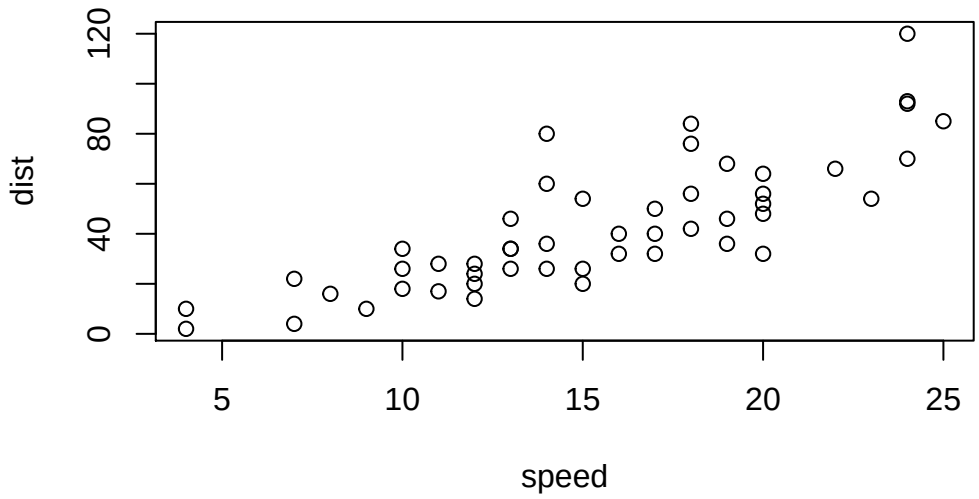
lab5

Zijing

Our First Plot

R has base graphics

```
plot(cars)
```




```
#install.package("ggplot2")
#install.packages("gapminder")
#install.packages("dplyr")
#install.packages("patchwork")
#install.packages("gganimate")
library(ggplot2)
```

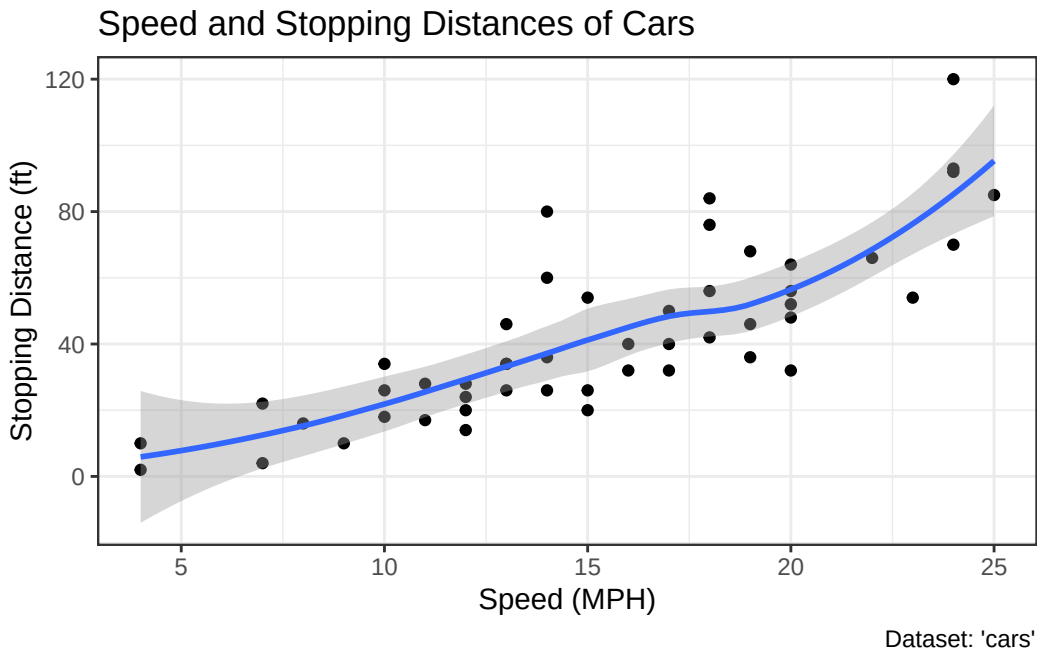
Every ggplot needs at least 3 layers:

- **Data**

- **Aes**
- **Geoms**

```
ggplot(cars) +
  aes(x=speed, y = dist)+
  geom_point()+
  geom_smooth()+
  theme_bw()+
  labs(title="Speed and Stopping Distances of Cars",
       x="Speed (MPH)",
       y="Stopping Distance (ft)",
       caption="Dataset: 'cars'")
```

```
`geom_smooth()` using method = 'loess' and formula 'y ~ x'
```




```
#Download Gene Data
url <- "https://bioboot.github.io/bimm143_S20/class-material/up_down_expression.txt"
genes <- read.delim(url)
head(genes)
```

```
        Gene Condition1 Condition2      State
1      A4GNT -3.6808610 -3.4401355 unchanging
2       AAAS  4.5479580  4.3864126 unchanging
3      AASDH  3.7190695  3.4787276 unchanging
4       AATF  5.0784720  5.0151916 unchanging
5       AATK  0.4711421  0.5598642 unchanging
6 AB015752.4 -3.6808610 -3.5921390 unchanging
```

```
nrow(genes)
```

```
[1] 5196
```

```
ncol(genes)
```

```
[1] 4
```

```
colnames(genes)
```

```
[1] "Gene"       "Condition1" "Condition2" "State"
```

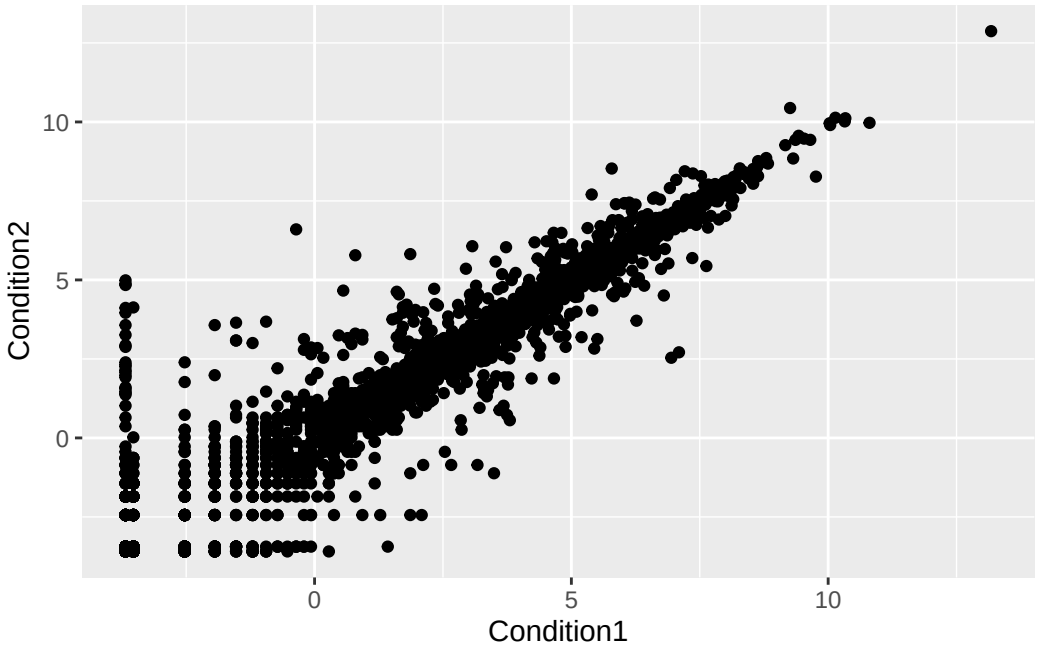
```
state <- table(genes$State)
state
```

```
     down unchanging          up
       72       4997         127
```

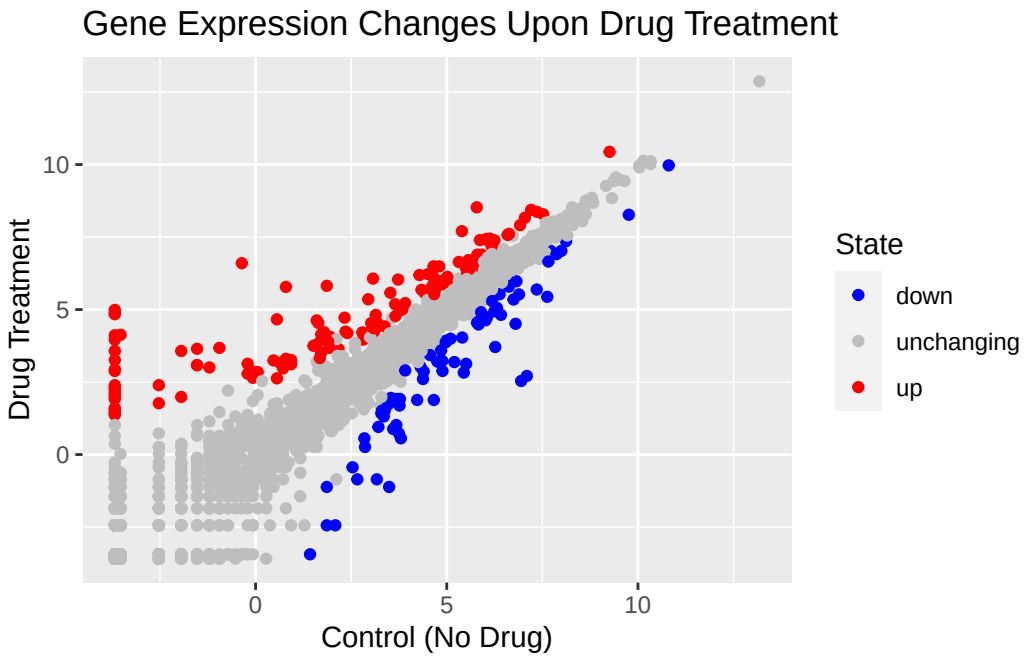
```
state["up"]/sum(state)
```

```
        up
0.02444188
```

```
ggplot(genes, aes(x=Condition1,y=Condition2))+
  geom_point()
```




```
ggplot(genes, aes(x=Condition1,y=Condition2, col=State))+
  geom_point()+
  scale_colour_manual( values=c("blue","gray","red") )+
  labs(title="Gene Expression Changes Upon Drug Treatment",
       x="Control (No Drug)",
       y="Drug Treatment")
```

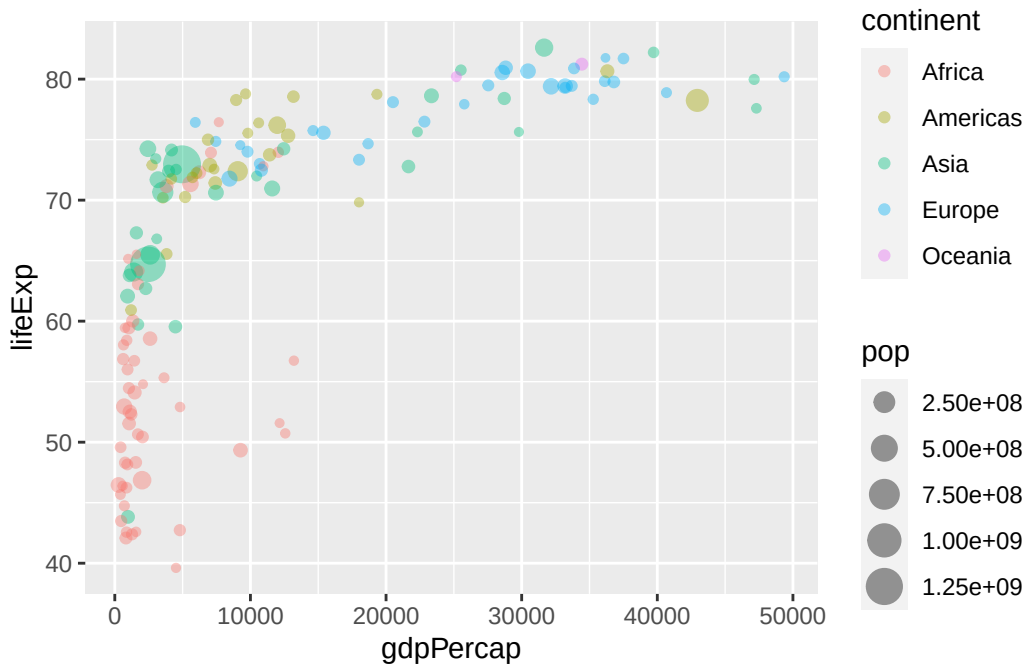



```
#install.packages("gapminder")
#install.packages("dplyr")
library(gapminder)
library(dplyr)
```

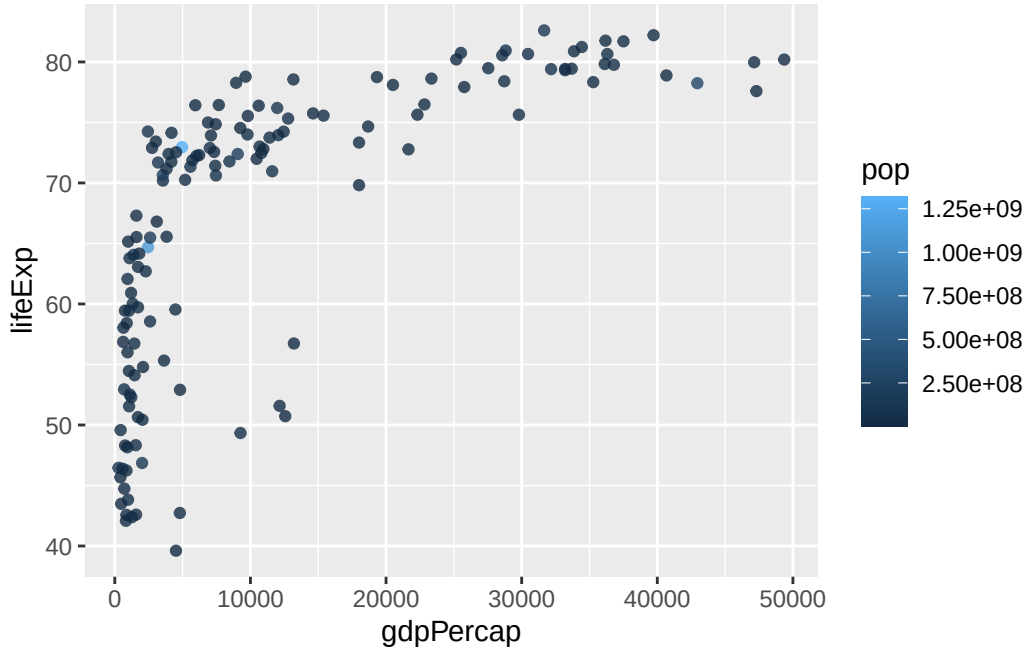
```
Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

    filter, lag

The following objects are masked from 'package:base':

    intersect, setdiff, setequal, union
```

```
gapminder_2007 <- gapminder %>% filter(year==2007)
```

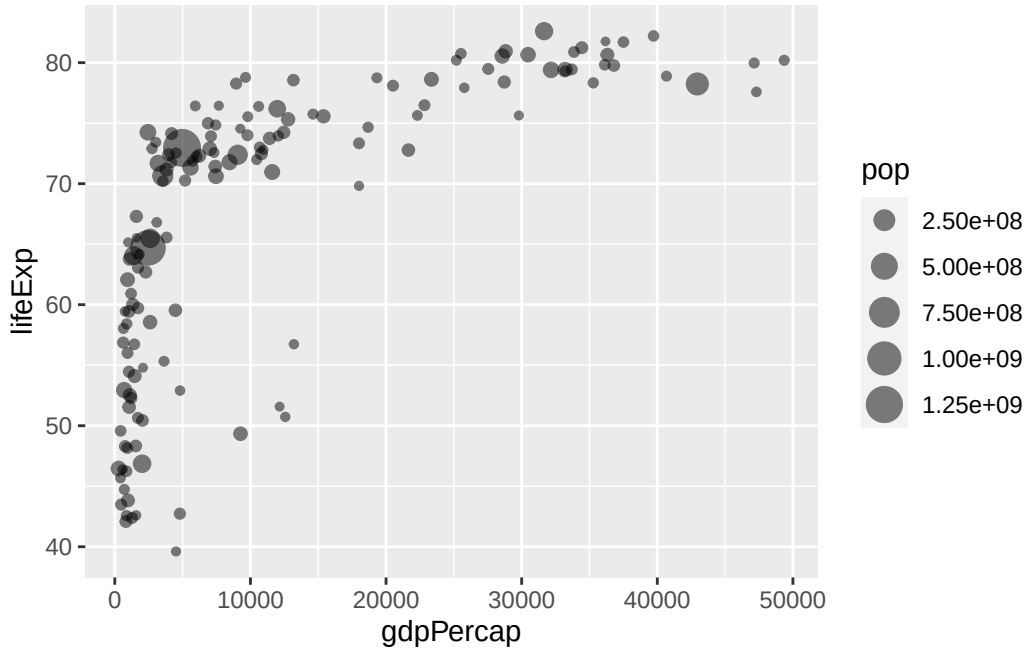
```
ggplot(gapminder_2007,aes(x=gdpPercap, y=lifeExp,col=continent,size=pop))+
  geom_point(alpha=0.4)
```



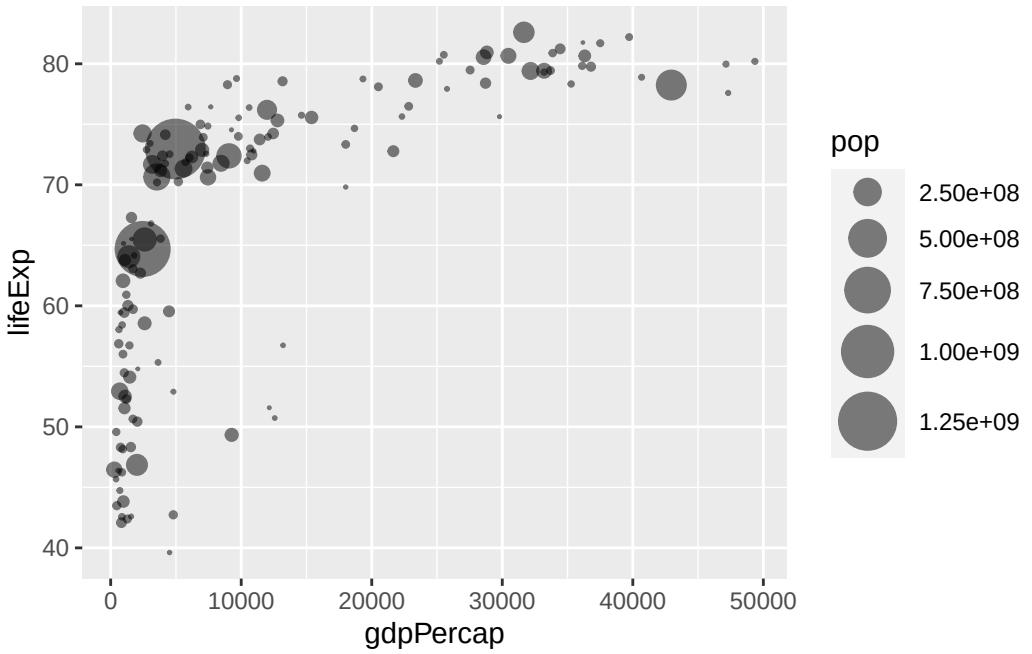

```
ggplot(gapminder_2007,aes(x=gdpPercap, y=lifeExp,col=pop))+
  geom_point(alpha=0.8)
```



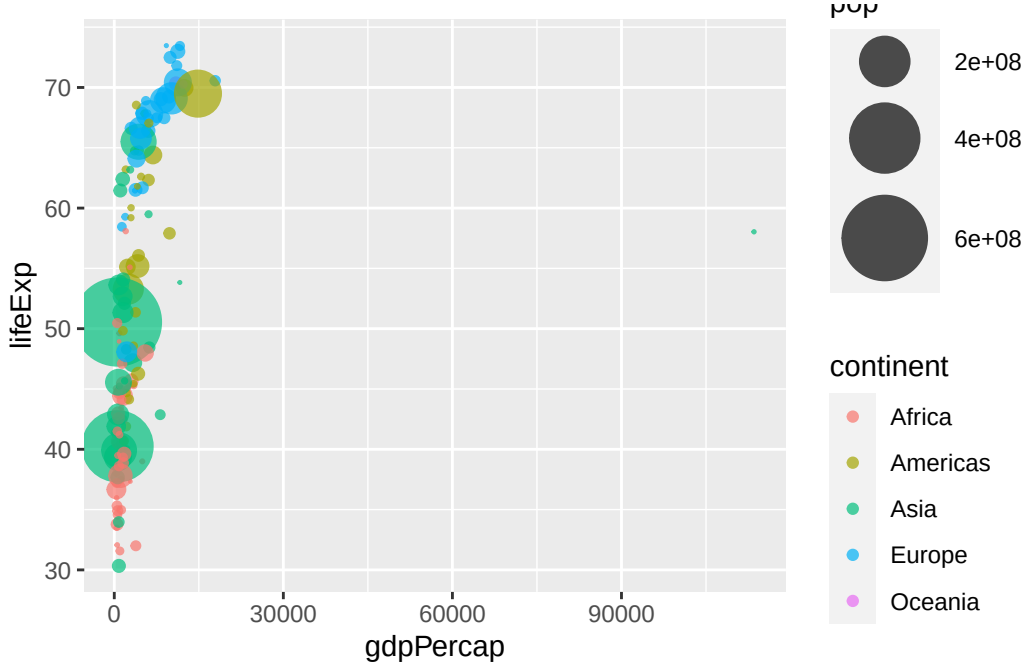
```
ggplot(gapminder_2007,aes(x=gdpPercap, y=lifeExp,size=pop))+
  geom_point(alpha=0.5)
```




```
ggplot(gapminder_2007,aes(x=gdpPercap, y=lifeExp,size=pop,))+
  geom_point(alpha=0.5)+
  scale_size_area(max_size=10)
```



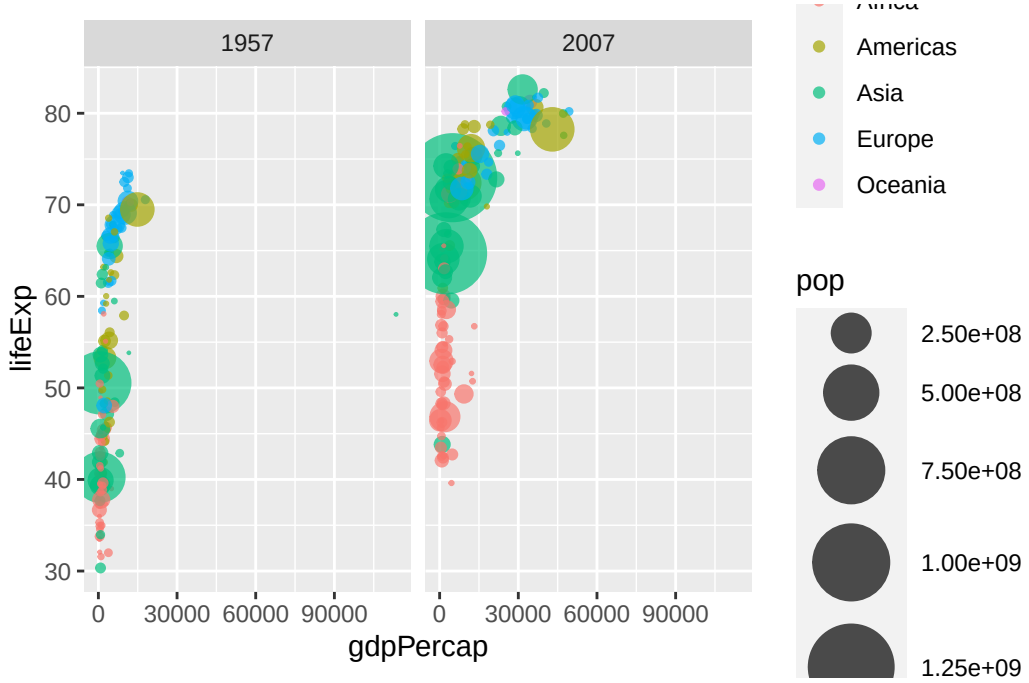

```
gapminder_1957 <- gapminder %>% filter(year==1957)
ggplot(gapminder_1957,aes(x=gdpPercap, y=lifeExp,col=continent,size=pop))+
  geom_point(alpha=0.7)+
  scale_size_area(max_size = 15)
```




```
gapminder_1 <- gapminder_1957 %>% filter(gdpPercap>90000)
gapminder_1
```

```
# A tibble: 1 x 6
  country continent  year lifeExp    pop gdpPercap
  <fct>   <fct>     <int>   <dbl>  <int>     <dbl>
1 Kuwait  Asia       1957    58.0 212846   113523.
```

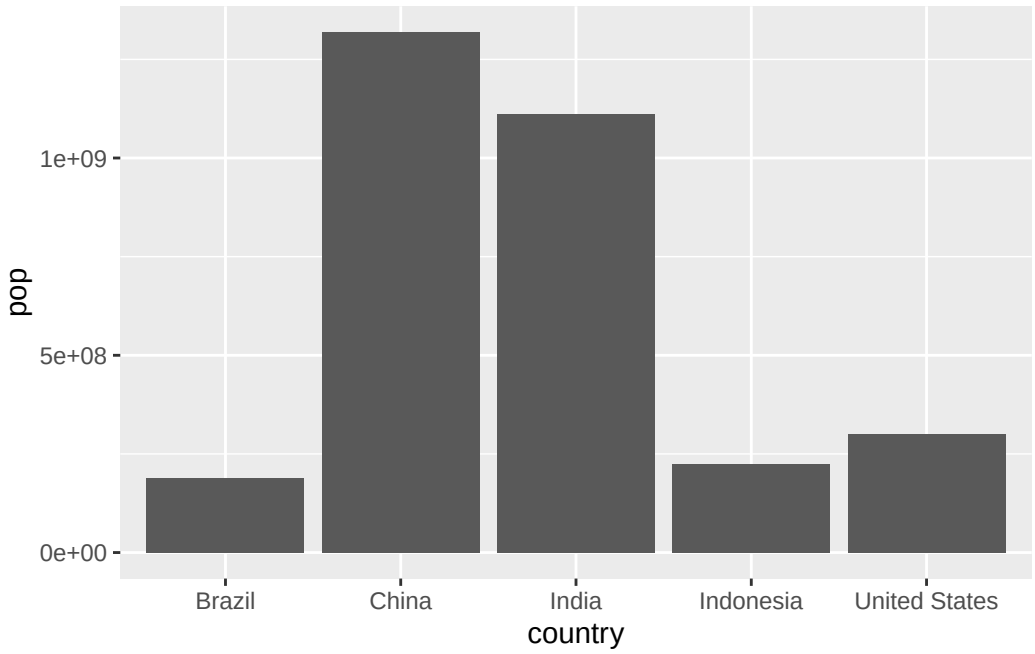
```
gapminder_2years <- gapminder %>% filter(year==1957 | year==2007)
ggplot(gapminder_2years,aes(x=gdpPercap, y=lifeExp,col=continent,size=pop))+
  geom_point(alpha=0.7)+
  scale_size_area(max_size = 15)+
  facet_wrap(~year)
```



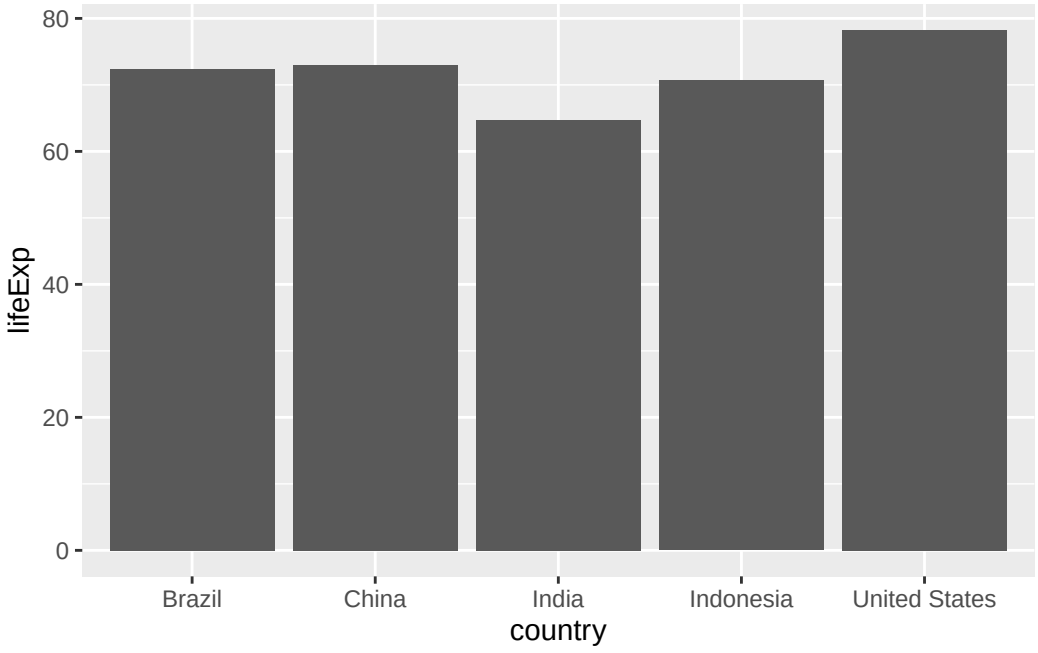

```
gapminder_top5 <- gapminder %>% filter(year==2007) %>% arrange(desc(pop)) %>%top_n(5,pop)
gapminder_top5
```

```
# A tibble: 5 x 6
  country       continent  year lifeExp        pop gdpPercap
  <fct>         <fct>     <int>   <dbl>      <int>     <dbl>
1 China         Asia       2007    73.0 1318683096     4959.
2 India         Asia       2007    64.7 1110396331     2452.
3 United States Americas   2007    78.2  301139947    42952.
4 Indonesia     Asia       2007    70.6  223547000     3541.
5 Brazil        Americas   2007    72.4  190010647     9066.
```

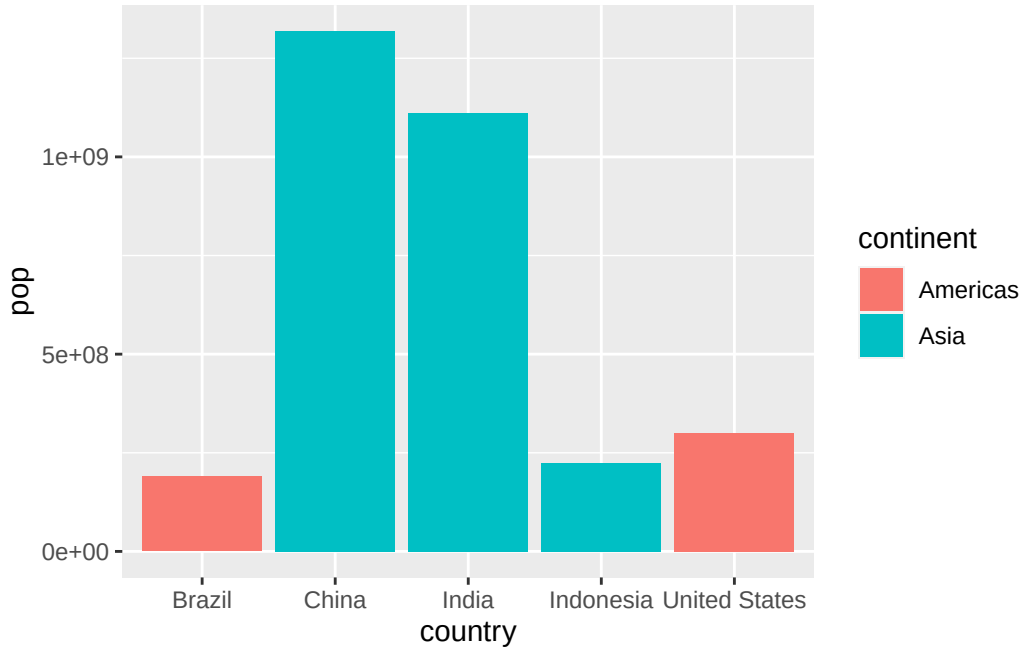
```
ggplot(gapminder_top5,aes(x = country, y = pop))+
  geom_col()
```



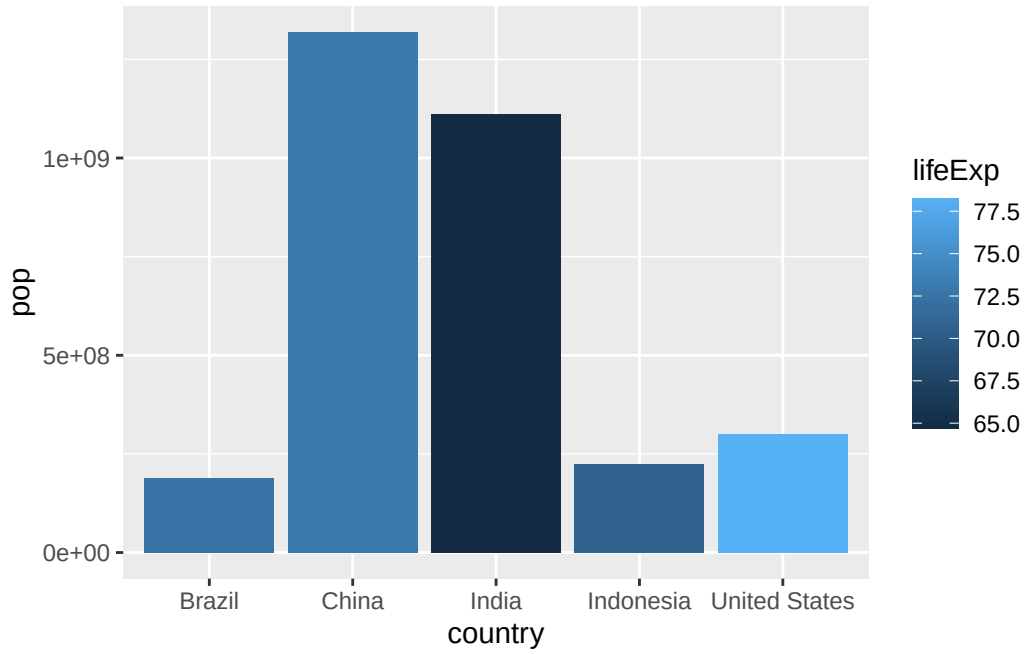

```
ggplot(gapminder_top5,aes(x = country, y = lifeExp))+
  geom_col()
```



