

Class 5 Lab

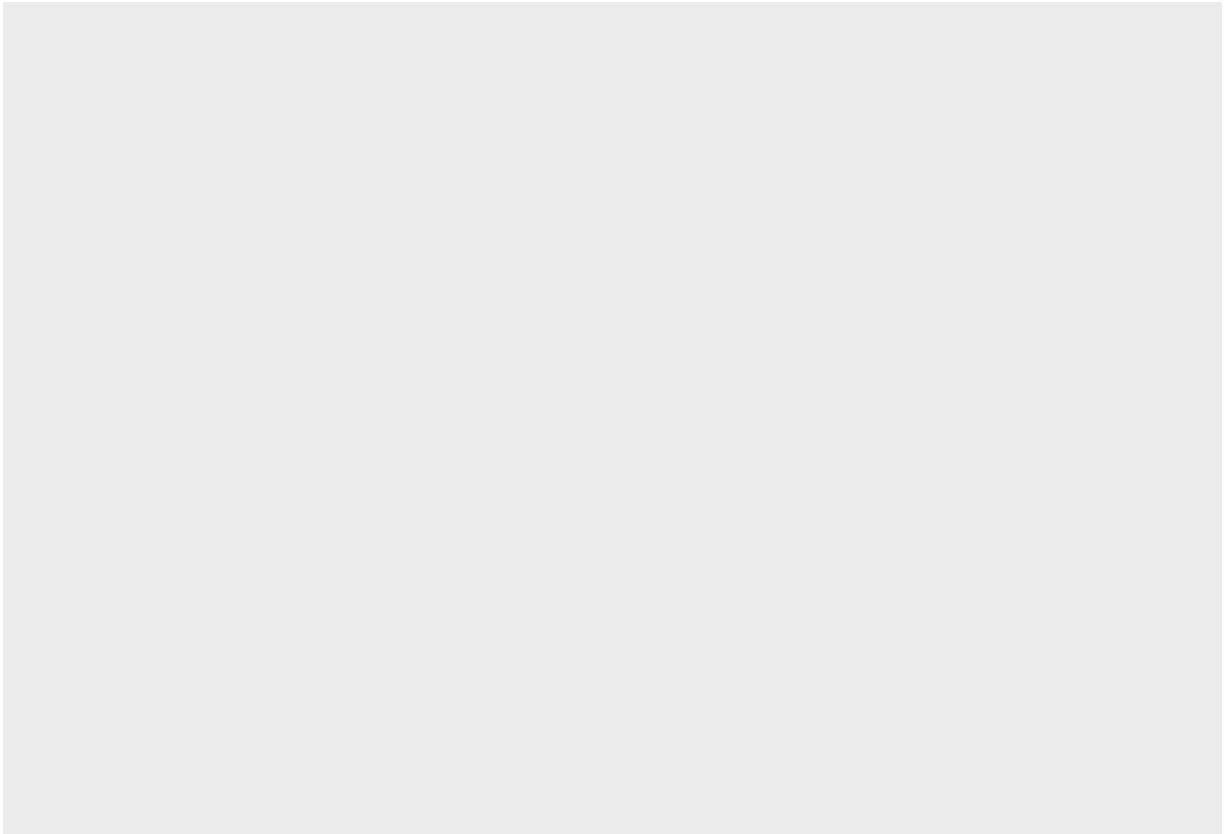
Yash Garodia (PID: A16165682)

Febuary 1st, 2022

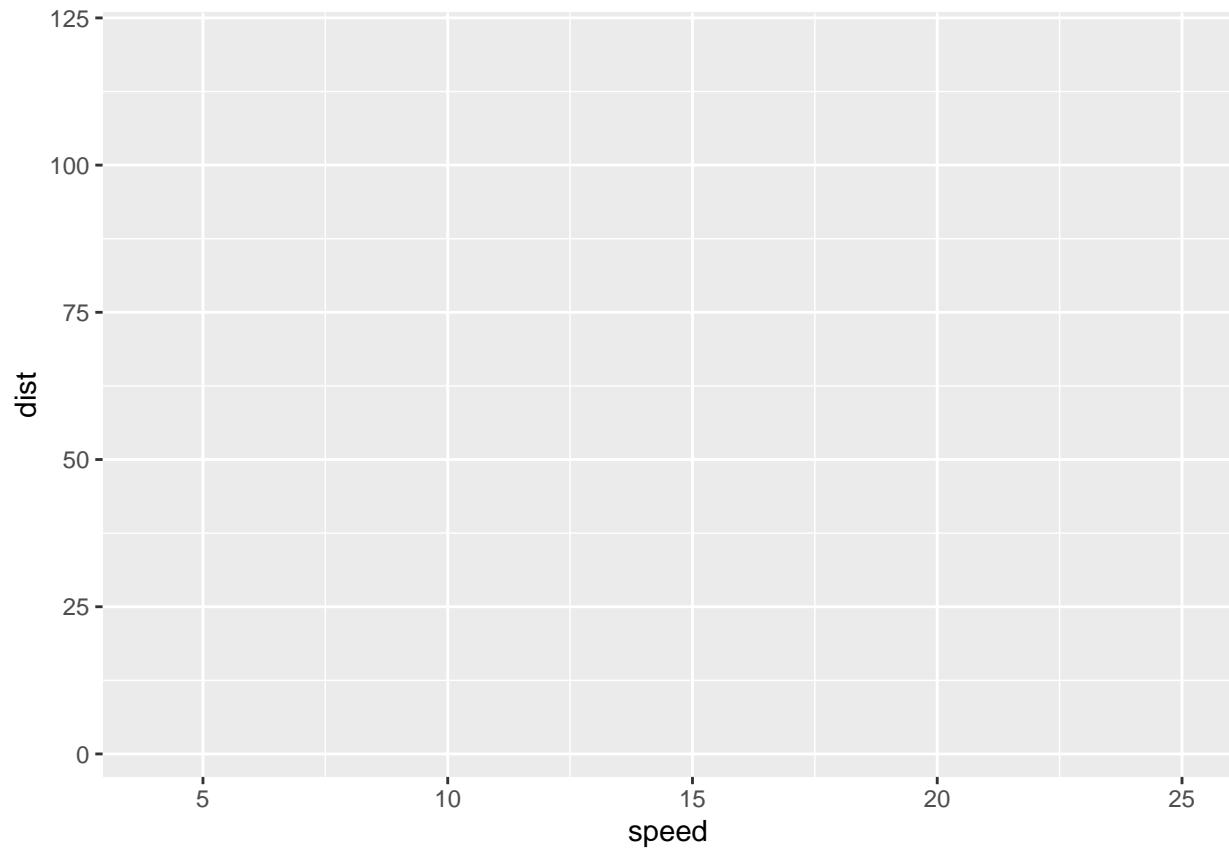
```
library(ggplot2)

## Warning: package 'ggplot2' was built under R version 4.0.2

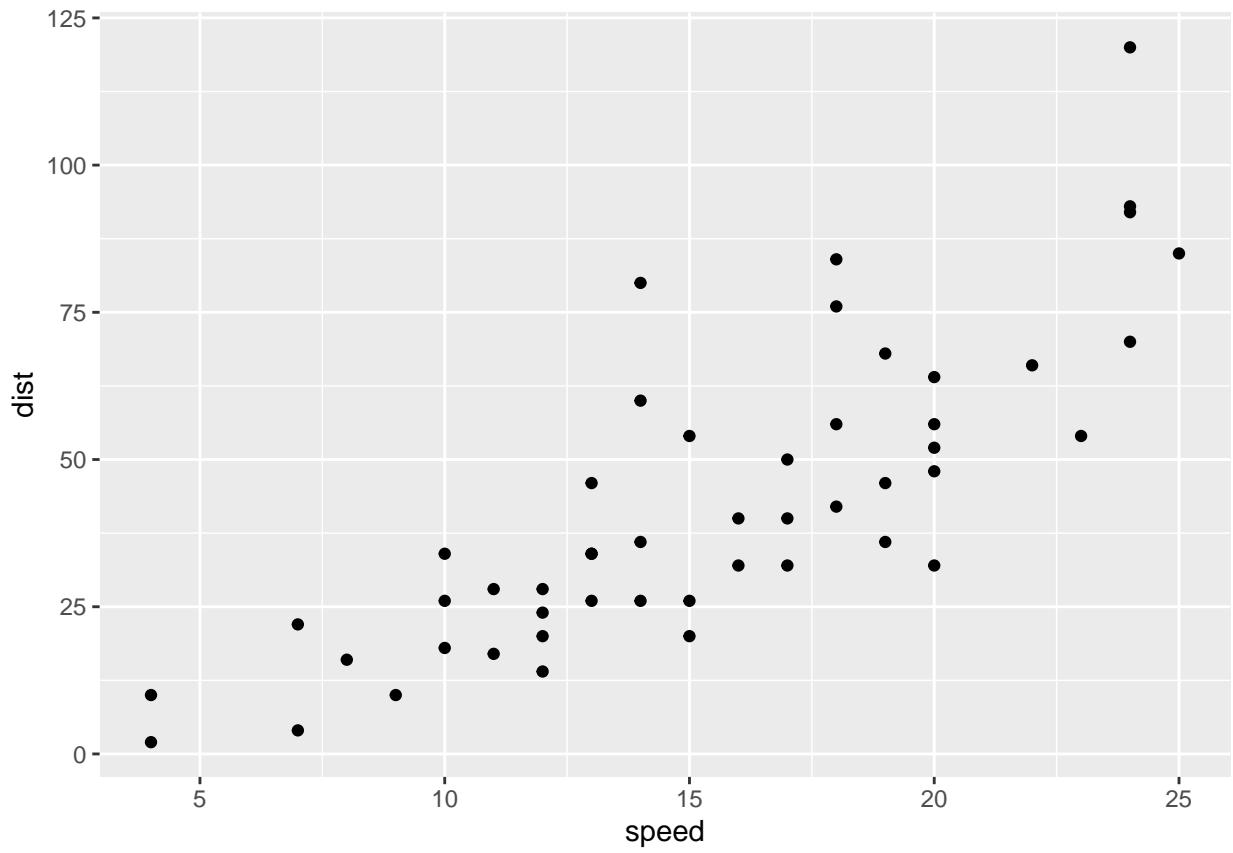
ggplot(cars)
```



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

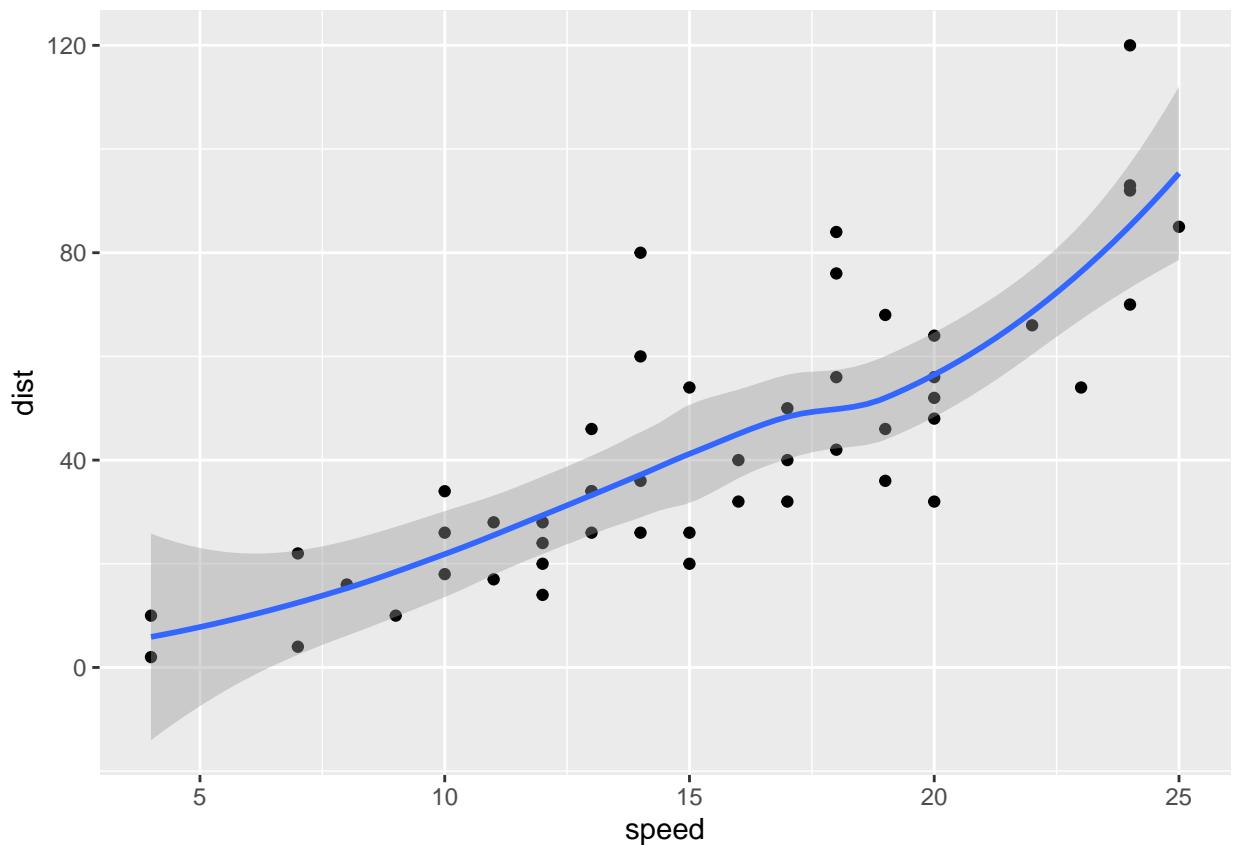


```
ggplot(cars) + aes(x = speed, y = dist) + geom_point()
```



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

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

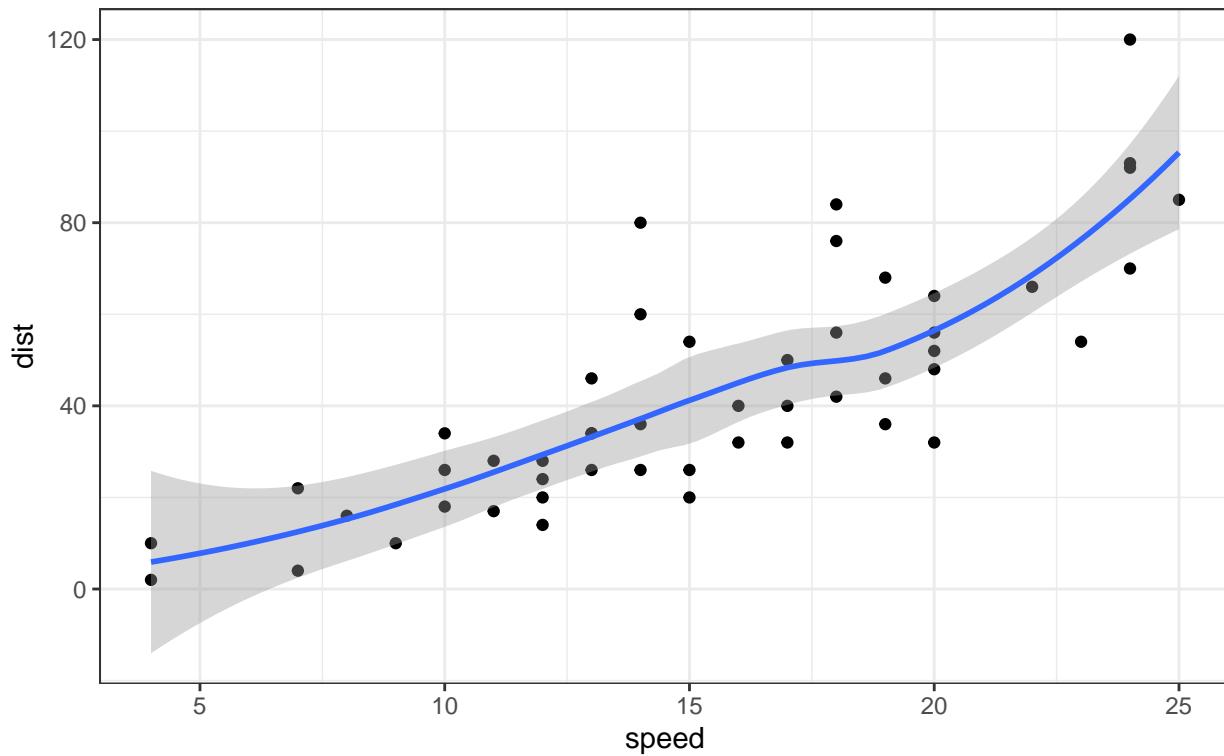


```
ggplot(cars) + aes(x = speed, y = dist) + geom_point() + geom_smooth() + theme_bw() + labs(title = "Speed vs Distance")
```

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

Speed Distance Relationship Between Cars

Random survey 2020

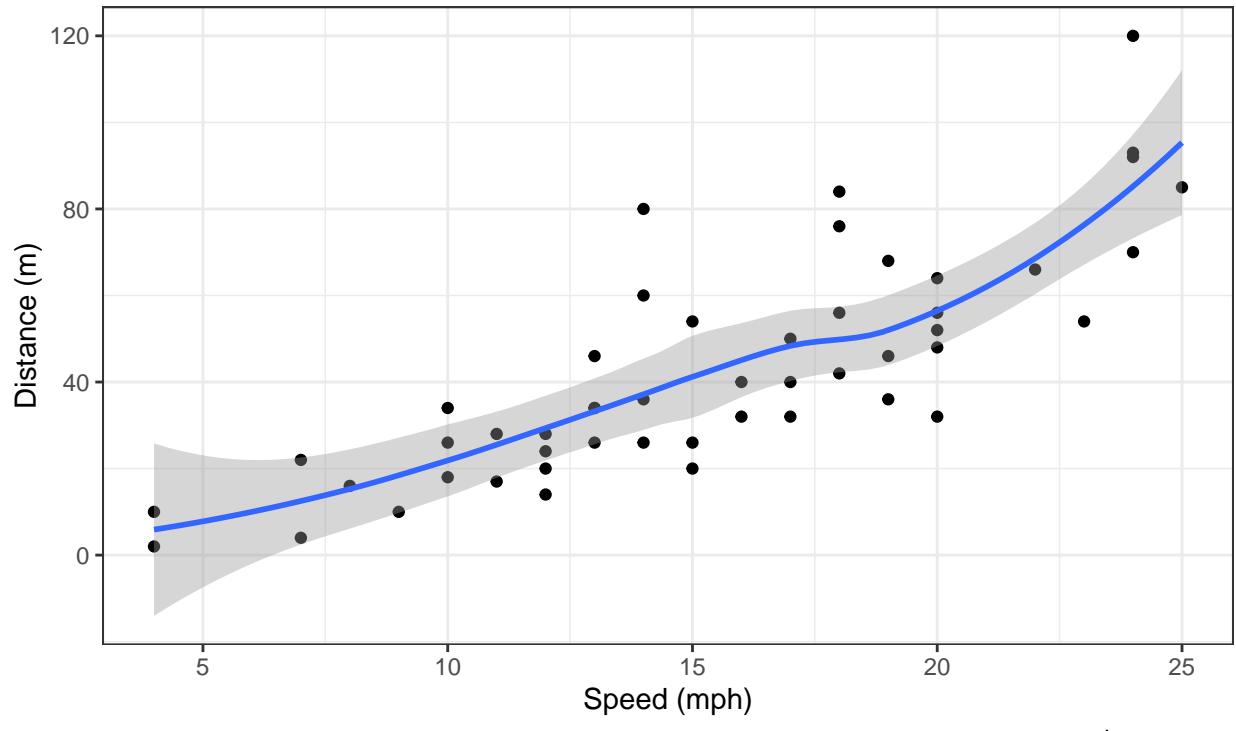


```
ggplot(cars) + aes(x = speed, y = dist) + geom_point() + geom_smooth() + theme_bw() + labs(title = "Speed
```

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

Speed Distance Relationship Between Cars

Random survey 2020



dataset :cars

```
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"
```

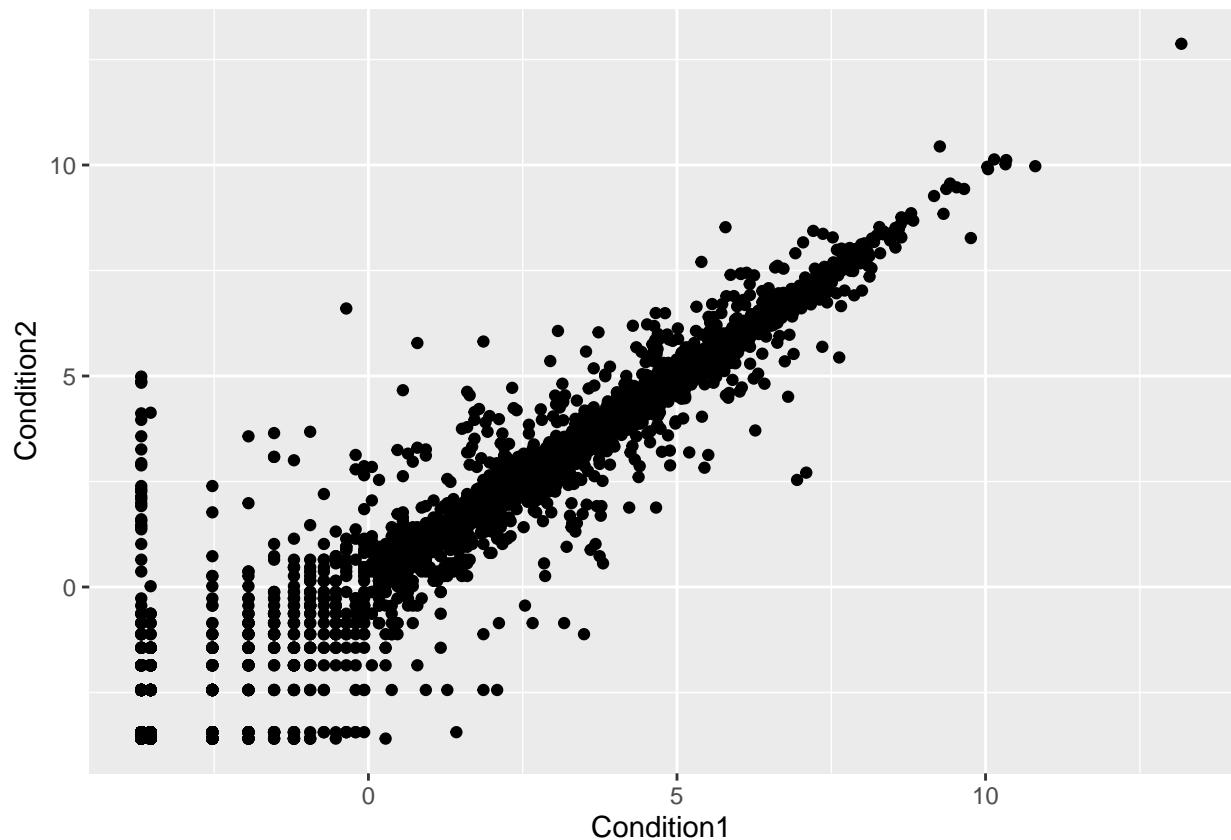
```
summary(genes)
```

```
##      Gene        Condition1        Condition2       State
##  Length:5196    Min.   :-3.6809    Min.   :-3.5921  Length:5196
##  Class  :character  1st Qu.:-3.6809  1st Qu.:-3.5921  Class  :character
##  Mode   :character  Median :-0.9439  Median :-0.8552  Mode   :character
##                                         Mean   : 0.1800  Mean   : 0.2796
##                                         3rd Qu.: 4.0859  3rd Qu.: 4.0437
##                                         Max.   :13.1733  Max.   :12.8731
```

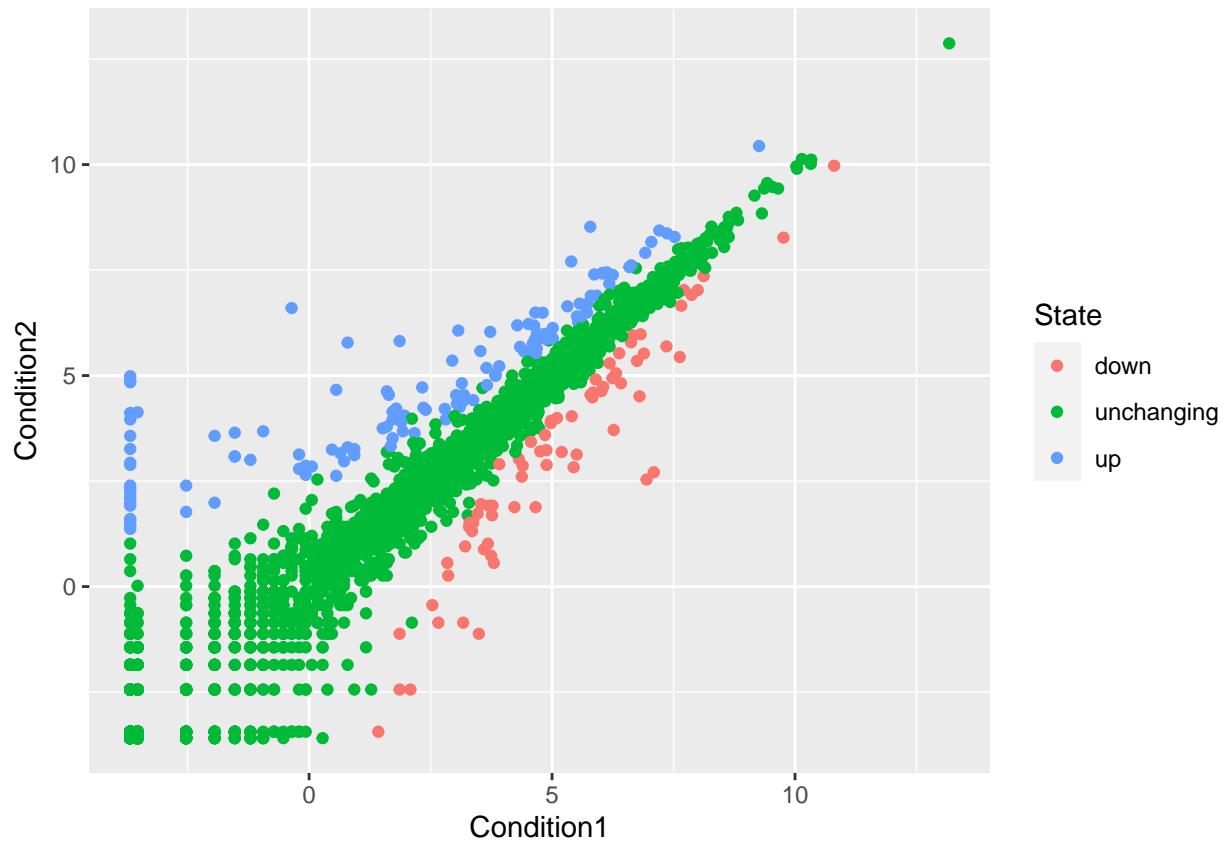
```
table(genes$state)
```

```
## < table of extent 0 >
```

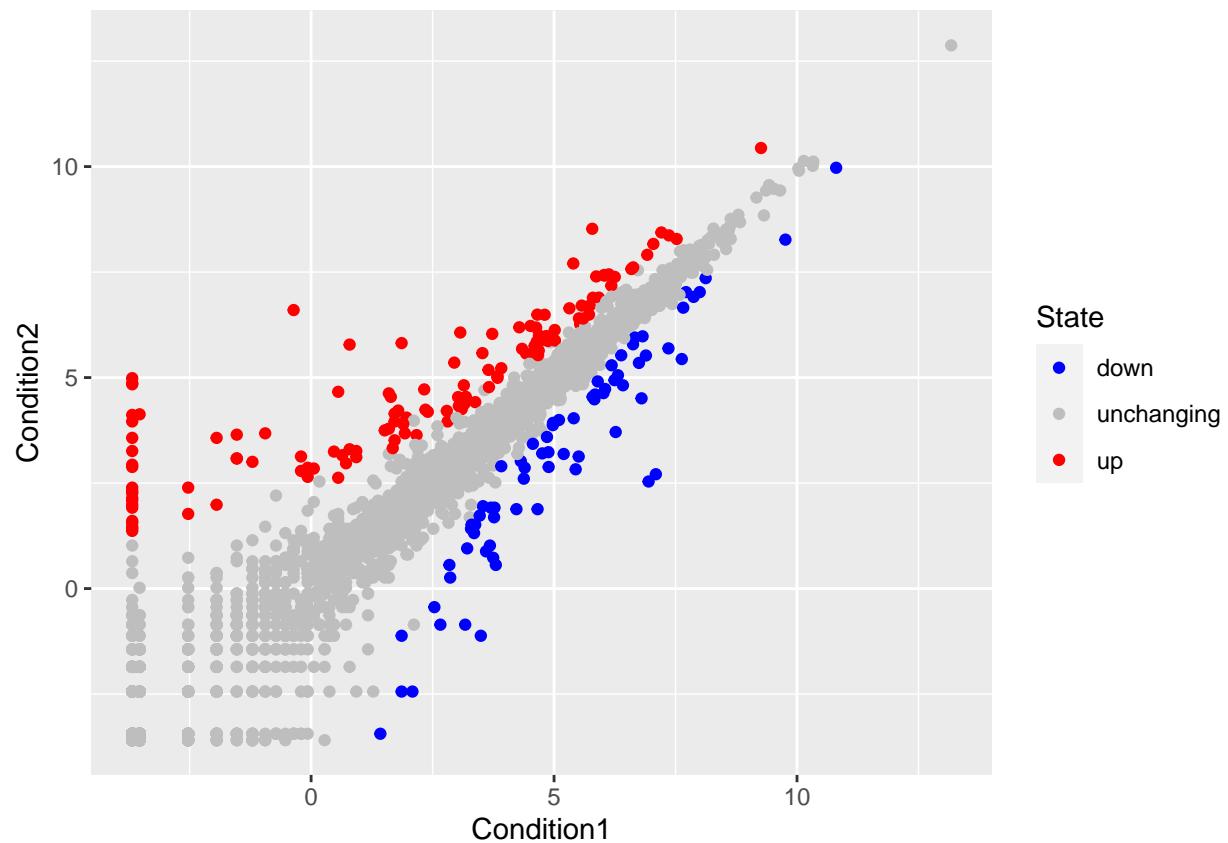
```
ggplot(data = genes) + aes(x = Condition1, y = Condition2) + geom_point()
```



