

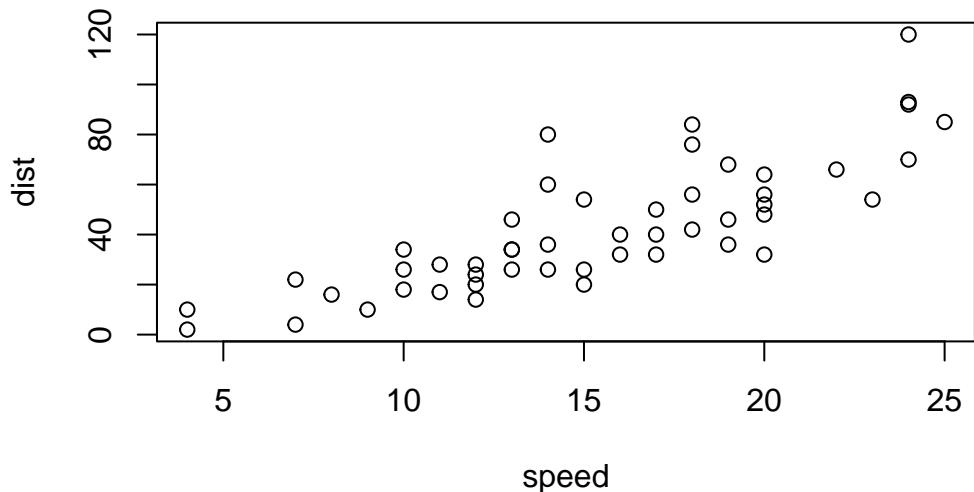
Class05

Ebru Robinson

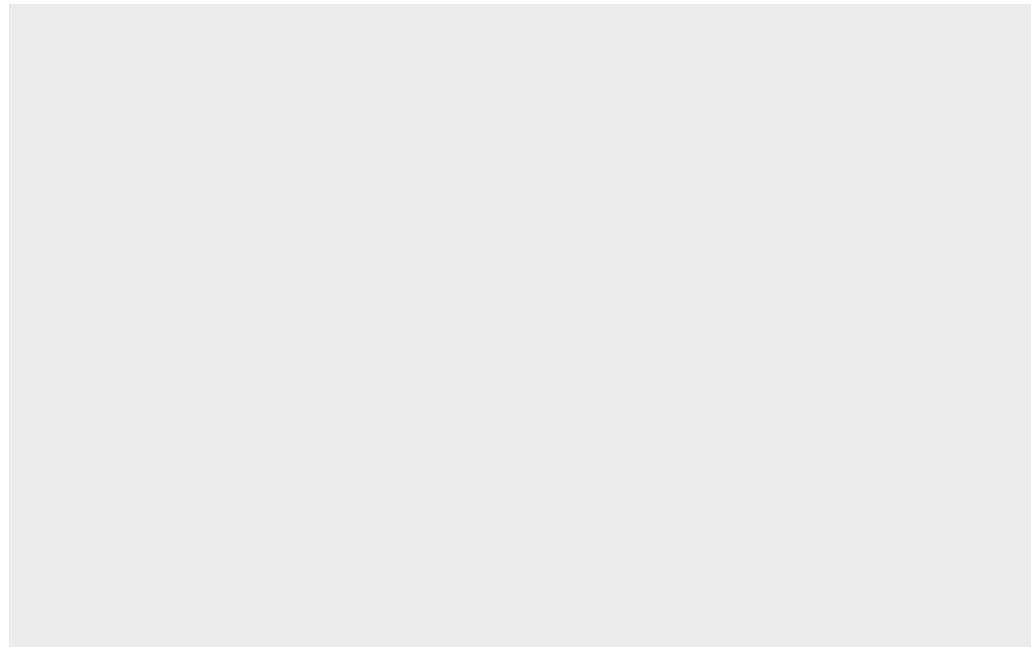
Table of contents

```
View(cars)
```

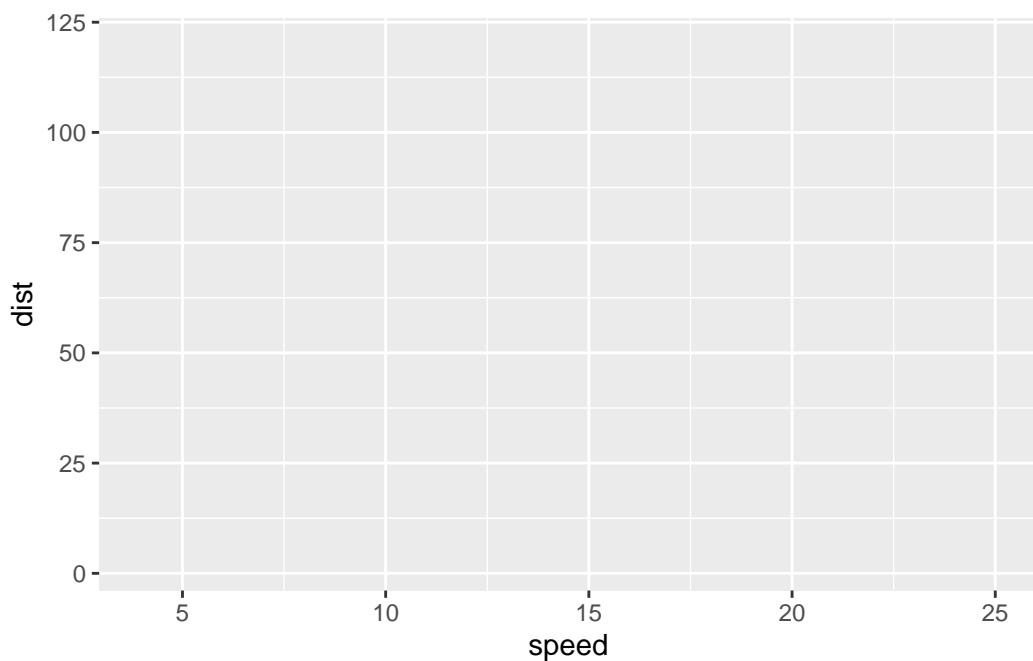
```
plot(cars)
```



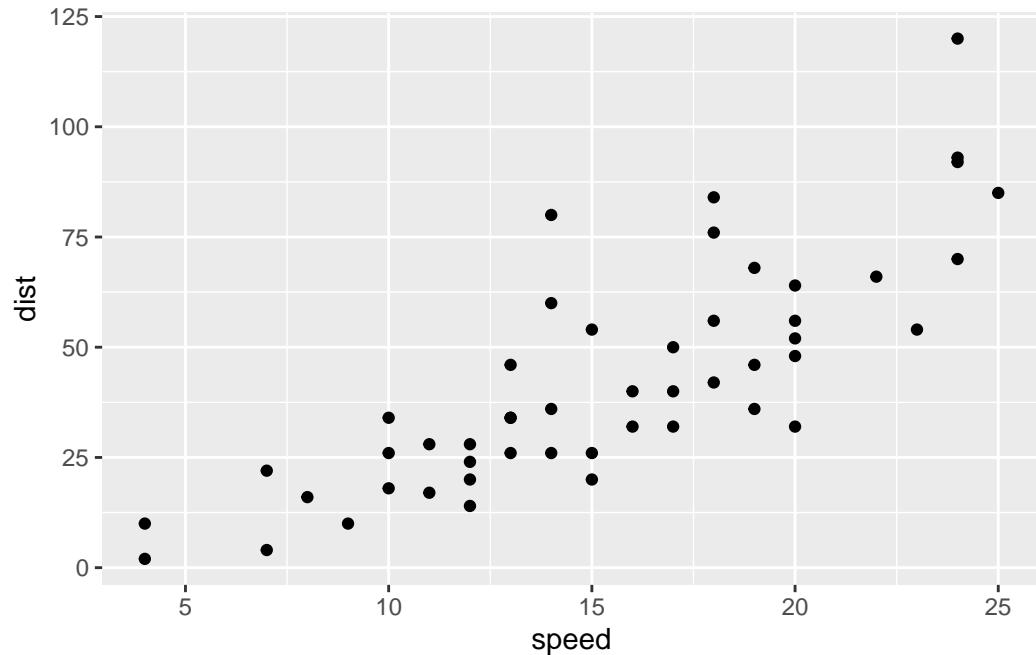
```
library(ggplot2)
ggplot(cars)
```



```
ggplot(cars) +  
  aes(x=speed, y=dist)
```



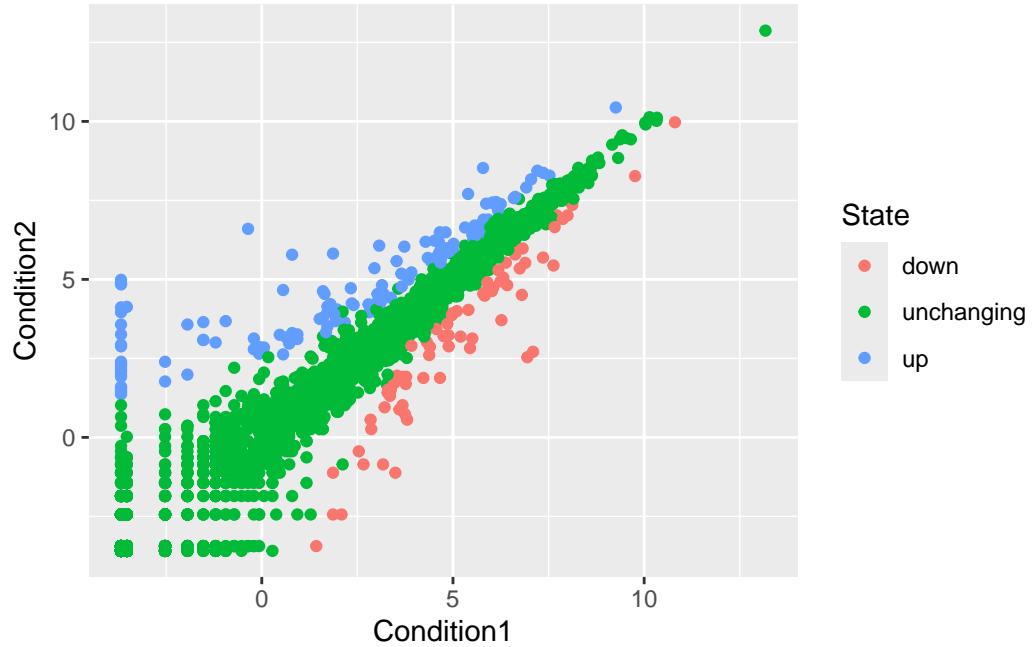
```
ggplot(cars) +
  aes(x=speed, y=dist) +
  geom_point()
```



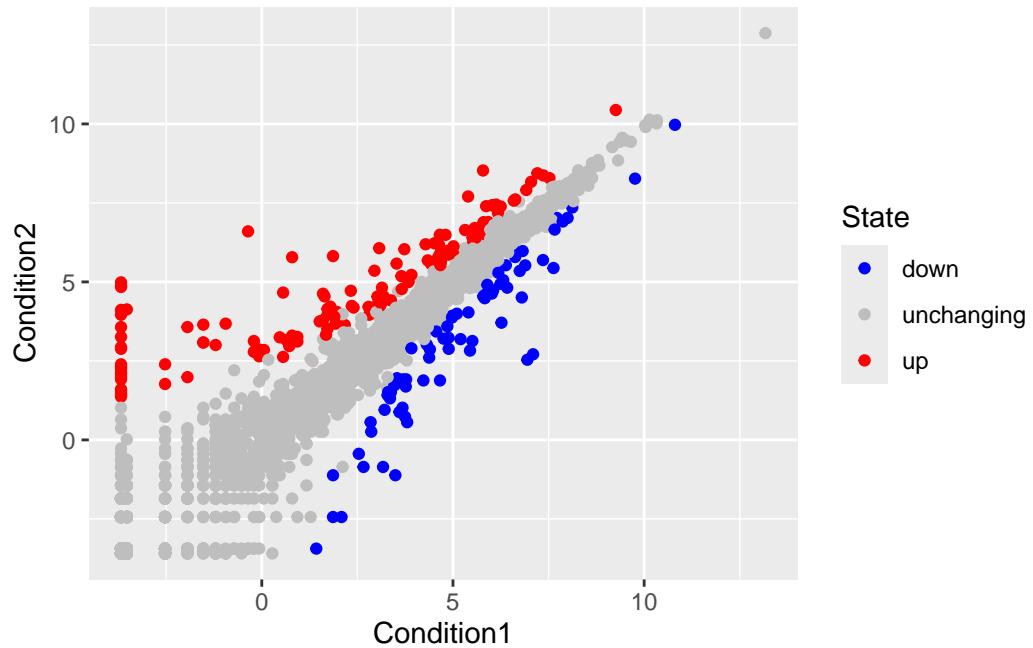
```
url <- "https://bioboot.github.io/bimm143_S20/class-material/up_down_expression.txt"
genes <- read.delim(url)
head(genes)
```

| | 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 |

```
p <- ggplot(genes) +
  aes(x=Condition1, y=Condition2, col=State) +
  geom_point()
p
```



```
p + scale_colour_manual( values=c("blue","gray","red") )
```



```
# File location online  
url <- "https://raw.githubusercontent.com/jennybc/gapminder/master/inst/extdata/gapminder.ts  
  
gapminder <- read.delim(url)
```

```
# install.packages("dplyr") ## un-comment to install if needed  
library(dplyr)
```

Attaching package: 'dplyr'

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

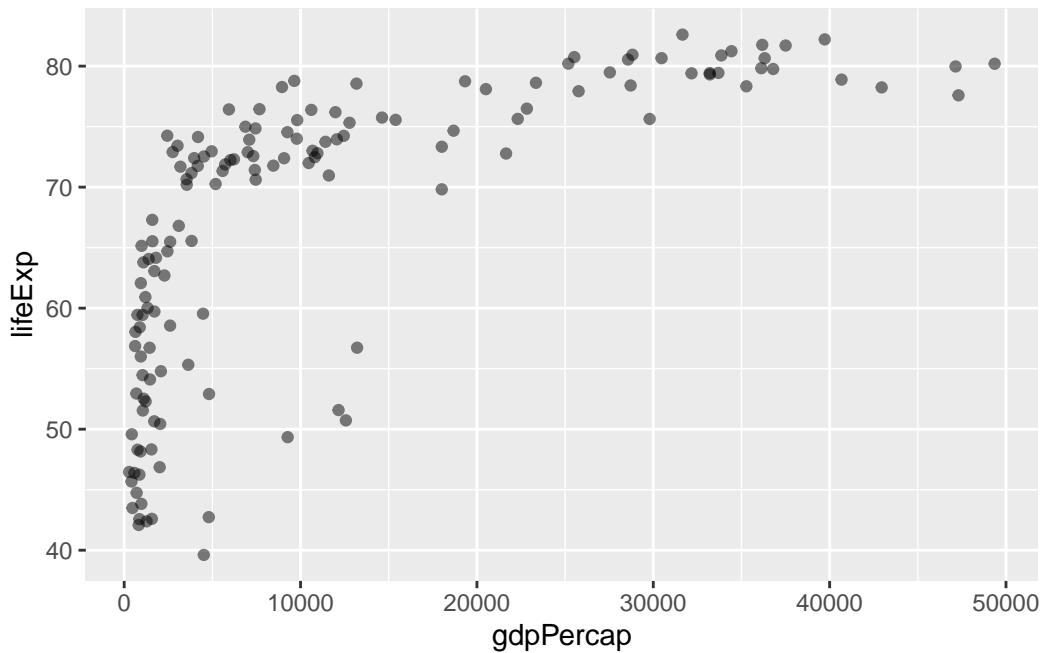
filter, lag

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

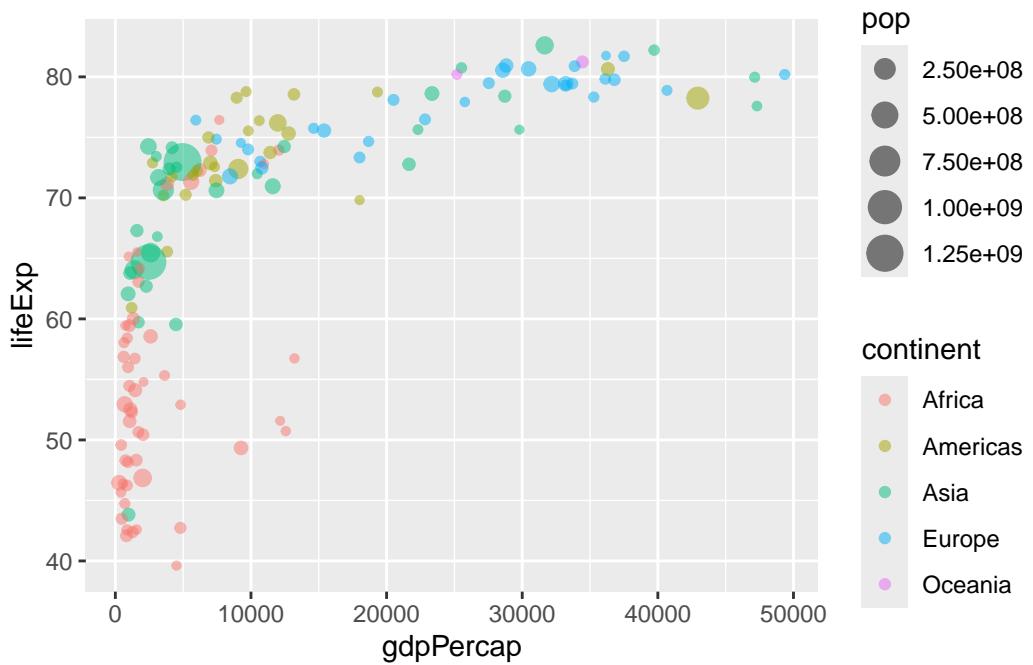
intersect, setdiff, setequal, union

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

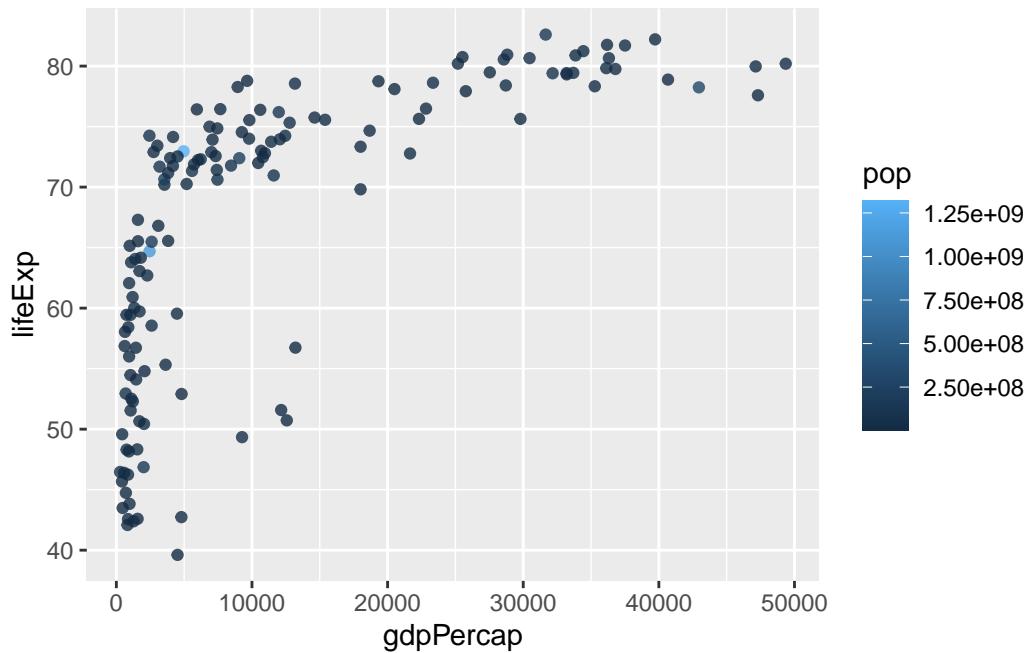
```
ggplot(gapminder_2007) +  
  aes(x=gdpPercap, y=lifeExp) +  
  geom_point(alpha=0.5)
```



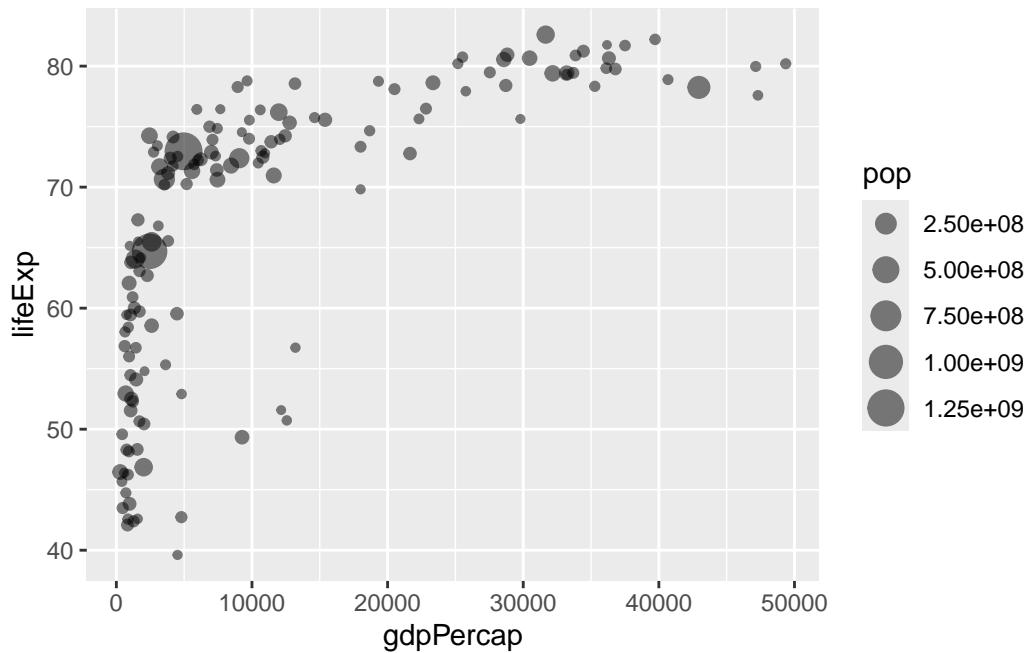
```
ggplot(gapminder_2007) +
  aes(x=gdpPercap, y=lifeExp, color=continent, size=pop) +
  geom_point(alpha=0.5)
```



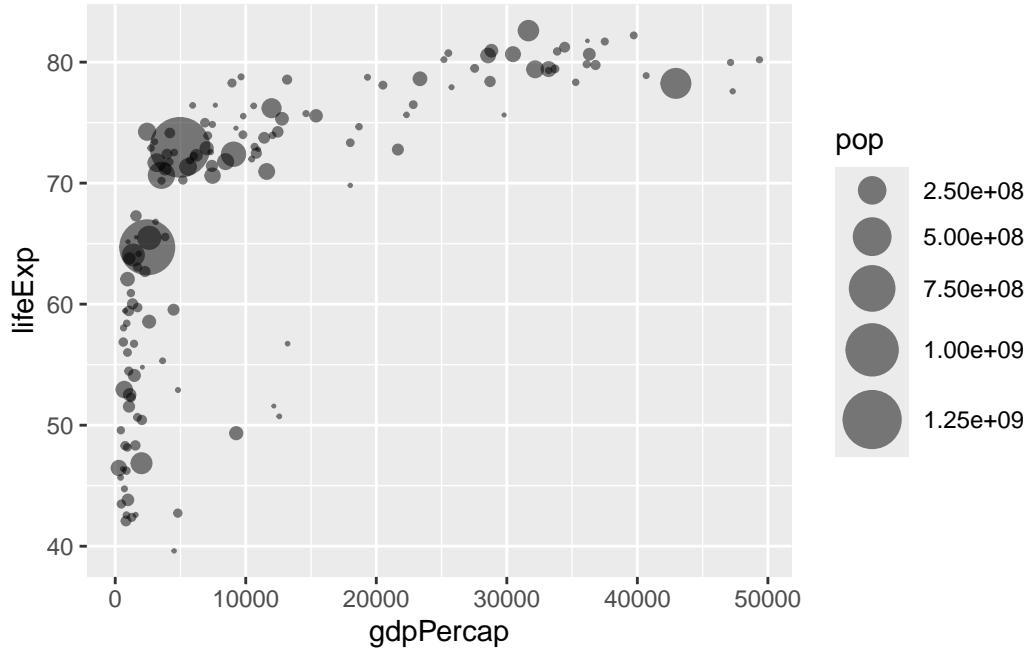
```
ggplot(gapminder_2007) +  
  aes(x = gdpPercap, y = lifeExp, color = pop) +  
  geom_point(alpha=0.8)
```



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



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

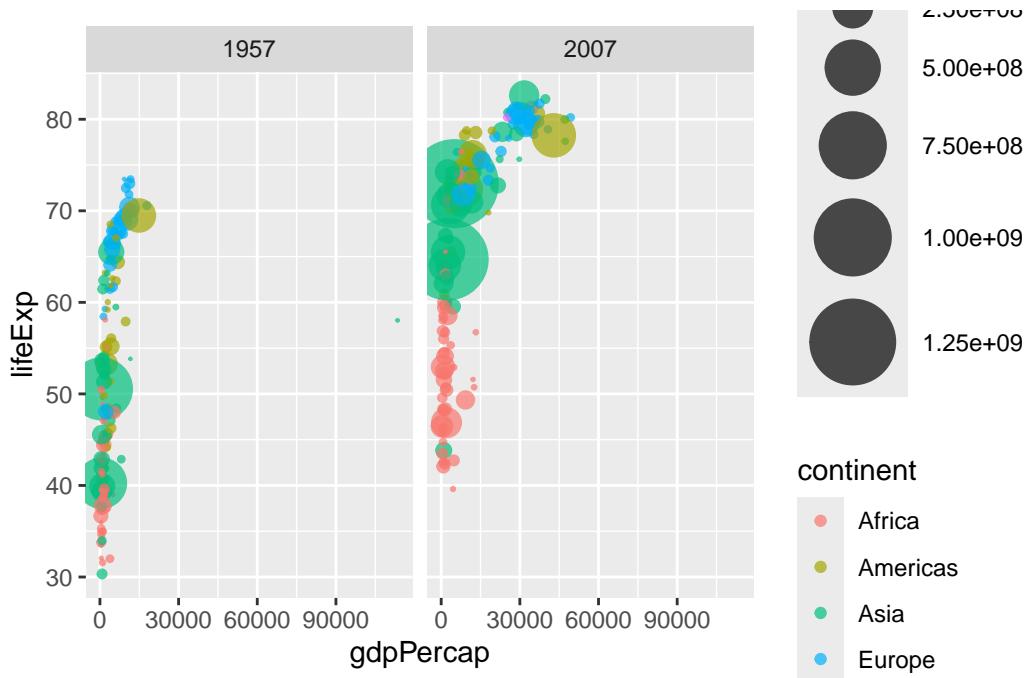


```

gapminder_1957_2007 <- gapminder %>%
  filter(year %in% c(1957, 2007))

ggplot(gapminder_1957_2007) +
  geom_point(aes(x = gdpPercap,
                 y = lifeExp,
                 color = continent,
                 size = pop),
             alpha = 0.7) +
  scale_size_area(max_size = 15) +
  facet_wrap(~year)

```

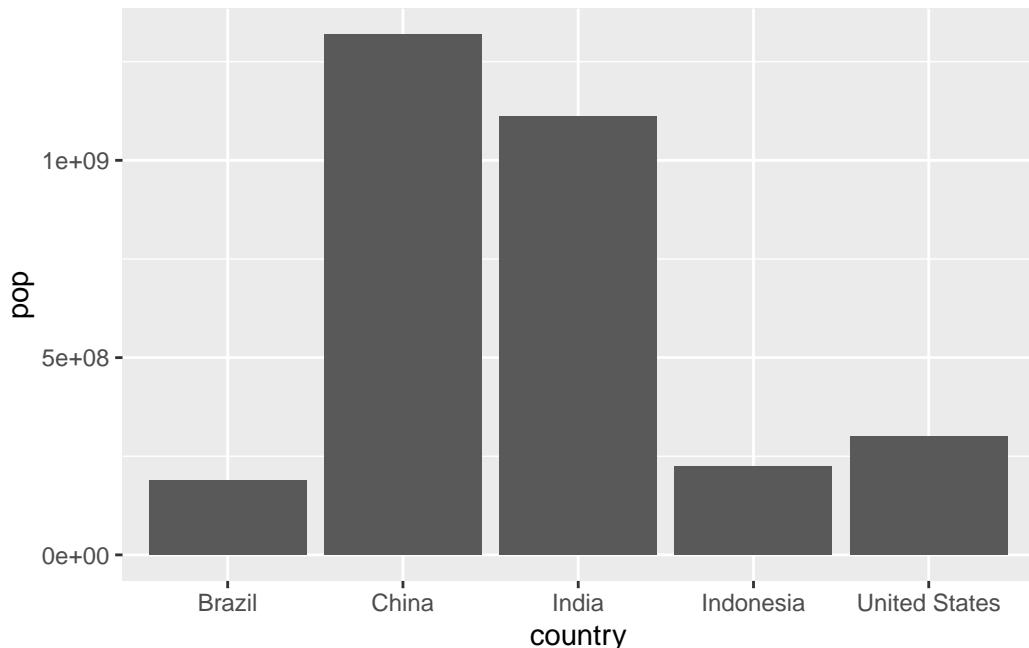


```
gapminder_top5 <- gapminder %>%
  filter(year==2007) %>%
  arrange(desc(pop)) %>%
  top_n(5, pop)

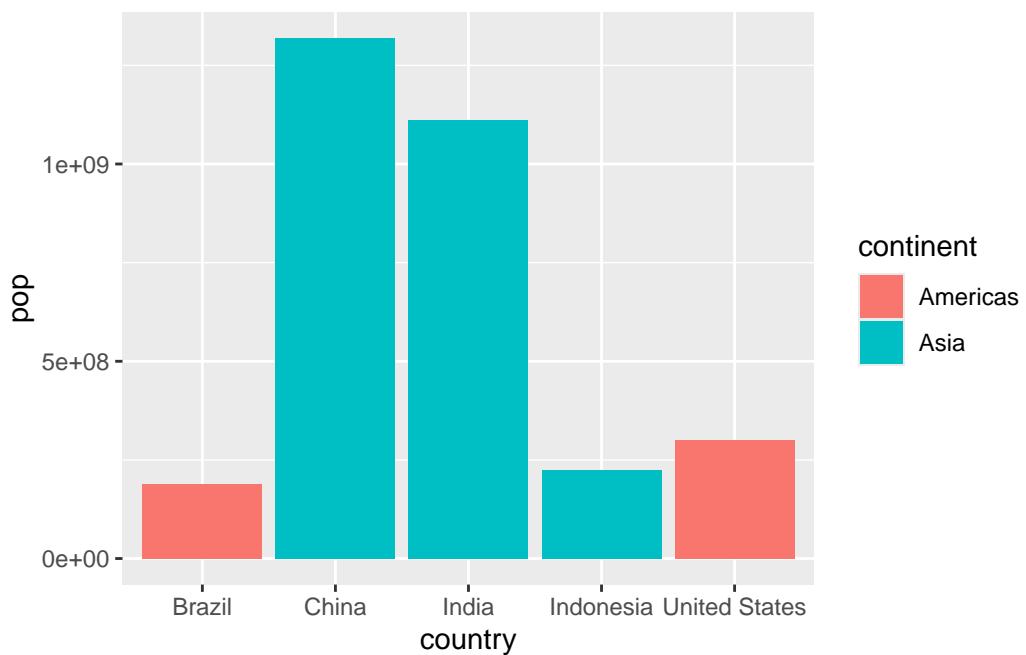
gapminder_top5
```

| | country | continent | year | lifeExp | pop | gdpPercap |
|---|---------------|-----------|------|---------|------------|-----------|
| 1 | China | Asia | 2007 | 72.961 | 1318683096 | 4959.115 |
| 2 | India | Asia | 2007 | 64.698 | 1110396331 | 2452.210 |
| 3 | United States | Americas | 2007 | 78.242 | 301139947 | 42951.653 |
| 4 | Indonesia | Asia | 2007 | 70.650 | 223547000 | 3540.652 |
| 5 | Brazil | Americas | 2007 | 72.390 | 190010647 | 9065.801 |

