2      1     6     1     2
## 3 b1     loc3      3     5     1     2
## 4 b2     loc1      5     6     8     9
## 5 b2     loc2      7     5     6     4
## 6 b2     loc3      3     4     9     2
```

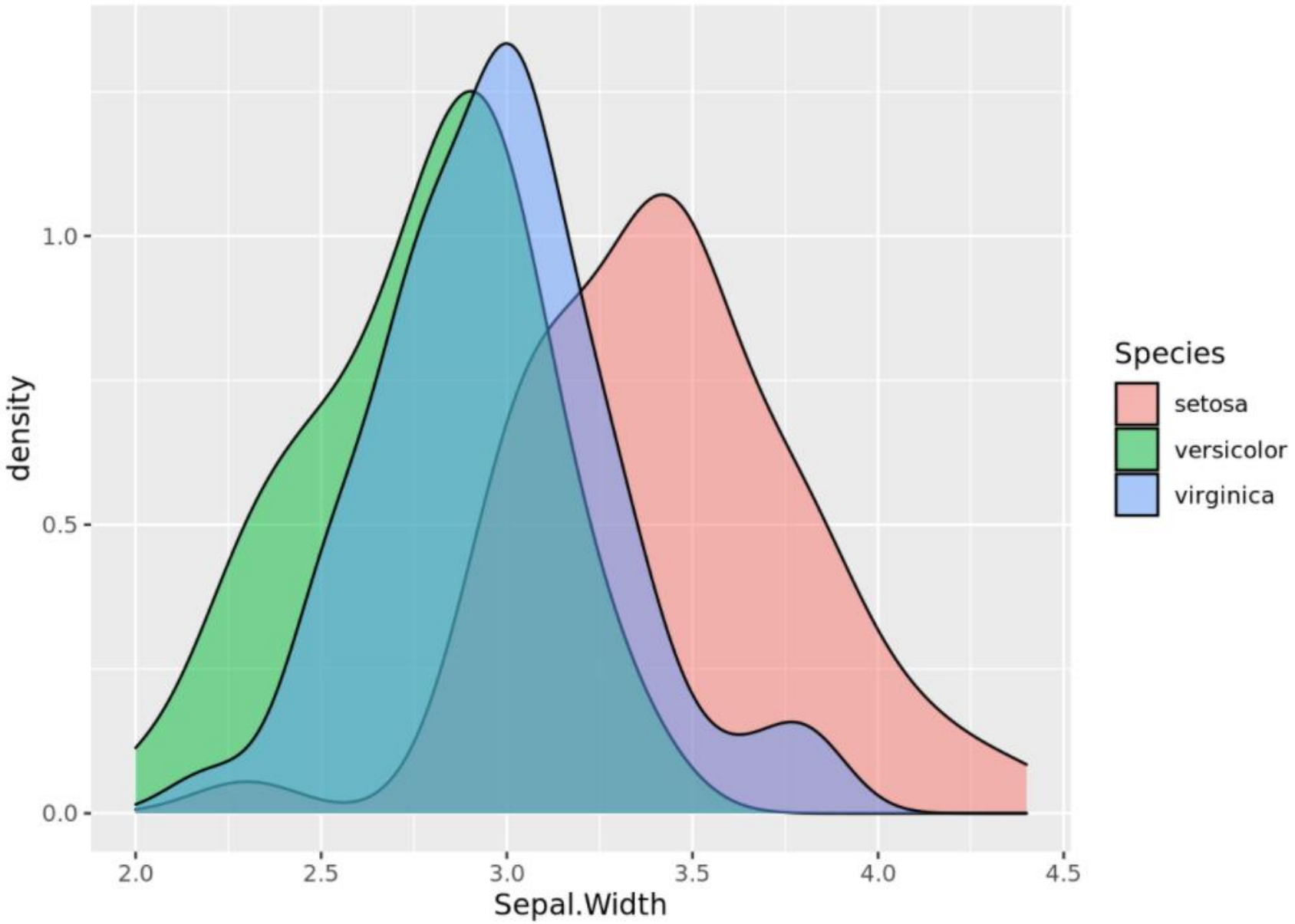
```
p<- ggplot(beav_longer, aes(x = name, y = value))
p + geom_boxplot()
```



```