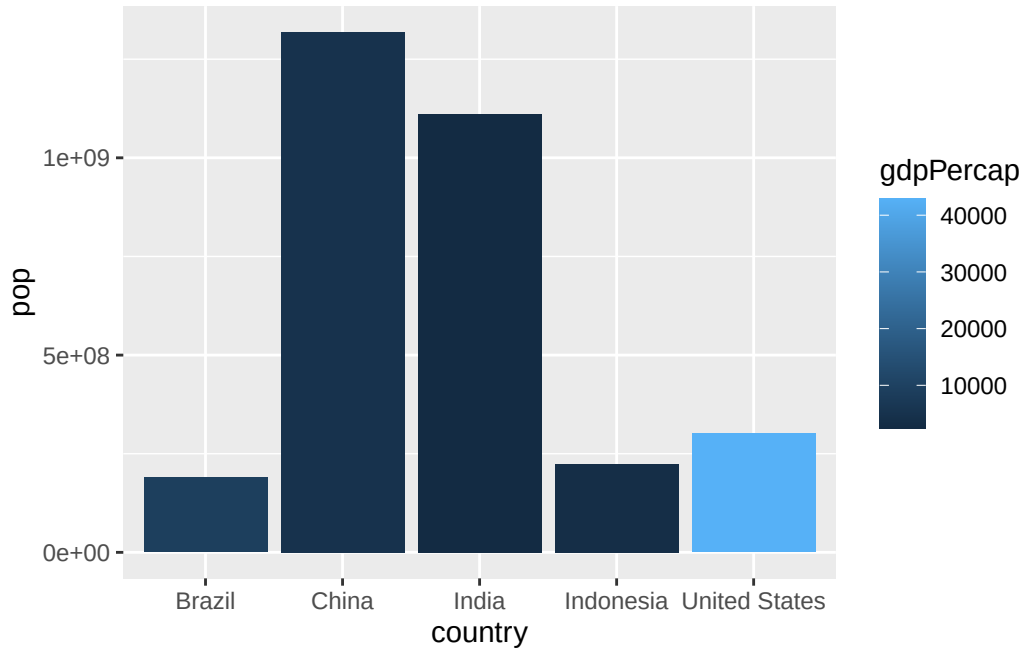
```
ggplot(gapminder_top5,aes(x = country, y = pop, fill=continent))+
  geom_col()
```



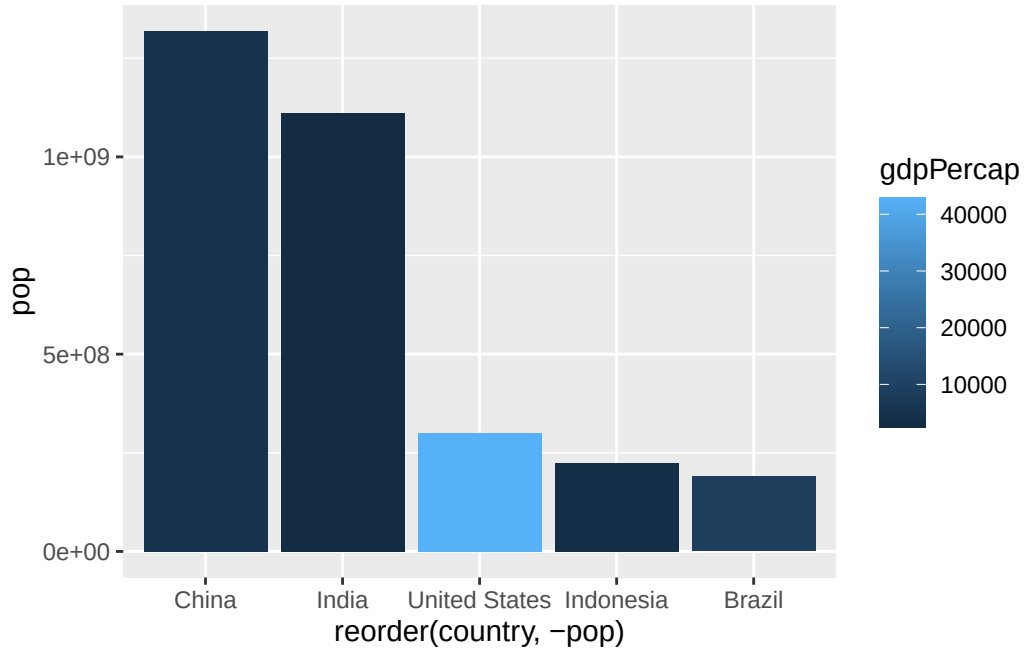

```
ggplot(gapminder_top5,aes(x = country, y = pop, fill=lifeExp))+
  geom_col()
```




```
ggplot(gapminder_top5,aes(x = country, y = pop, fill=gdpPercap))+
  geom_col()
```

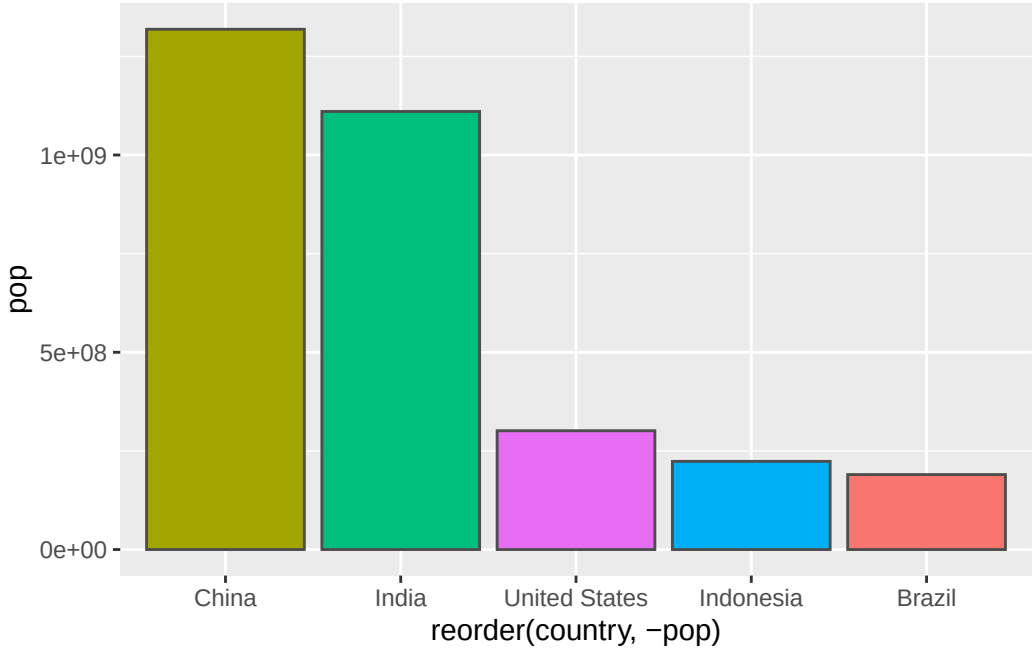


```
ggplot(gapminder_top5,aes(x = reorder(country,-pop), y = pop, fill=gdpPercap))+
  geom_col()
```




```
ggplot(gapminder_top5,aes(x = reorder(country,-pop), y = pop, fill=country))+
  geom_col(col="gray30")+
  guides(fill=FALSE)
```

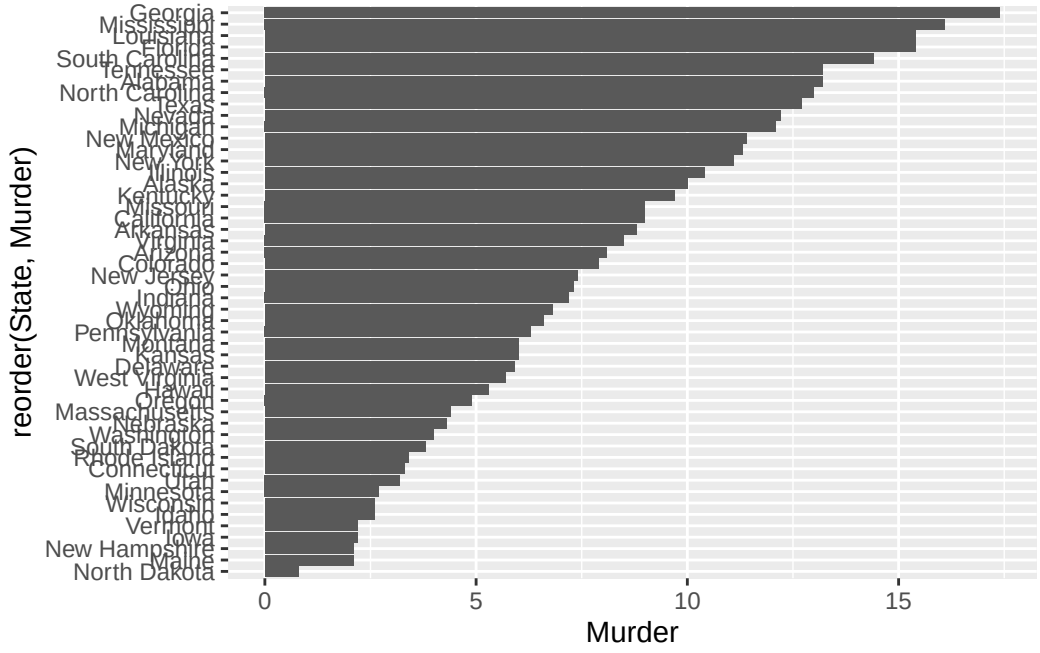
```
Warning: `guides(<scale> = FALSE)` is deprecated. Please use `guides(<scale> =
"none")` instead.
```



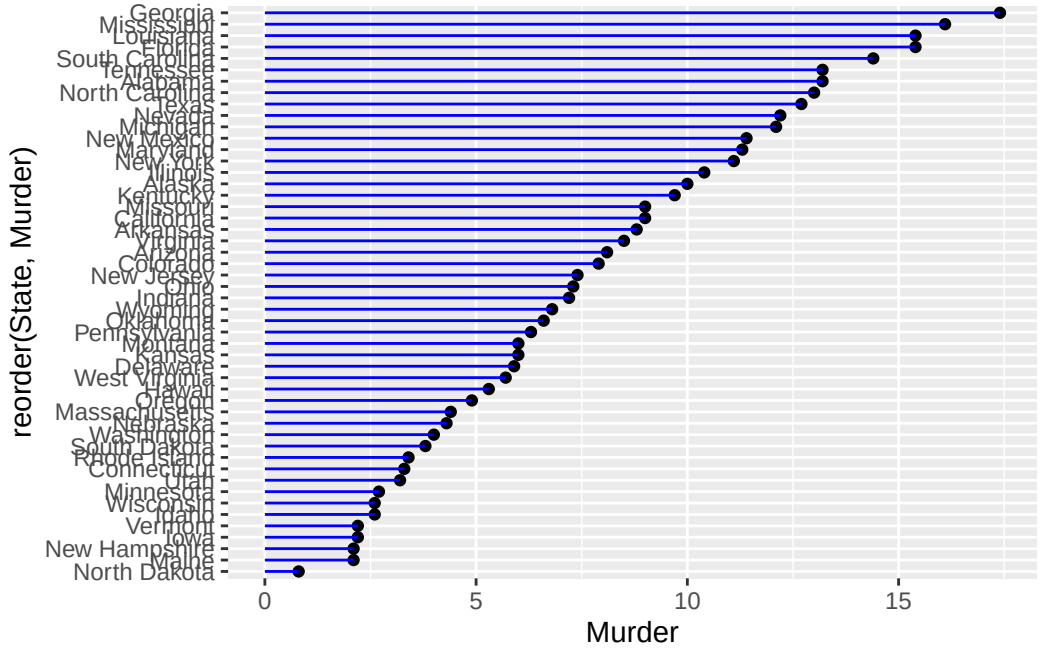

```r
head(USArrests)
```

```
           Murder Assault UrbanPop Rape
Alabama      13.2     236       58 21.2
Alaska       10.0     263       48 44.5
Arizona       8.1     294       80 31.0
Arkansas      8.8     190       50 19.5
California    9.0     276       91 40.6
Colorado      7.9     204       78 38.7
```

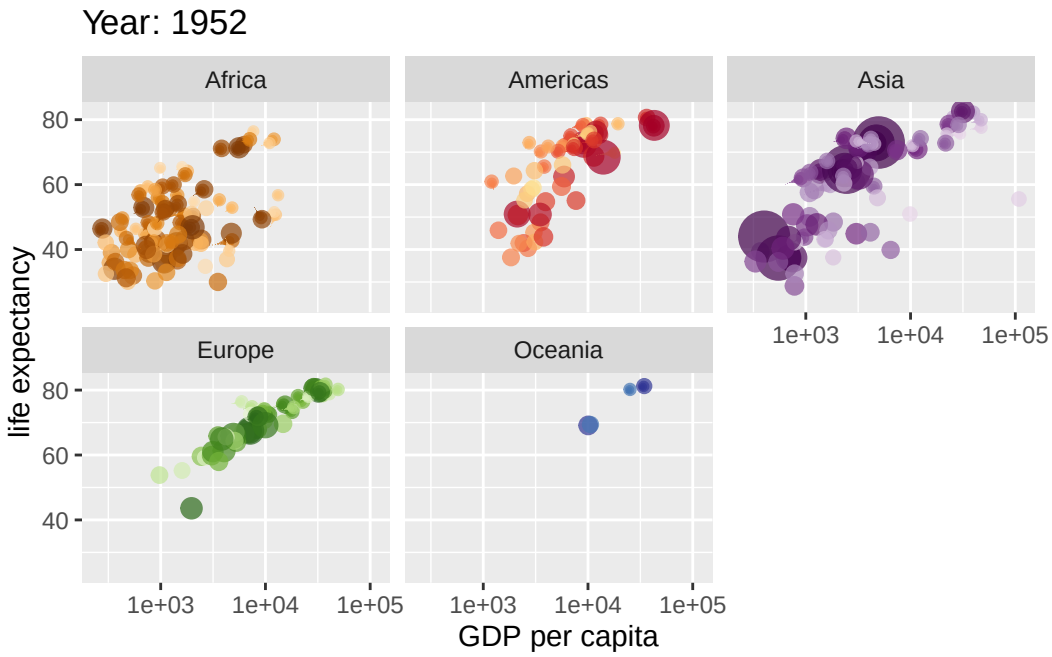
```r
USArrests$State <- rownames(USArrests)
ggplot(USArrests, aes(x=reorder(State,Murder), y=Murder))+
  geom_col()+
  coord_flip()
```

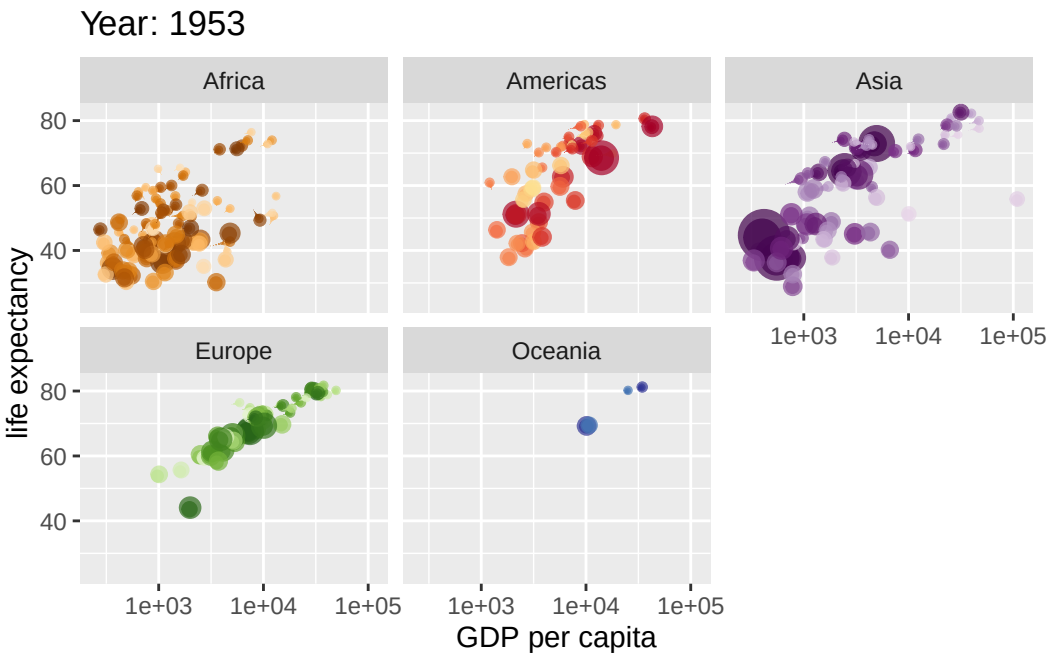


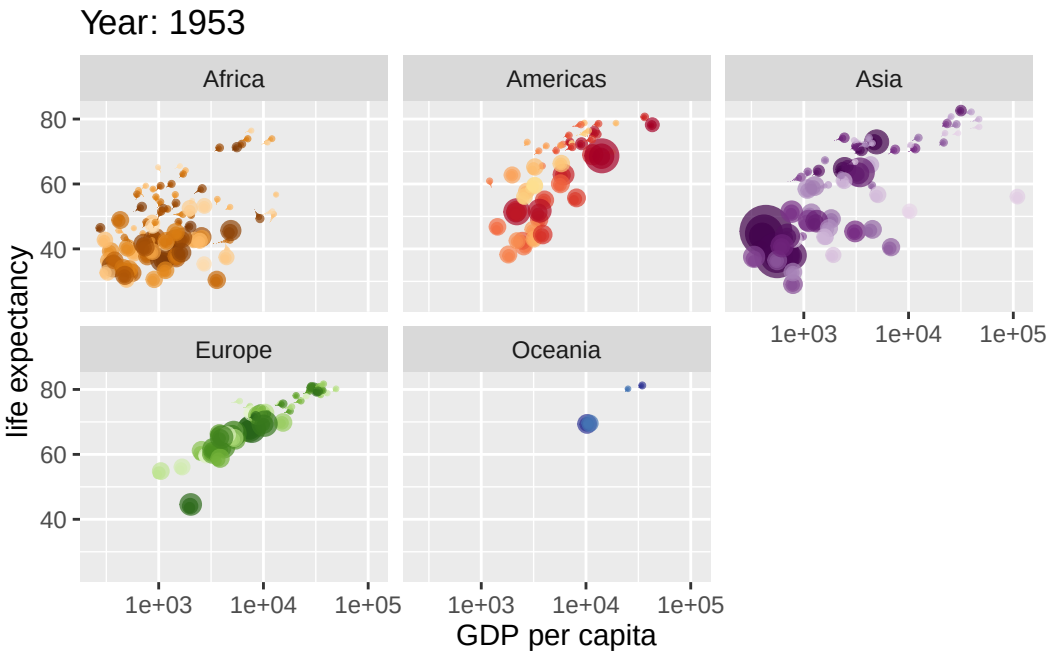

```
ggplot(USArrests, aes(x=reorder(State,Murder), y=Murder))+
  geom_point()+
  geom_segment(aes(x=State,xend=State,y=0,yend=Murder),col="blue")+
  coord_flip()
```

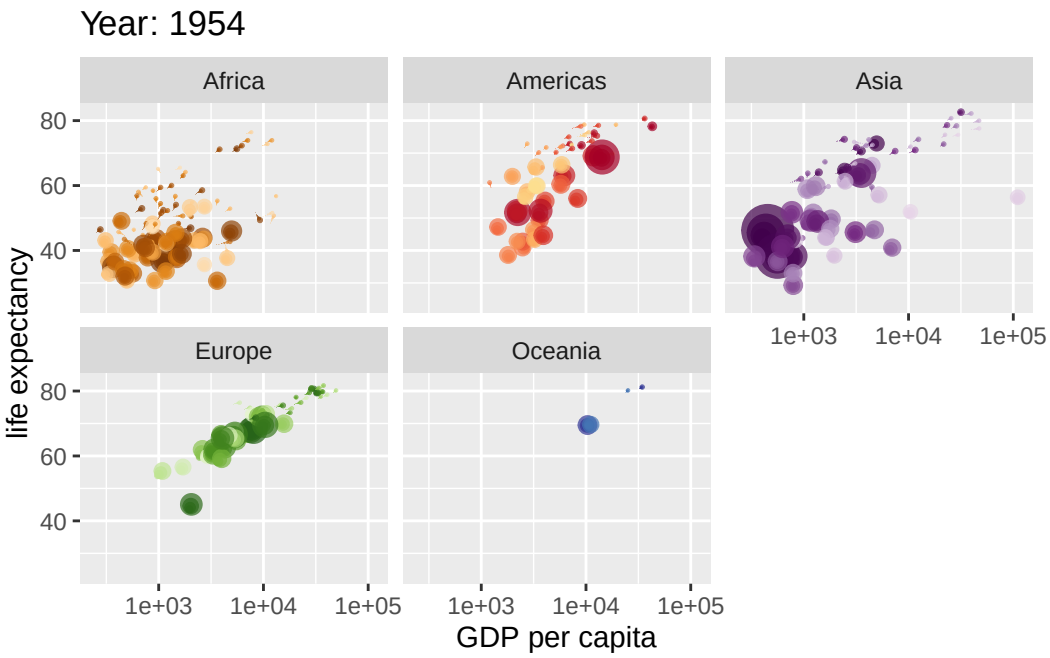


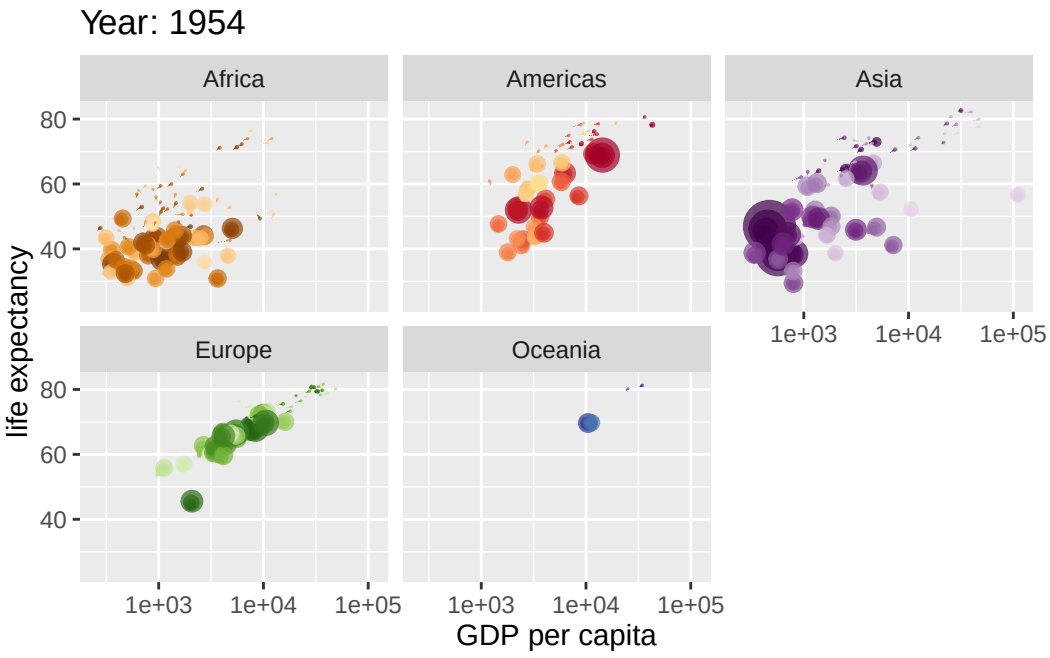
```
library(gganimate)

ggplot(gapminder, aes(gdpPercap, lifeExp, size = pop, colour = country)) +
  geom_point(alpha = 0.7, show.legend = FALSE) +
  scale_colour_manual(values = country_colors) +
  scale_size(range = c(2, 12)) +
  scale_x_log10() +
  facet_wrap(~continent) +
  labs(title = 'Year: {frame_time}', x = 'GDP per capita', y = 'life expectancy') +
  transition_time(year) +
  shadow_wake(wake_length = 0.1, alpha = FALSE)
```