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

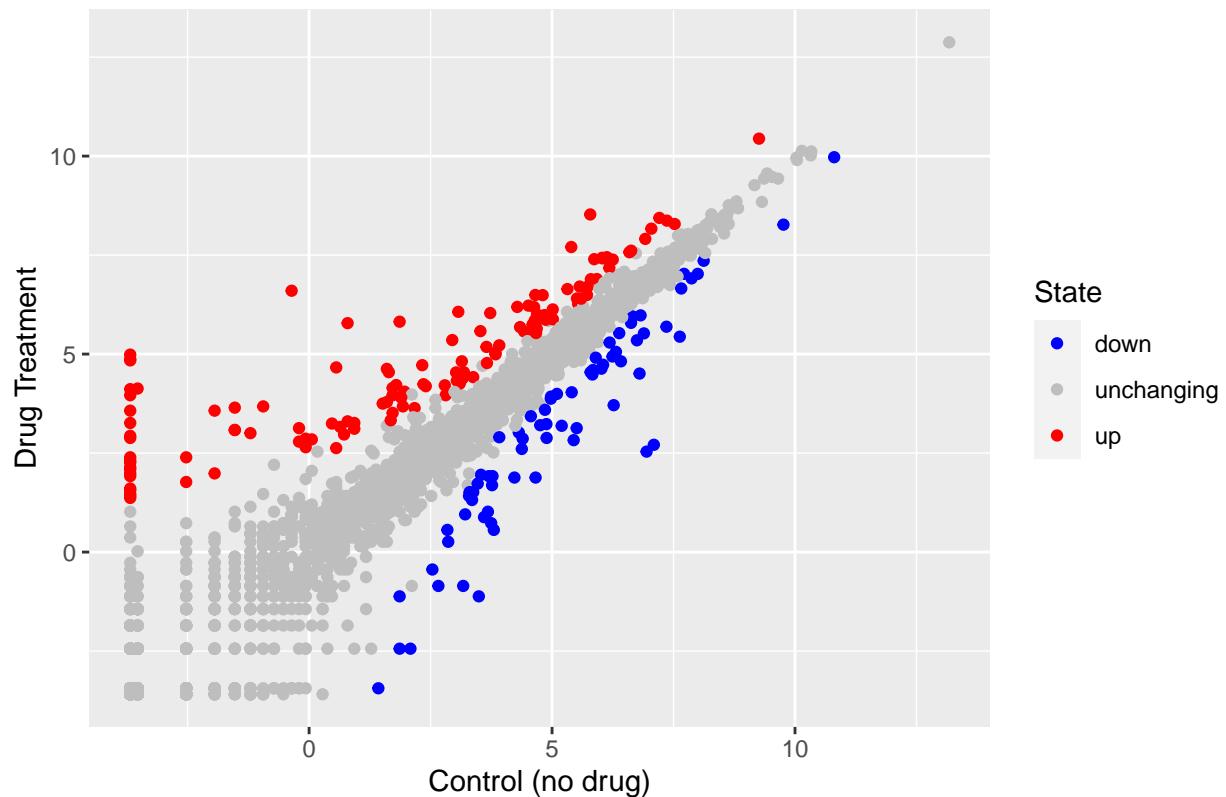


```
p<-p + scale_color_manual(values = c("blue", "gray", "red"))
p
```



```
p <- p + labs(title = "Gene Expression Changes Upon Drug Treatment", y = "Drug Treatment", x = "Control")  
p
```

Gene Expression Changes Upon Drug Treatment



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

## Warning: package 'gapminder' was built under R version 4.0.2

library(dplyr)

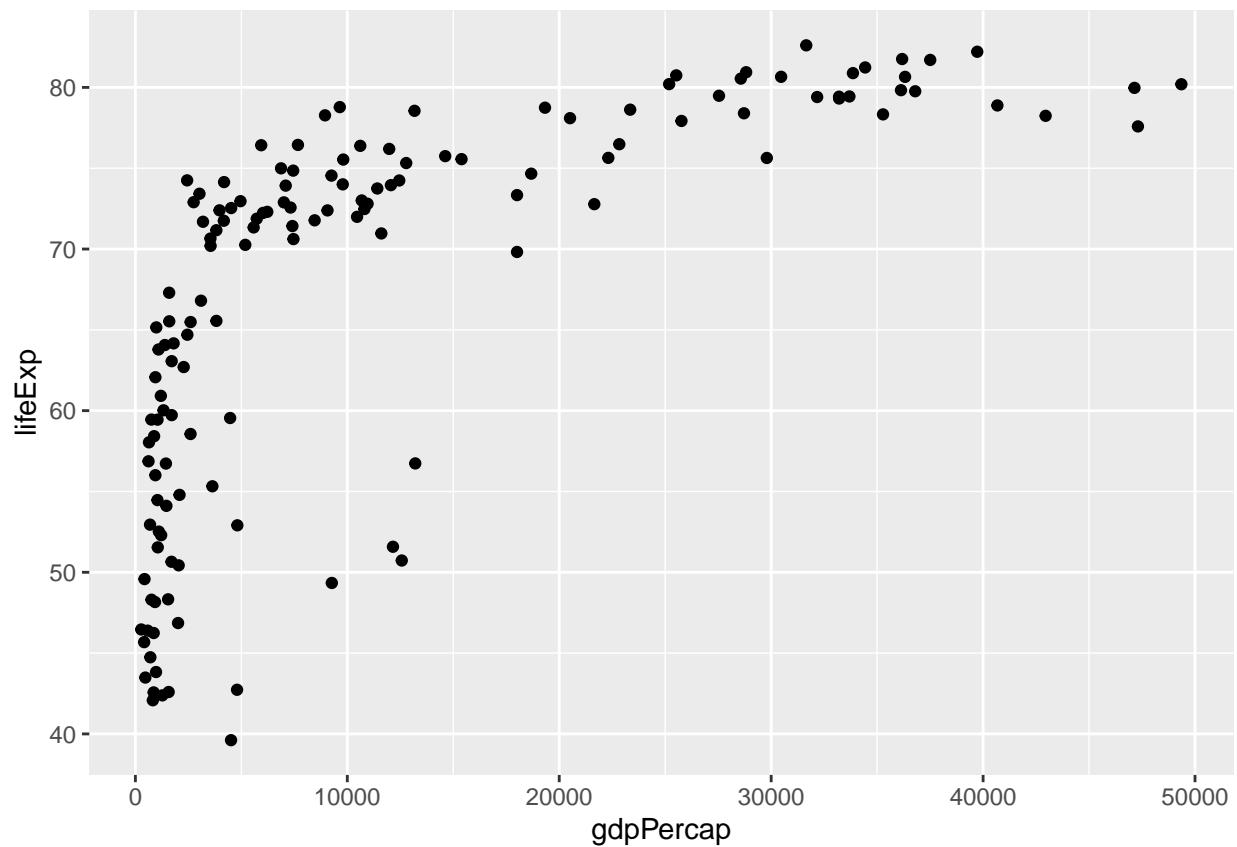
## Warning: package 'dplyr' was built under R version 4.0.2

##
## Attaching package: 'dplyr'

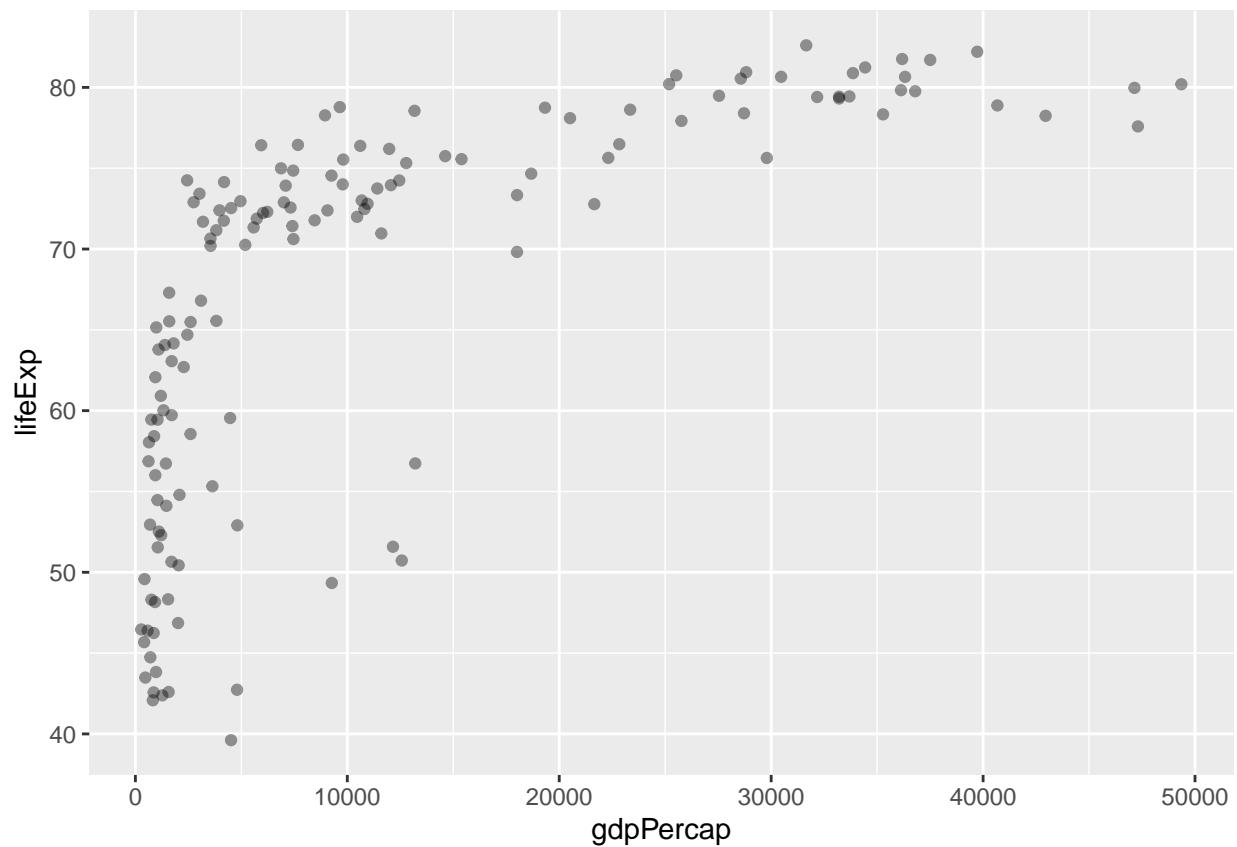
## The following objects are masked from 'package:stats':
## 
##     filter, lag

## The following objects are masked from 'package:base':
## 
##     intersect, setdiff, setequal, union

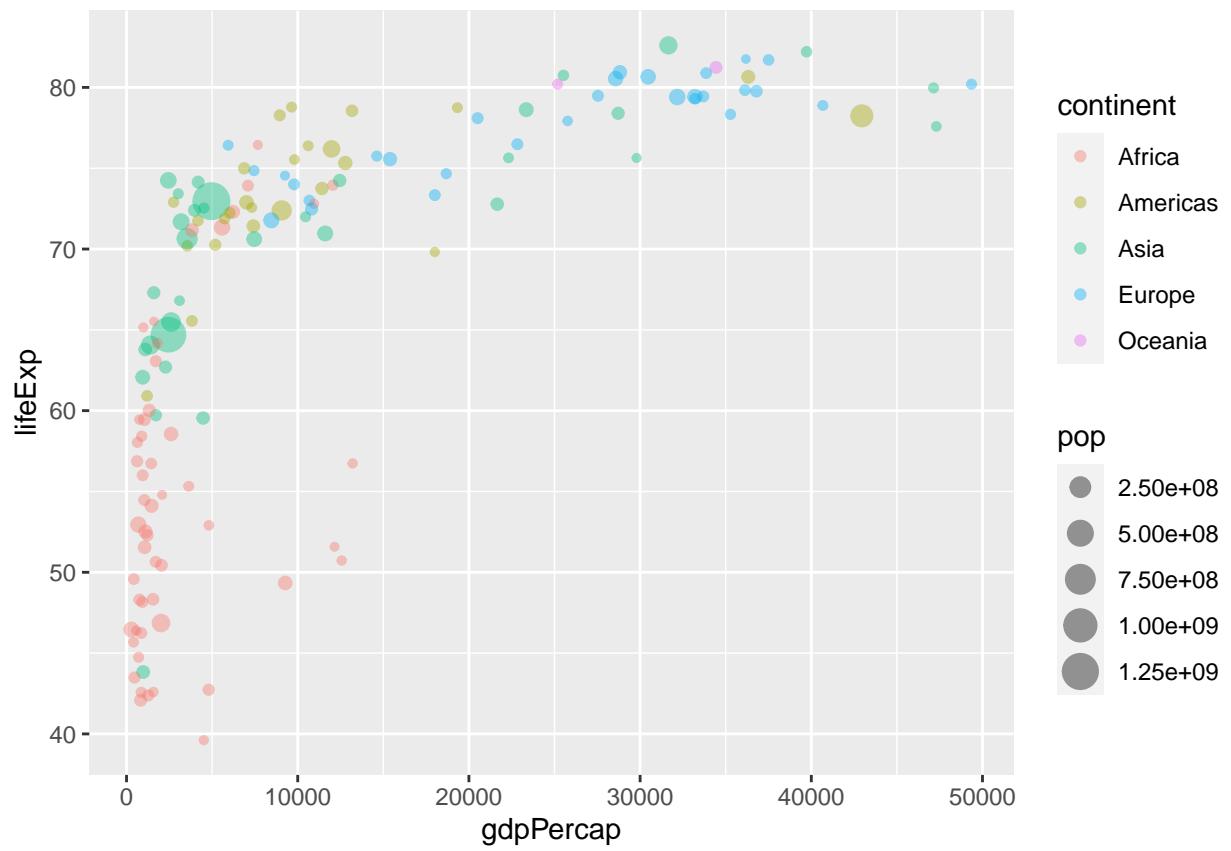
gapminder_2007 <- gapminder %>% filter(year == 2007)
ggplot(gapminder_2007) + aes(y = lifeExp, x = gdpPerCap) + geom_point()
```



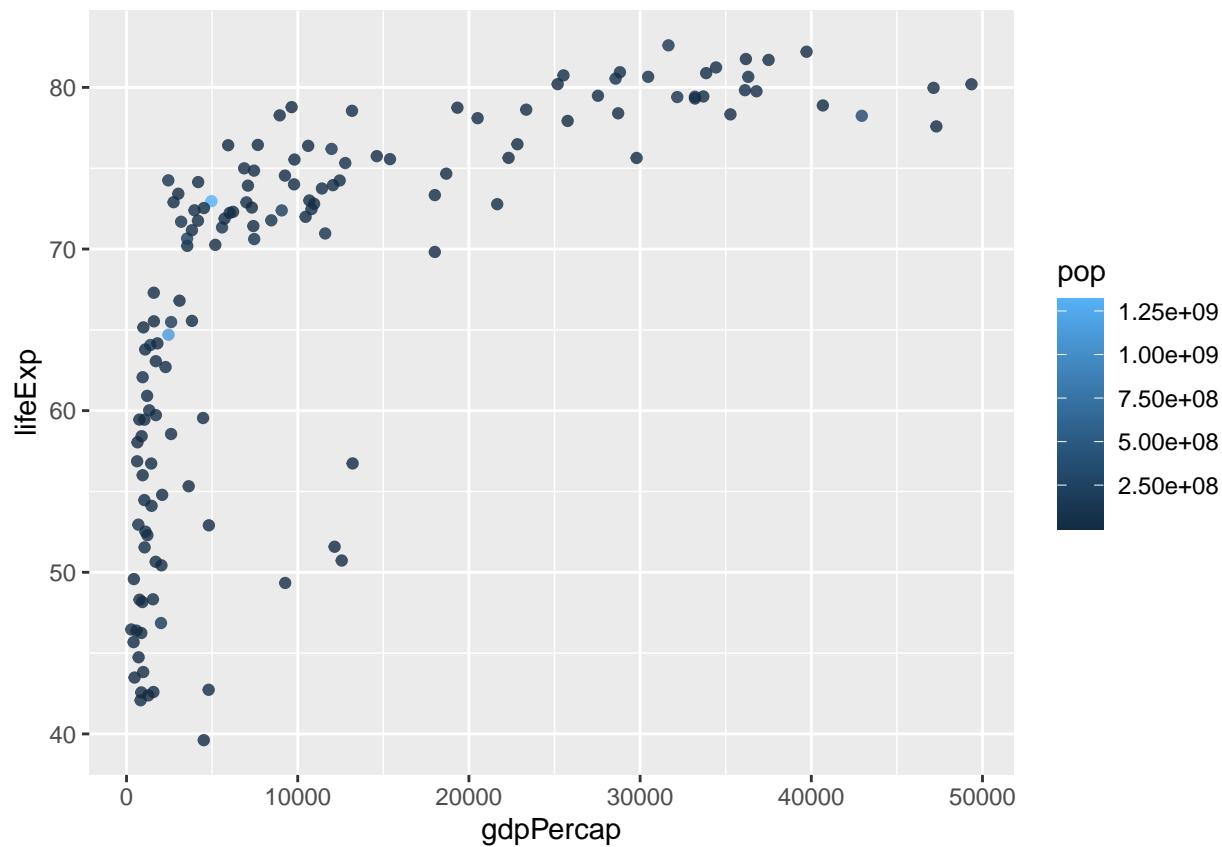
```
ggplot(gapminder_2007) + aes(y = lifeExp, x = gdpPercap) + geom_point(alpha = 0.4)
```



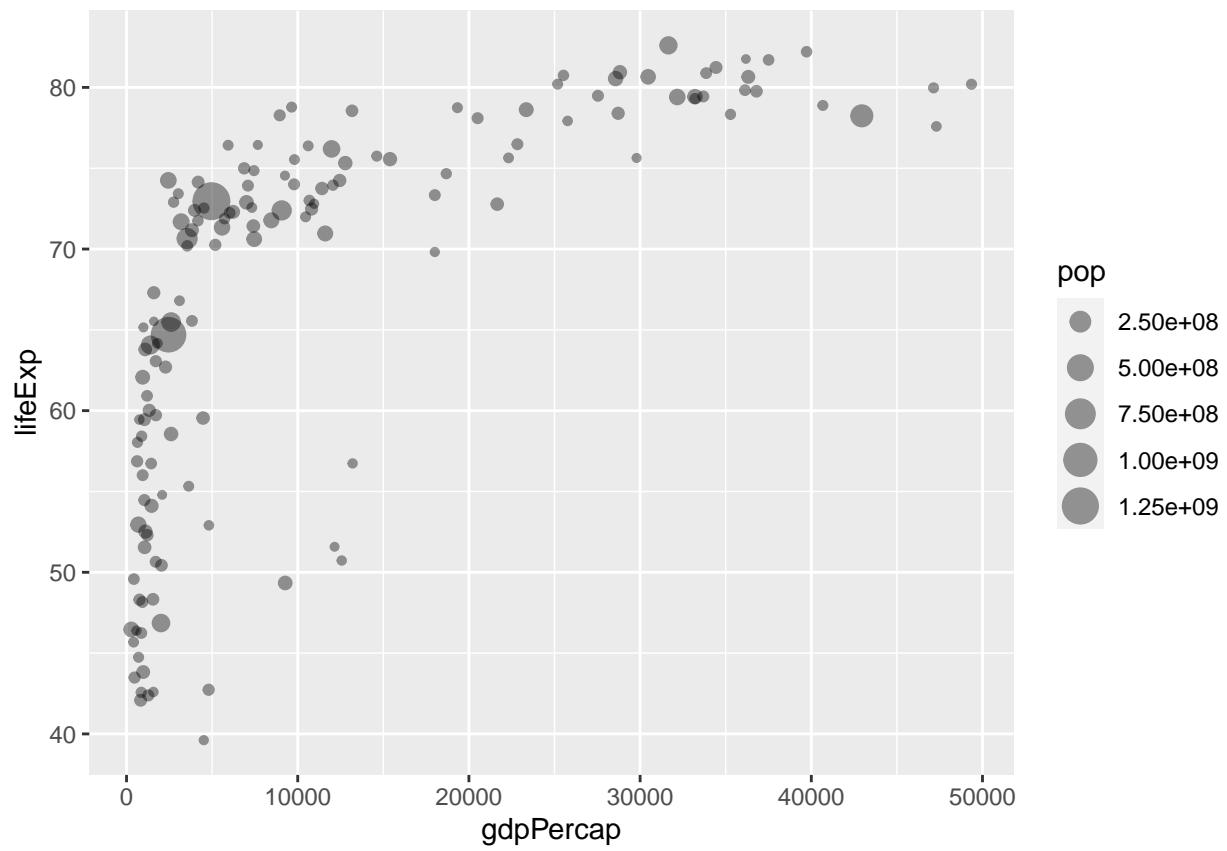
```
ggplot(gapminder_2007) + aes(y = lifeExp, x = gdpPercap, color = continent, size = pop) + geom_point(alpha = 0.5)
```



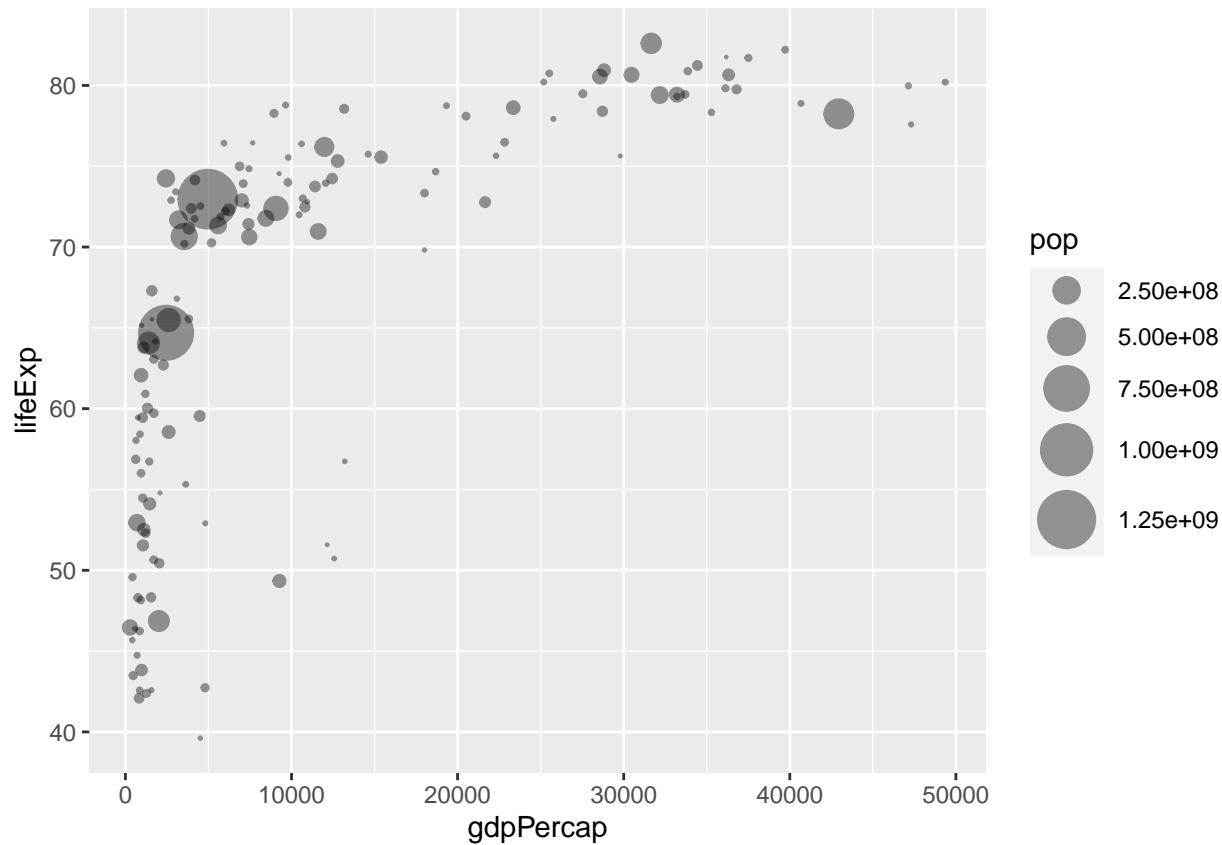
```
ggplot(gapminder_2007) + aes(y = lifeExp, x = gdpPercap, color = pop) + geom_point(alpha = 0.8)
```



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

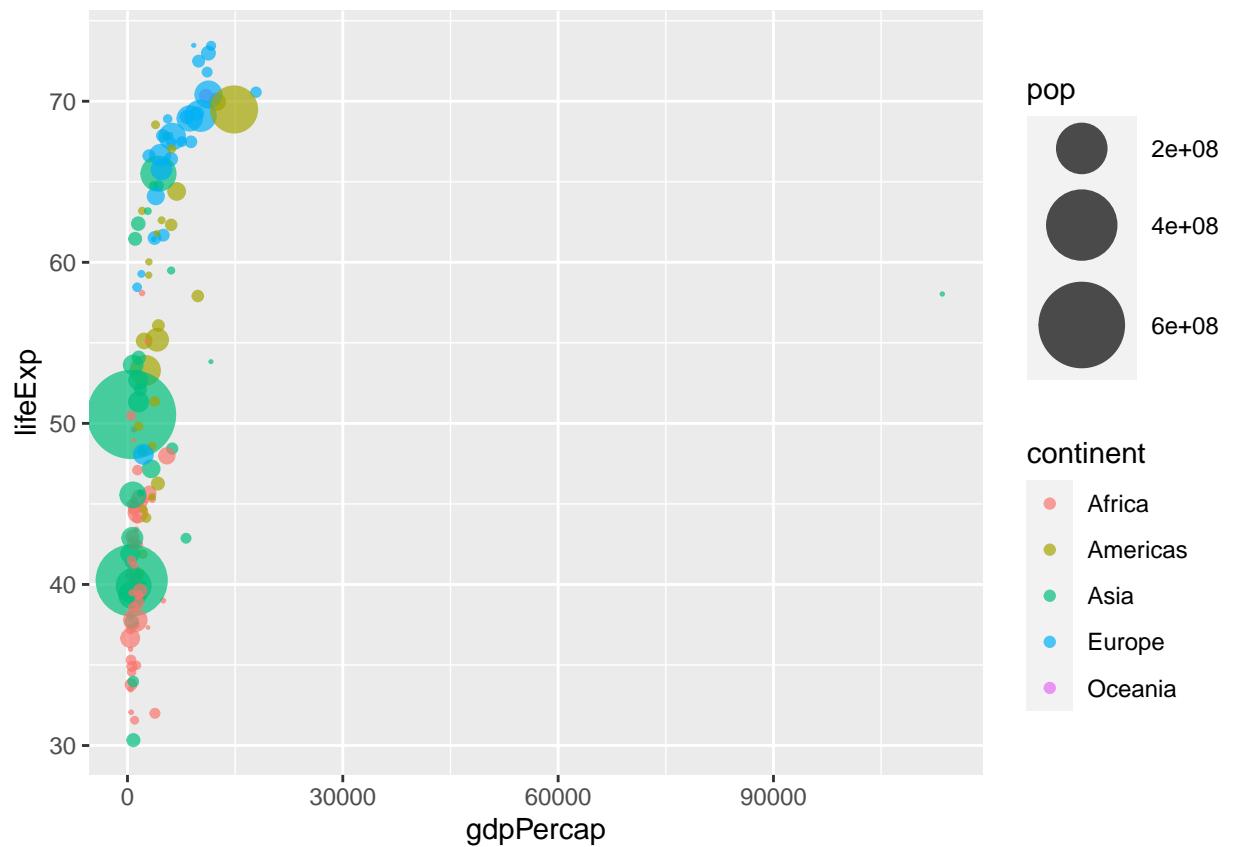


```
ggplot(gapminder_2007) + aes(y = lifeExp, x = gdpPercap, size = pop) + geom_point(alpha = 0.4) + scale_s
```



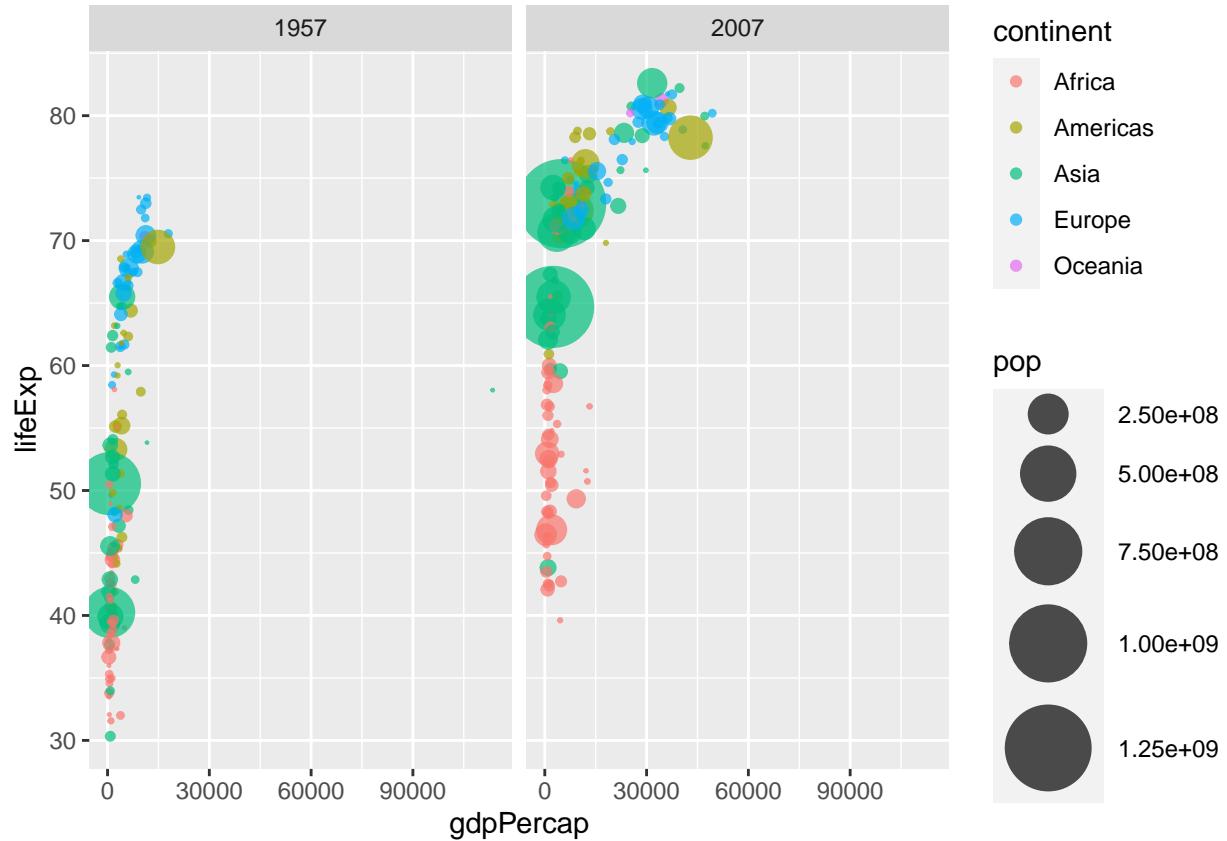
```
gapminder_1957 <- gapminder %>% filter(year == 1957)
```