p<- ggplot(beav_longer, aes(x = name, y = value))
p + geom_boxplot(aes(fill=beaver))
```

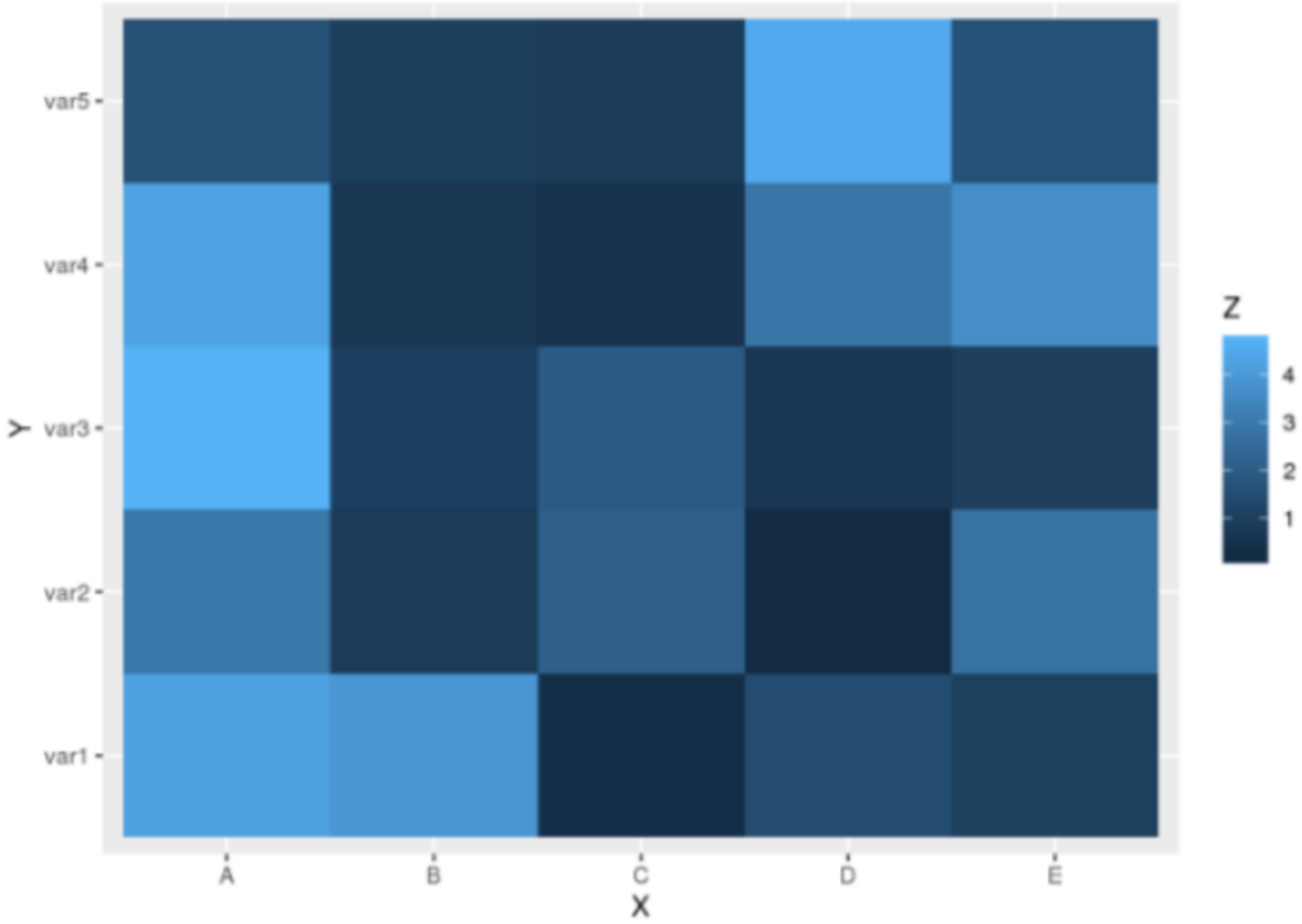


```
ggplot(data=iris, aes(x=Sepal.Width)) +
  geom_density(aes(fill=Species),alpha=0.5)
```

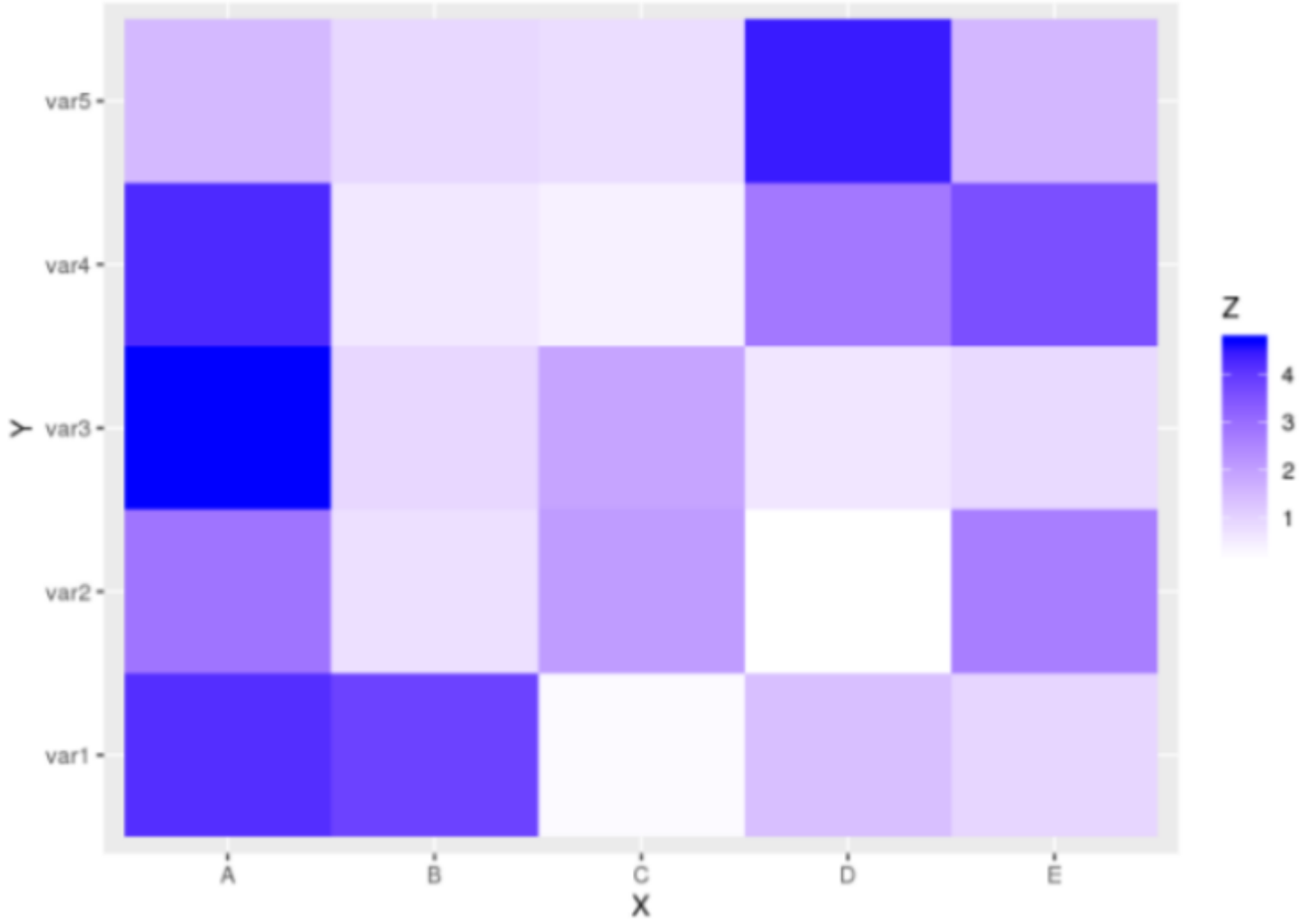


```r
x <- LETTERS[1:5]
y <- paste0("var", seq(1,5))
data <- expand.grid(X=x, Y=y)
data$Z <- runif(25, 0, 5)