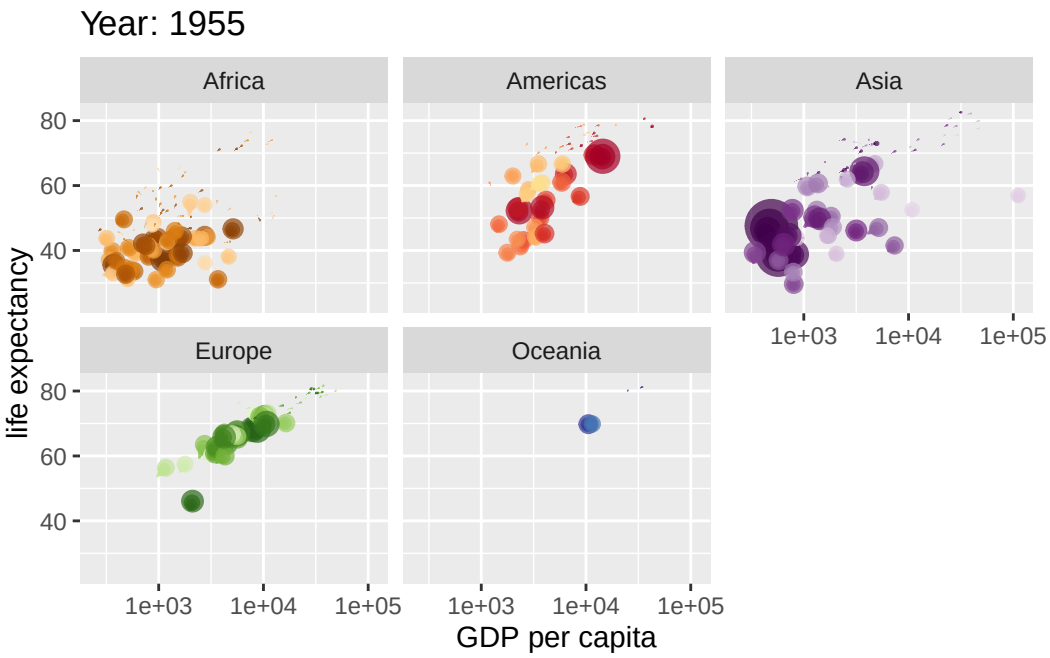


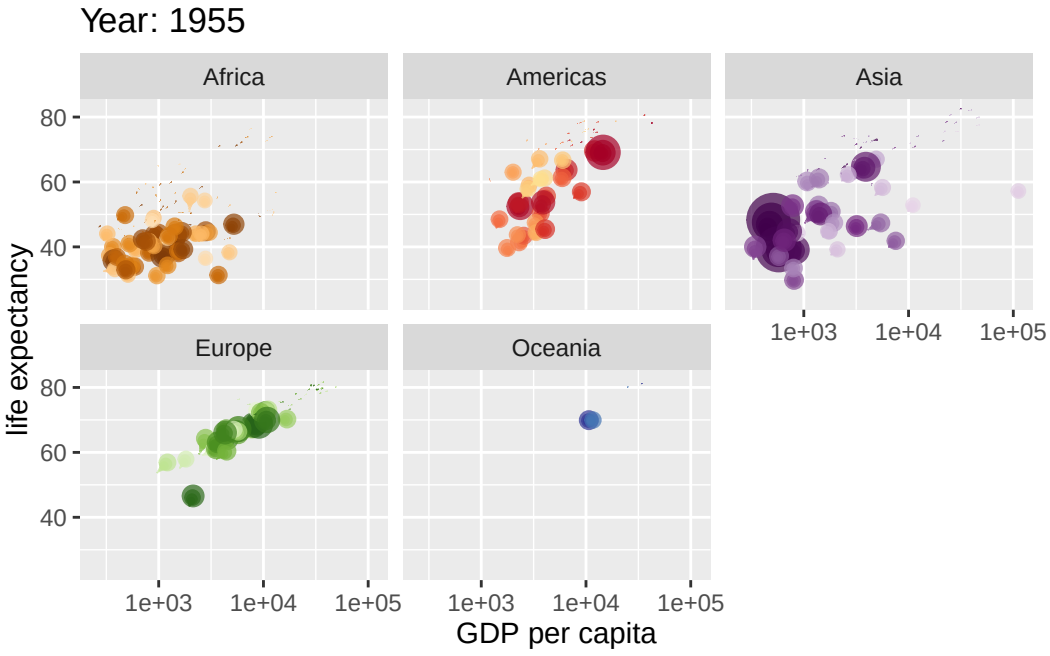

Year: 1953
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

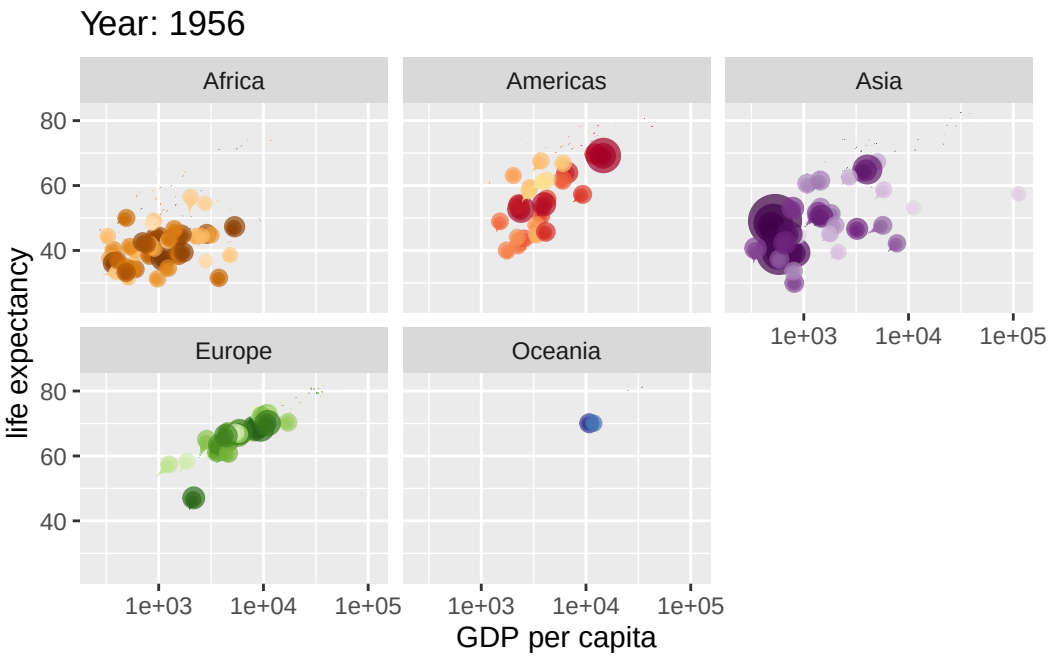

Year: 1953
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

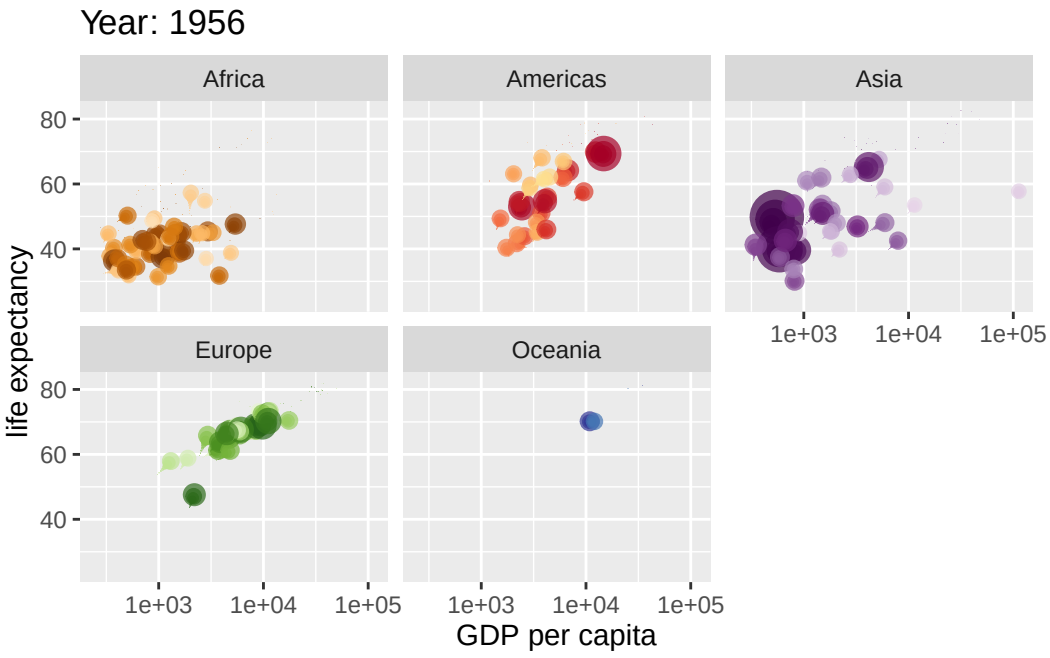

Year: 1954
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

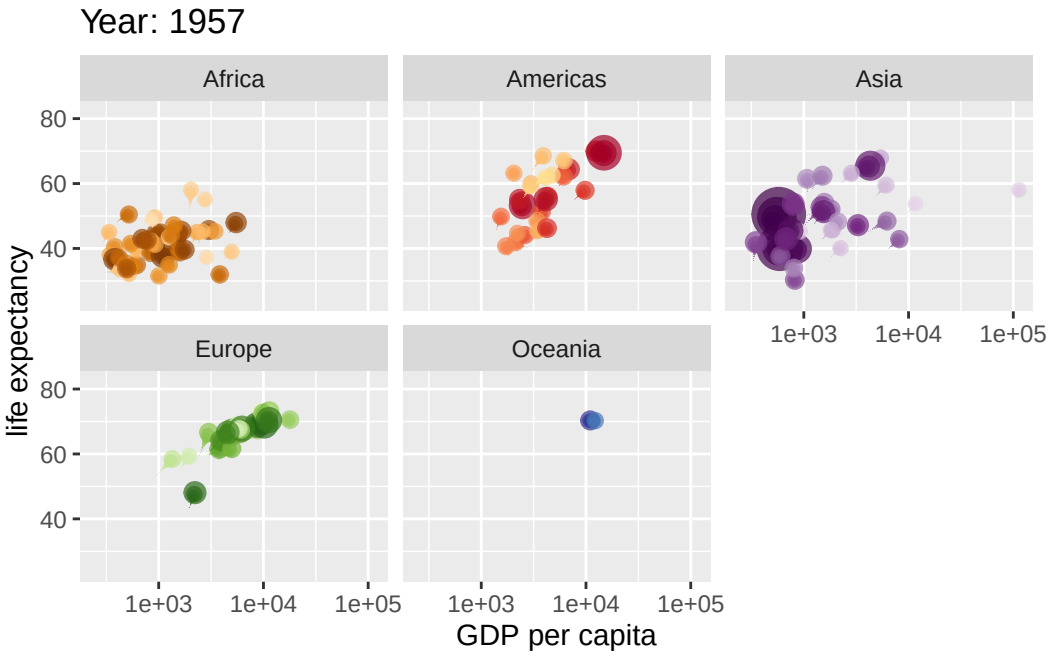

Year: 1954
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

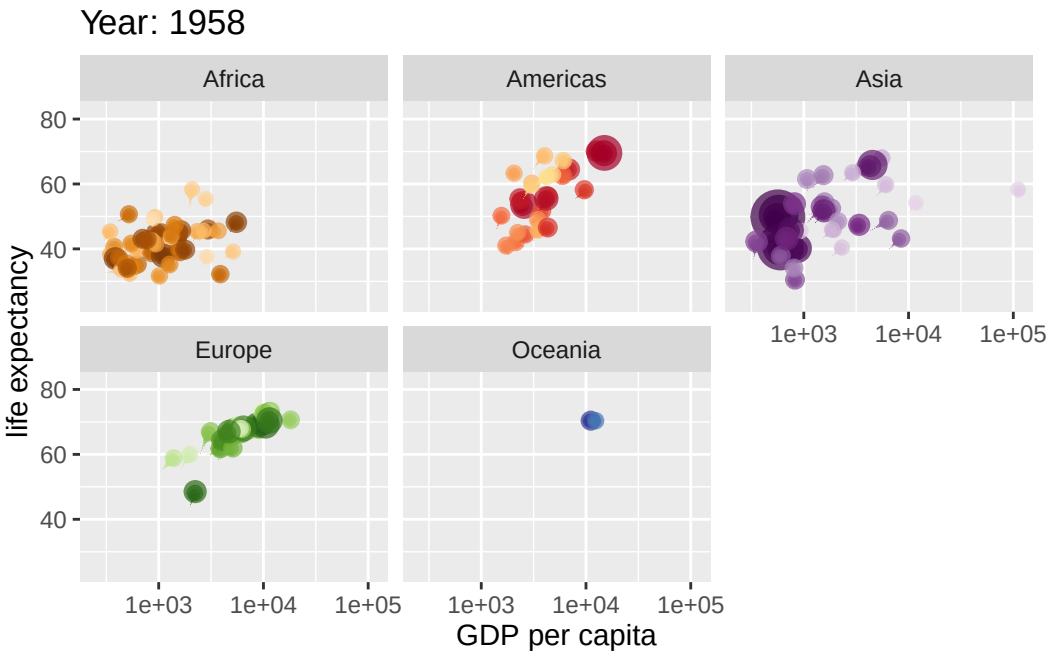

Year: 1955
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

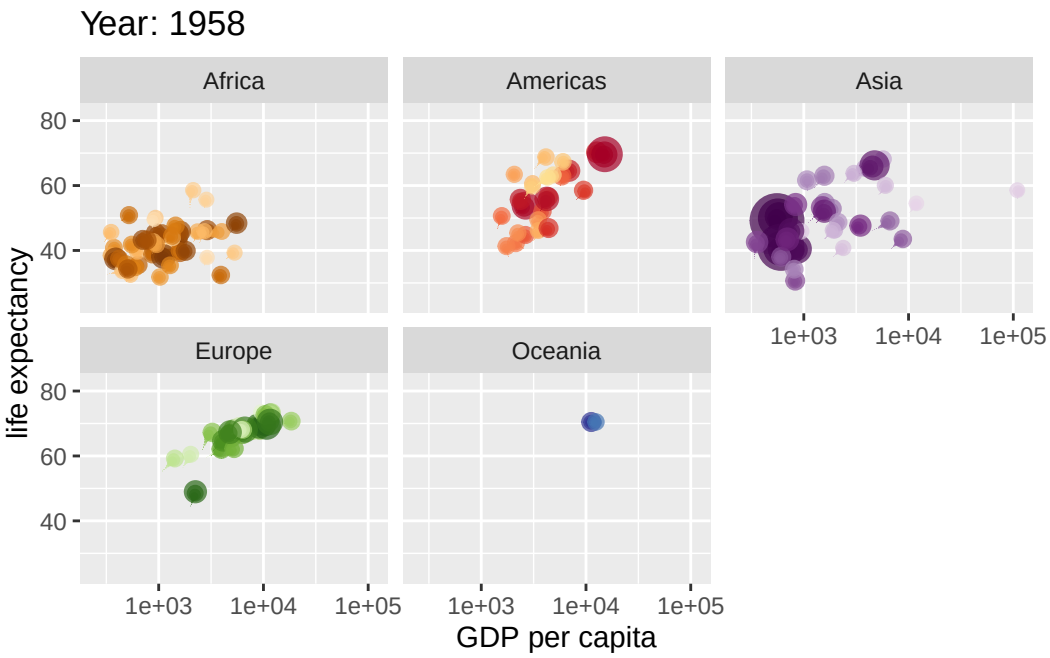

Year: 1955
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

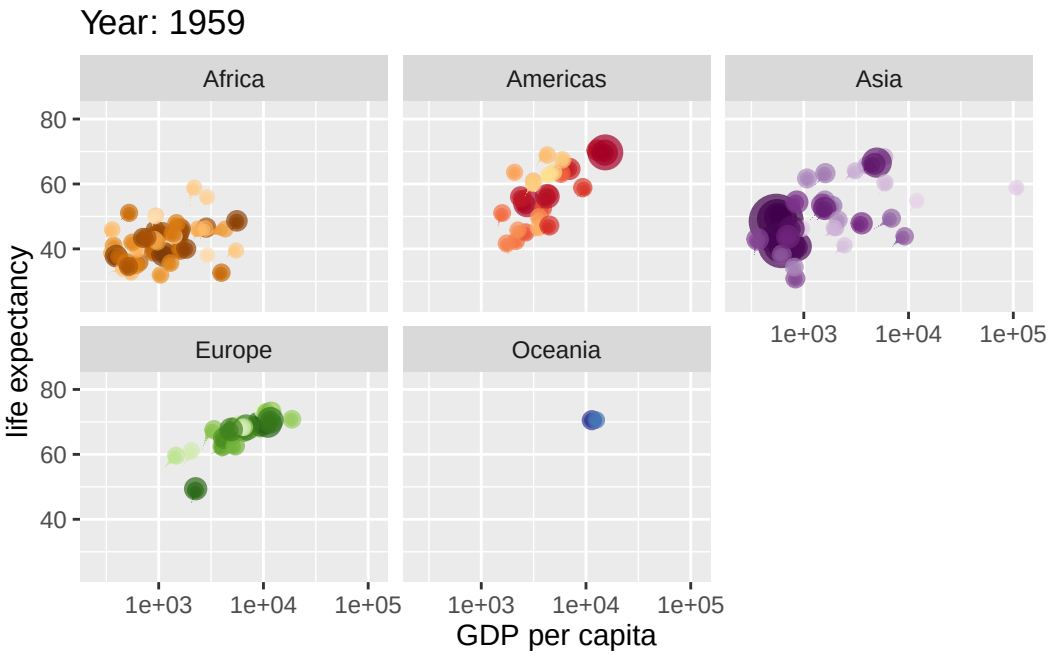

Year: 1956
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

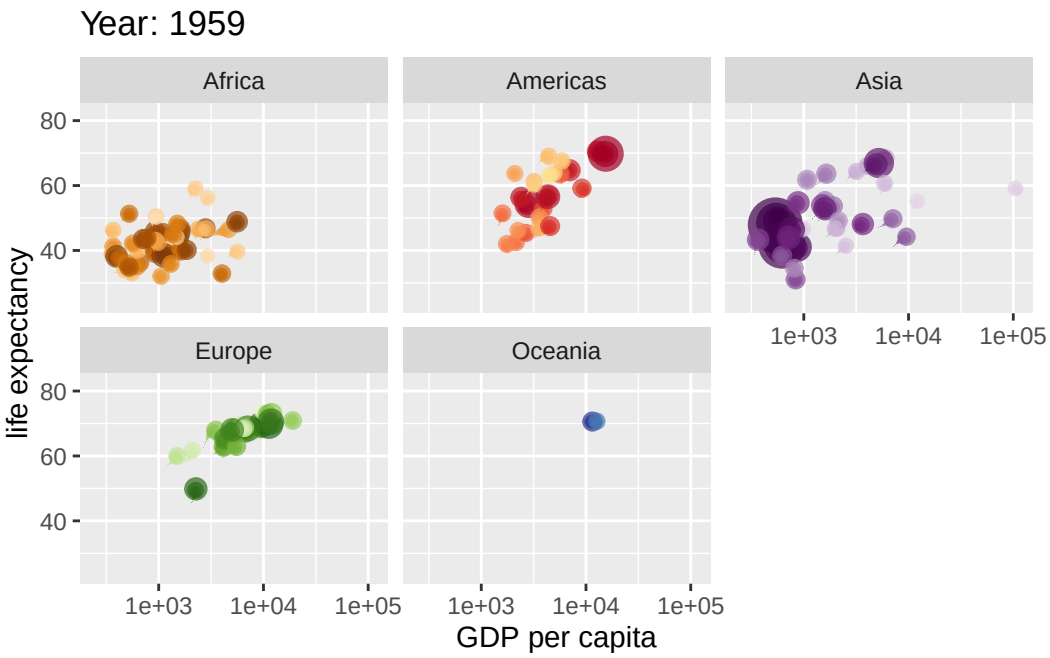

Year: 1956
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

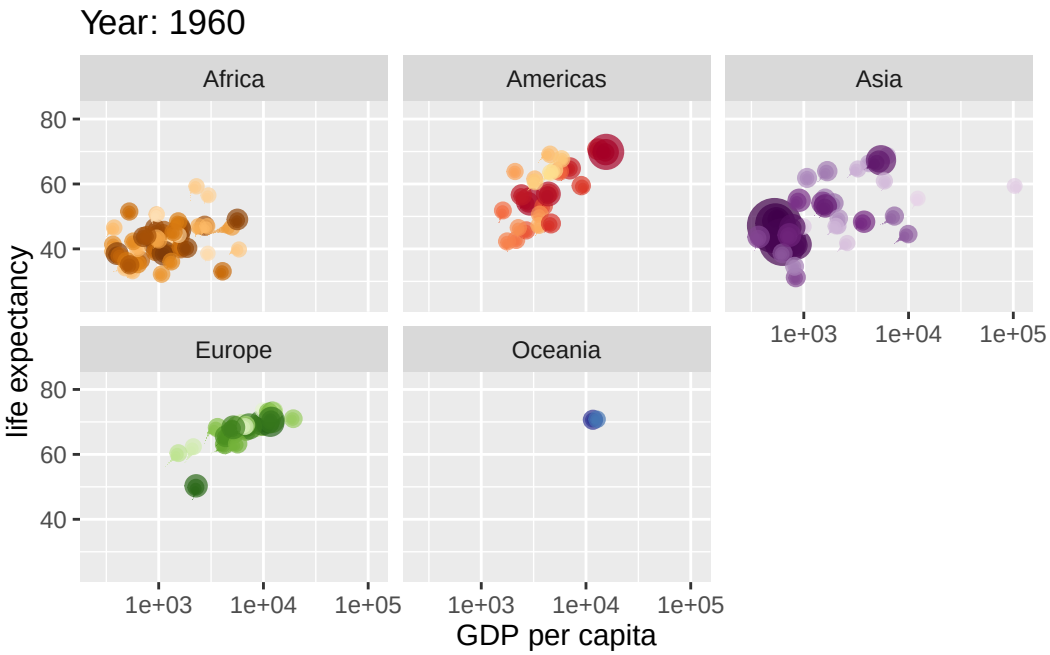

Year: 1957
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

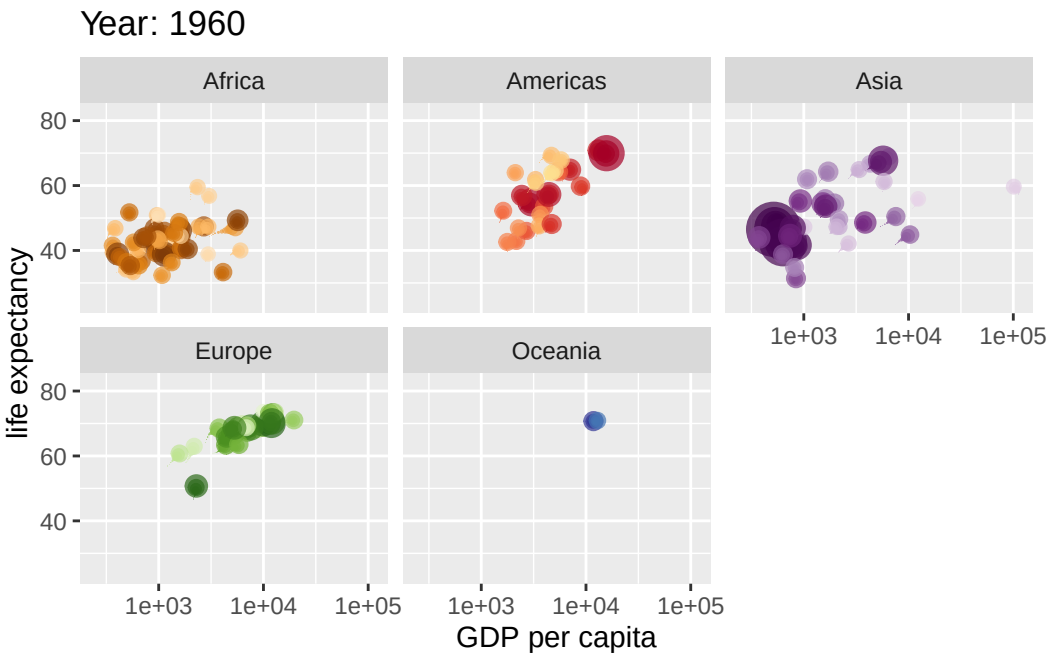

Year: 1958
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

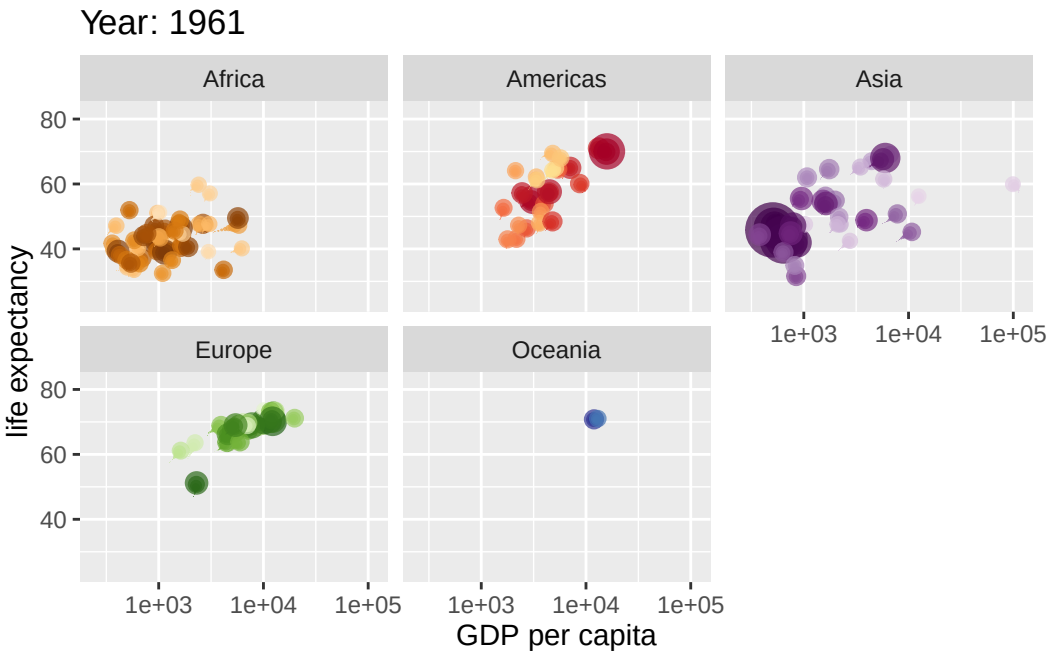

Year: 1958
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

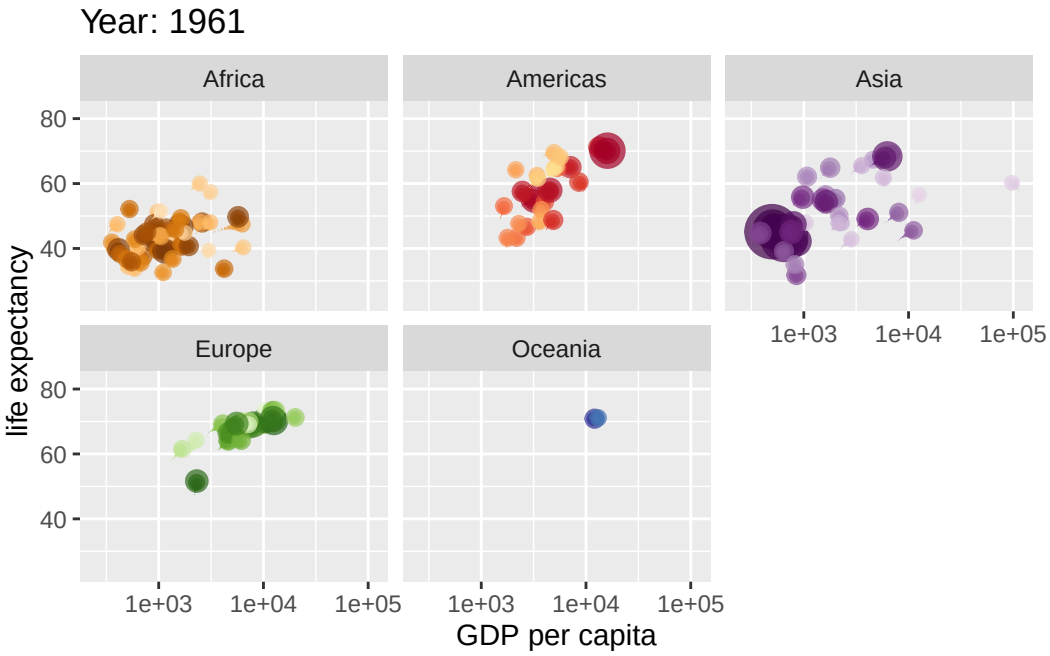

Year: 1959
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

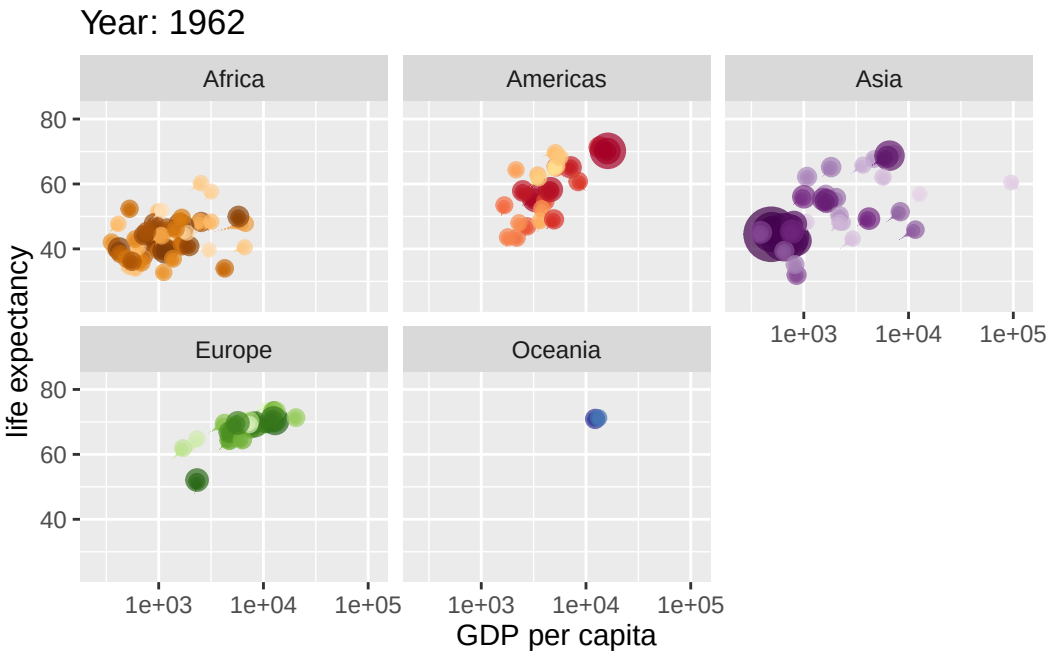

Year: 1959
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

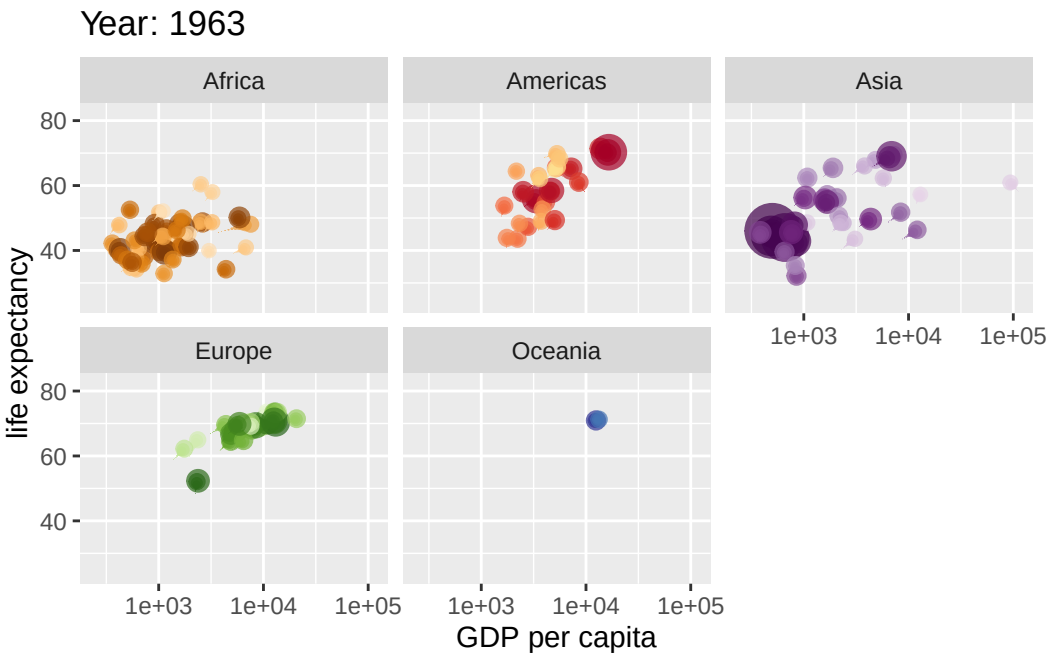

Year: 1960
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

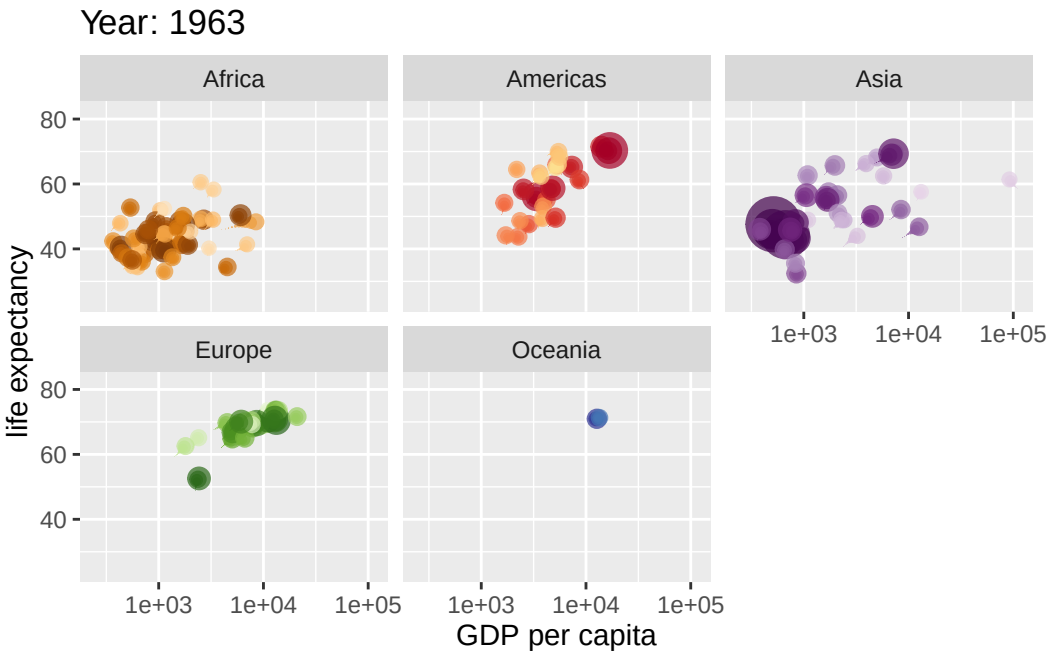

Year: 1960
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

