Ggplot2 tutorial - Command lines Part 2

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Load R packages

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.3     v readr     2.1.4
## v forcats   1.0.0     v stringr   1.5.0
## v ggplot2   3.4.3     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.0
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(ggpubr)
library(gridExtra)
```

```
##
## Attaching package: 'gridExtra'
##
## The following object is masked from 'package:dplyr':
##
##     combine
```

```
library(Lock5Data)
```

Part 2 - Grammar of Graphics and Visual Components

Layers

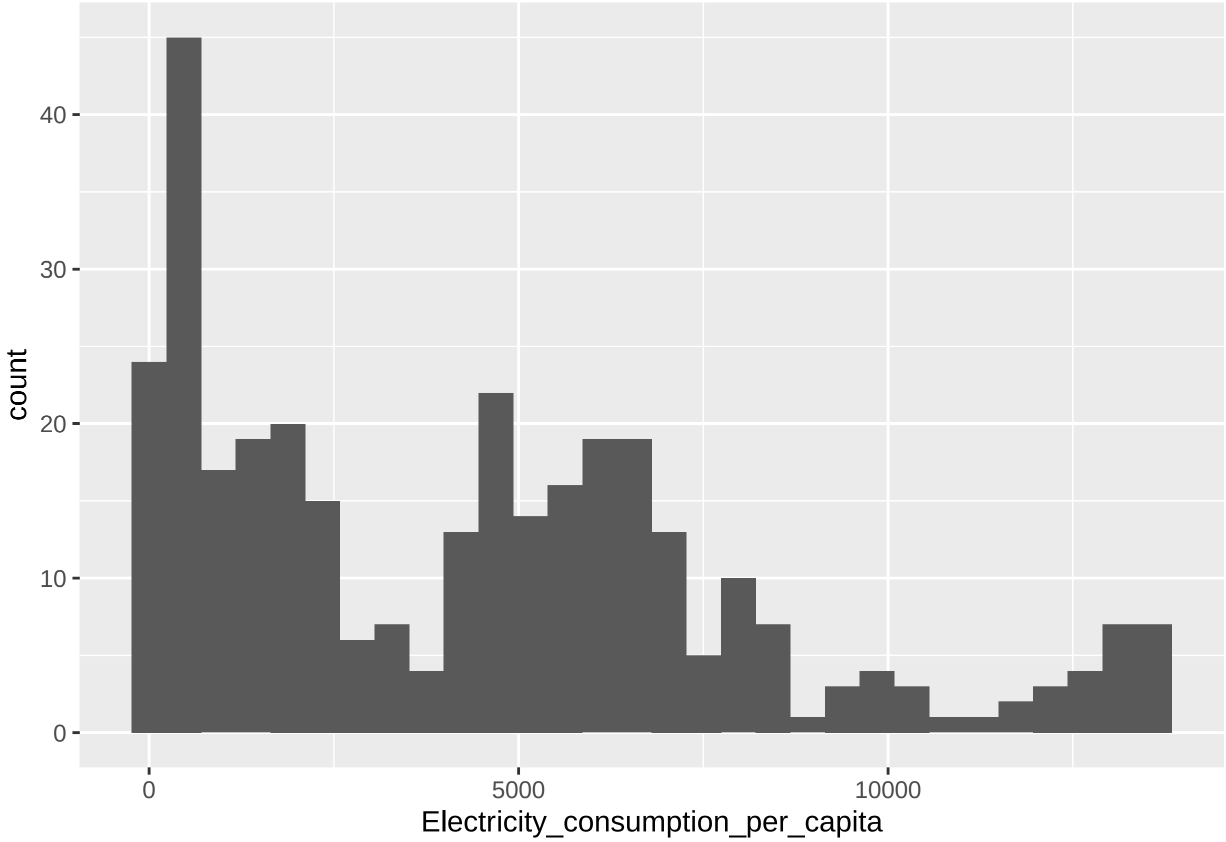
```
df <- read_csv("../data/gapminder-data.csv")
```

```
## New names:
## Rows: 1512 Columns: 10
## -- Column specification
## -------------------------------------------------------- Delimiter: "," chr
## (1): Country dbl (9): ...1, Year, gdp_per_capita,
## Electricity_consumption_per_capita, und...
## i Use `spec()` to retrieve the full column specification for this data. i
## Specify the column types or set `show_col_types = FALSE` to quiet this message.
## * `` -> `...1`
```

```
p1 <- ggplot(df, aes(x=Electricity_consumption_per_capita))
p2 <- p1 + geom_histogram()
p2
```

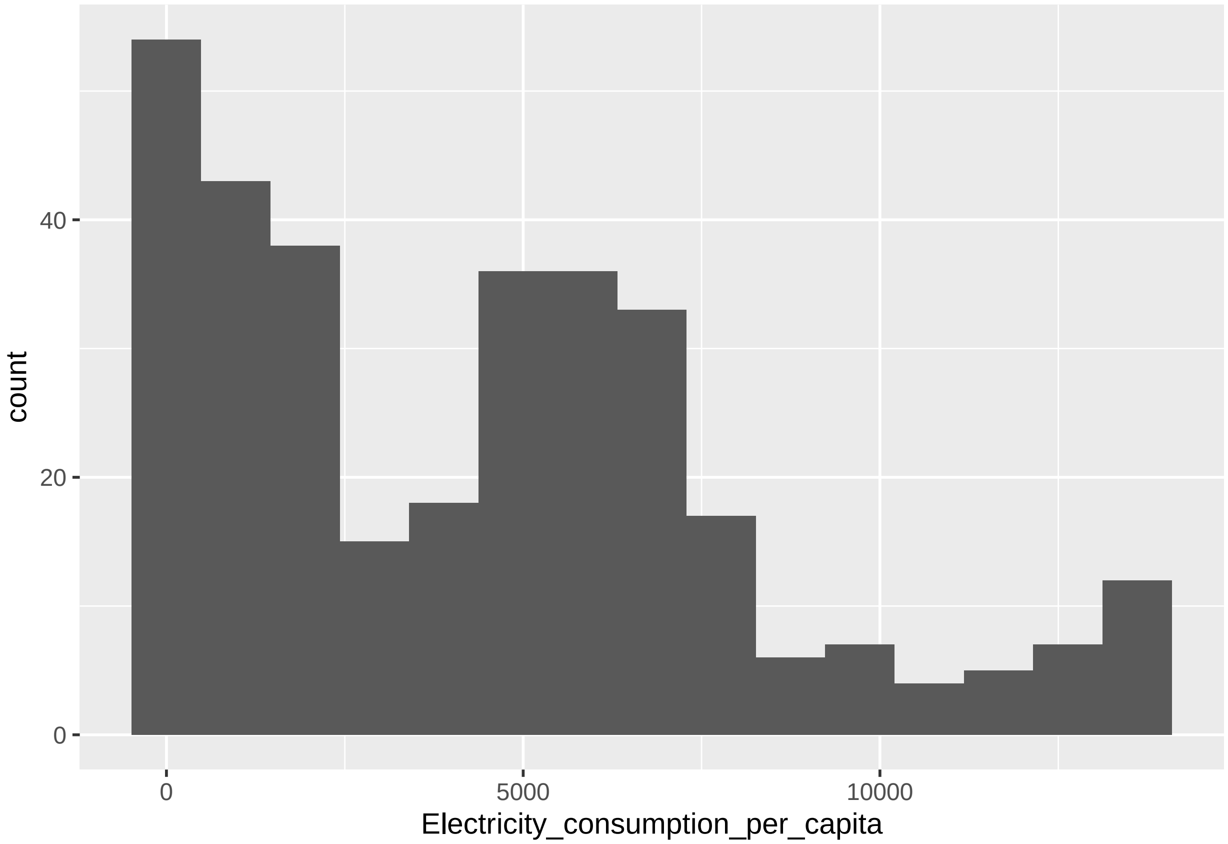
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 1181 rows containing non-finite values (`stat_bin()`).
```