```
ggplot(gapminder_1957) + aes(x = gdpPercap, y = lifeExp, color = continent, size = pop) + scale_size_ar
```



```
gapminder_1957 <- gapminder %>% filter(year == 1957 | year == 2007)
```

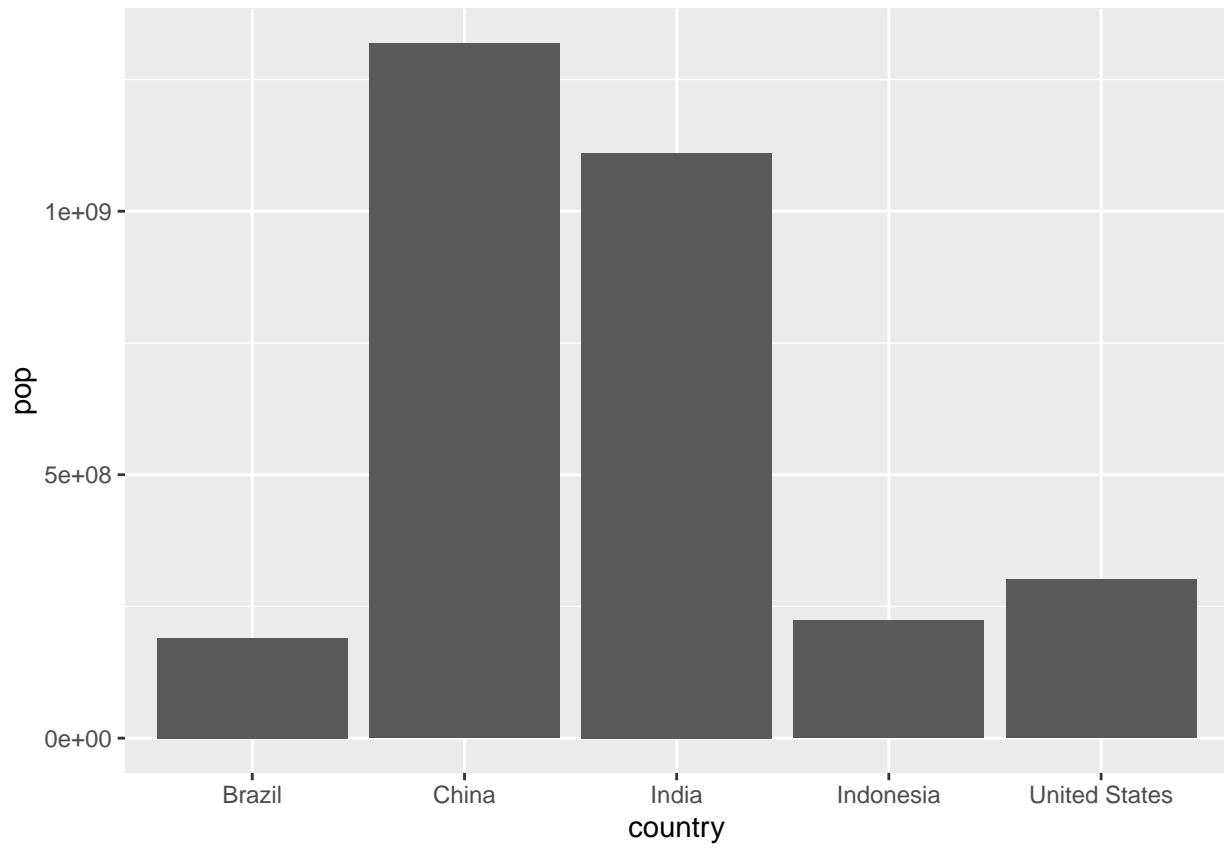
```
ggplot(gapminder_1957) + aes(x = gdpPercap, y = lifeExp, color = continent, size = pop) + scale_size_area
```



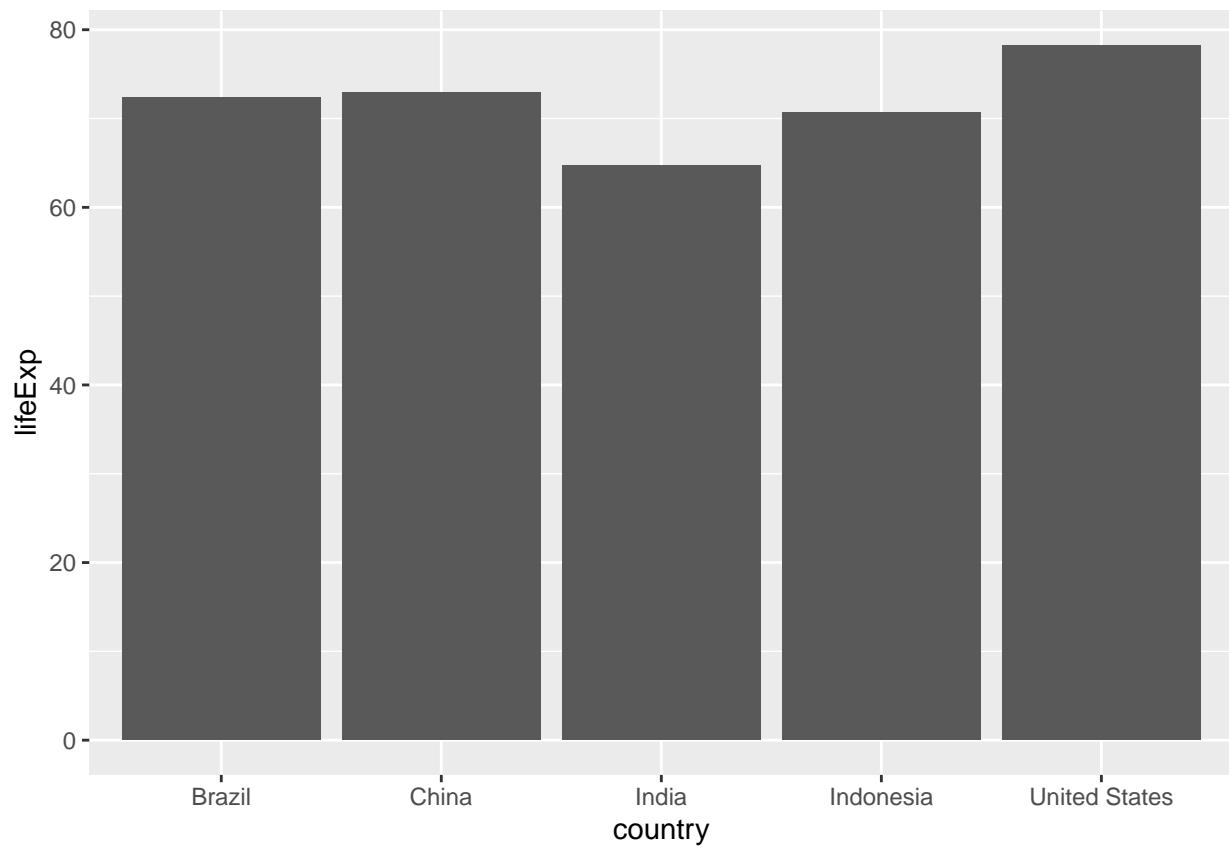
```
gapminder_top5 <- gapminder %>% filter(year == 2007) %>% arrange(desc(pop)) %>% top_n(5, pop)
```

```
## # 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.
```

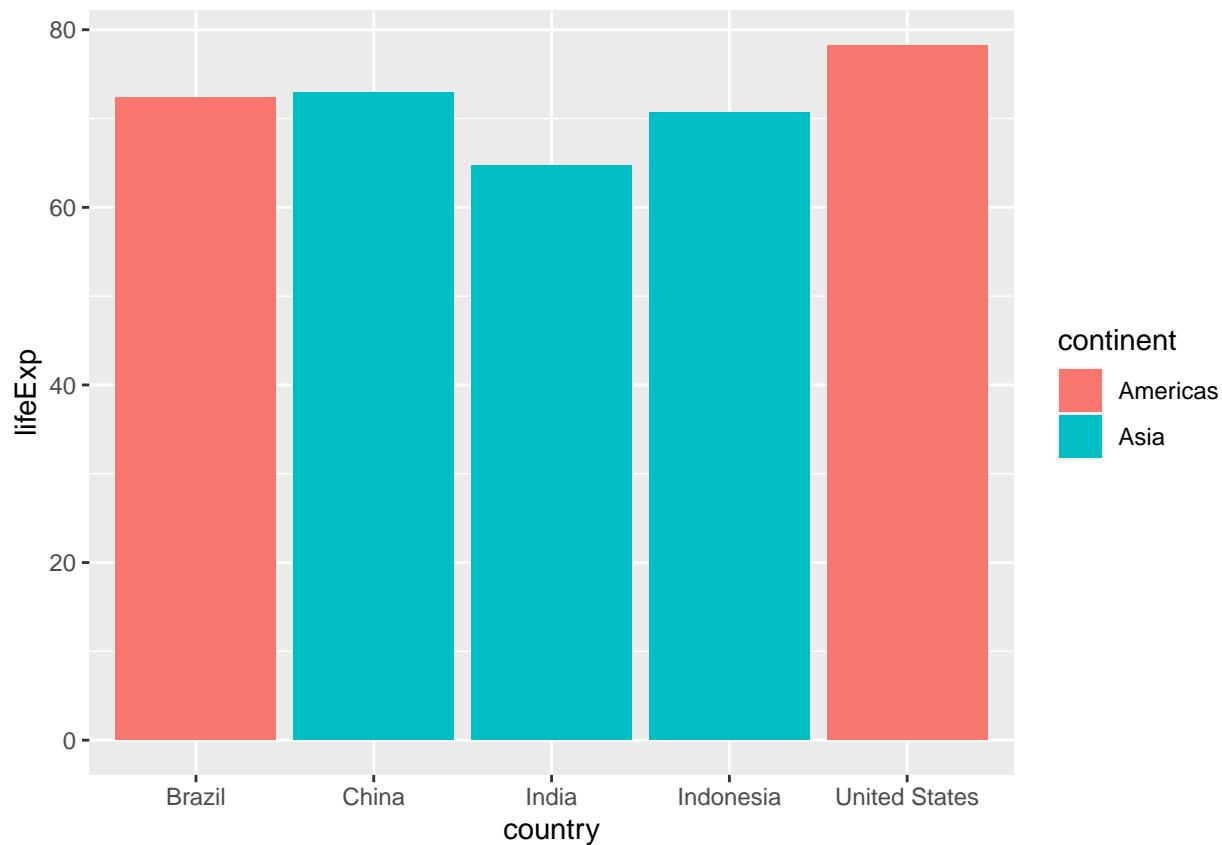
```
ggplot(gapminder_top5) + geom_col(aes(x = country, y= pop))
```



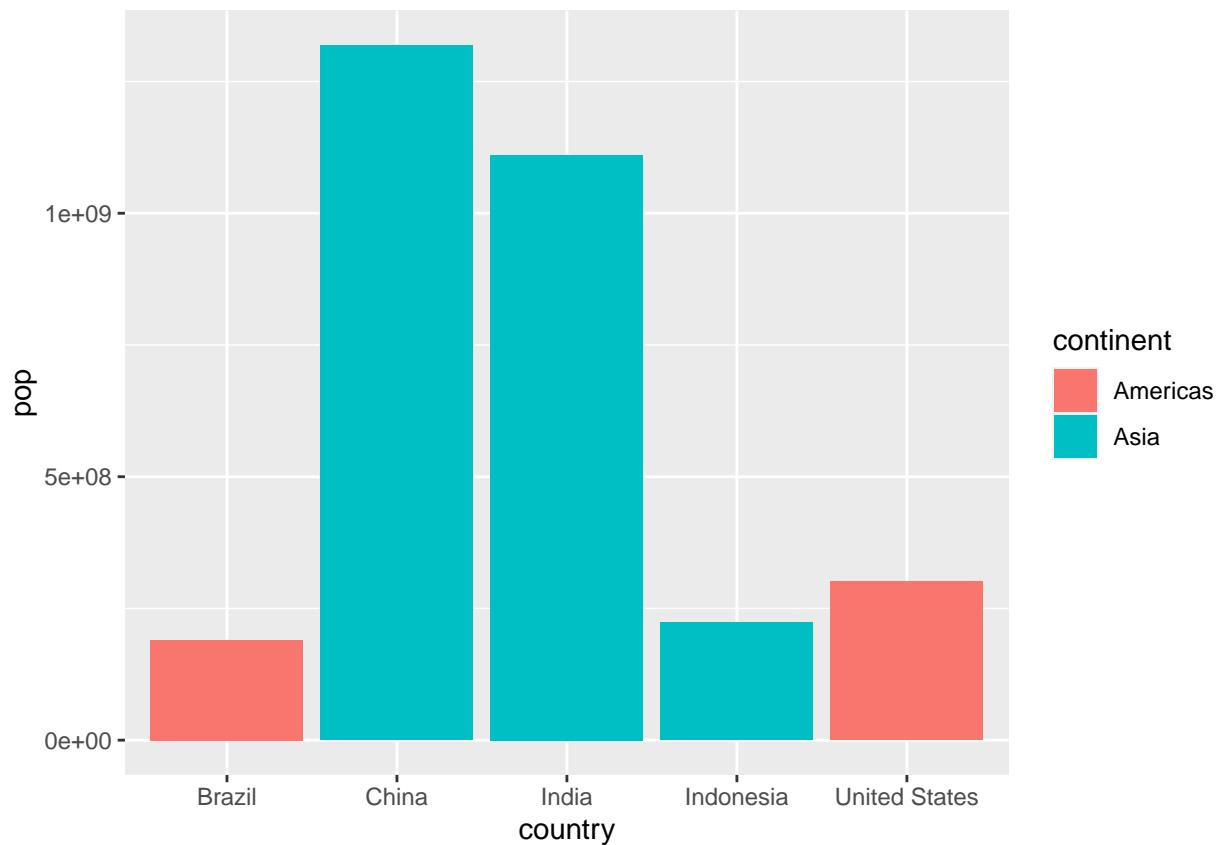
```
ggplot(gapminder_top5) + geom_col(aes(x = country, y = lifeExp))
```



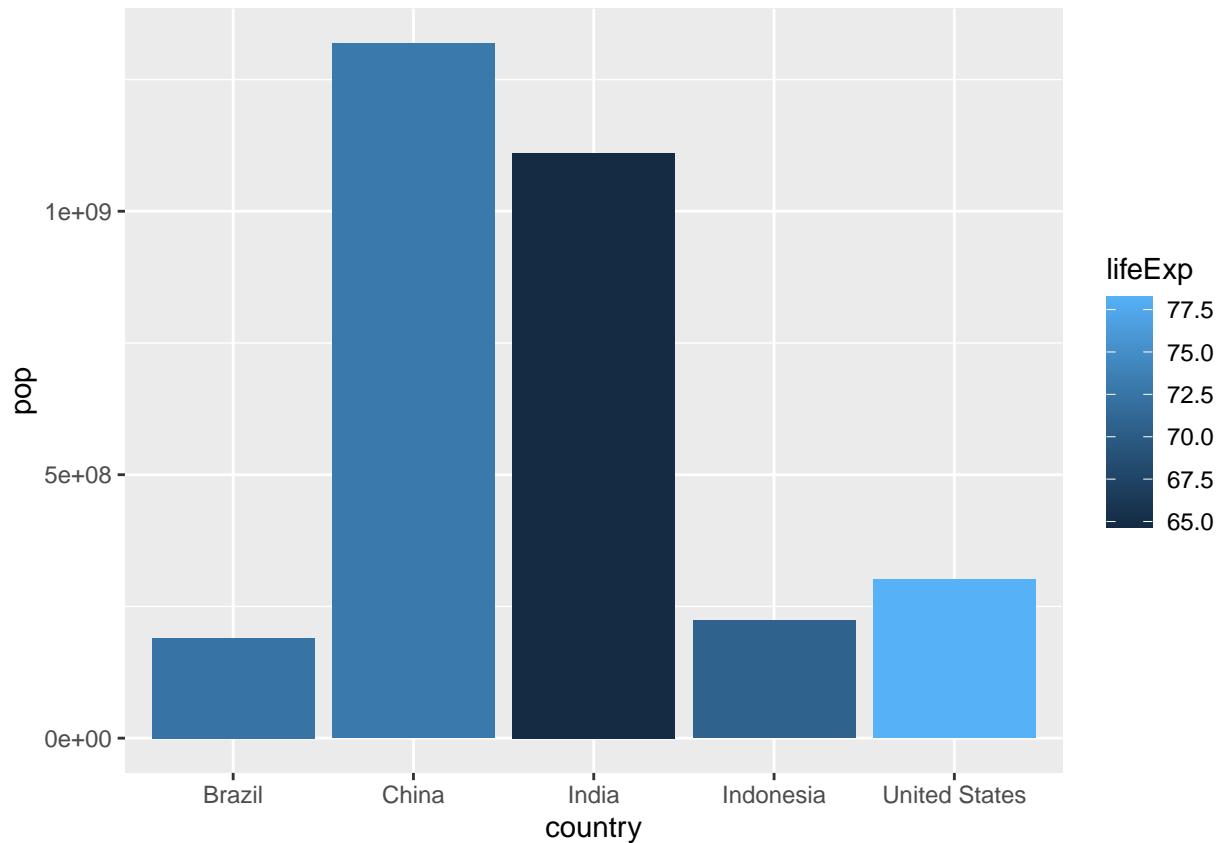
```
ggplot(gapminder_top5) + geom_col(aes(x = country, y = lifeExp, fill = continent))
```



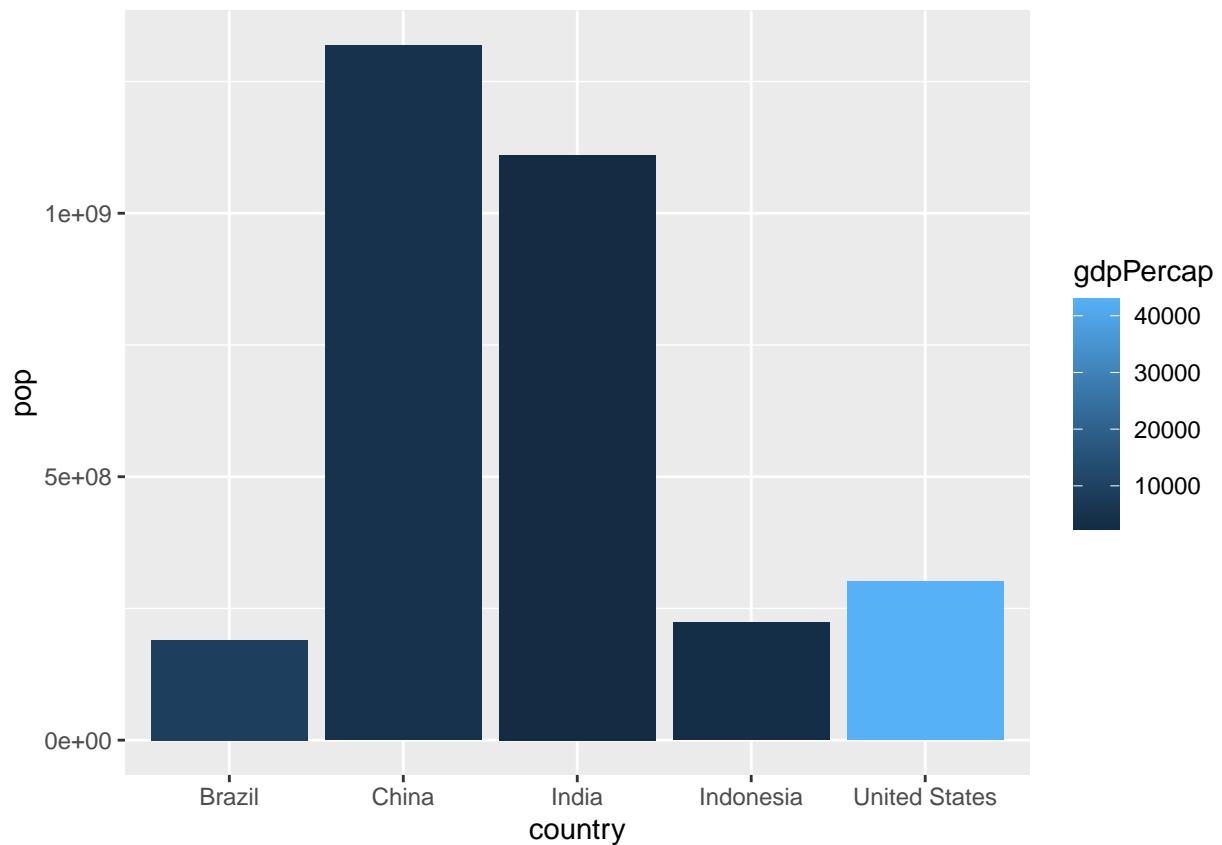
```
ggplot(gapminder_top5) + geom_col(aes(x = country, y= pop, fill = continent))
```



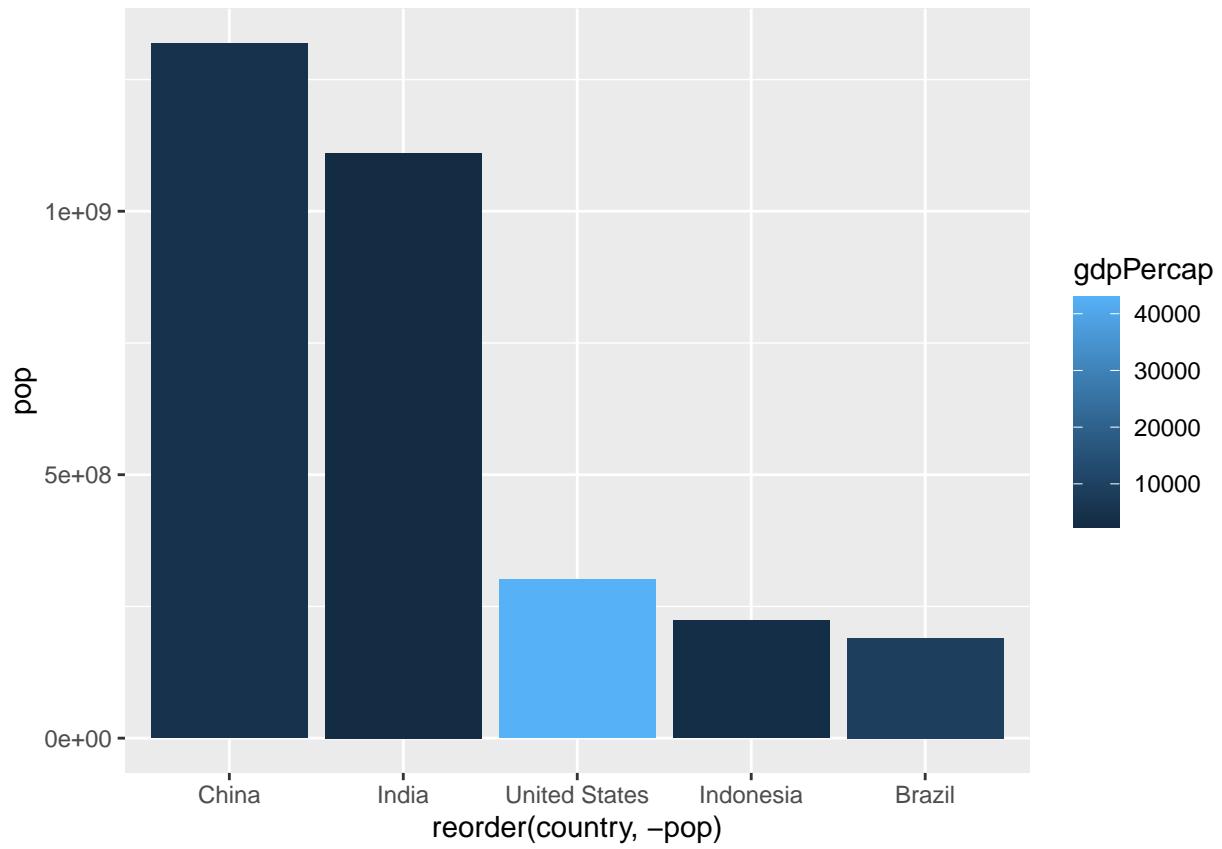
```
ggplot(gapminder_top5) + geom_col(aes(x = country, y= pop, fill = lifeExp))
```



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

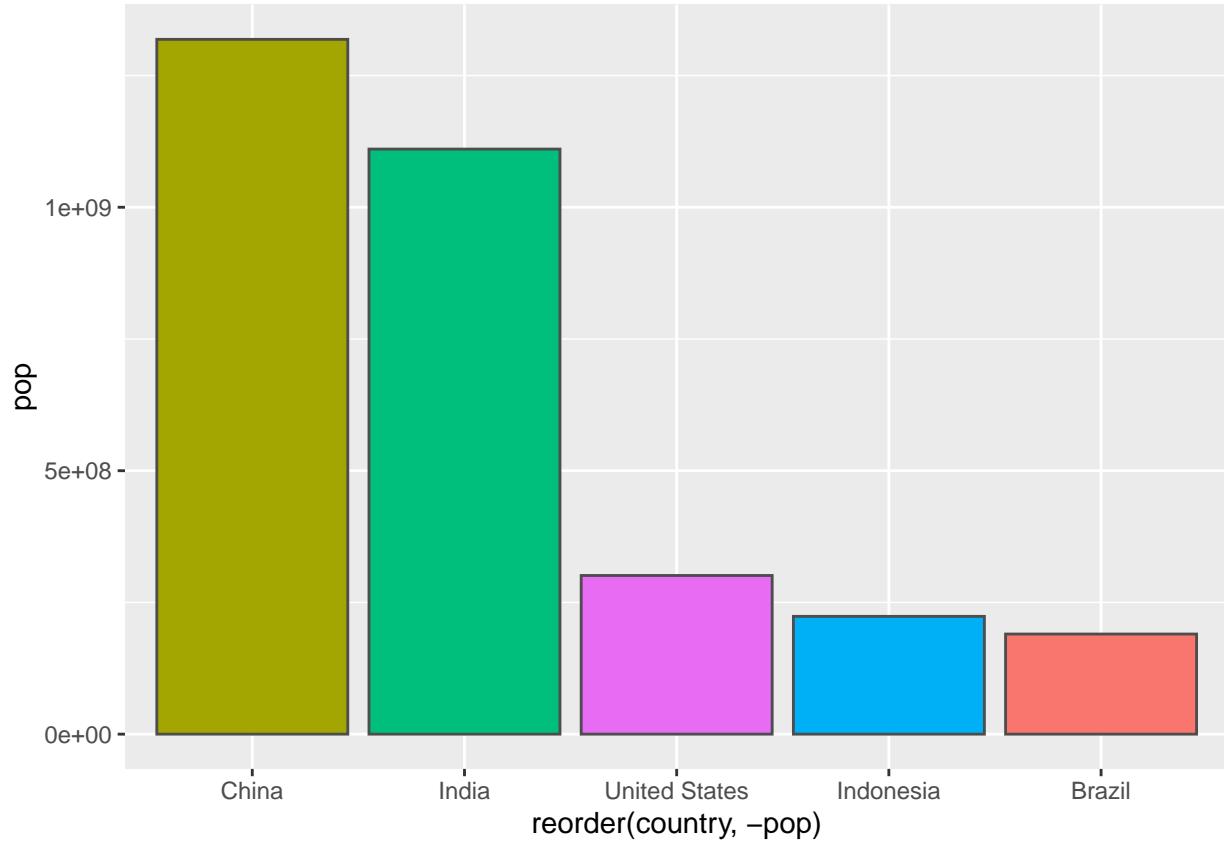


```
ggplot(gapminder_top5) + geom_col(aes(x = reorder(country, -pop), y= pop, fill = gdpPerCap))
```