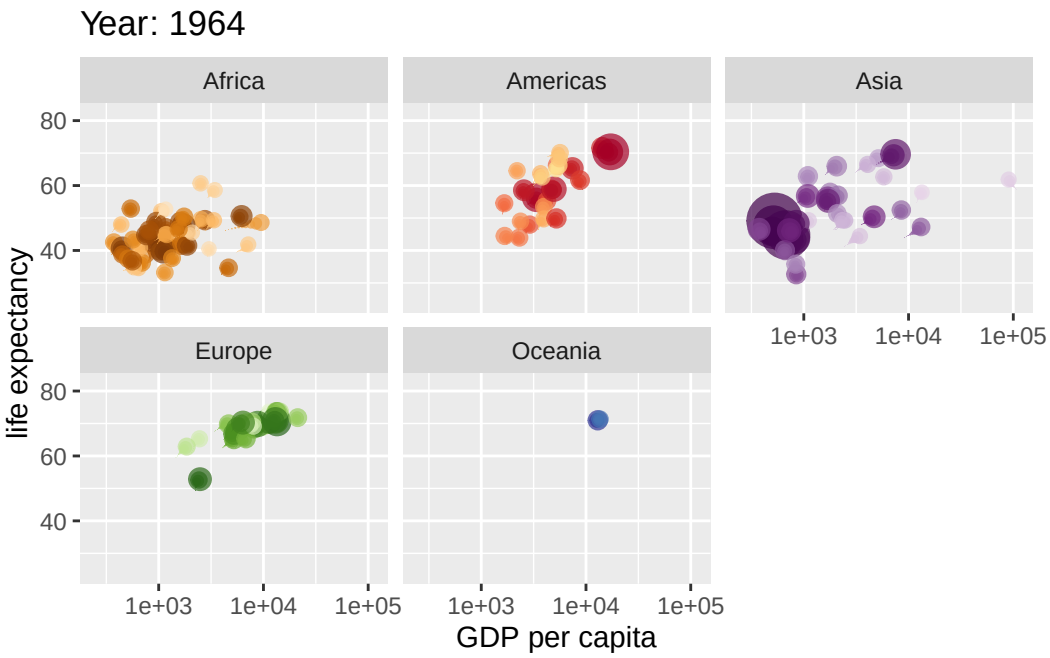

Year: 1961
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

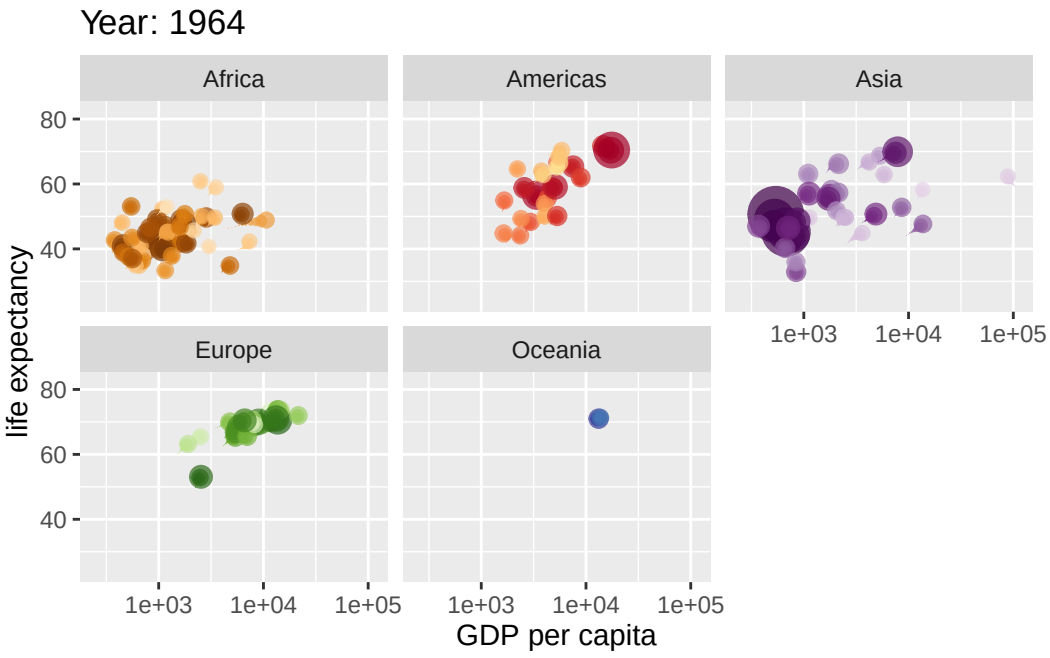

Year: 1961
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

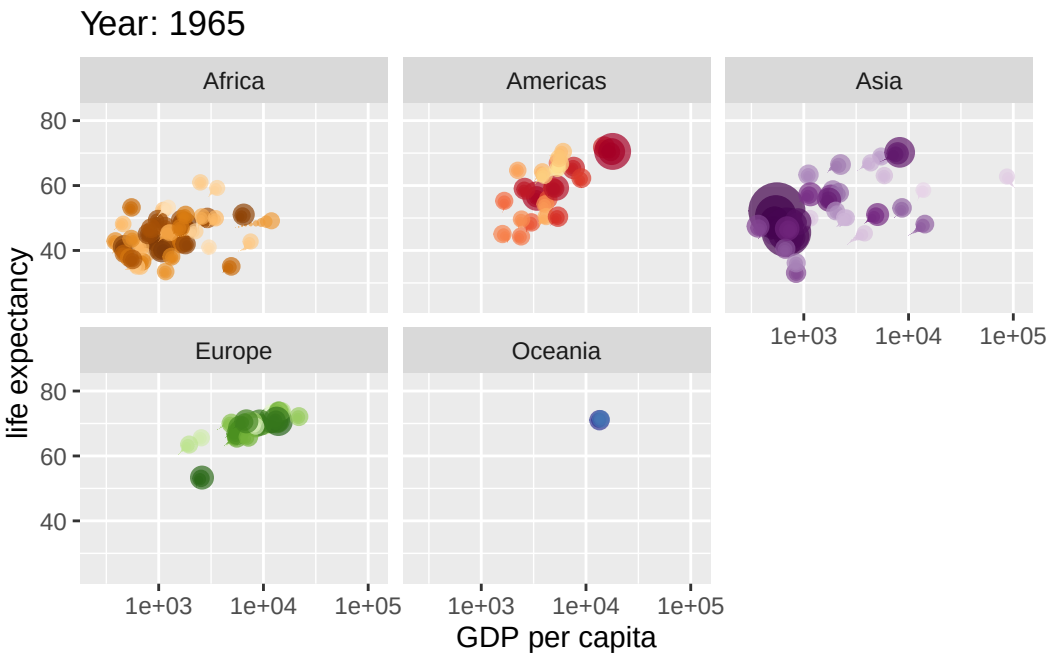

Year: 1962
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

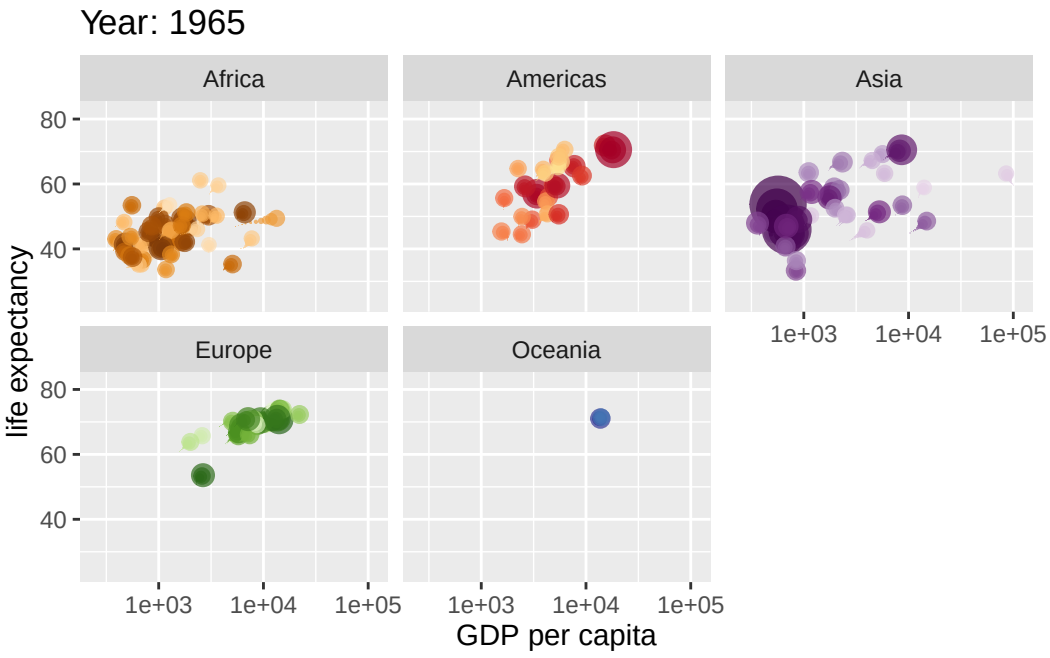

Year: 1963
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1963
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1964
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1964
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1965
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1965
Africa
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Europe
Oceania
life expectancy
80
60
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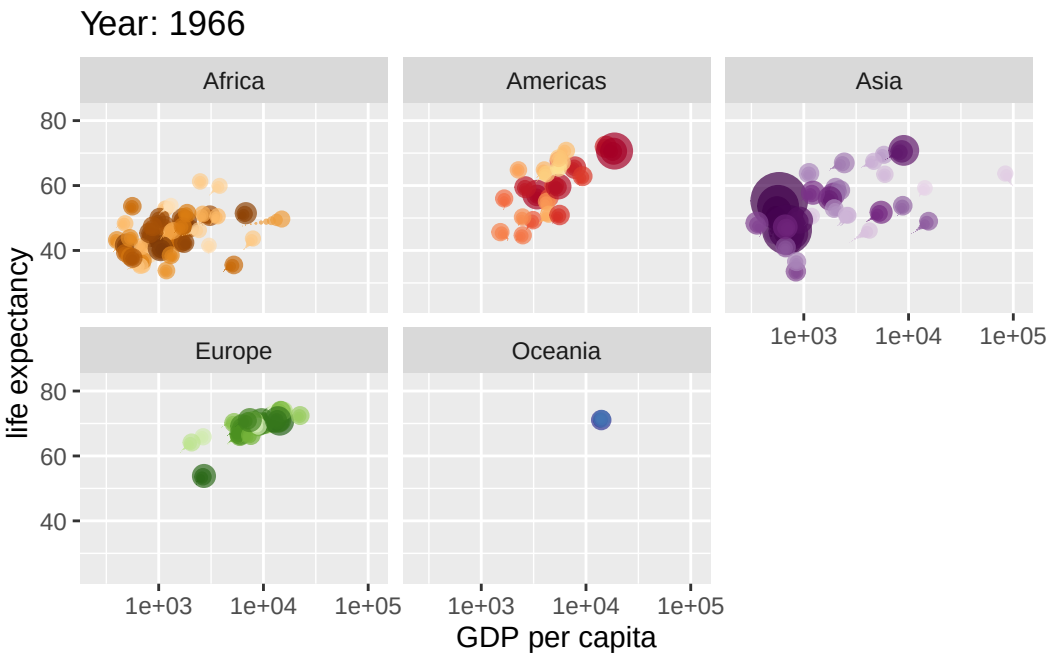
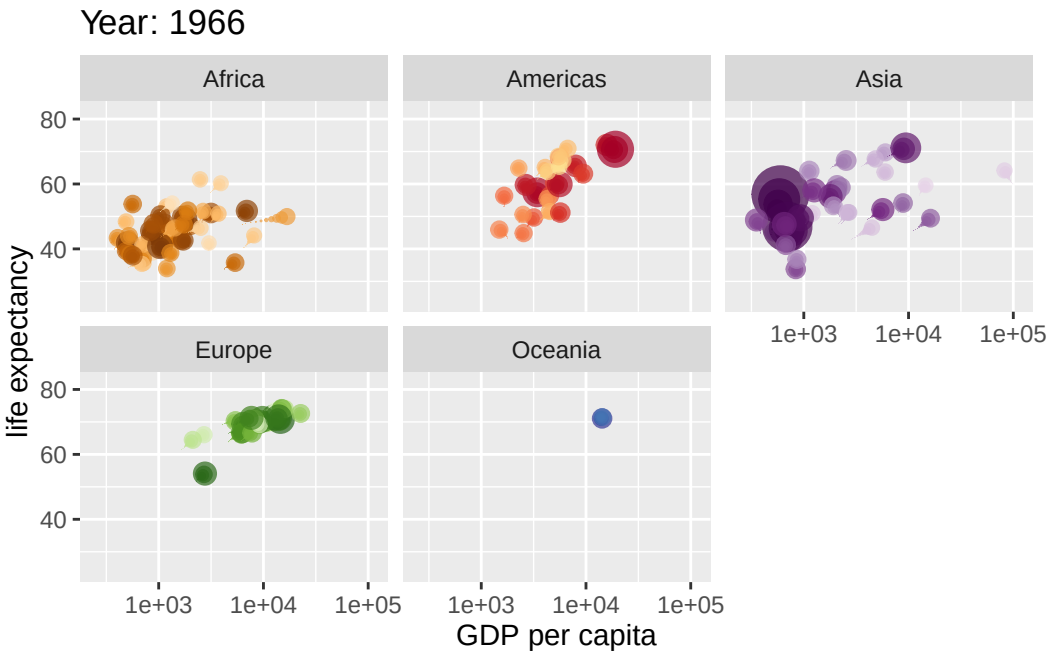
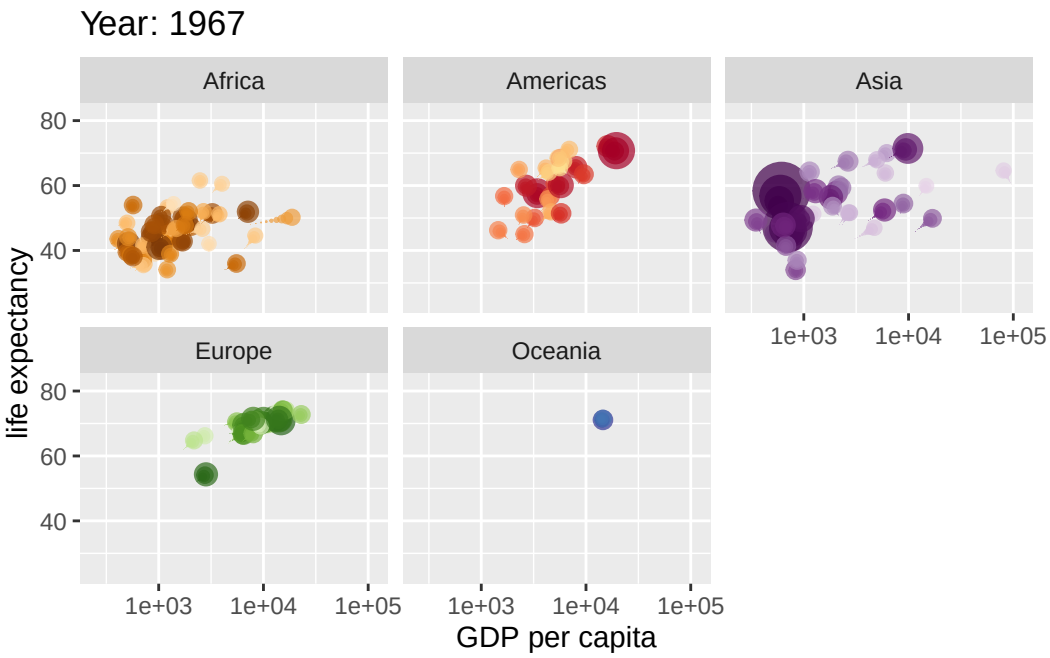
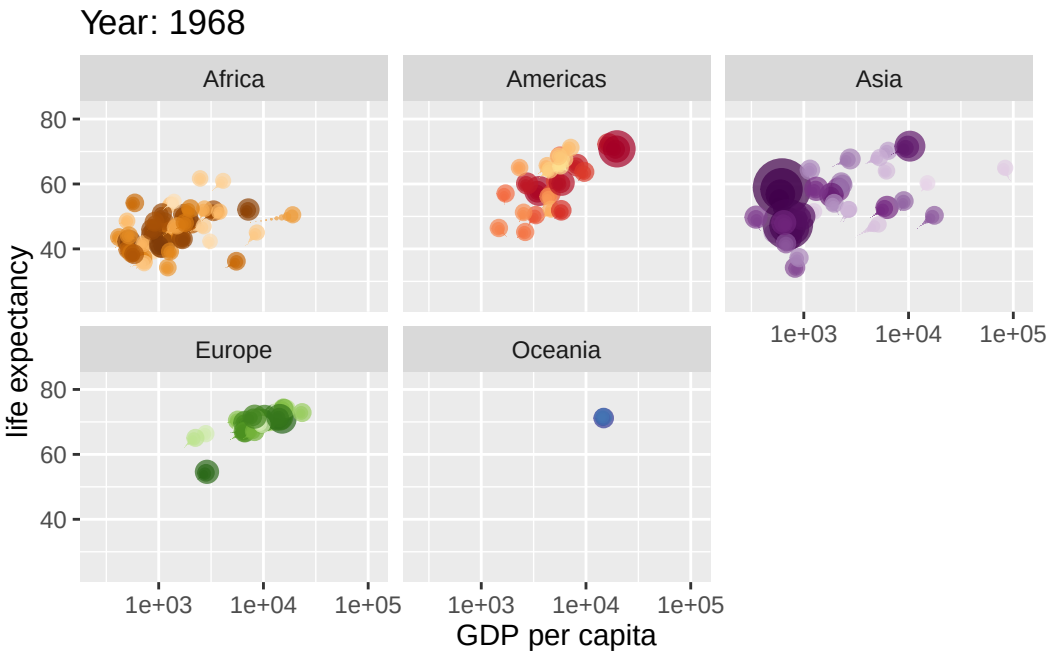
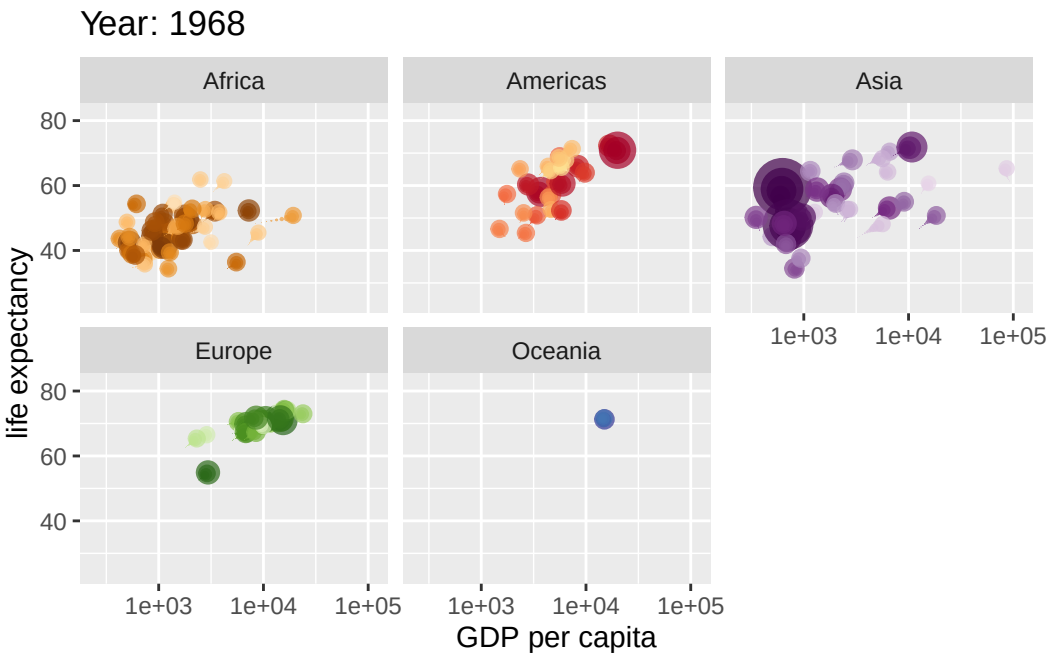
1e+03
1e+04
1e+05
GDP per capita


Year: 1966
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1966
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1967
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1968
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1968
Africa
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Asia
Europe
Oceania
life expectancy
80
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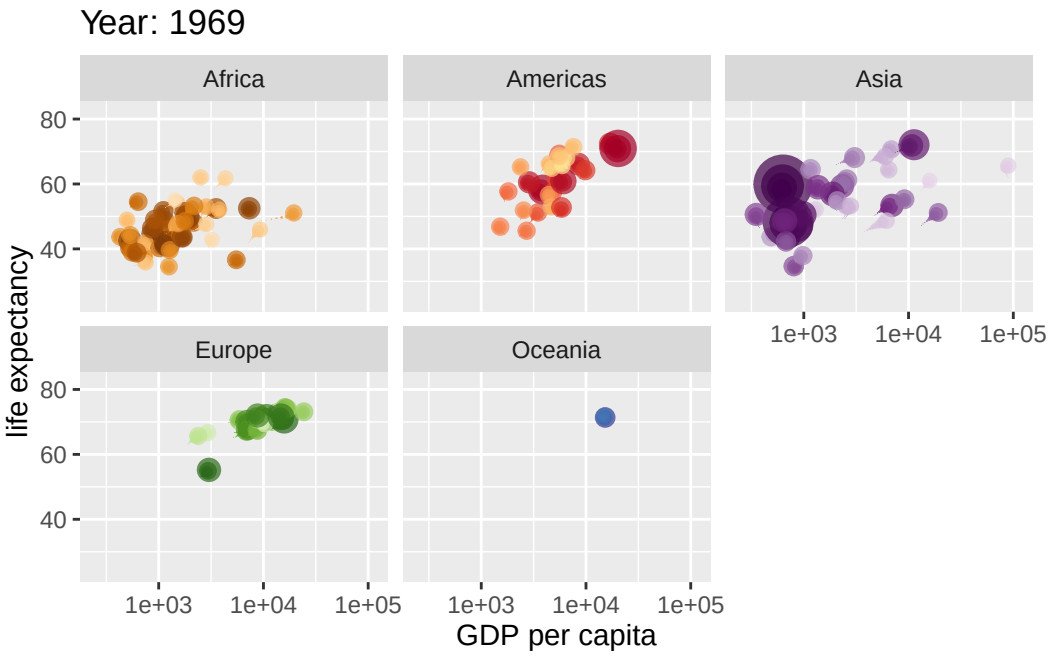
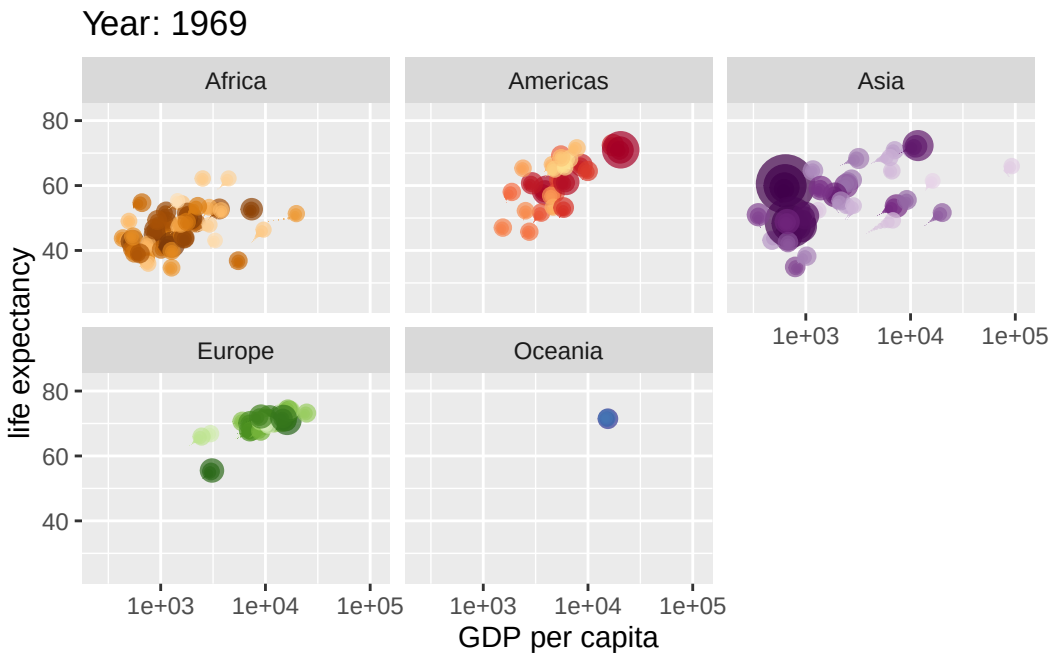
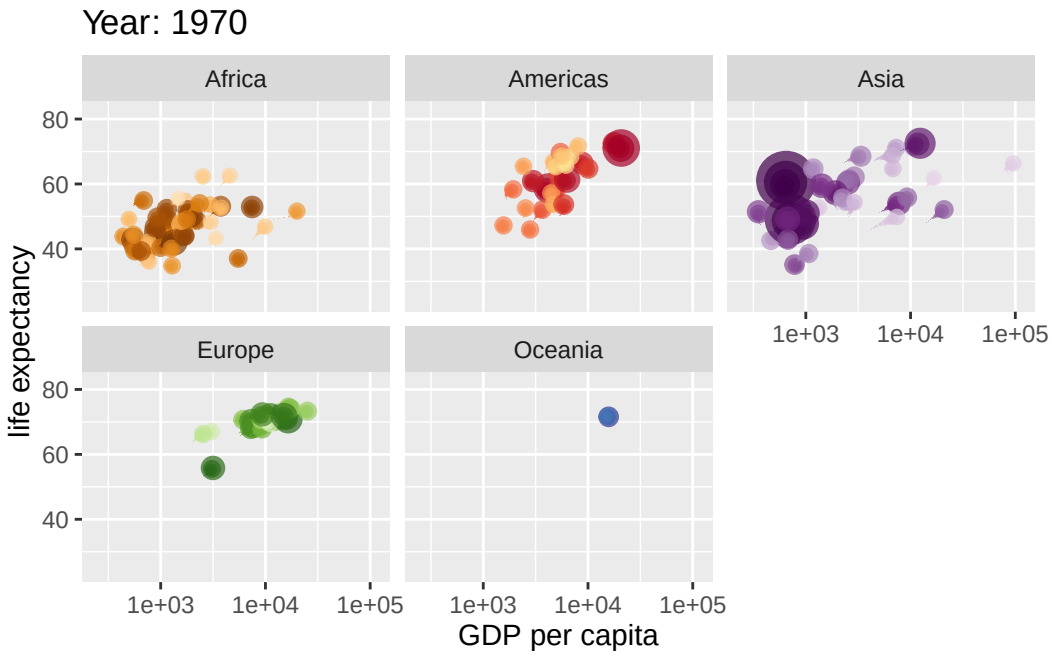
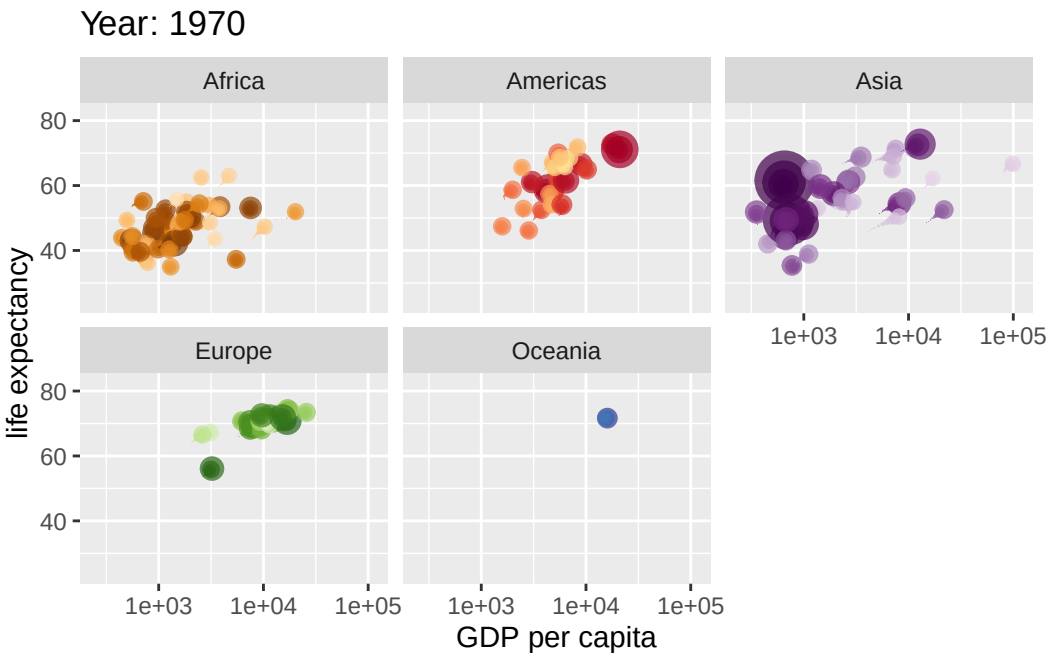
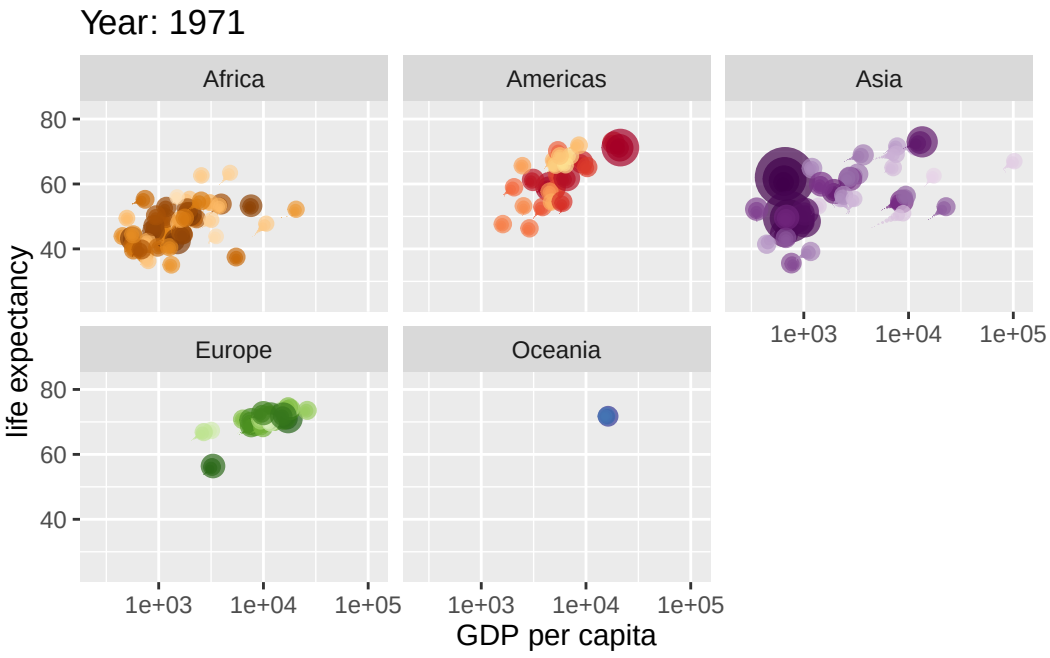
1e+03
1e+04
1e+05
GDP per capita