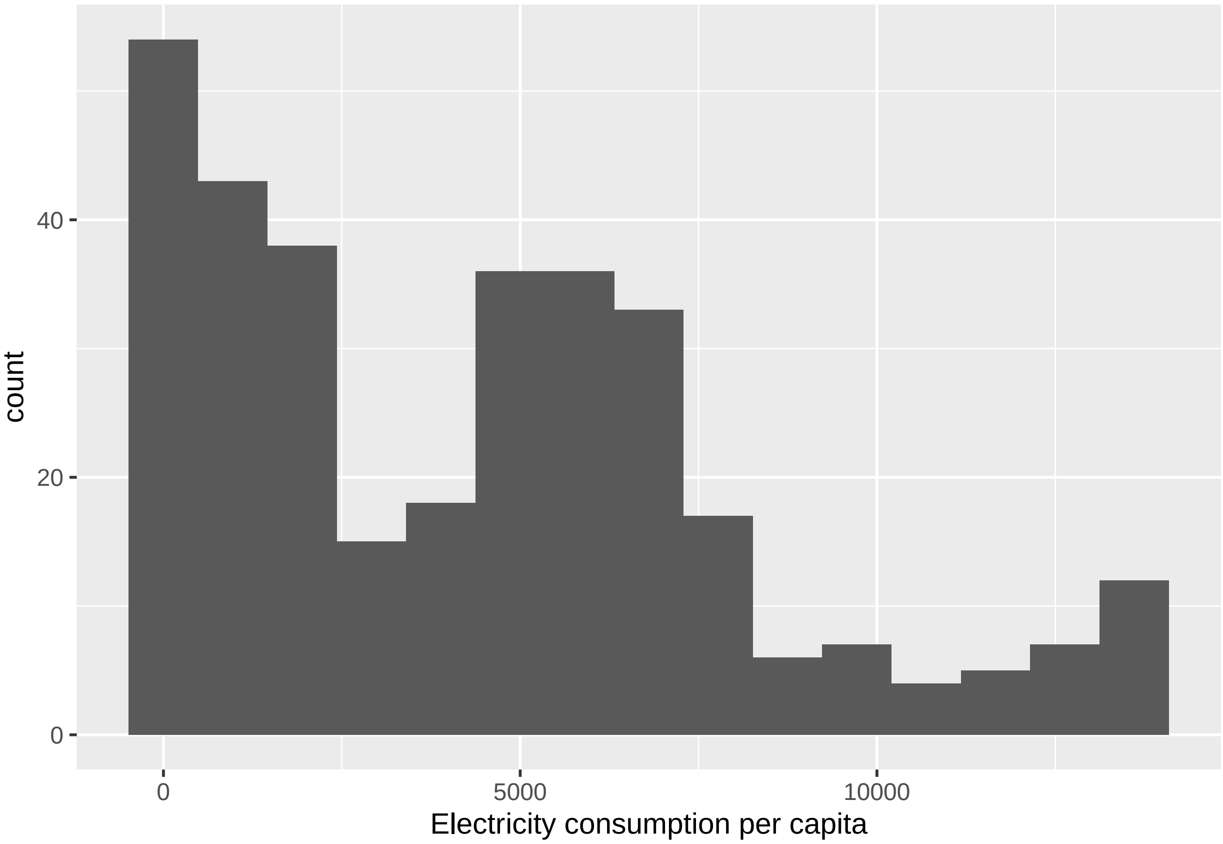
```
p3 <- p1 + geom_histogram(bins=15)
p3
```

```
## Warning: Removed 1181 rows containing non-finite values (`stat_bin()`).
```



```
p4 <- p3 + xlab("Electricity consumption per capita")
p4
```

```
## Warning: Removed 1181 rows containing non-finite values (`stat_bin()`).
```



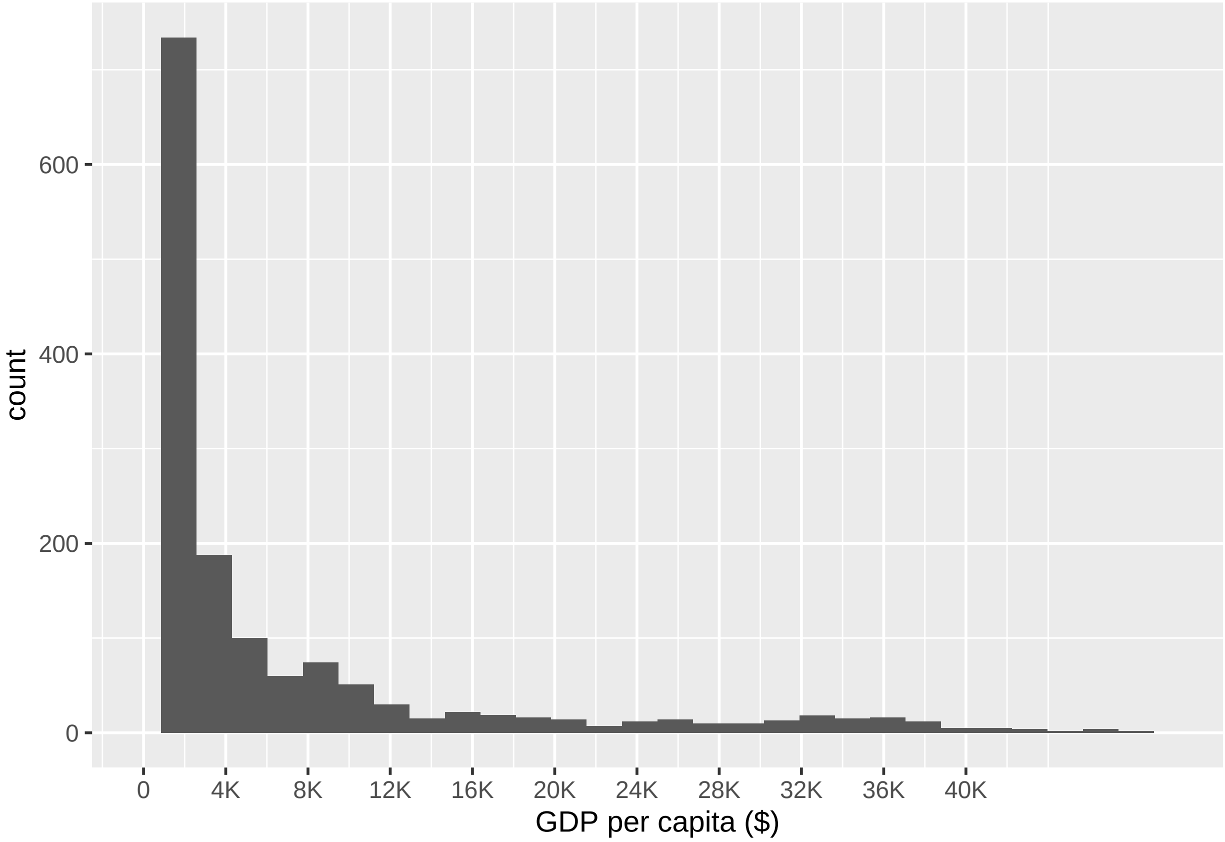
Scales

```r
df <- read_csv("../data/gapminder-data.csv")
```

```
## New names:
## Rows: 1512 Columns: 10
## -- Column specification
## -------------------------------------------------------- Delimiter: "," chr
## (1): Country dbl (9): ...1, Year, gdp_per_capita,
## Electricity_consumption_per_capita, und...
## i Use `spec()` to retrieve the full column specification for this data. i
## Specify the column types or set `show_col_types = FALSE` to quiet this message.
## * `` -> `...1`
```

```r
p1 <- ggplot(df, aes(x=gdp_per_capita))
p2 <- p1 + geom_histogram()
p3 <- p2 + scale_x_continuous(name='GDP per capita ($)',
                              limits=c(0, 50000),
                              breaks=seq(0, 40000, 4000),
                              labels=c('0', '4K', '8K', '12K', '16K', '20K',
                                       '24K', '28K', '32K', '36K', '40K'))
p3
```

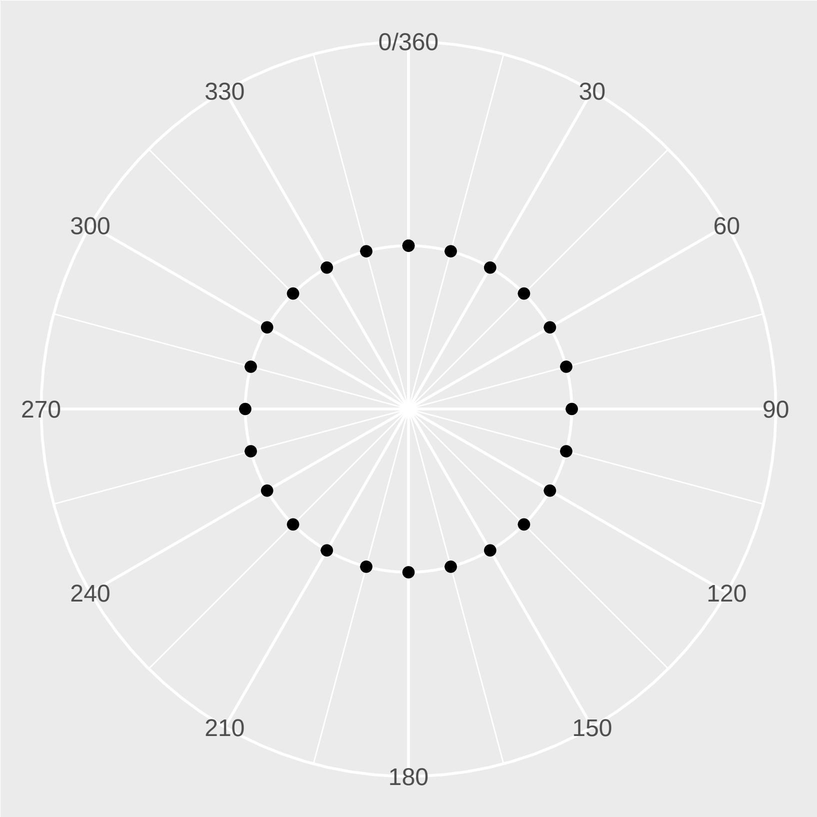
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 7 rows containing non-finite values (`stat_bin()`).