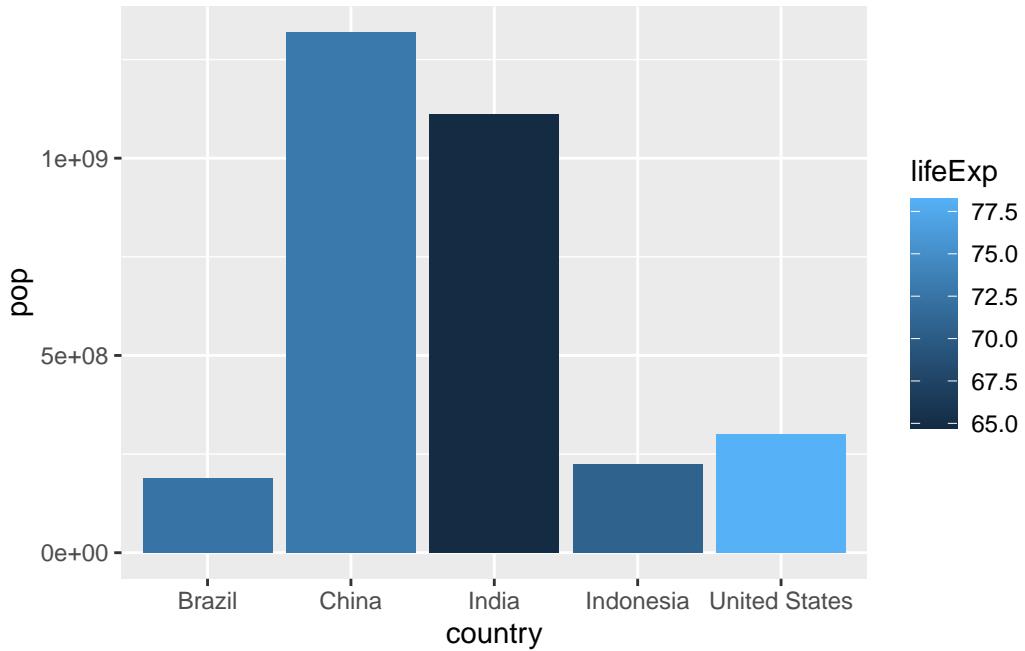
```
ggplot(gapminder_top5) +
  geom_col(aes(x = country, y = pop))
```



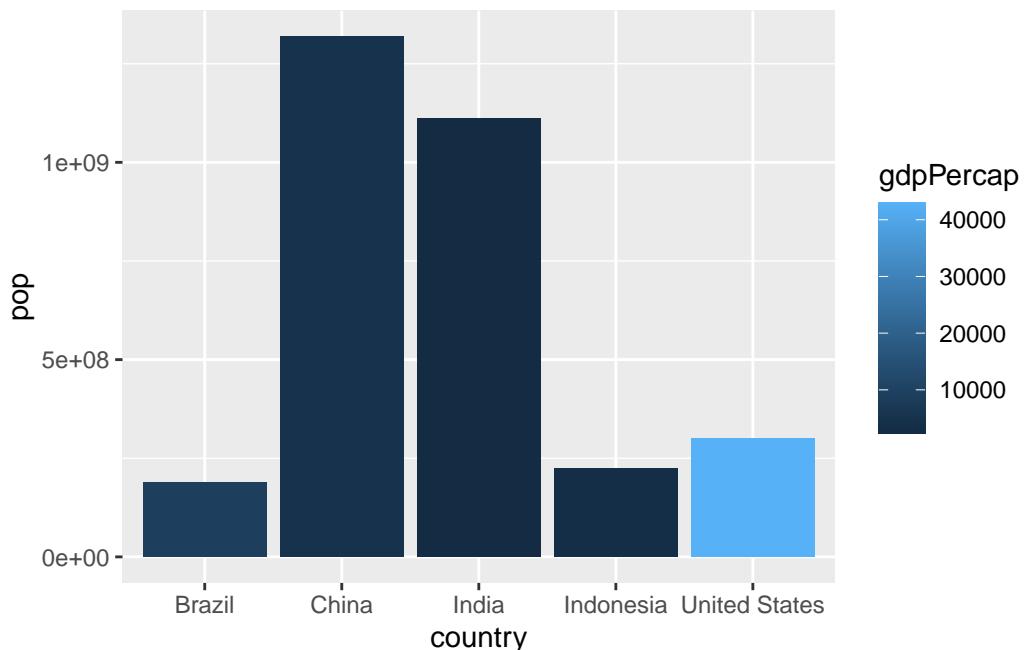
```
ggplot(gapminder_top5) +  
  geom_col(aes(x = country, y = pop, fill = continent))
```



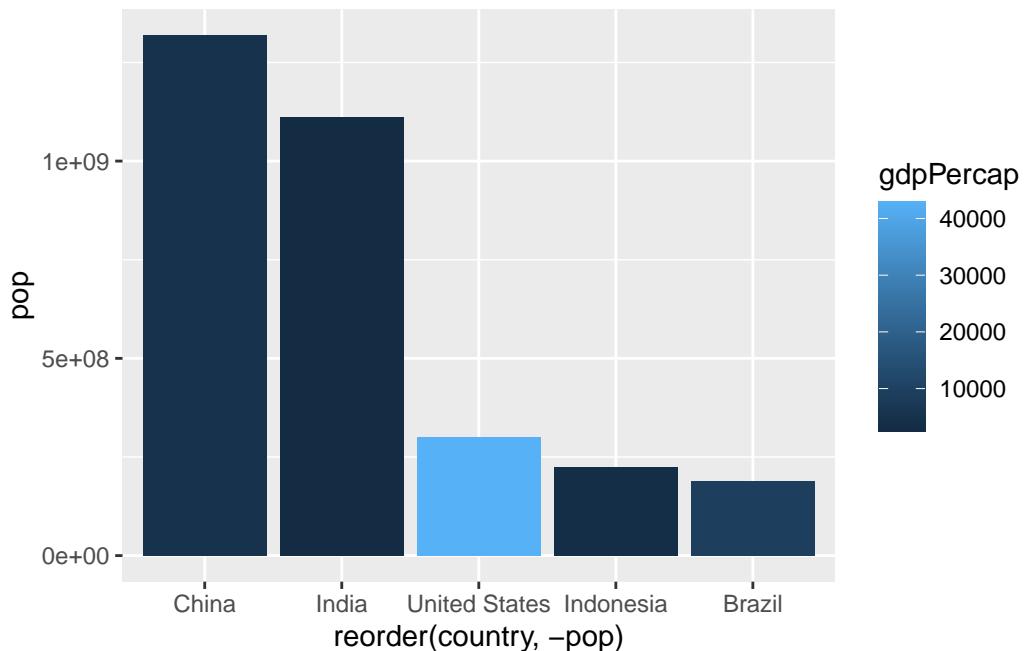
```
ggplot(gapminder_top5) +  
  geom_col(aes(x = country, y = pop, fill = lifeExp))
```



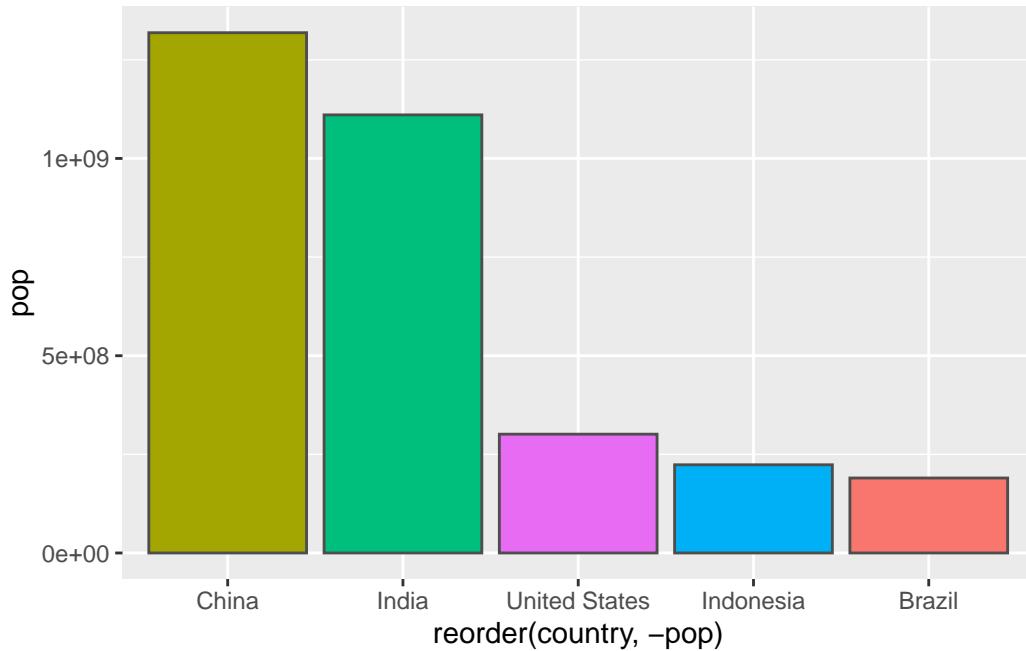
```
ggplot(gapminder_top5) +  
  aes(x=country, y=pop, fill=gdpPercap) +  
  geom_col()
```



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



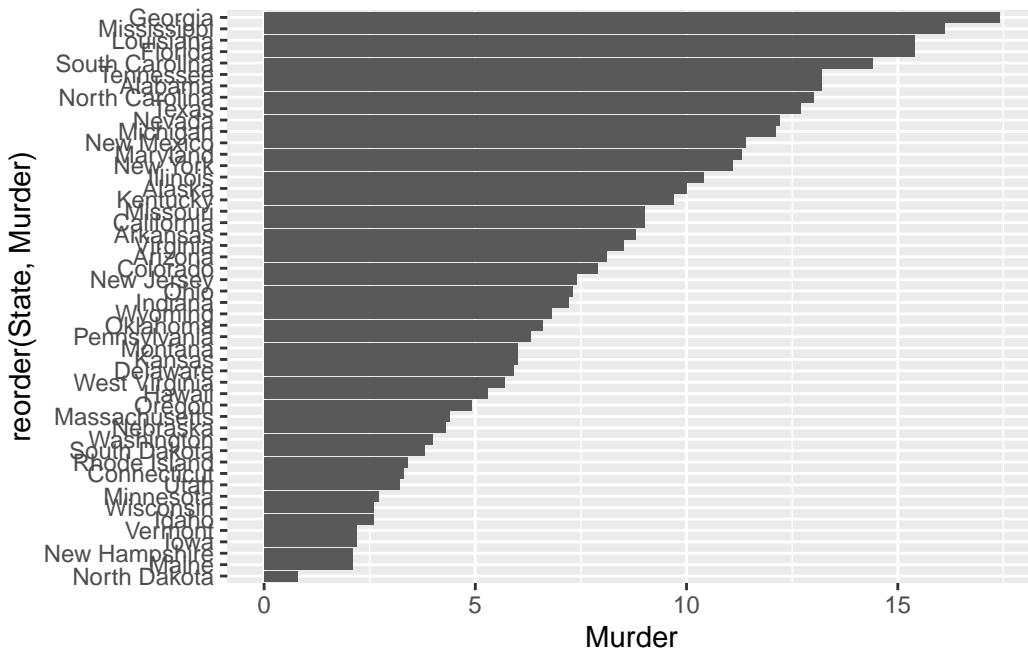
```
ggplot(gapminder_top5) +
  aes(x=reorder(country, -pop), y=pop, fill=country) +
  geom_col(col="gray30") +
  guides(fill="none")
```



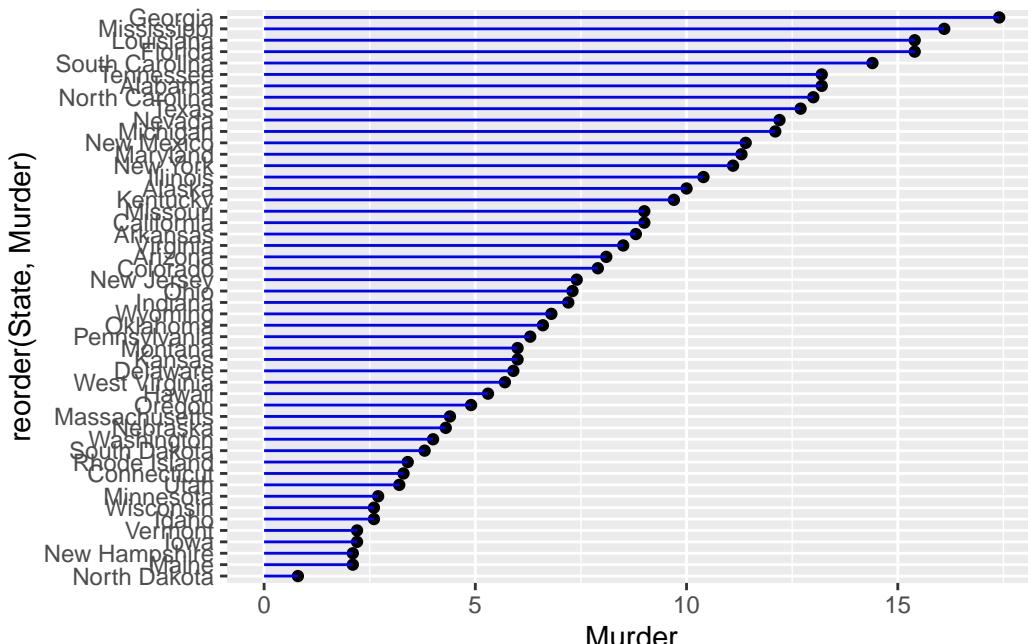
```
head(USAArrests)
```

| | 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 |

```
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), color="blue") + coord_flip()
```



```
library(gapminder)
```

```
Attaching package: 'gapminder'
```

```
The following object is masked _by_ '.GlobalEnv':
```

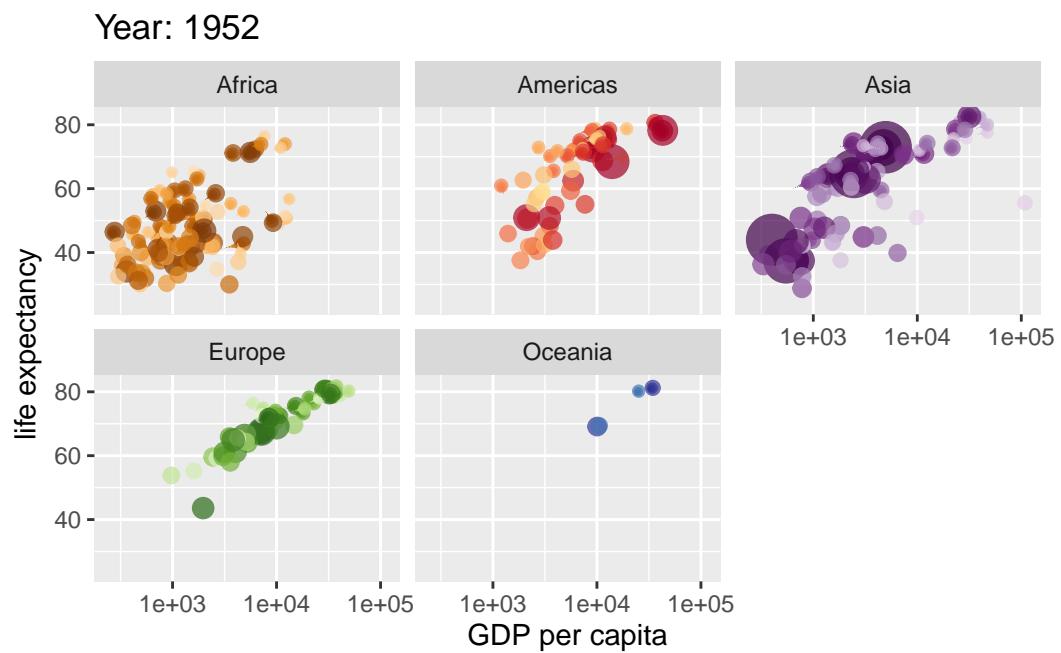
```
gapminder
```

```
library(gganimate)

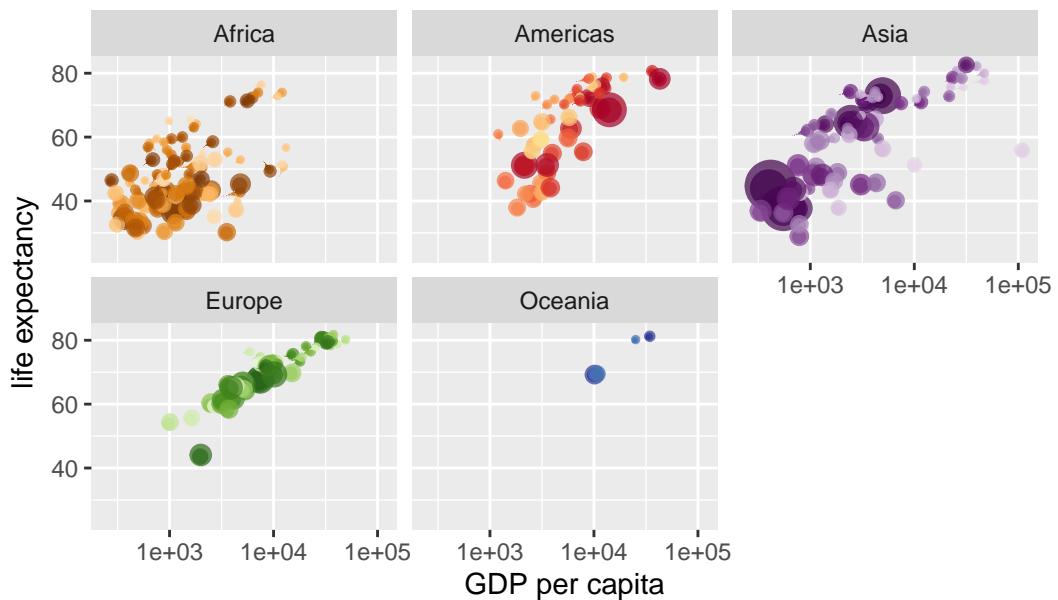
# Setup nice regular ggplot of the gapminder data
ggplot(gapminder, aes(gdpPercap, lifeExp, size = pop, colour = country)) +
  geom_point(alpha = 0.7, show.legend = FALSE) +
  scale_colour_manual(values = country_colors) +
  scale_size(range = c(2, 12)) +
  scale_x_log10() +
  # Facet by continent
  facet_wrap(~continent) +
  # Here comes the gganimate specific bits
  labs(title = 'Year: {frame_time}', x = 'GDP per capita', y = 'life expectancy') +
```

```
transition_time(year) +  
shadow_wake(wake_length = 0.1, alpha = FALSE)
```

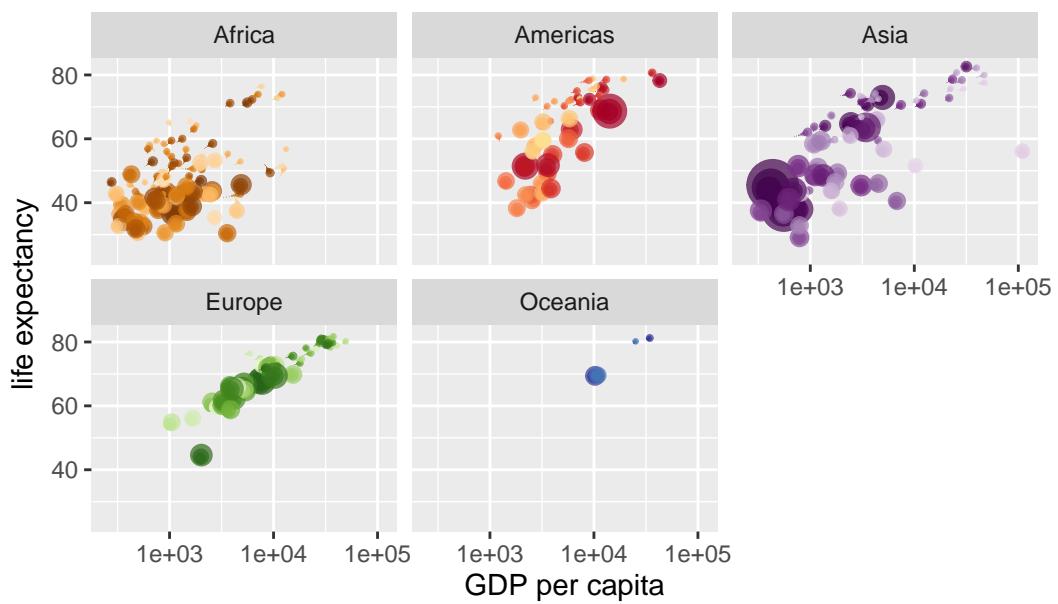
Warning in formals(fun): argument is not a function