```

```
ggplot(data, aes(X, Y, fill= Z)) +
  geom_tile()
```

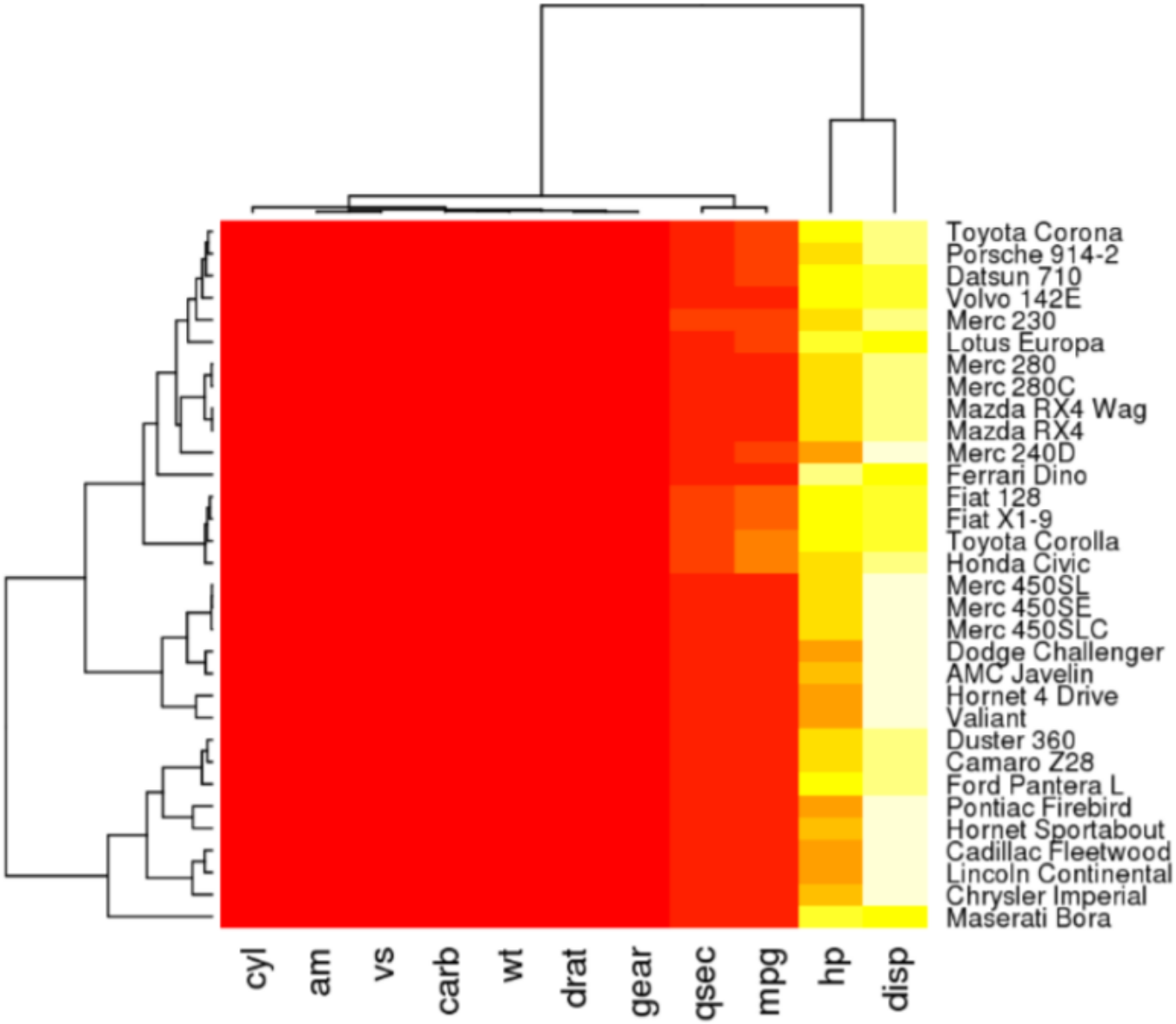


```
ggplot(data, aes(X, Y, fill= Z)) +
  geom_tile() +
  scale_fill_gradient(low="white", high="blue")
```

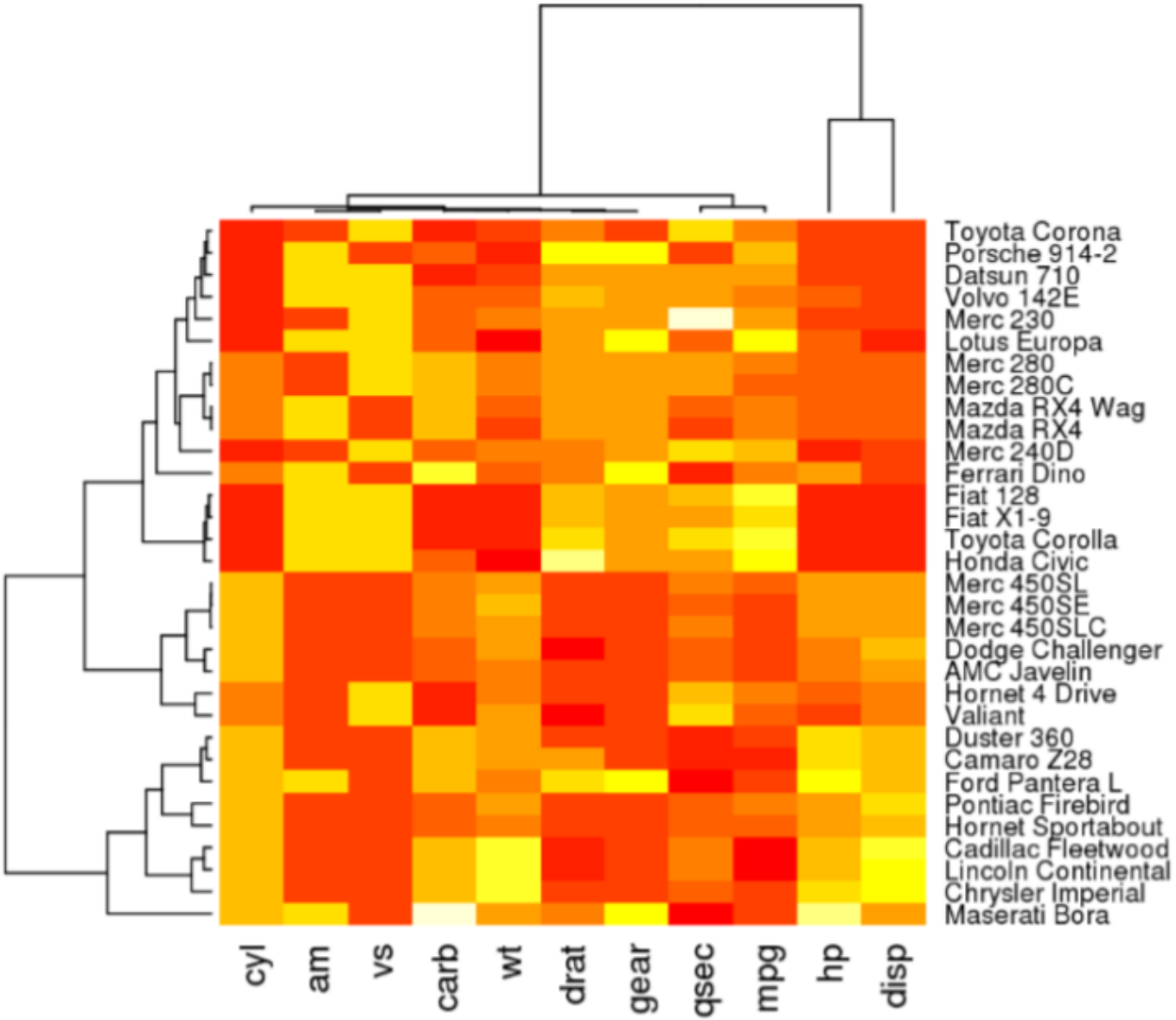


```
ggplot(data, aes(X, Y, fill= Z)) +
  geom_tile() +