## Warning: Removed 2 rows containing missing values (`geom_bar()`).
```



Polar coordinates

```
t <- seq(0, 360, by=15)
r <- 2
qplot(r, t) +
coord_polar(theta="y") +
scale_y_continuous(breaks=seq(0, 360, 30)) +
theme(axis.title.x=element_blank(),
      axis.title.y=element_blank(),
      axis.text.y=element_blank(),
      axis.ticks.y=element_blank())
```

```
## Warning: `qplot()` was deprecated in ggplot2 3.4.0.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```



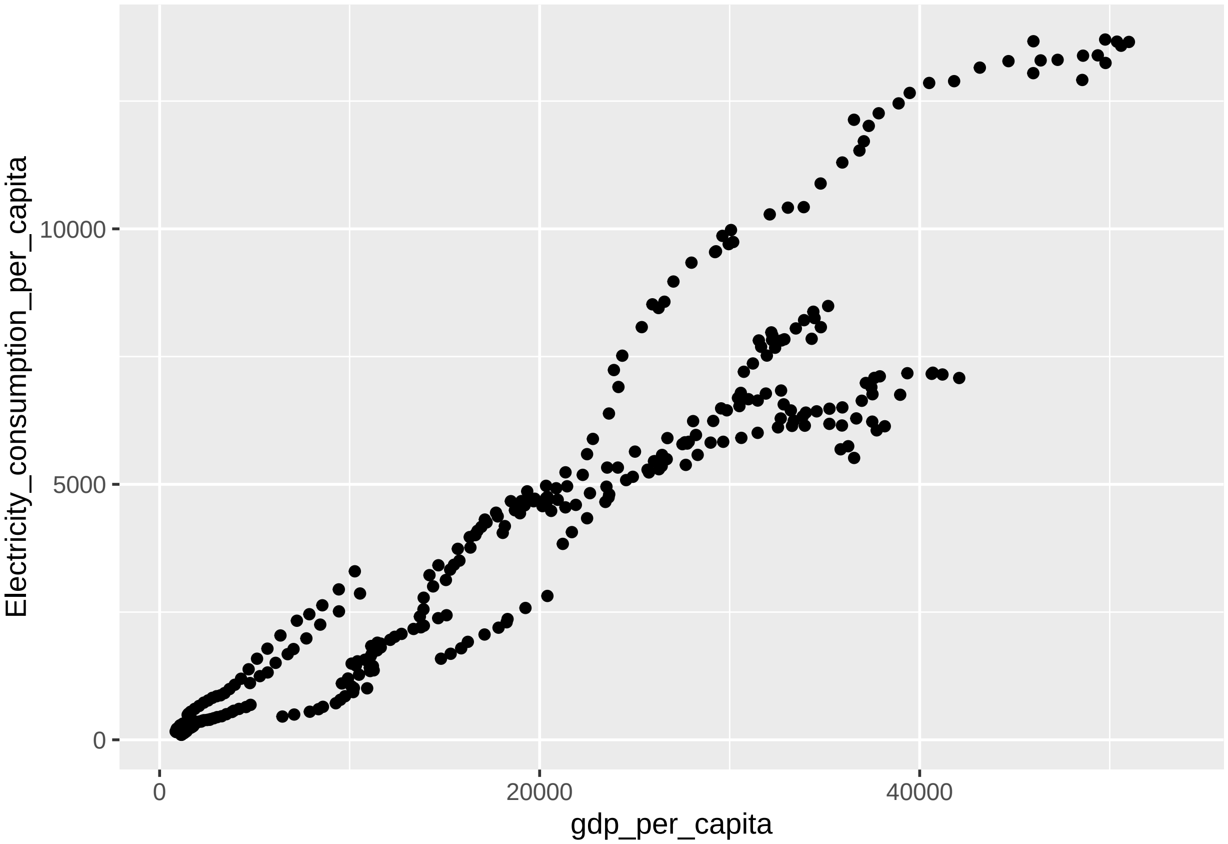
Facets

```
df <- read_csv("../data/gapminder-data.csv")
```

```
## New names:
## Rows: 1512 Columns: 10
## -- Column specification
## -------------------------------------------------------- Delimiter: "," chr
## (1): Country dbl (9): ...1, Year, gdp_per_capita,
## Electricity_consumption_per_capita, und...
## i Use `spec()` to retrieve the full column specification for this data. i
## Specify the column types or set `show_col_types = FALSE` to quiet this message.
## * `` -> `...1`
```

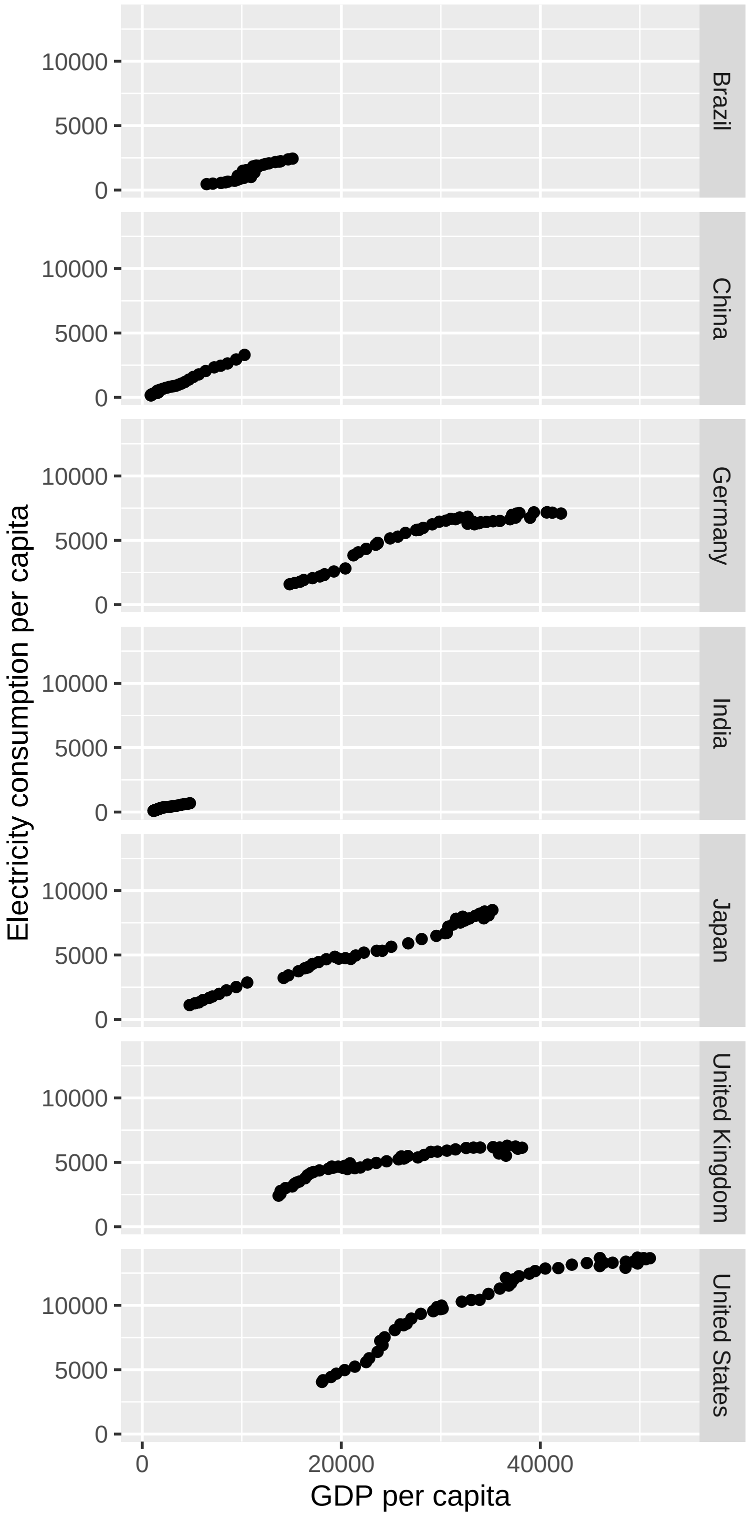
```
p <- ggplot(df, aes(x=gdp_per_capita, y=Electricity_consumption_per_capita)) + geom_point()
p
```

```
## Warning: Removed 1181 rows containing missing values (`geom_point()`).
```