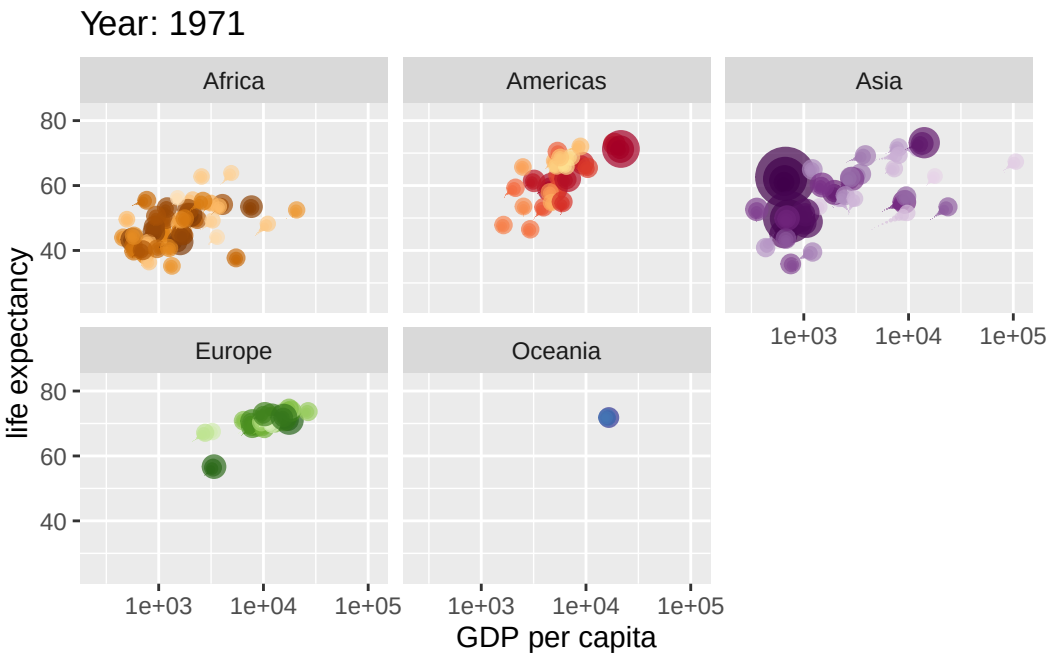

Year: 1969
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1969
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1970
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1970
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1971
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1971
Africa
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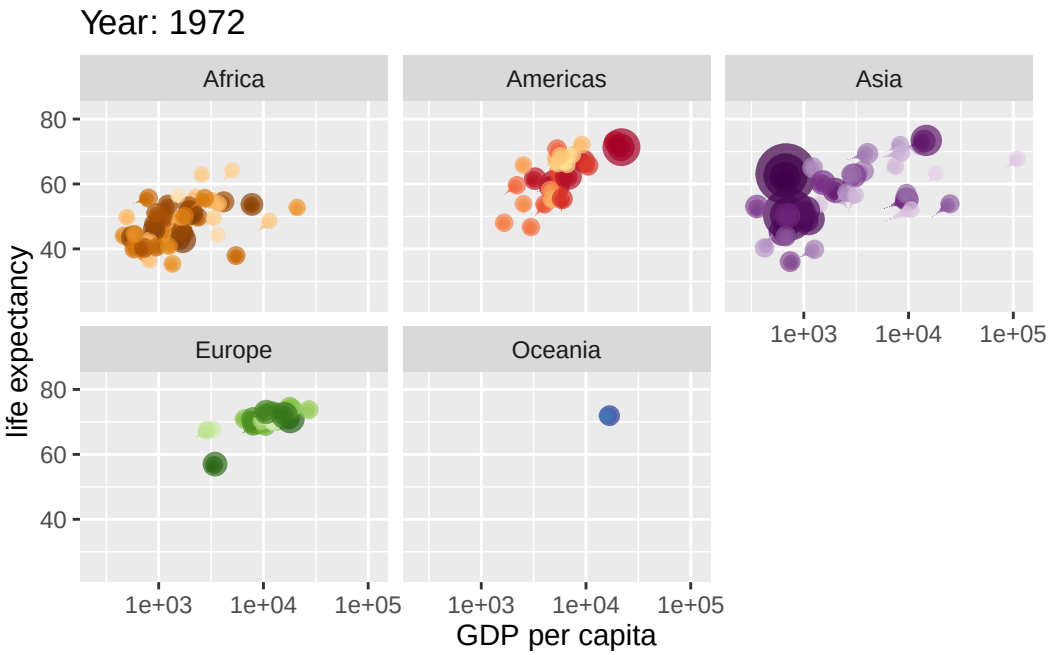
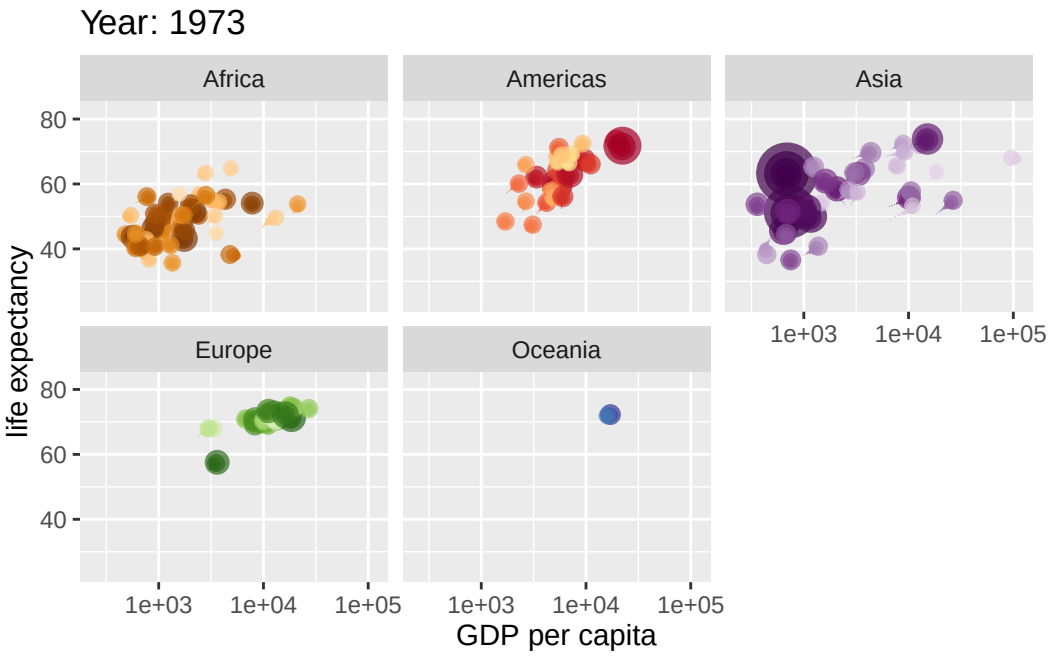
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1972
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1973
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1973
Africa
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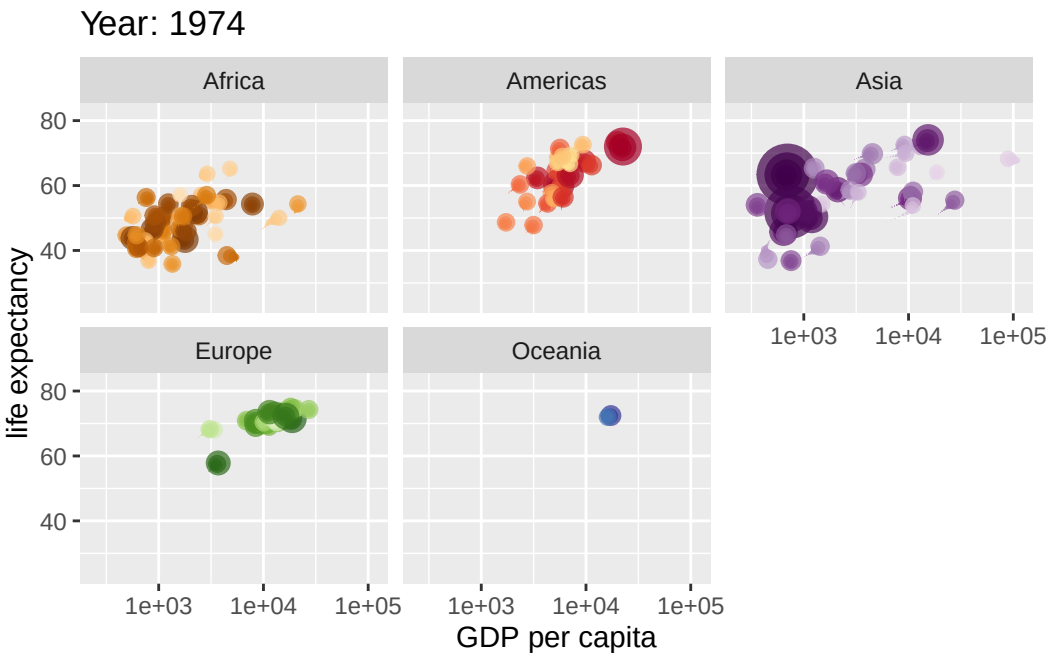
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1974
Africa
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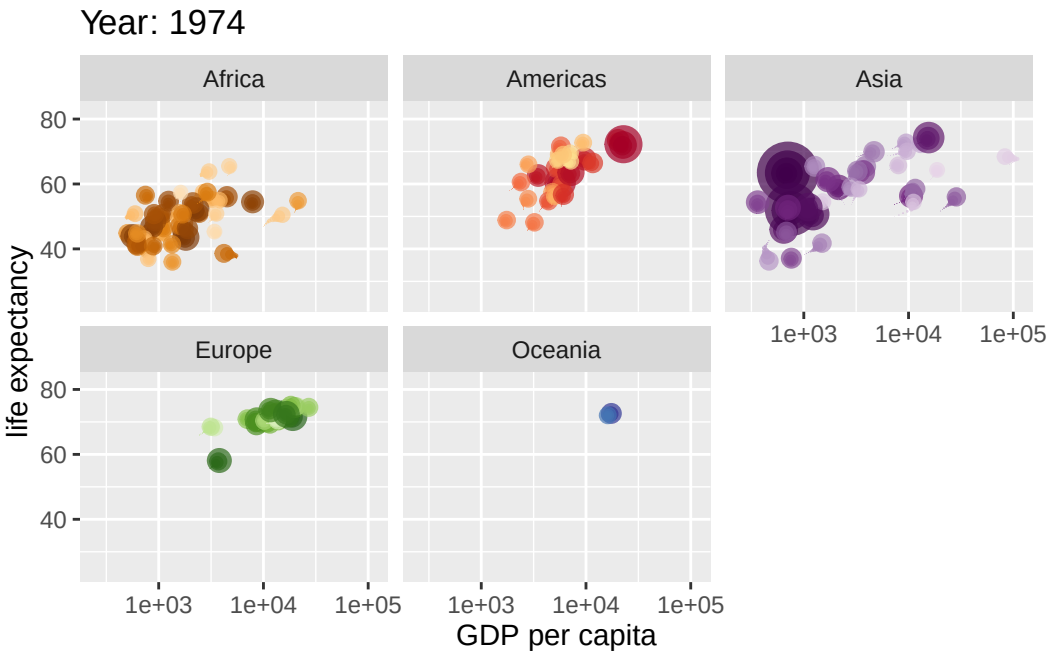
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1974
Africa
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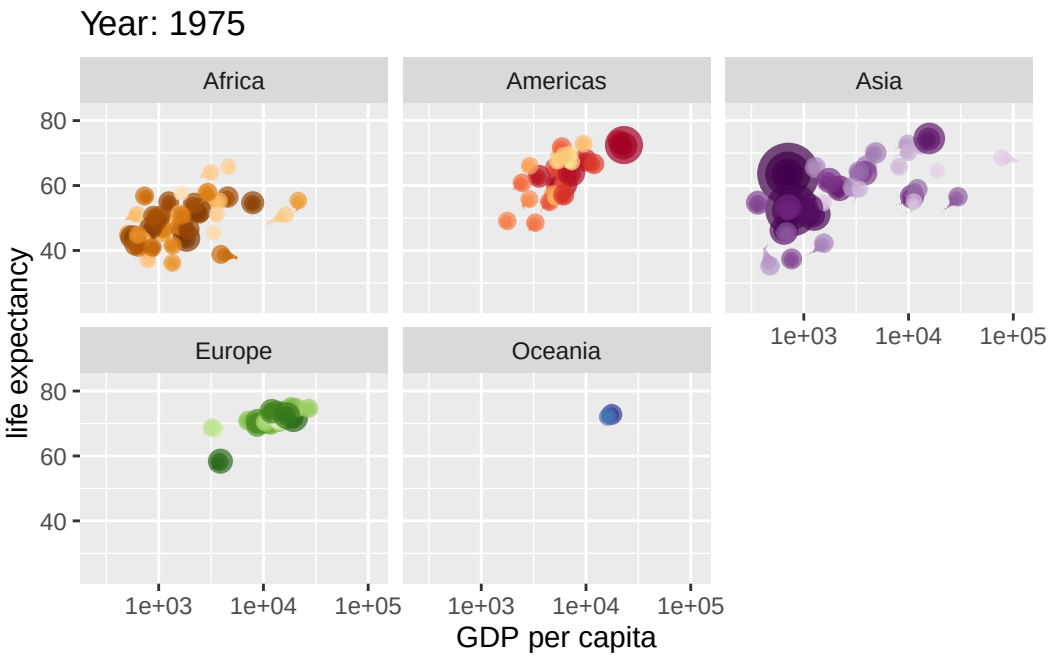
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1975
Africa
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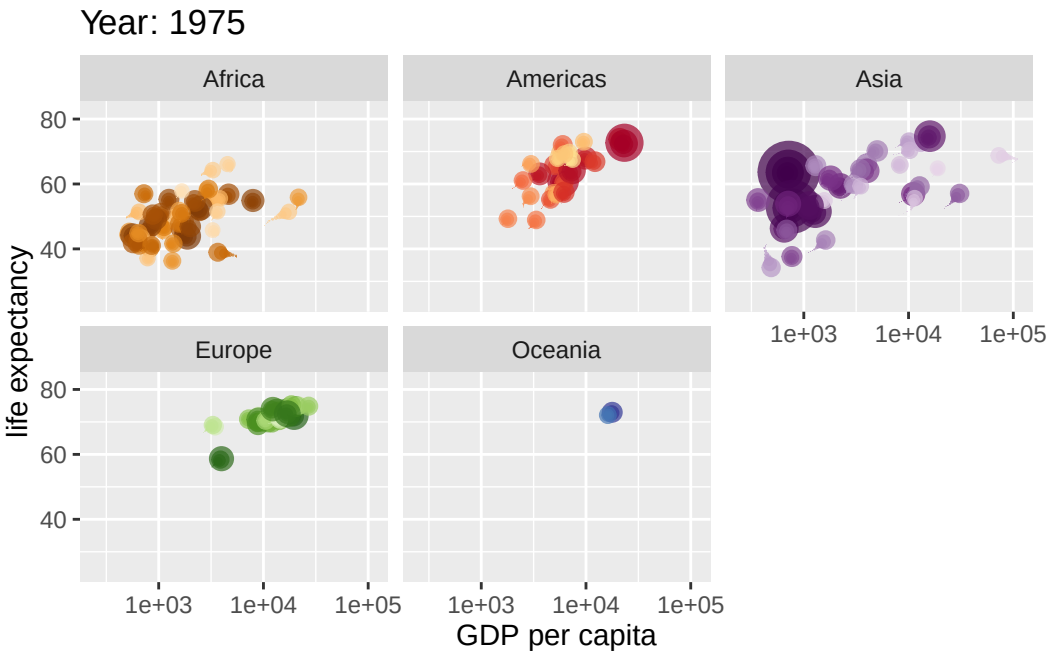
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1975
Africa
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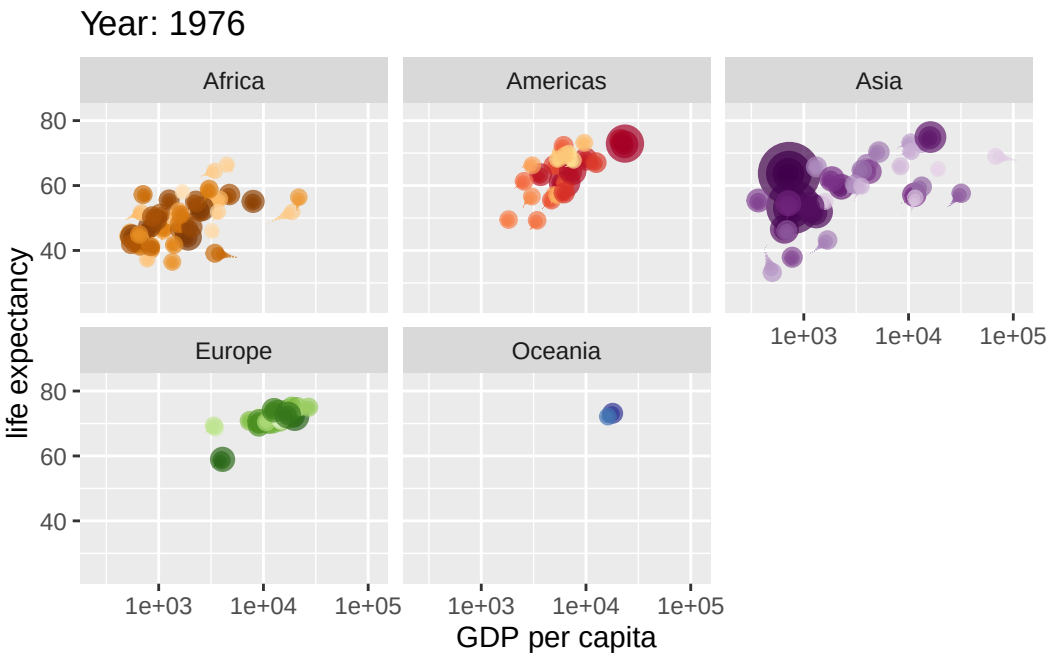
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1976
Africa
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Europe
Oceania
life expectancy
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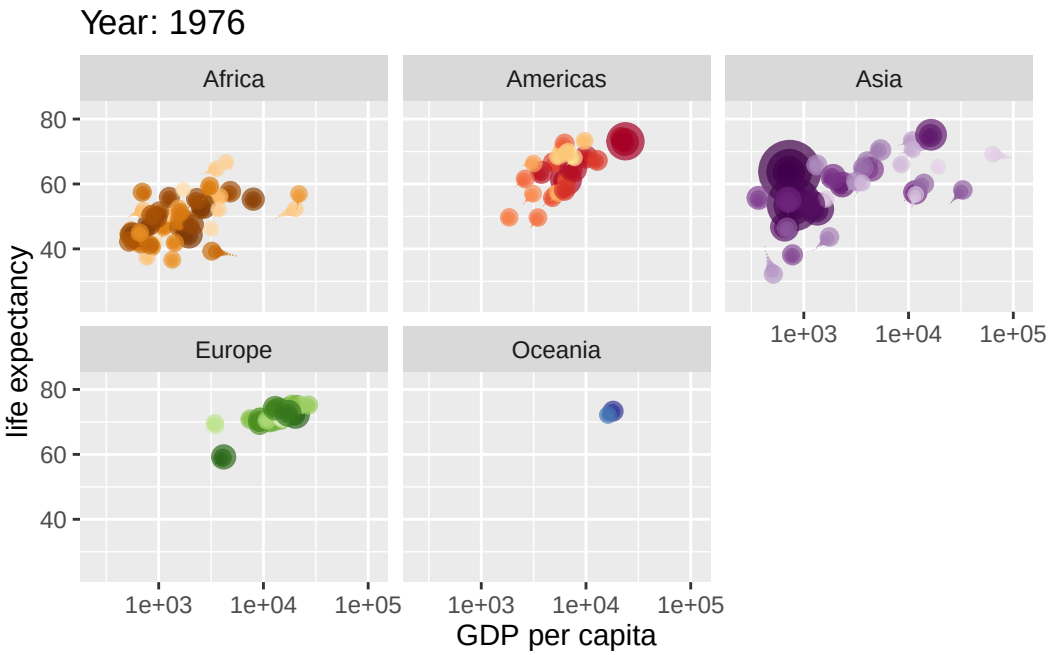
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1976
Africa
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Europe
Oceania
life expectancy
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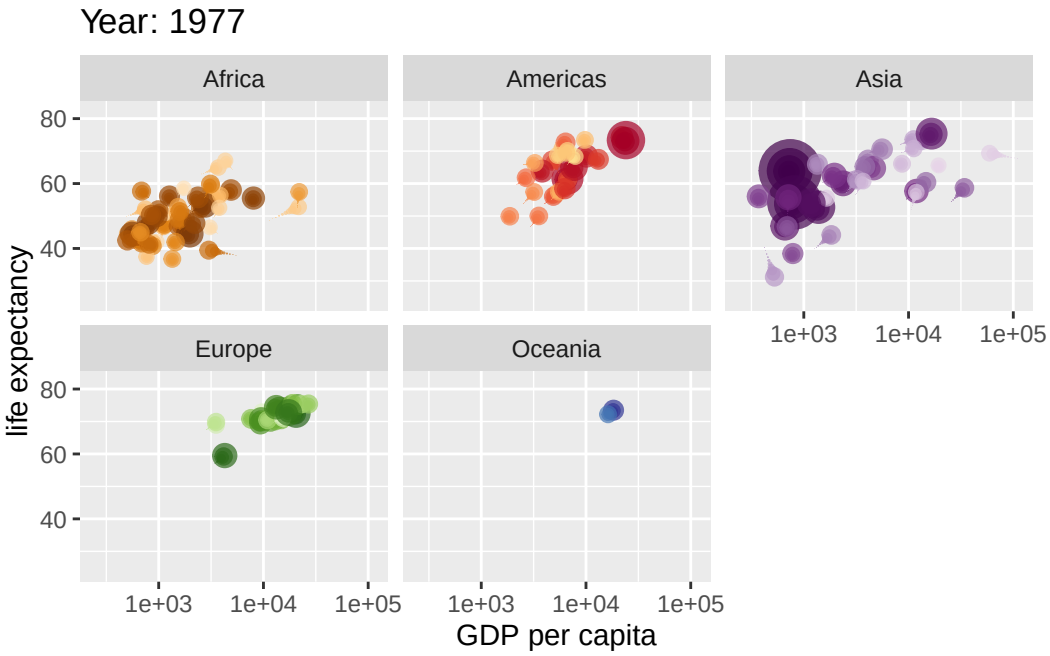
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1977
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Oceania
life expectancy
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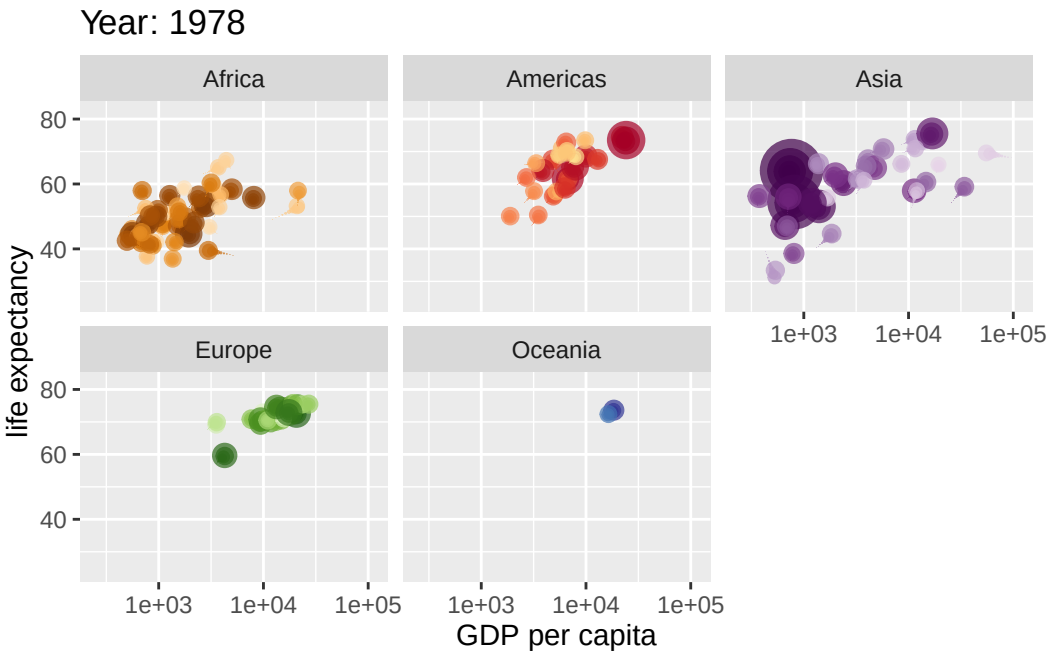
1e+03
1e+04
1e+05
GDP per capita


Year: 1978
Africa
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Asia
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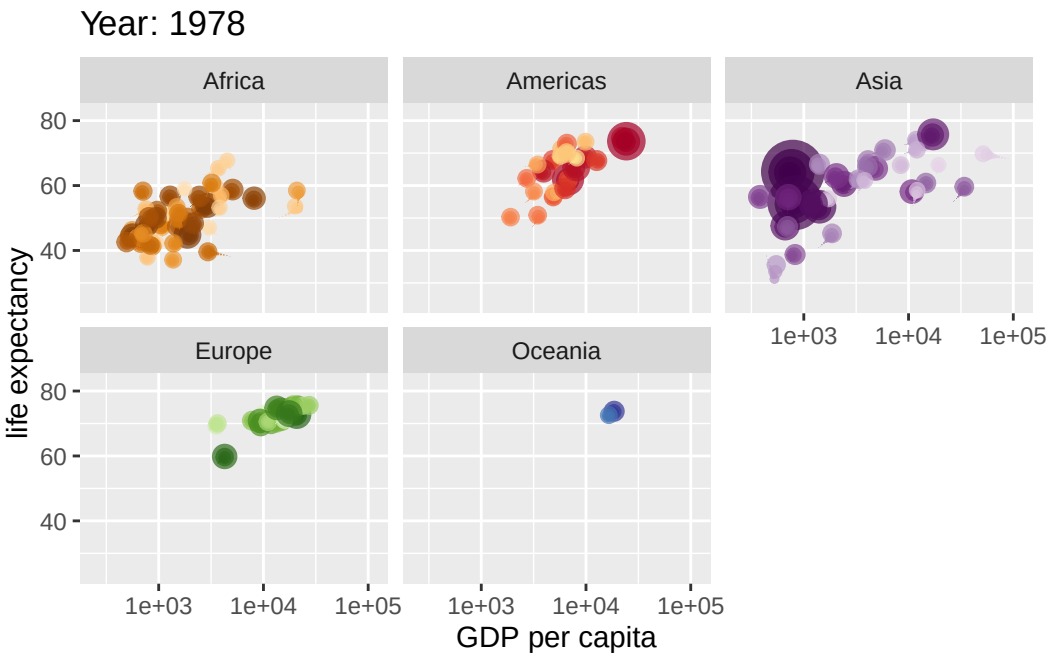
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1978
Africa
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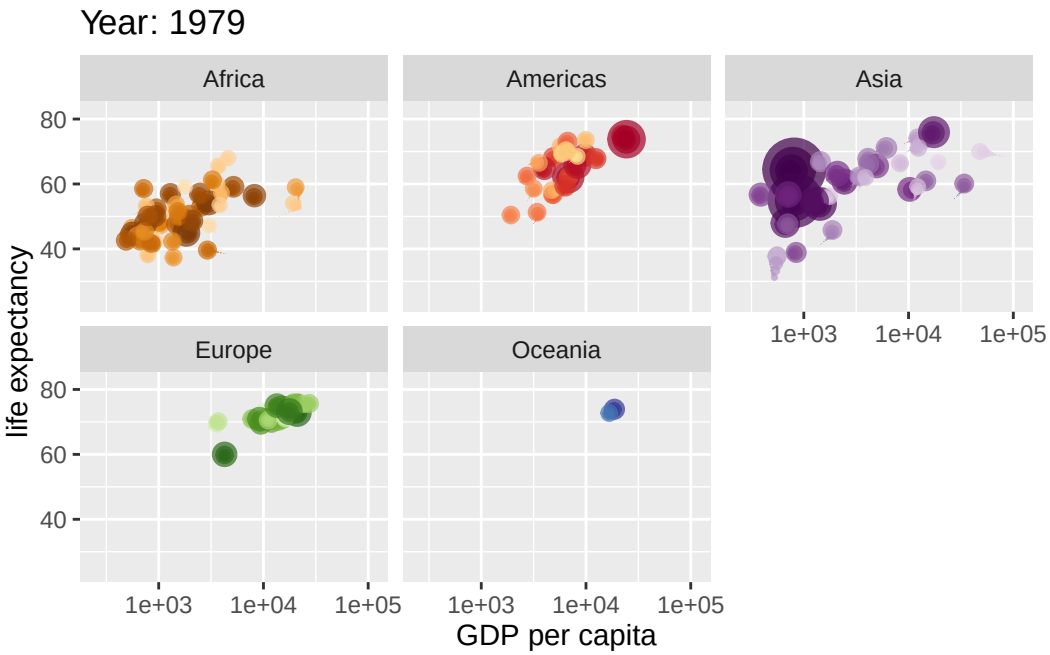
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1979
Africa
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Asia
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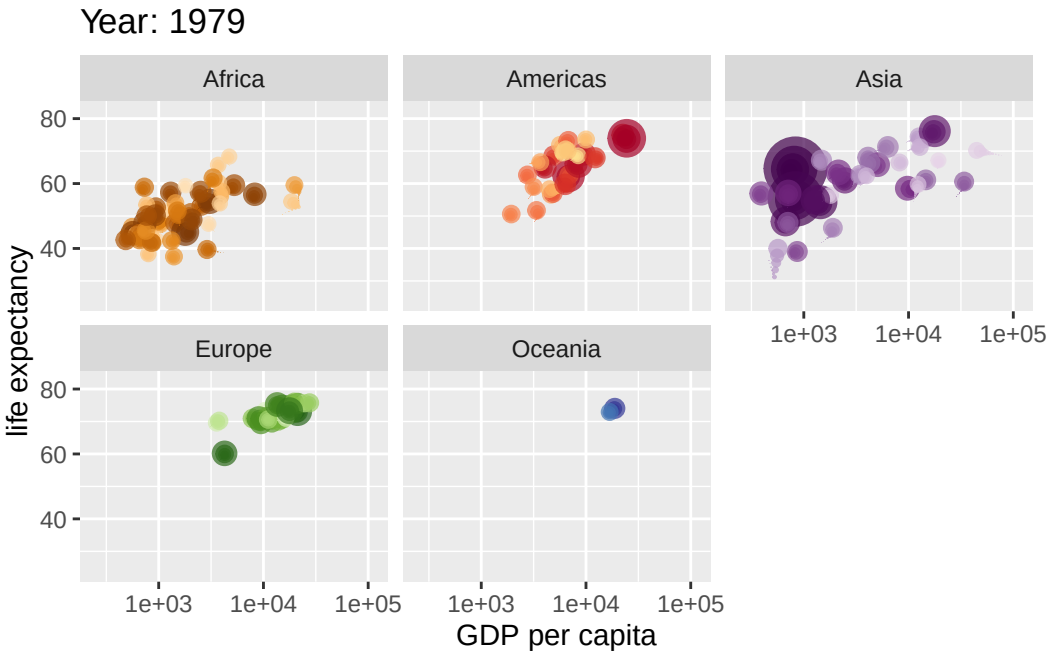
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1979
Africa
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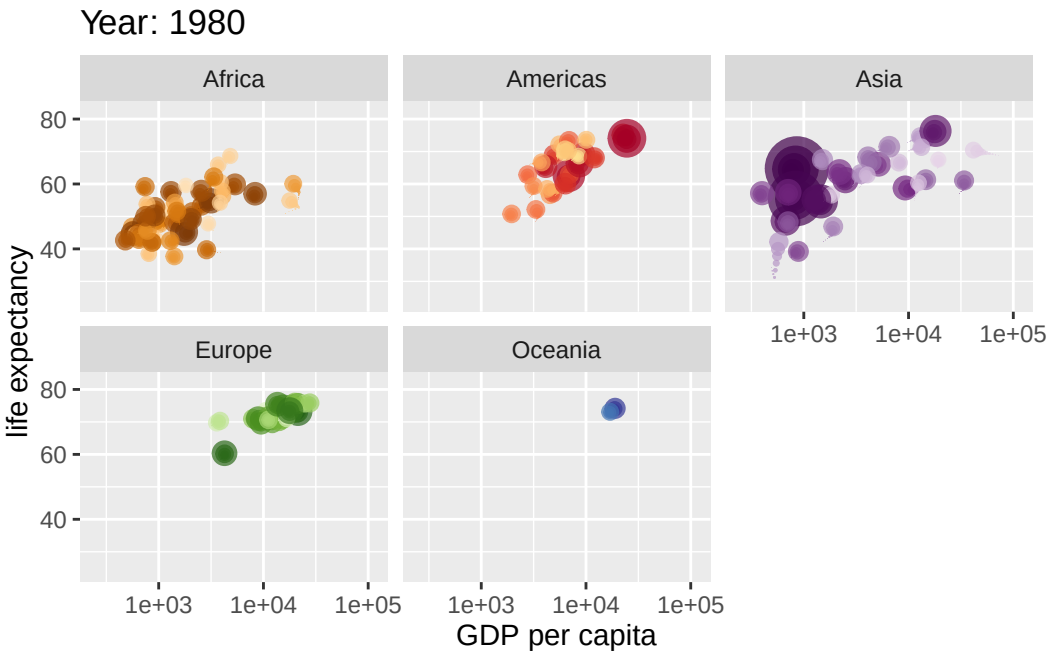
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1980
Africa
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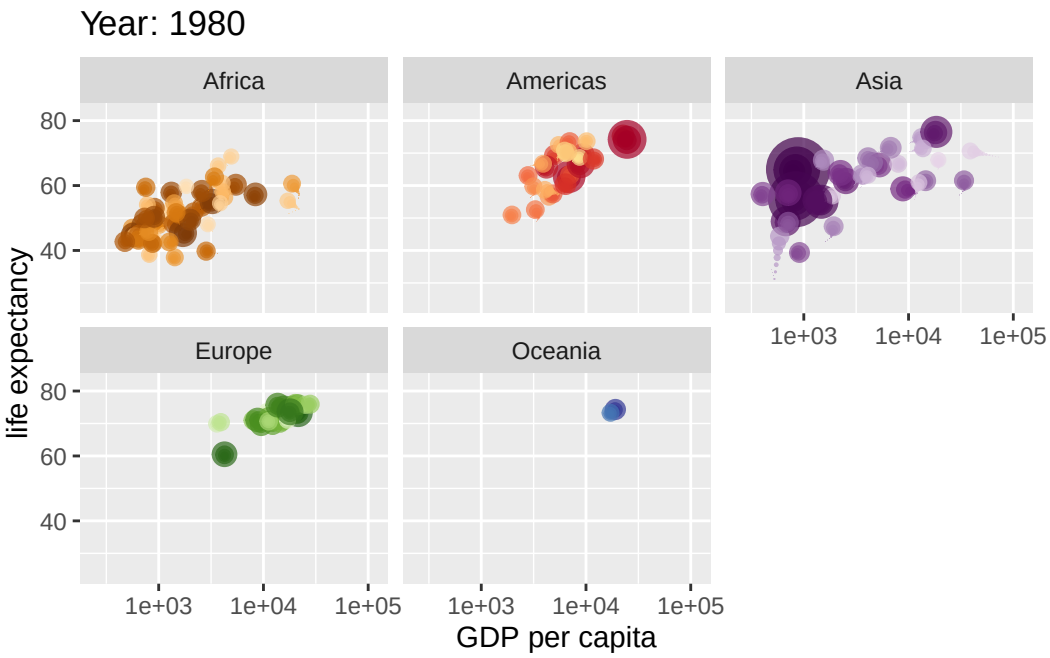
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1980
Africa
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Asia
Europe
Oceania
life expectancy
80
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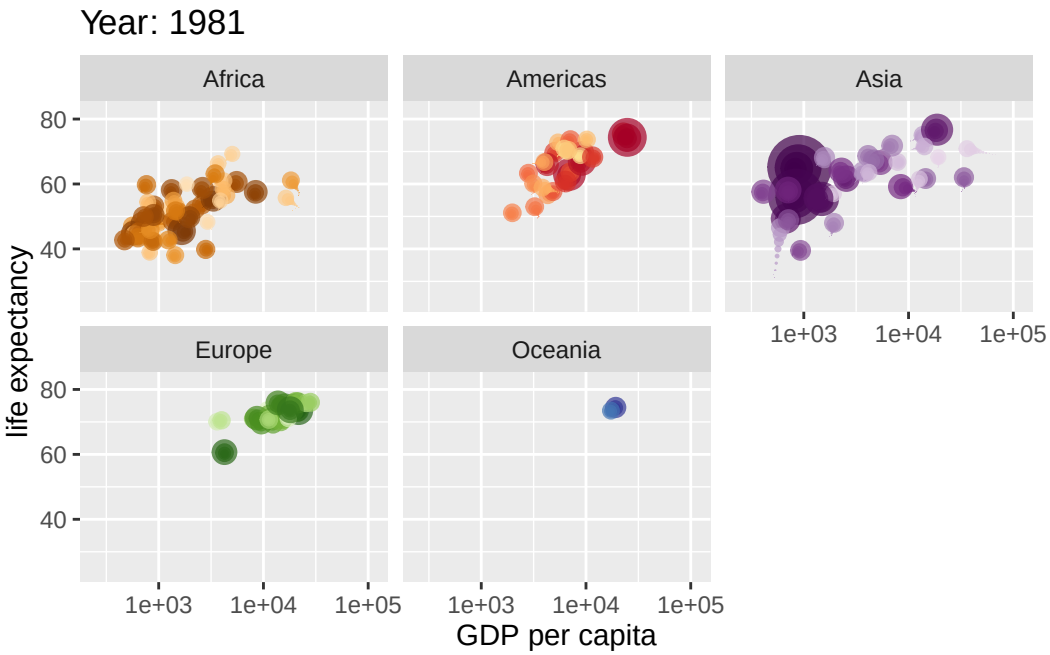
1e+03
1e+04
1e+05
GDP per capita


Year: 1981
Africa
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Asia
Europe
Oceania
life expectancy
80
60
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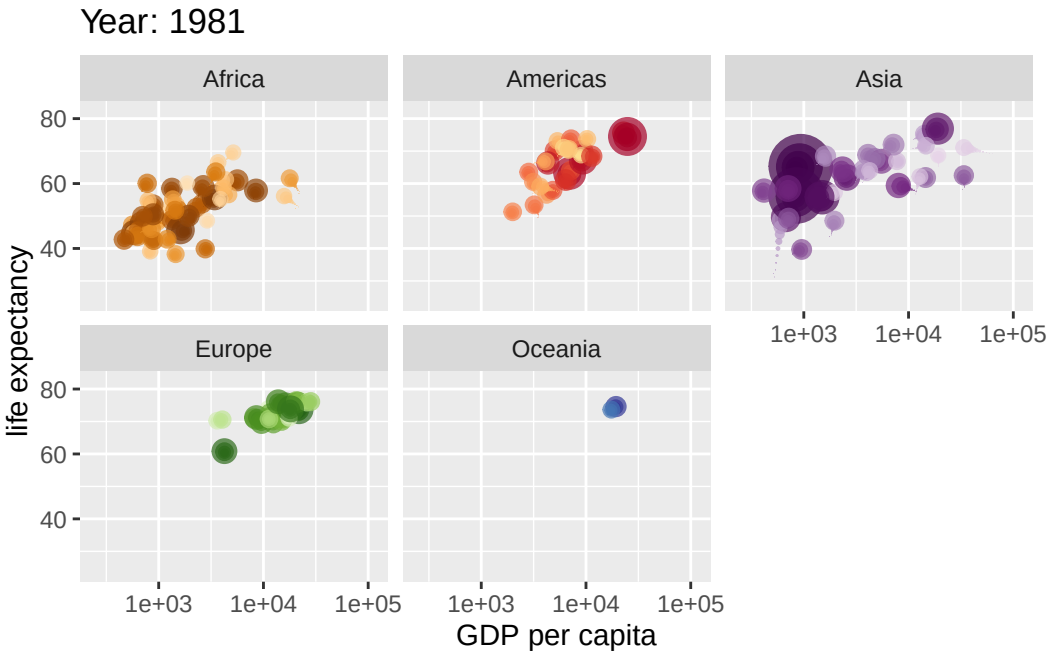
1e+03
1e+04
1e+05
GDP per capita