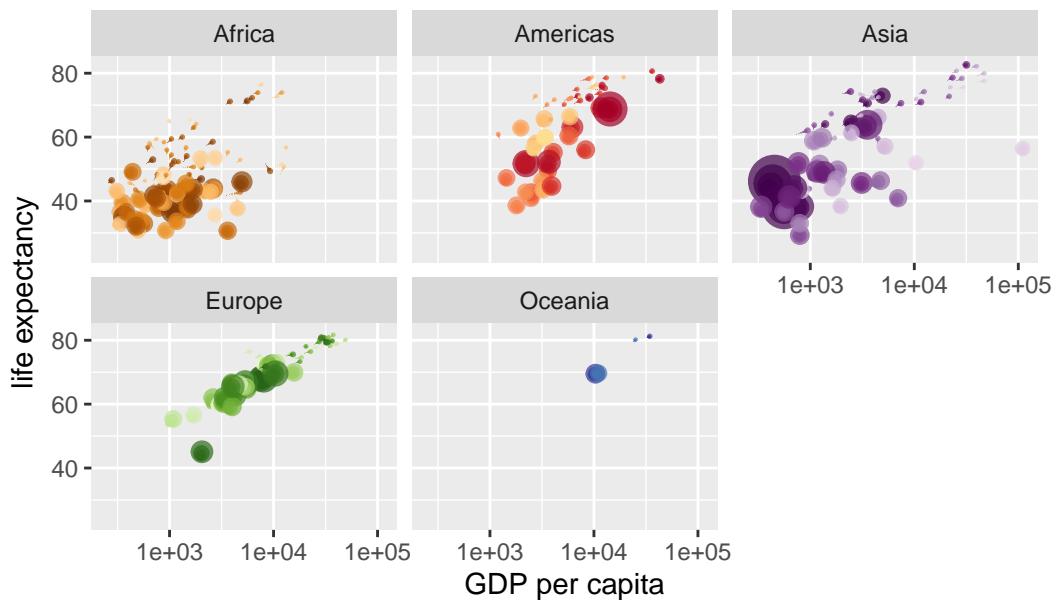
Year: 1953



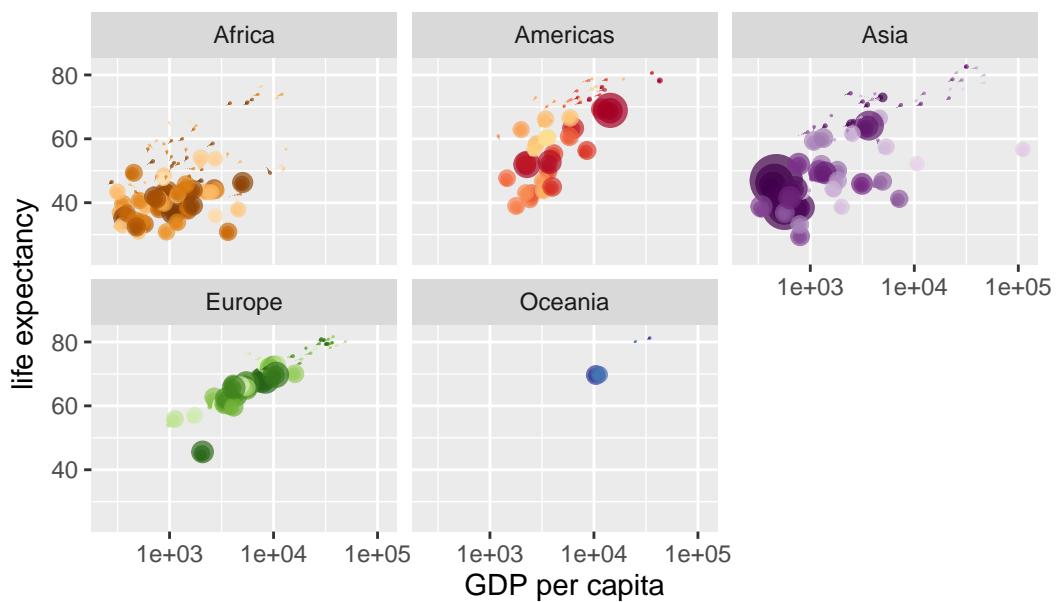
Year: 1953



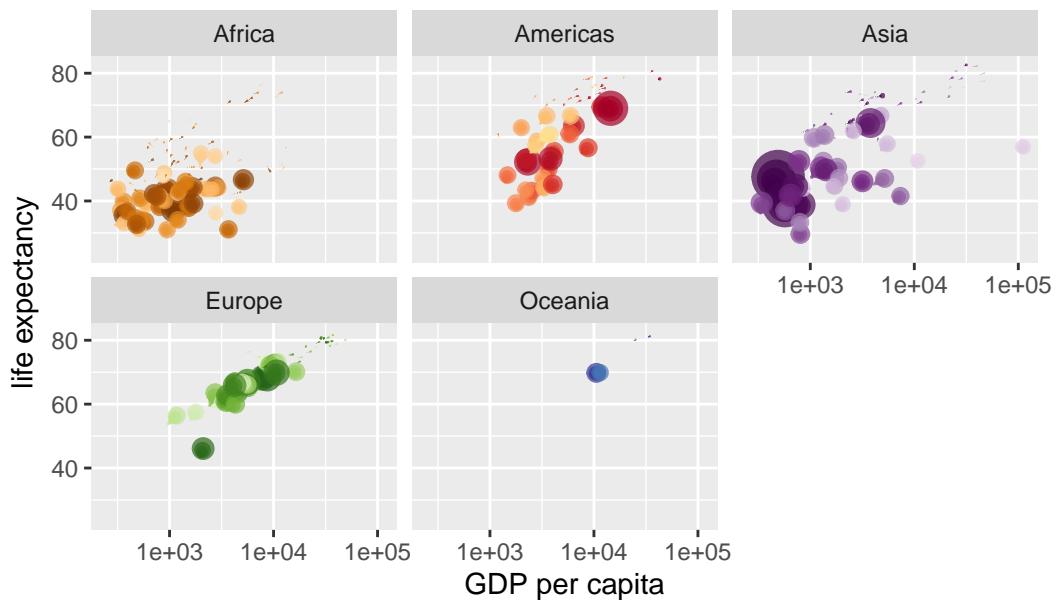
Year: 1954



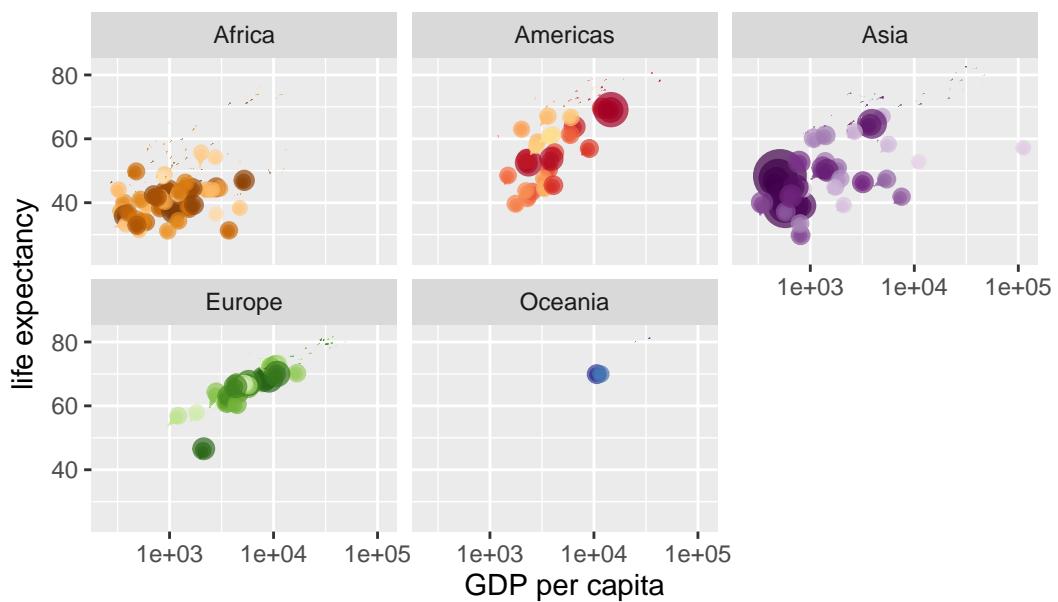
Year: 1954



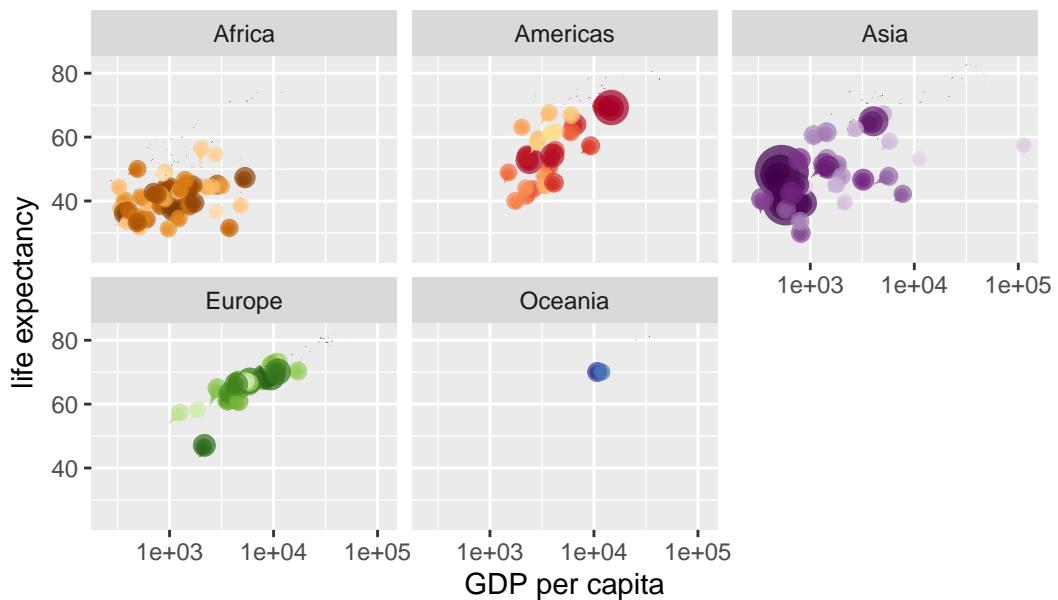
Year: 1955



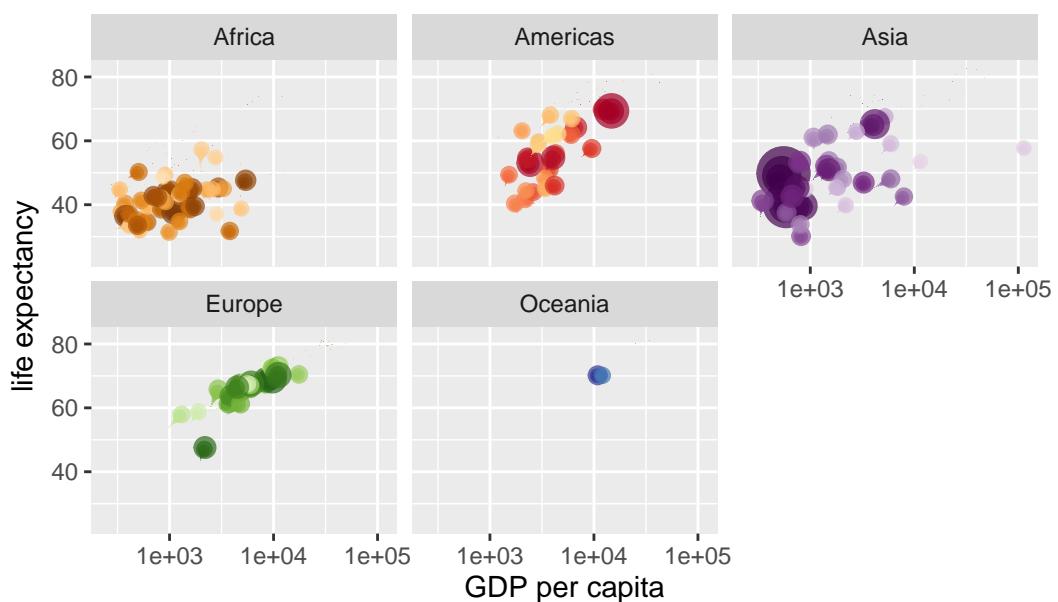
Year: 1955



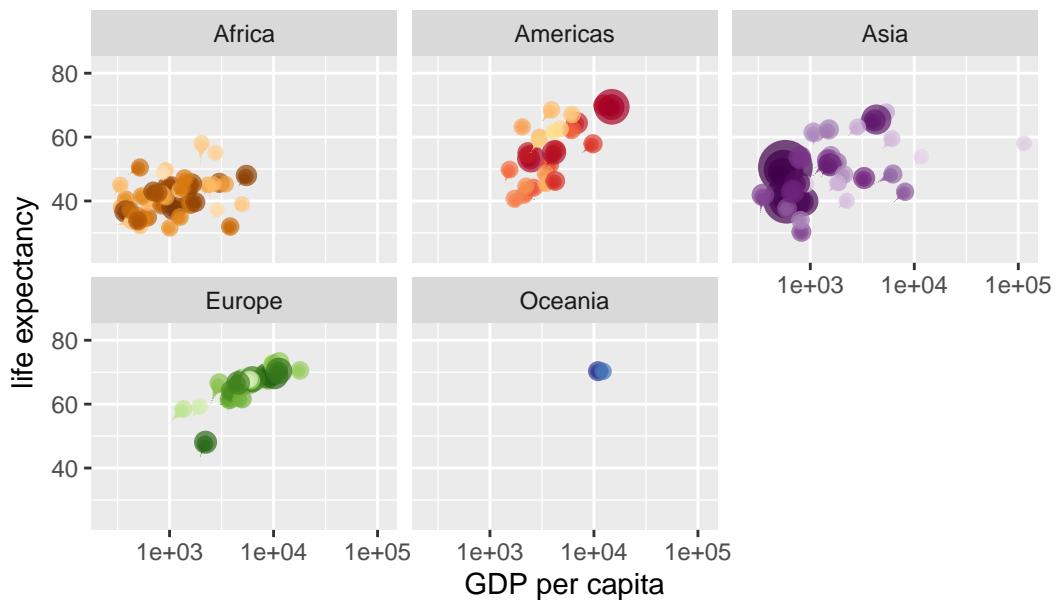
Year: 1956



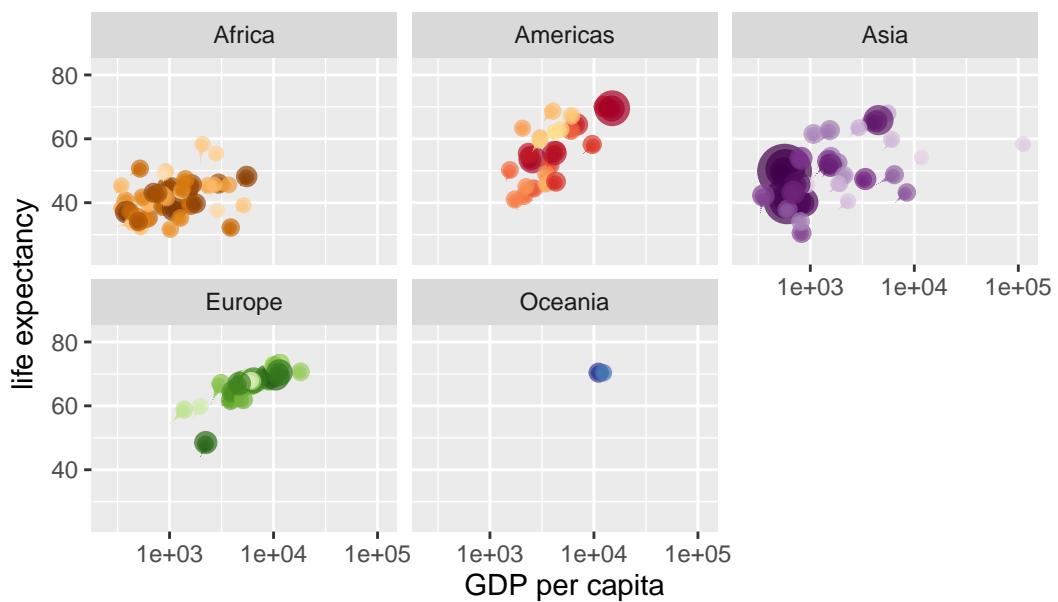
Year: 1956



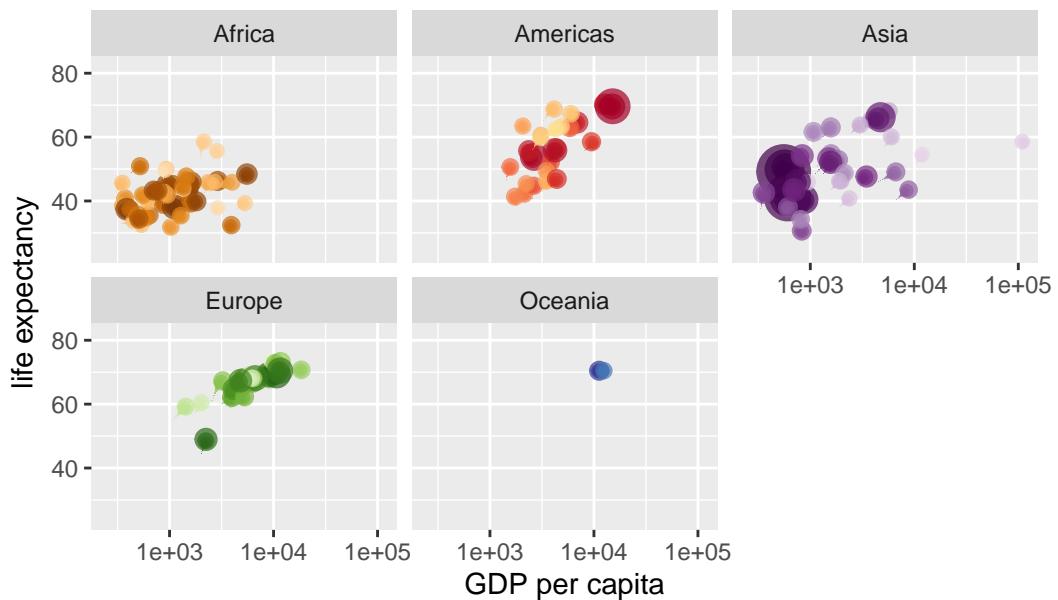
Year: 1957



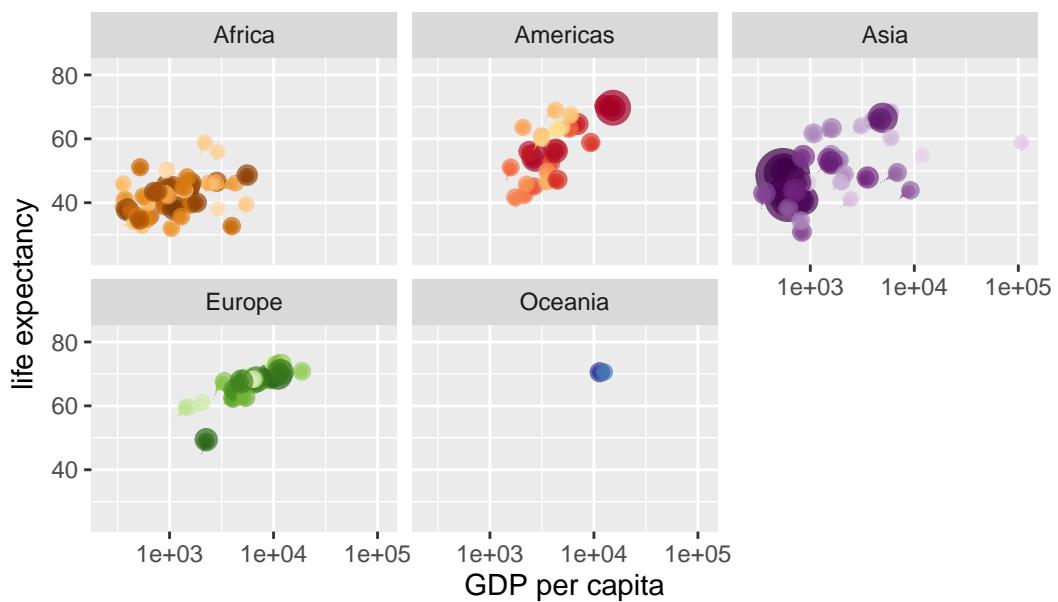
Year: 1958



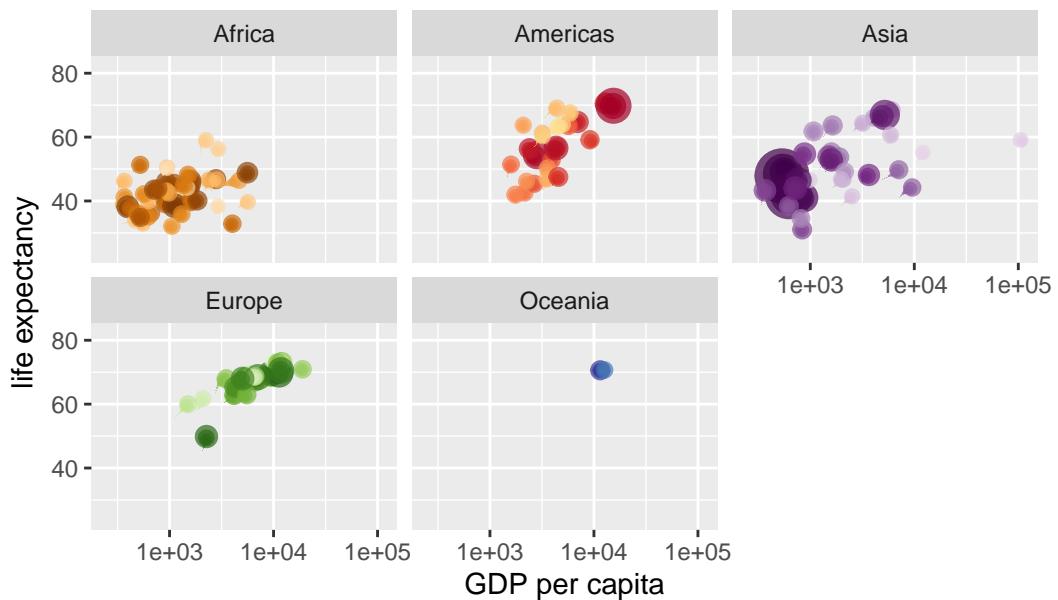
Year: 1958



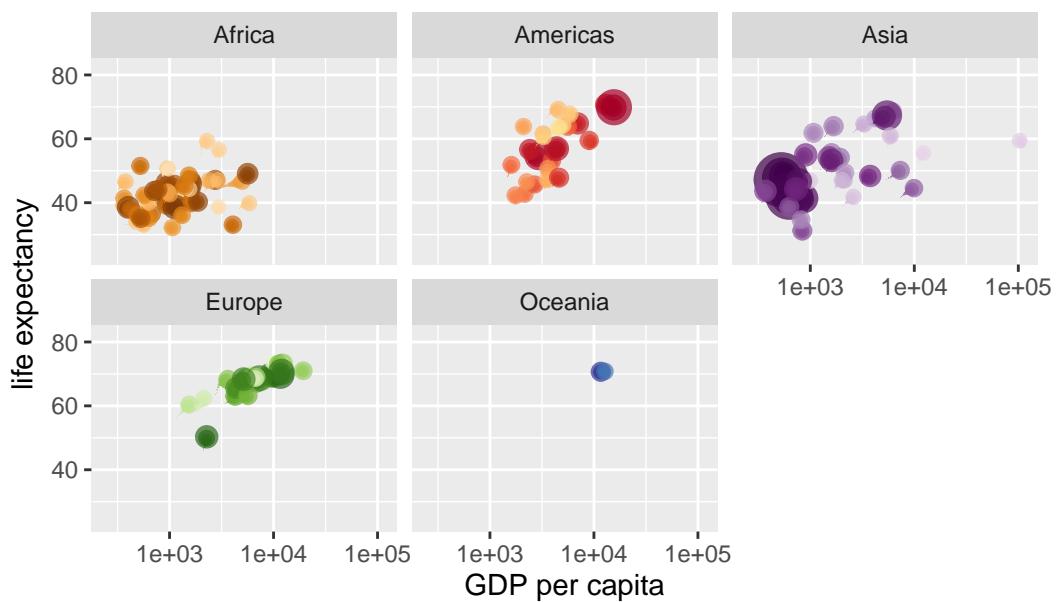
Year: 1959



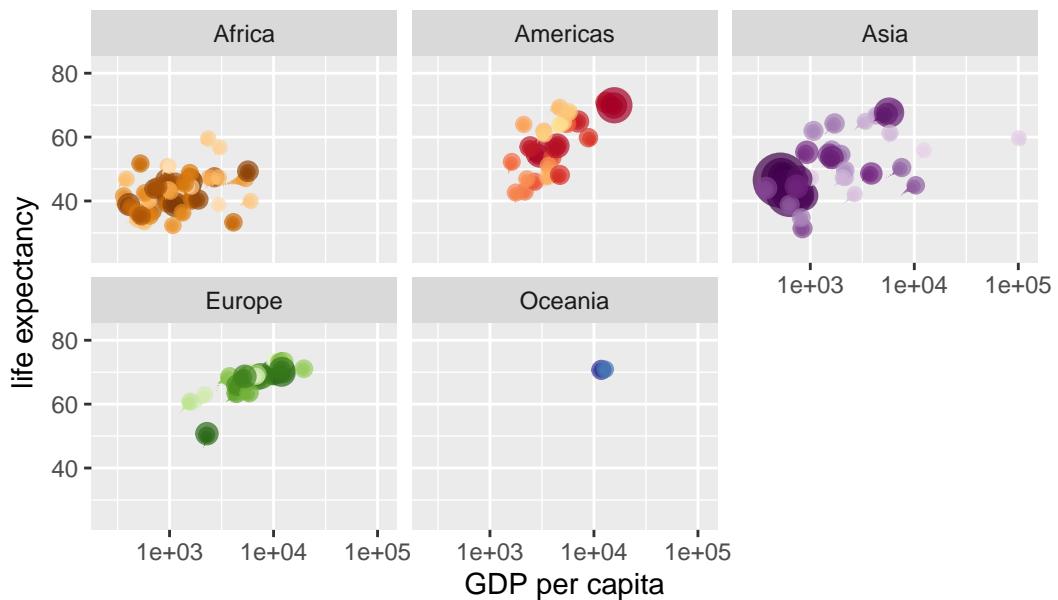
Year: 1959



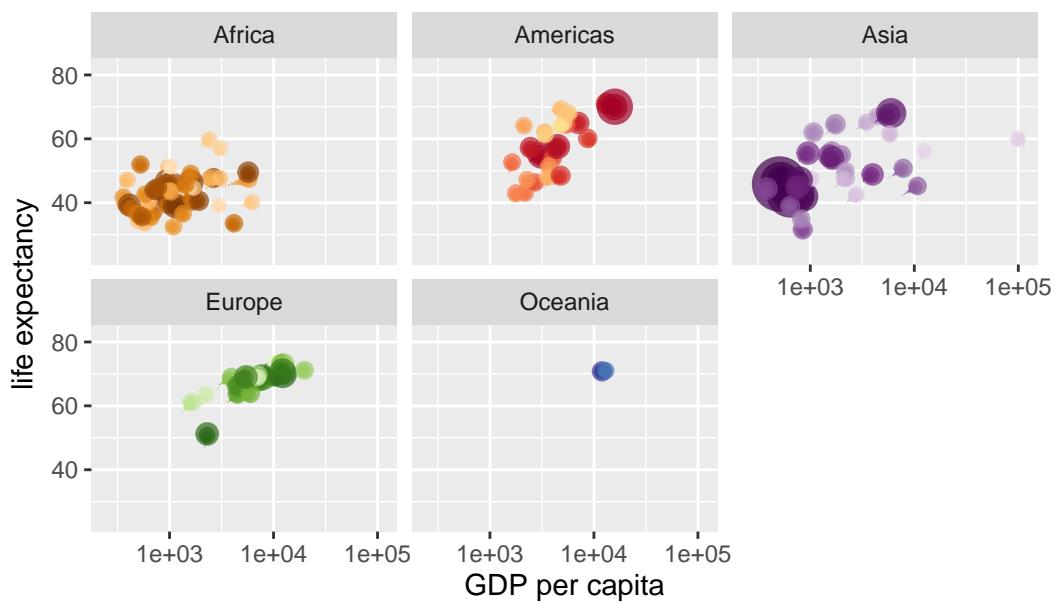
Year: 1960



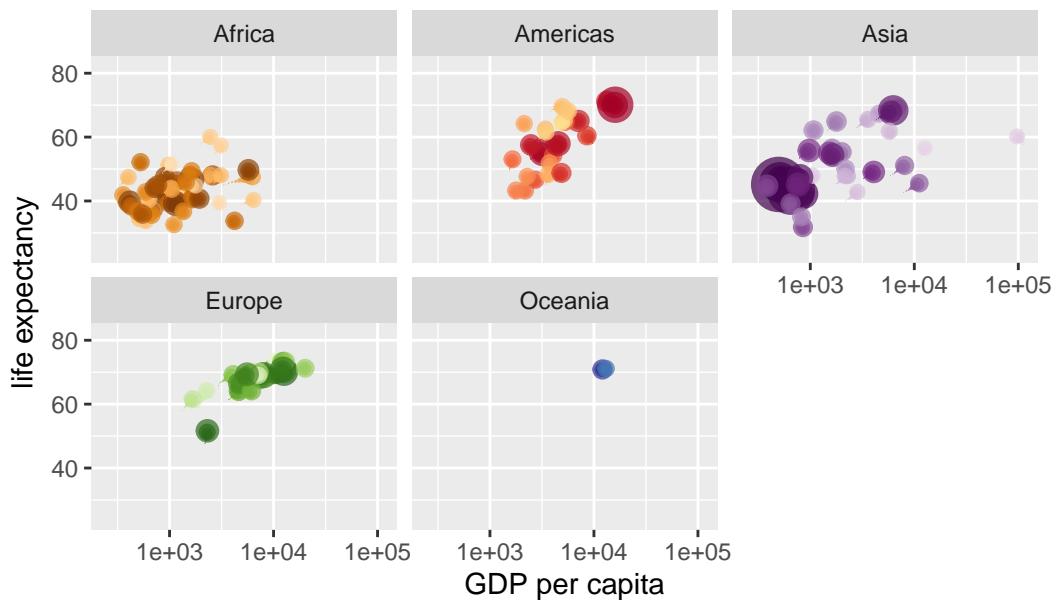
Year: 1960



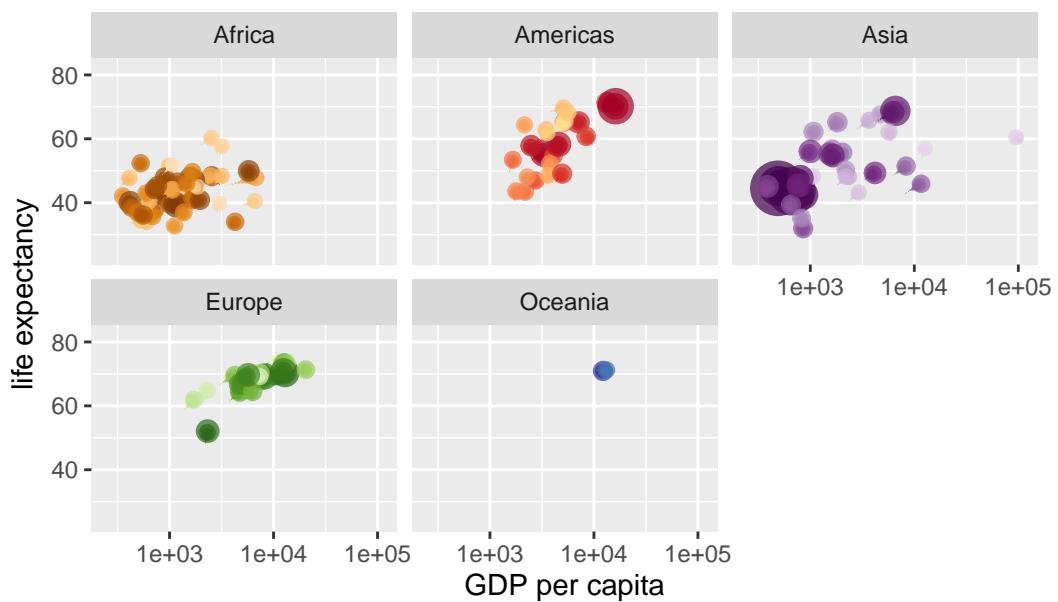
Year: 1961



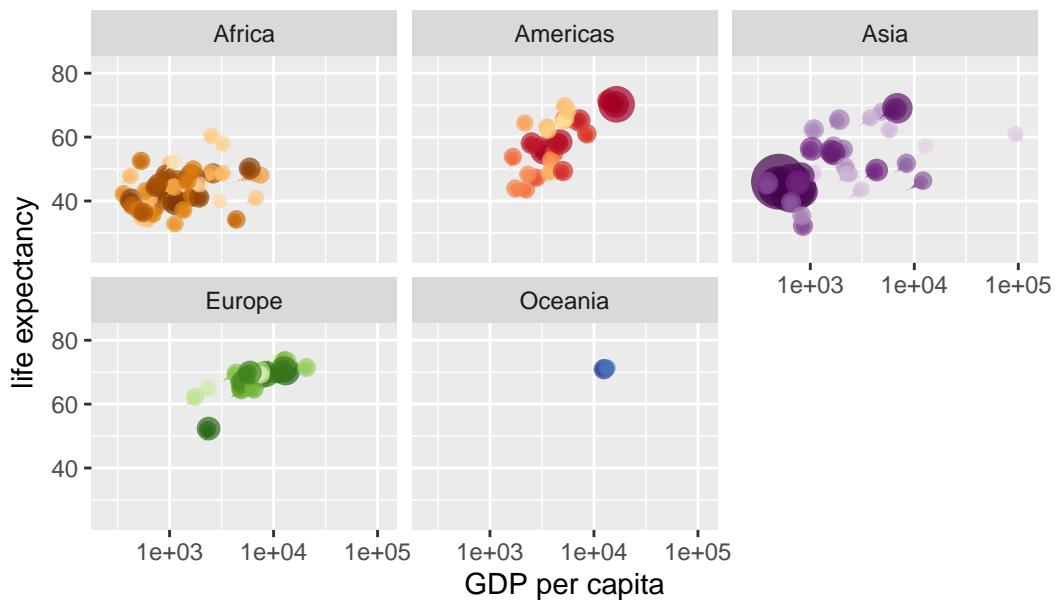
Year: 1961



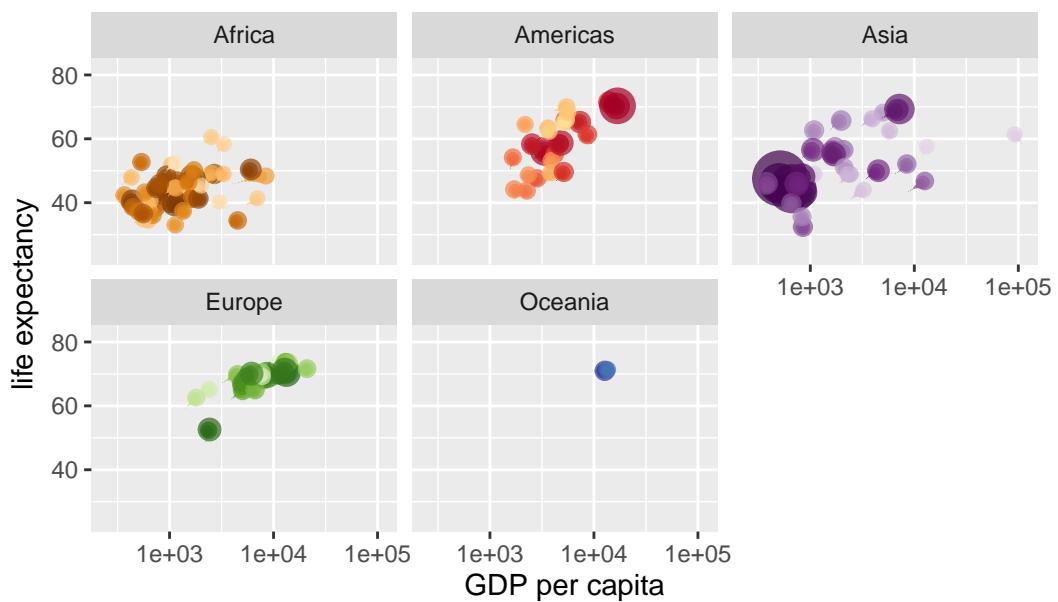
Year: 1962



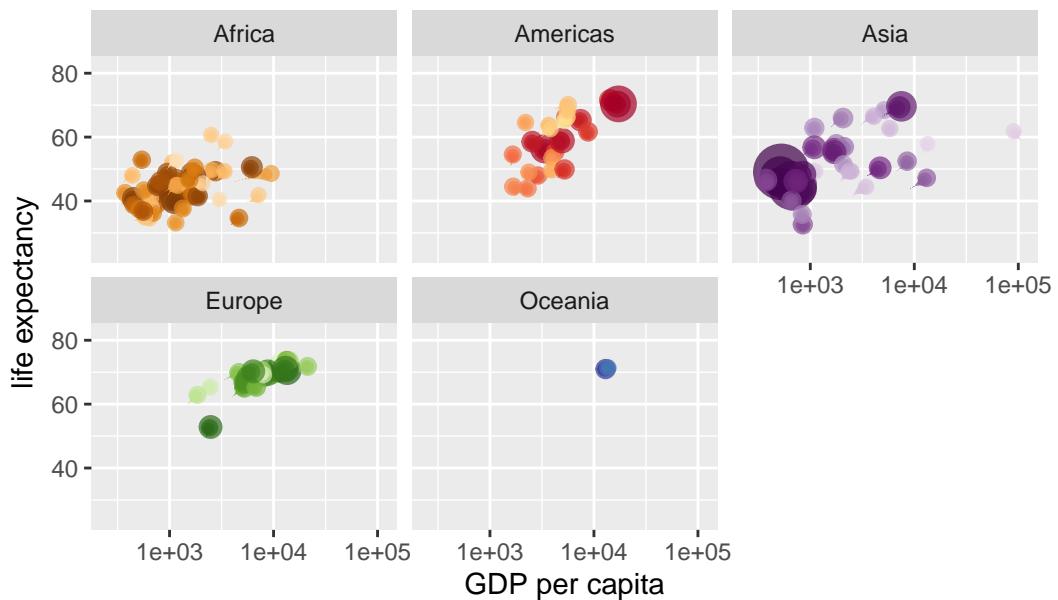
Year: 1963



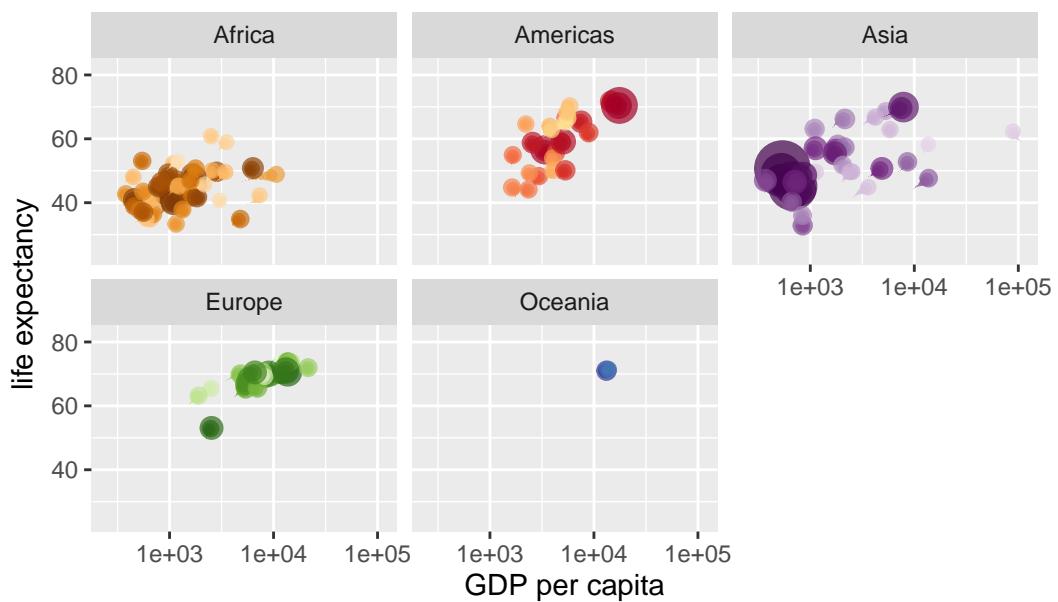
Year: 1963



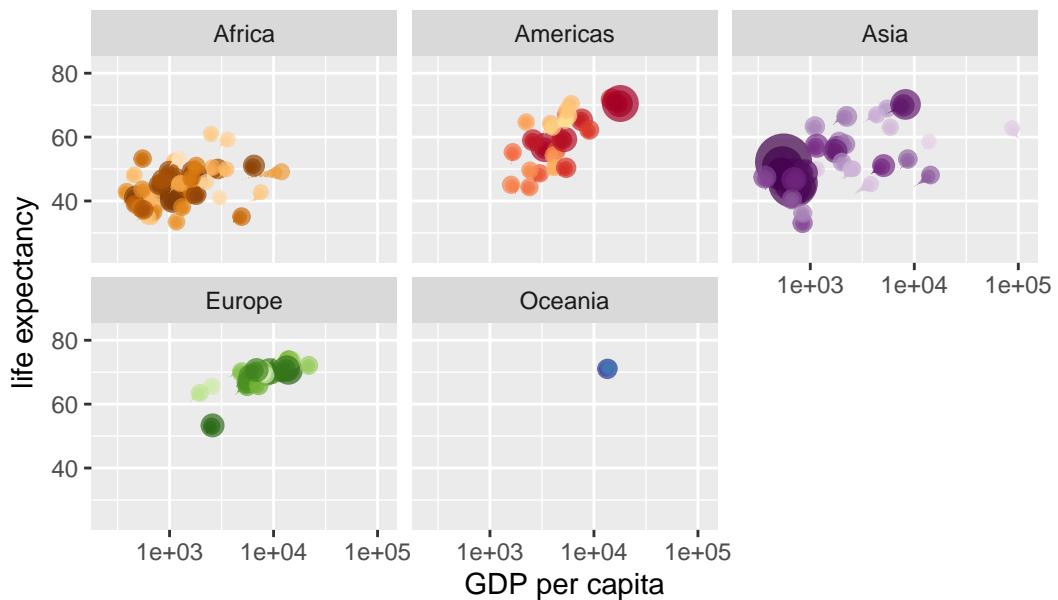
Year: 1964



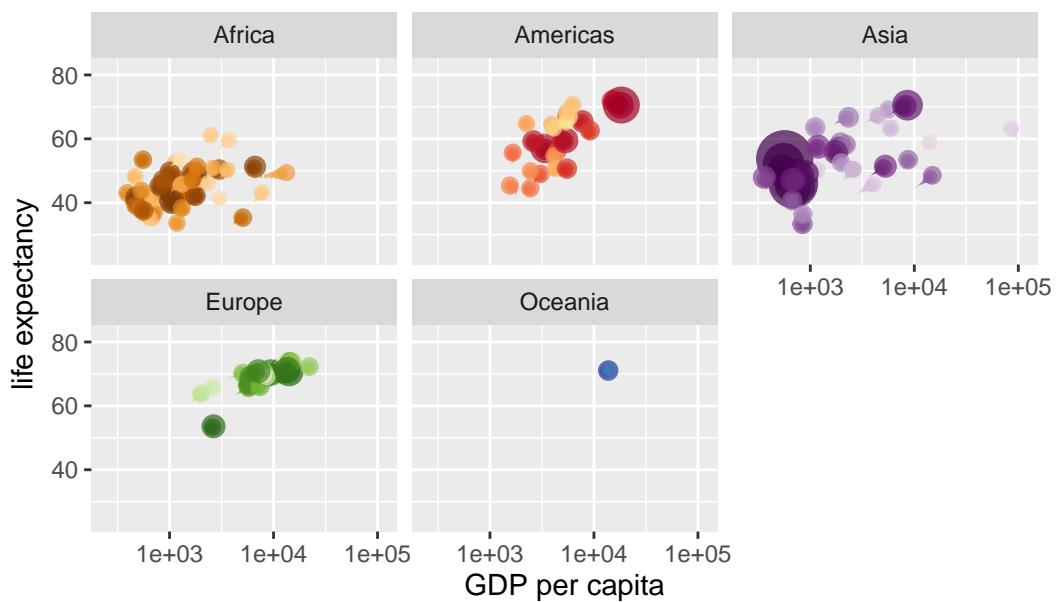