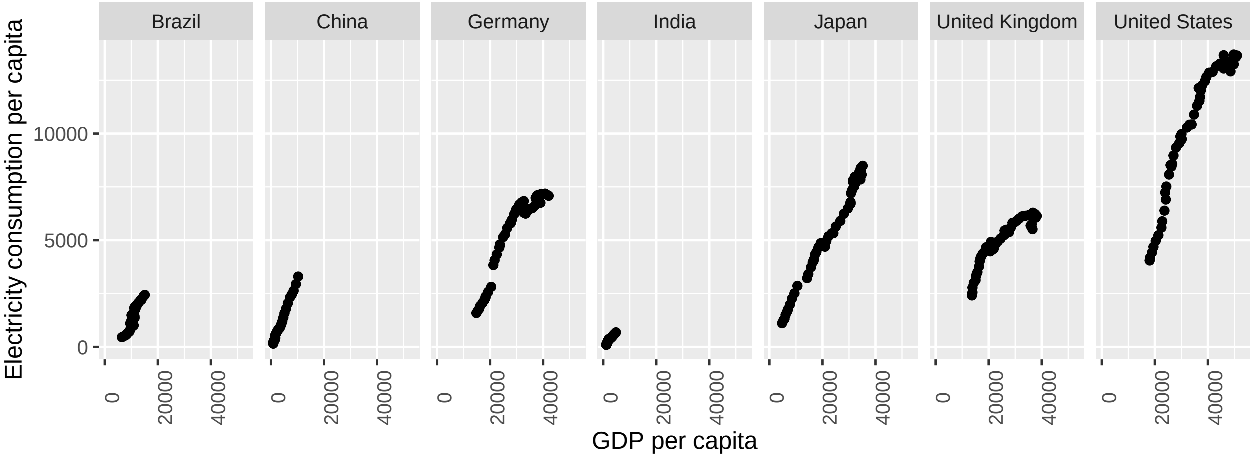
```r
p + facet_grid(Country ~ .) +
xlab("GDP per capita") +
ylab("Electricity consumption per capita")
```

```
## Warning: Removed 1181 rows containing missing values (`geom_point()`).
```



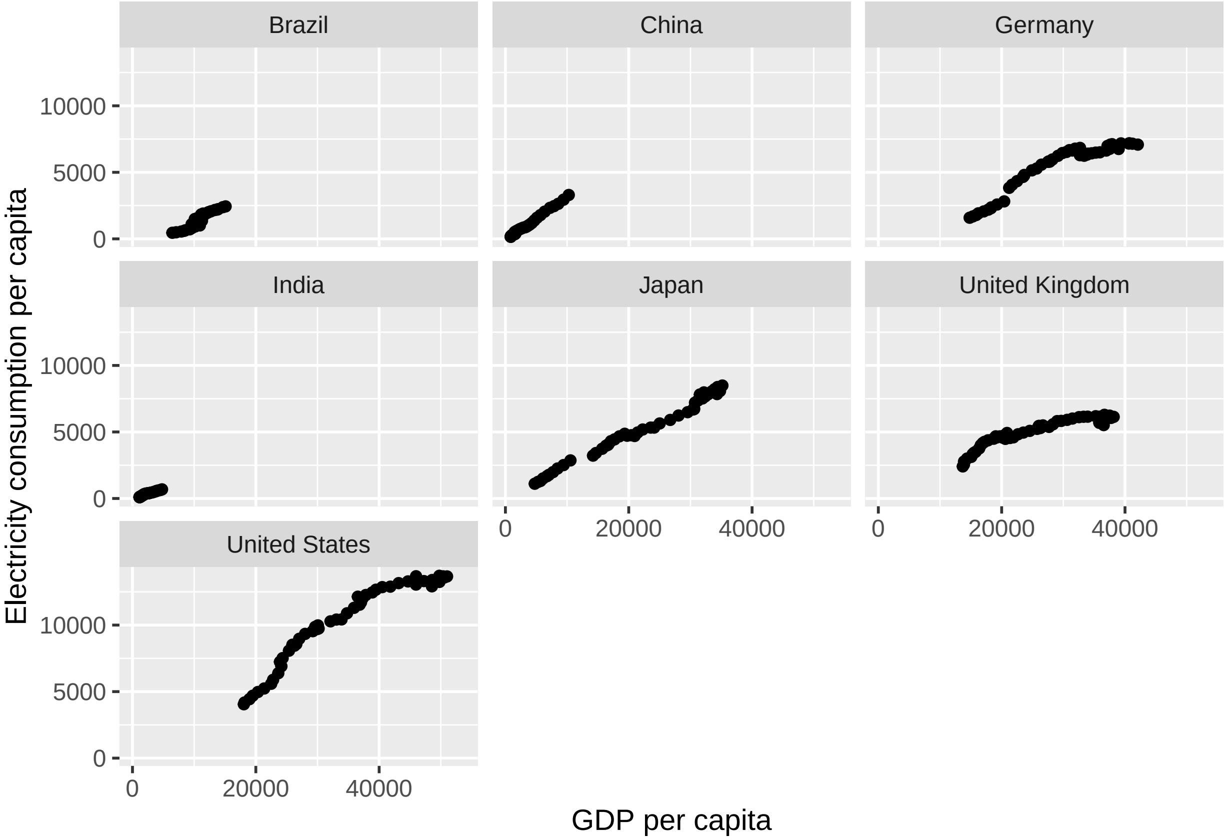
```r
p + facet_grid(. ~ Country) +
xlab("GDP per capita") +
ylab("Electricity consumption per capita") +
theme(axis.text.x=element_text(angle=90))
```

```
## Warning: Removed 1181 rows containing missing values (`geom_point()`).
```



```
p + facet_wrap(~Country) +
xlab("GDP per capita") +
ylab("Electricity consumption per capita")
```

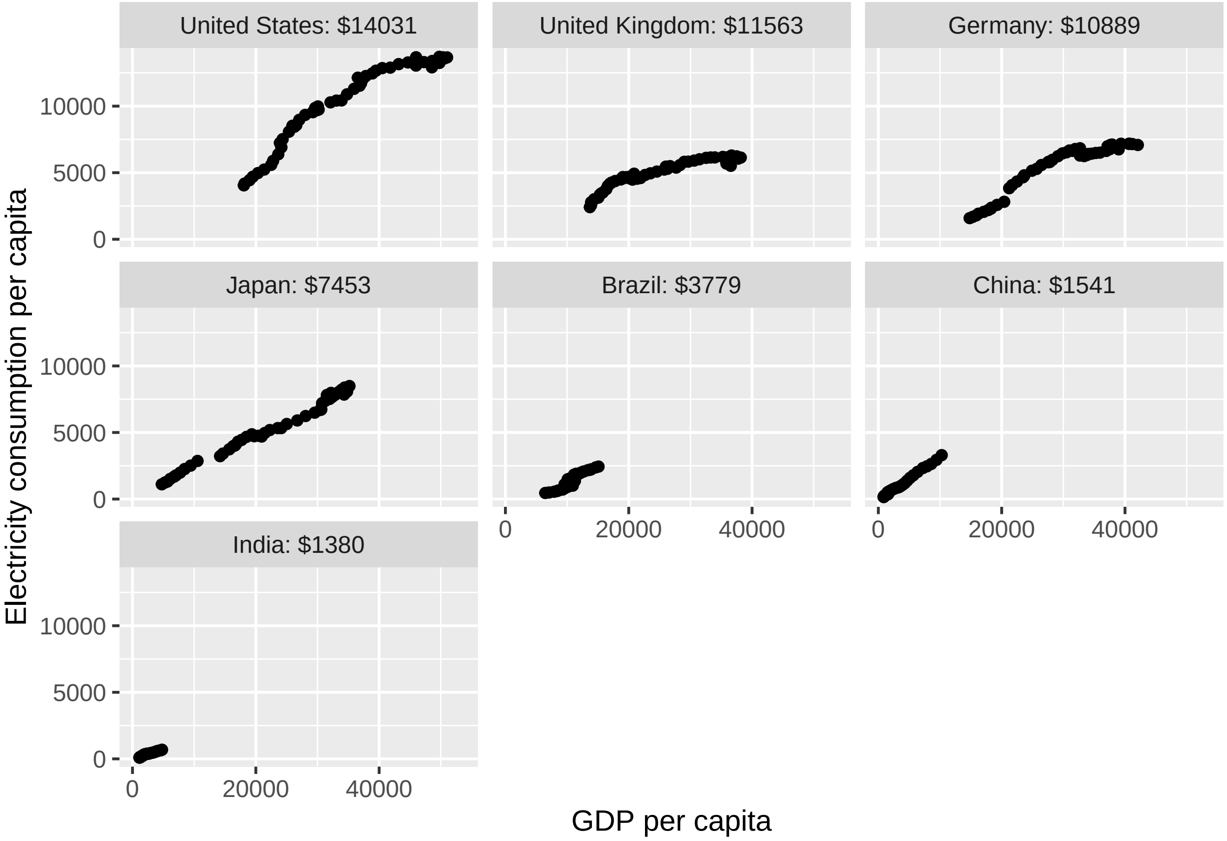
```
## Warning: Removed 1181 rows containing missing values (`geom_point()`).
```



```
ordered_countries <- df %>%
  group_by(Country) %>%
  summarize(mean = round(mean(gdp_per_capita))) %>%
  arrange(desc(mean)) %>%
  mutate(labels = str_c(Country, ": $", mean))
country.labs <- ordered_countries$labels
```

```
names(country.labs) <- ordered_countries$Country

df_ordered <- df %>%
  mutate(Country = factor(Country, levels=ordered_countries$Country))

ggplot(df_ordered, aes(x=gdp_per_capita, y=Electricity_consumption_per_capita)) +
  geom_point() +
  facet_wrap(~Country,
             labeller=labeller(Country = country.labs)) +
xlab("GDP per capita") +
ylab("Electricity consumption per capita")
```

```
## Warning: Removed 1181 rows containing missing values (`geom_point()`).
```