  geom_text(aes(label = round(Z,1)), color = "blac
k", size = 4) +
  scale_fill_distiller(palette = "RdPu")
```

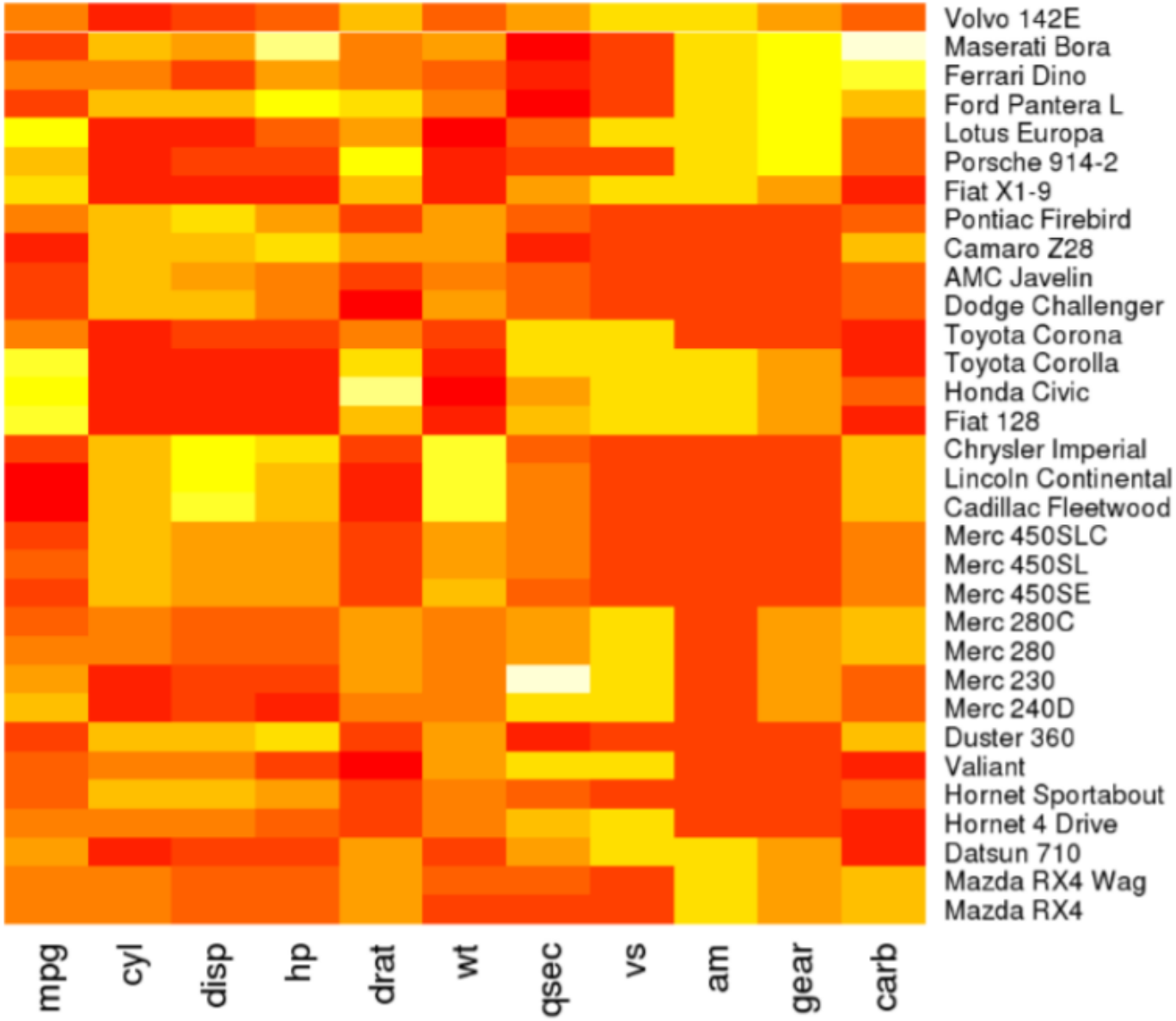
```
data <- as.matrix(mtcars)
heatmap(data)
```



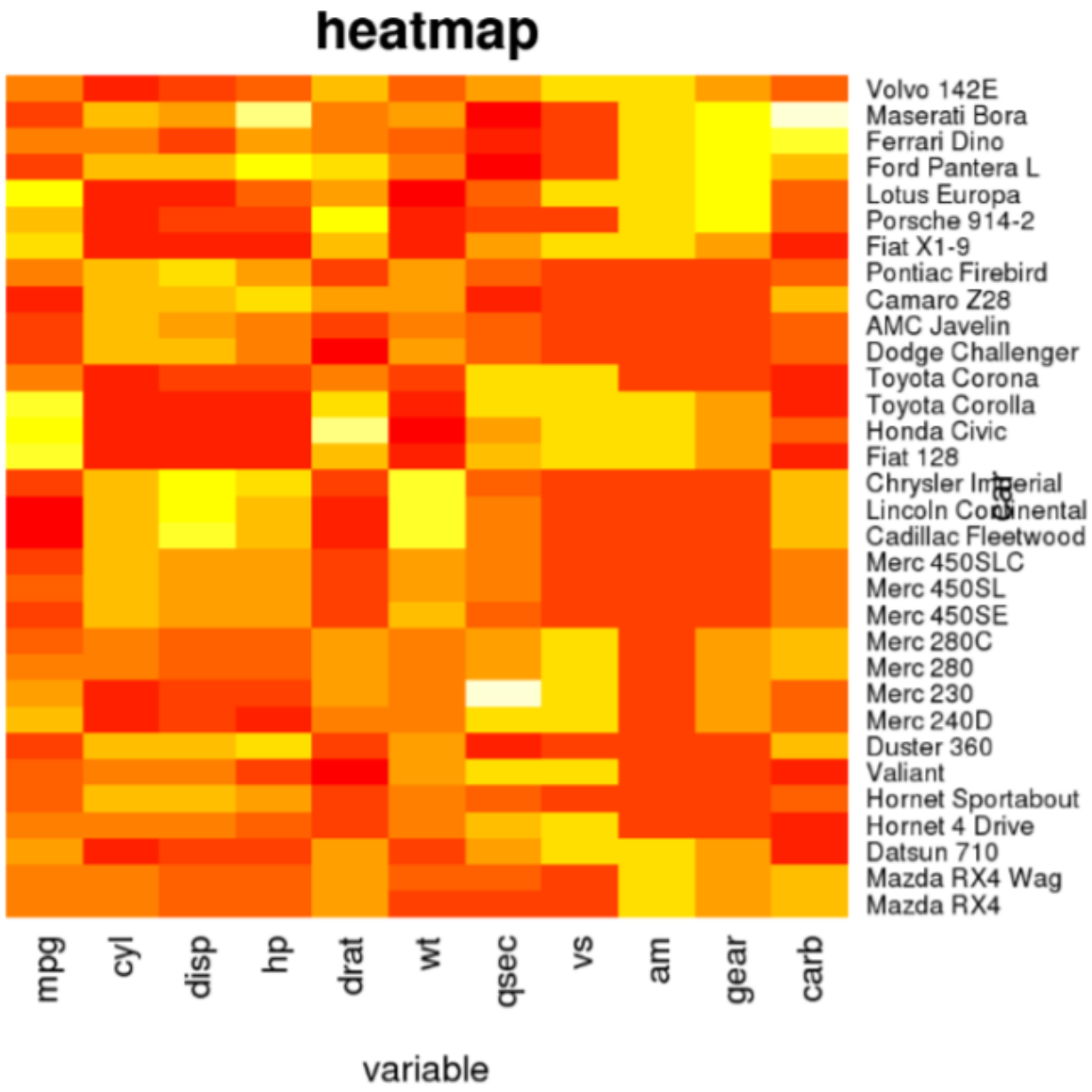
```
heatmap(data, scale="column")
```



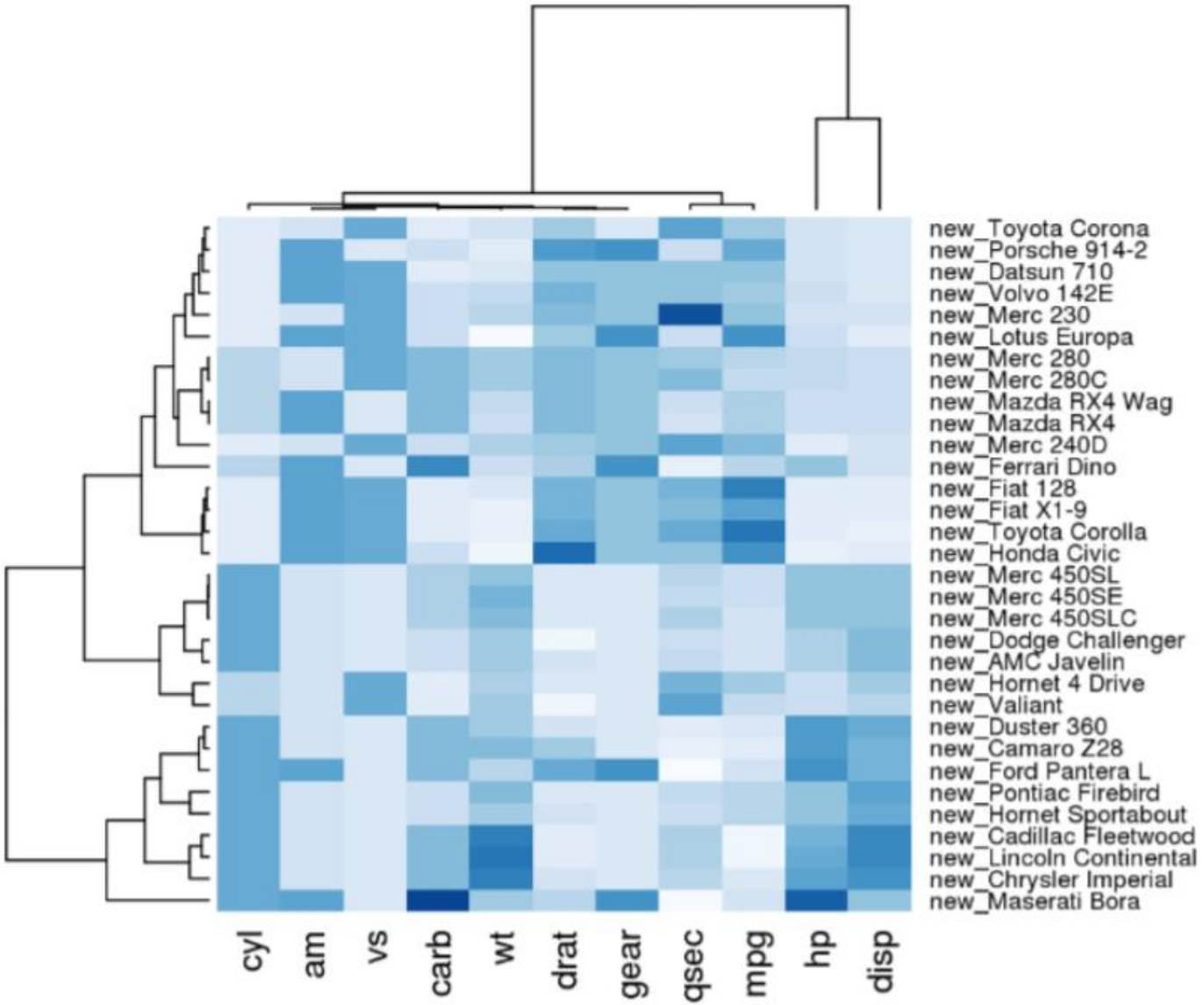
```
heatmap(data, Colv = NA, Rowv = NA, scale="column")