Year: 1964



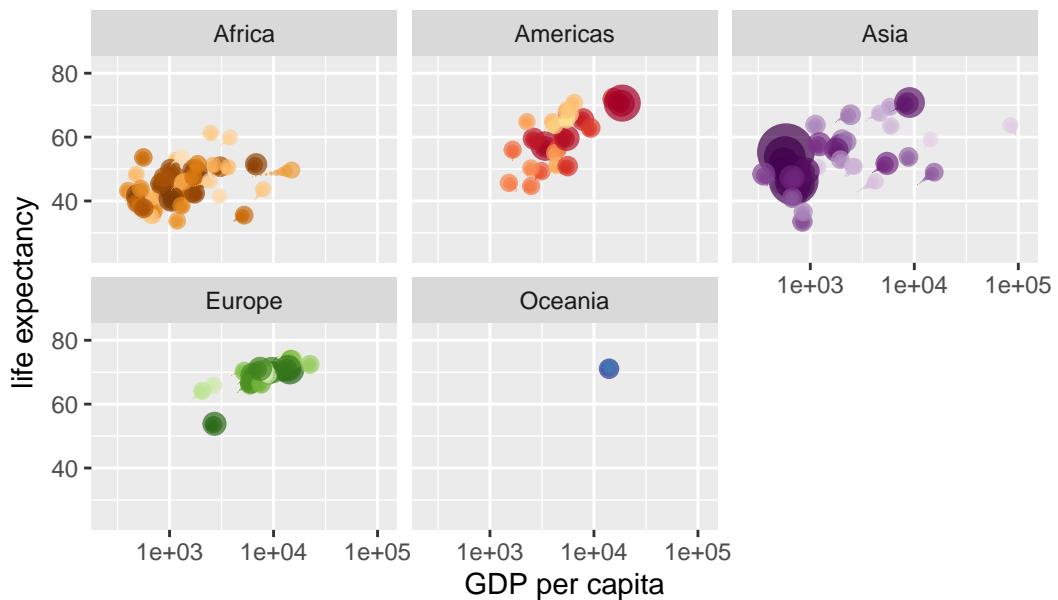
Year: 1965



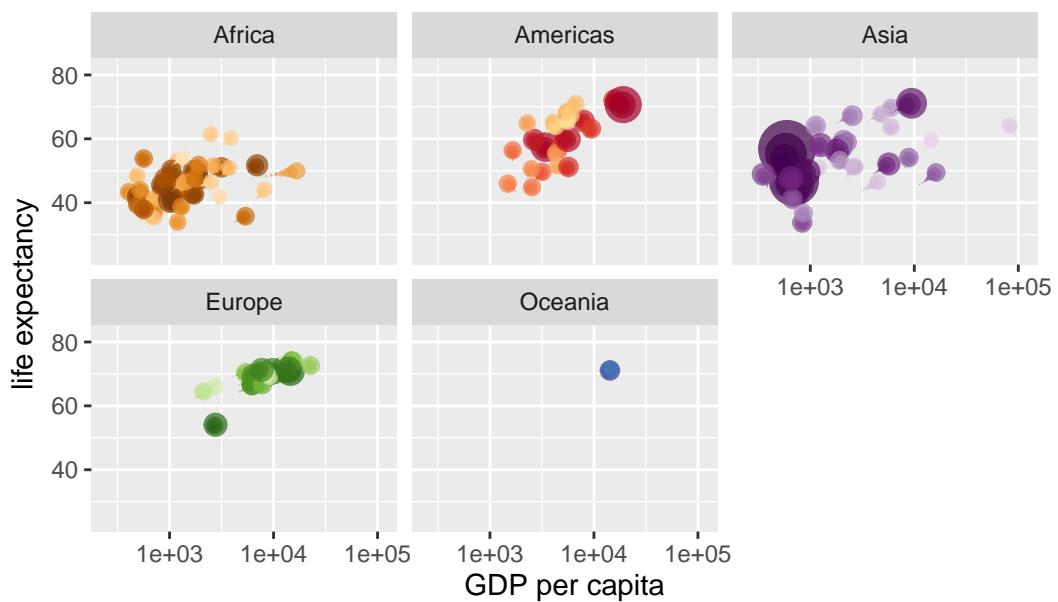
Year: 1965



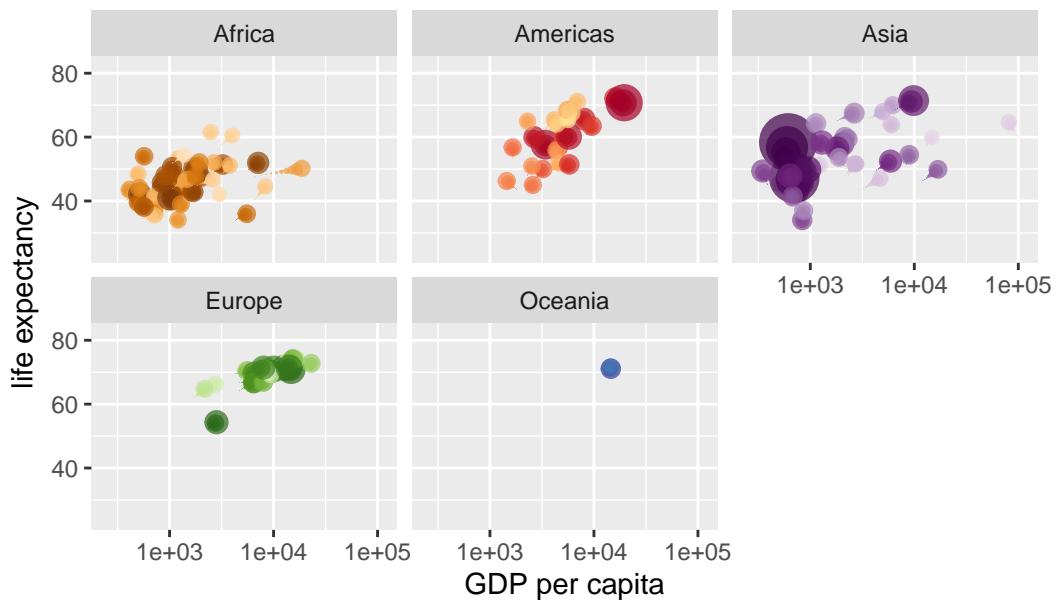
Year: 1966



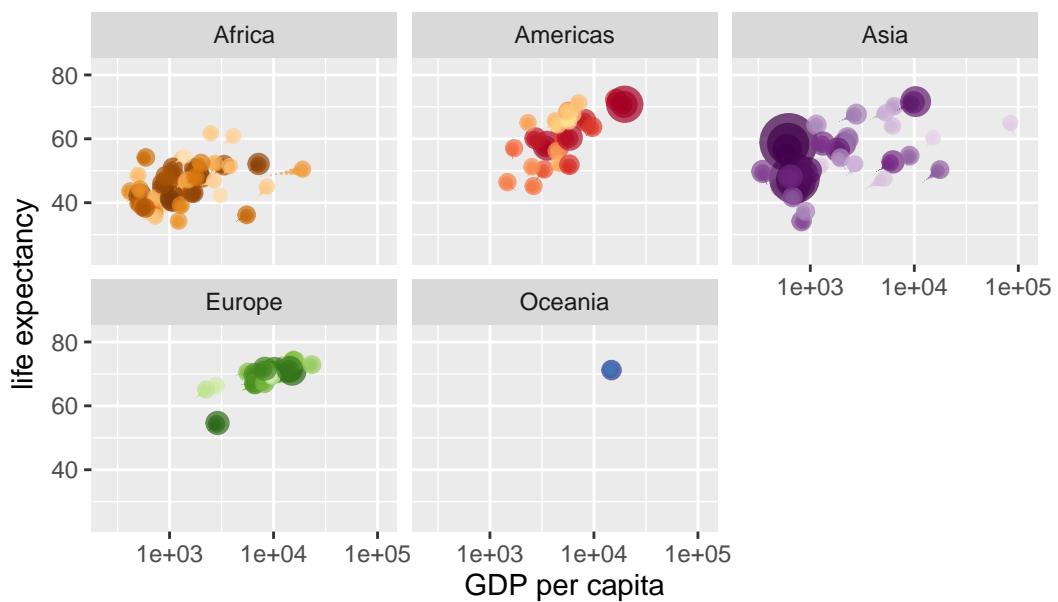
Year: 1966



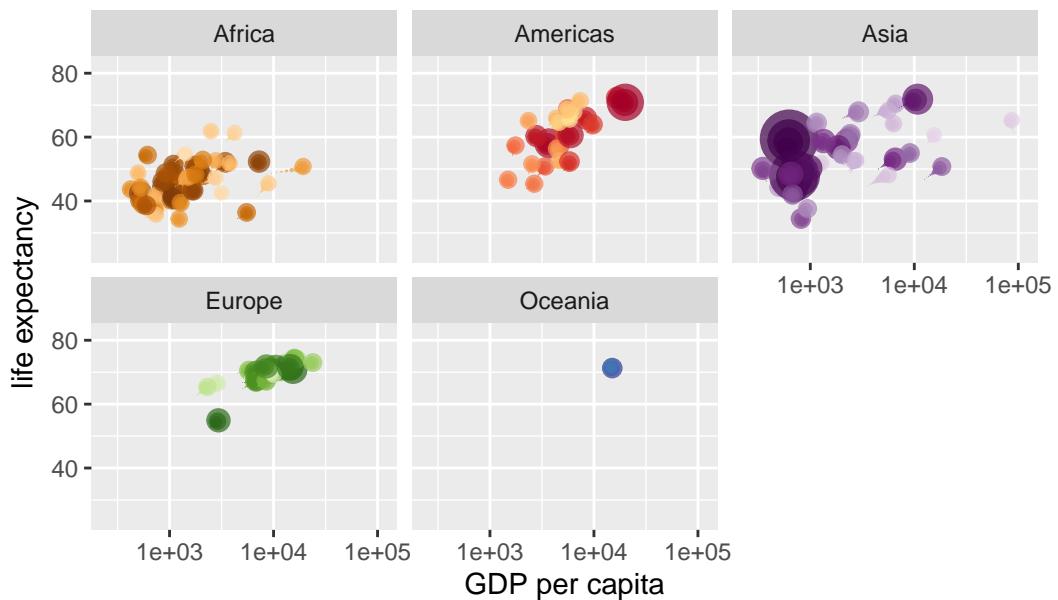
Year: 1967



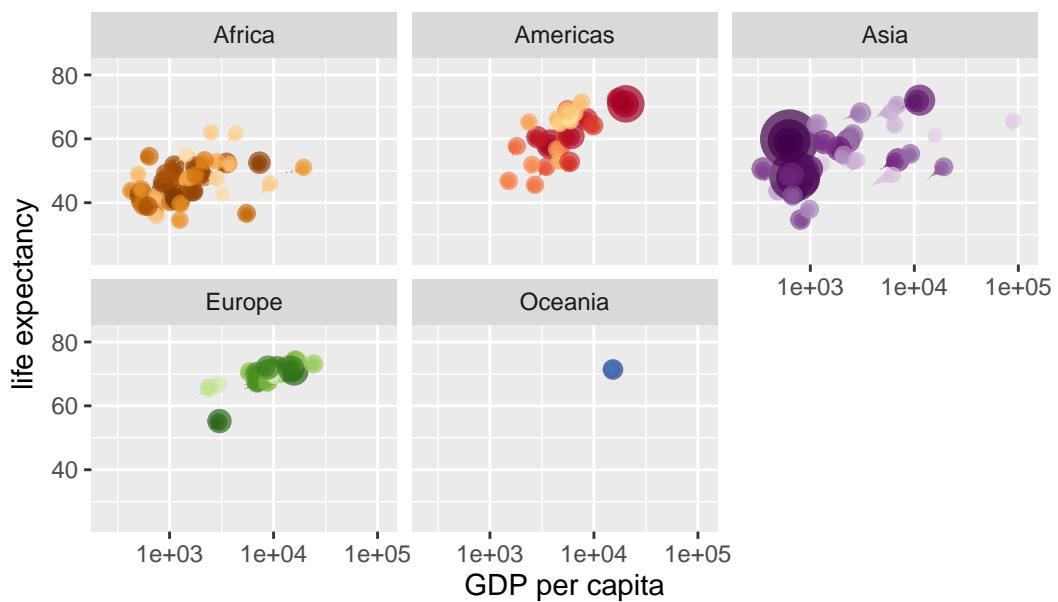
Year: 1968



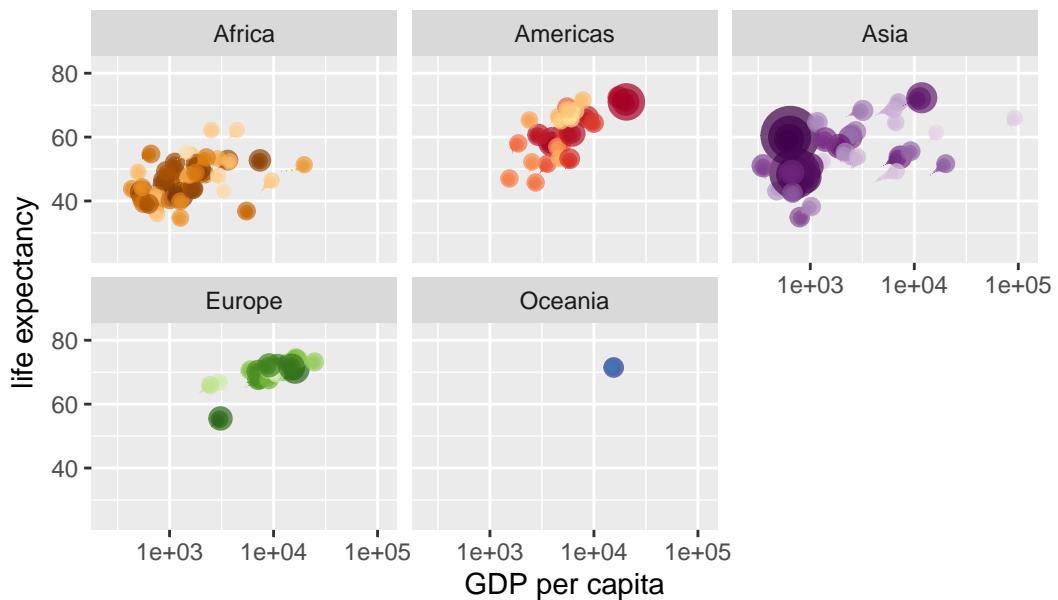
Year: 1968



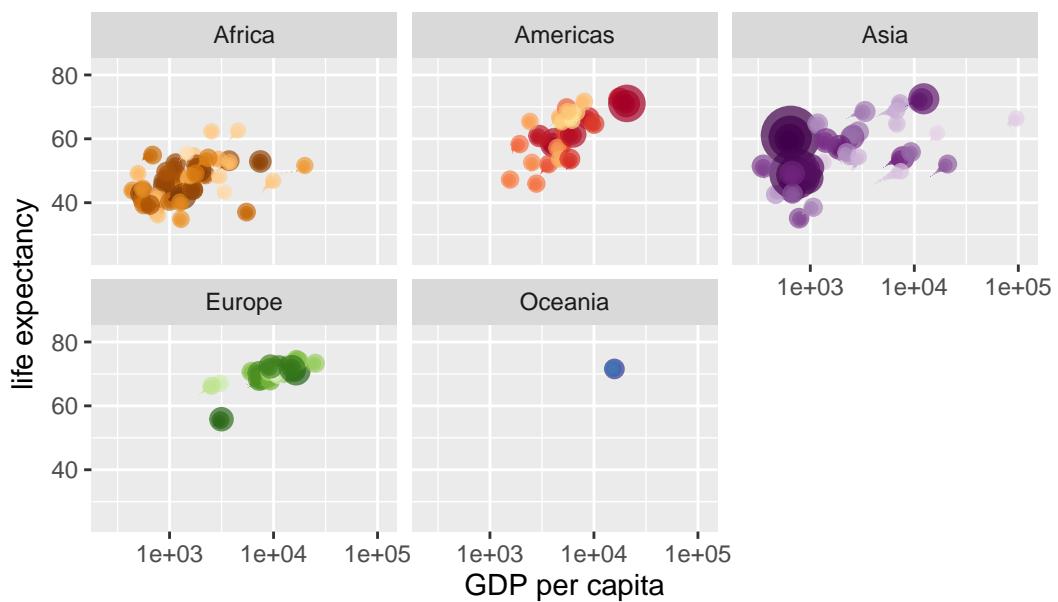
Year: 1969



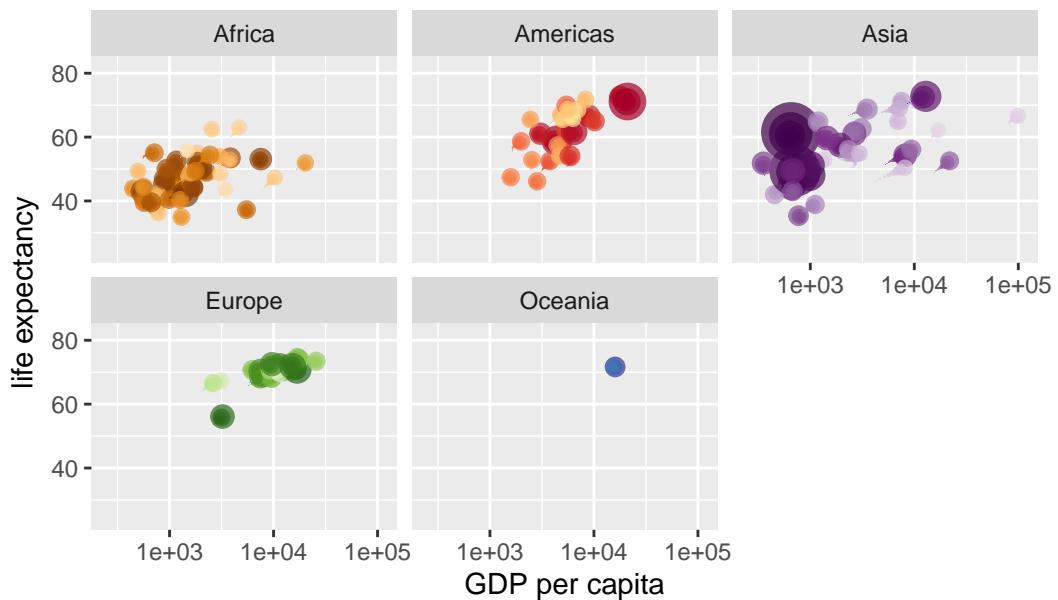
Year: 1969



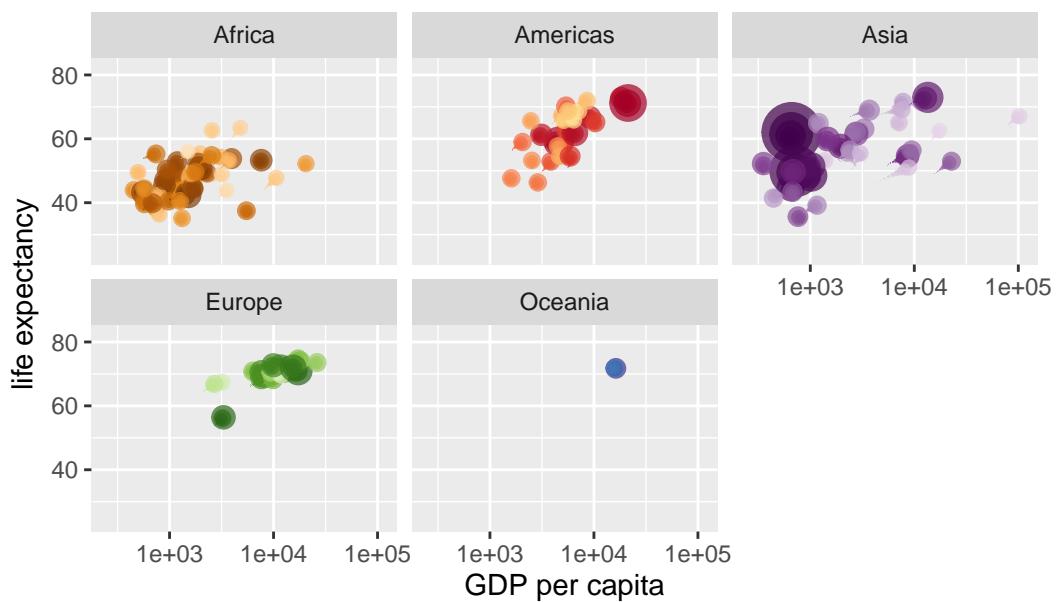
Year: 1970



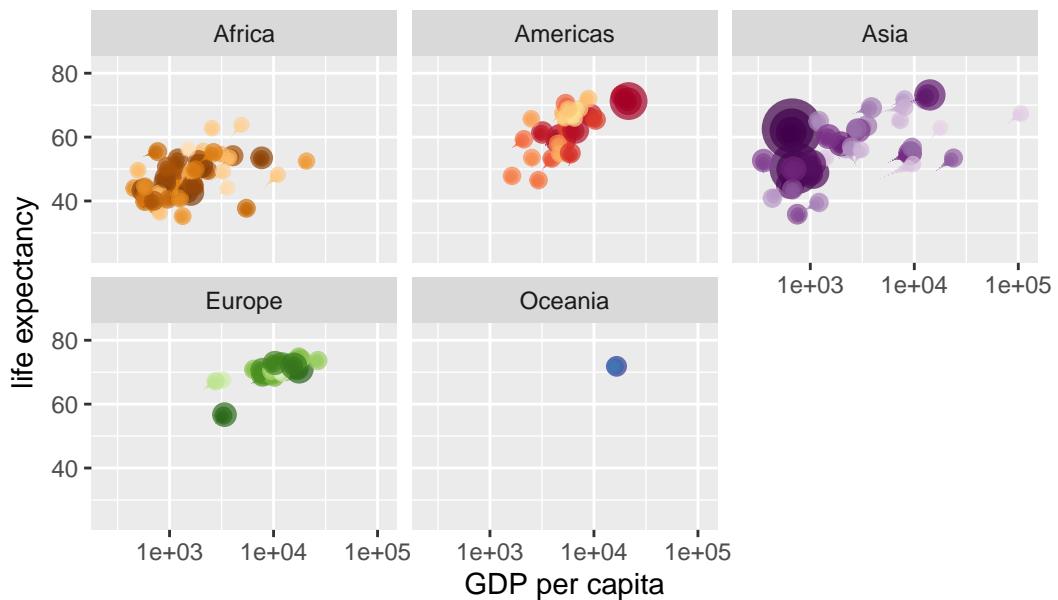
Year: 1970



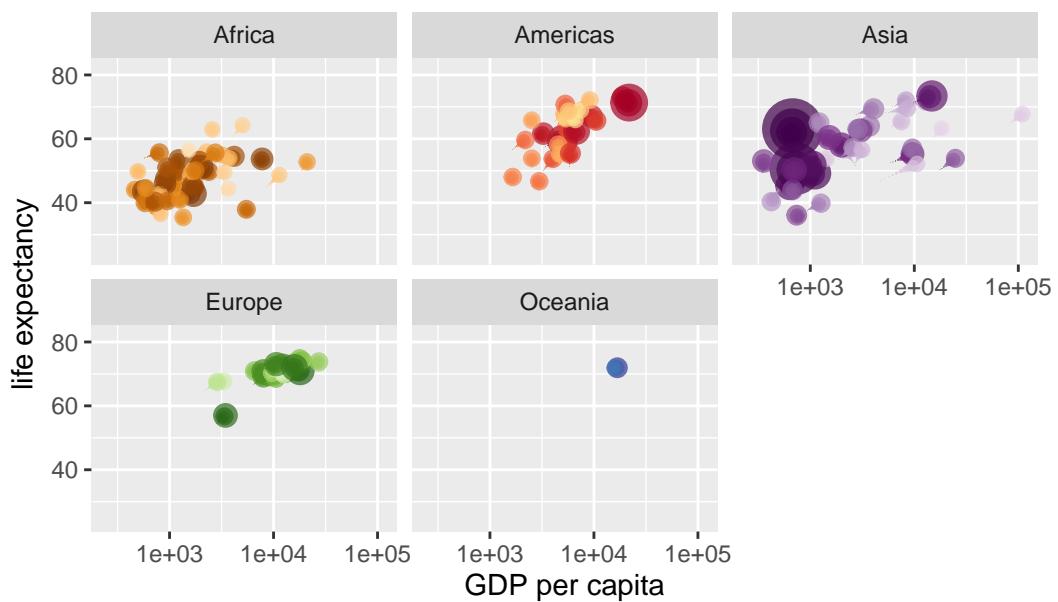
Year: 1971



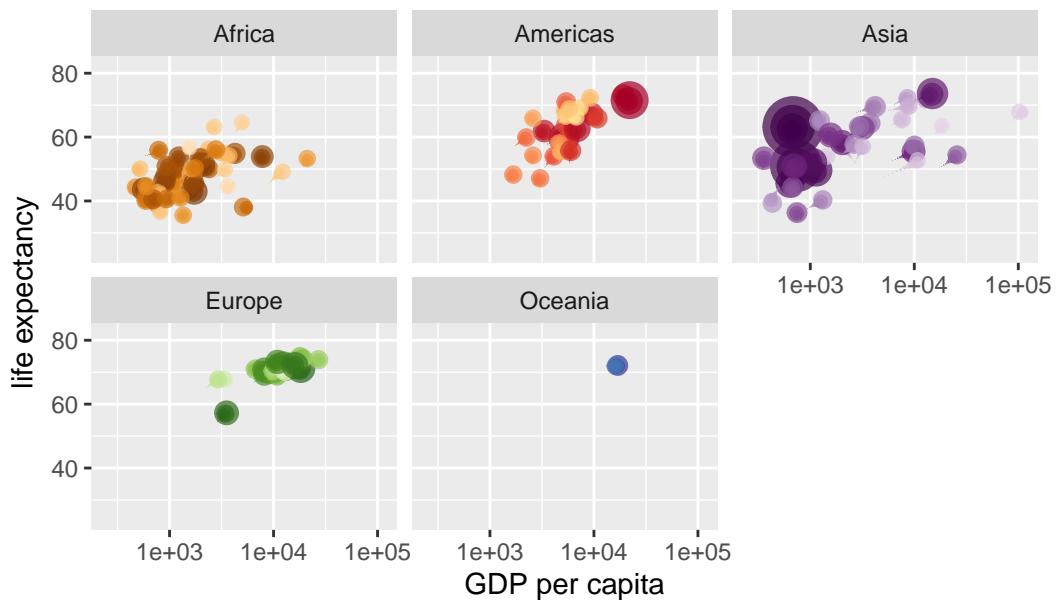
Year: 1971



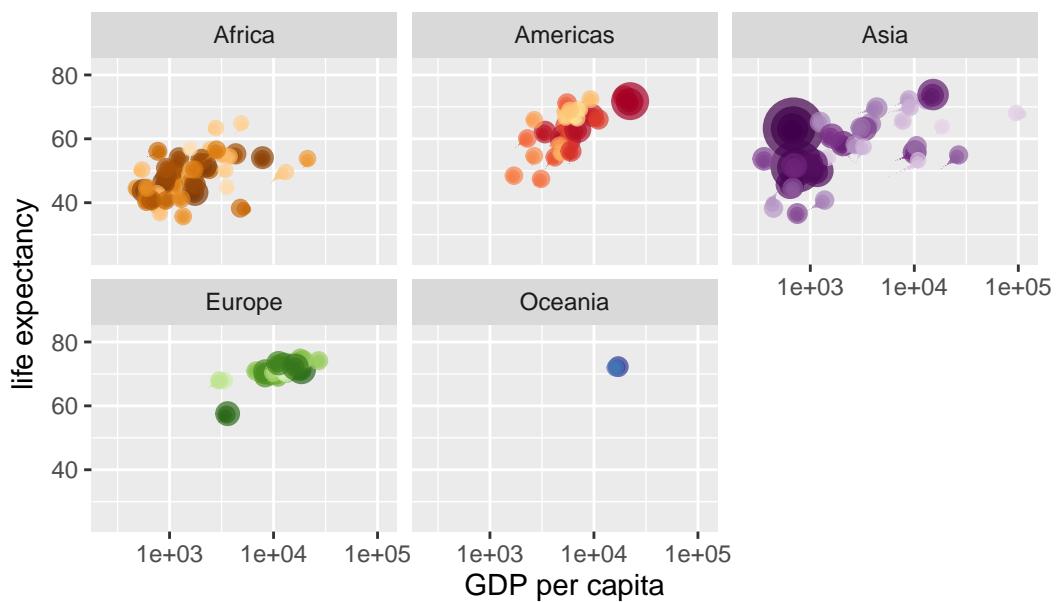
Year: 1972



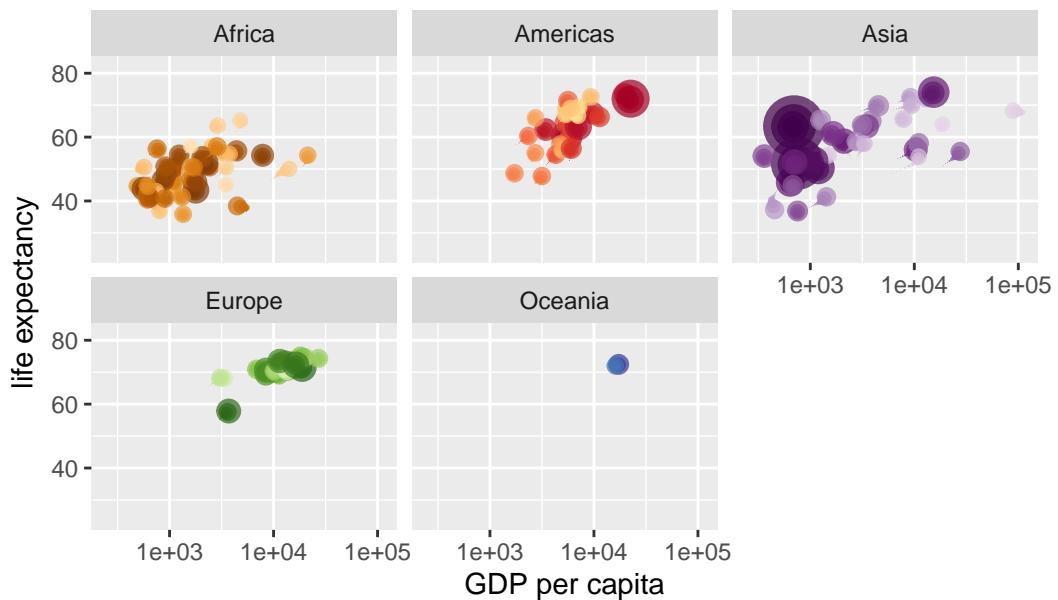
Year: 1973



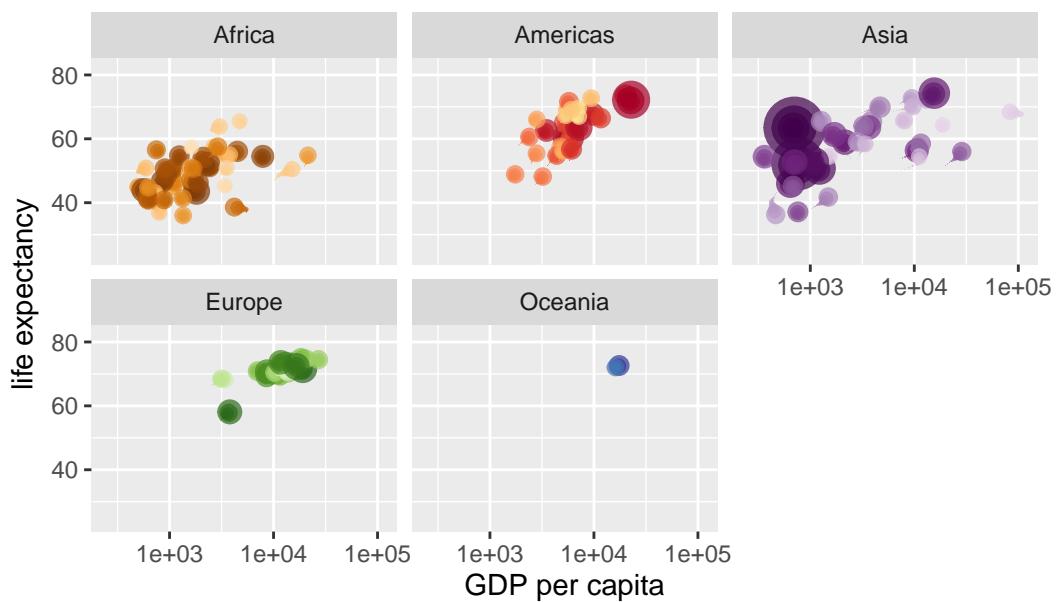
Year: 1973



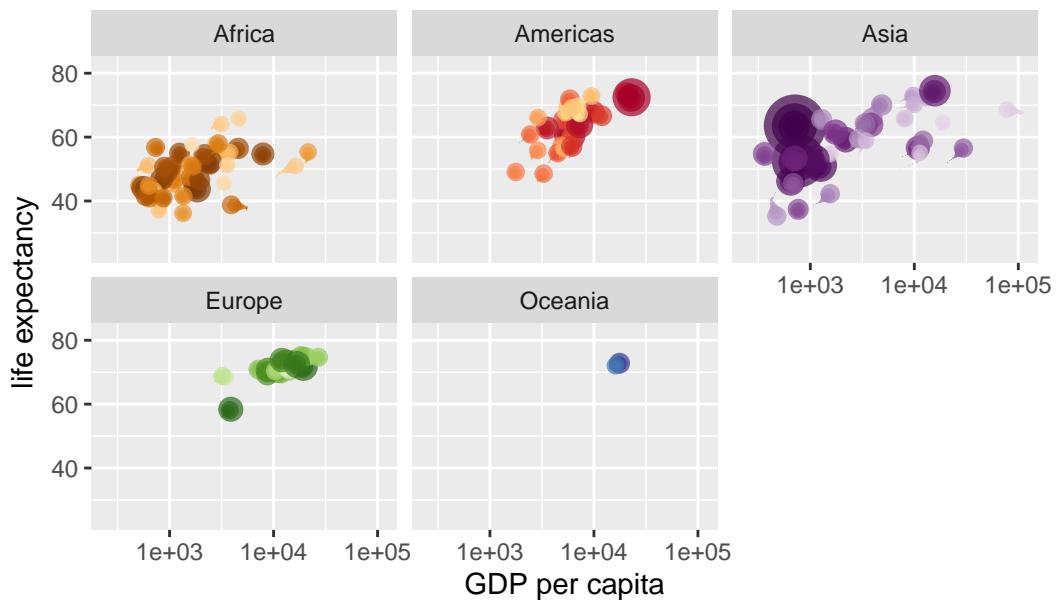
Year: 1974



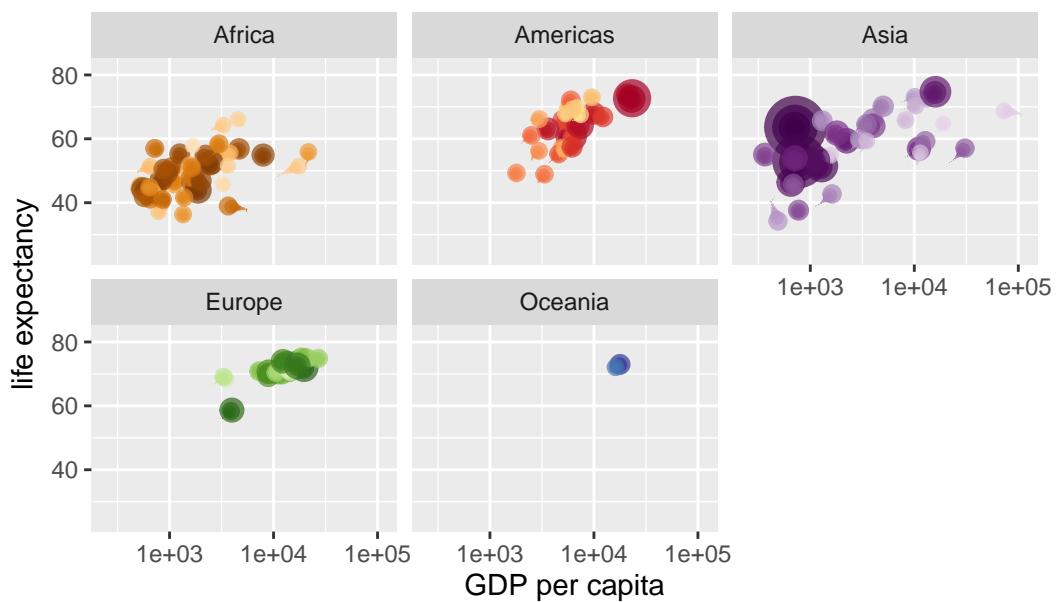
Year: 1974



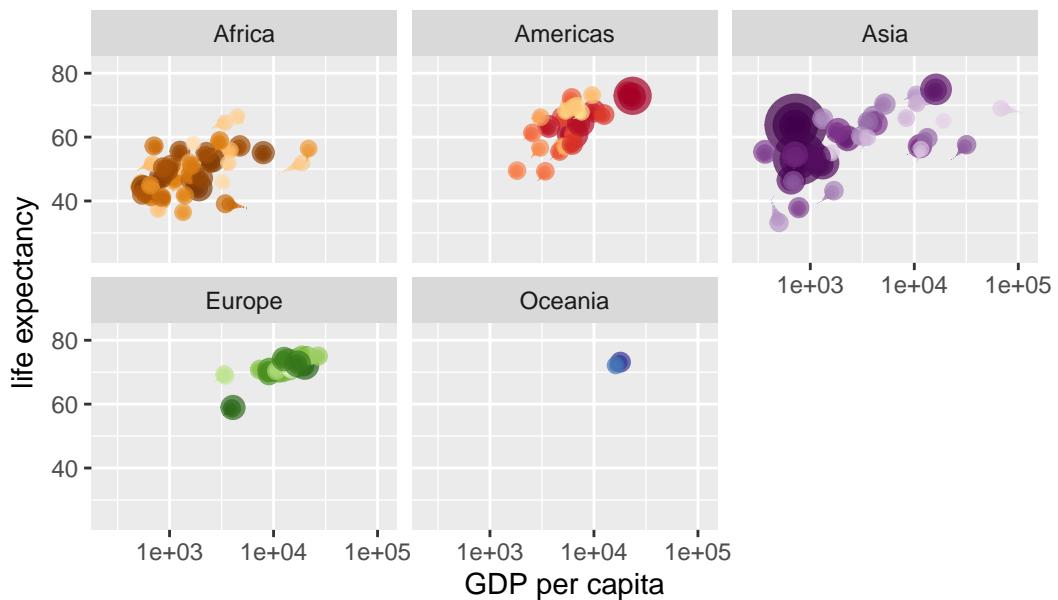
Year: 1975



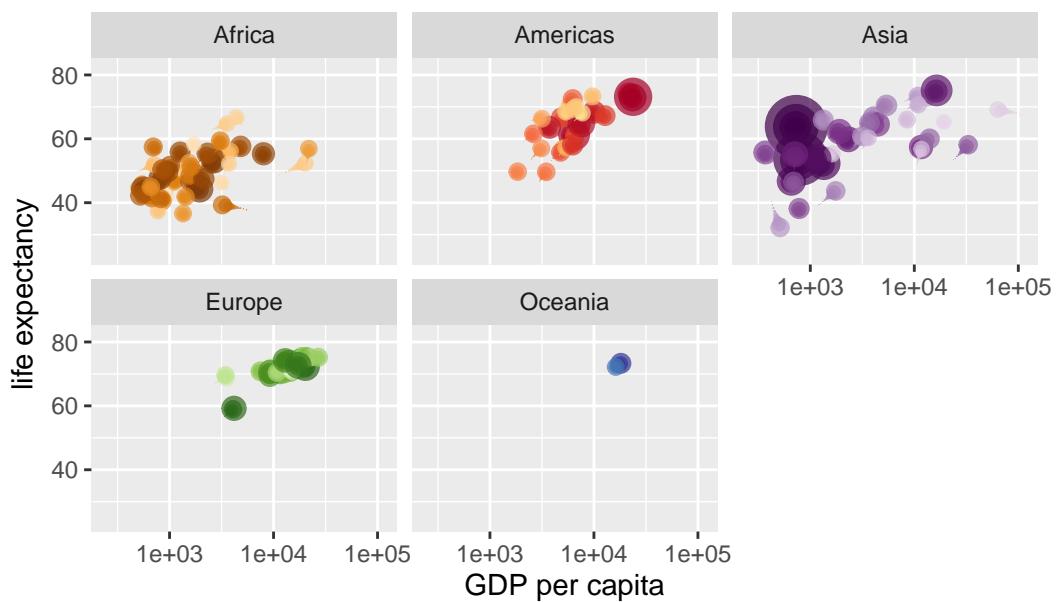
Year: 1975



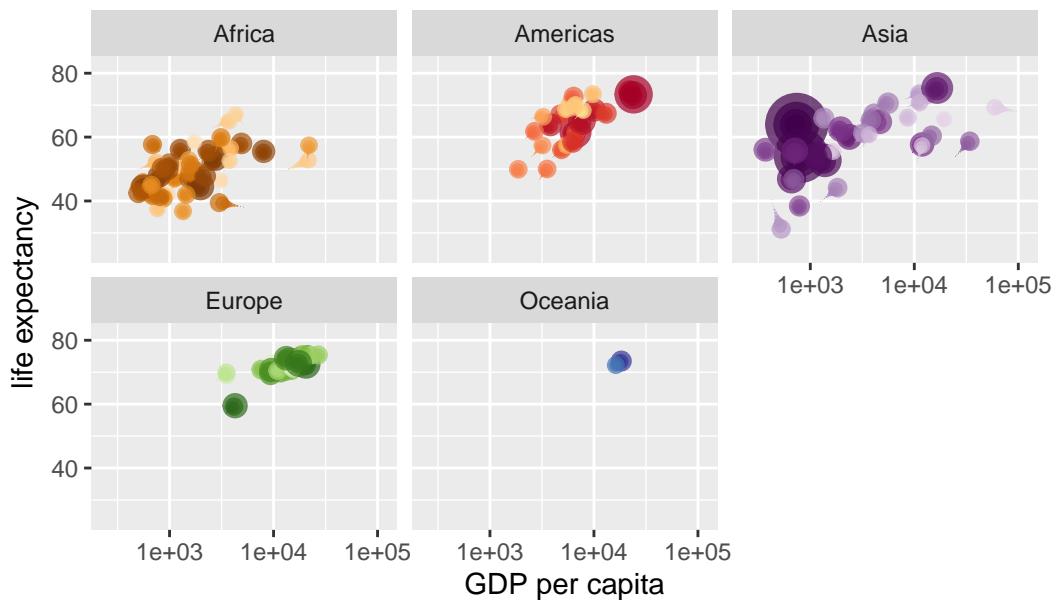
Year: 1976



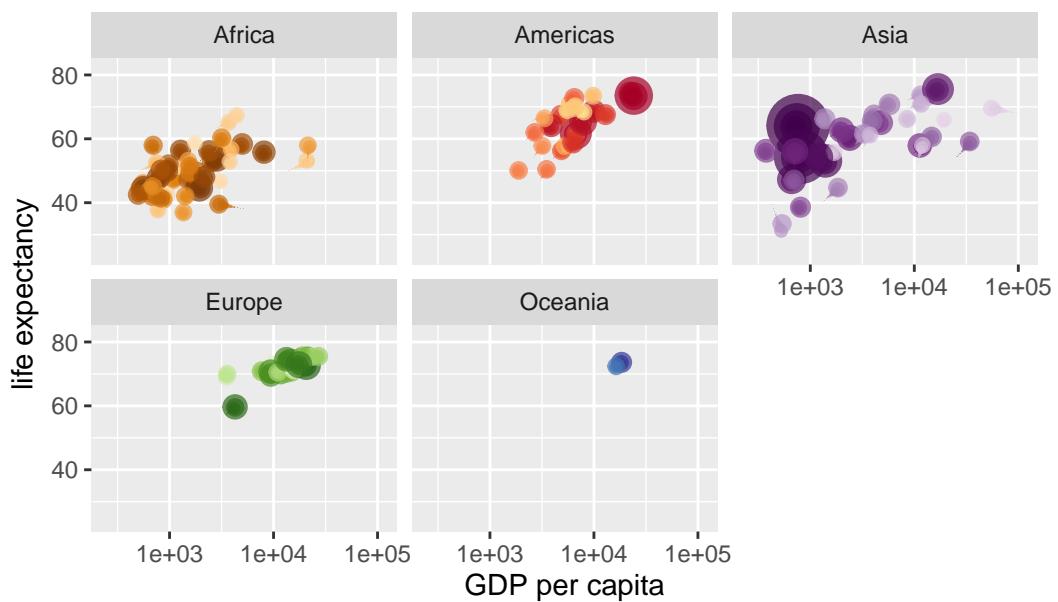