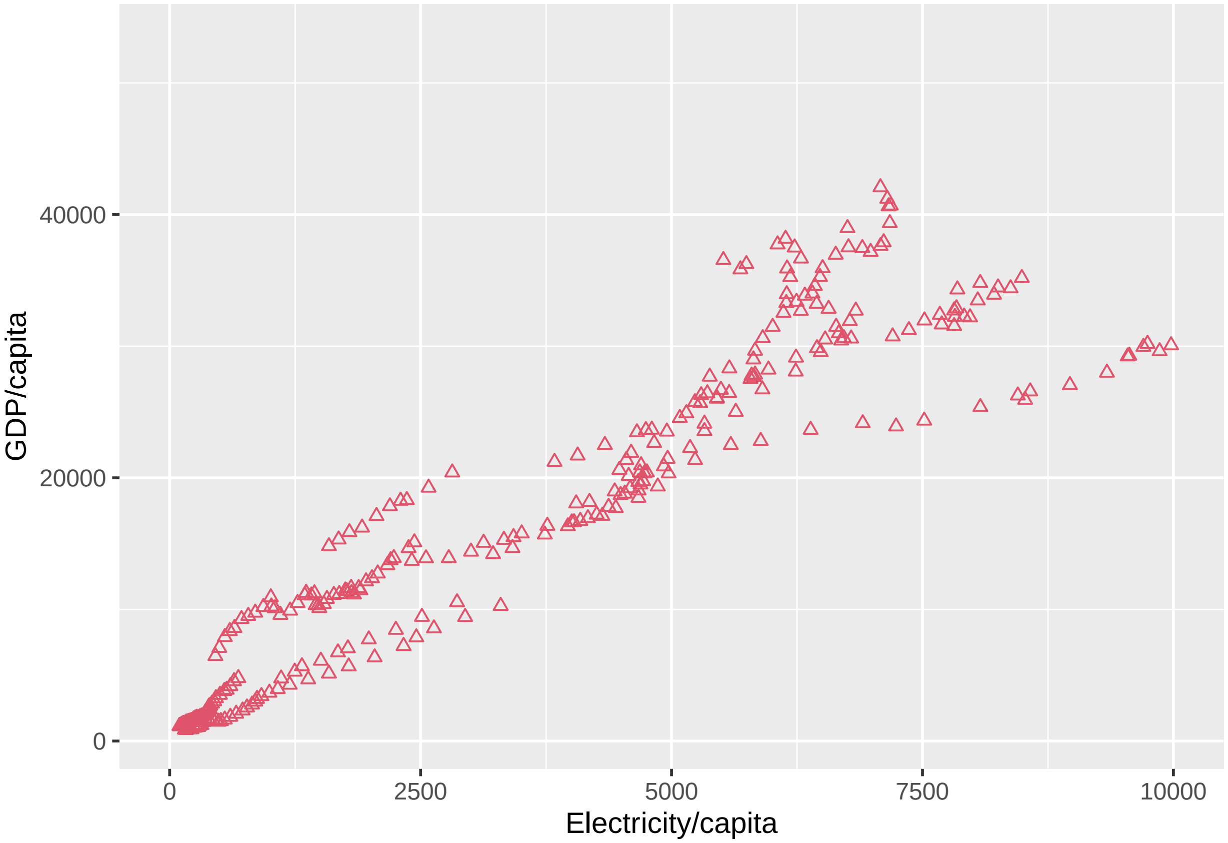


Shapes and colors

```
dfs <- subset(df, Country %in% c("Germany", "India", "China", "United States"))
var1 <- "Electricity_consumption_per_capita"
var2 <- "gdp_per_capita"
name1 <- "Electricity/capita"
name2 <- "GDP/capita"
ggplot(df, aes_string(x=var1, y=var2)) +
geom_point(color=2, shape=2) +
xlim(0, 10000) +
xlab(name1) +
ylab(name2)
```

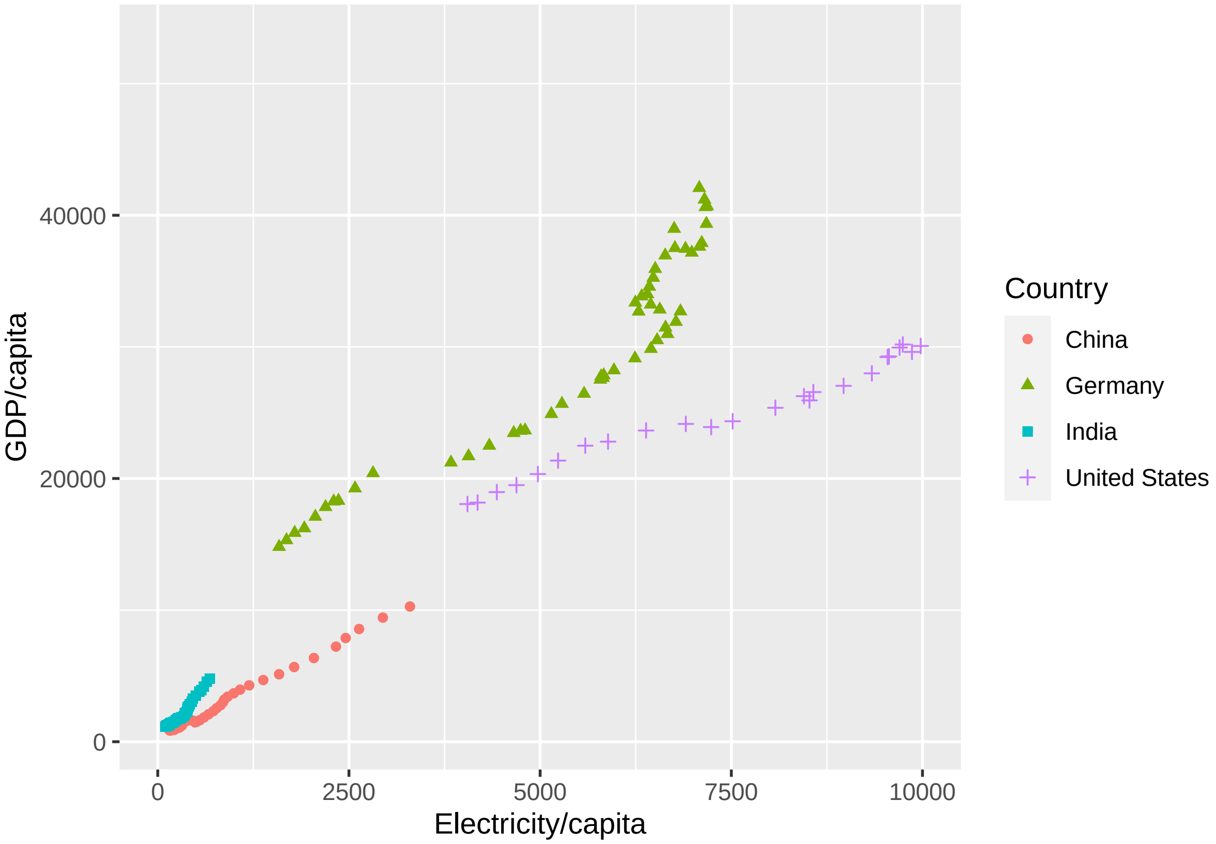
```
## Warning: `aes_string()` was deprecated in ggplot2 3.0.0.
## i Please use tidy evaluation idioms with `aes()`.
## i See also `vignette("ggplot2-in-packages")` for more information.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
## Warning: Removed 1209 rows containing missing values (`geom_point()`).
```