```



```
heatmap(data, Colv = NA, Rowv = NA, scale="column", xlab="variable", ylab="car",
main="heatmap")
```

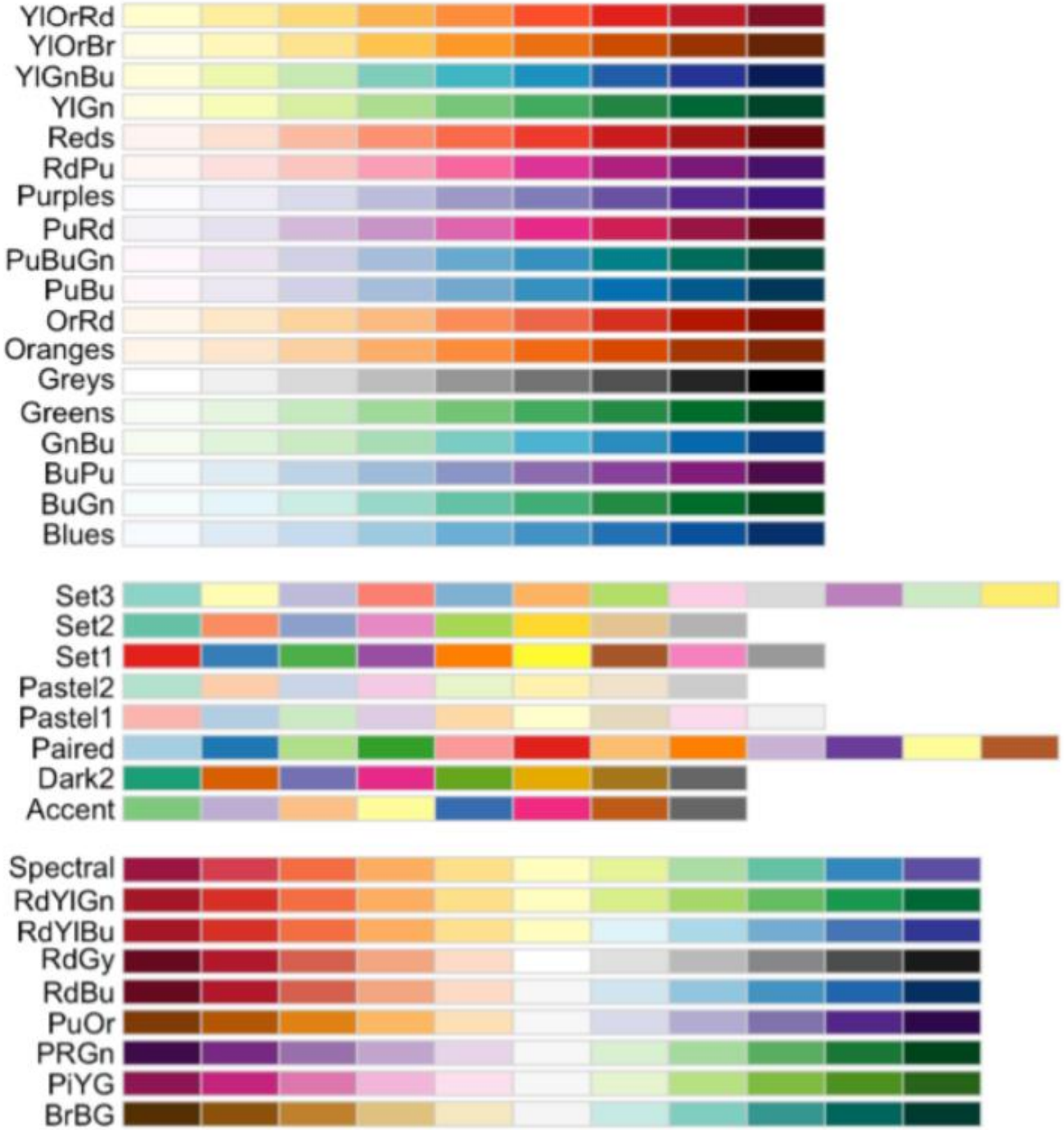


```
library(RColorBrewer)
heatmap(data, scale="column", cexRow=0.8, labRow=paste("new_", rownames(data),
sep=""), col= colorRampPalette(brewer.pal(8, "Blues"))(25))
```