```
ggplot(gapminder_top5) + geom_col(aes(x = reorder(country, -pop), y= pop, fill = country), col = "gray3")
```

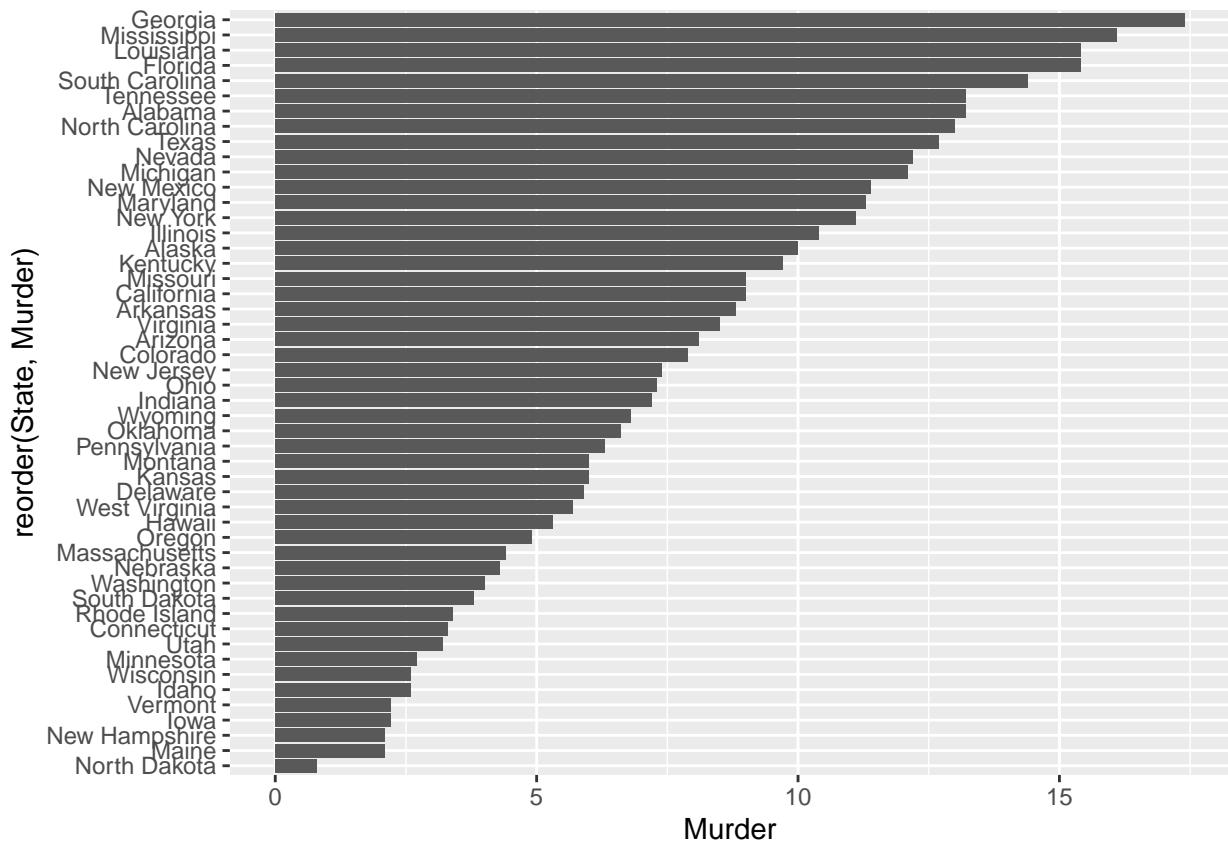
```
## Warning: `guides(<scale> = FALSE)` is deprecated. Please use `guides(<scale> =  
## "none")` instead.
```



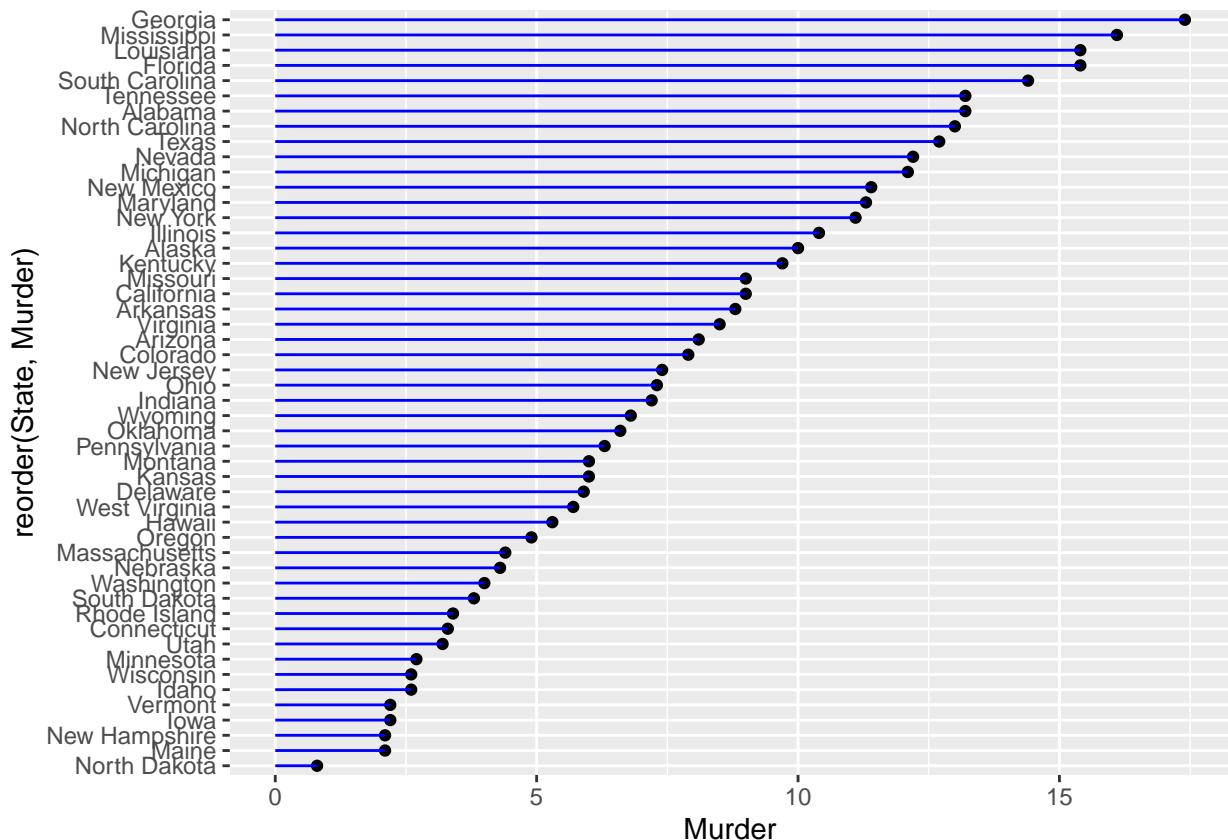
```
head(USArrests)
```

```
##          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
```

```
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 = S
```



```

library(gapminder)
# install.packages("gifski")
# install.packages("png")
# install.packages("gganimate")
library(gifski)

## Warning: package 'gifski' was built under R version 4.0.2

library(png)

## Warning: package 'png' was built under R version 4.0.2

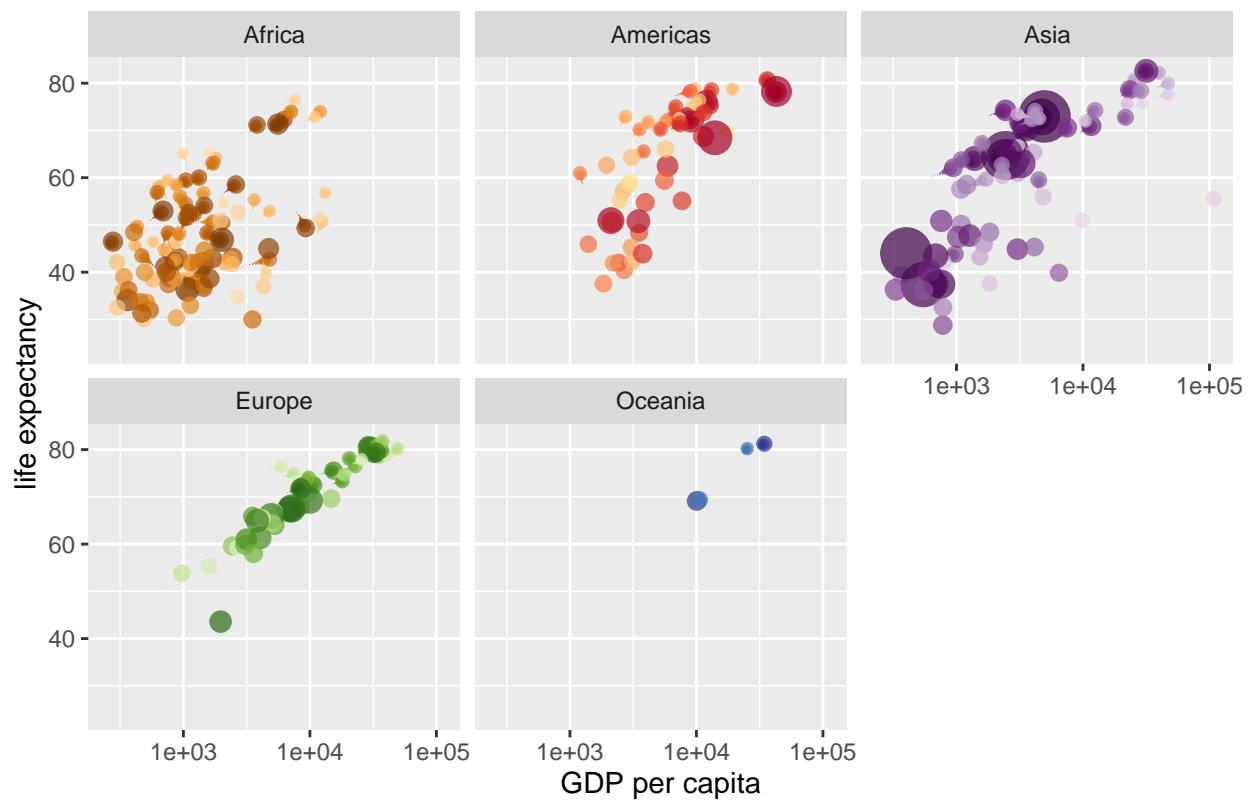
library(gganimate)