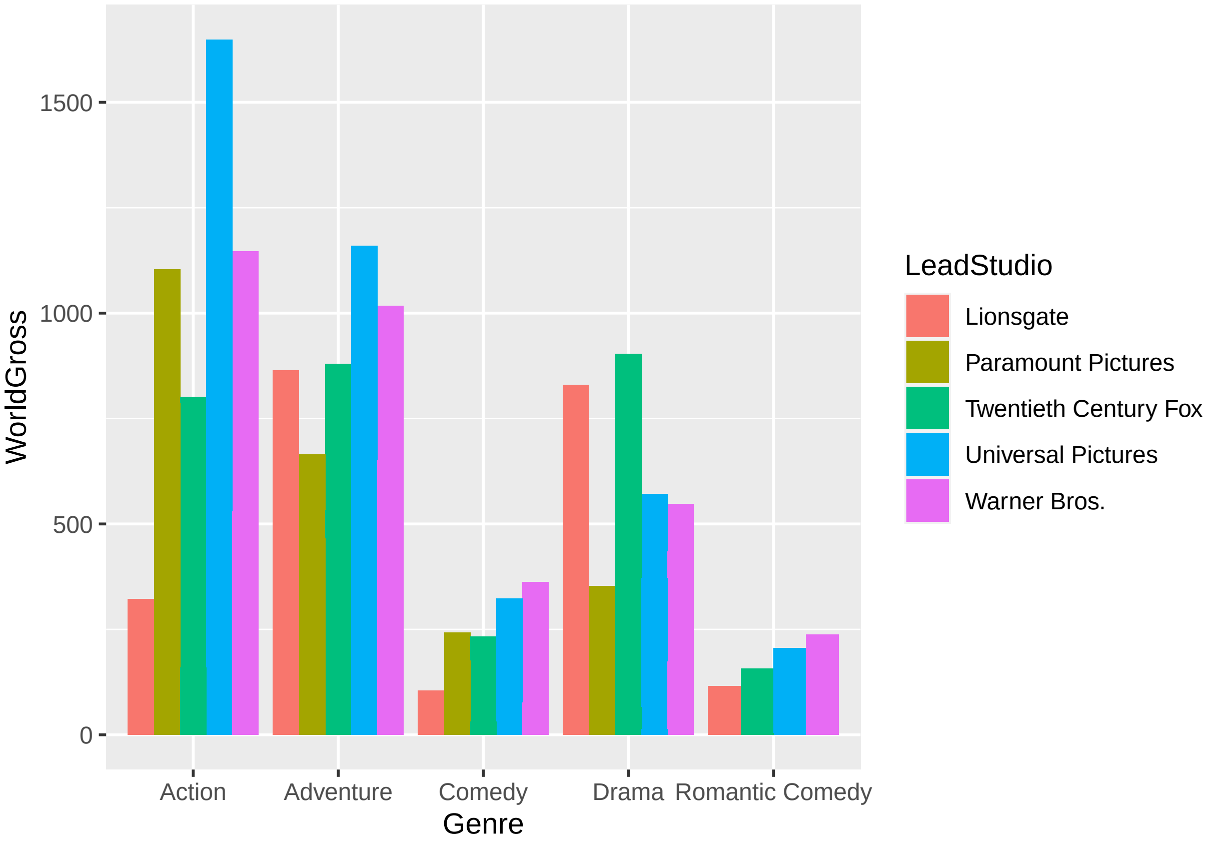
```
ggplot(dfs, aes_string(x=var1, y=var2)) +
geom_point(aes(color=Country, shape=Country)) +
xlim(0, 10000) +
xlab(name1) +
ylab(name2)
```

```
## Warning: Removed 706 rows containing missing values (`geom_point()`).
```