Year: 1981
Africa
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Asia
Europe
Oceania
life expectancy
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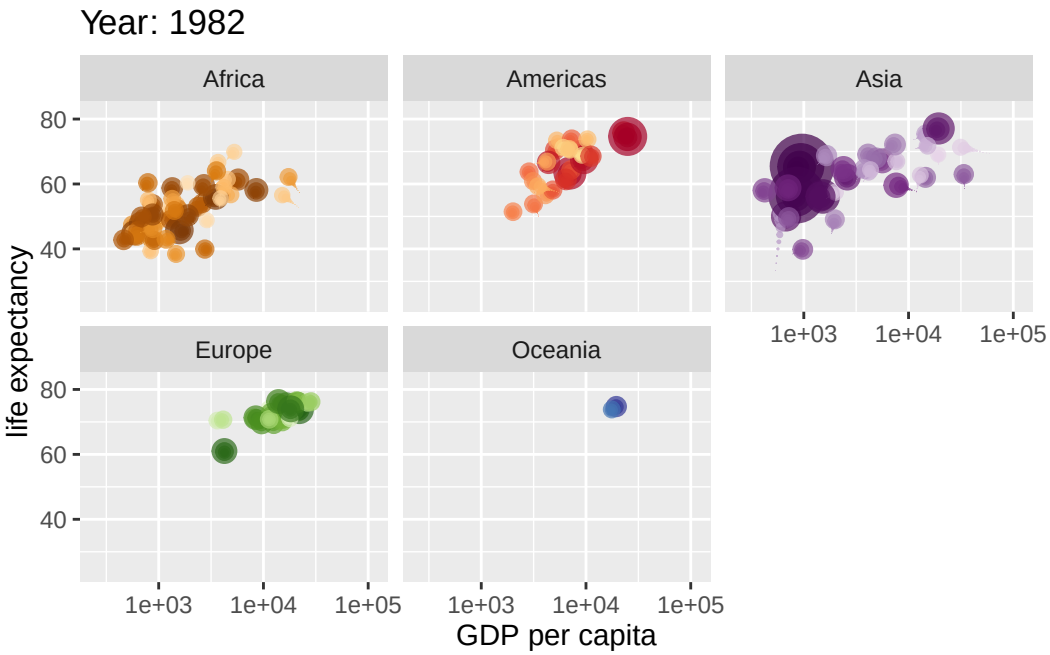
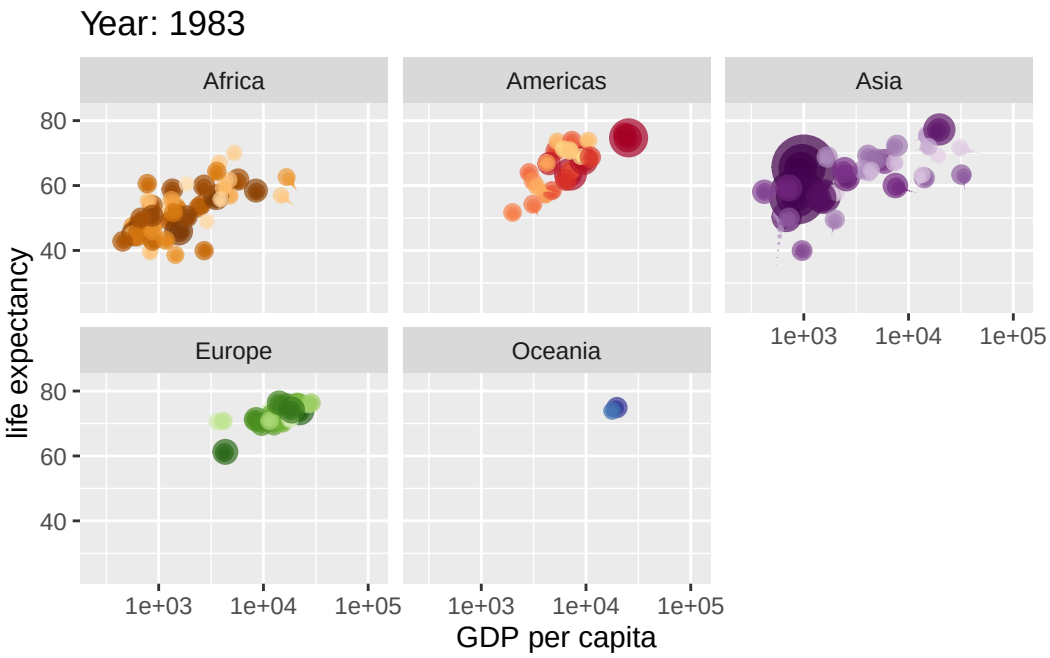
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1982
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1983
Africa
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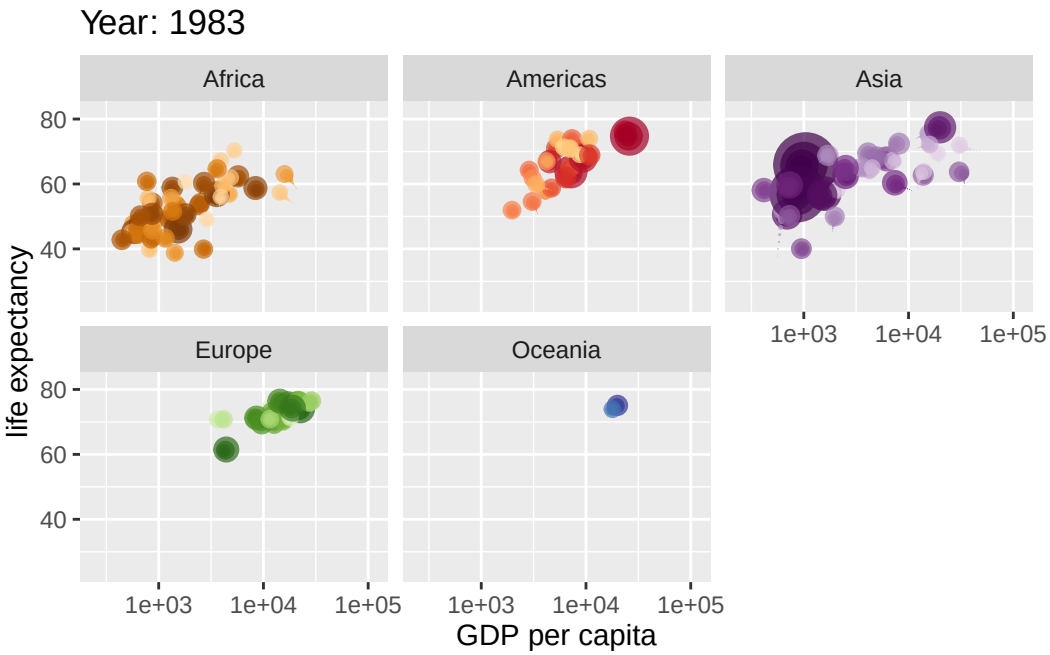
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1983
Africa
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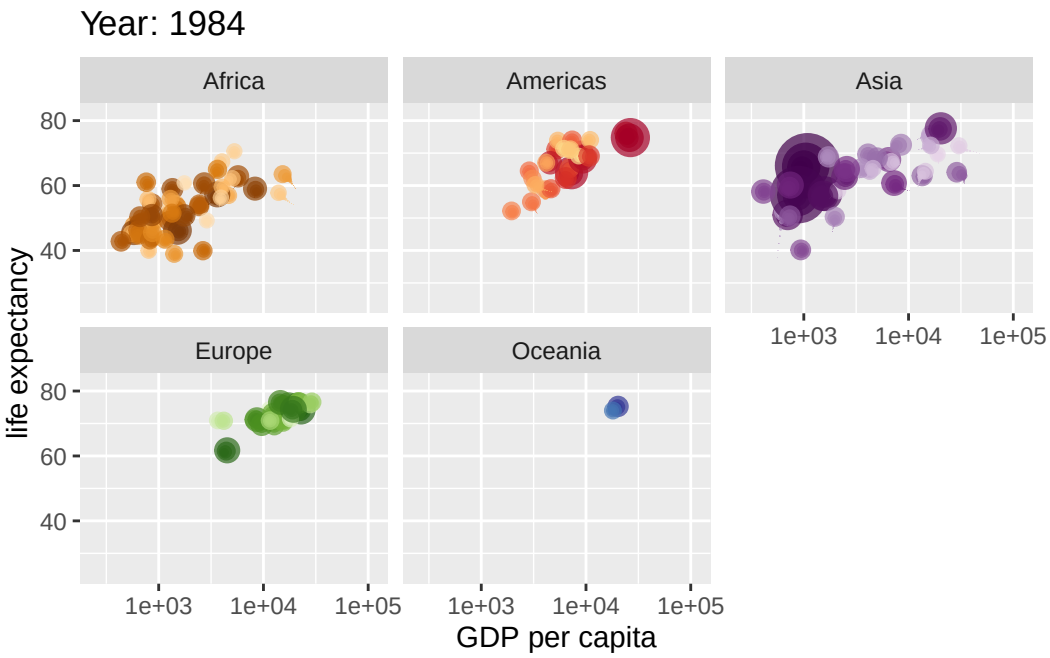
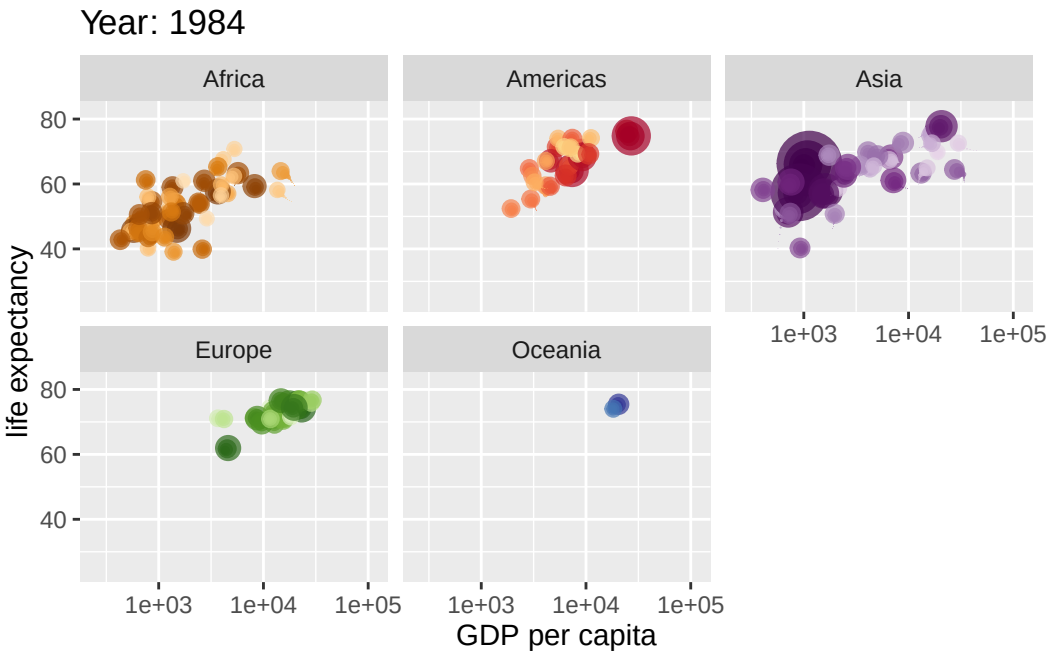
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1984
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1984
Africa
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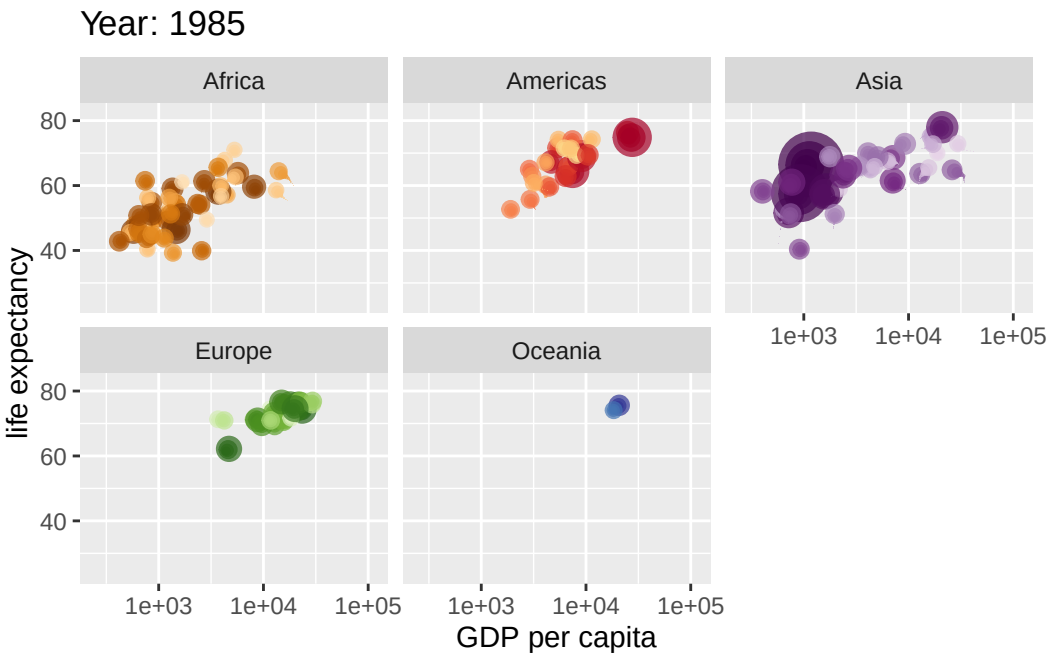
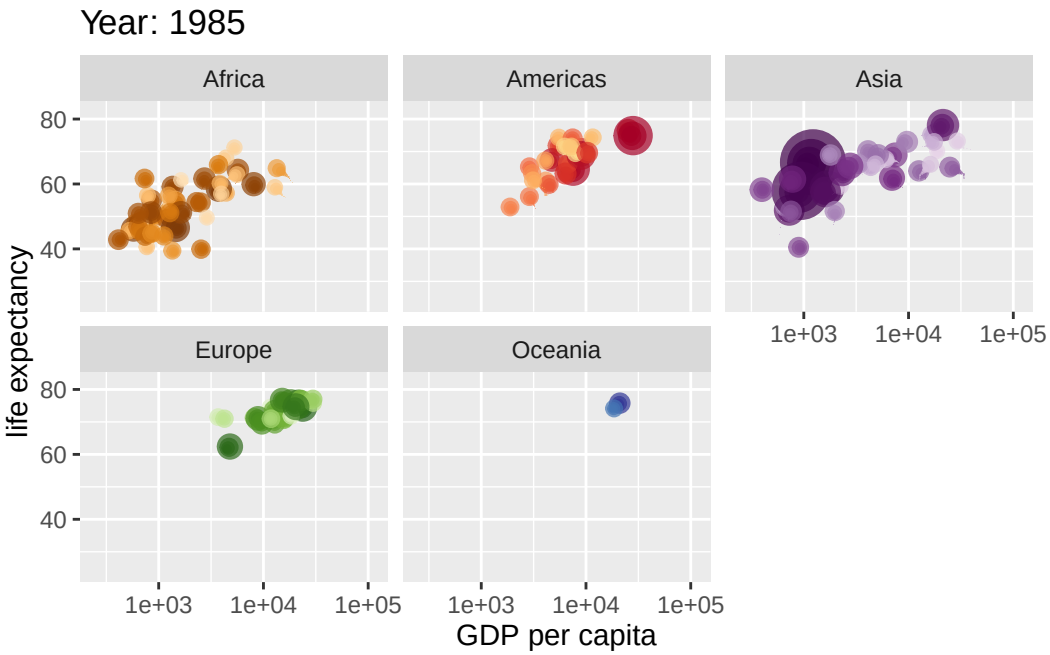
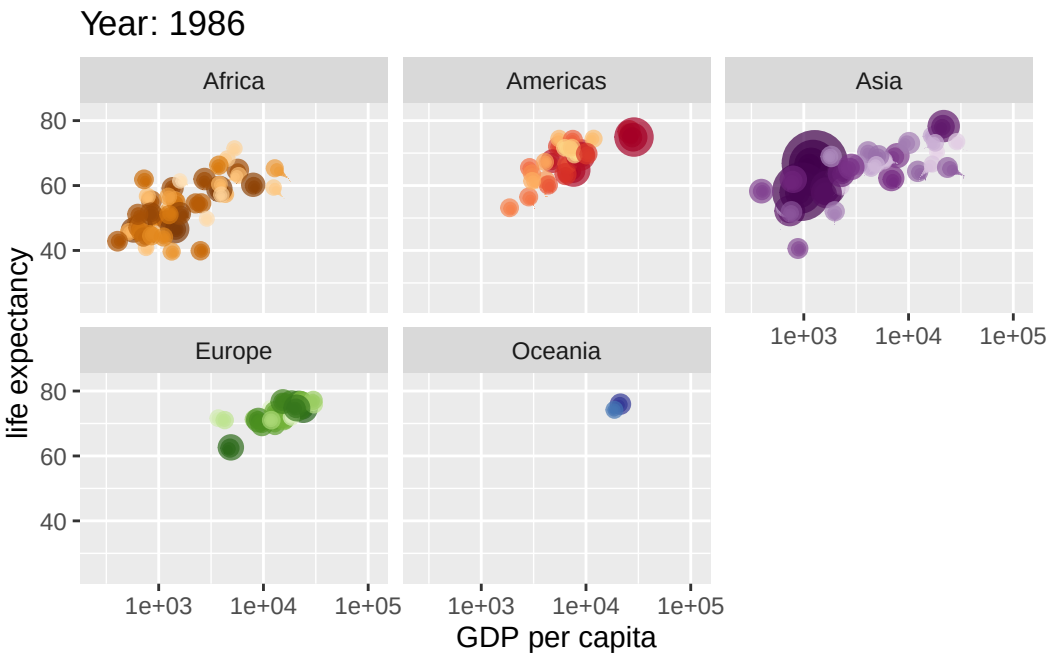
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1985
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1985
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita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Asia
Europe
Oceania
life expectancy
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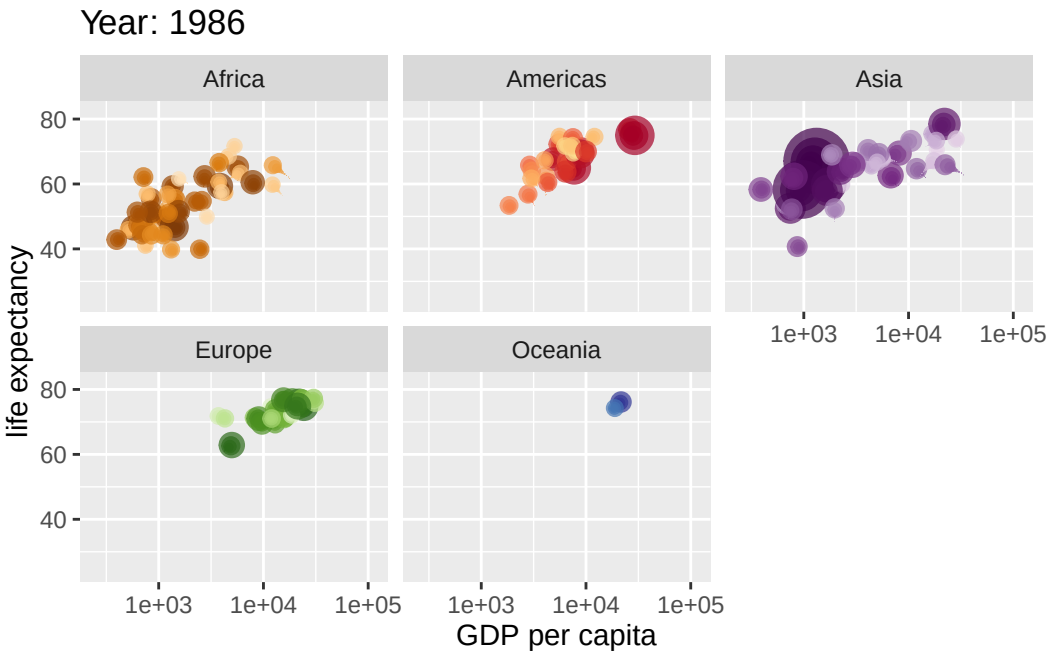
1e+05
GDP per capita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Oceania
life expectancy
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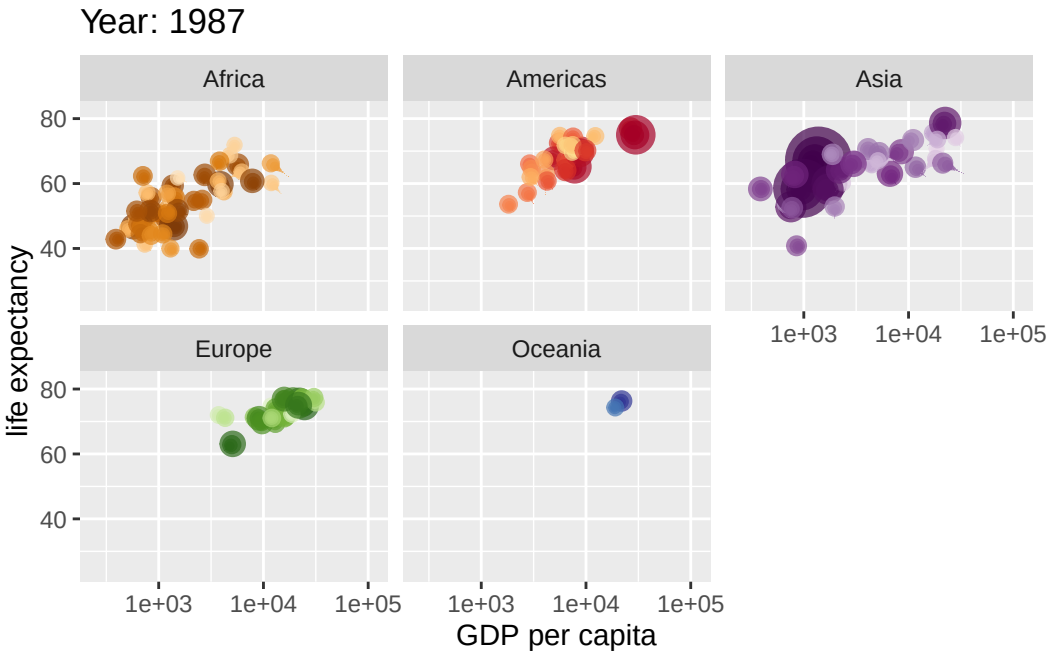
1e+05
GDP per capita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life expectancy
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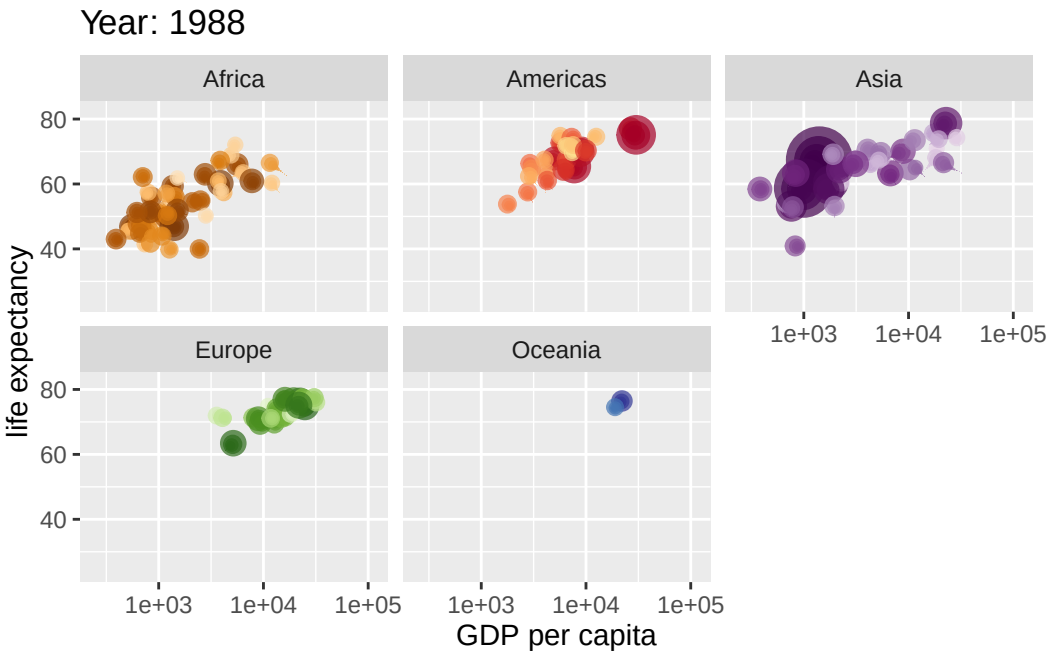
1e+05
GDP per capita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Asia
Europe
Oceania
life expectancy
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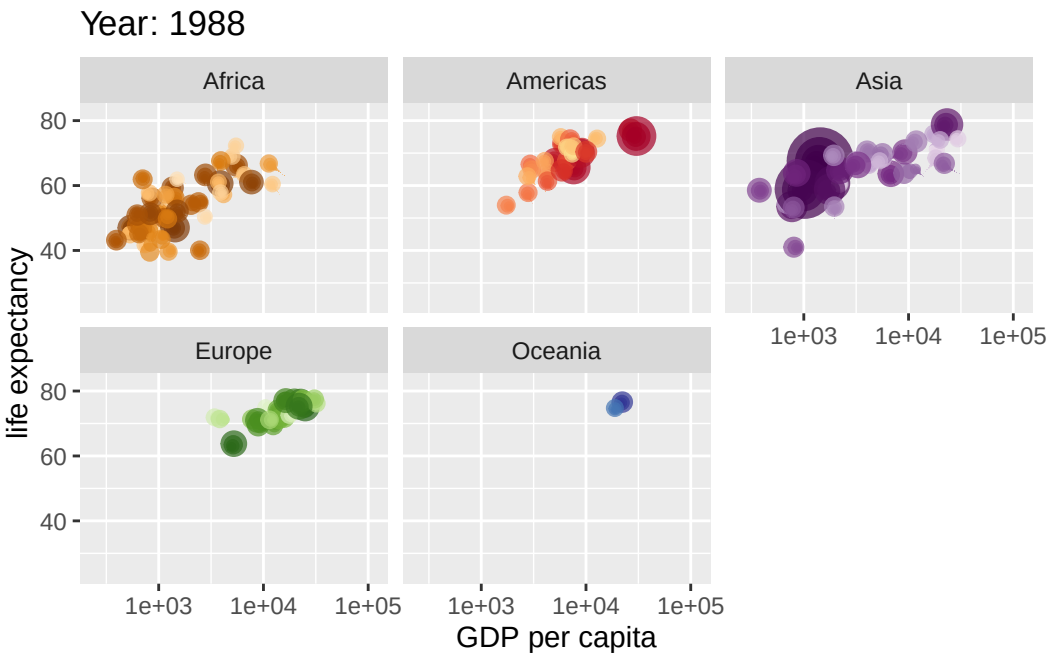
1e+05
GDP per capita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Europe
Oceania
life expectancy
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1e+03
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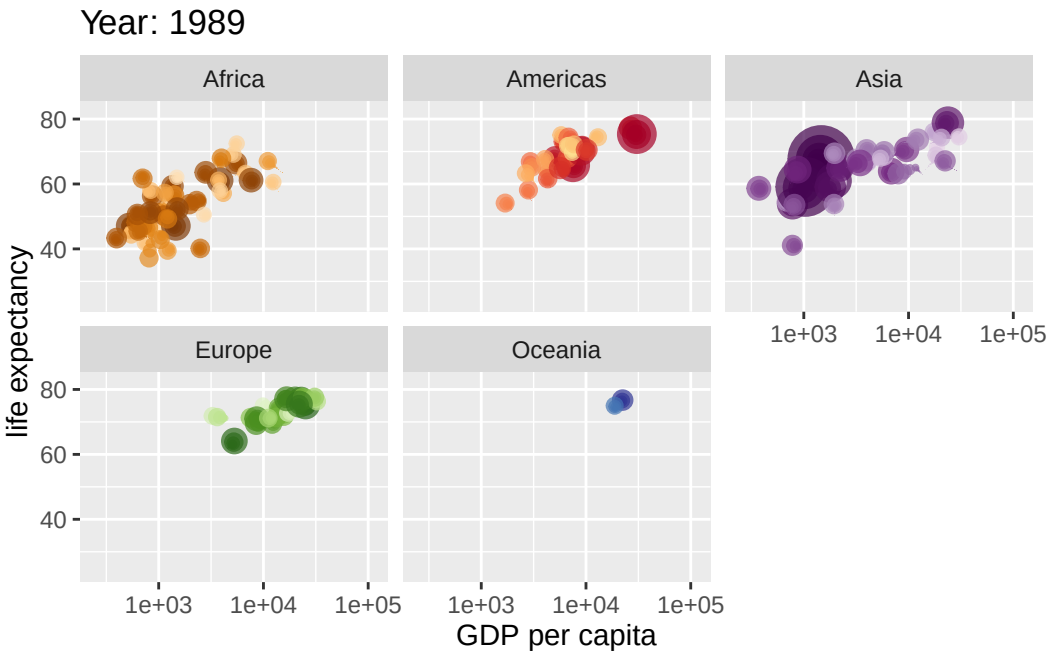
1e+05
GDP per capita


Year: 1989
Africa
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Asia
Europe
Oceania
life expectancy
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1e+03
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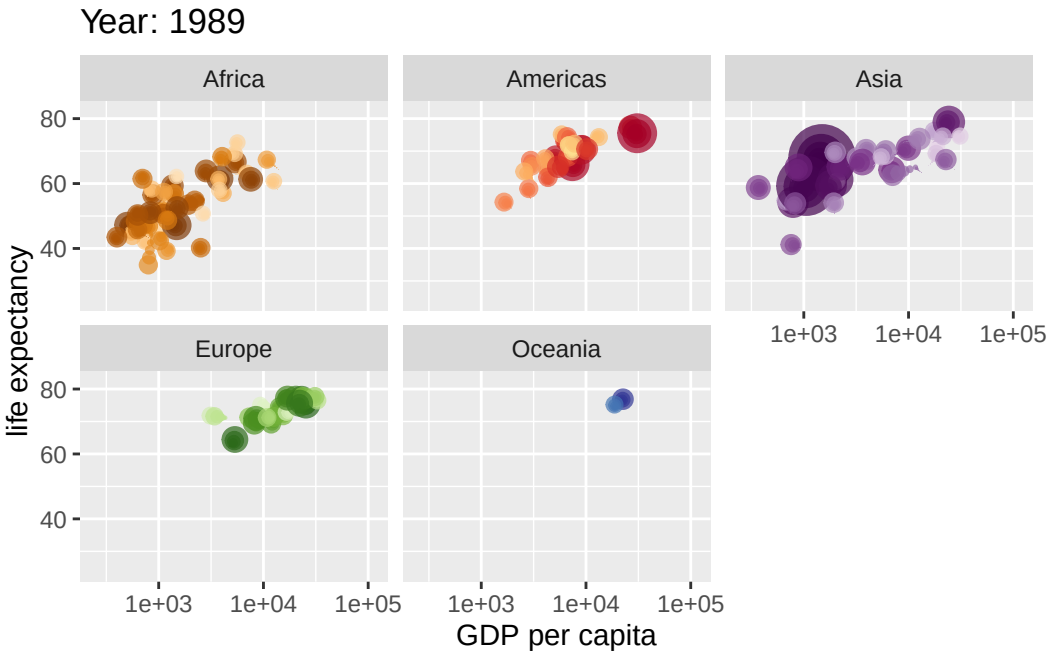
1e+05
GDP per capita


Year: 1989
Africa
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Asia
Europe
Oceania
life expectancy
80
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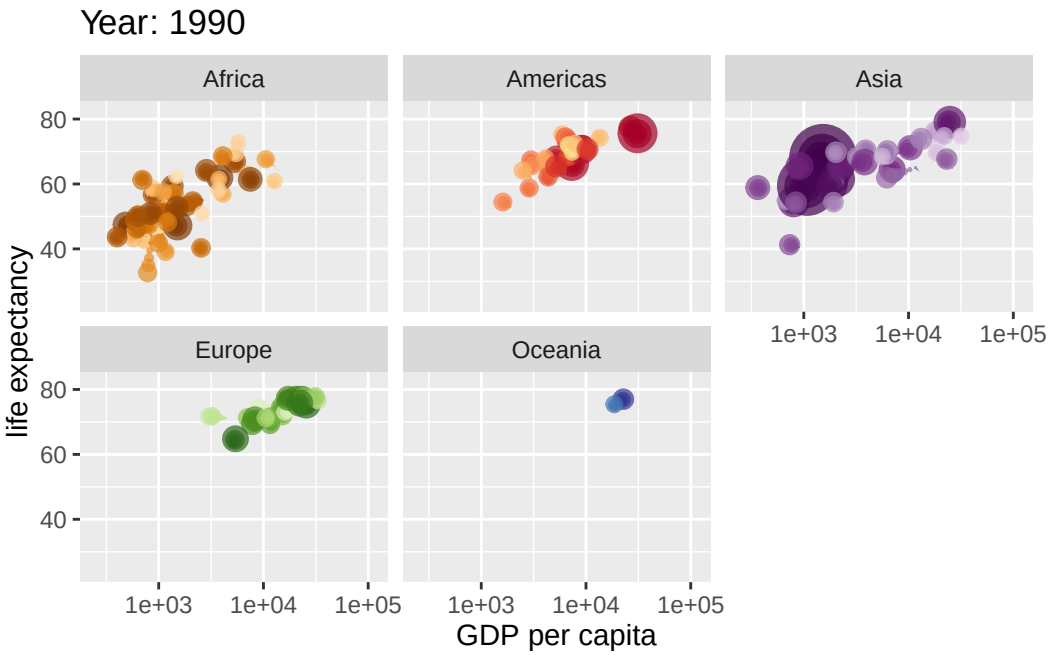
1e+03
1e+04
1e+05
GDP per capita


Year: 1990
Africa
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Asia
Europe
Oceania
life expectancy
80
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1e+03
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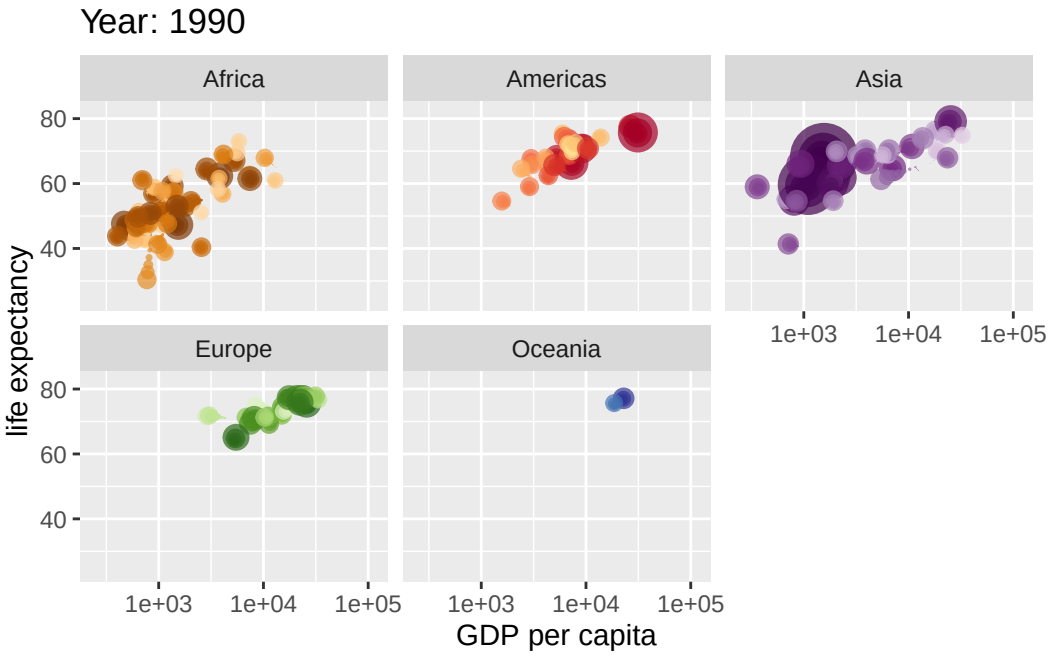
1e+05
GDP per capita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Africa
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Asia
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Oceania
life expectancy
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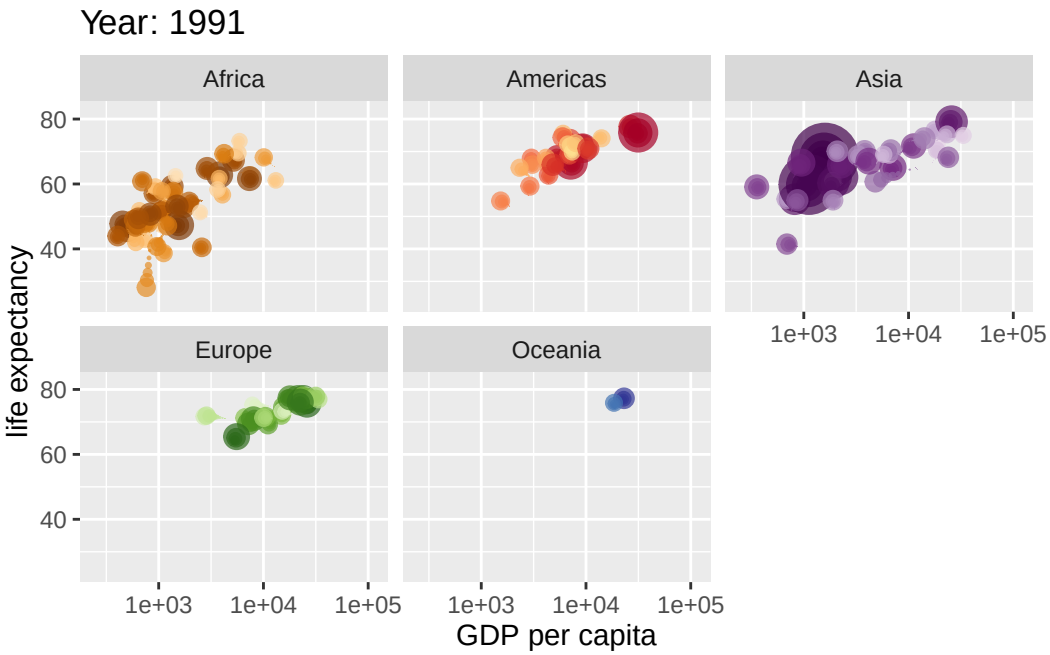
1e+03
1e+04
1e+05
GDP per capita


Year: 1991
Africa
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Asia
Europe
Oceania
life expectancy
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1e+03
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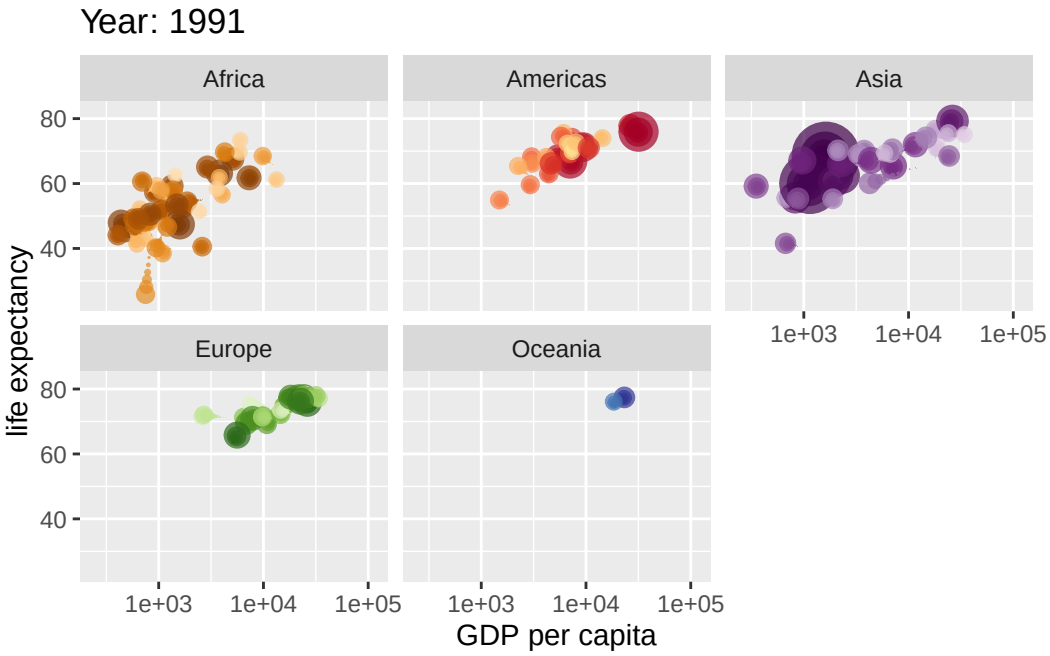
1e+05
GDP per capita