## Warning: package 'gganimate' was built under R version 4.0.2

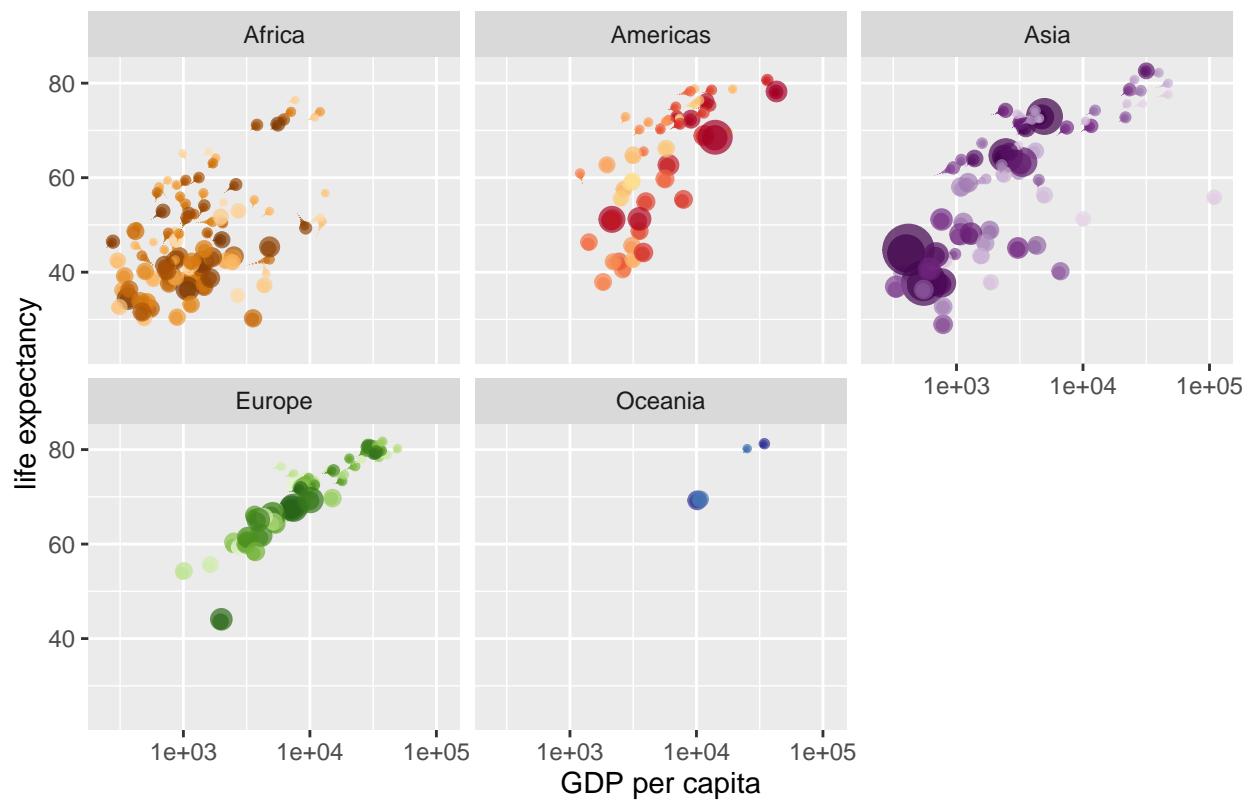
ggplot(gapminder, aes(gdpPercap, lifeExp, size = pop, colour = country)) +
  geom_point(alpha = 0.7, show.legend = FALSE) +
  scale_colour_manual(values = country_colors) +
  scale_size(range = c(2, 12)) +
  scale_x_log10() +
  facet_wrap(~continent) +
  labs(title = 'Year: {frame_time}', x = 'GDP per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

```

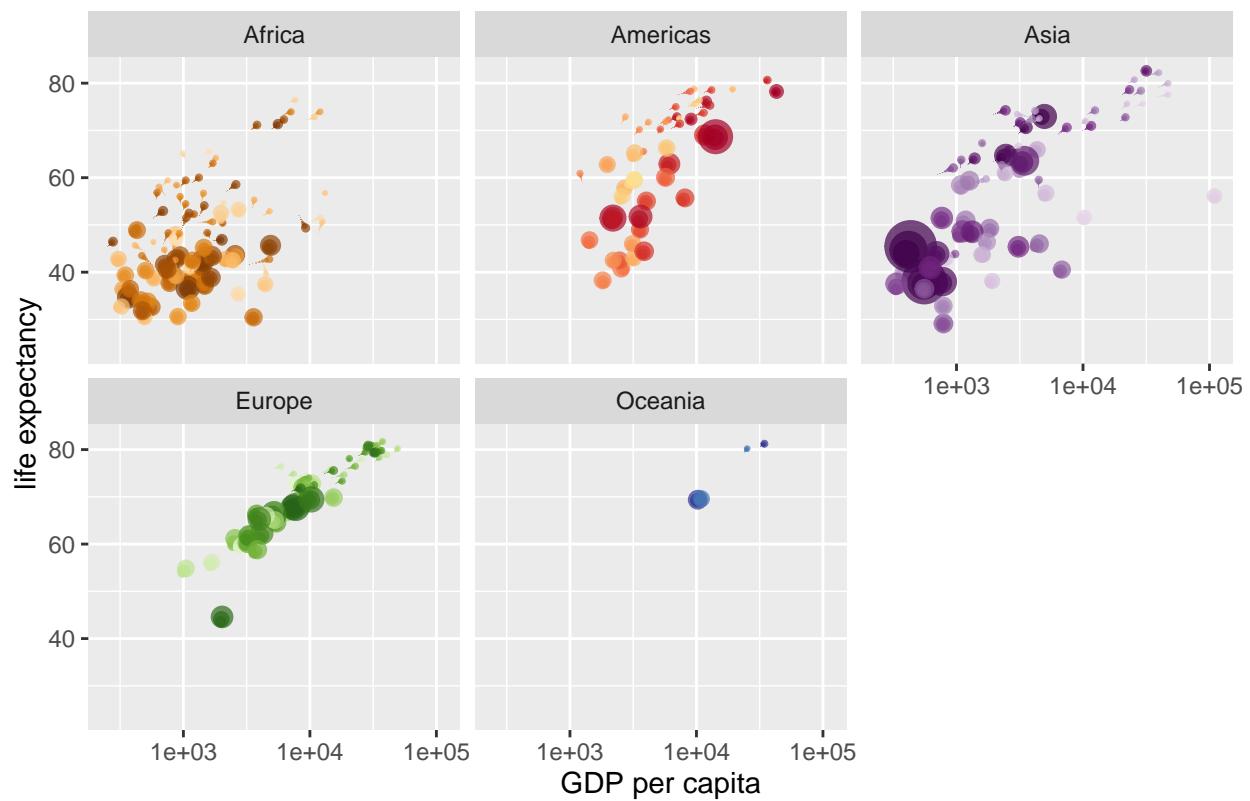
Year: 1952



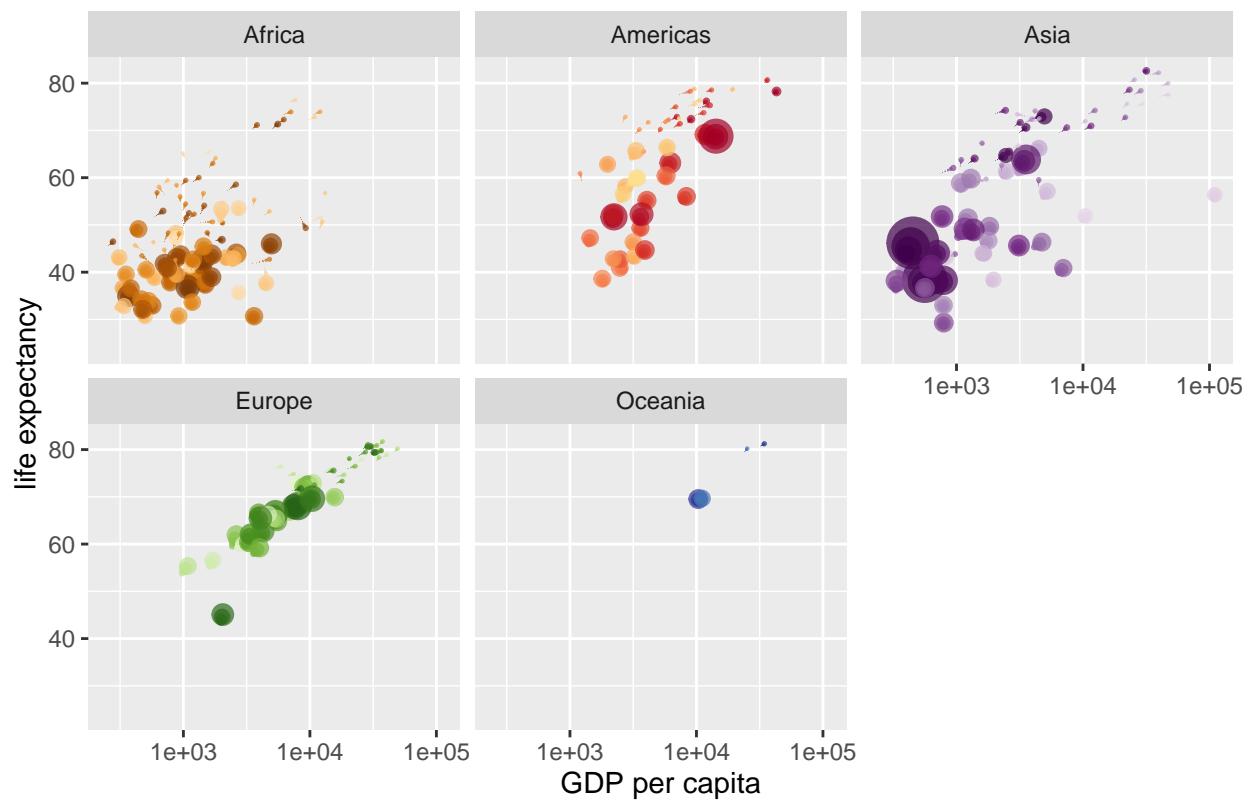
Year: 1953



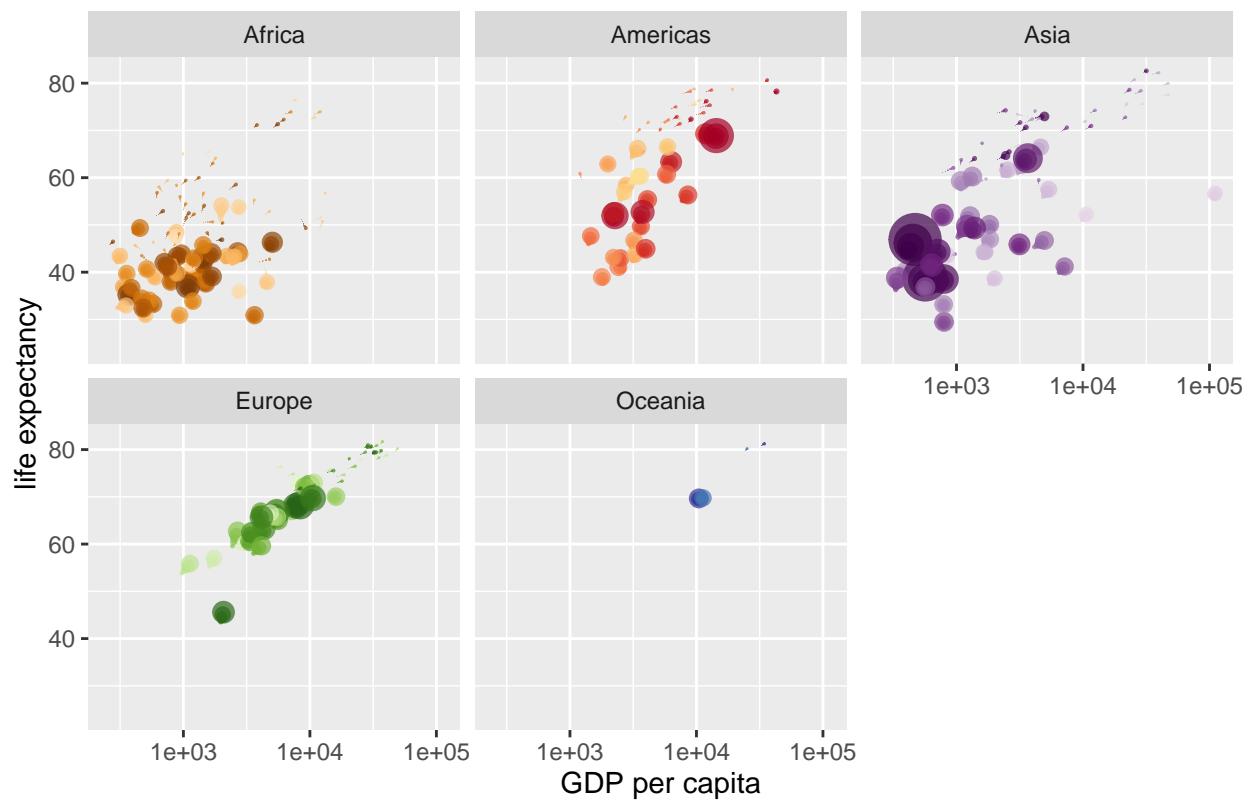
Year: 1953



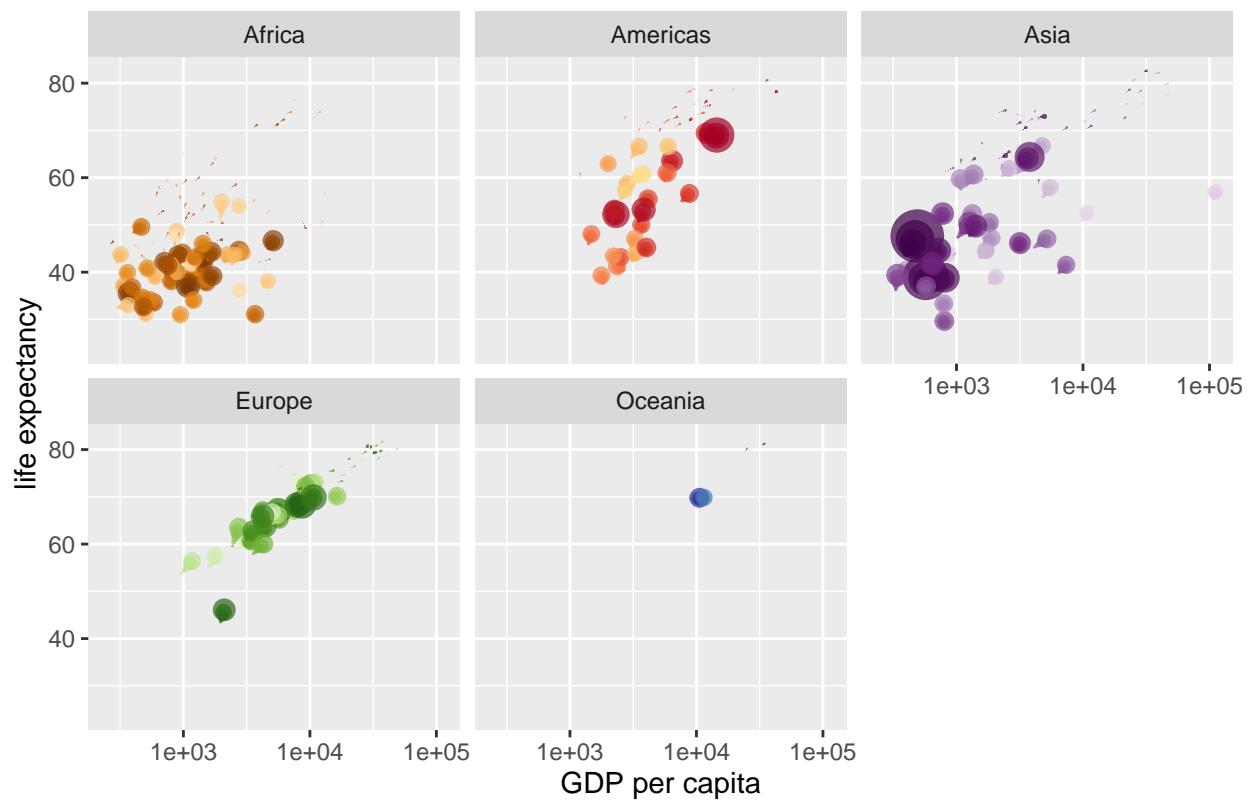
Year: 1954



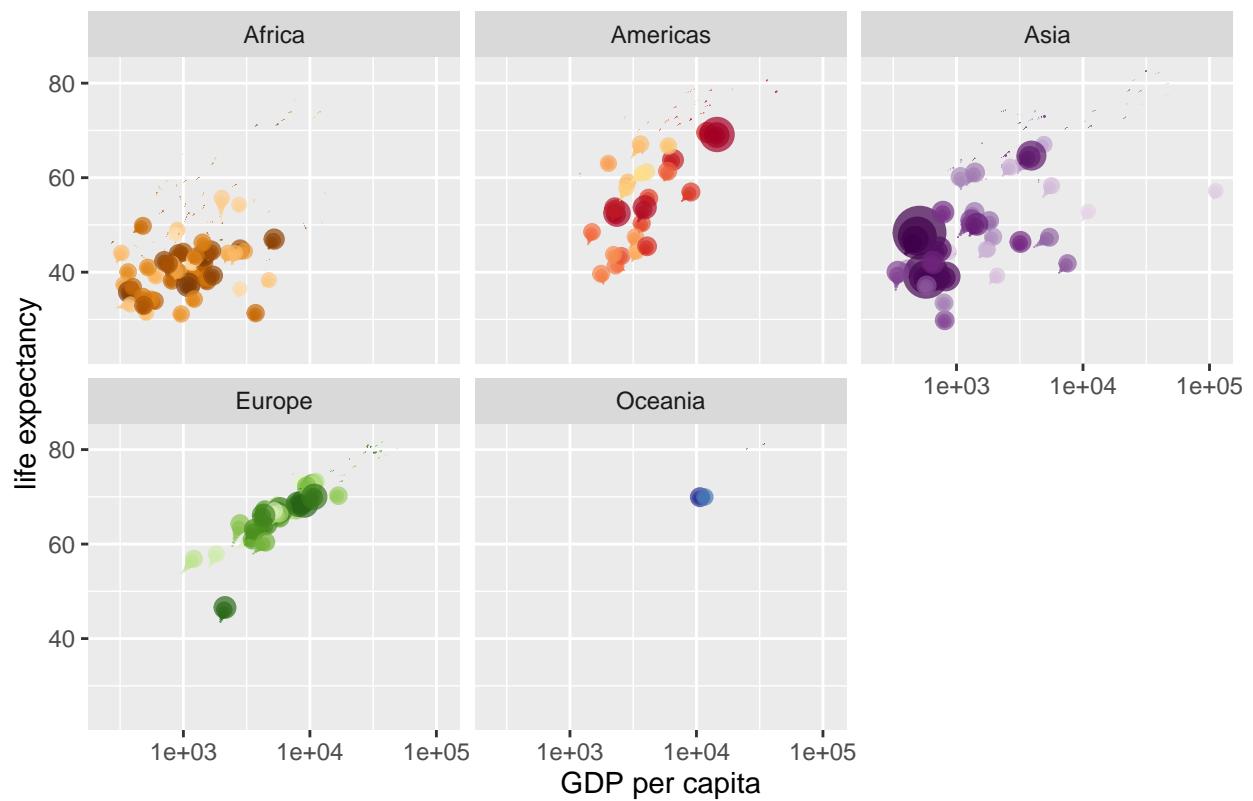