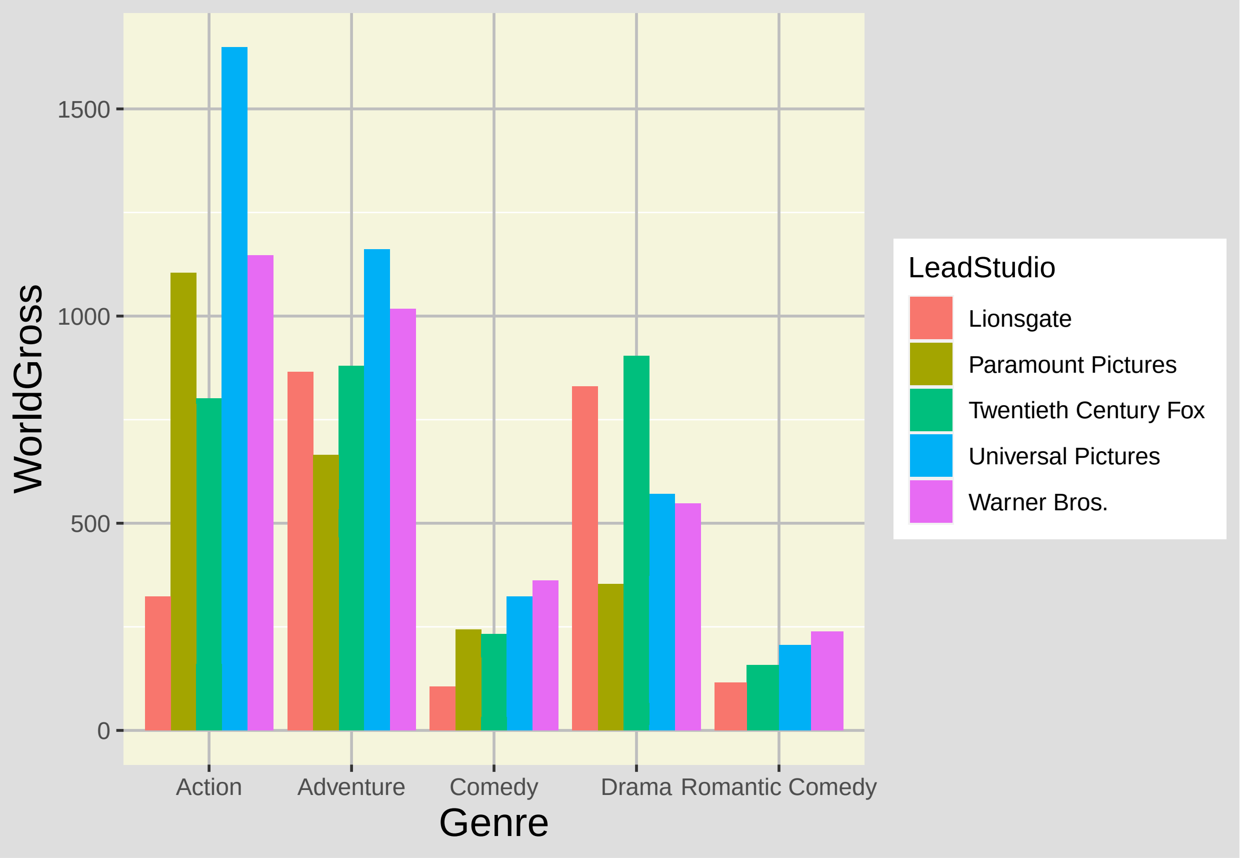


Themes

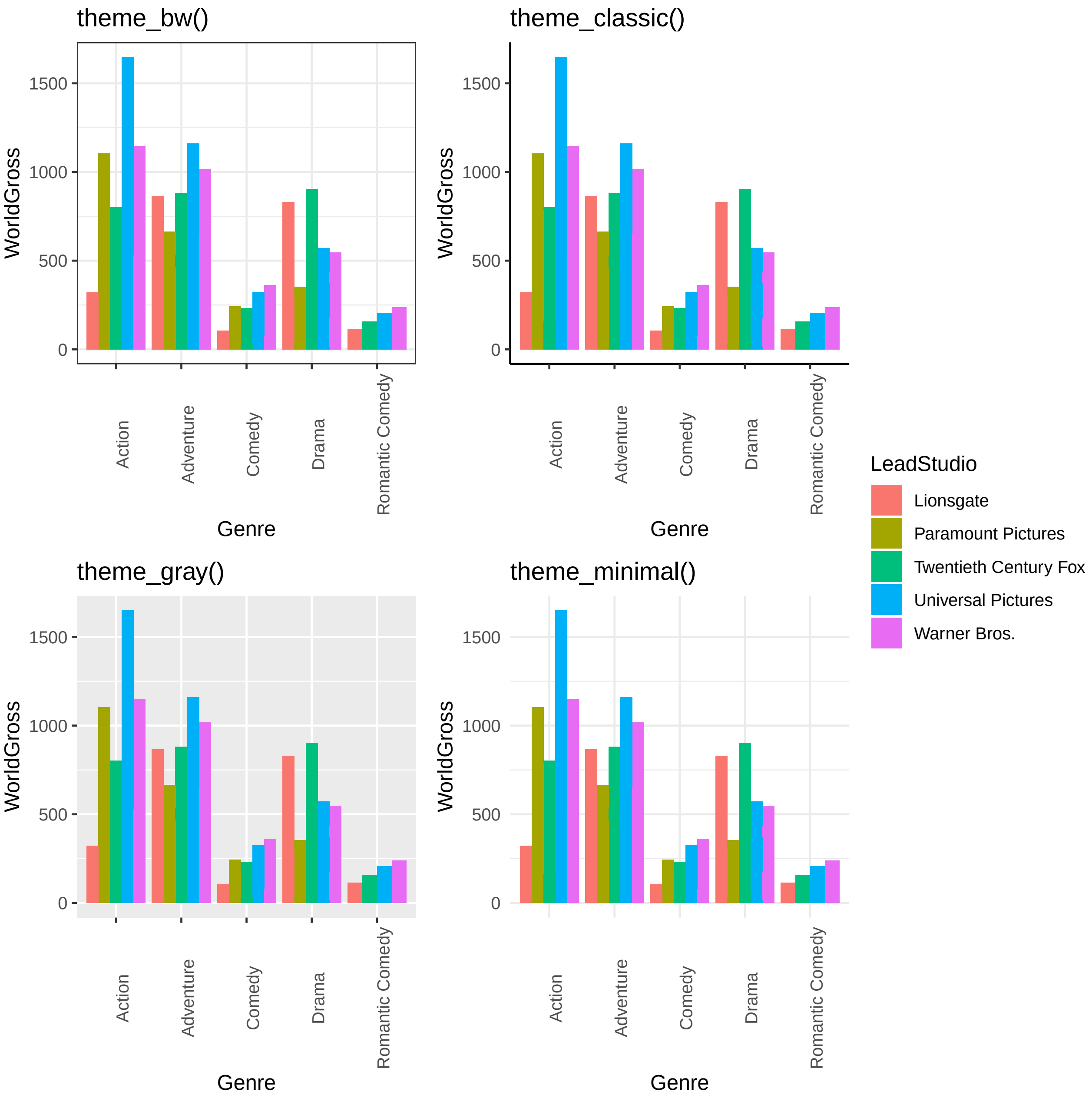
```
dfn <- subset(HollywoodMovies,
              Genre %in% c("Action", "Adventure", "Comedy", "Drama",
              "Romantic Comedy") &
              LeadStudio %in% c("Lionsgate ", "Paramount Pictures ",
              "Twentieth Century Fox ", "Universal Pictures ", "Warner Bros. "))
p1 <- ggplot(dfn, aes(x=Genre, y=WorldGross))
p2 <- p1 + geom_bar(aes(fill=LeadStudio), stat="Identity", position="dodge")
p2
```



```
p3 <- p2 + theme(axis.title.x=element_text(size=15),
                 axis.title.y=element_text(size=15),
                 plot.background=element_rect(fill="gray87"),
                 panel.background=element_rect(fill="beige"),
                 panel.grid.major=element_line(color="Gray", linetype=1))
p3
```

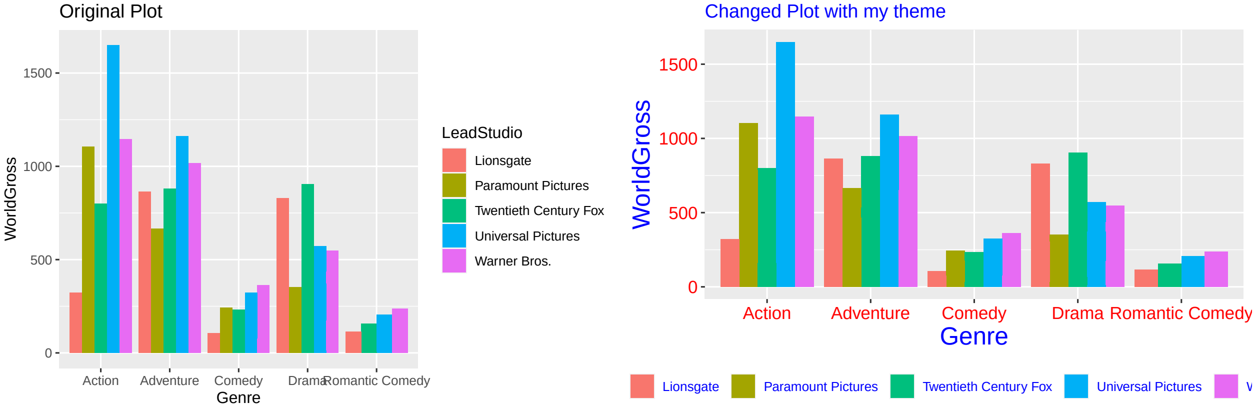


```
p4 <- p2 +
  theme_bw() +
  ggtitle("theme_bw()") +
  theme(axis.text.x=element_text(angle=90))
p5 <- p2 +
  theme_classic() +
  ggtitle("theme_classic()") +
  theme(axis.text.x=element_text(angle=90))
p6 <- p2 +
  theme_gray() +
  ggtitle("theme_gray()") +
  theme(axis.text.x=element_text(angle=90))
p7 <- p2 +
  theme_minimal() +
  ggtitle("theme_minimal()") +
  theme(axis.text.x=element_text(angle=90))
ggarrange(p4, p5, p6, p7, ncol=2, nrow=2, common.legend = TRUE, legend="right")
```

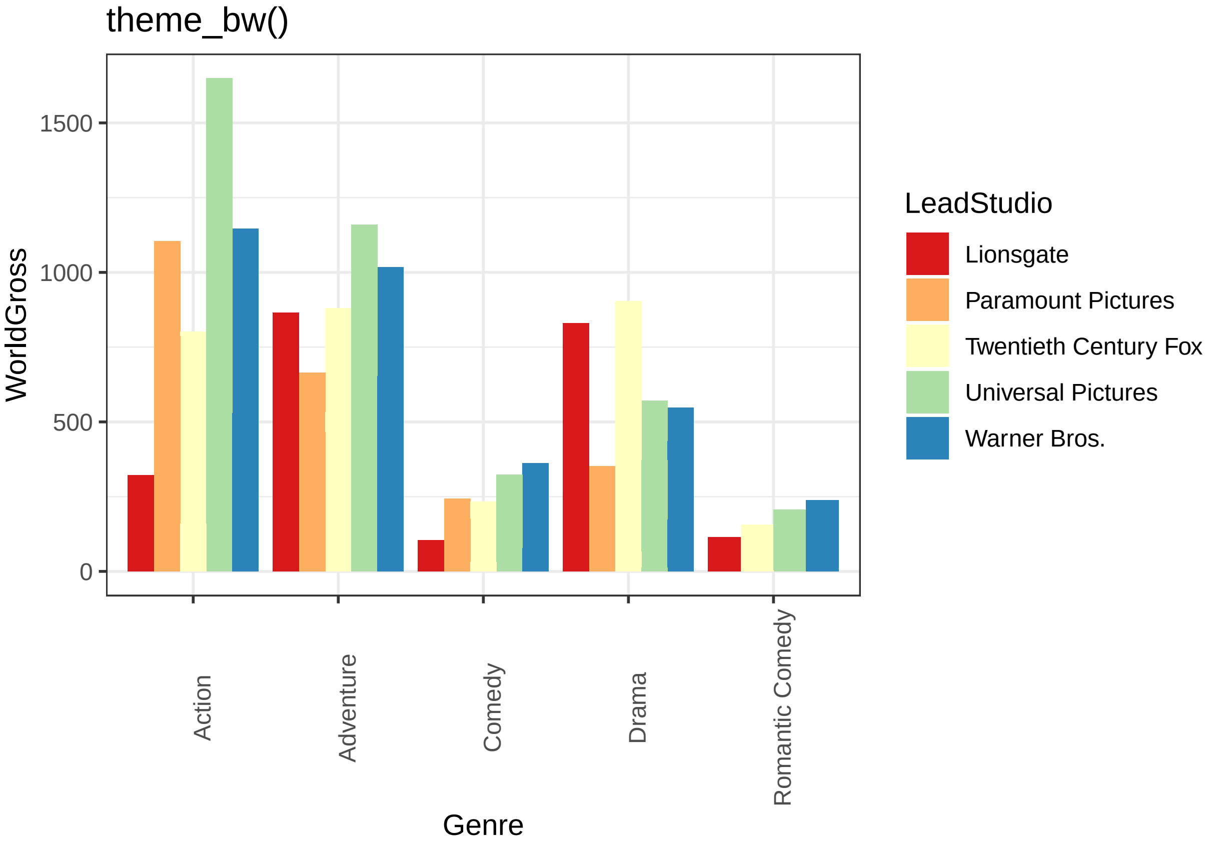


```
mytheme <- theme(legend.title=element_blank(),
legend.position="bottom",
text = element_text(color="Blue"),
axis.text=element_text(size=12, color="Red"),
axis.title=element_text(size=rel(1.5)))
```