Year: 1976



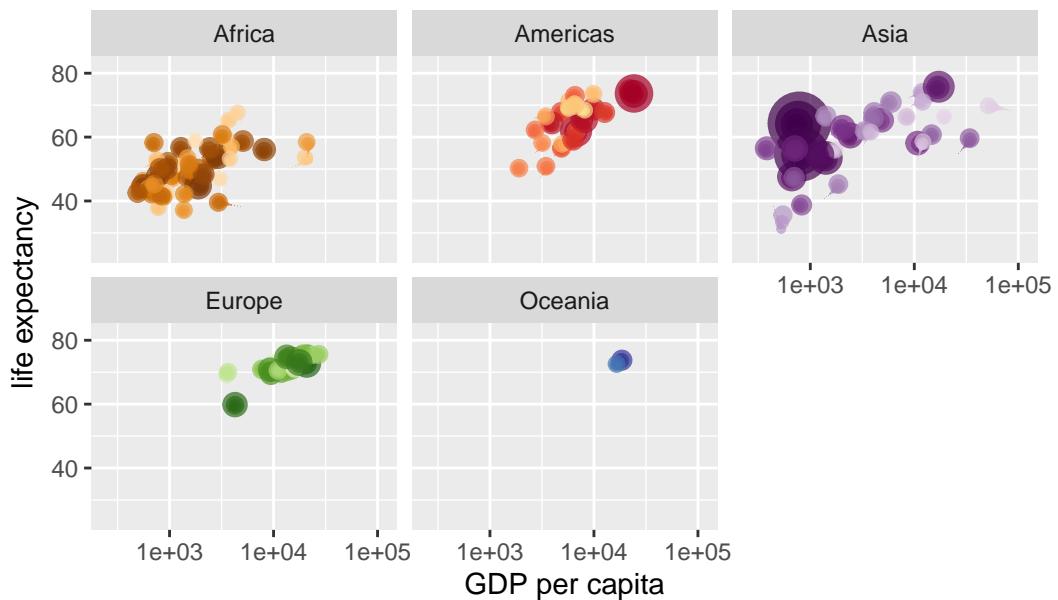
Year: 1977



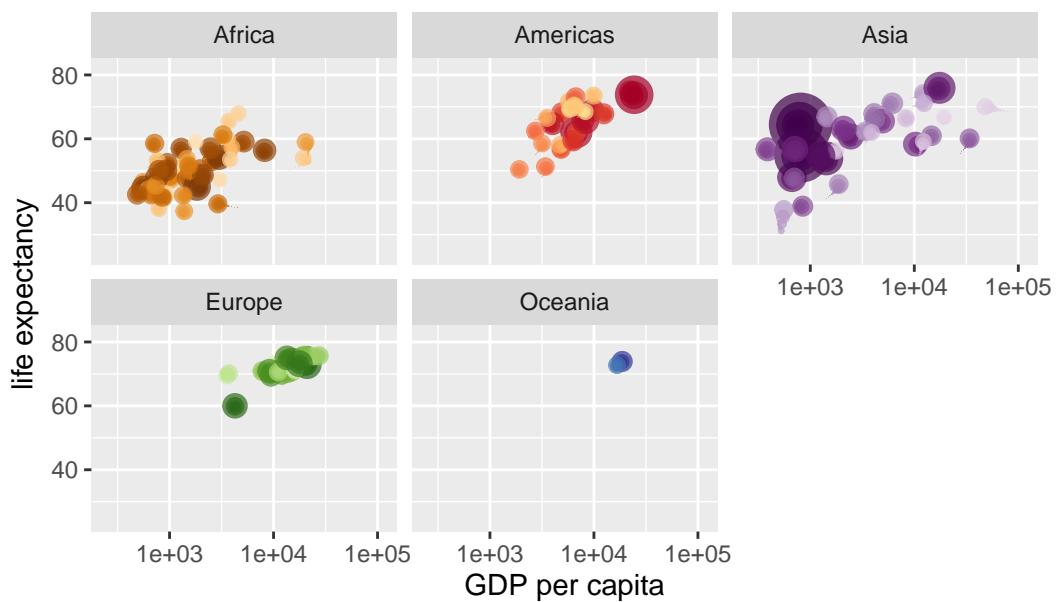
Year: 1978



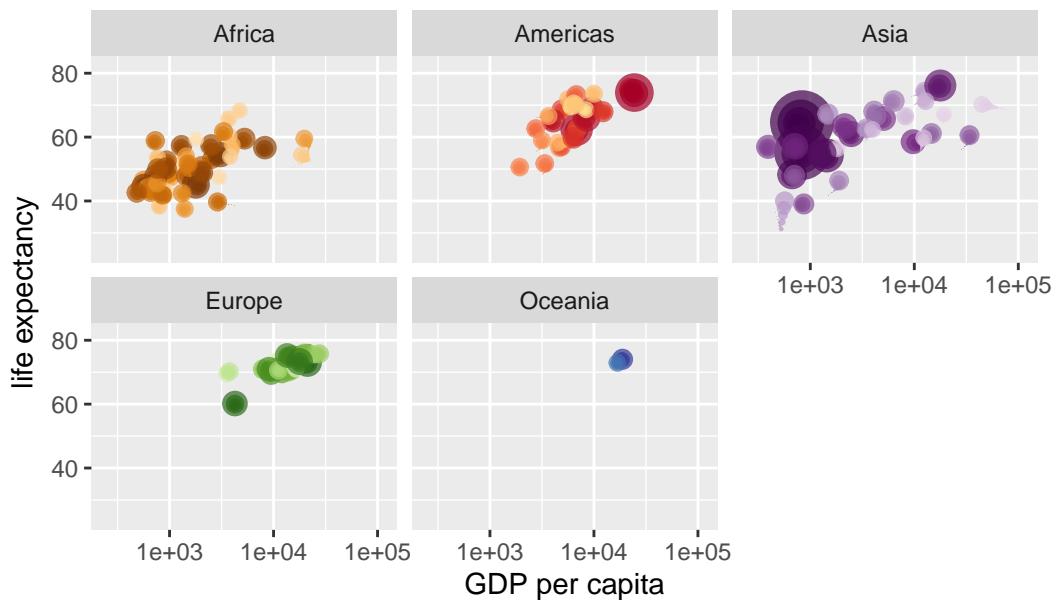
Year: 1978



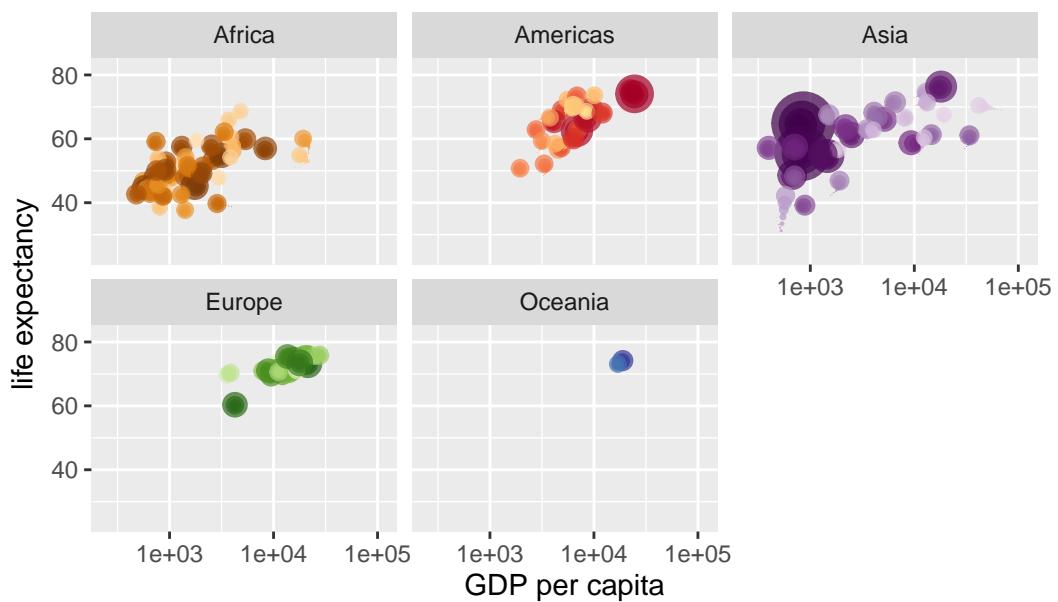
Year: 1979



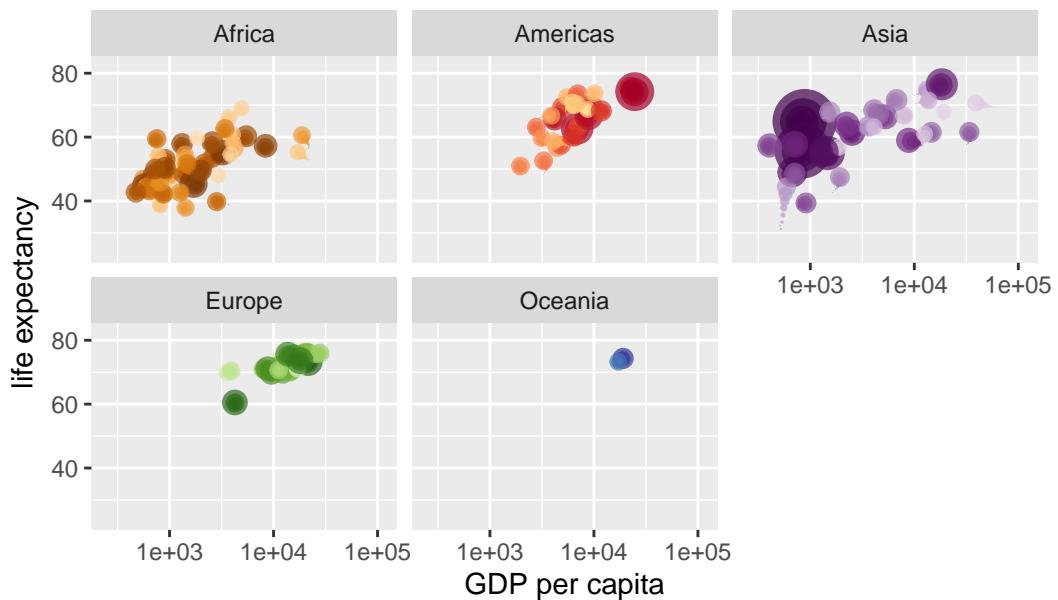
Year: 1979



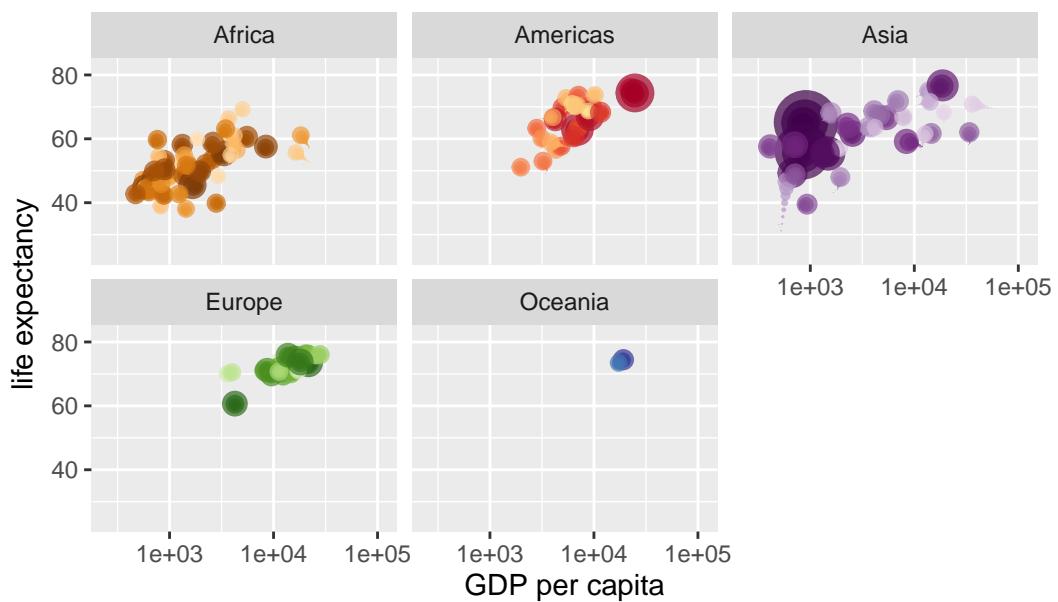
Year: 1980



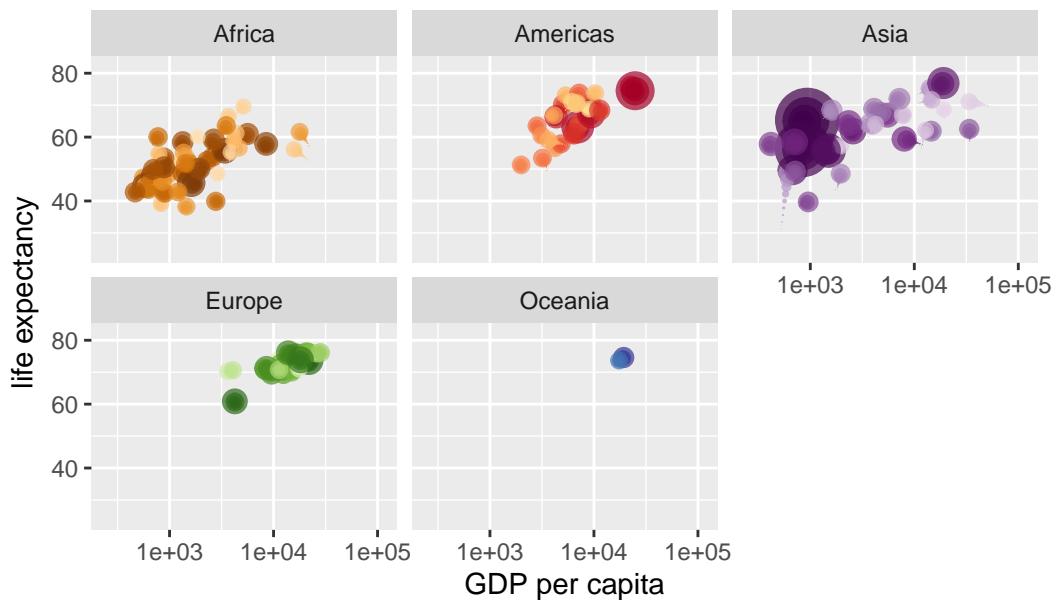
Year: 1980



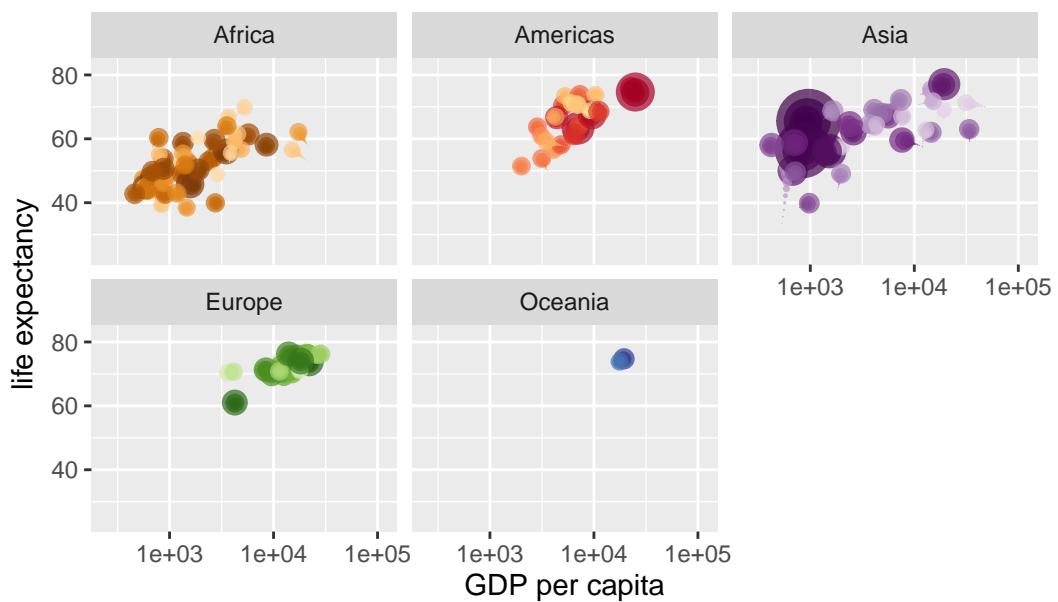
Year: 1981



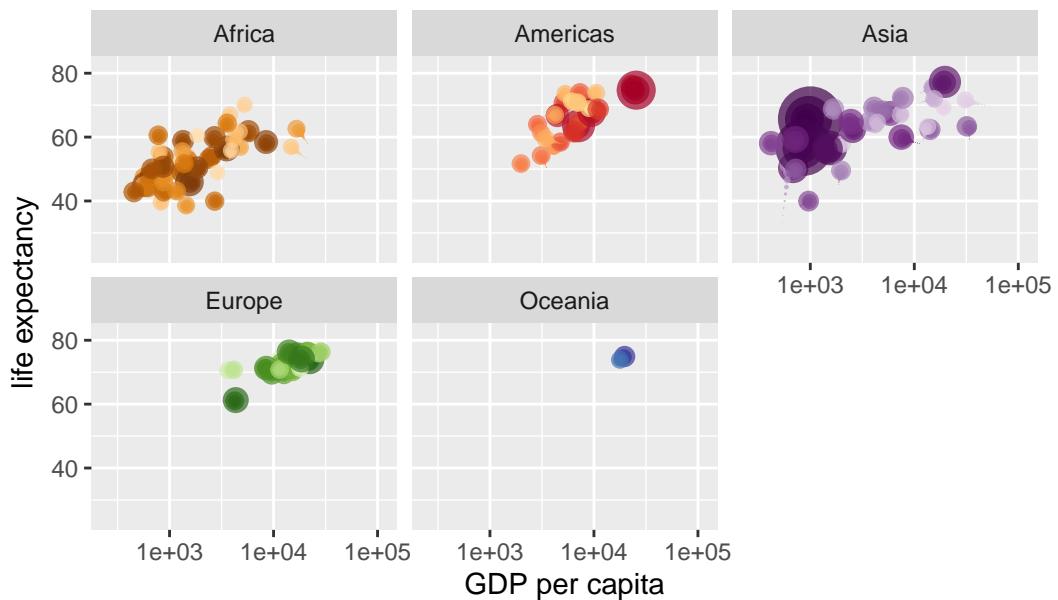
Year: 1981



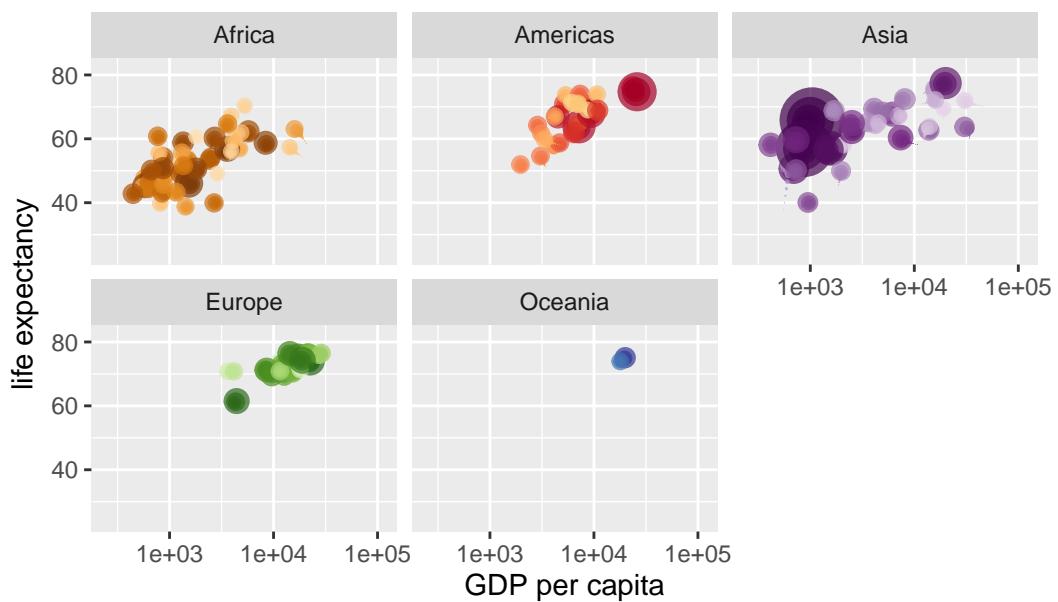
Year: 1982



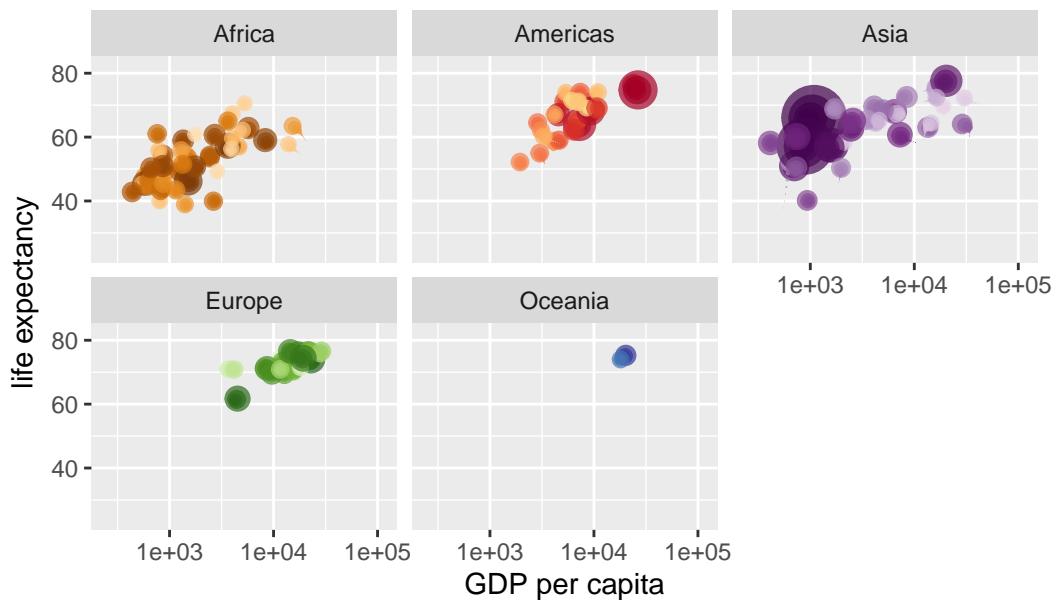
Year: 1983



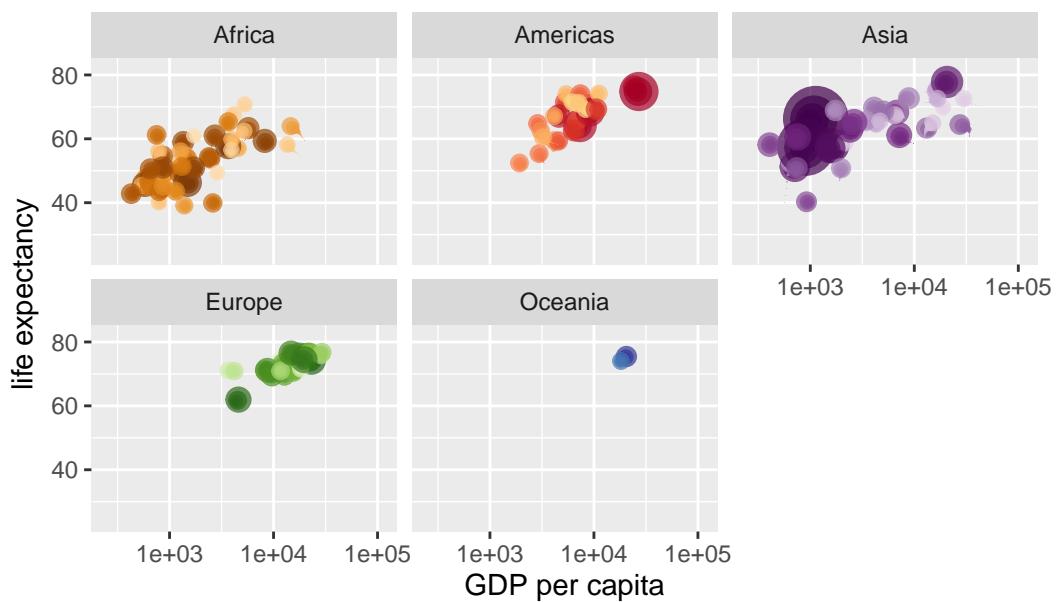
Year: 1983



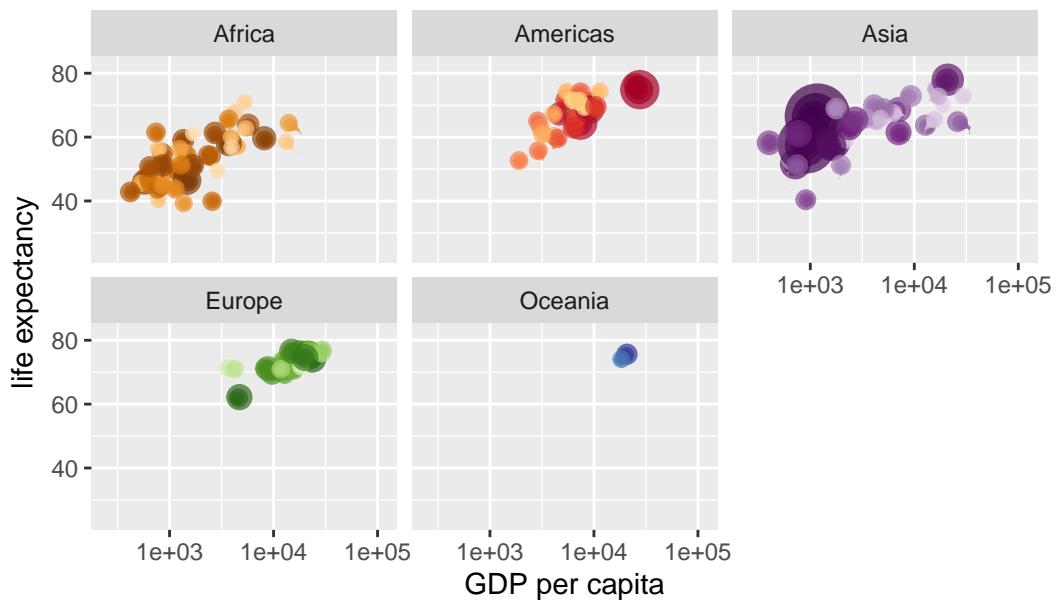
Year: 1984



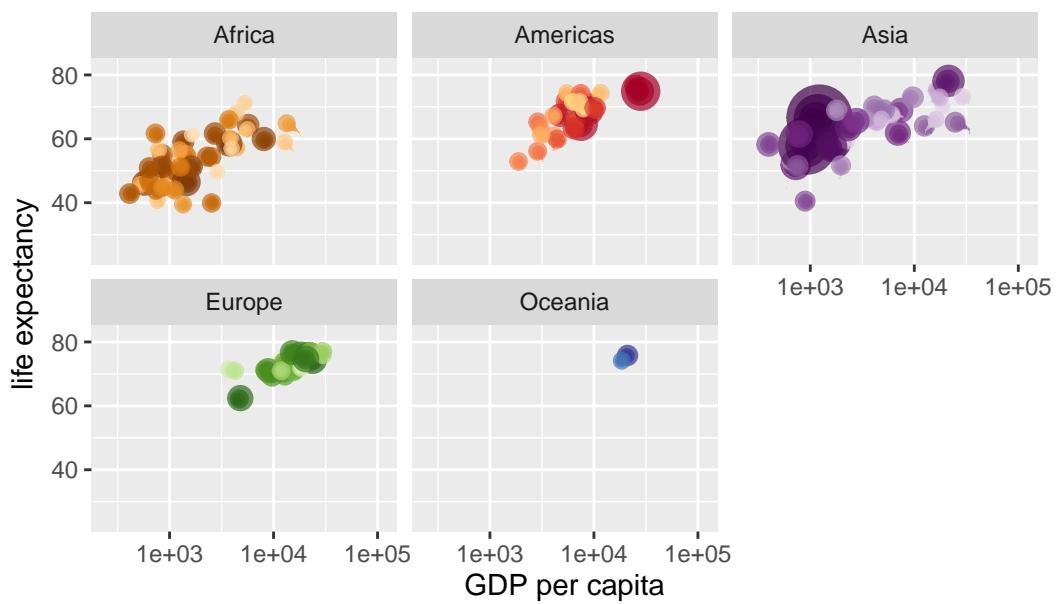
Year: 1984



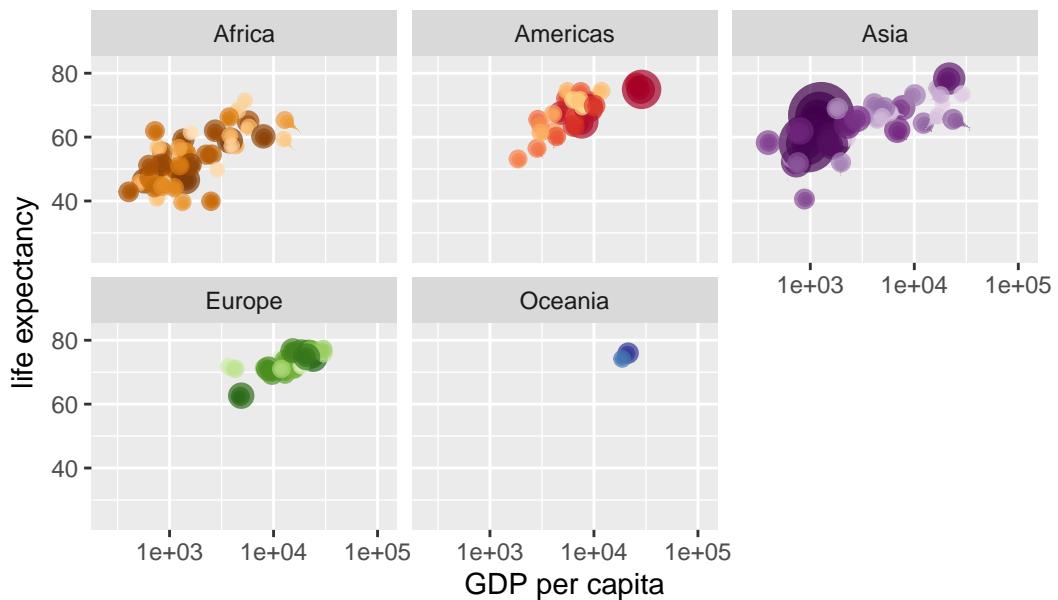
Year: 1985



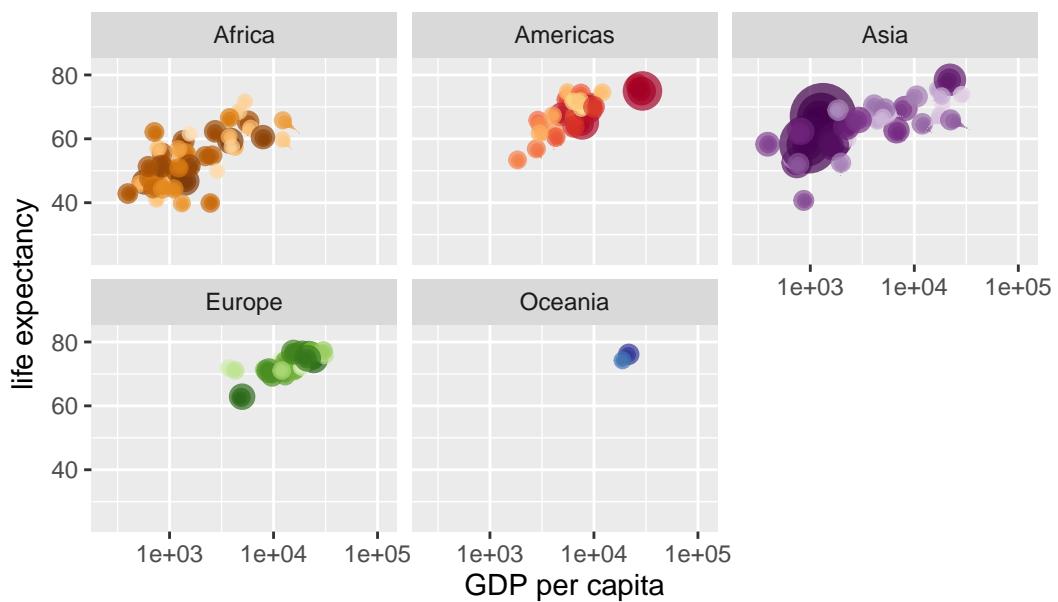
Year: 1985



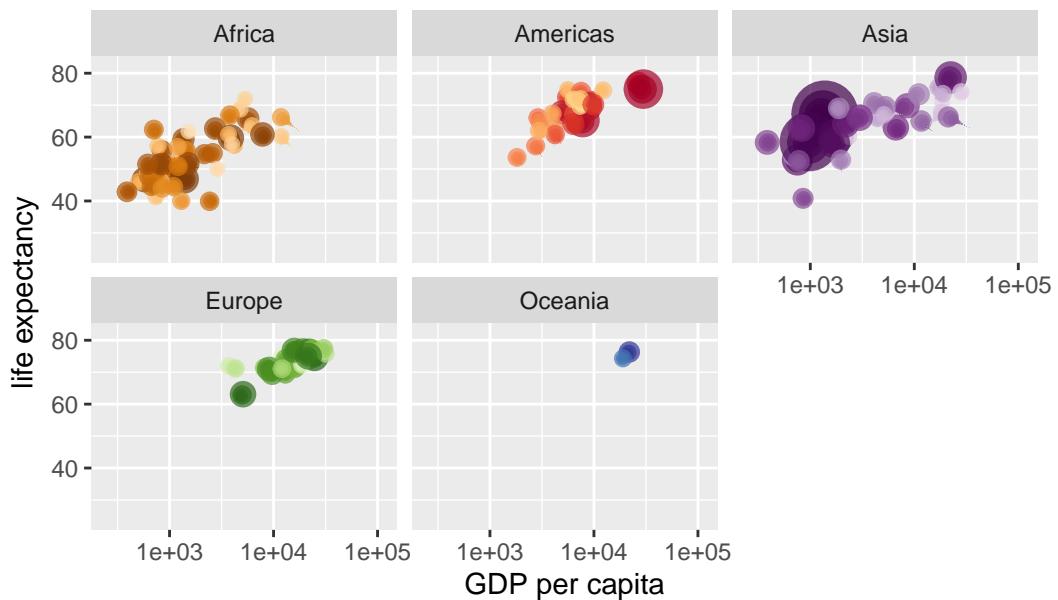
Year: 1986



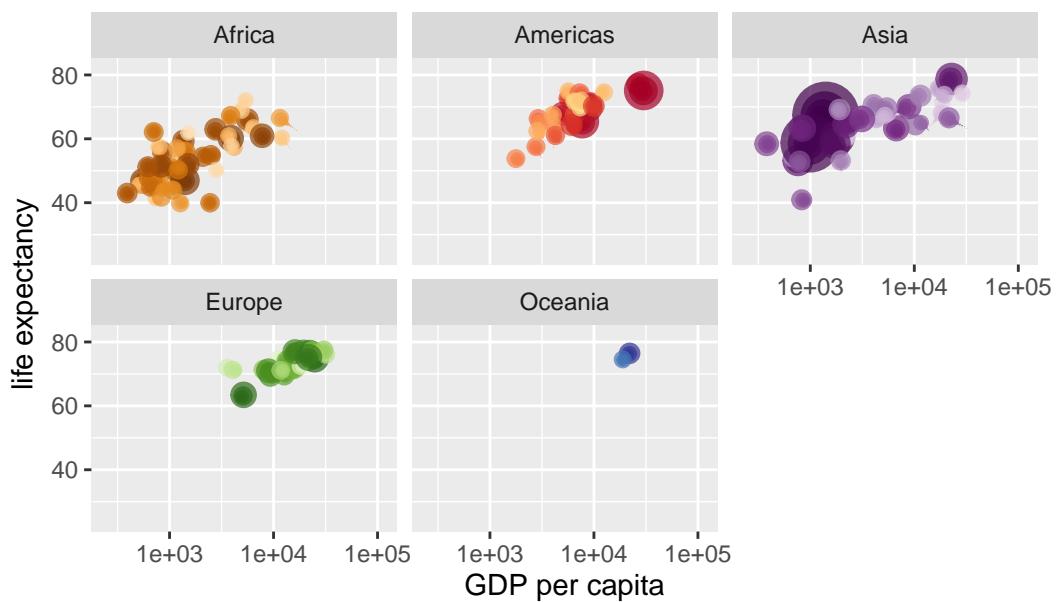
Year: 1986



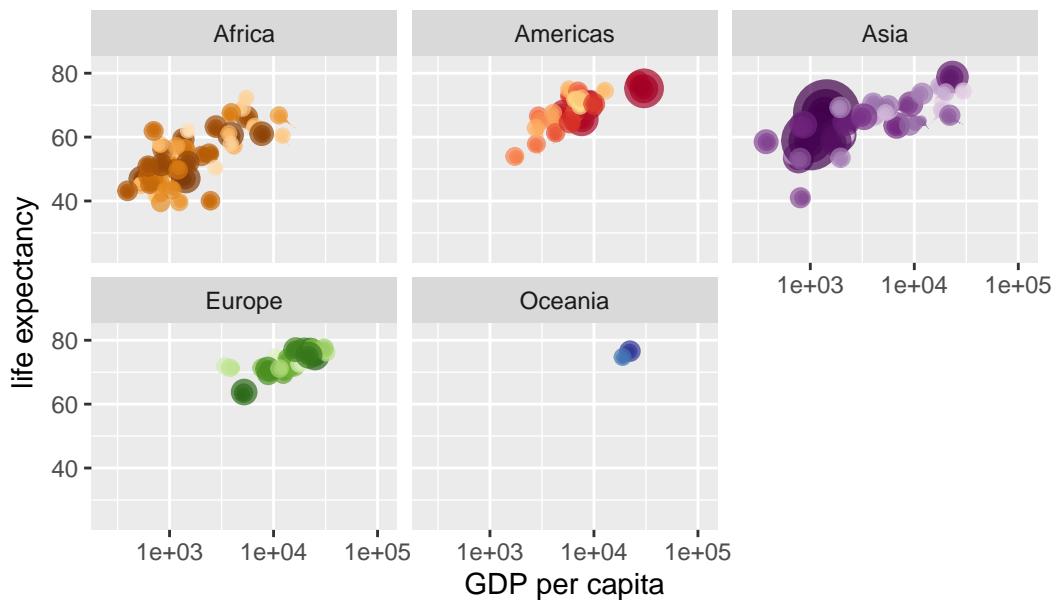
Year: 1987



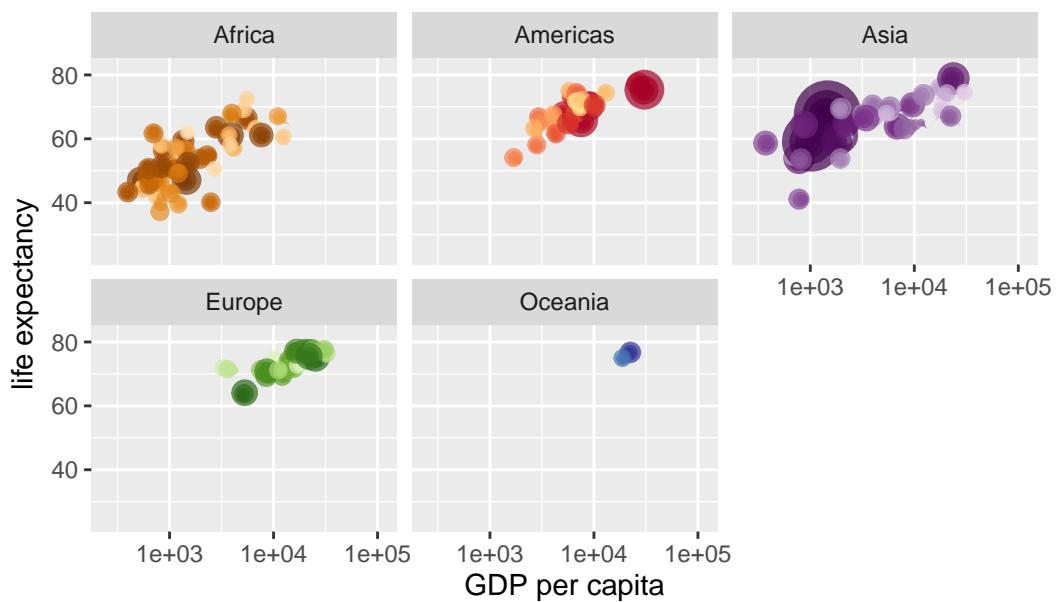
Year: 1988



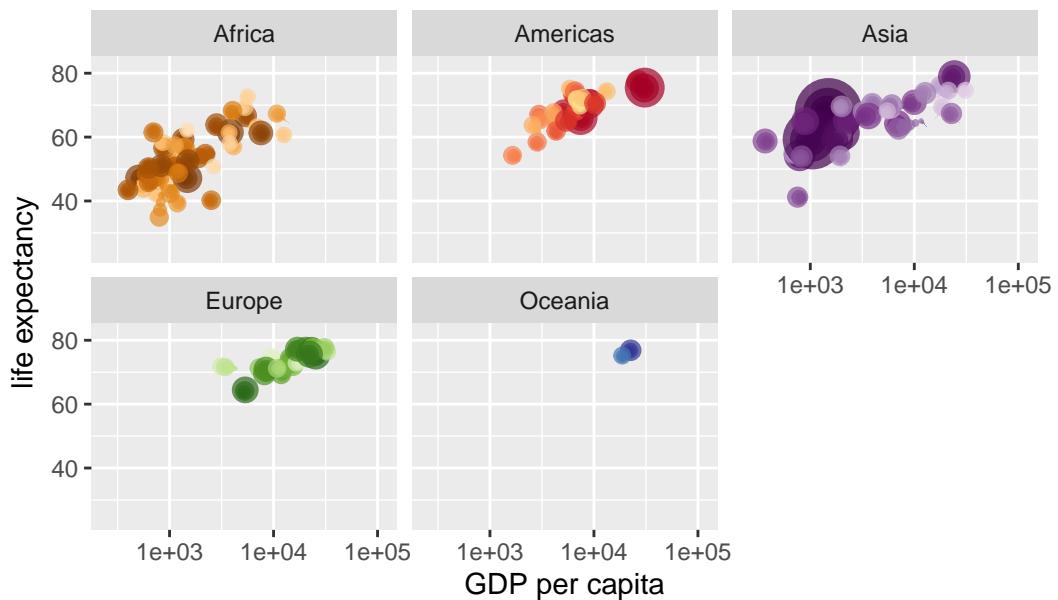
Year: 1988