Year: 1991
Africa
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Oceania
life expectancy
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1e+03
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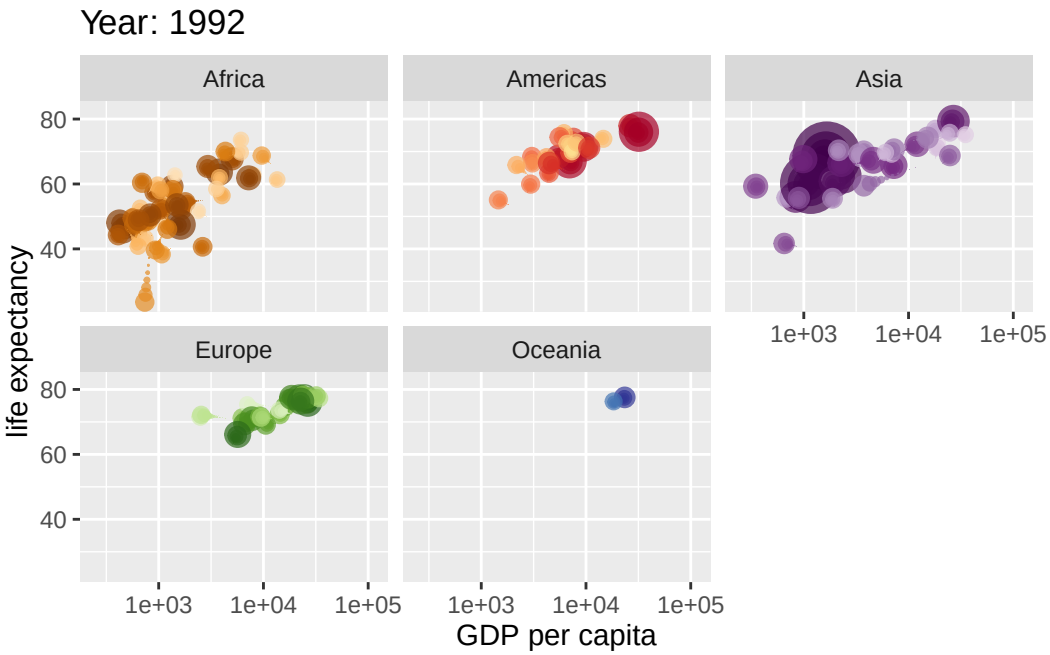
1e+05
GDP per capita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Africa
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Europe
Oceania
life expectancy
80
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1e+03
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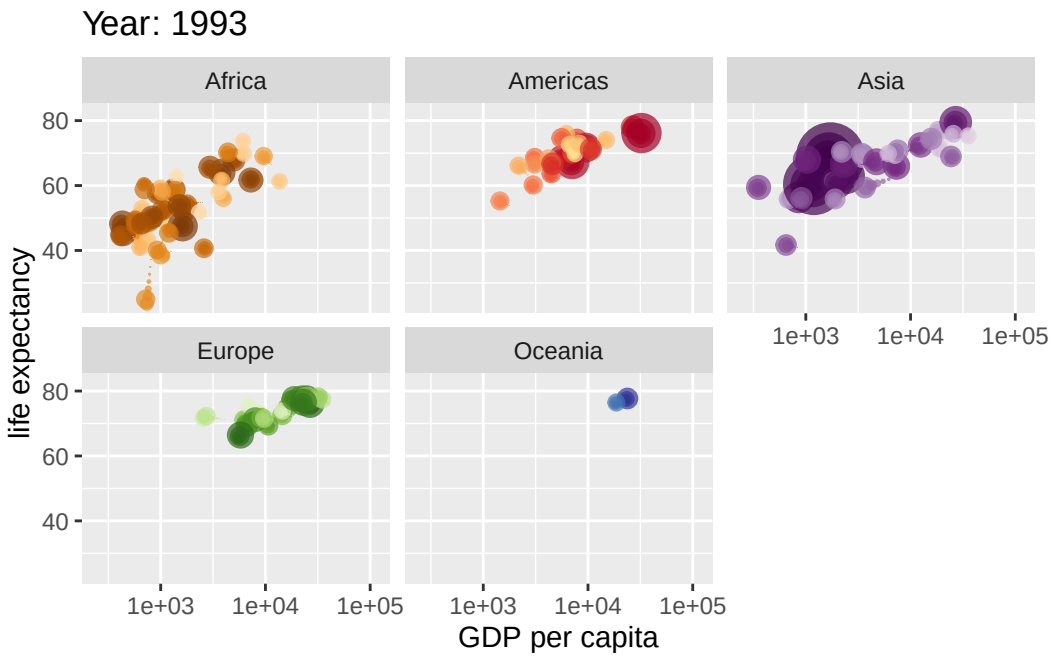
1e+05
GDP per capita


Year: 1993
Africa
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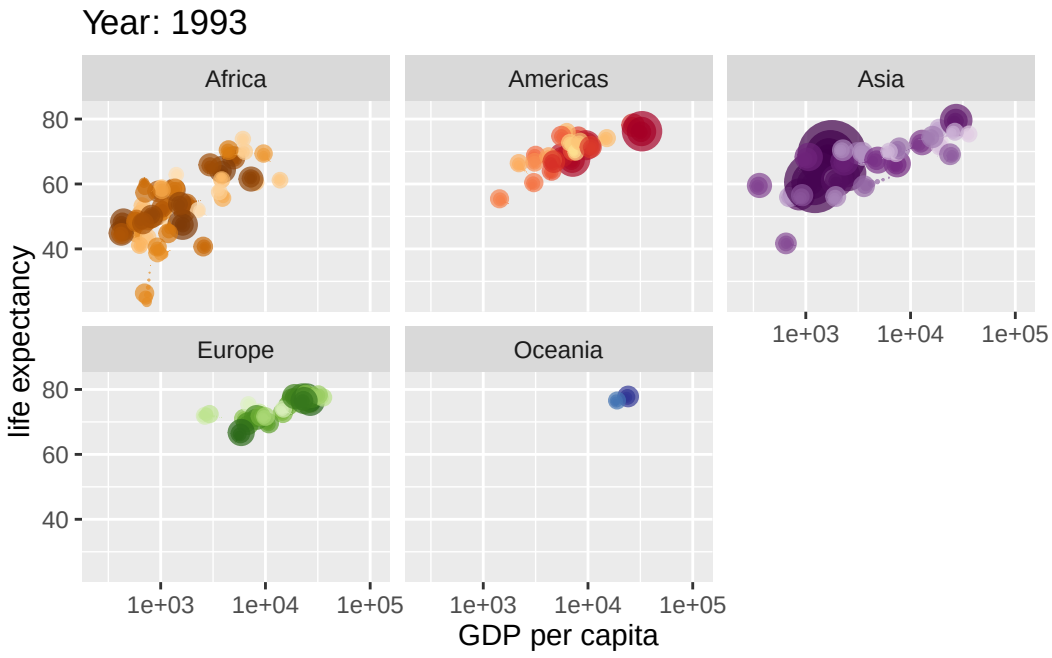
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1993
Africa
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Asia
Europe
Oceania
life expectancy
80
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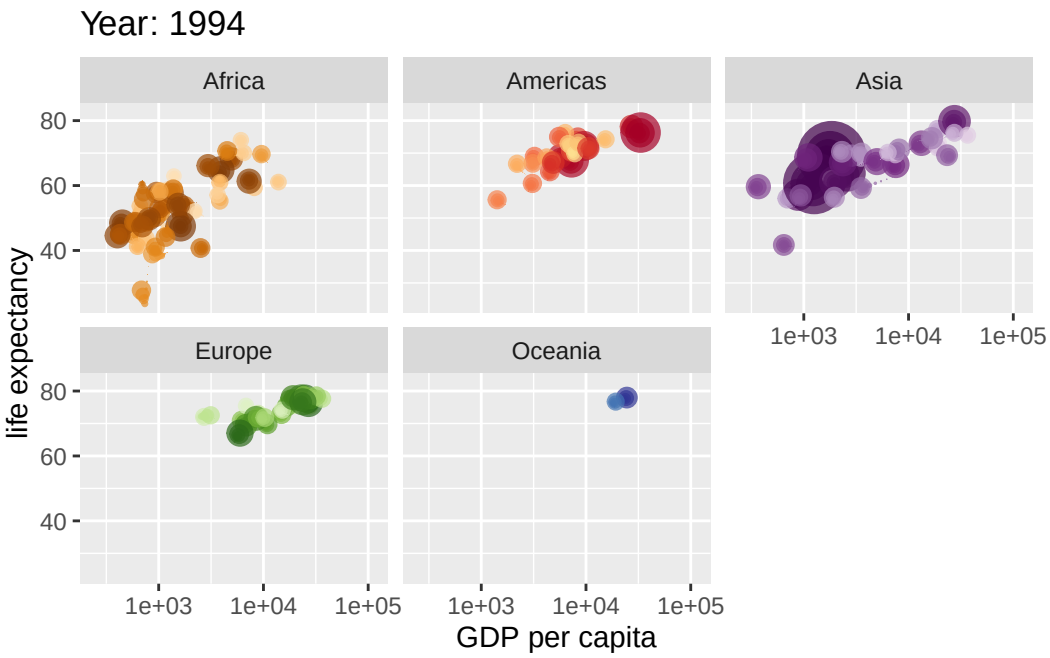
40
1e+03
1e+04
1e+05
GDP per capita


Year: 1994
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
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40
1e+03
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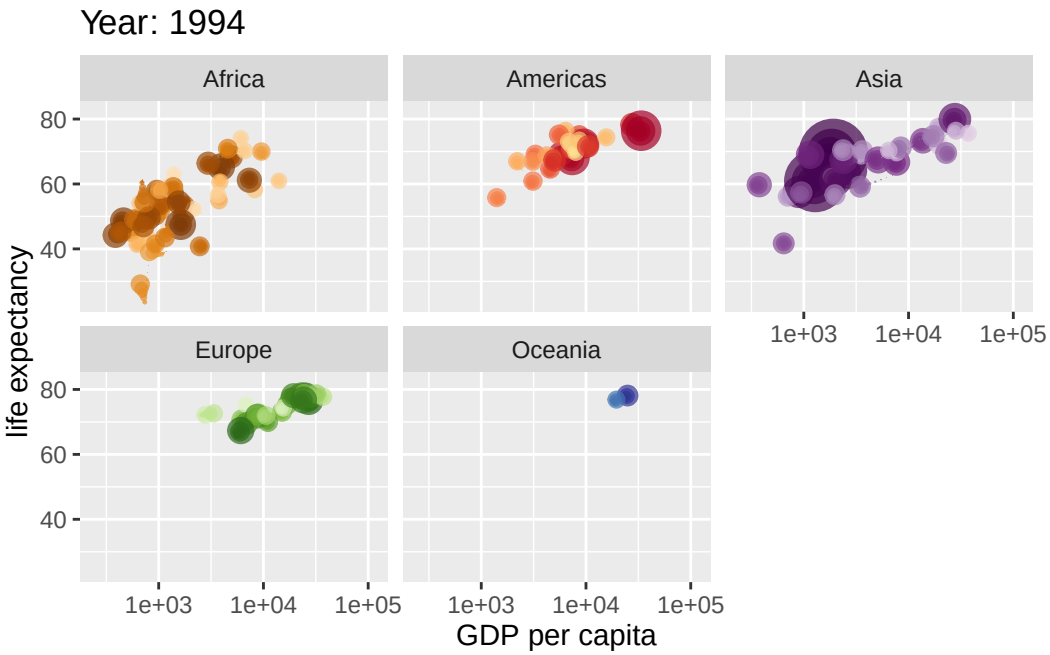
1e+05
GDP per capita


Year: 1994
Africa
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Oceania
life expectancy
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1e+03
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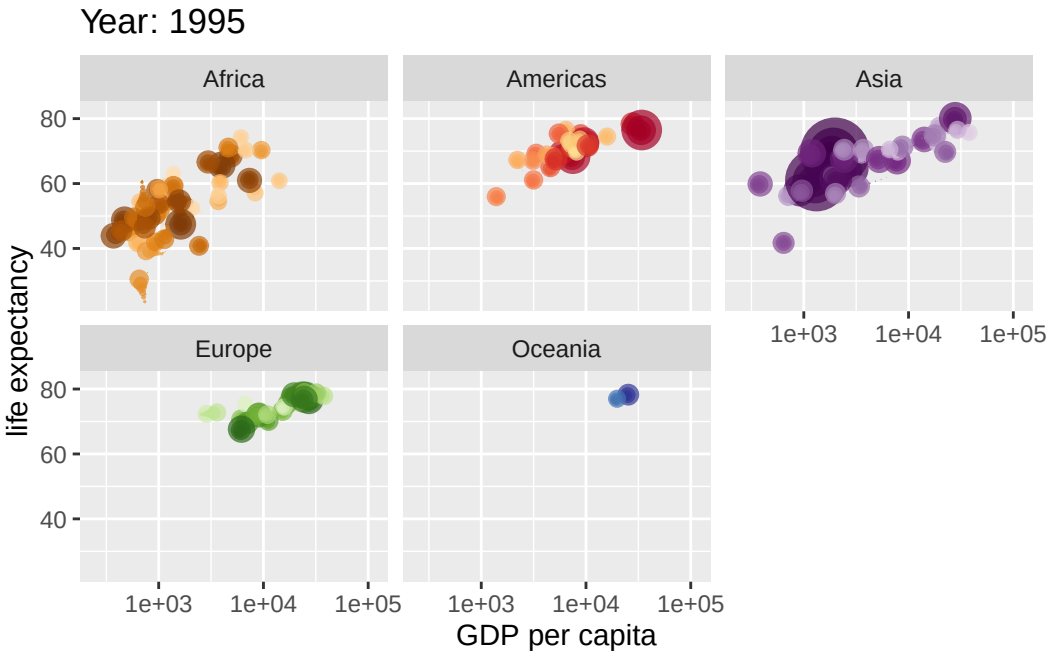
1e+05
GDP per capita


Year: 1995
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
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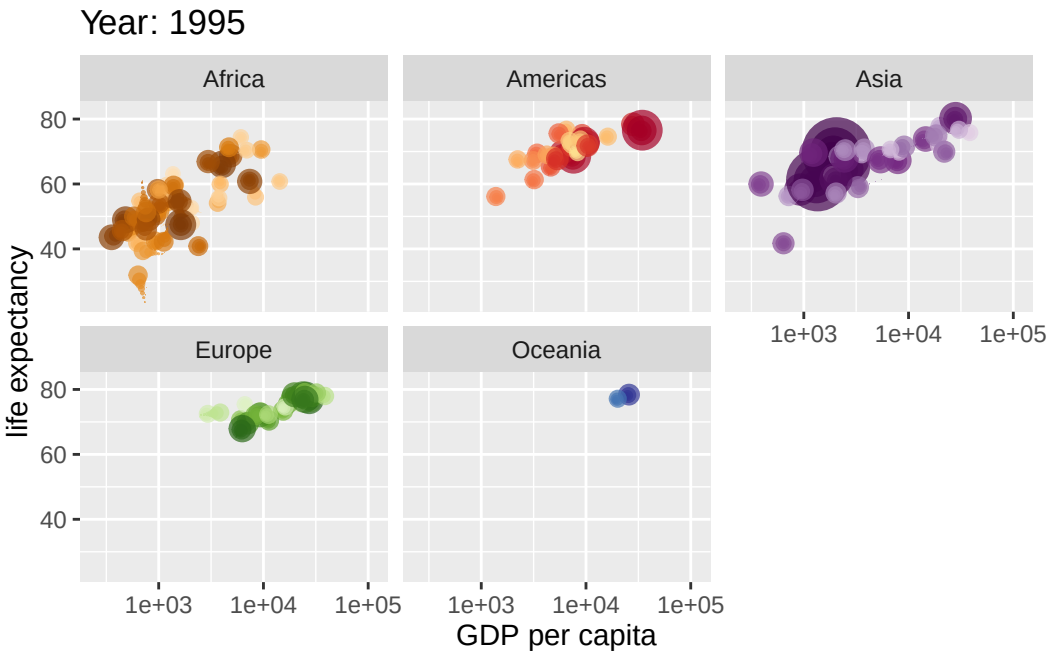
1e+03
1e+04
1e+05
GDP per capita


Year: 1995
Africa
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Asia
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Oceania
life expectancy
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1e+03
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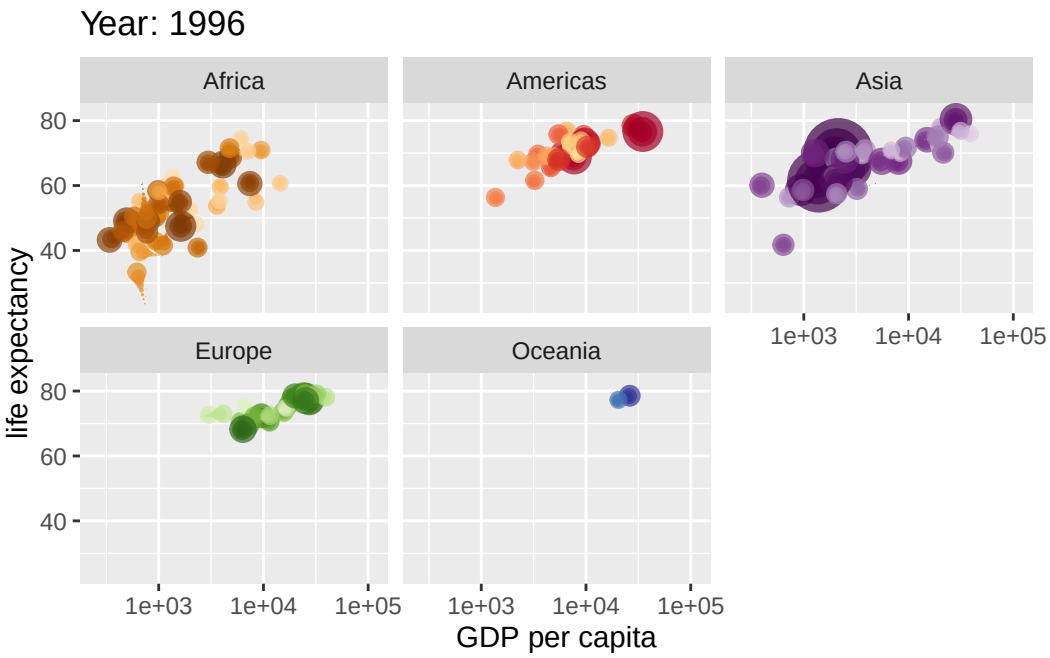
GDP per capita


Year: 1996
Africa
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Oceania
life expectancy
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1e+03
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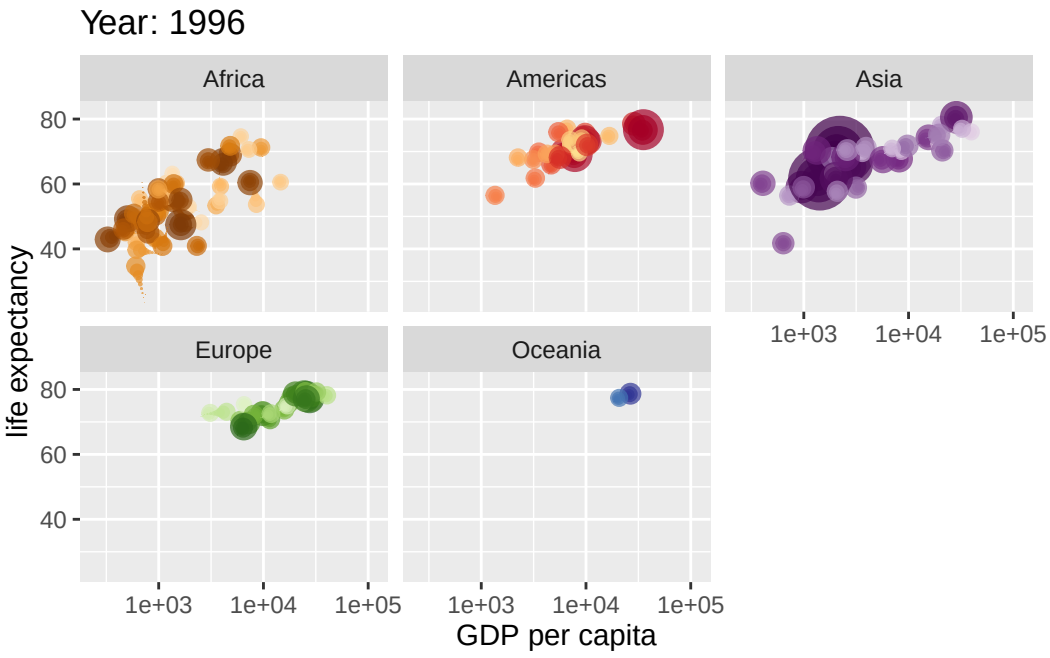
GDP per capita


Year: 1996
Africa
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Asia
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Oceania
life expectancy
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1e+03
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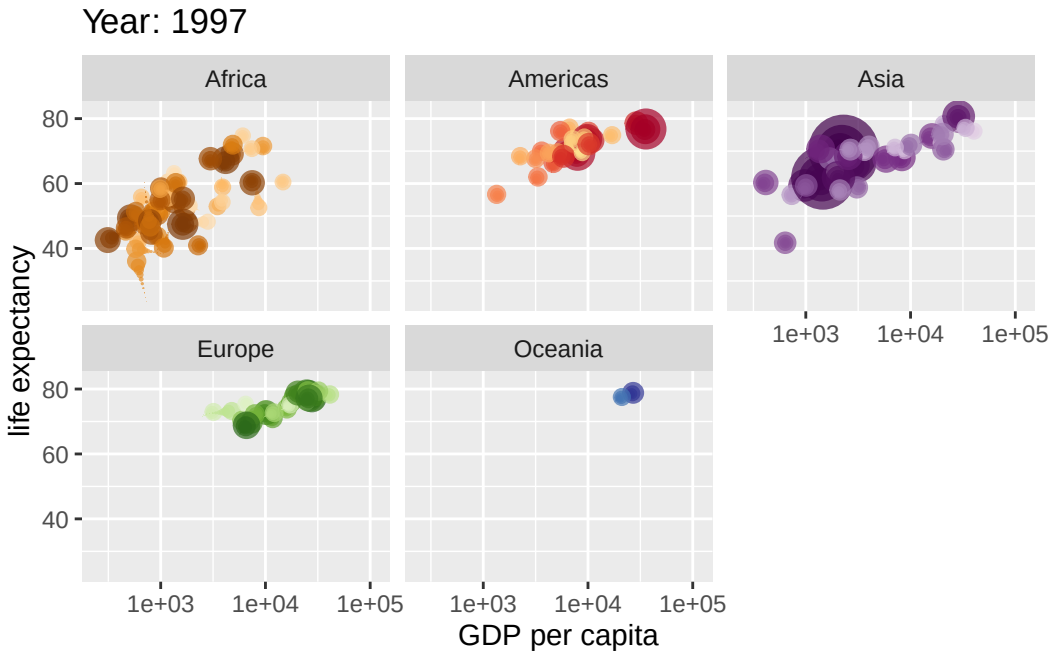
1e+05
GDP per capita


Year: 1997
Africa
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Asia
Europe
Oceania
life expectancy
80
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1e+03
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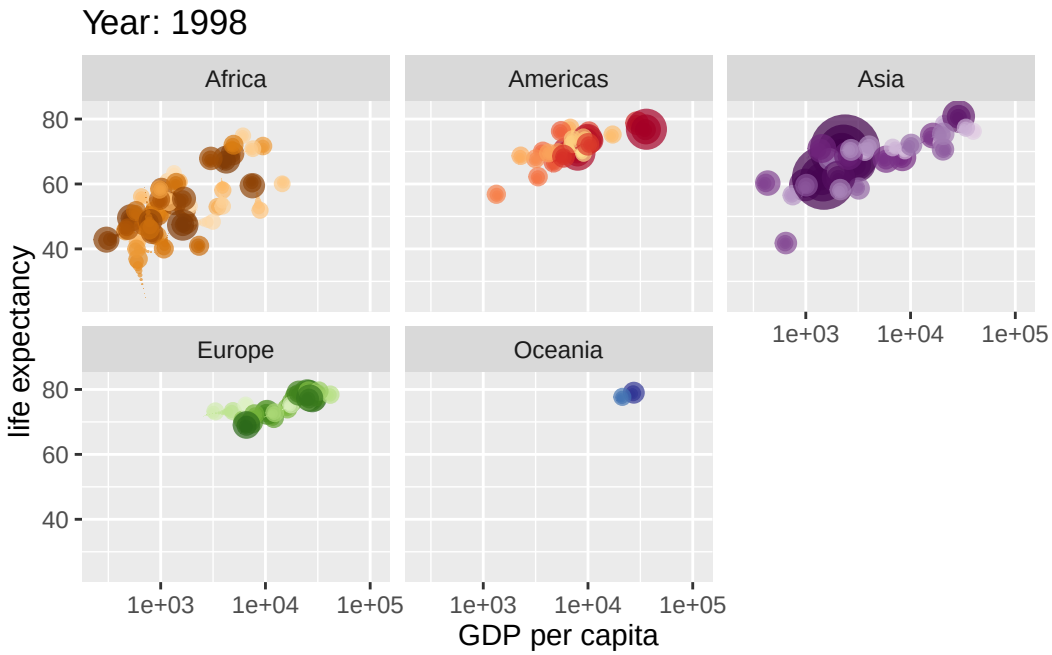
GDP per capita


Year: 1998
Africa
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Asia
Europe
Oceania
life expectancy
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1e+03
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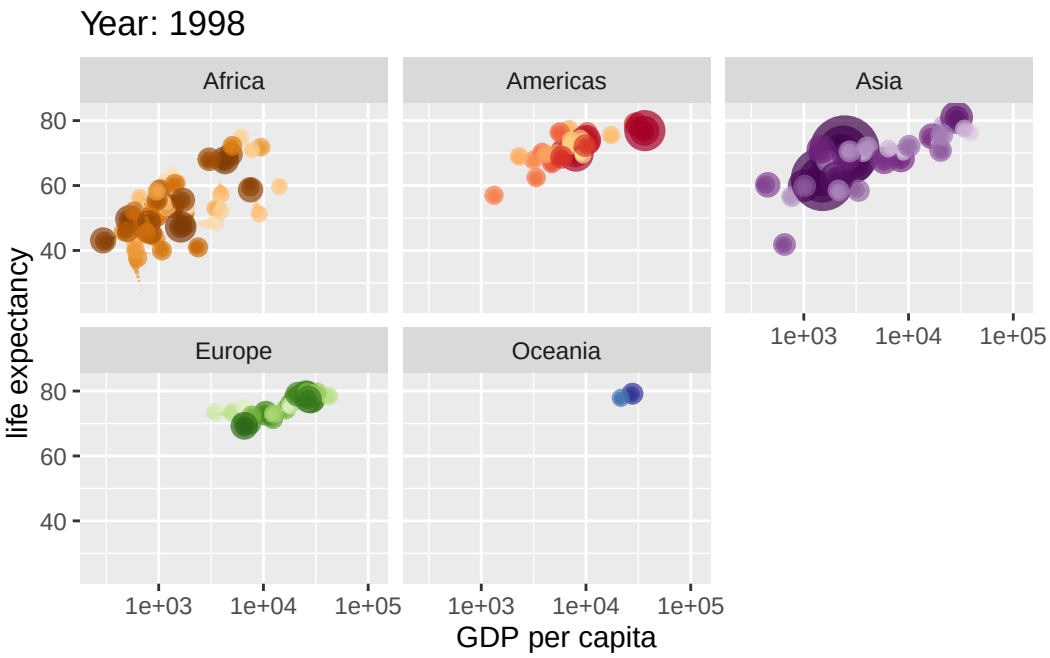
1e+05
GDP per capita


Year: 1998
Africa
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Asia
Europe
Oceania
life expectancy
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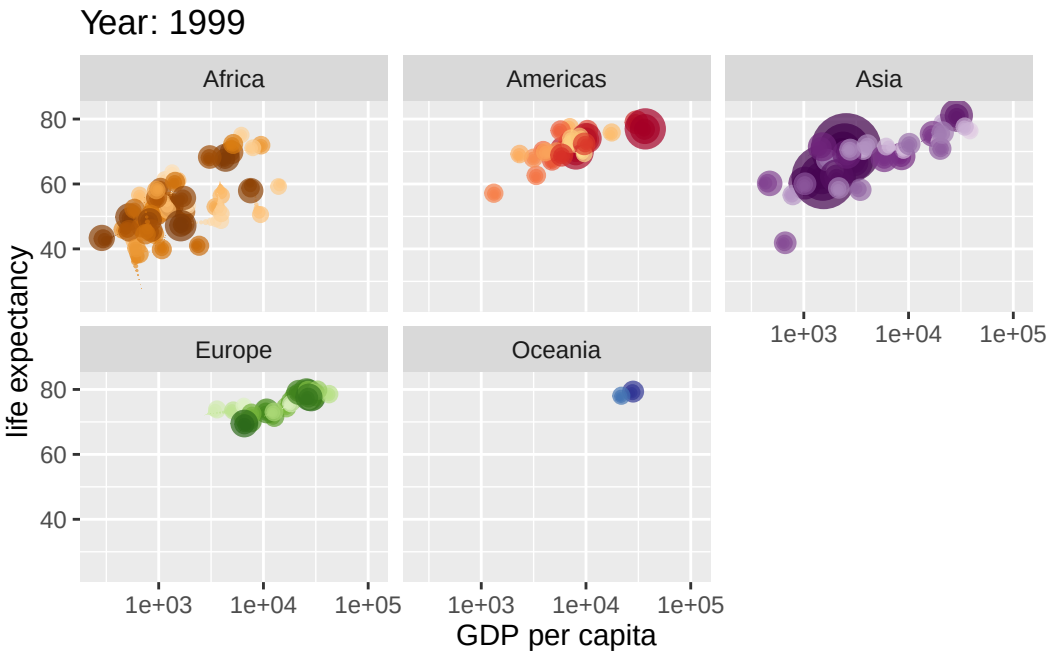
1e+03
1e+04
1e+05
GDP per capita


Year: 1999
Africa
Americas
Asia
Europe
Oceania
life expectancy
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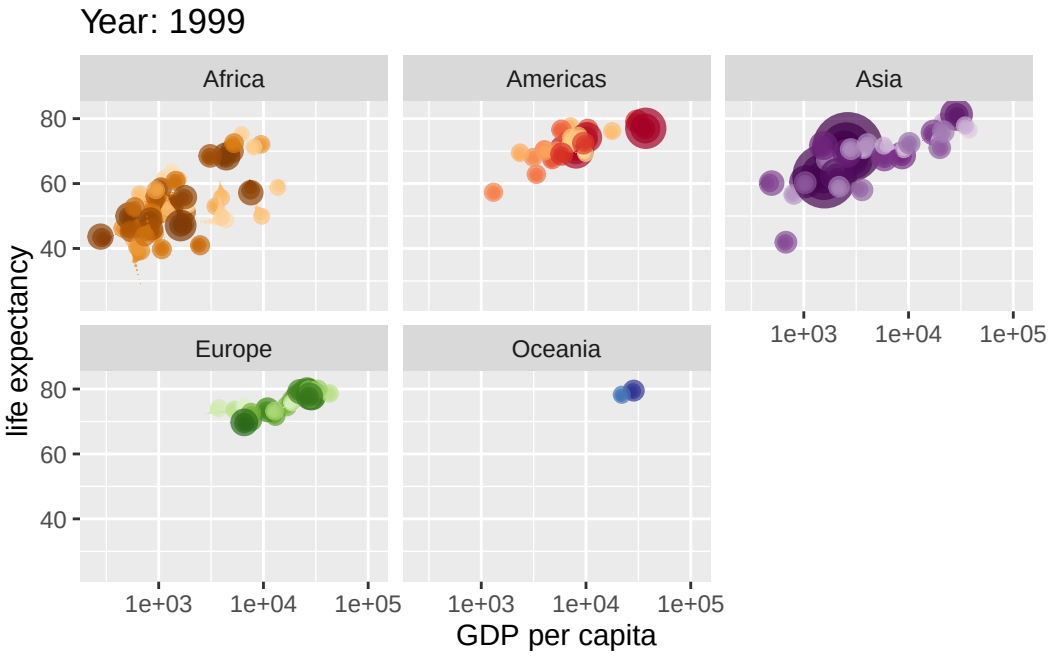
1e+03
1e+04
1e+05
GDP per capita