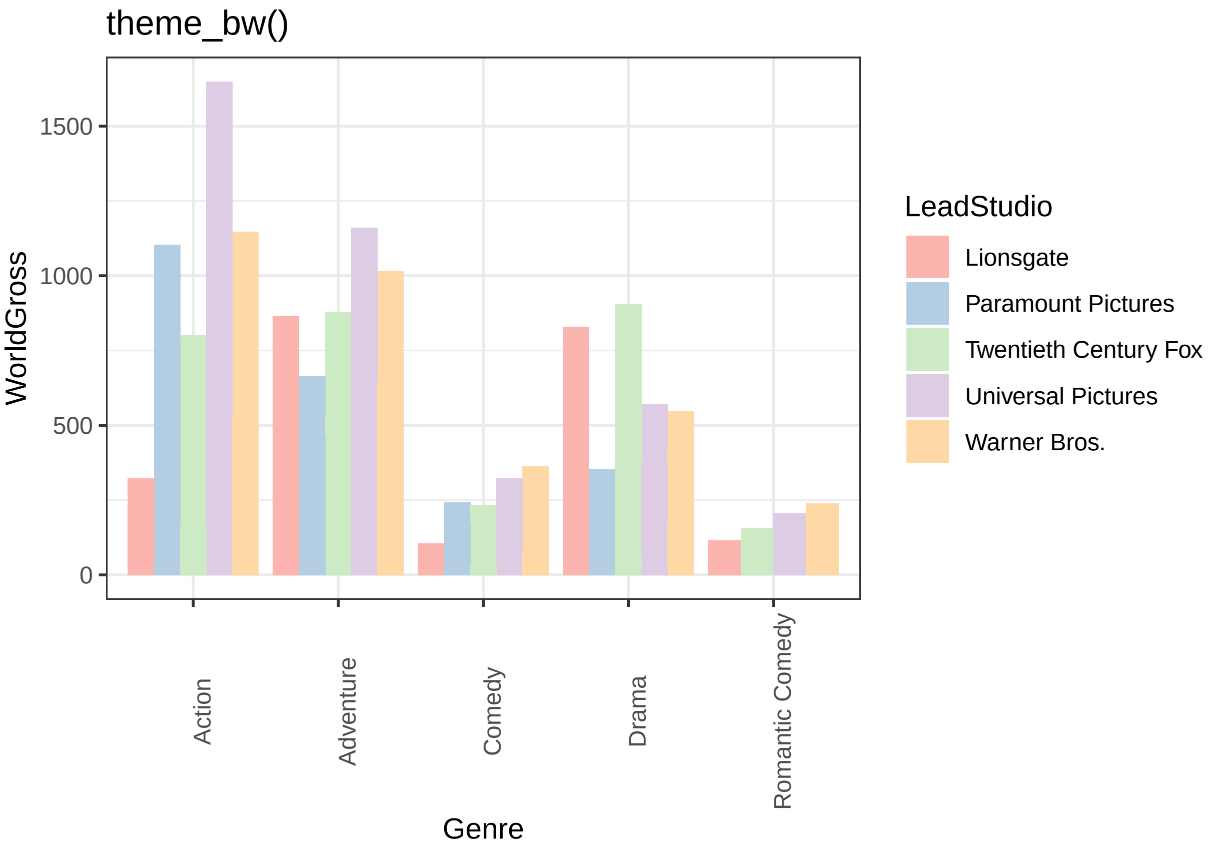
```
p2 <- p2 +
  ggtitle("Original Plot")
p8 <- p2 +
  mytheme +
  ggtitle("Changed Plot with my theme")
grid.arrange(p2, p8, ncol=2)
```



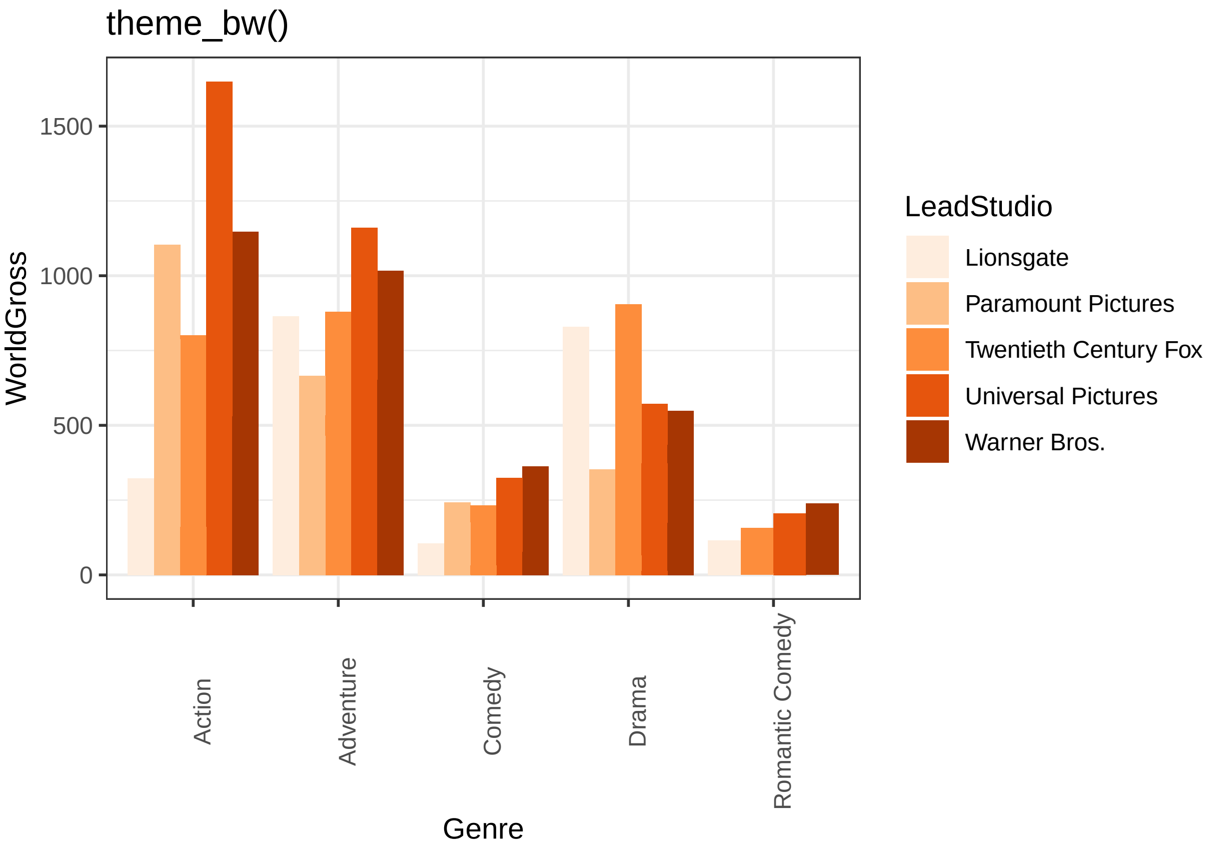
```
p4 + scale_fill_brewer(palette="Spectral")
```



```
p4 + scale_fill_brewer(palette="Pastel1")
```



```
p4 + scale_fill_brewer(palette="Oranges")
```


theme_bw()
WorldGross
1500
1000
500
0
Action
Adventure
Comedy
Drama
Romantic Comedy
Genre
LeadStudio
Lionsgate
Paramount Pictures
Twentieth Century Fox
Universal Pictures
Warner Bros.