Year: 1954



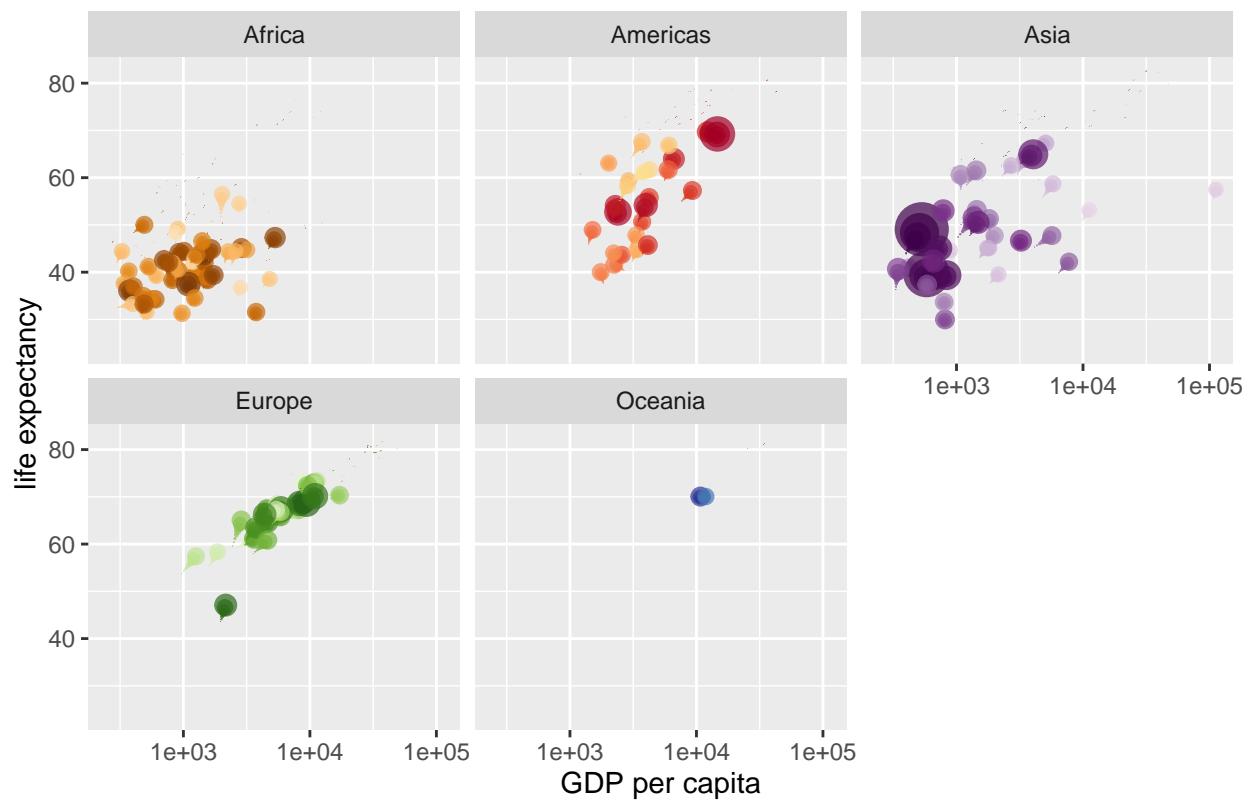
Year: 1955



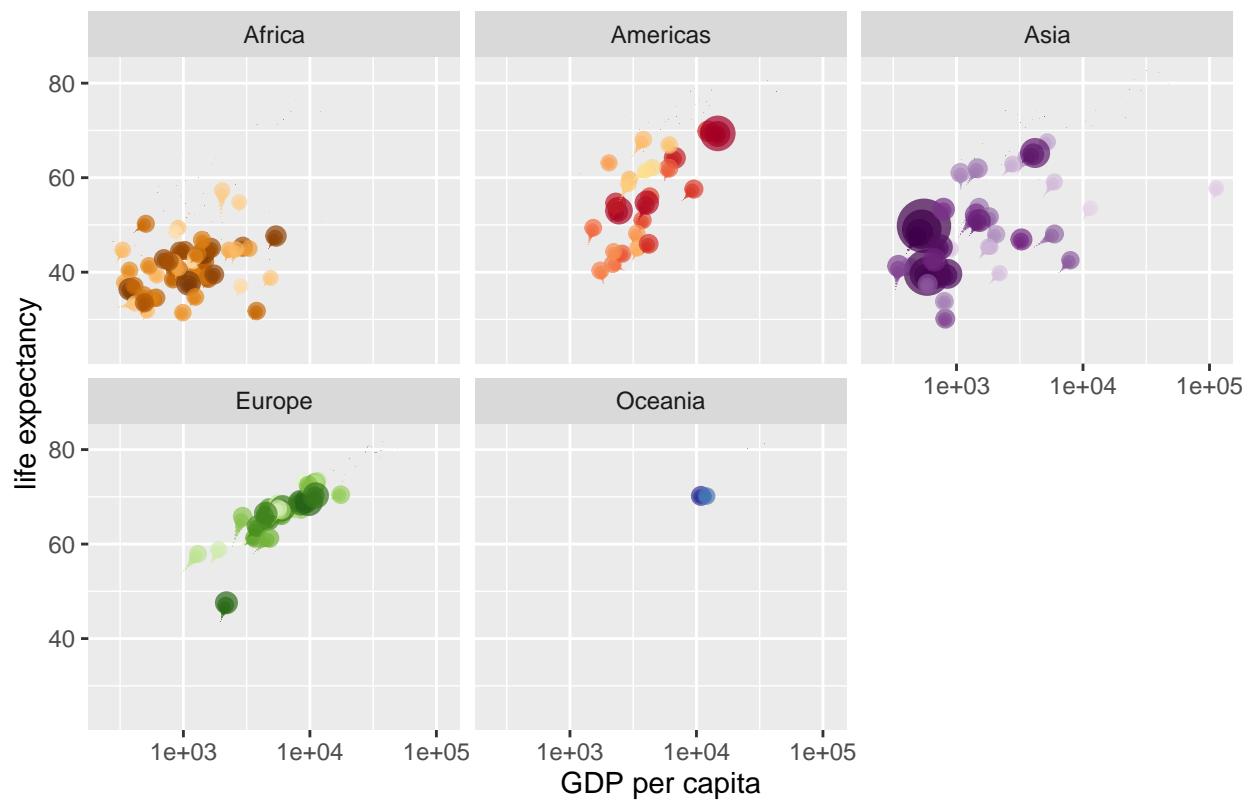
Year: 1955



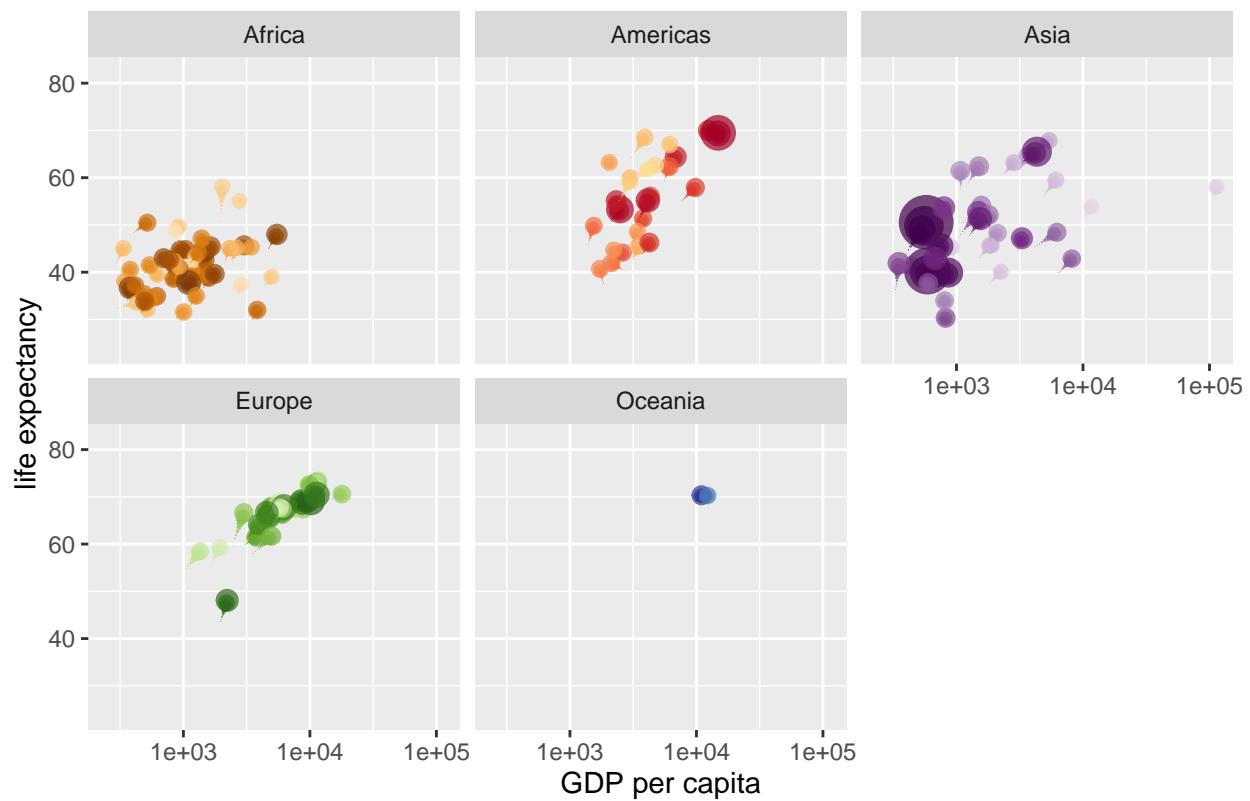
Year: 1956



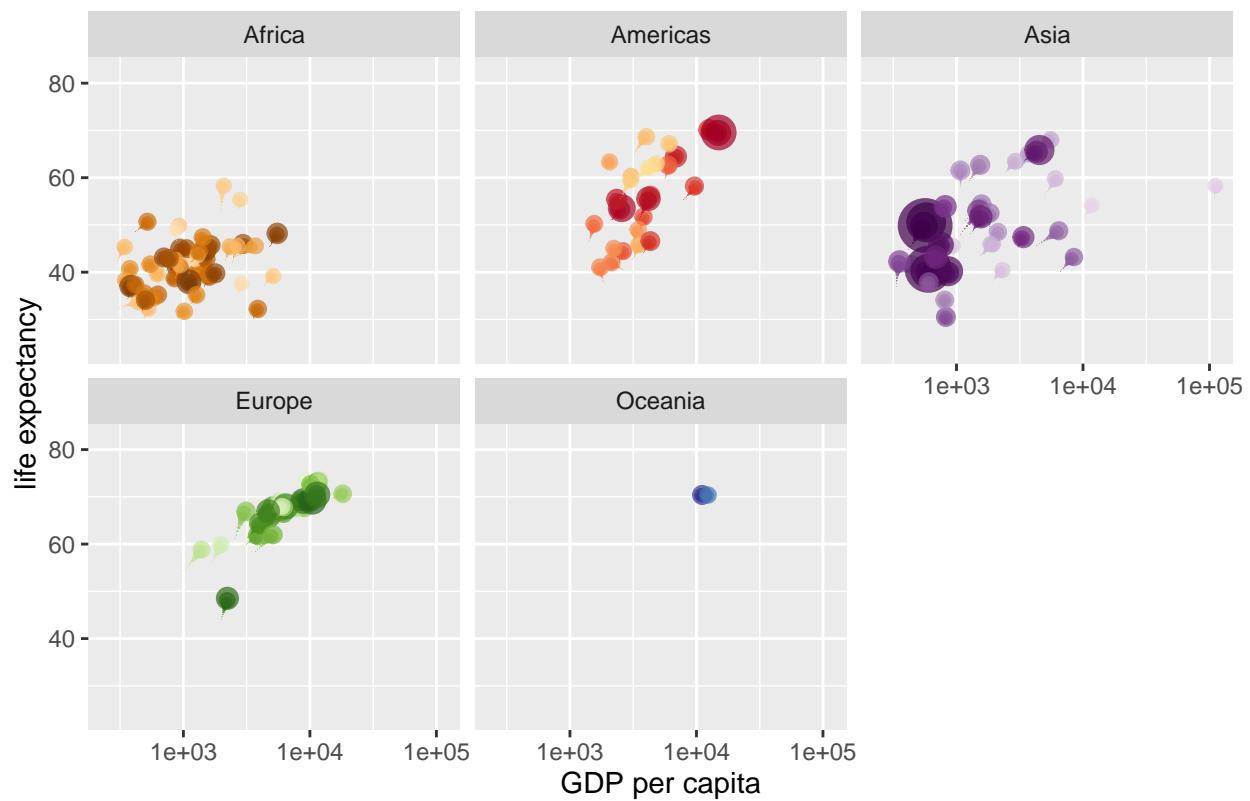
Year: 1956



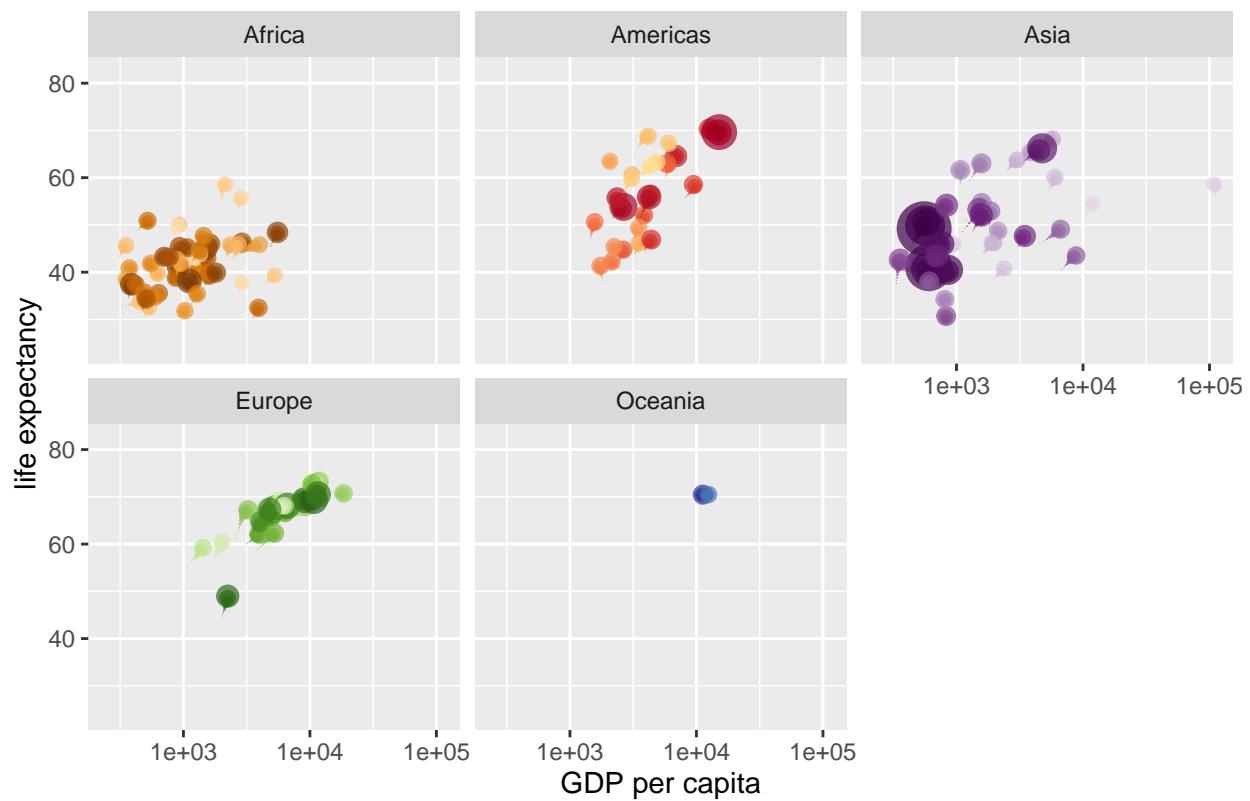
Year: 1957



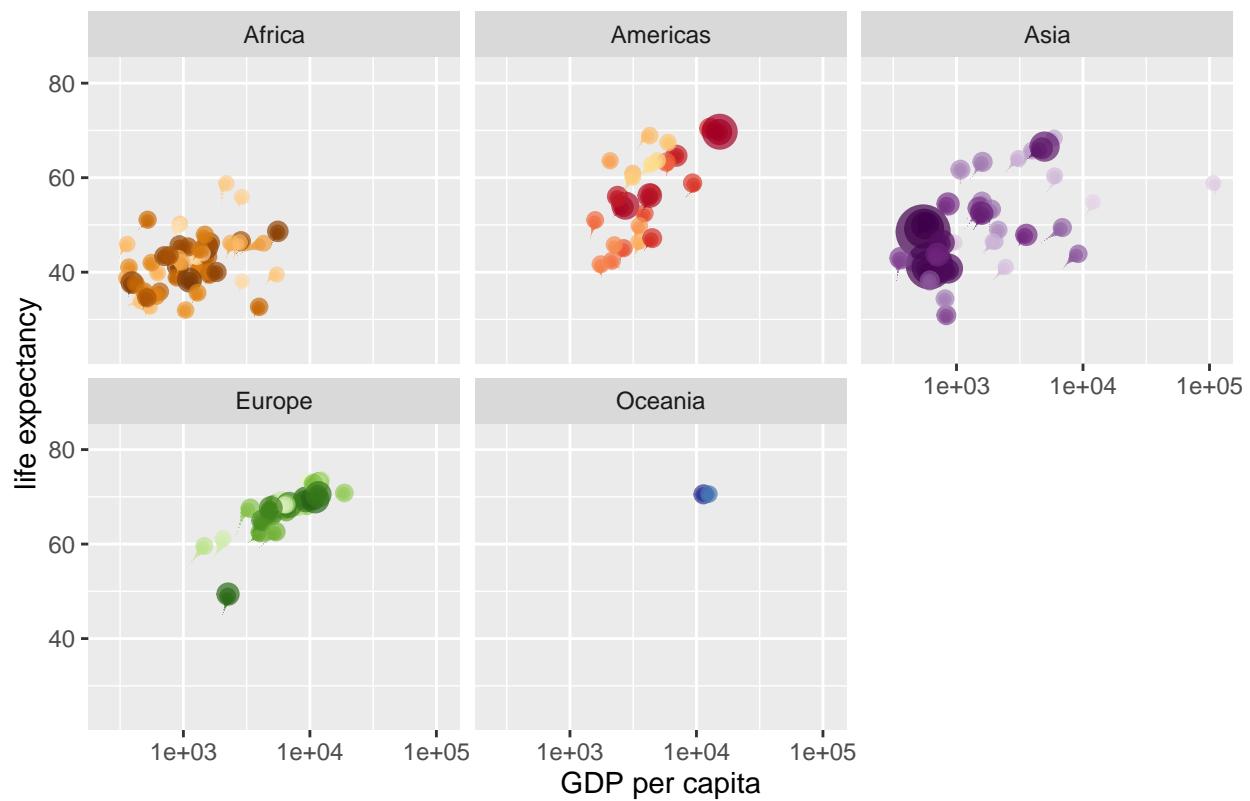
Year: 1958



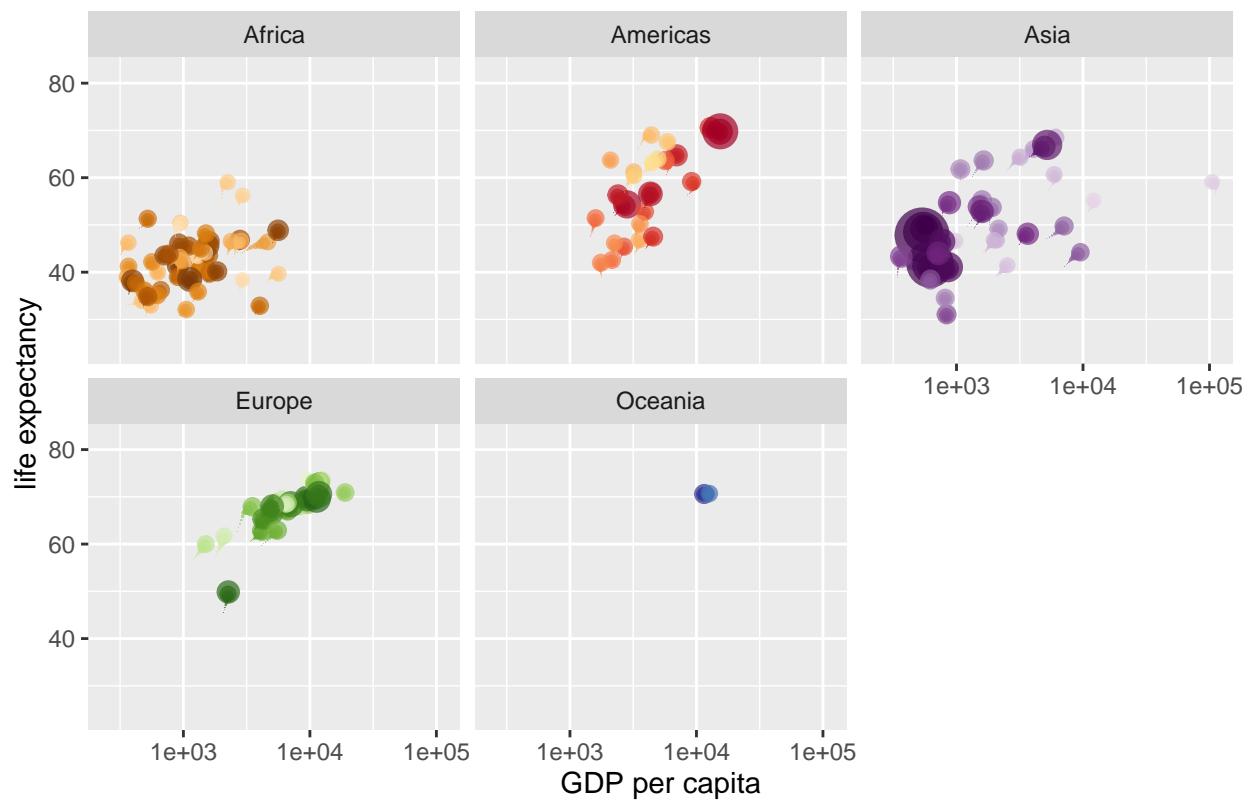
Year: 1958



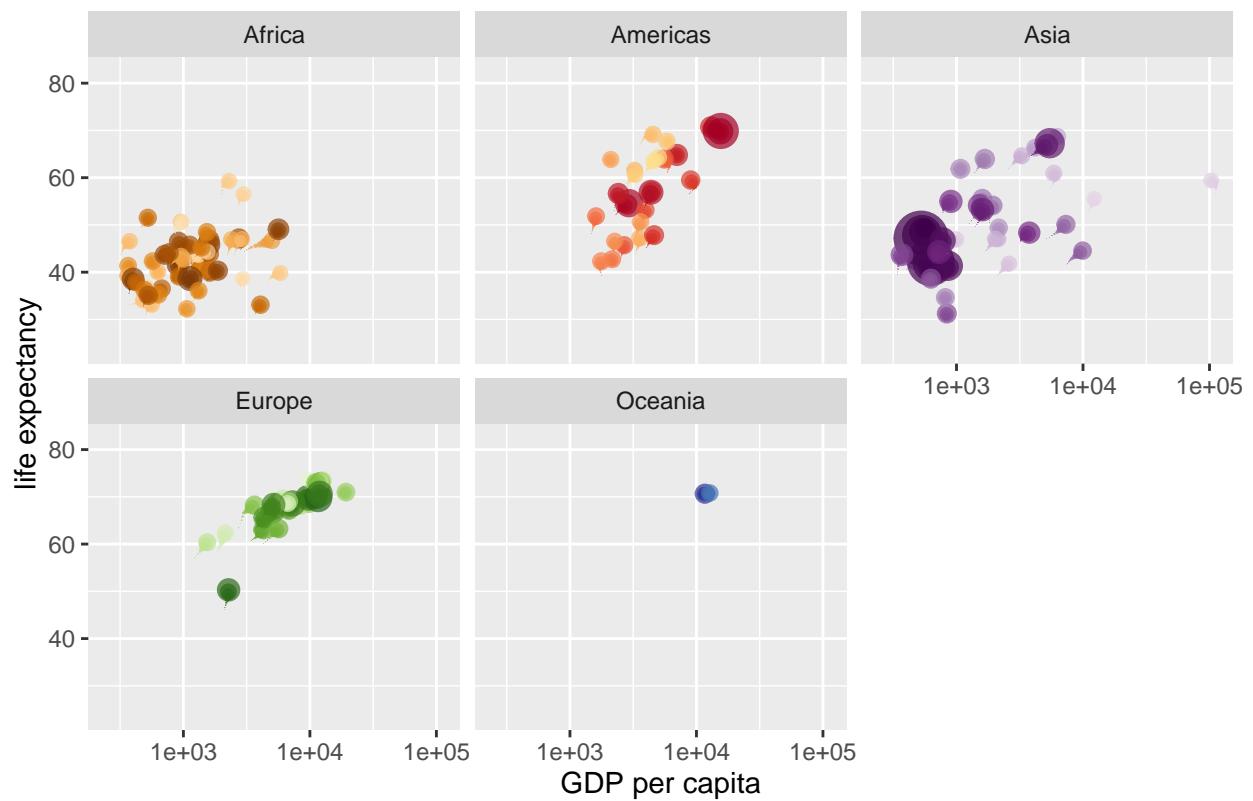
Year: 1959



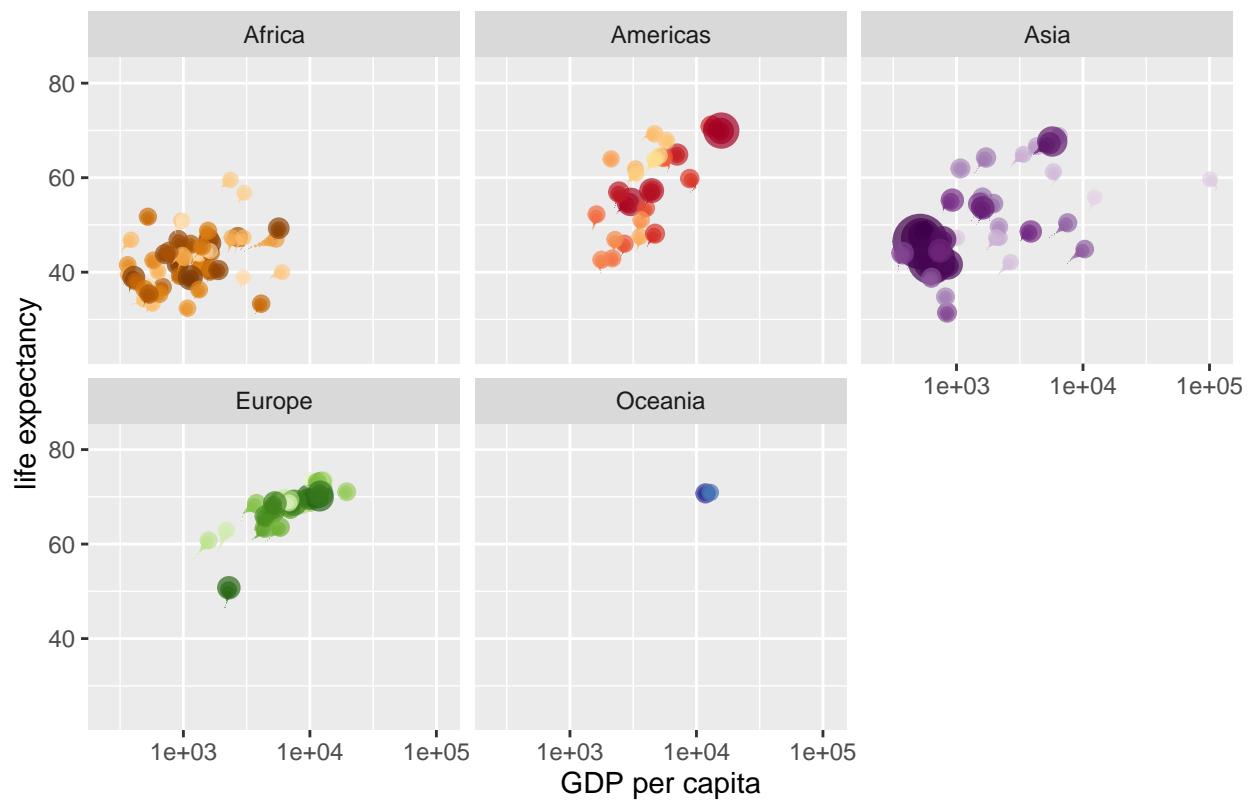
Year: 1959



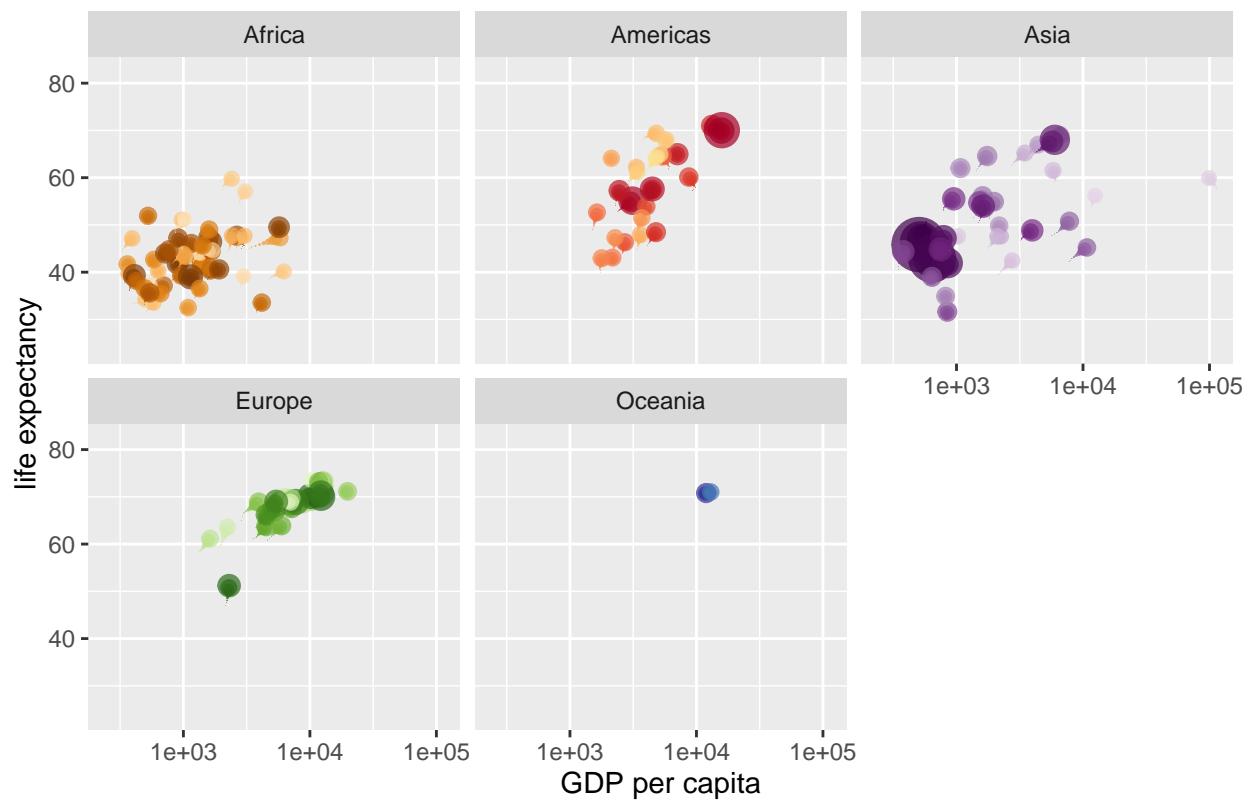
Year: 1960



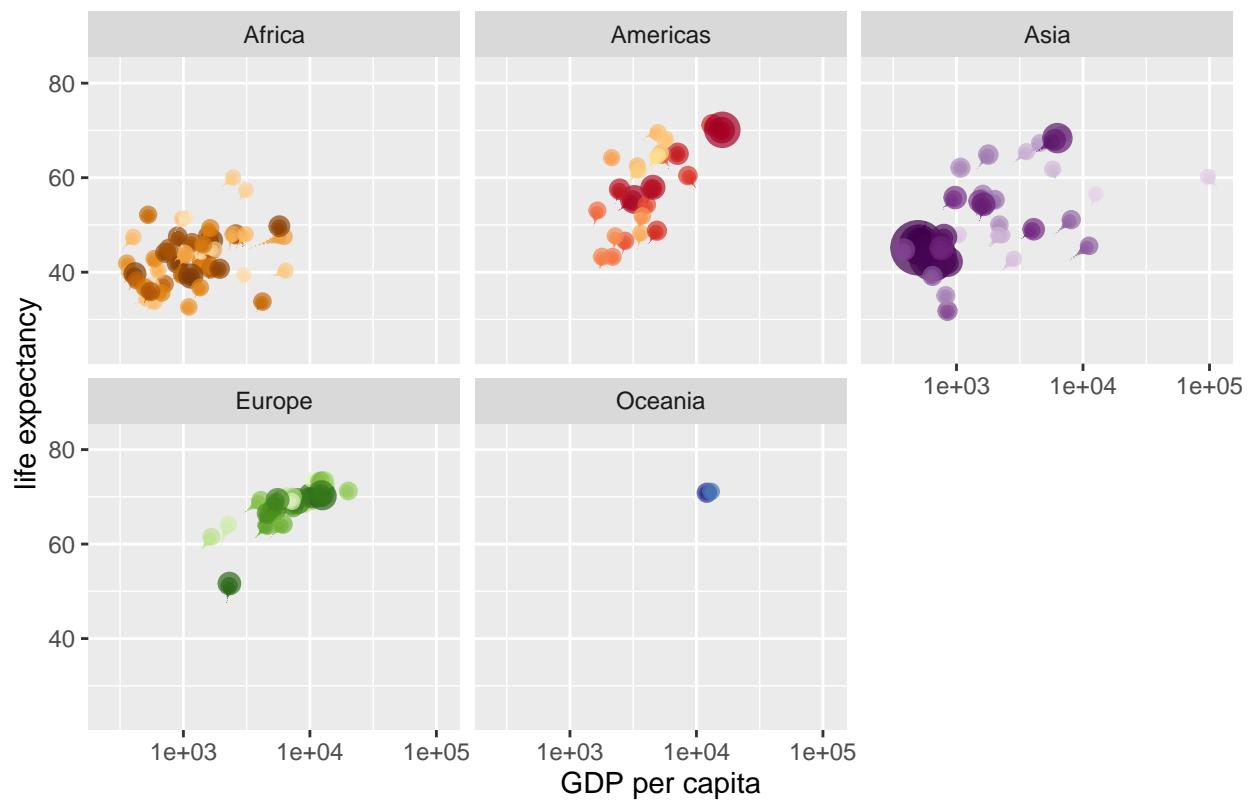
Year: 1960



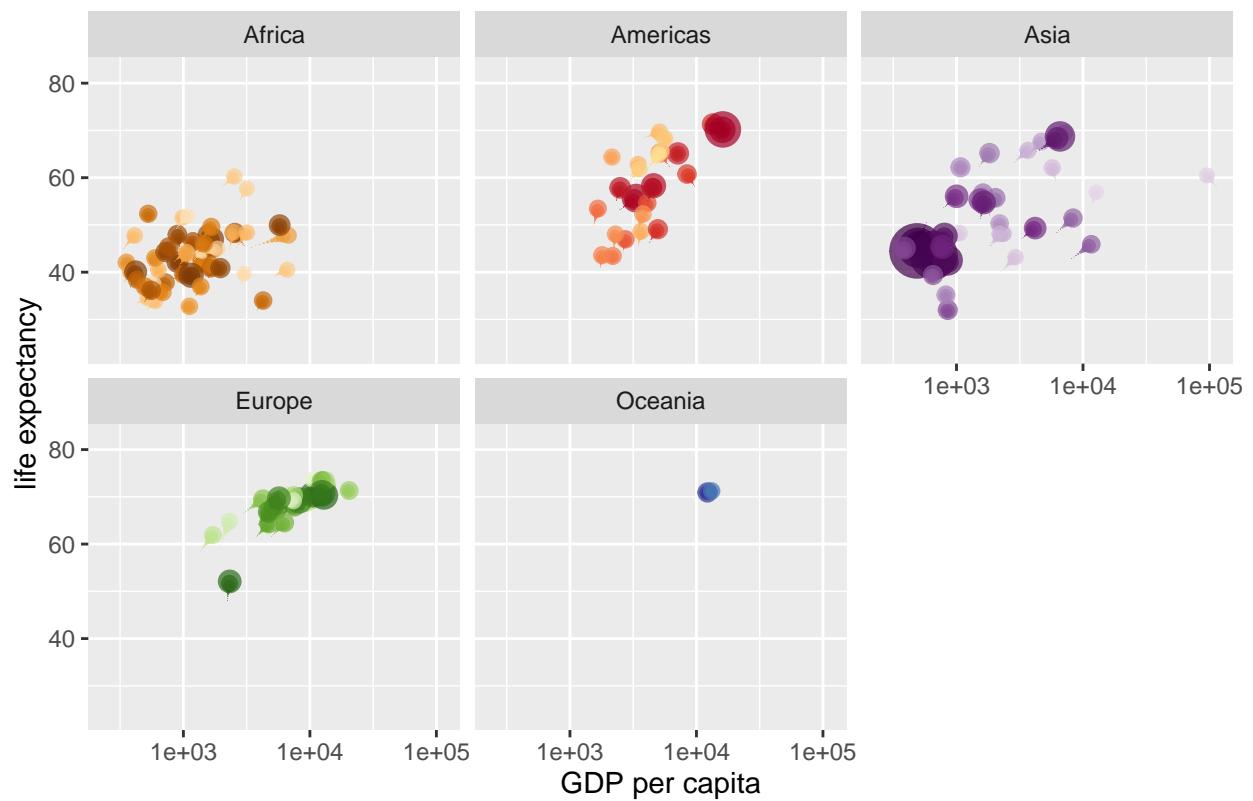
Year: 1961



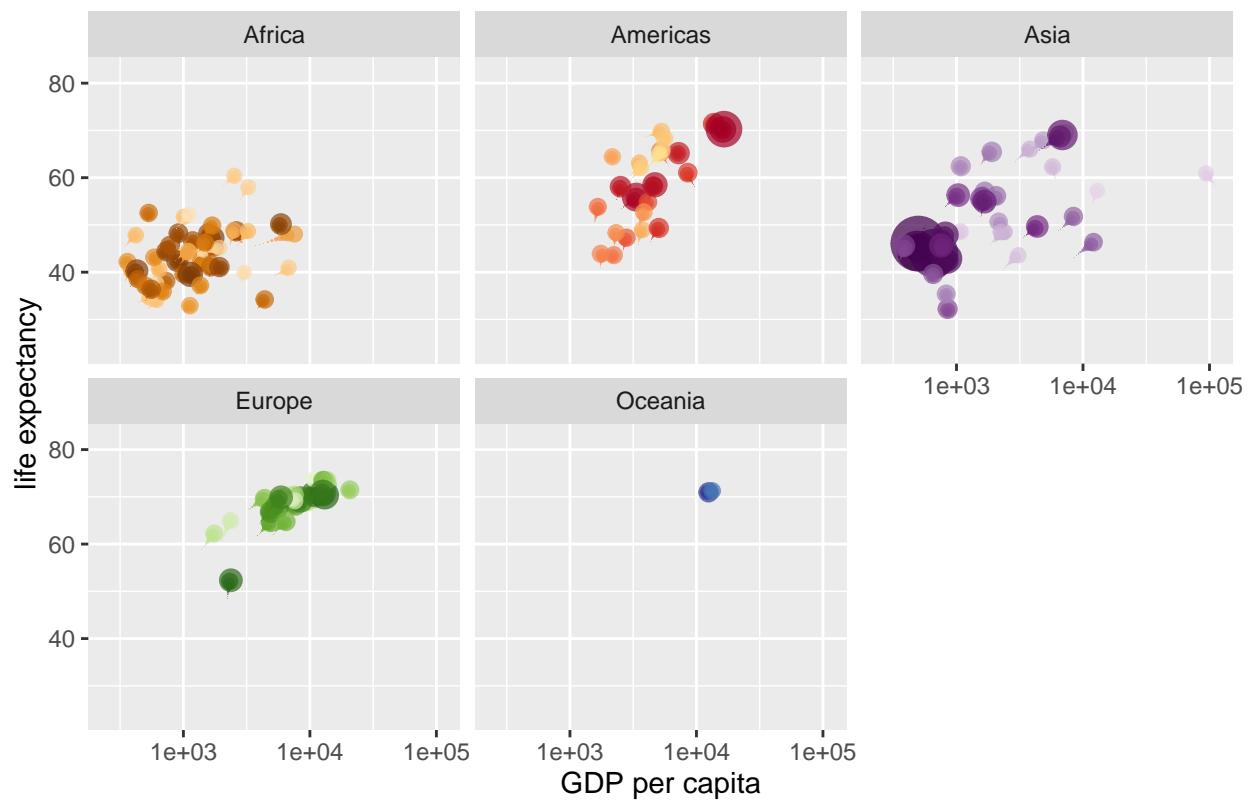
Year: 1961