Year: 1999
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
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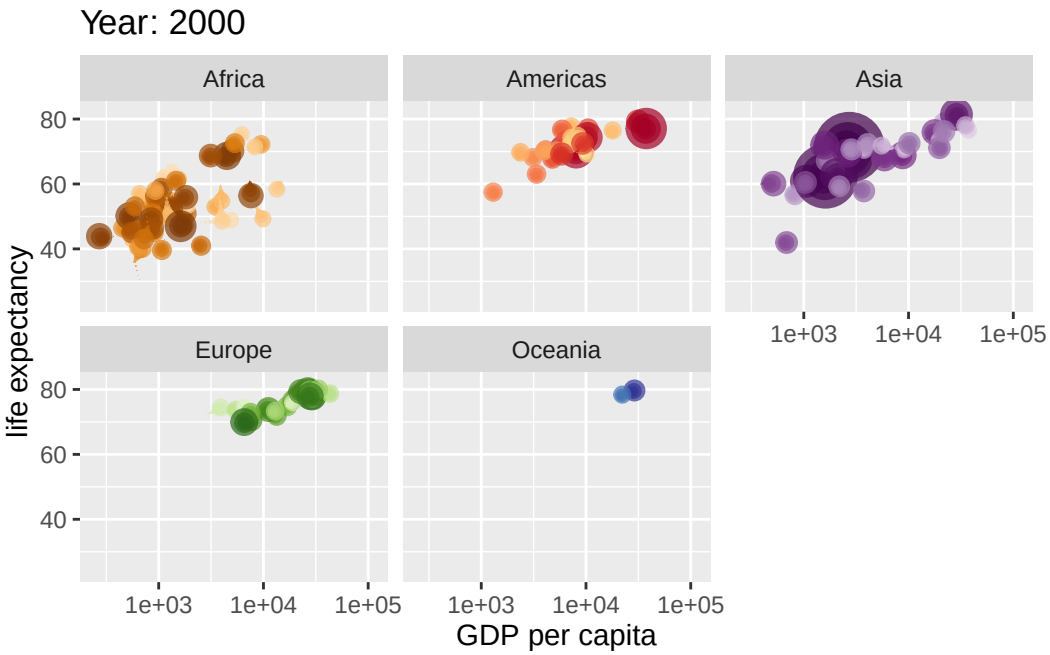
1e+03
1e+04
1e+05
GDP per capita


Year: 2000
Africa
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Asia
Europe
Oceania
life expectancy
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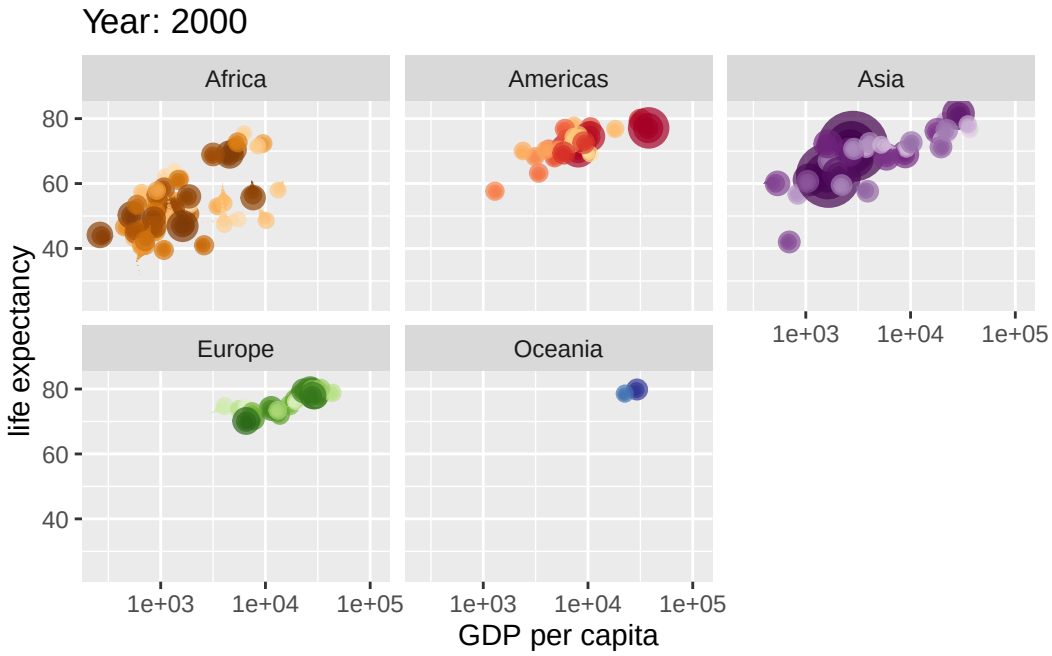
1e+03
1e+04
1e+05
GDP per capita


Year: 2000
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
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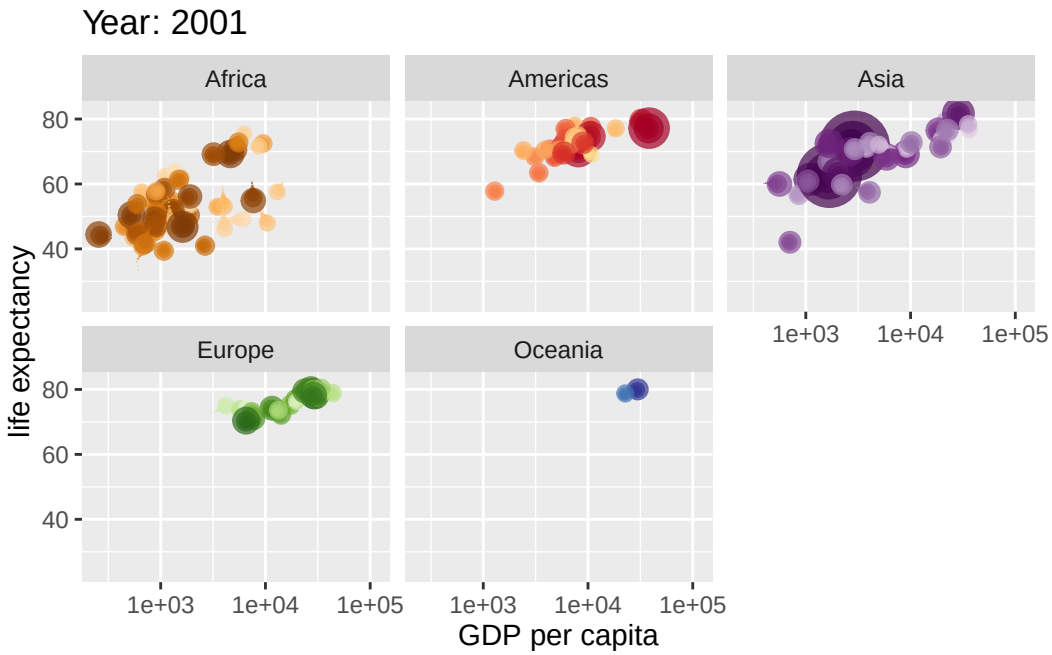
1e+03
1e+04
1e+05
GDP per capita


Year: 2001
Africa
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Asia
Europe
Oceania
life expectancy
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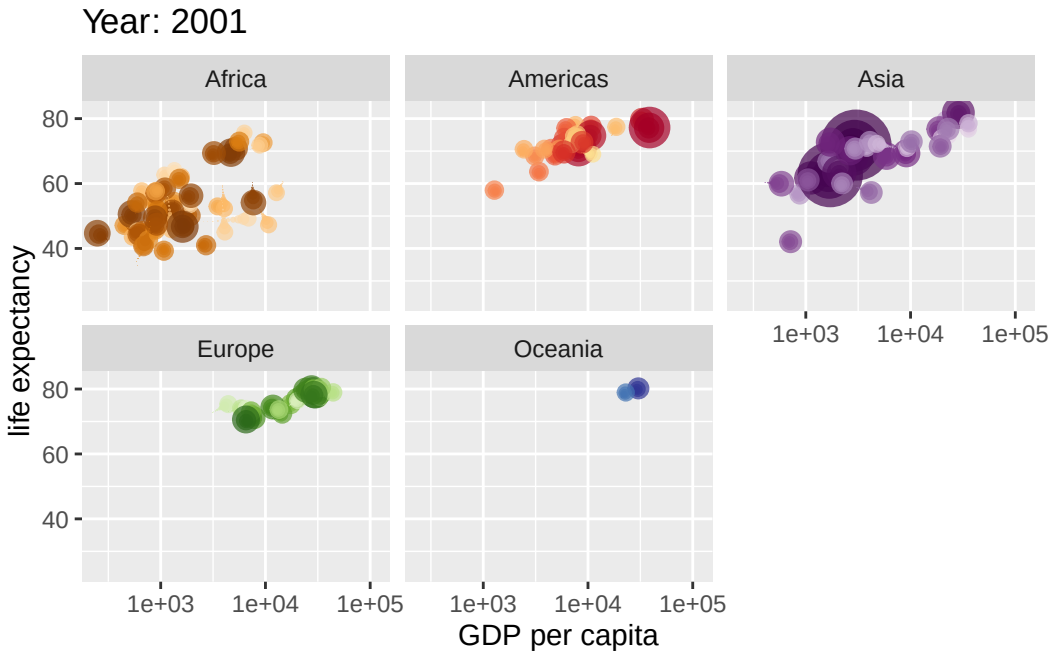
1e+03
1e+04
1e+05
GDP per capita


Year: 2001
Africa
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Oceania
life expectancy
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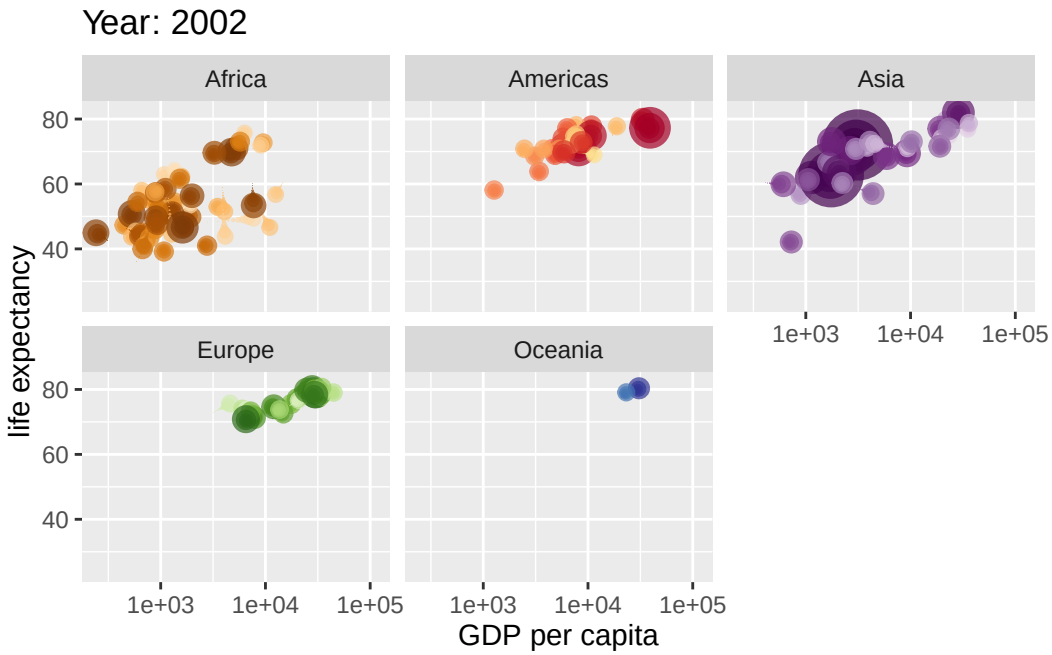
1e+05
GDP per capita


Year: 2002
Africa
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Asia
Europe
Oceania
life expectancy
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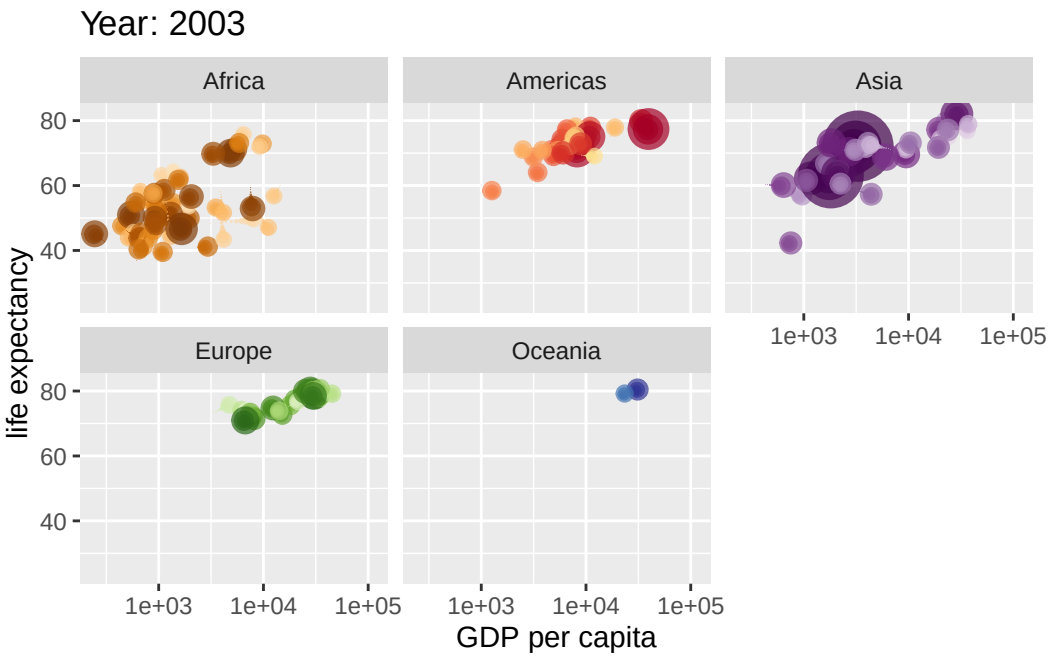
1e+03
1e+04
1e+05
GDP per capita


Year: 2003
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
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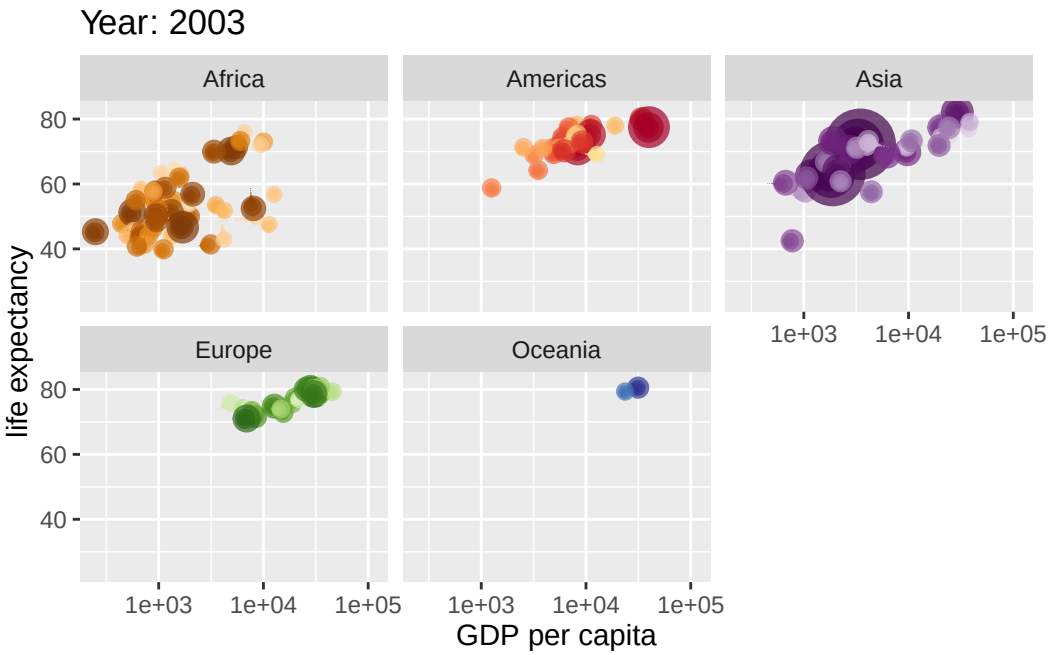
40
1e+03
1e+04
1e+05
GDP per capita


Year: 2003
Africa
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Asia
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Oceania
life expectancy
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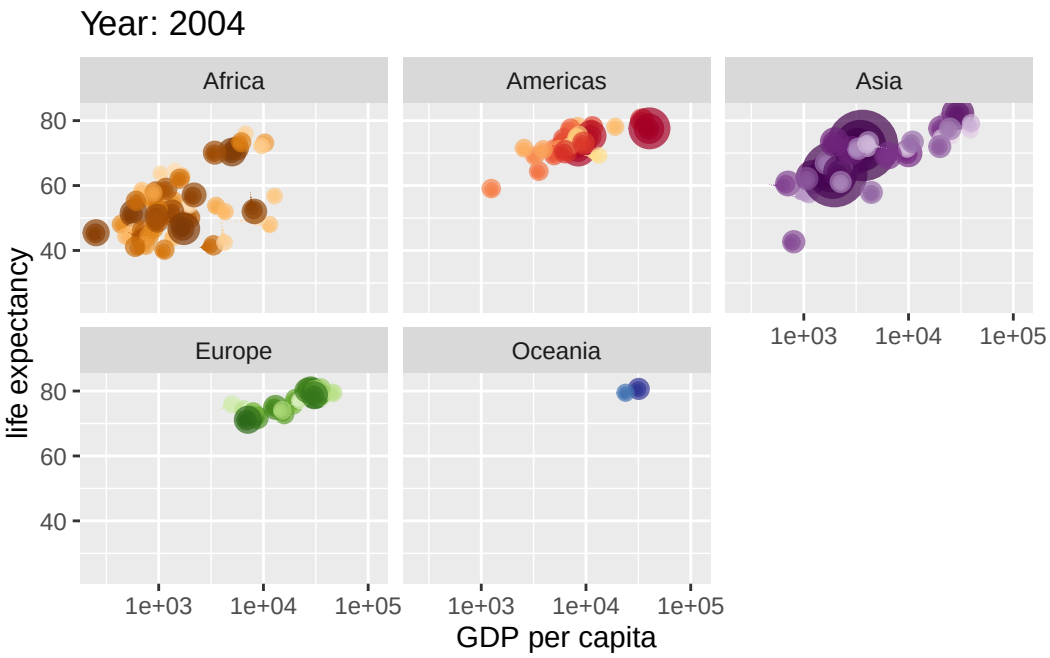
1e+03
1e+04
1e+05
GDP per capita


Year: 2004
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
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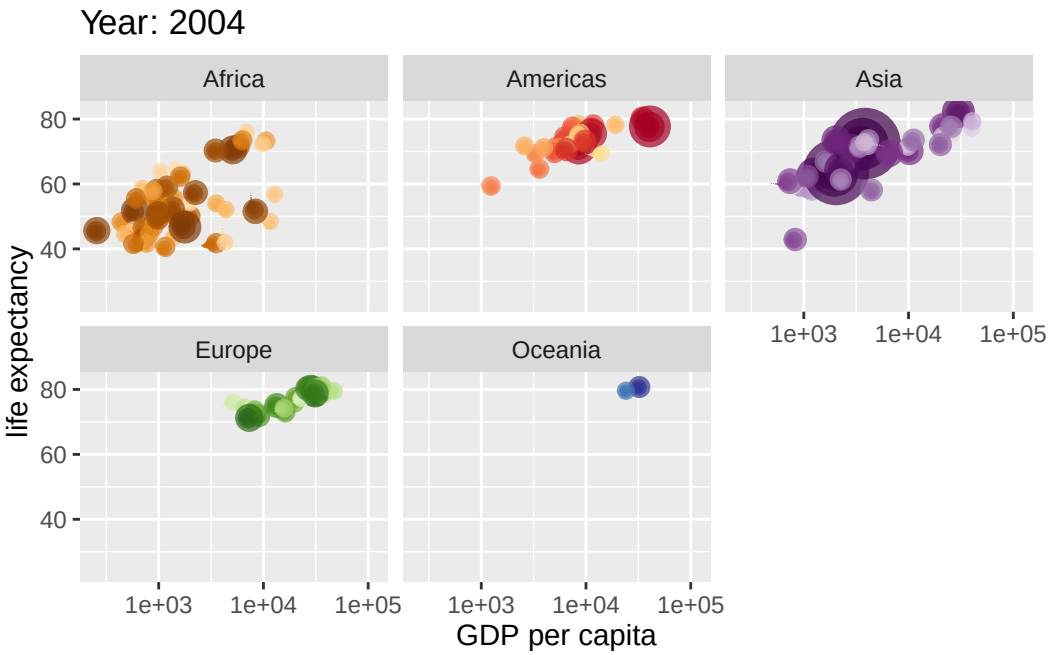
1e+03
1e+04
1e+05
GDP per capita


Year: 2004
Africa
Americas
Asia
Europe
Oceania
life expectancy
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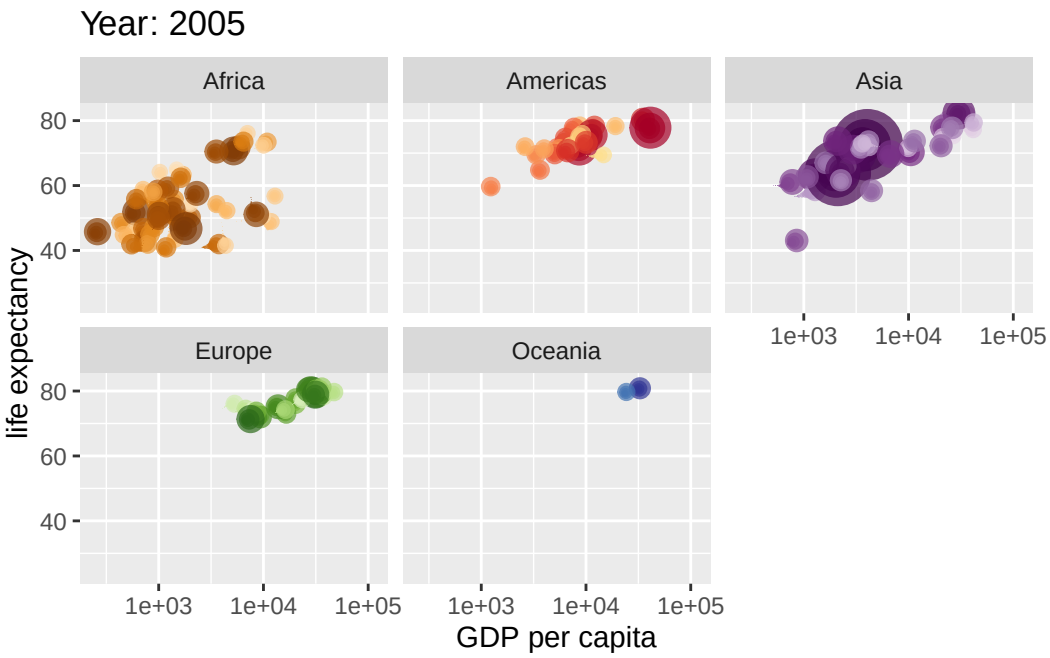
1e+03
1e+04
1e+05
GDP per capita


Year: 2005
Africa
Americas
Asia
Europe
Oceania
life expectancy
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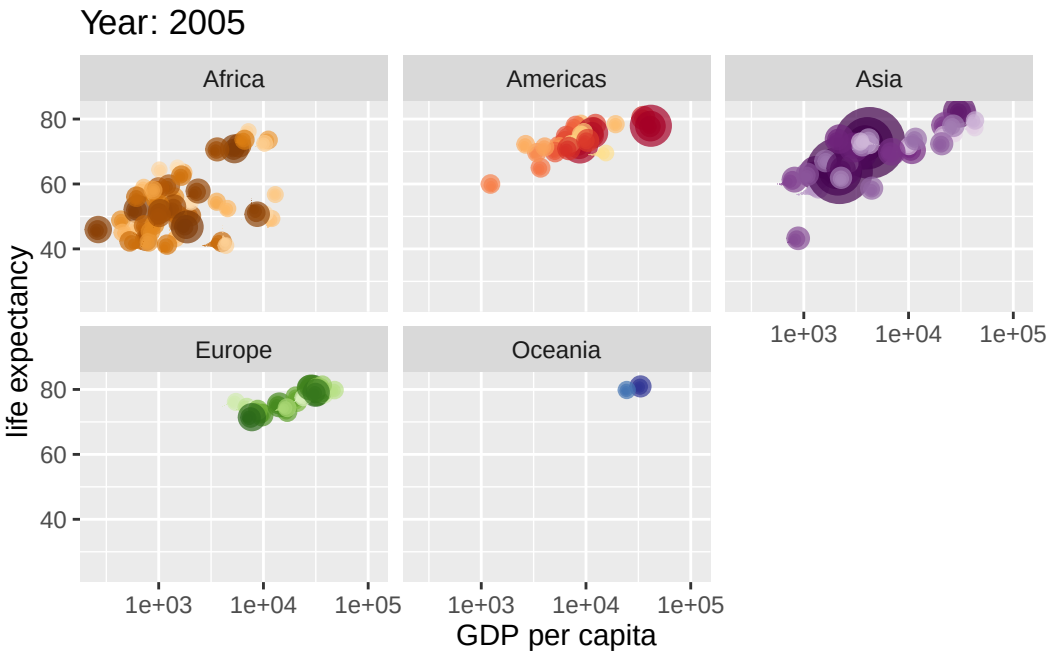
1e+03
1e+04
1e+05
GDP per capita


Year: 2005
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Asia
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Oceania
life expectancy
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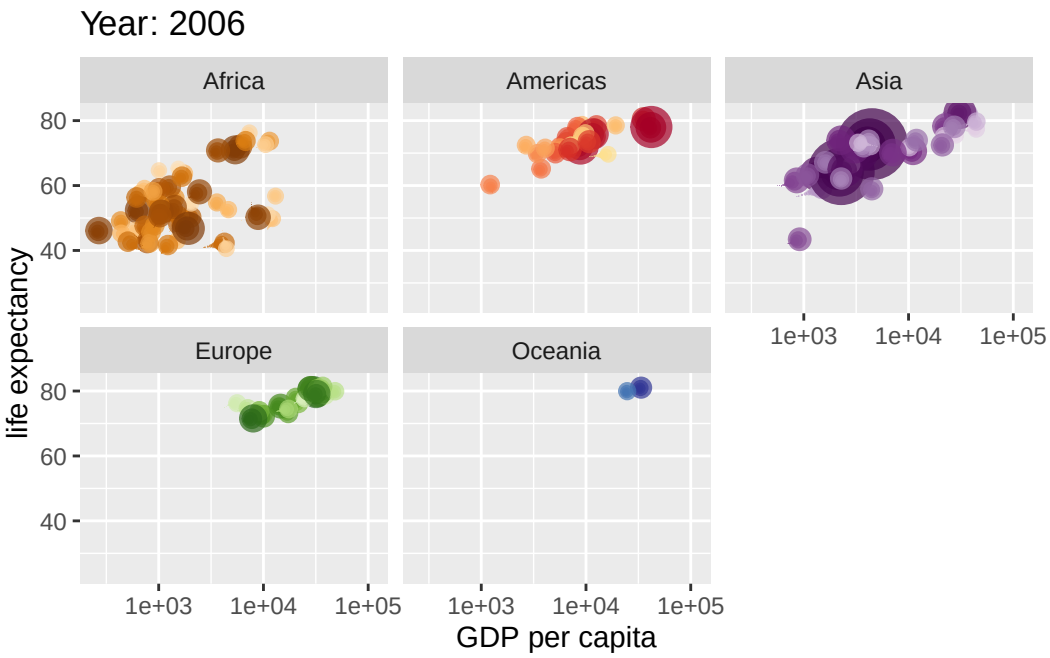
1e+03
1e+04
1e+05
GDP per capita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Asia
Europe
Oceania
life expectancy
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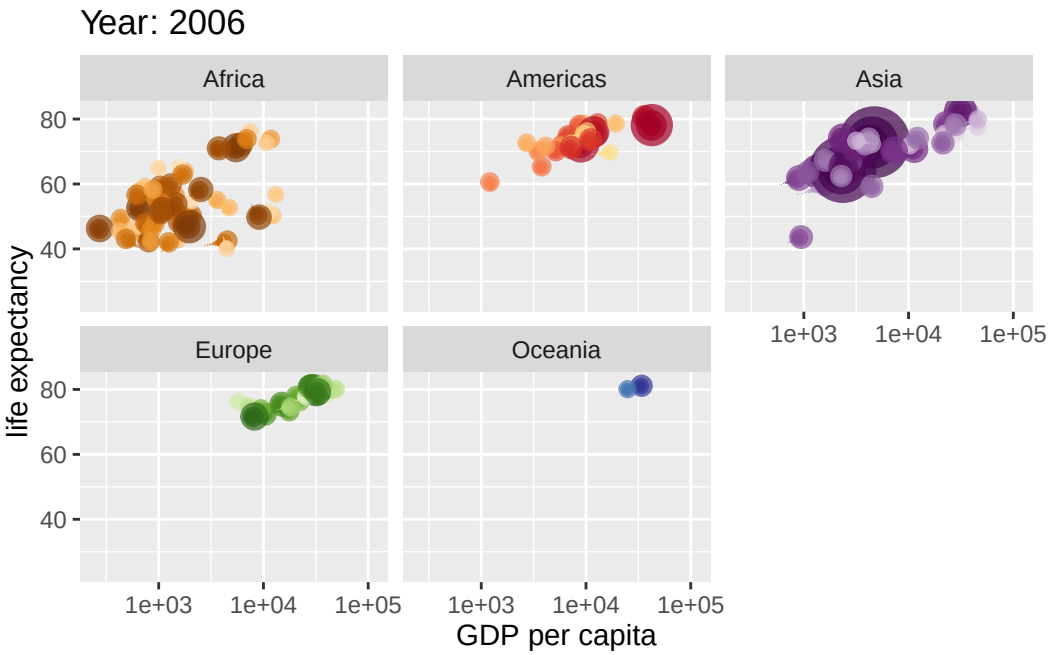
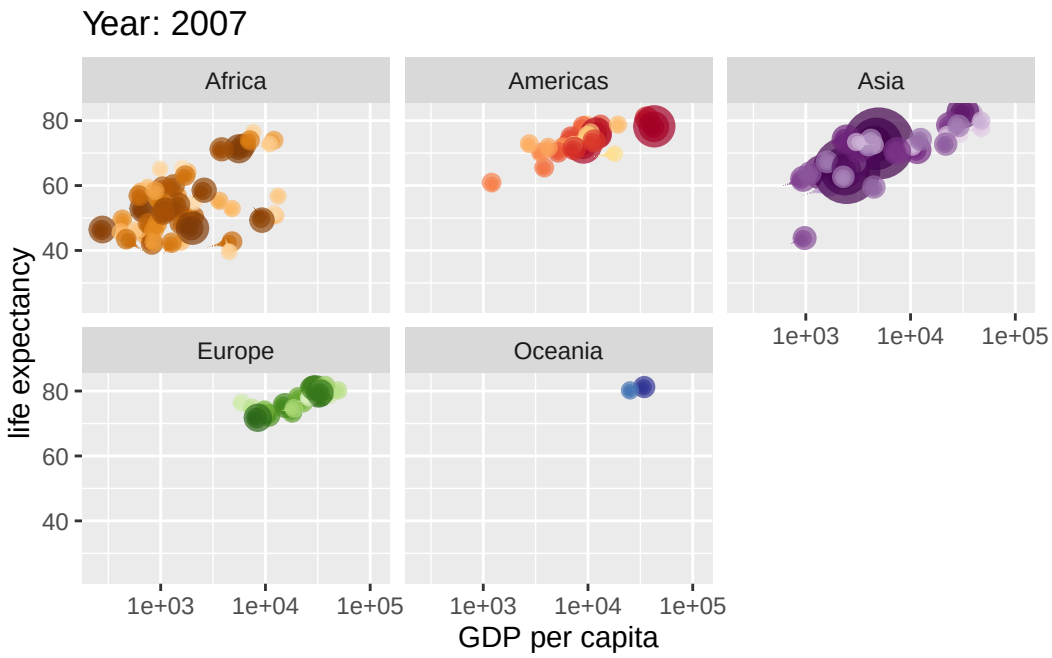
1e+04
1e+05
GDP per capita


Year: 2006
Africa
Americas
Asia
Europe
Oceania
life expectancy
80
60
40
1e+03
1e+04
1e+05
GDP per capita

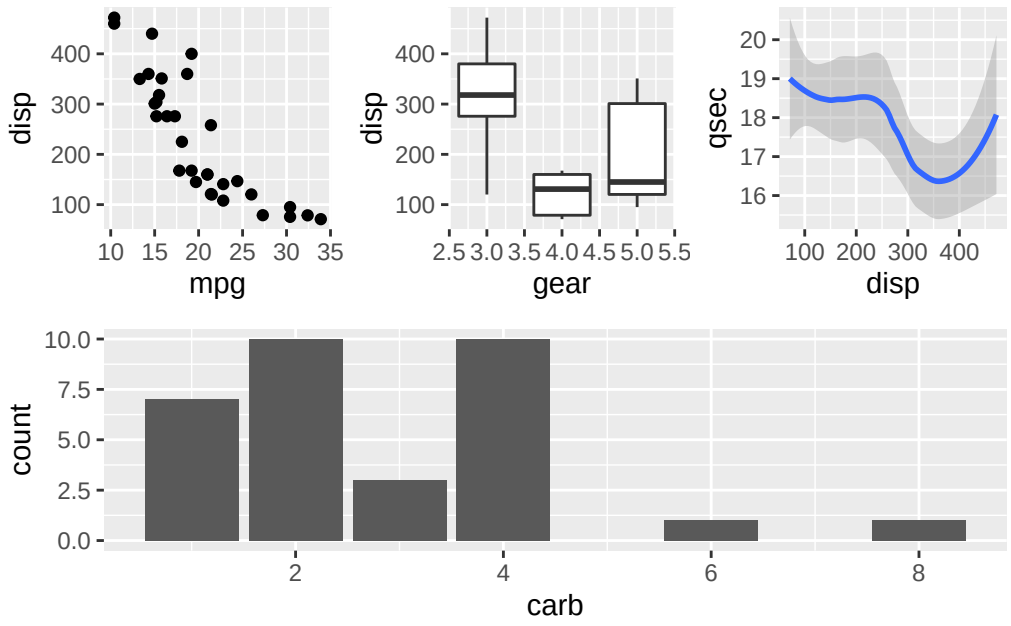



```
library(patchwork)

p1 <- ggplot(mtcars) + geom_point(aes(mpg, disp))
p2 <- ggplot(mtcars) + geom_boxplot(aes(gear, disp, group = gear))
p3 <- ggplot(mtcars) + geom_smooth(aes(disp, qsec))
p4 <- ggplot(mtcars) + geom_bar(aes(carb))

(p1 | p2 | p3) /
      p4
```

```
`geom_smooth()` using method = 'loess' and formula 'y ~ x'
```



Here is a level 1 head

Quarto

Quarto enables you to weave together content and executable code into a finished document. To learn more about Quarto see https://quarto.org.

Running Code

When you click the **Render** button a document will be generated that includes both content and the output of embedded code. You can embed code like this:

```
1 + 1
```

```
[1] 2
```

You can add options to executable code like this

```
[1] 4
```

The `echo: false` option disables the printing of code (only output is displayed).