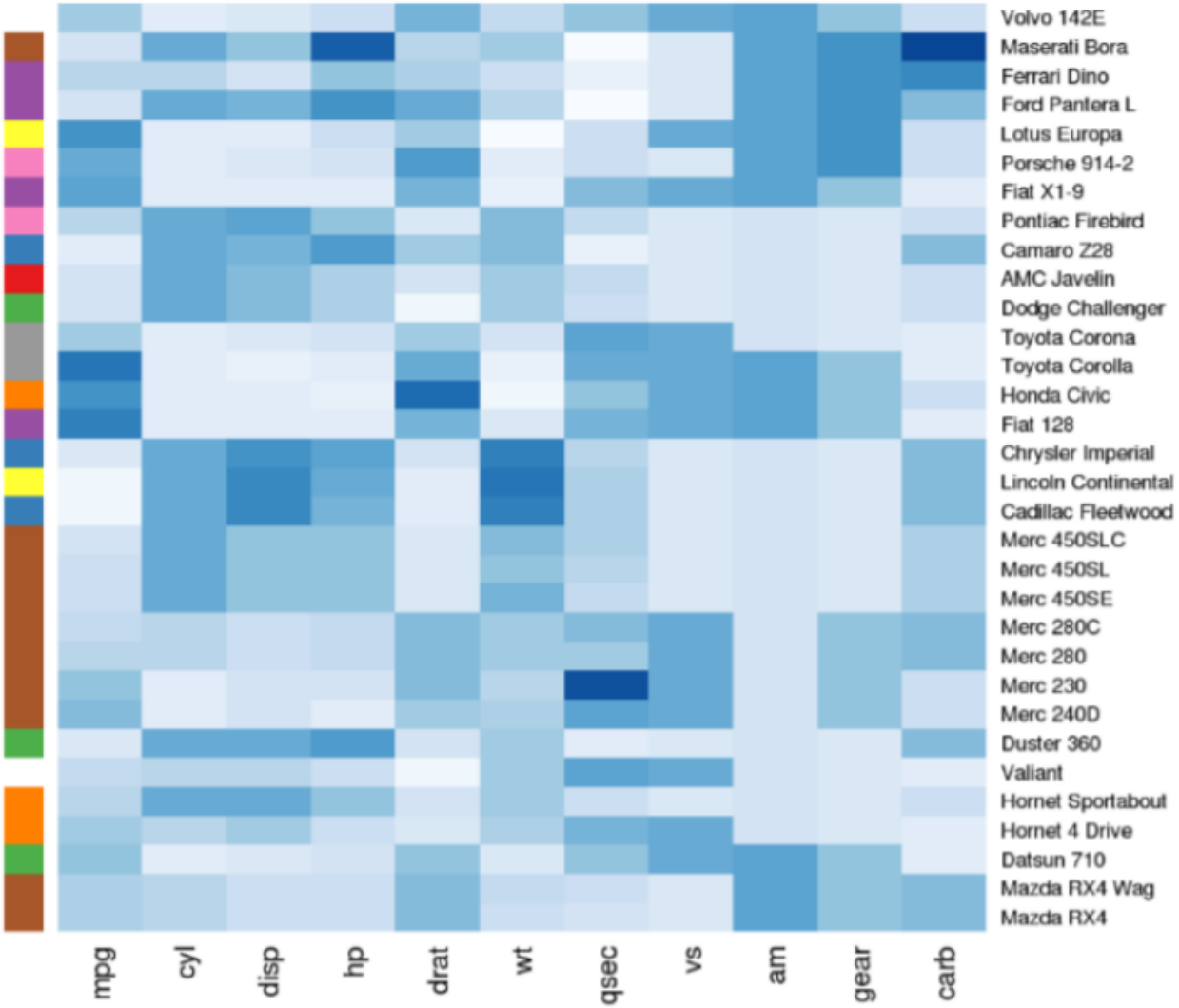


```
col= colorRampPalette(brewer.pal(8, "Blues"))(25)
col
```

```
##  [1] "#F7FBFF" "#EFF6FC" "#E8F1FA" "#E1ECF8" "#DAE8F5" "#D3E3F3" "#CCDEF1"
##  [8] "#C4DAEE" "#B8D5EA" "#ADD0E6" "#A1CBE2" "#93C4DE" "#84BBDB" "#75B3D8"
## [15] "#67ABD4" "#5BA3D0" "#4F9BCB" "#4393C6" "#3989C1" "#3080BC" "#2676B7"
## [22] "#1D6BB0" "#165EA7" "#0F519D" "#084594"
```


YlOrRd
YlOrBr
YlGnBu
YlGn
Reds
RdPu
Purples
PuRd
PuBuGn
PuBu
OrRd
Oranges
Greys
Greens
GnBu
BuPu
BuGn
Blues
Set3
Set2
Set1
Pastel2
Pastel1
Paired
Dark2
Accent
Spectral
RdYlGn
RdYlBu
RdGy
RdBu
PuOr
PRGn
PiYG
BrBG

```
my_group <- as.numeric(as.factor(substr(rownames(data), 1 , 1)))
colSide <- brewer.pal(9, "Set1")[my_group]
colMain <- colorRampPalette(brewer.pal(8, "Blues"))(25)
heatmap(data, Colv = NA, Rowv = NA, scale="column" , RowSideColors=colSide,
col=colMain)
```



```r
library(gapminder)
iris %>%
  ggplot(aes(x=Sepal.Length,y=Sepal.Width, color=Species))+
  geom_point()+
  scale_y_log10()+
  facet_zoom(xlim = c(5, 6))
```