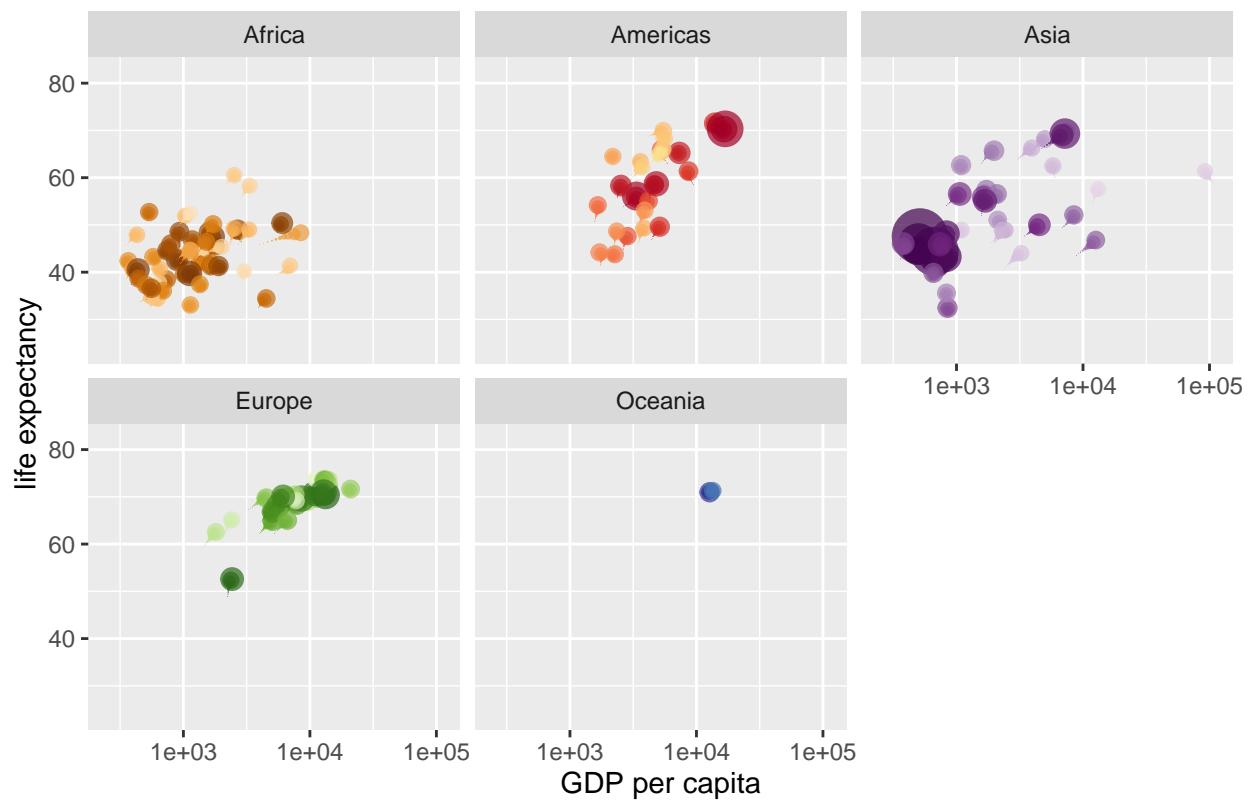
Year: 1962



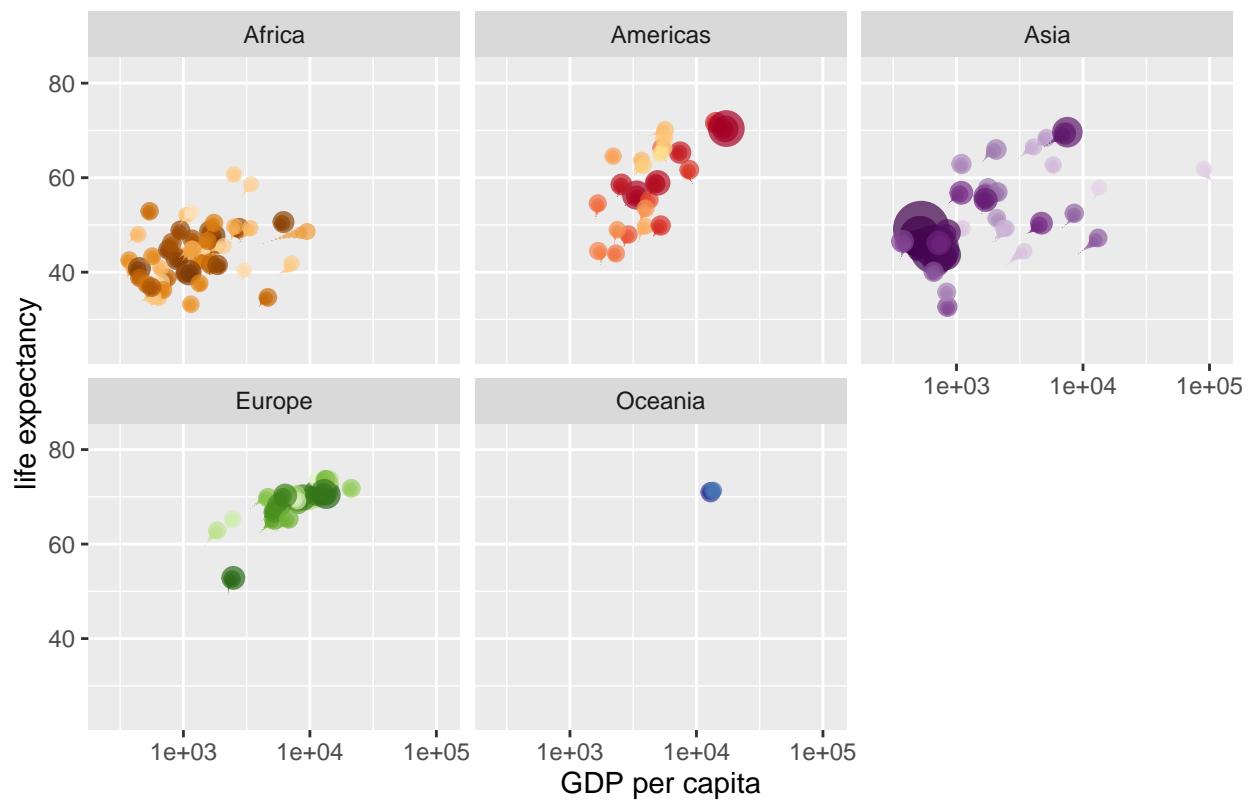
Year: 1963



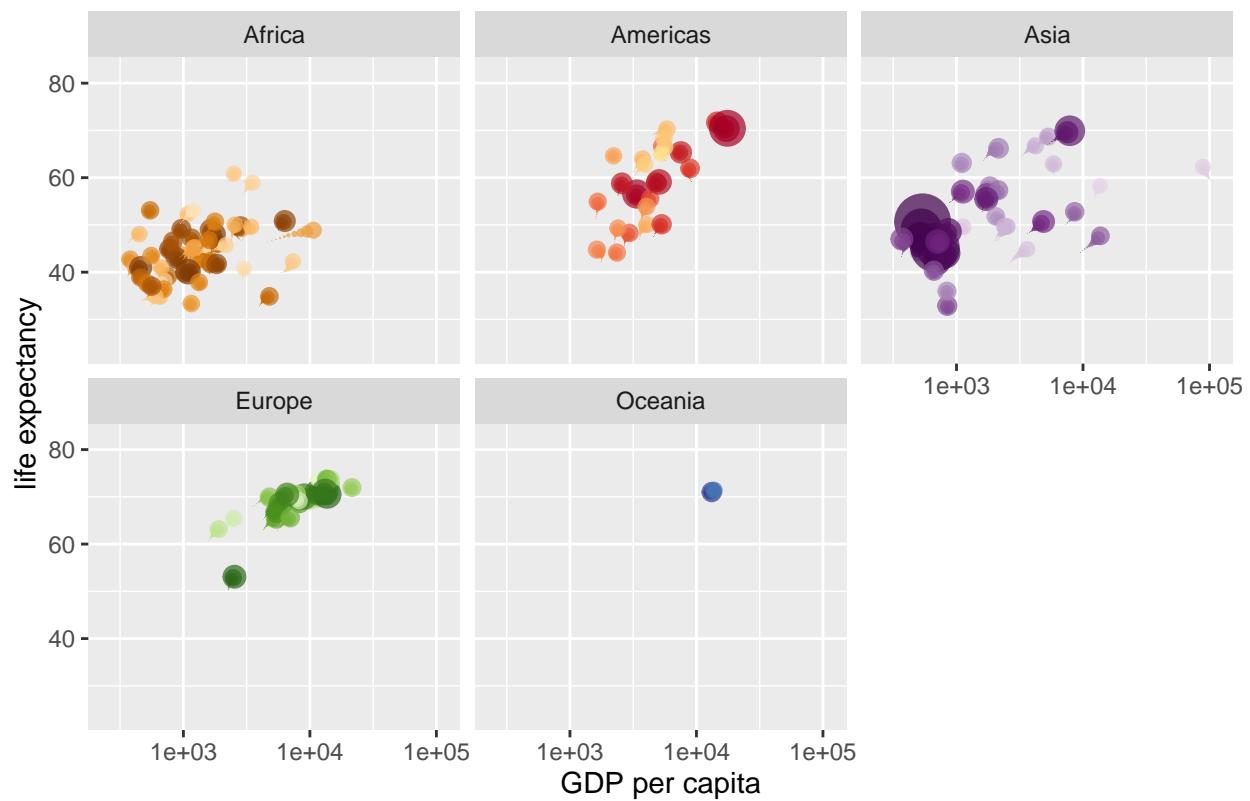
Year: 1963



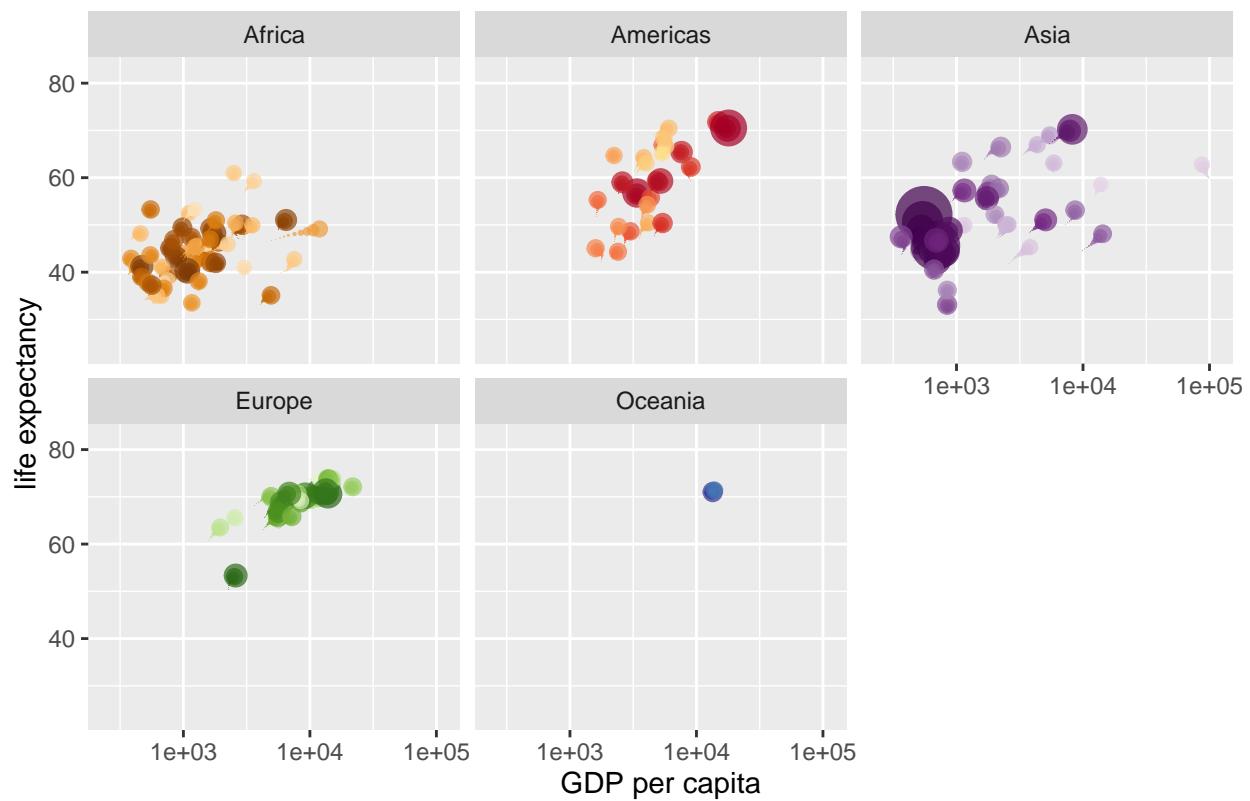
Year: 1964



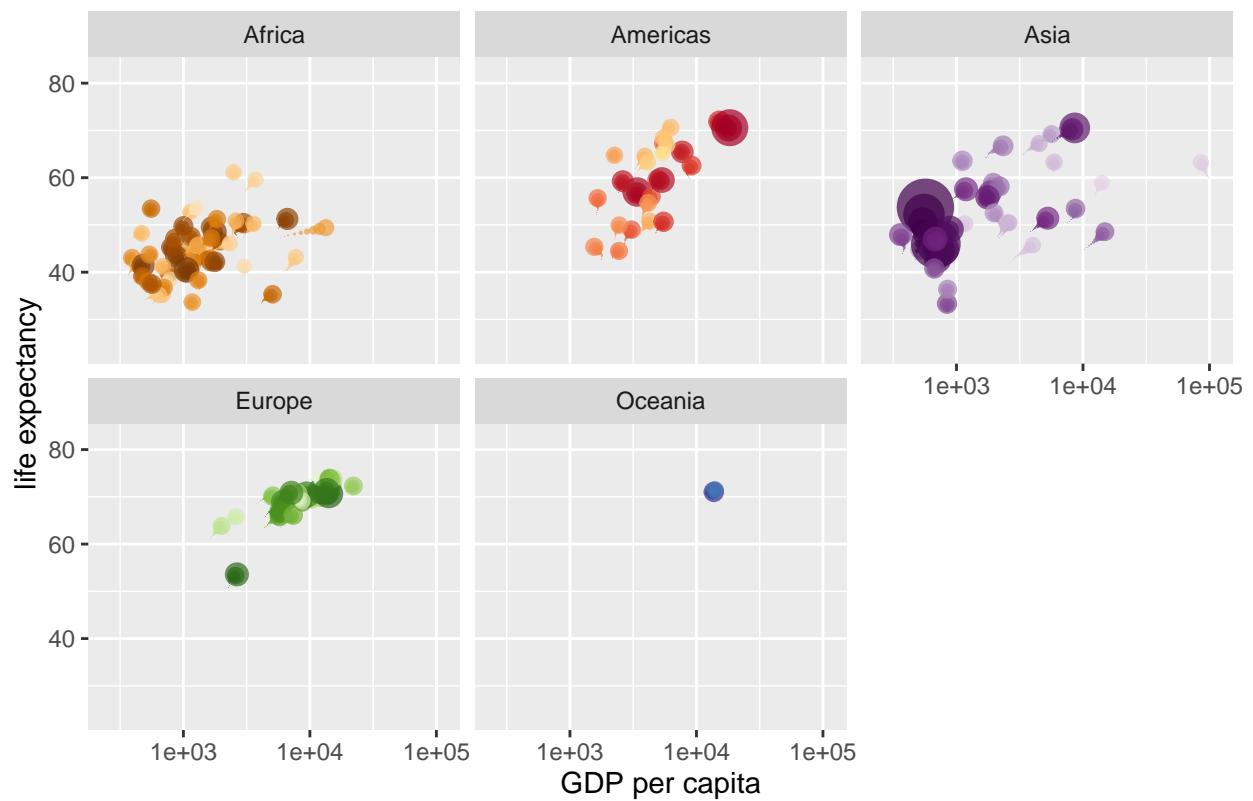
Year: 1964



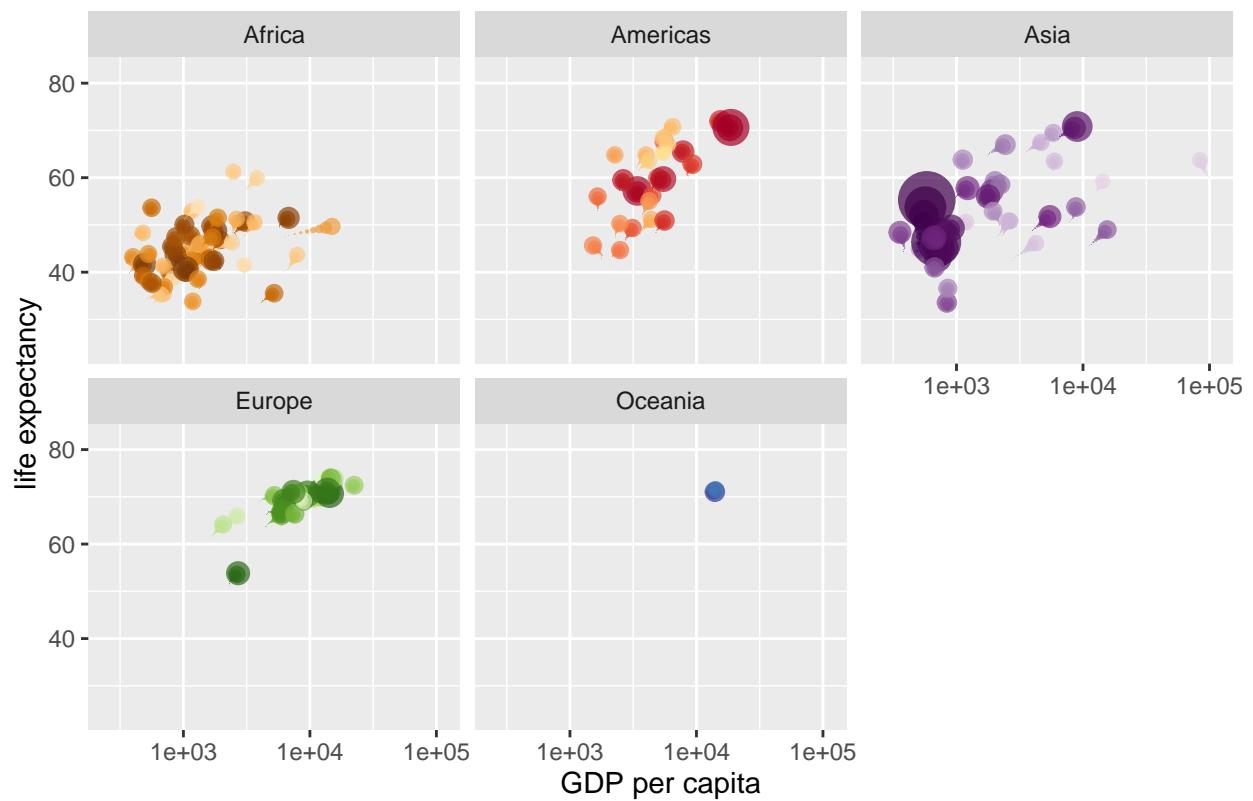
Year: 1965



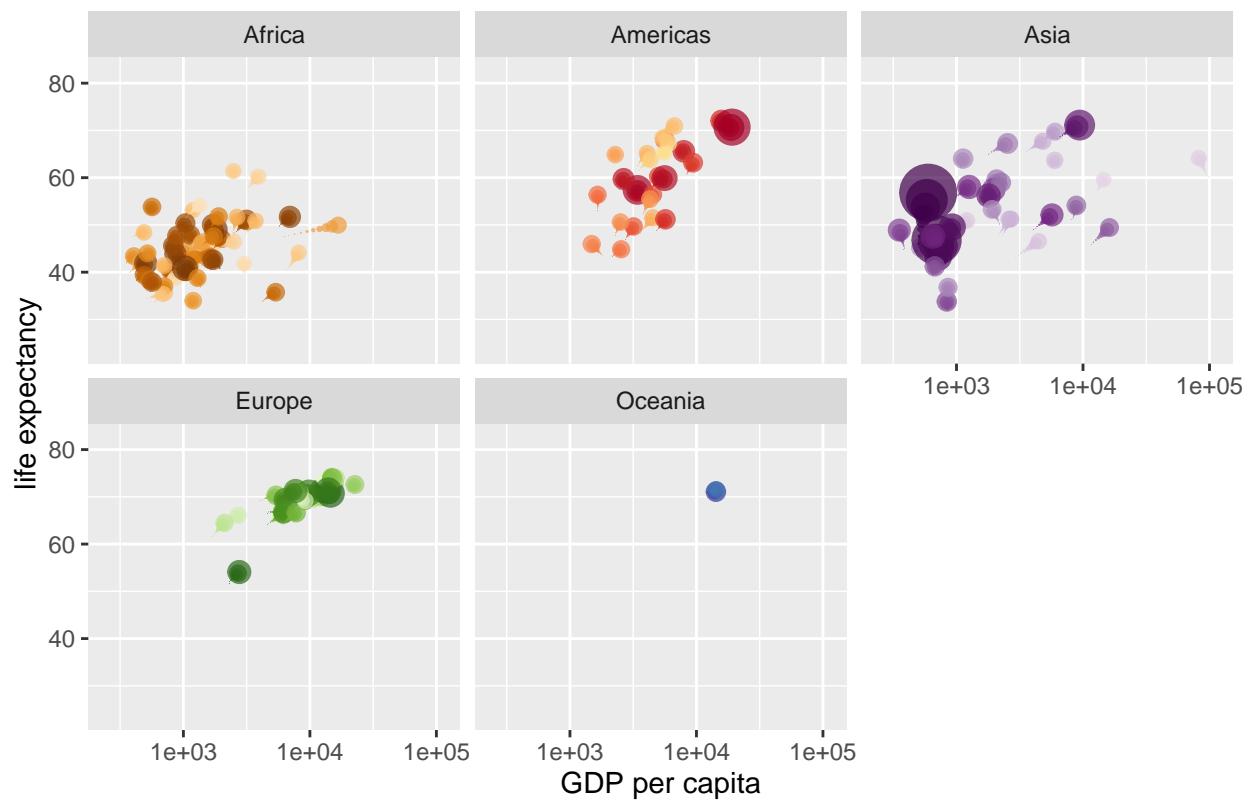
Year: 1965



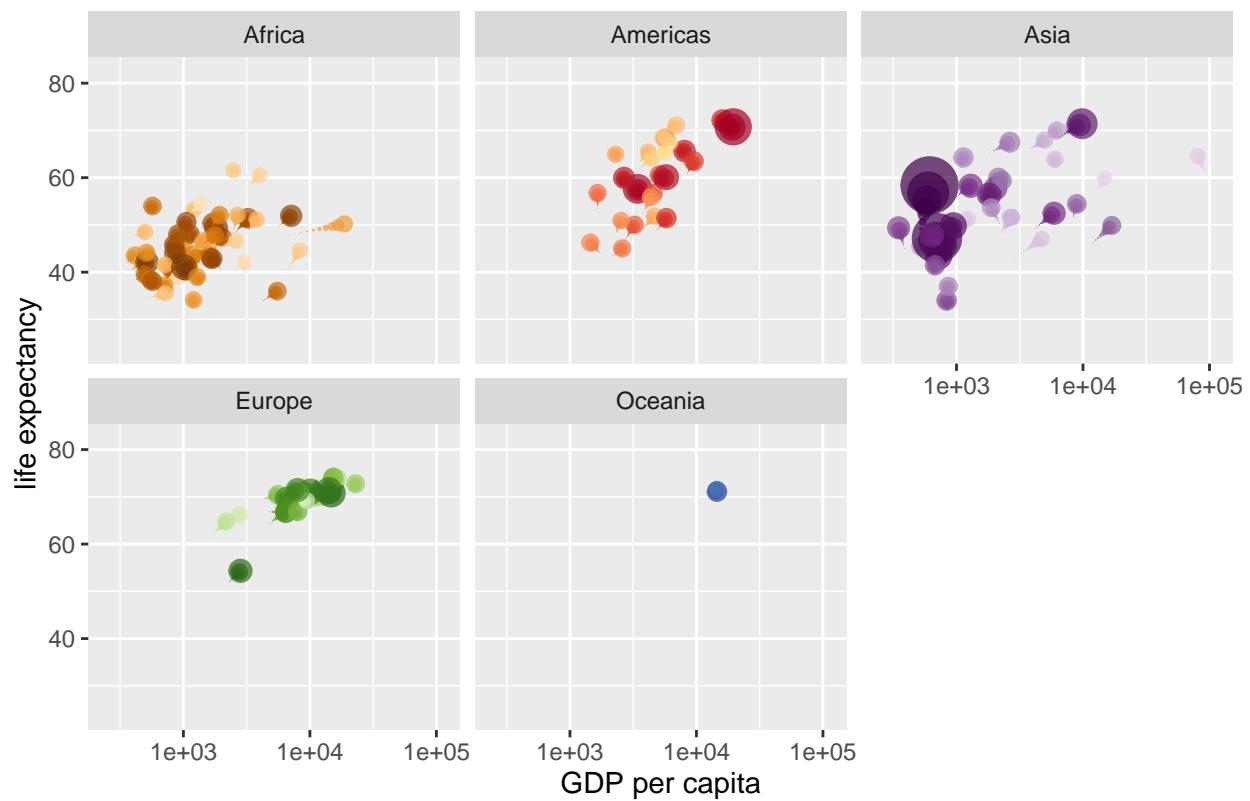
Year: 1966



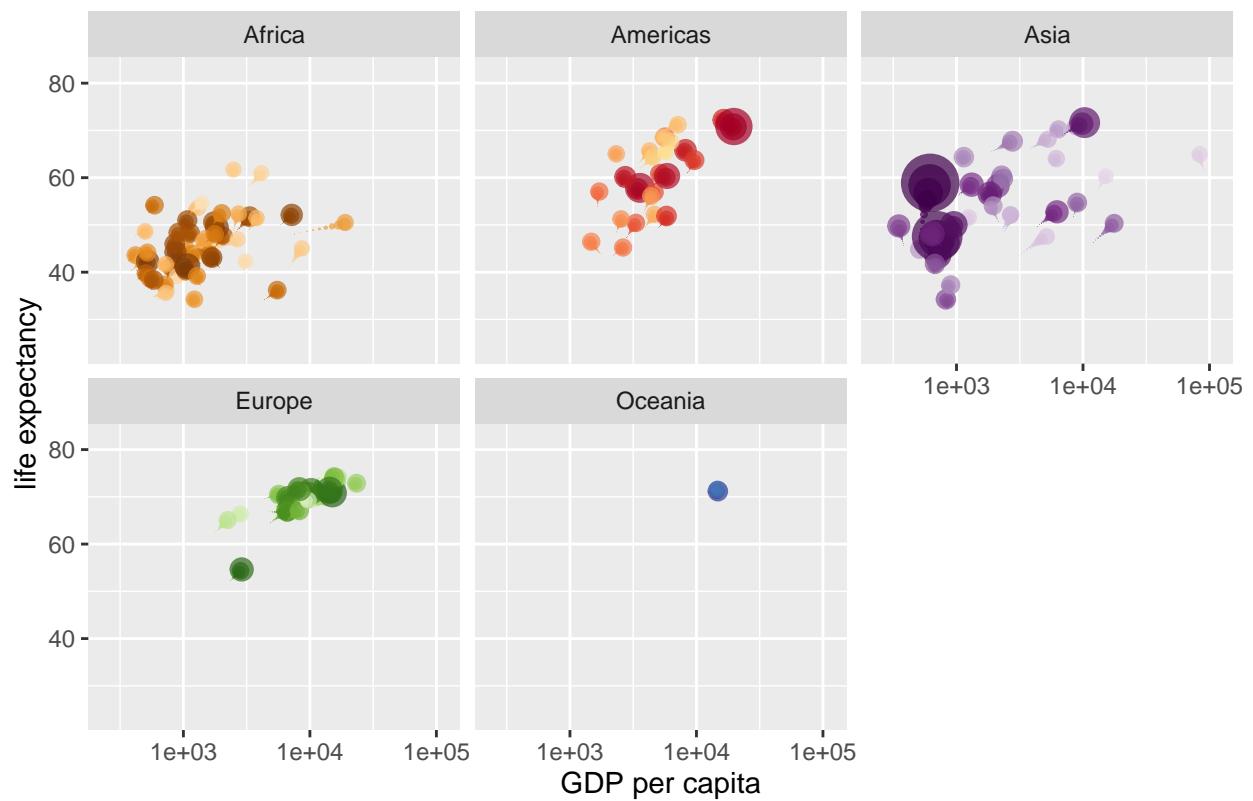
Year: 1966



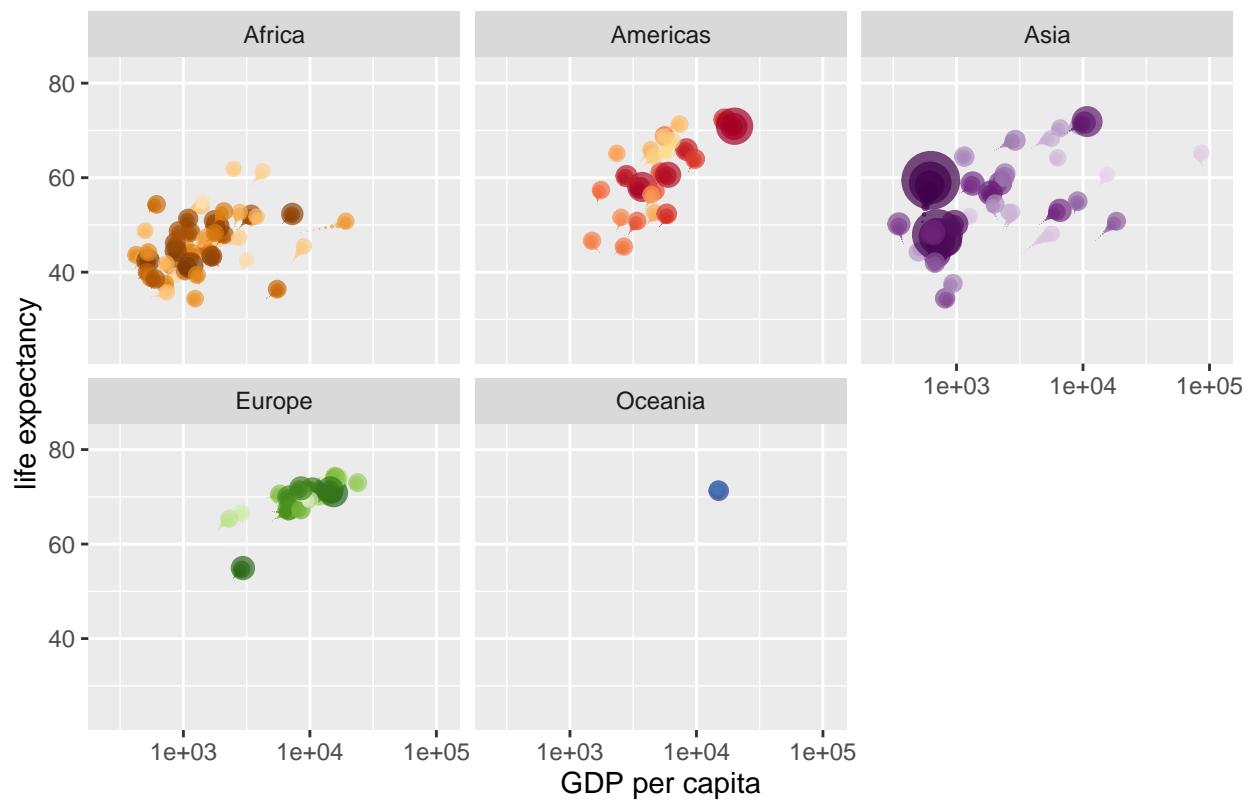
Year: 1967



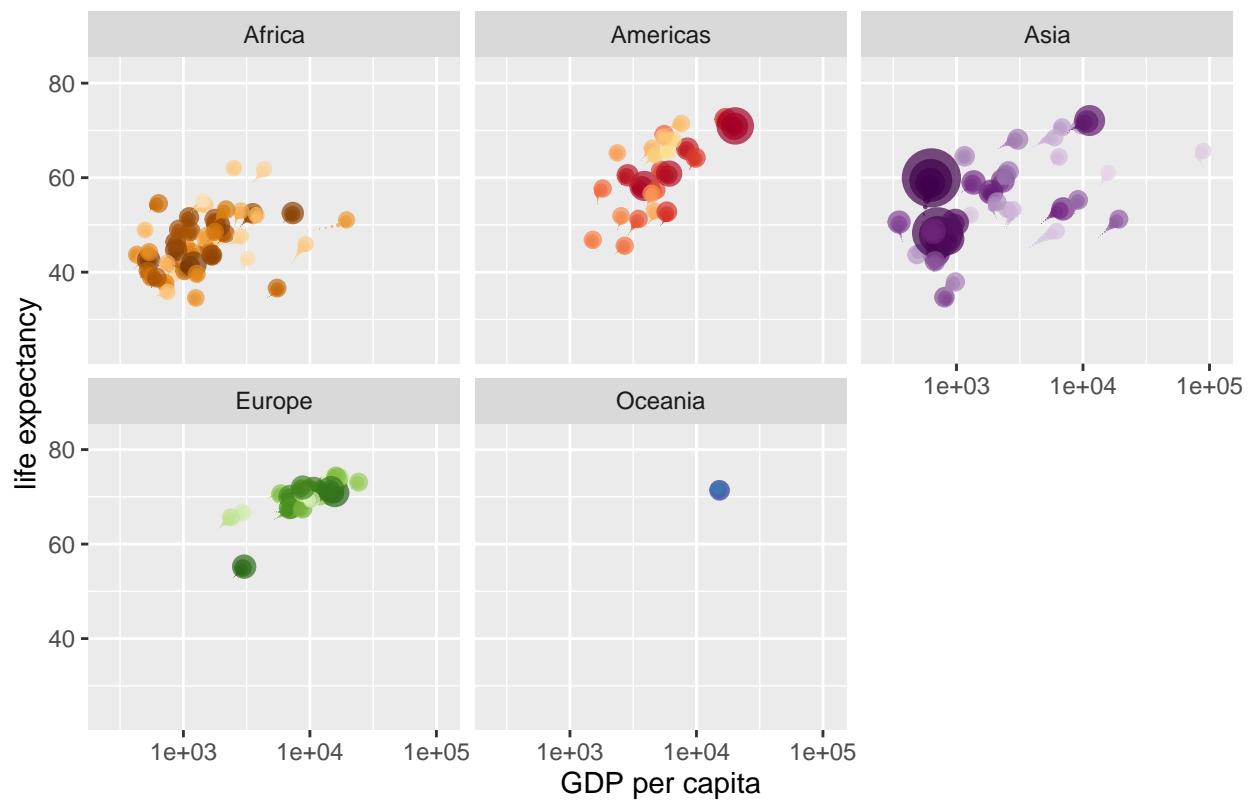
Year: 1968



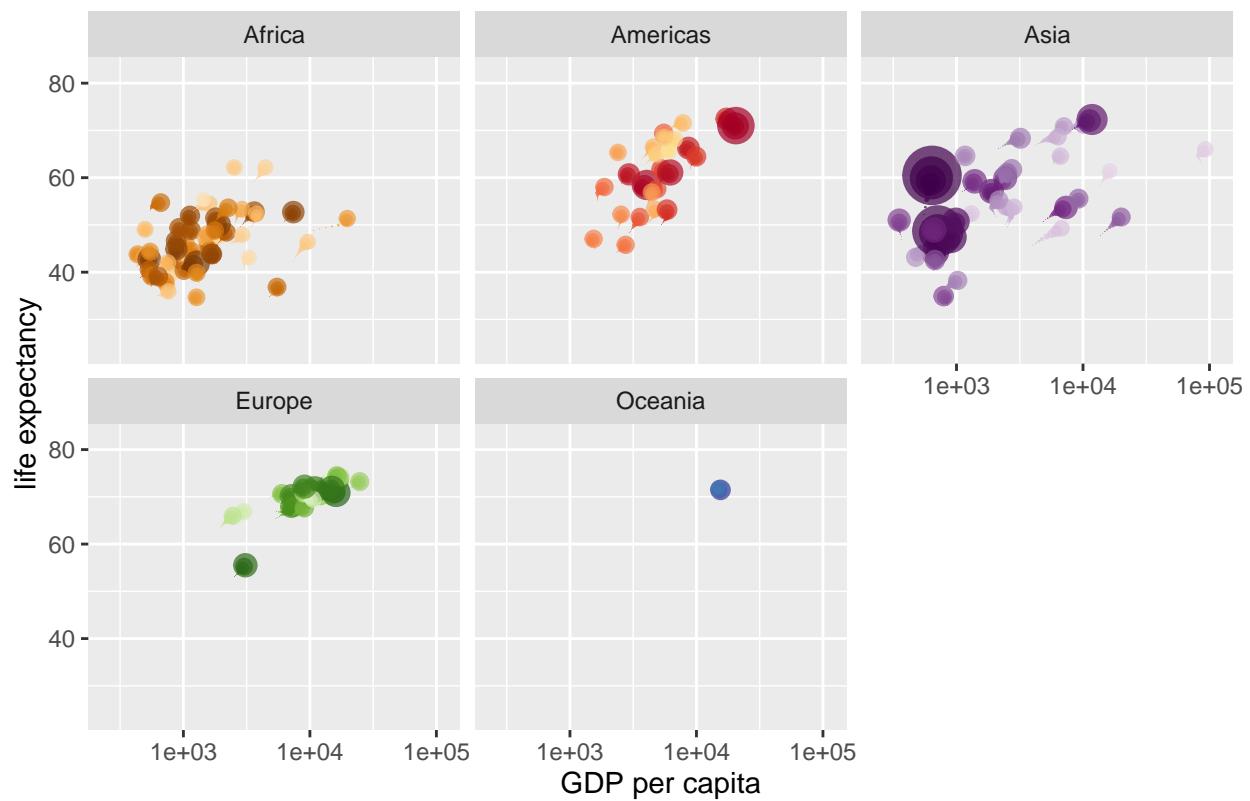
Year: 1968



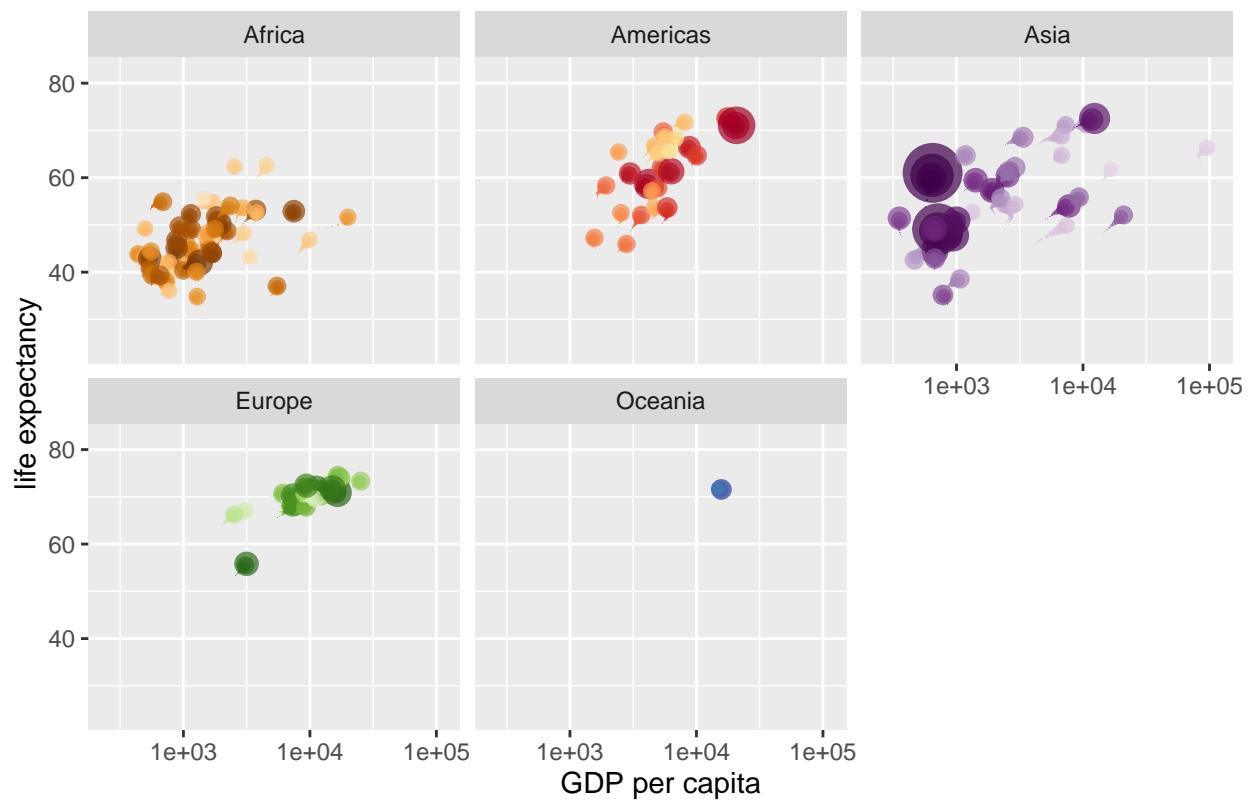
Year: 1969



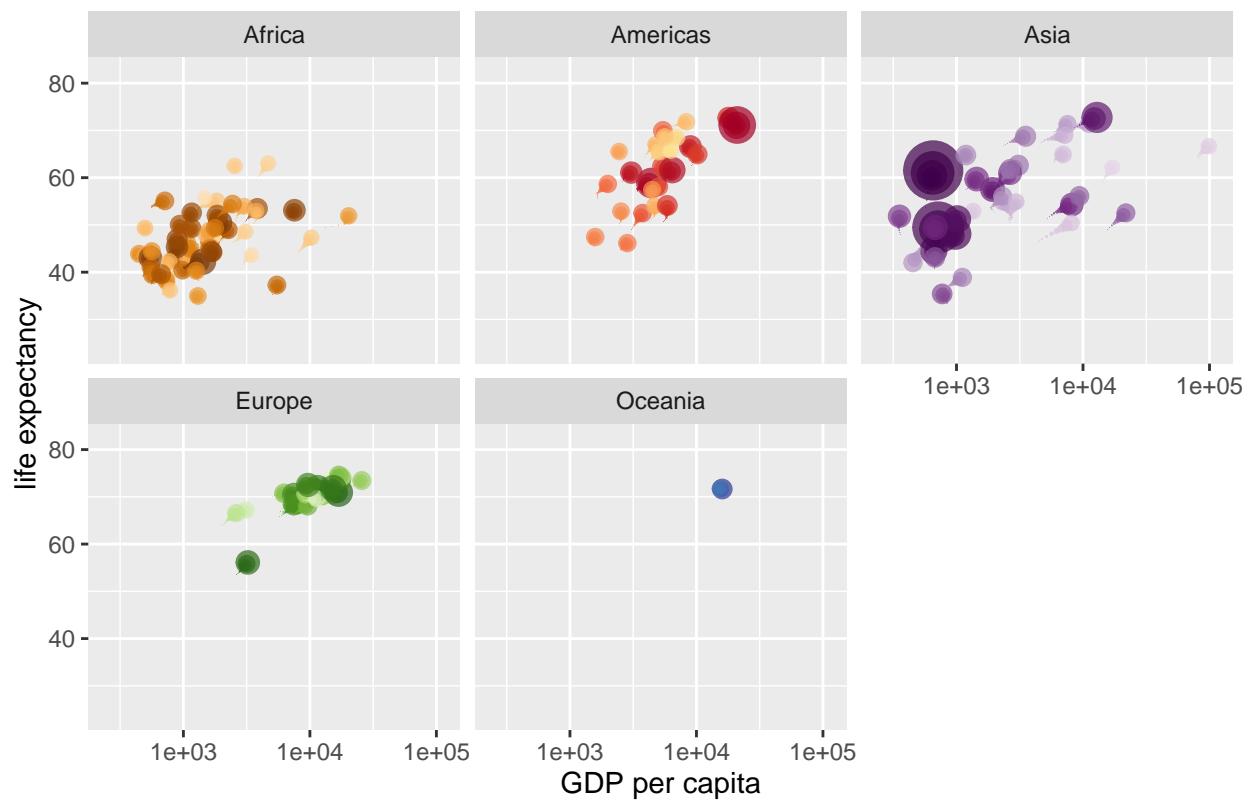