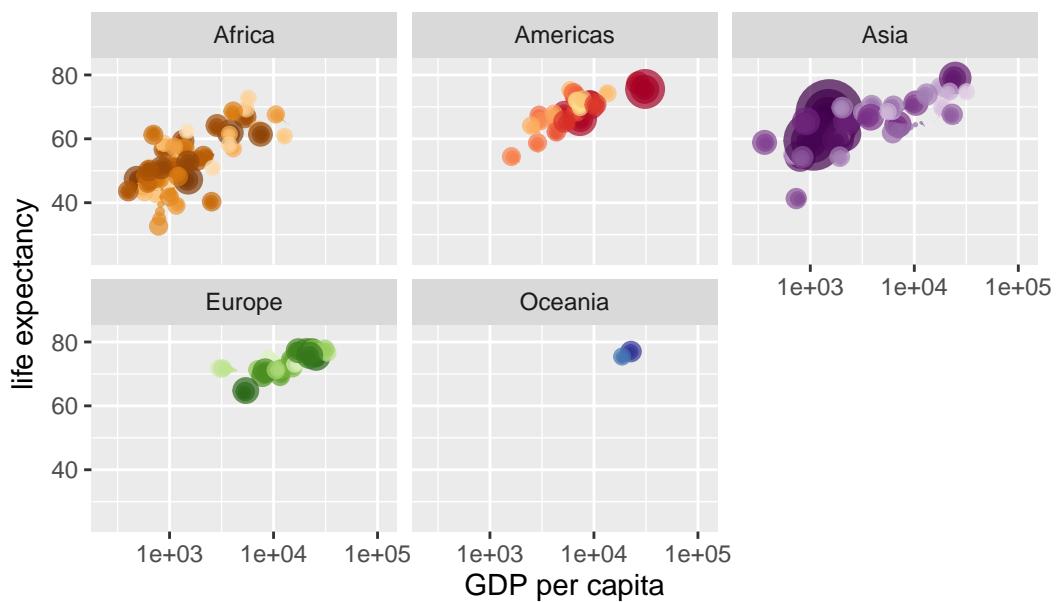
Year: 1989



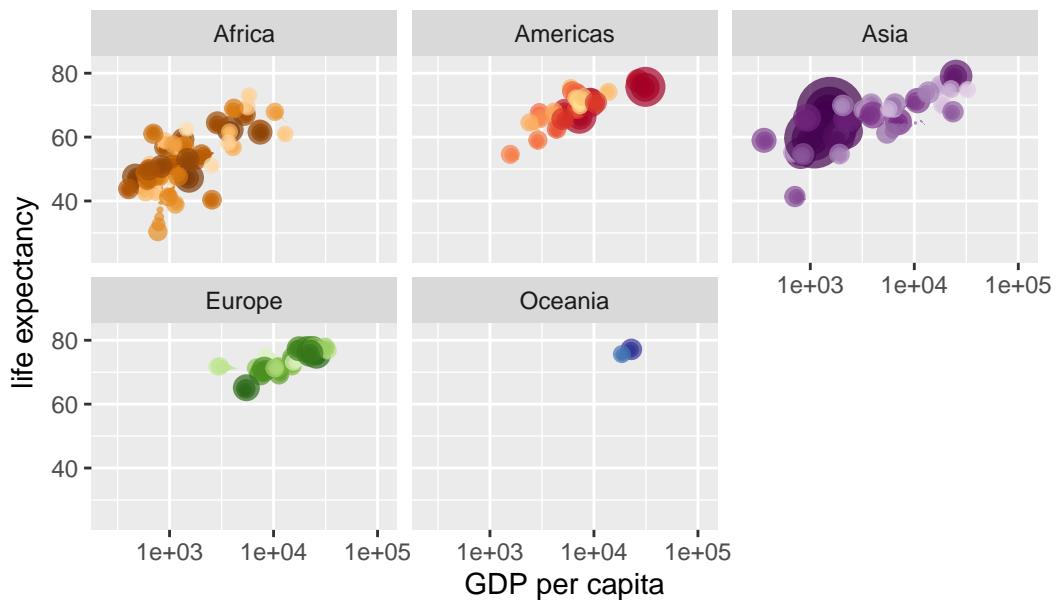
Year: 1989



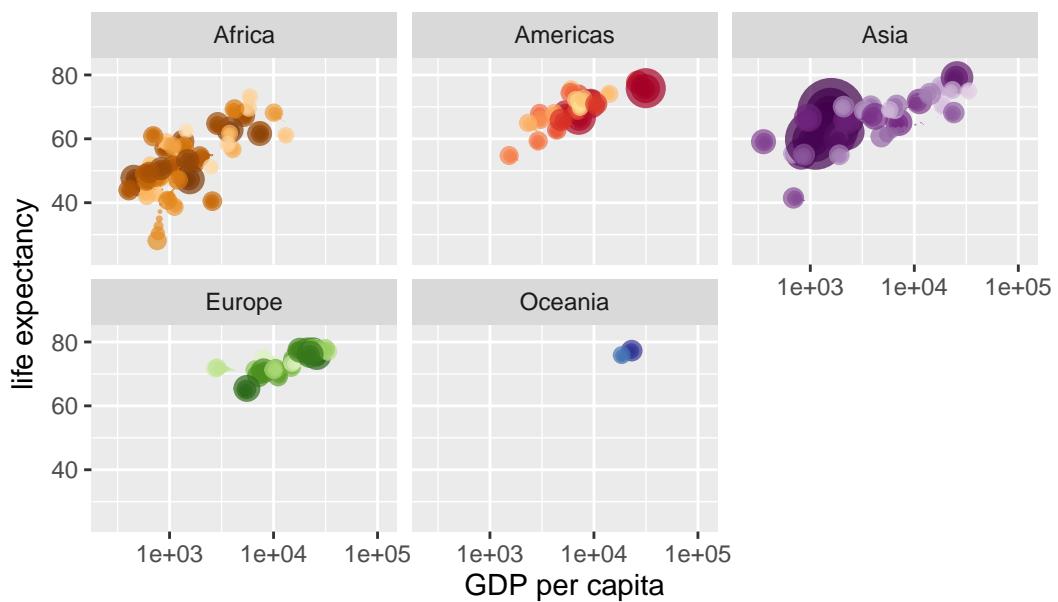
Year: 1990



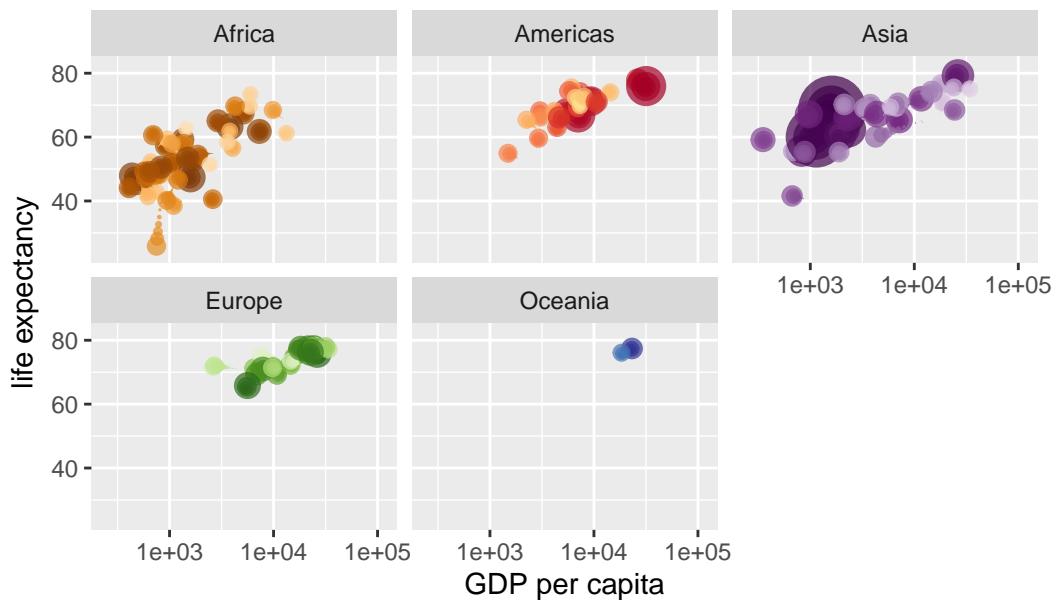
Year: 1990



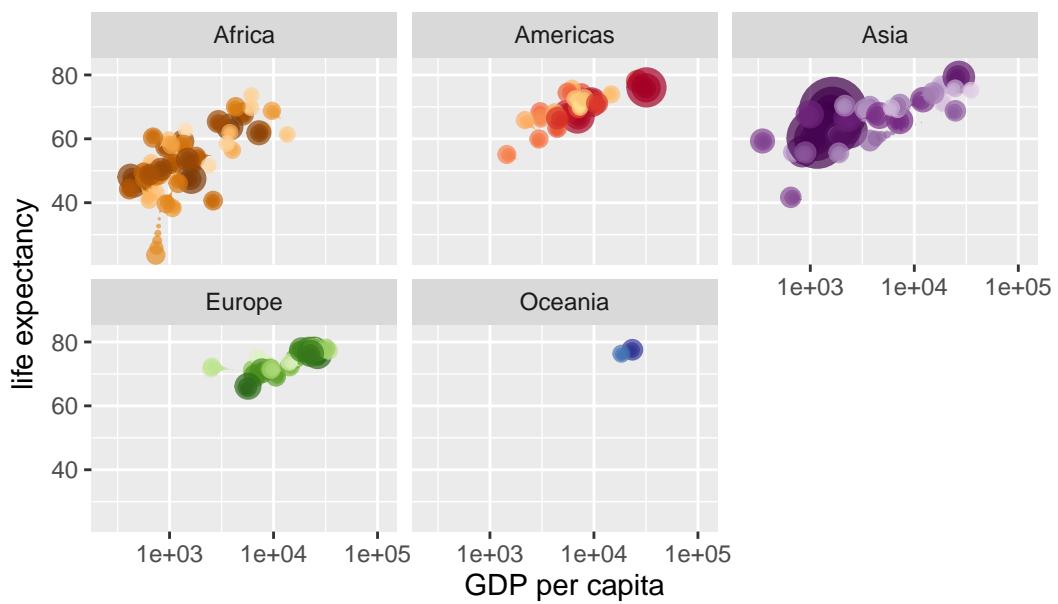
Year: 1991



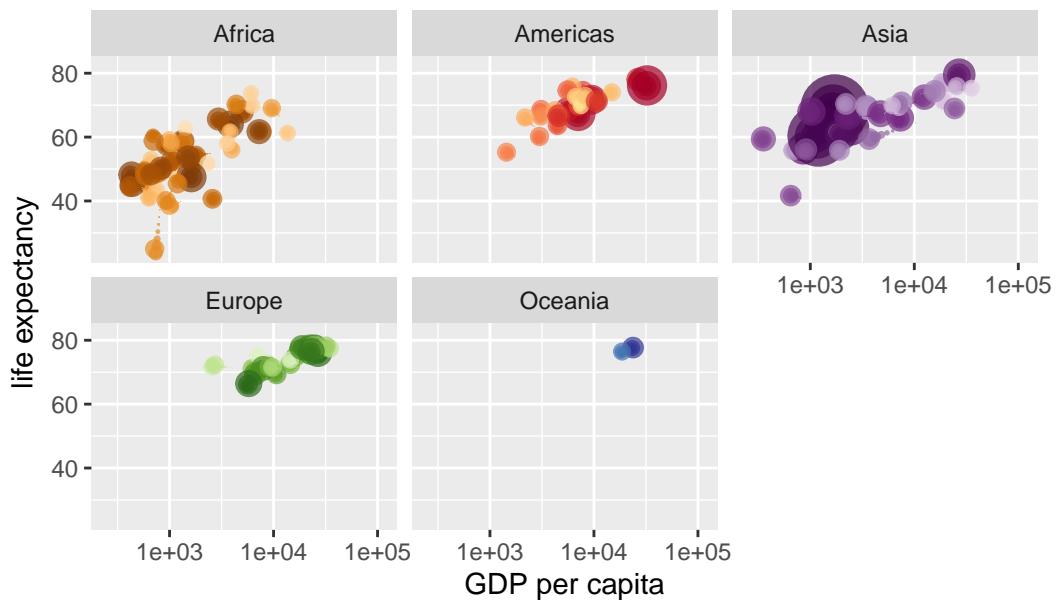
Year: 1991



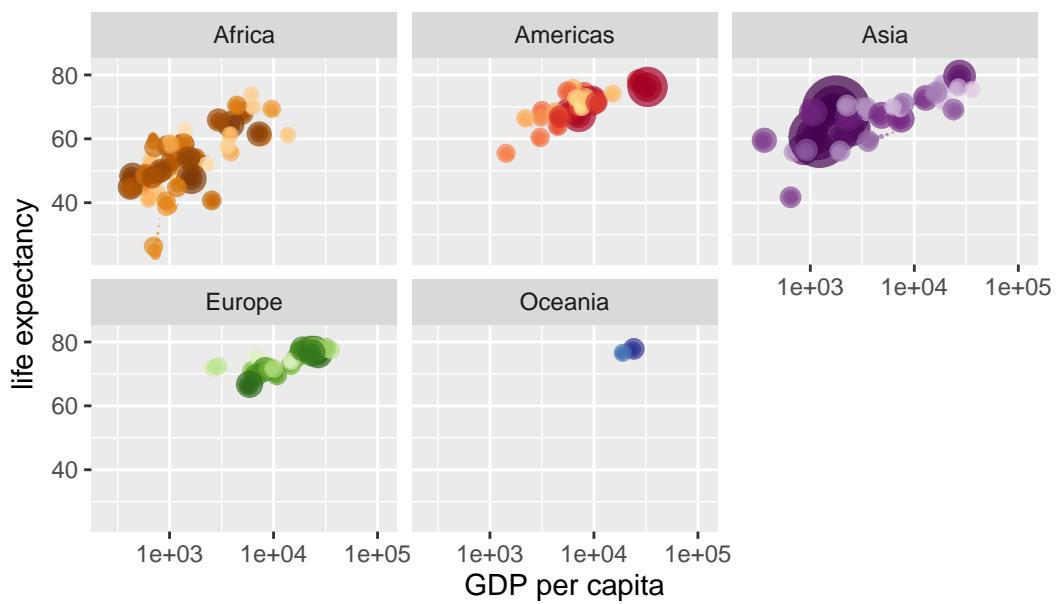
Year: 1992



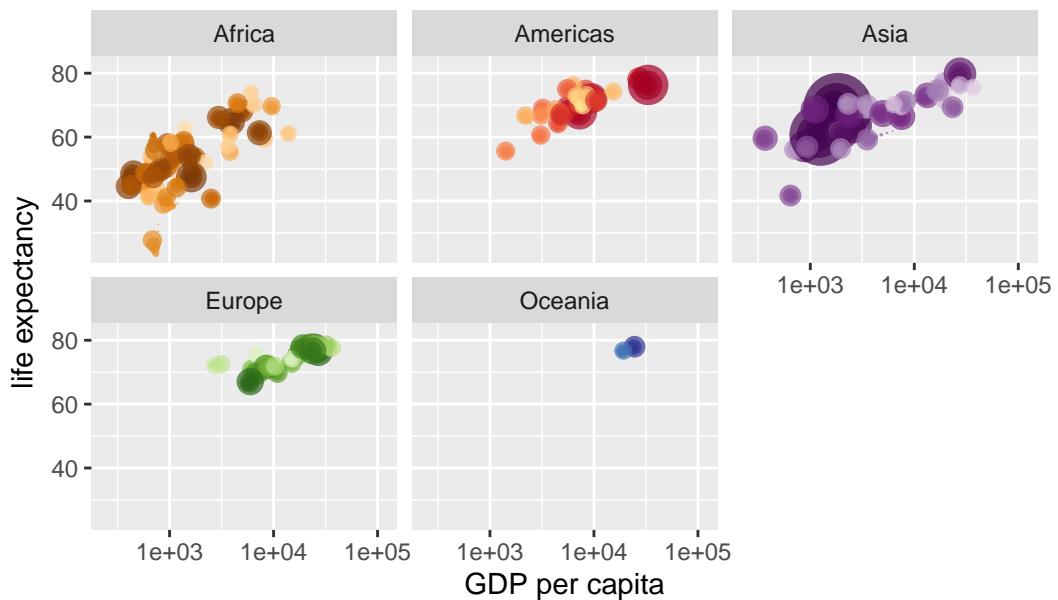
Year: 1993



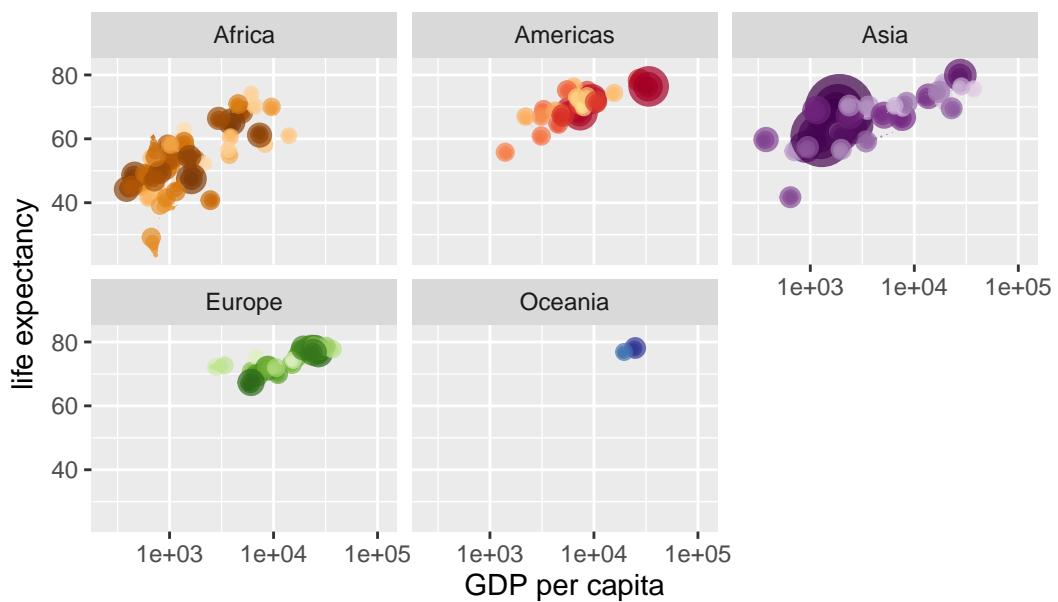
Year: 1993



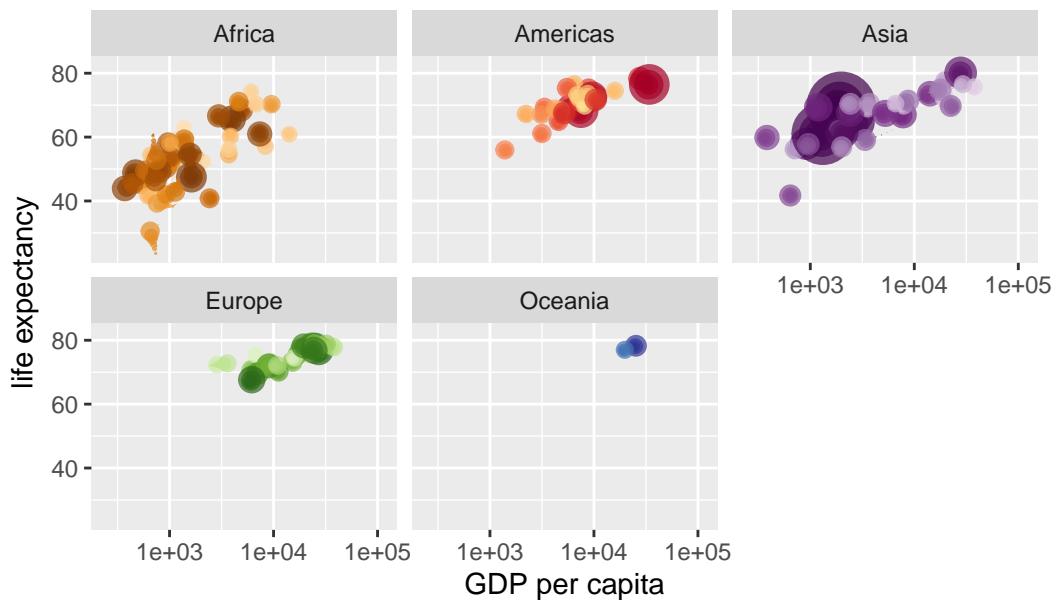
Year: 1994



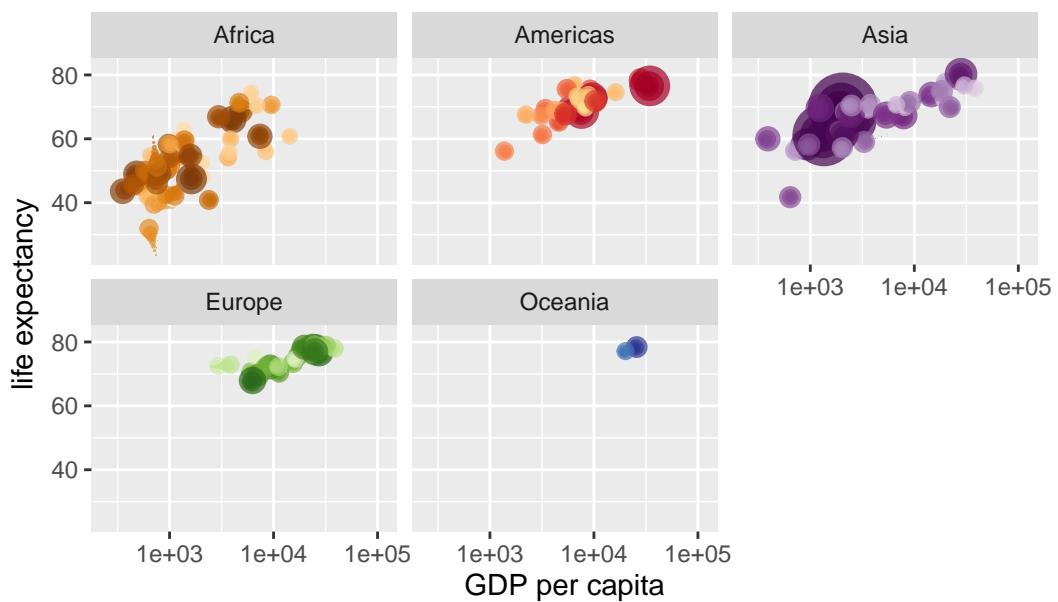
Year: 1994



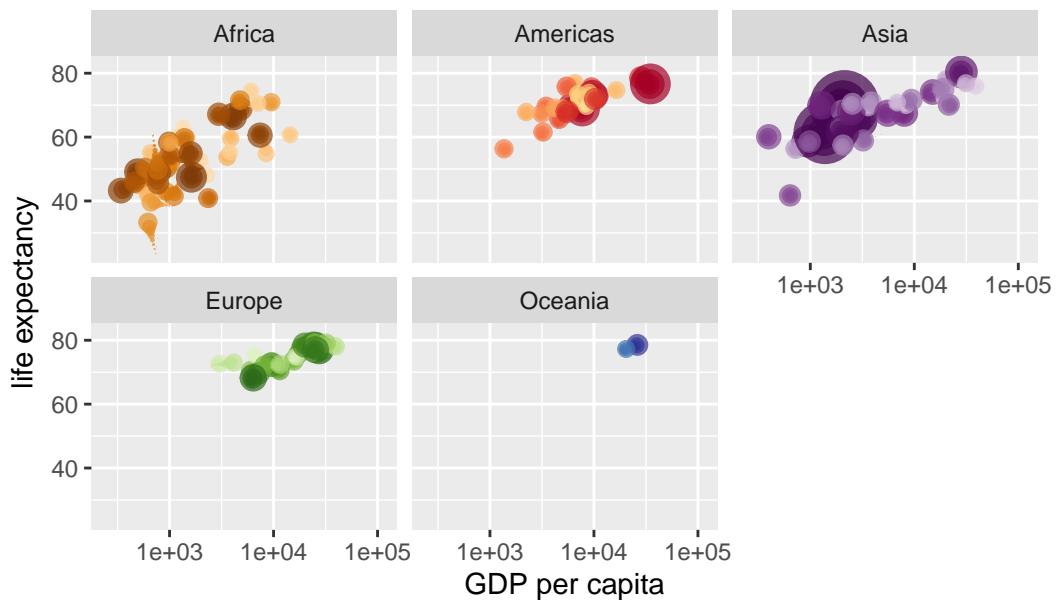
Year: 1995



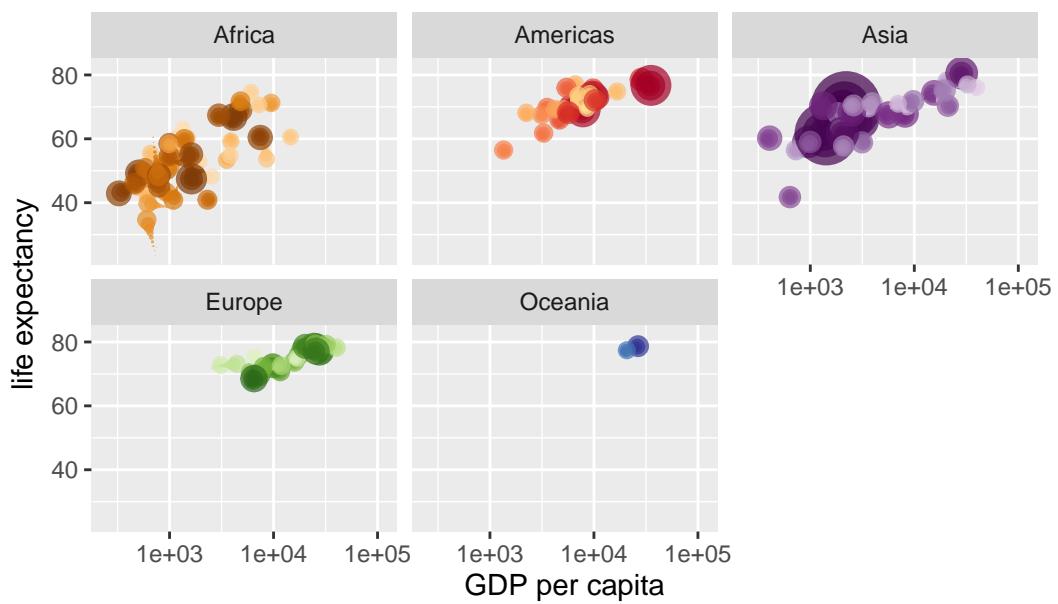
Year: 1995



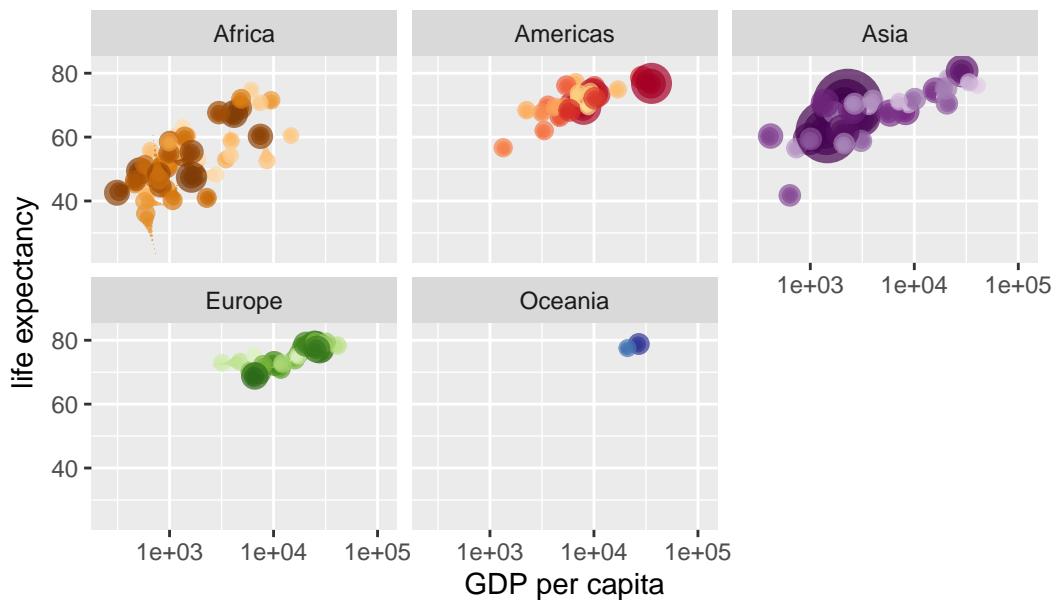
Year: 1996



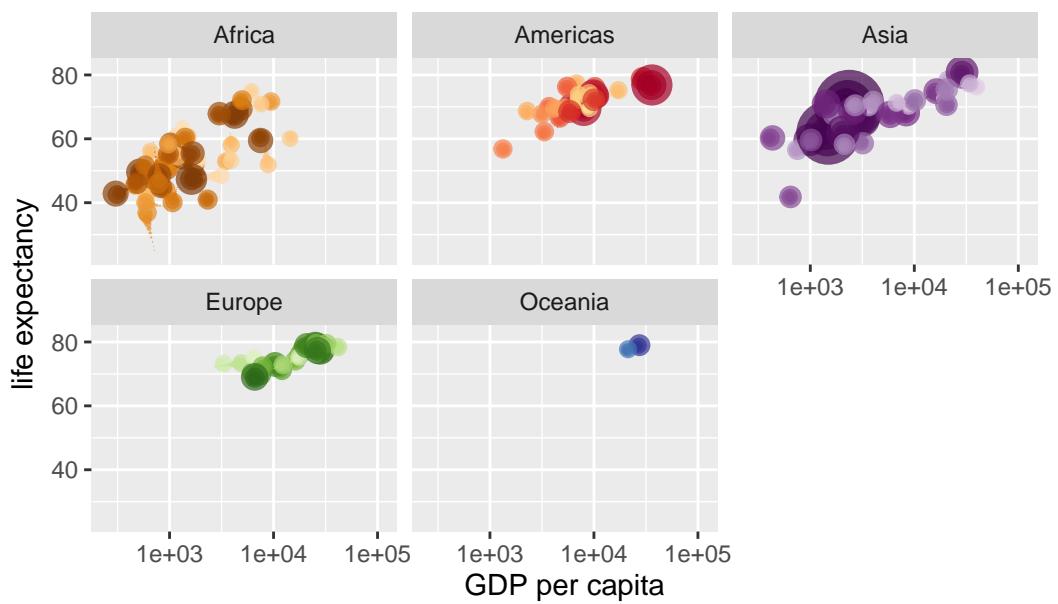
Year: 1996



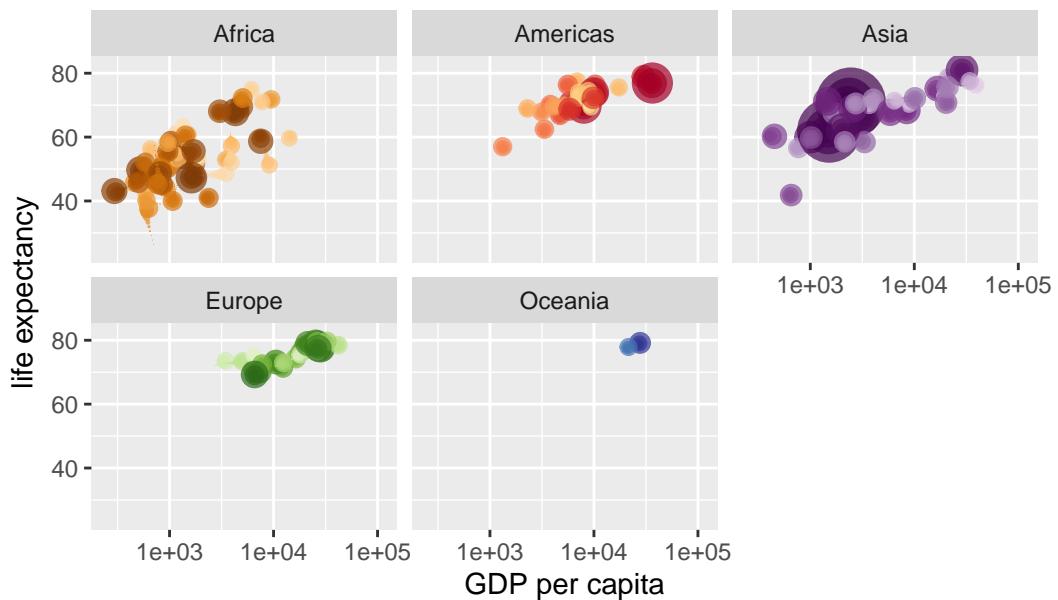
Year: 1997



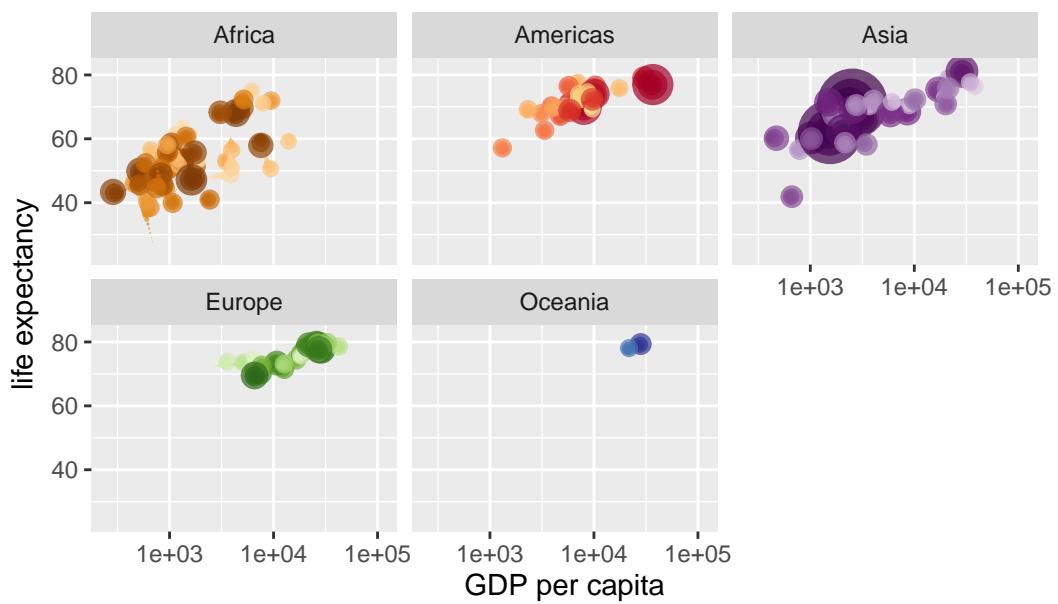
Year: 1998



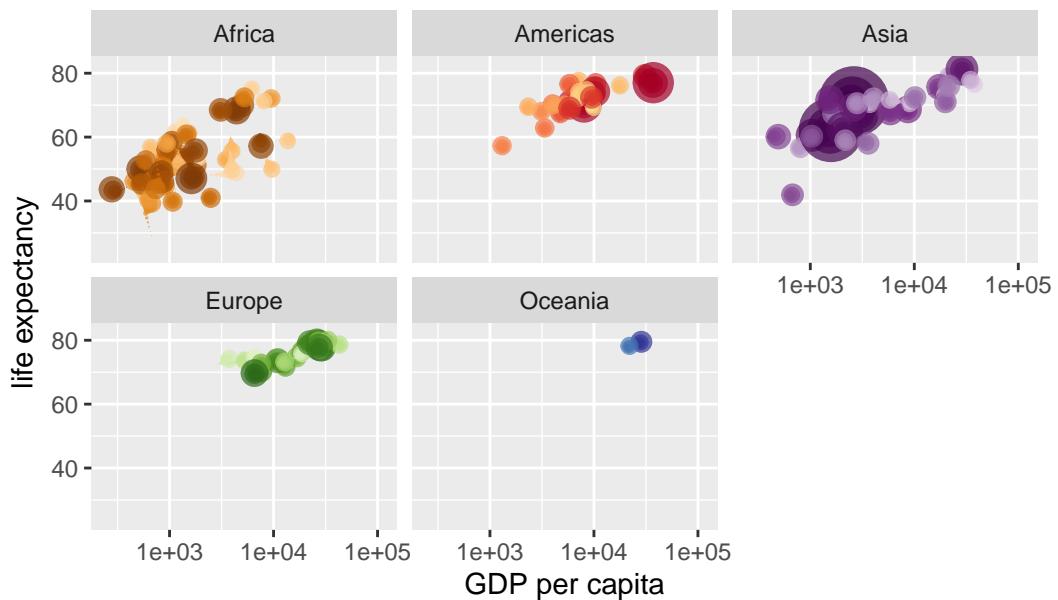
Year: 1998



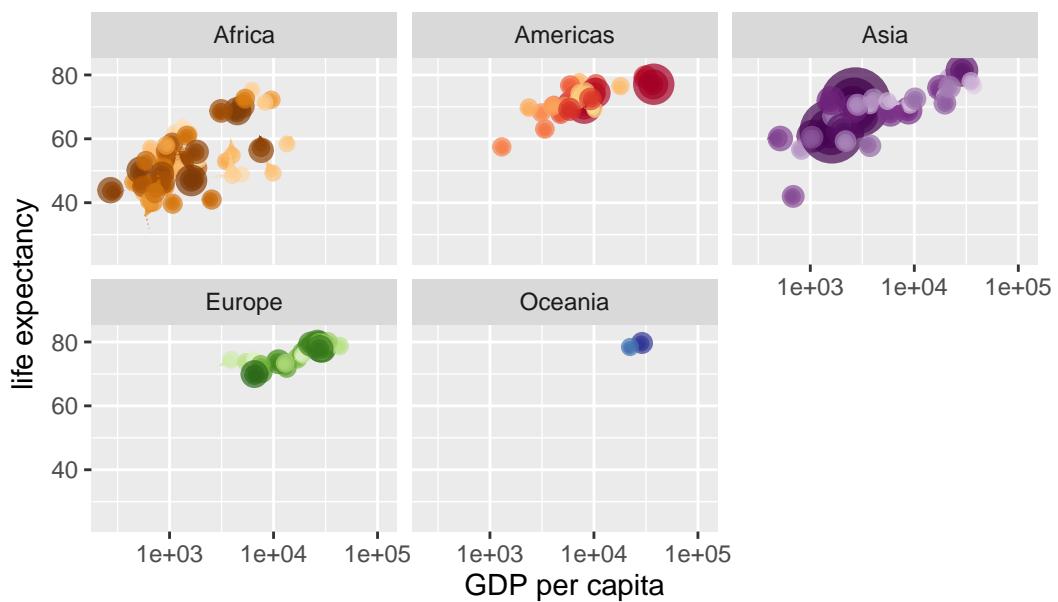
Year: 1999



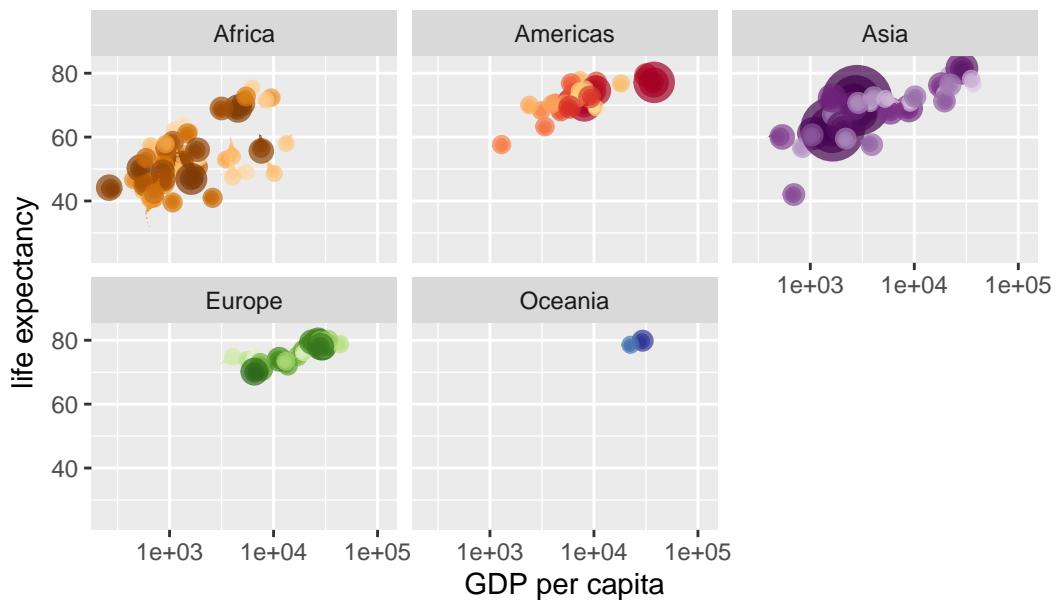
Year: 1999



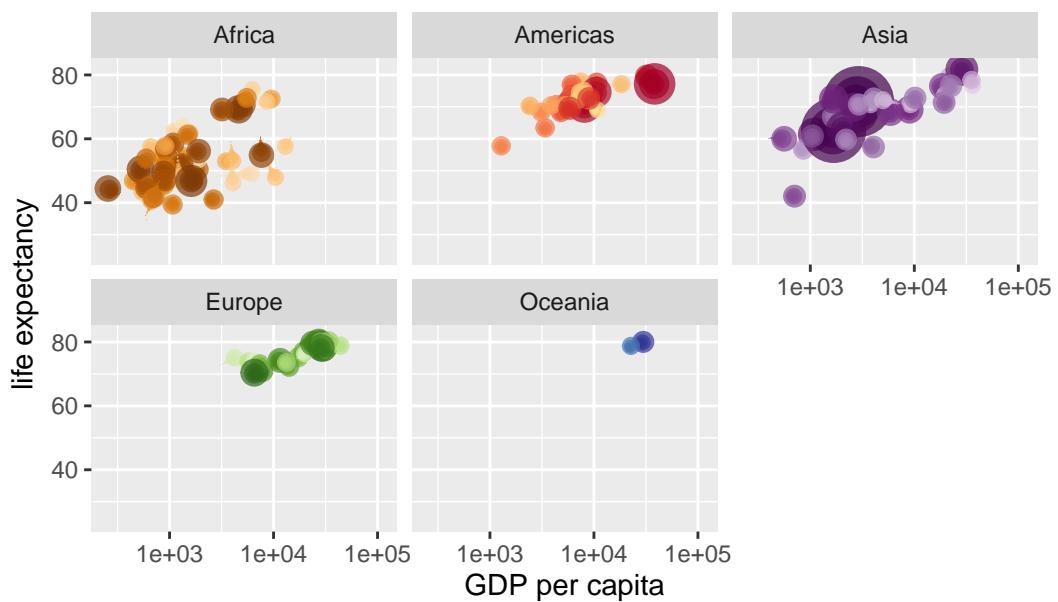
Year: 2000



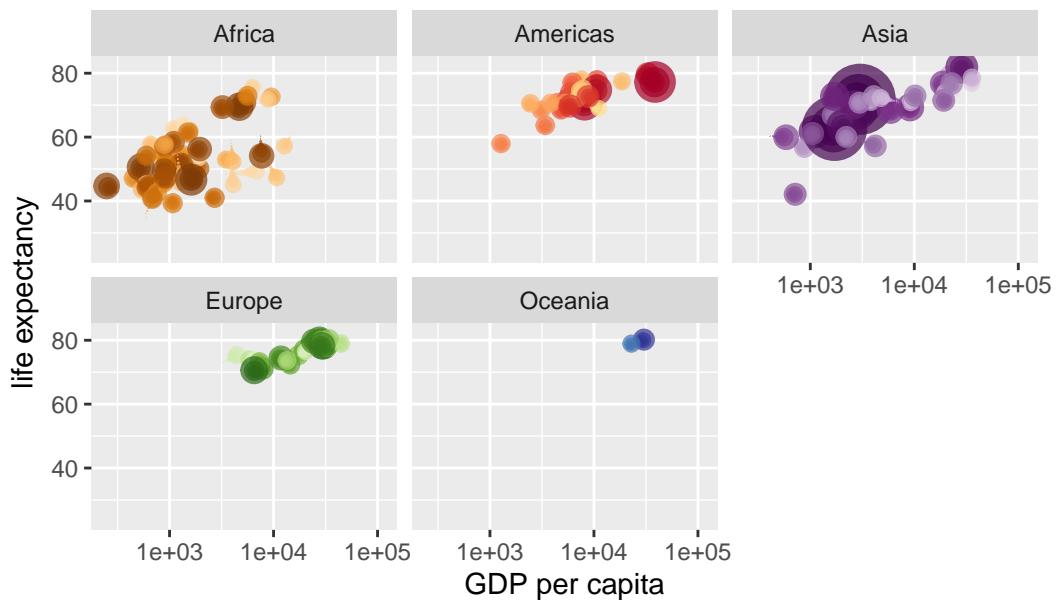
Year: 2000



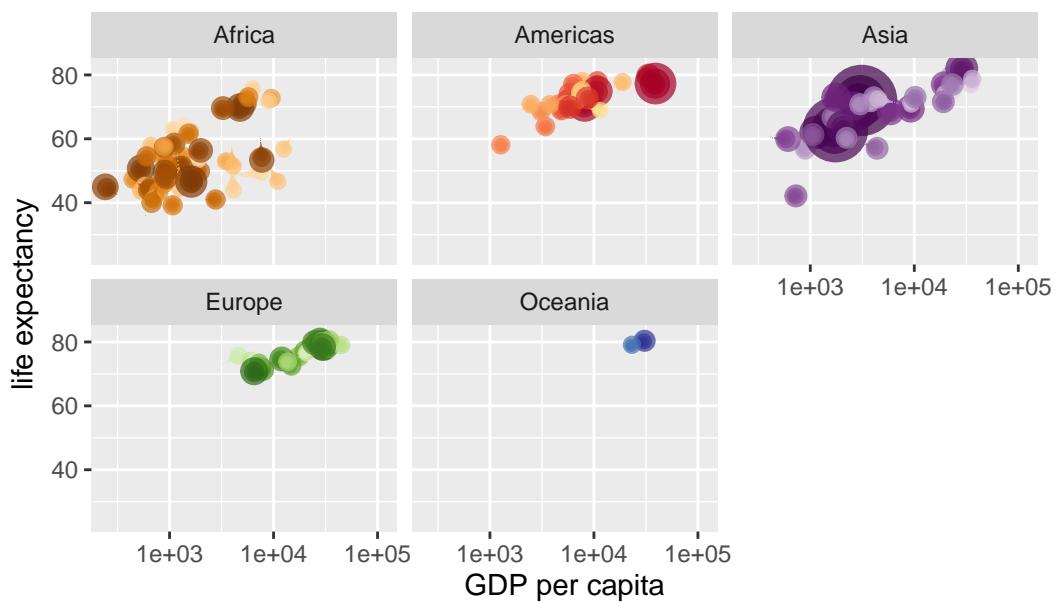
Year: 2001



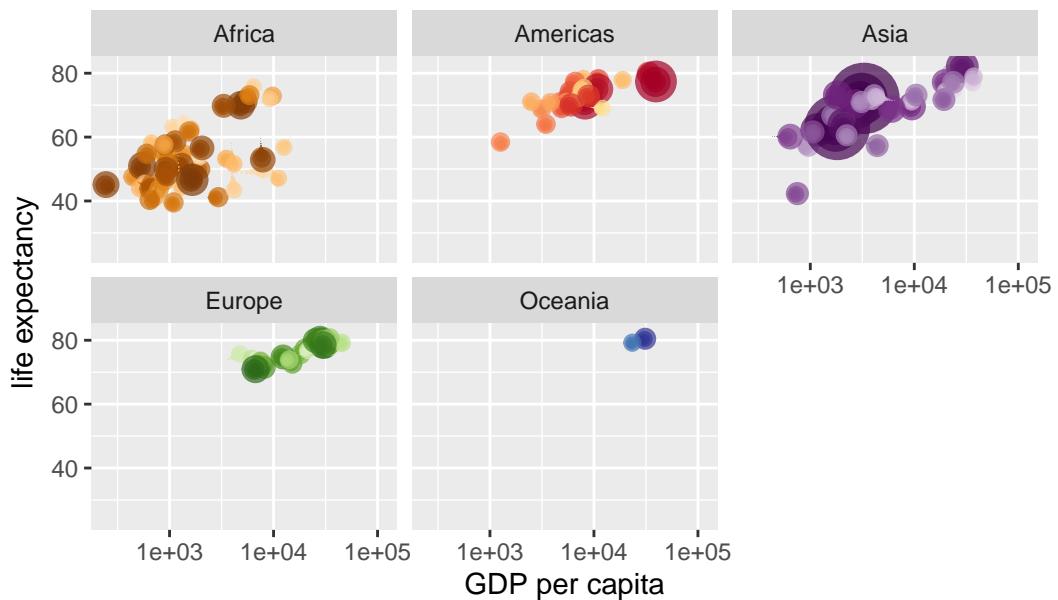
Year: 2001



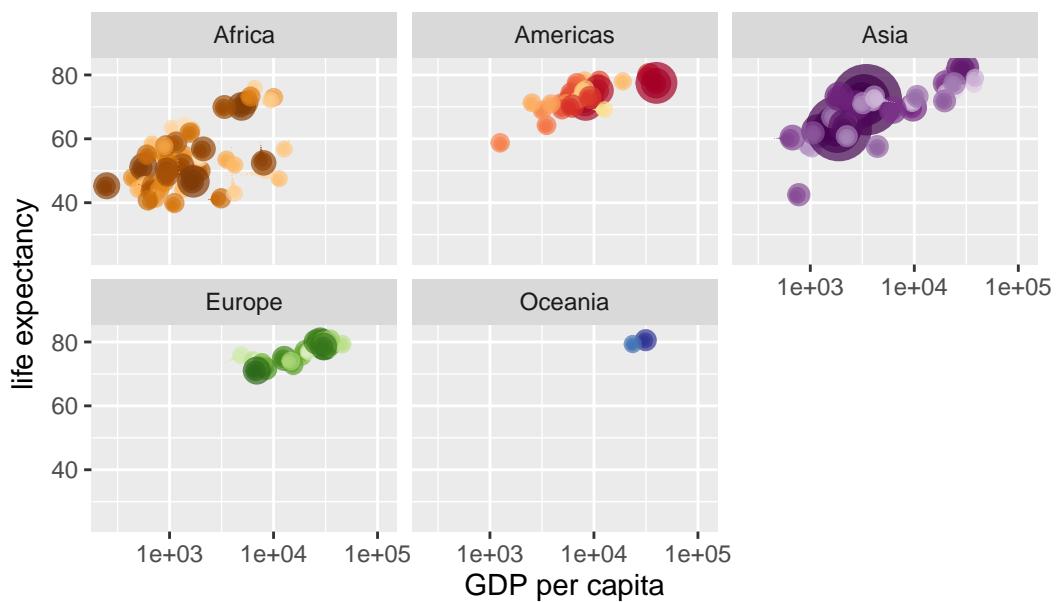
Year: 2002



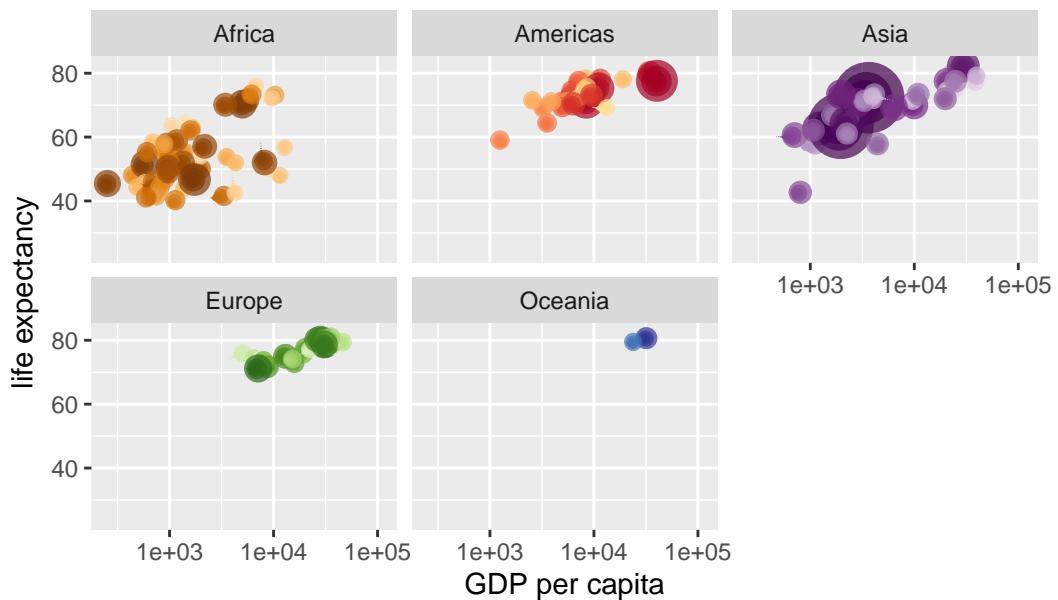
Year: 2003



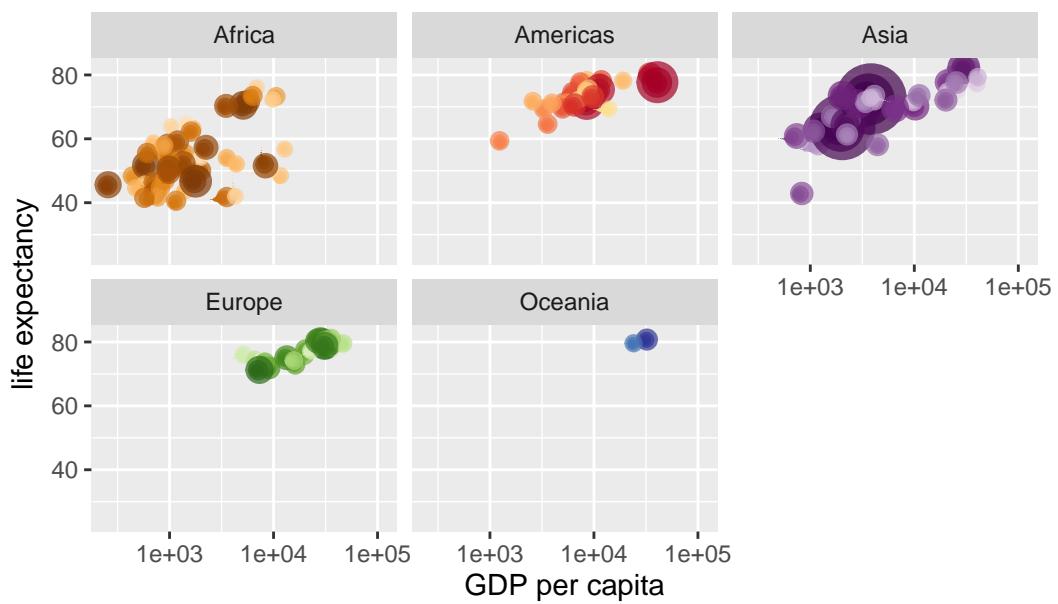
Year: 2003



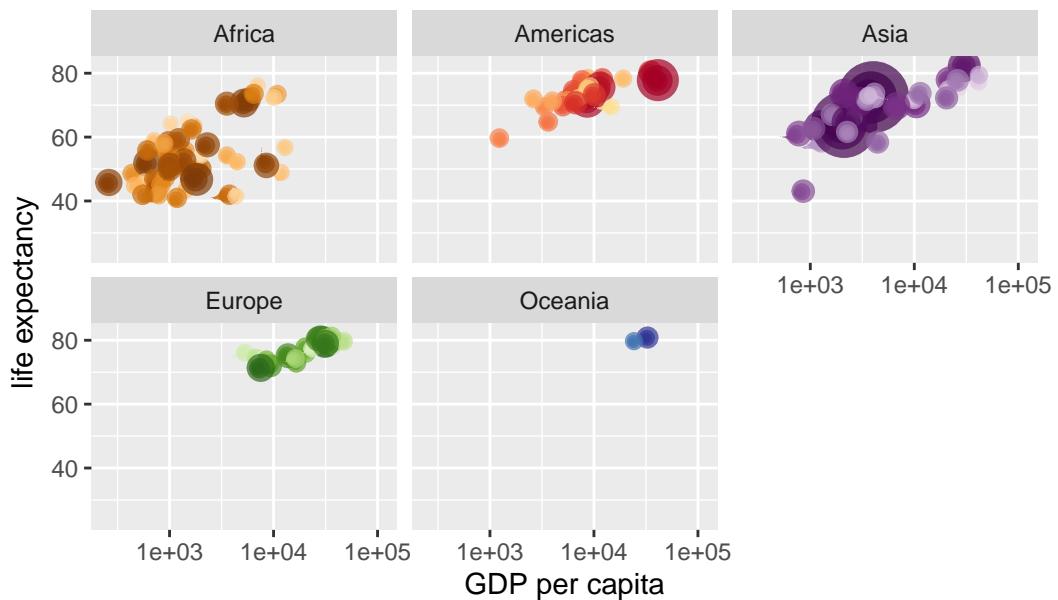
Year: 2004



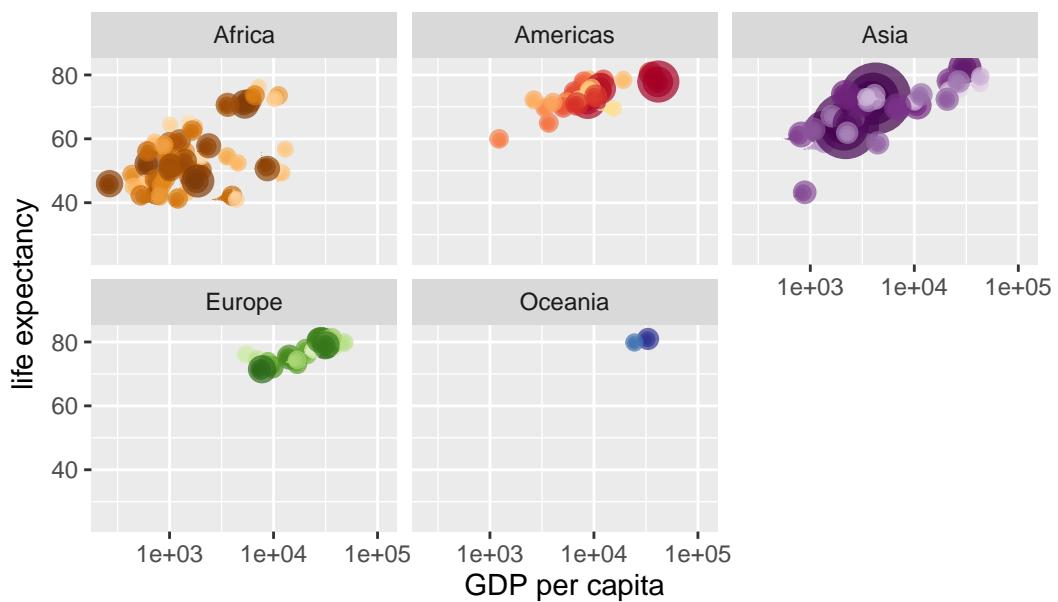
Year: 2004



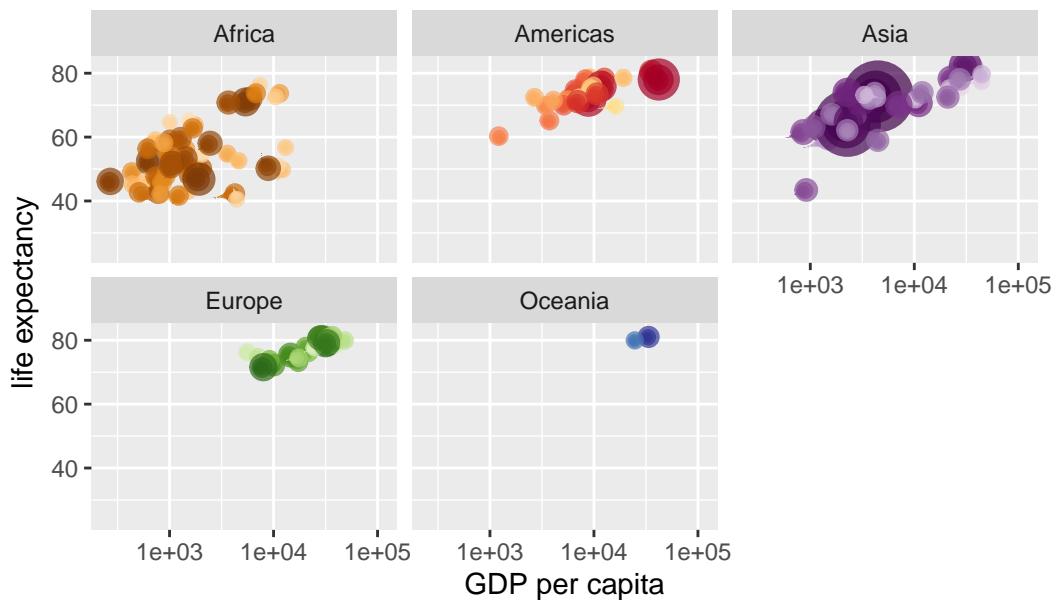
Year: 2005



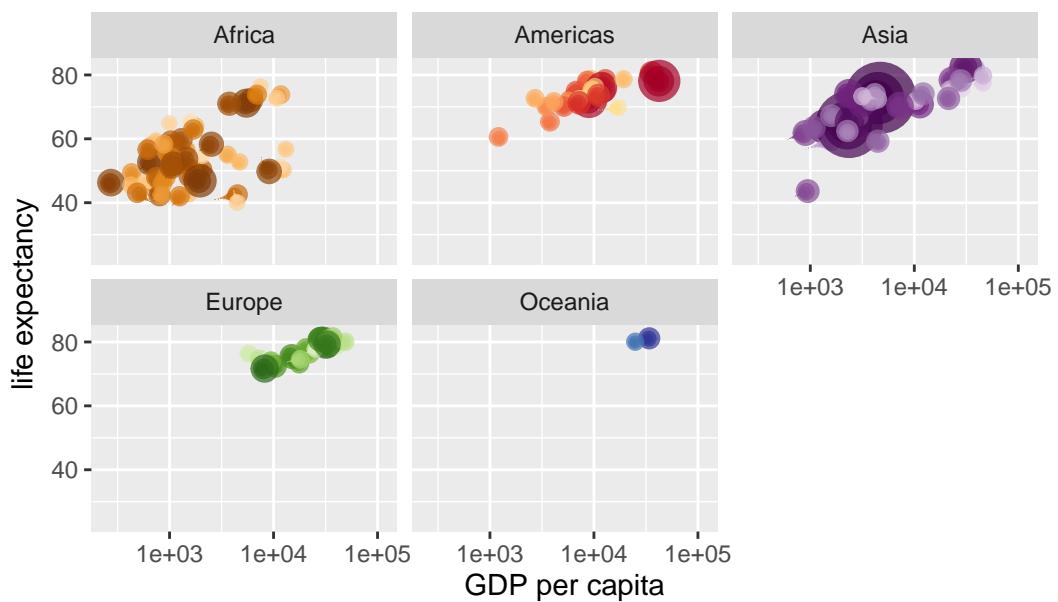
Year: 2005



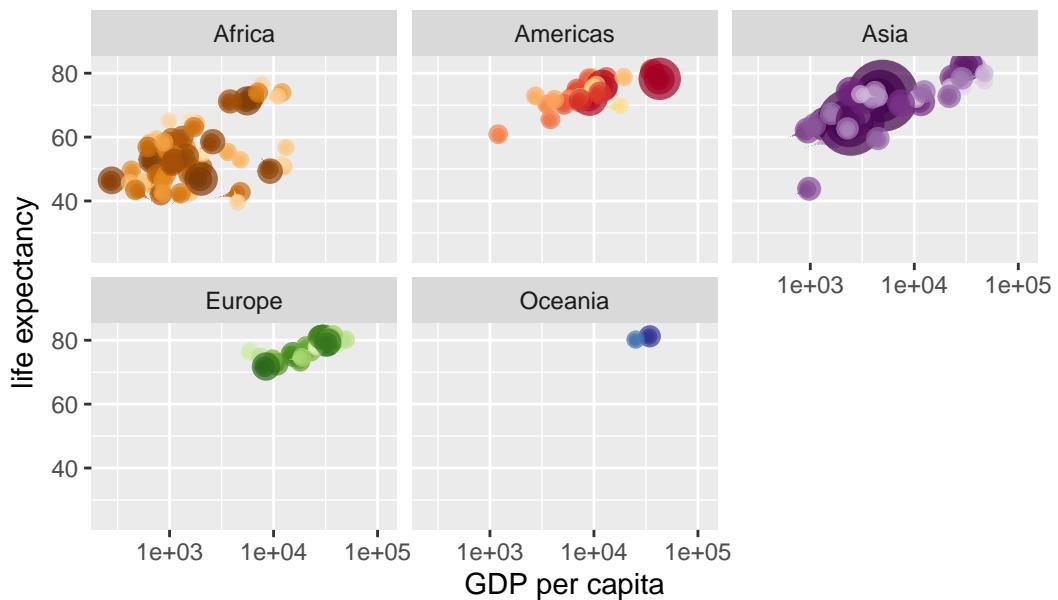
Year: 2006



Year: 2006



Year: 2007

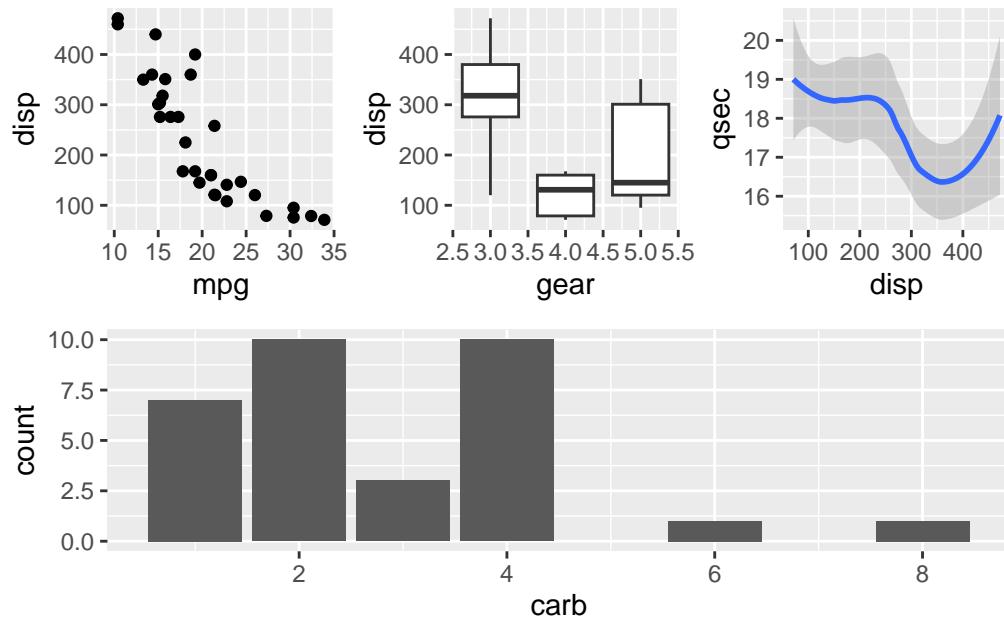


```
library(patchwork)

# Setup some example plots
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))

# Use patchwork to combine them here:
(p1 | p2 | p3) /
  p4

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



```
sessionInfo()
```

R version 4.5.1 (2025-06-13)
 Platform: aarch64-apple-darwin20
 Running under: macOS Sequoia 15.6

Matrix products: default
 BLAS: /Library/Frameworks/R.framework/Versions/4.5-arm64/Resources/lib/libRblas.0.dylib
 LAPACK: /Library/Frameworks/R.framework/Versions/4.5-arm64/Resources/lib/libRlapack.dylib

locale:
[1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8

time zone: America/Los_Angeles
tzcode source: internal

attached base packages:
[1] stats graphics grDevices utils datasets methods base

other attached packages:
[1] patchwork_1.3.2 gganimate_1.0.11 gapminder_1.0.1 dplyr_1.1.4
[5] ggplot2_4.0.0

loaded via a namespace (and not attached):

| | | | |
|---------------------|------------------|--------------------|-------------------|
| [1] Matrix_1.7-3 | gtable_0.3.6 | jsonlite_2.0.0 | compiler_4.5.1 |
| [5] crayon_1.5.3 | tidyselect_1.2.1 | splines_4.5.1 | progress_1.2.3 |
| [9] scales_1.4.0 | yaml_2.3.10 | fastmap_1.2.0 | lattice_0.22-7 |
| [13] R6_2.6.1 | labeling_0.4.3 | generics_0.1.4 | knitr_1.50 |
| [17] tibble_3.3.0 | pillar_1.11.1 | RColorBrewer_1.1-3 | rlang_1.1.6 |
| [21] stringi_1.8.7 | xfun_0.53 | S7_0.2.0 | cli_3.6.5 |
| [25] mgcv_1.9-3 | withr_3.0.2 | magrittr_2.0.4 | tweenr_2.0.3 |
| [29] digest_0.6.37 | grid_4.5.1 | rstudioapi_0.17.1 | hms_1.1.3 |
| [33] nlme_3.1-168 | ifecycle_1.0.4 | prettyunits_1.2.0 | vctrs_0.6.5 |
| [37] evaluate_1.0.5 | glue_1.8.0 | farver_2.1.2 | gifski_1.32.0-2 |
| [41] rmarkdown_2.30 | tools_4.5.1 | pkgconfig_2.0.3 | htmltools_0.5.8.1 |