Year: 1969



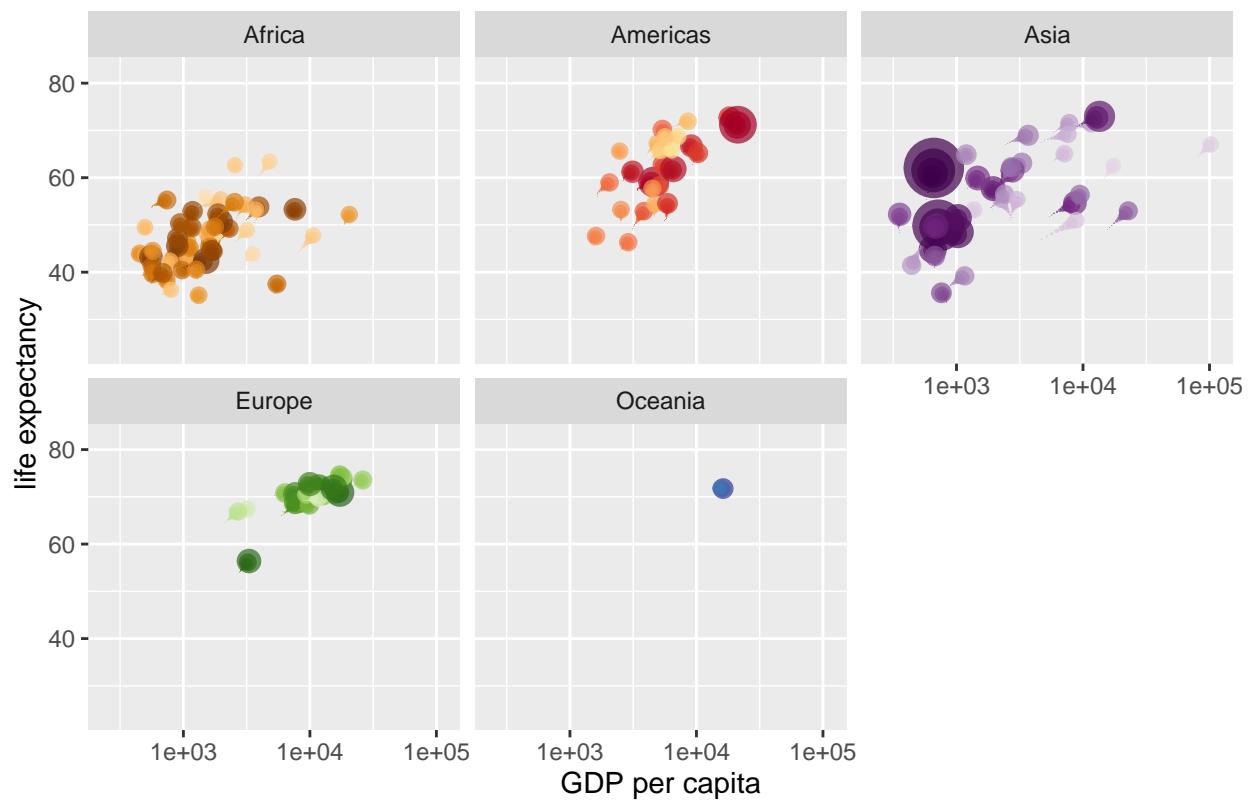
Year: 1970



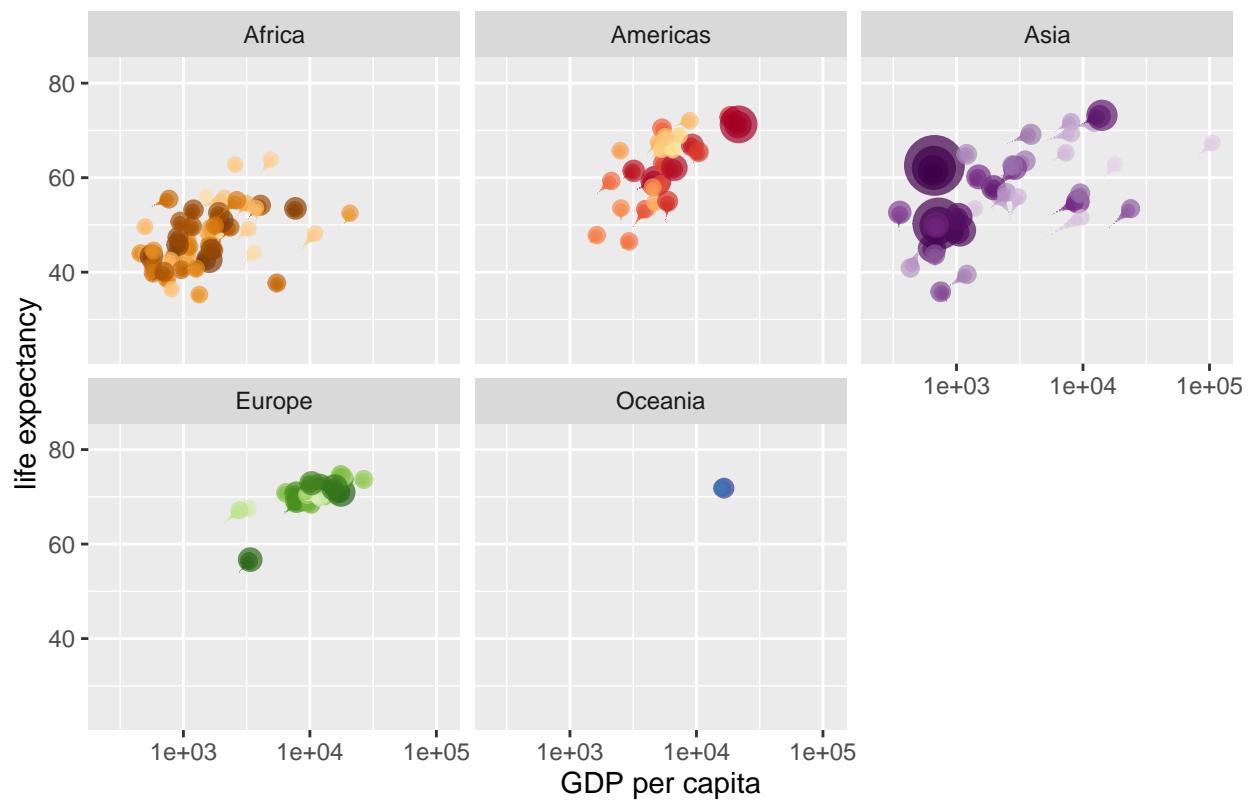
Year: 1970



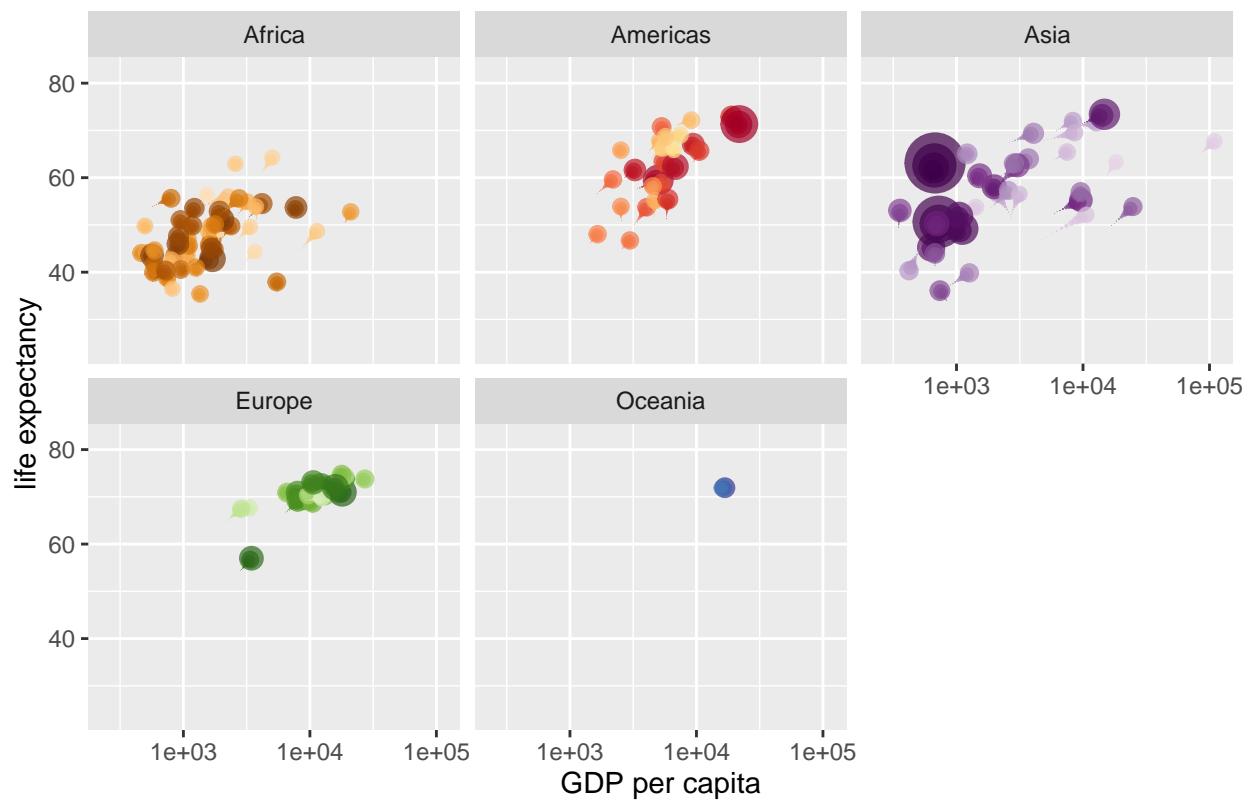
Year: 1971



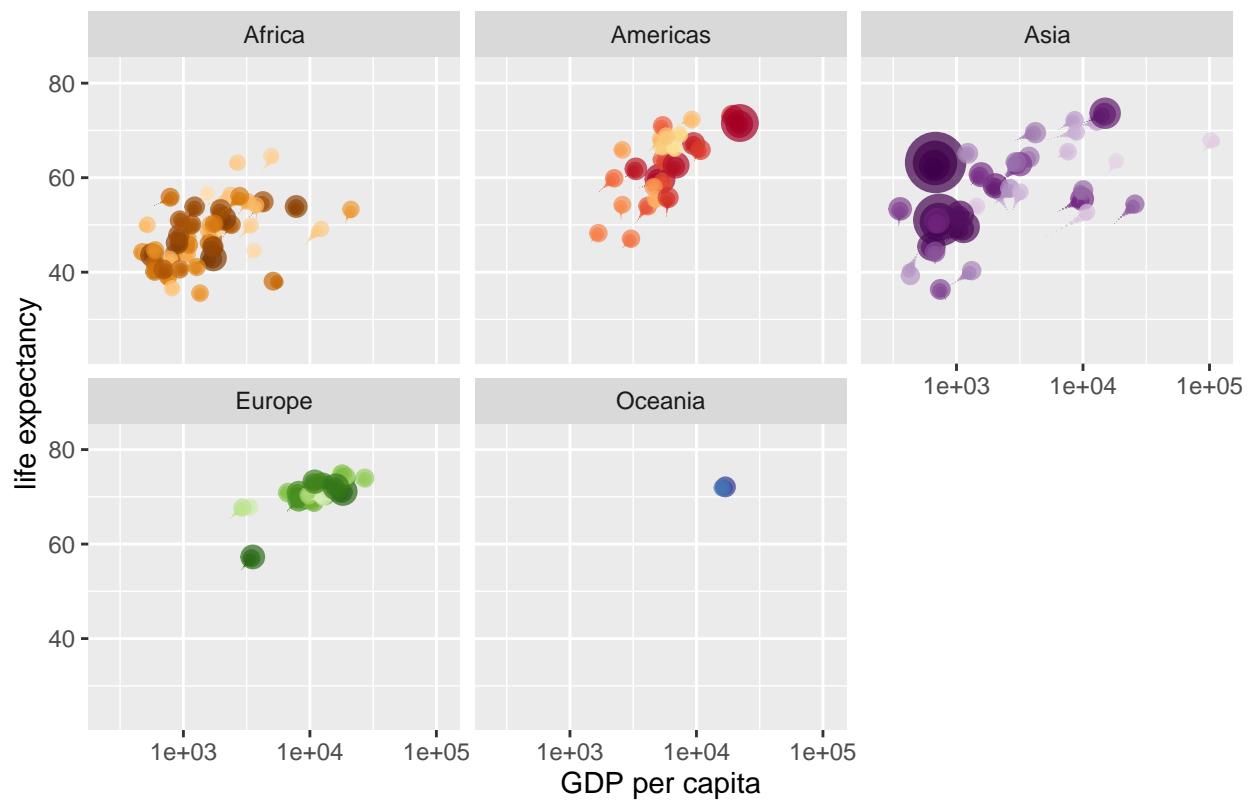
Year: 1971



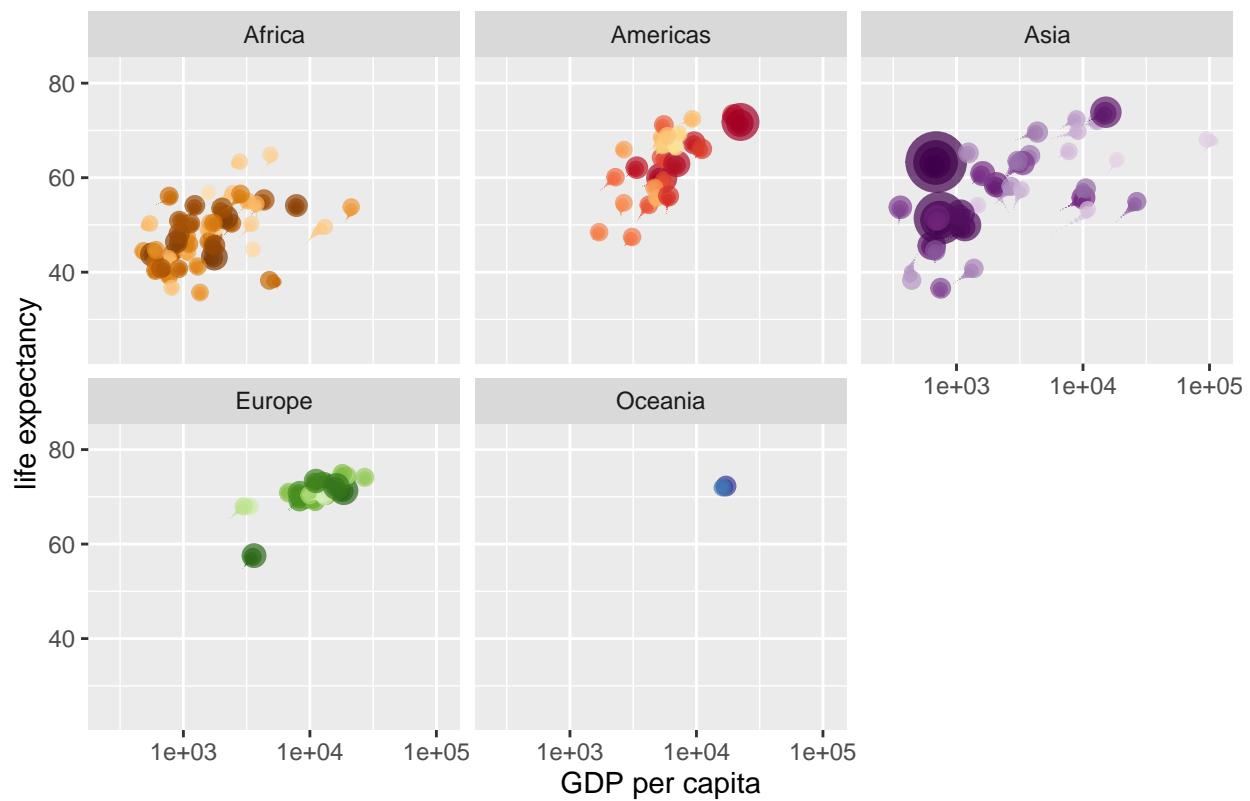
Year: 1972



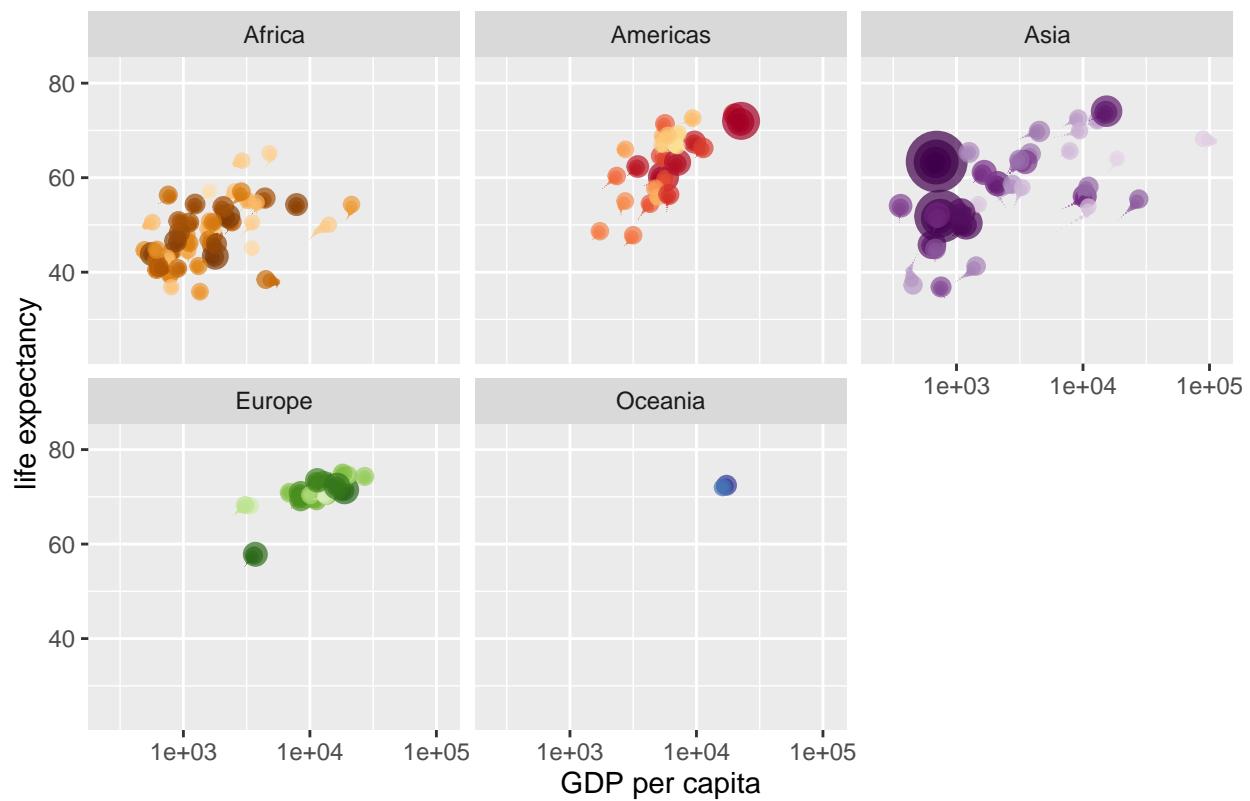
Year: 1973



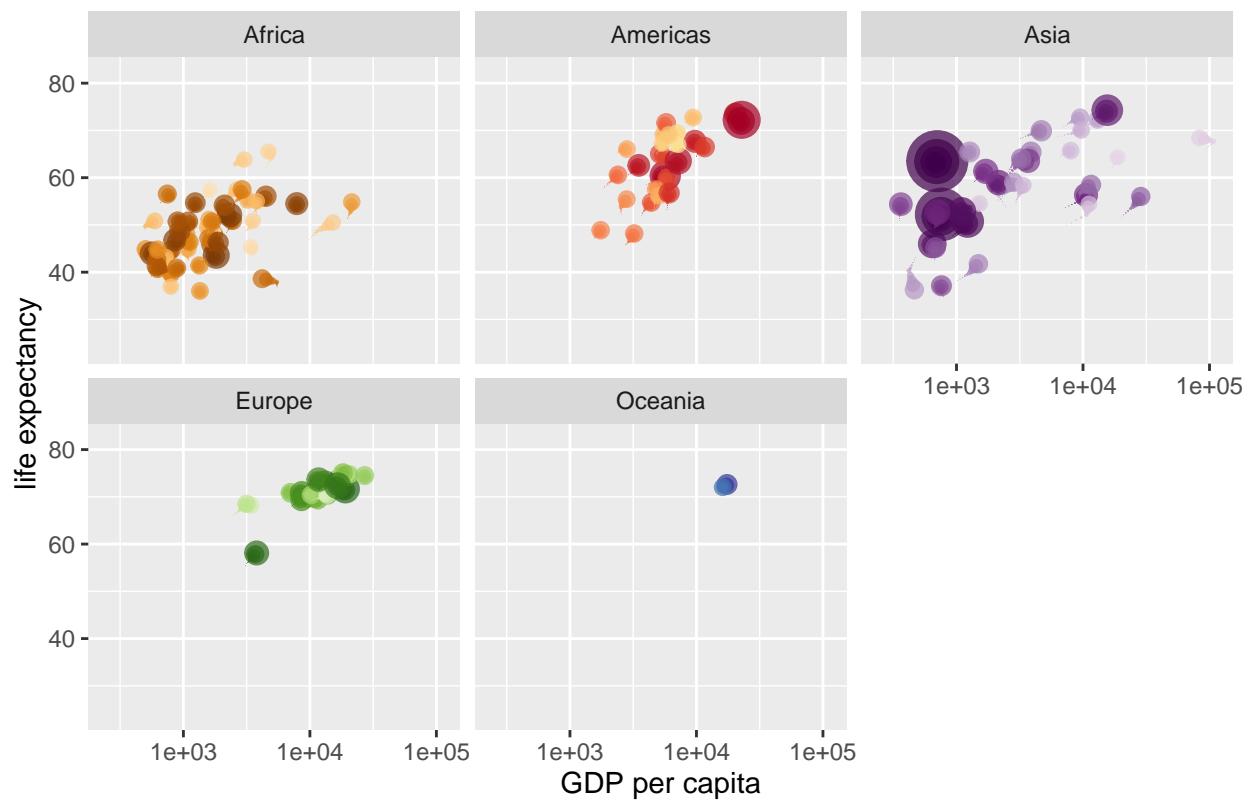
Year: 1973



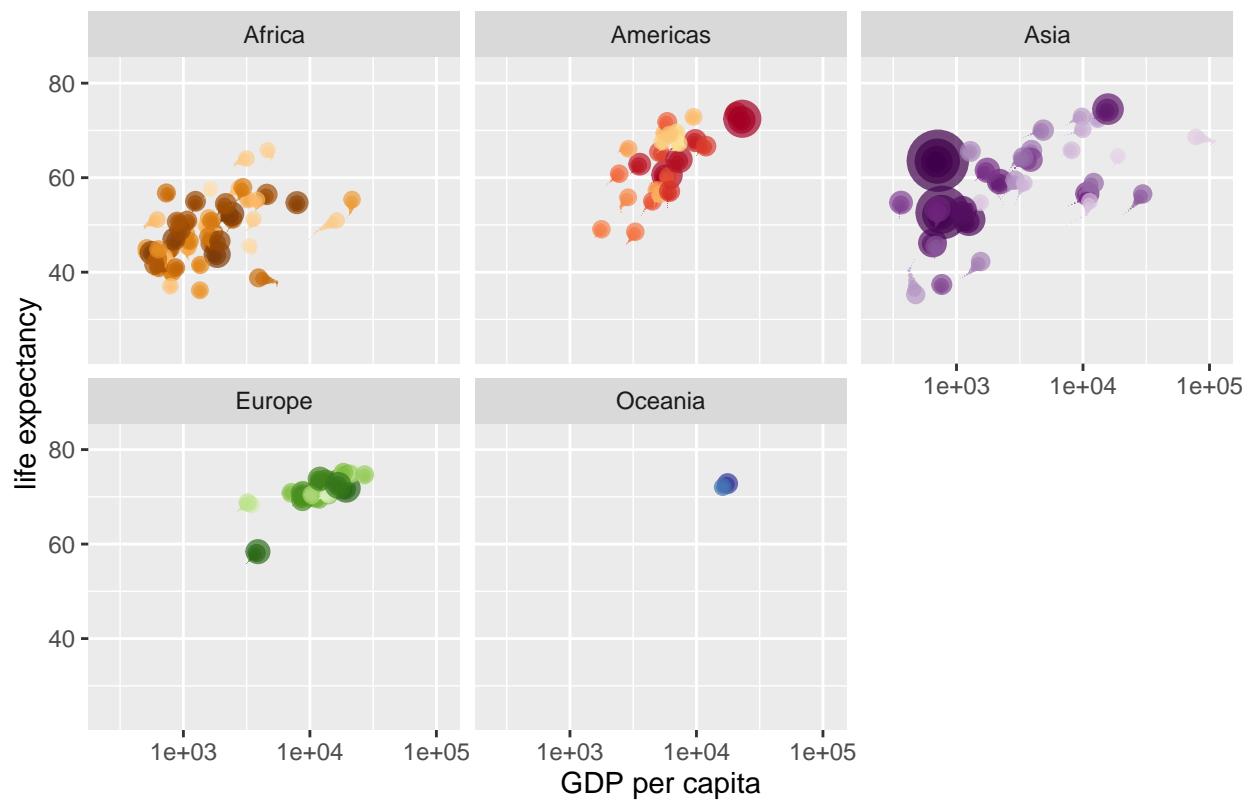
Year: 1974



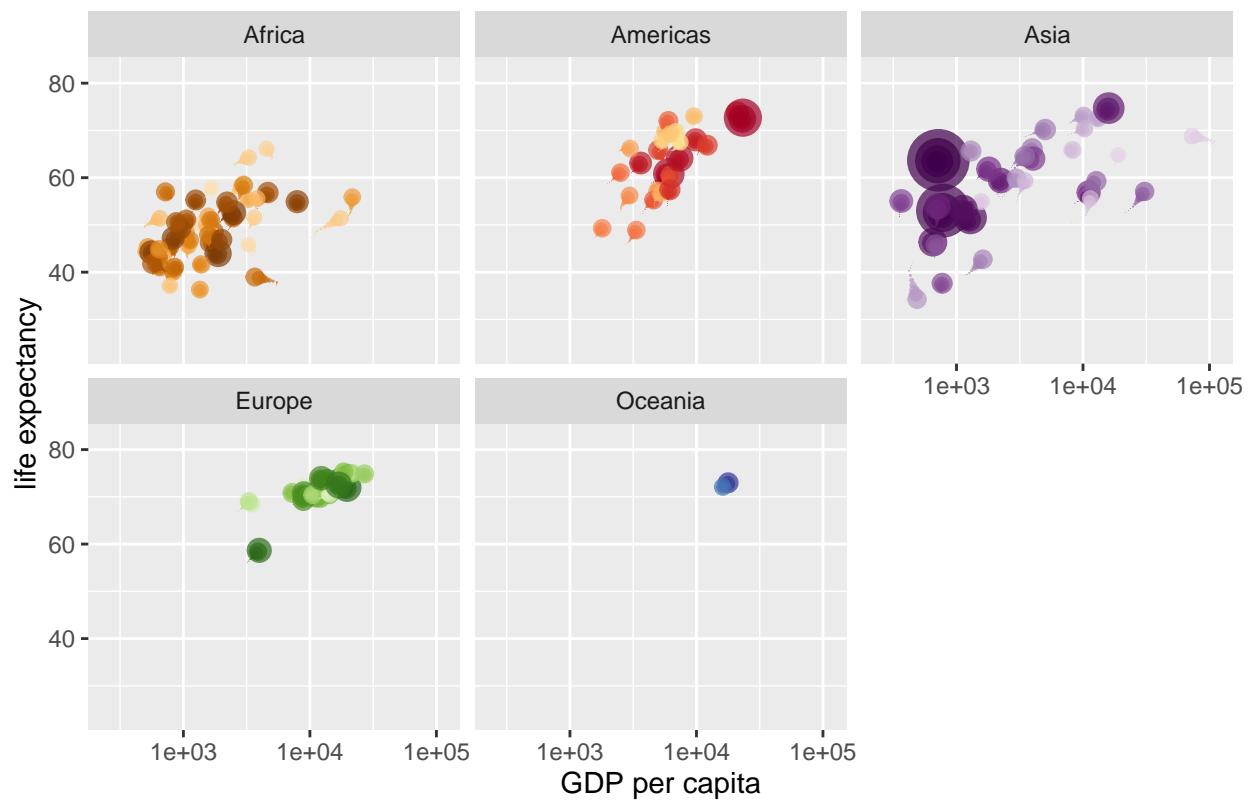
Year: 1974



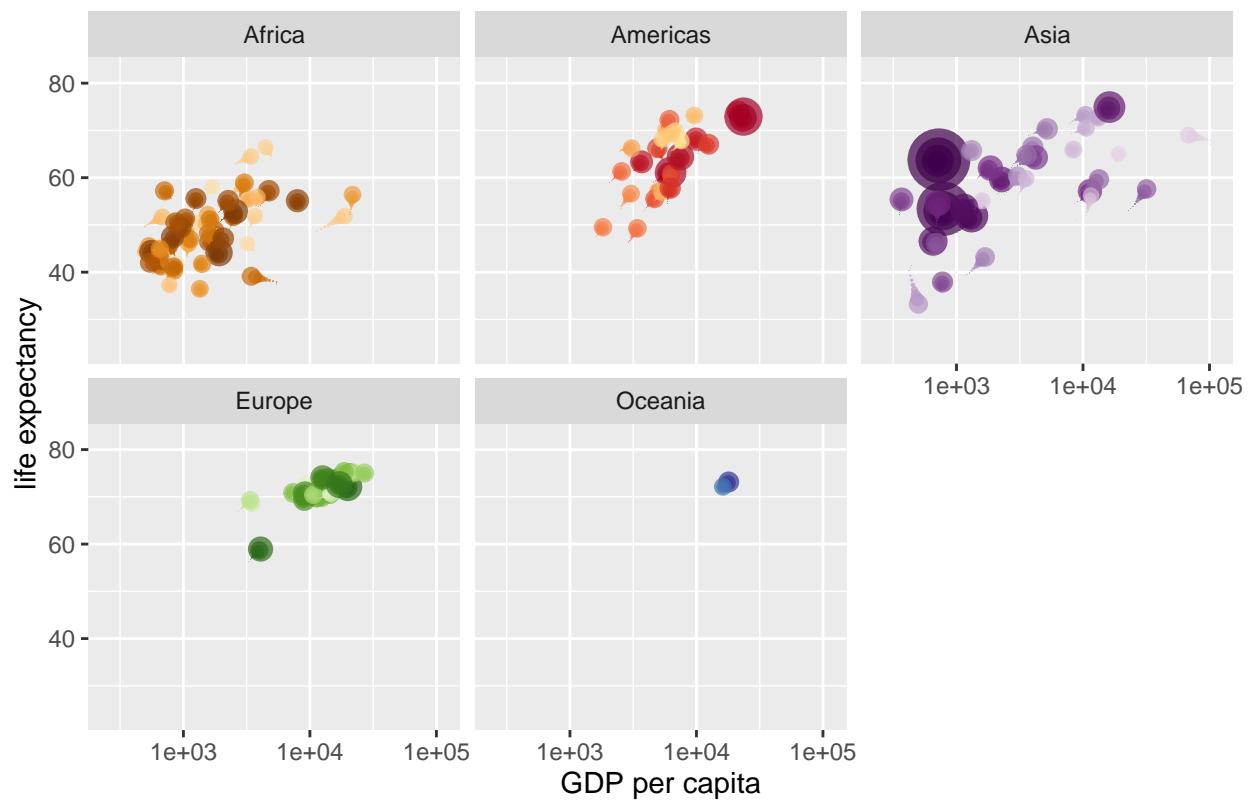
Year: 1975



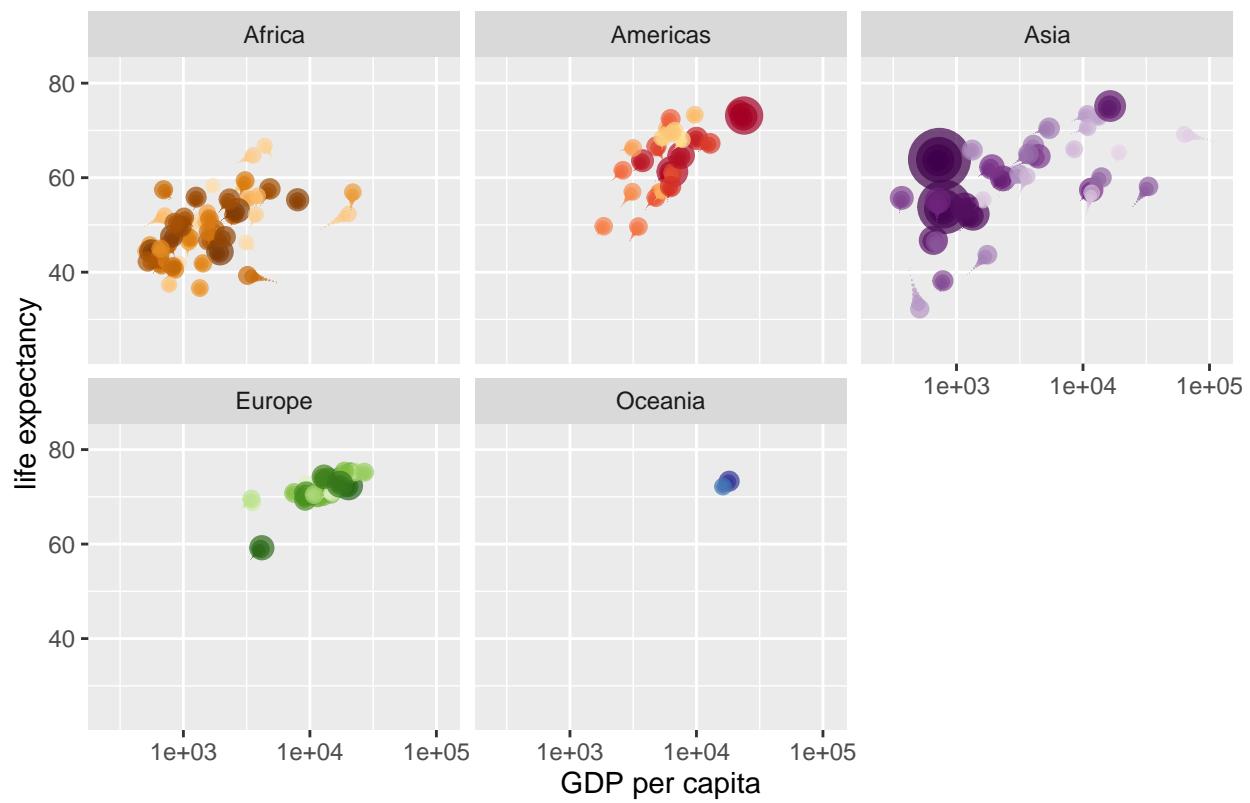
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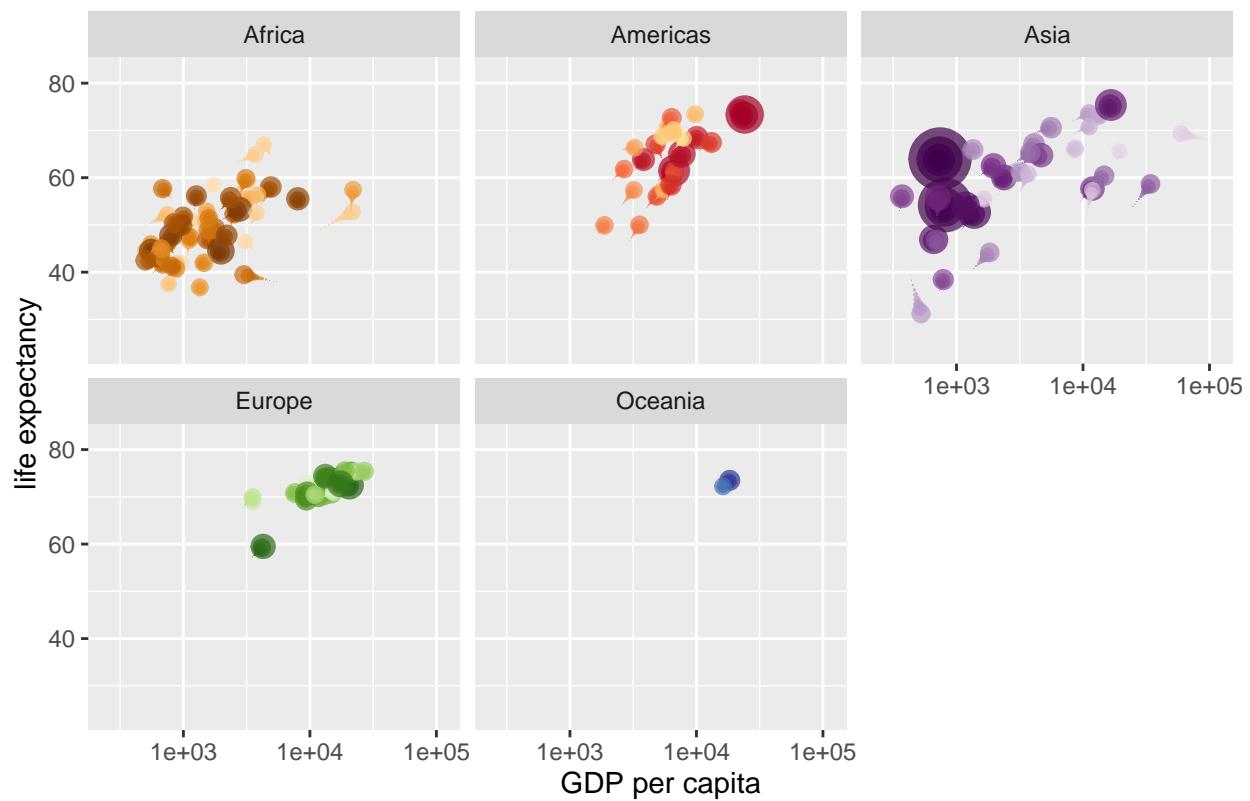
Year: 1976



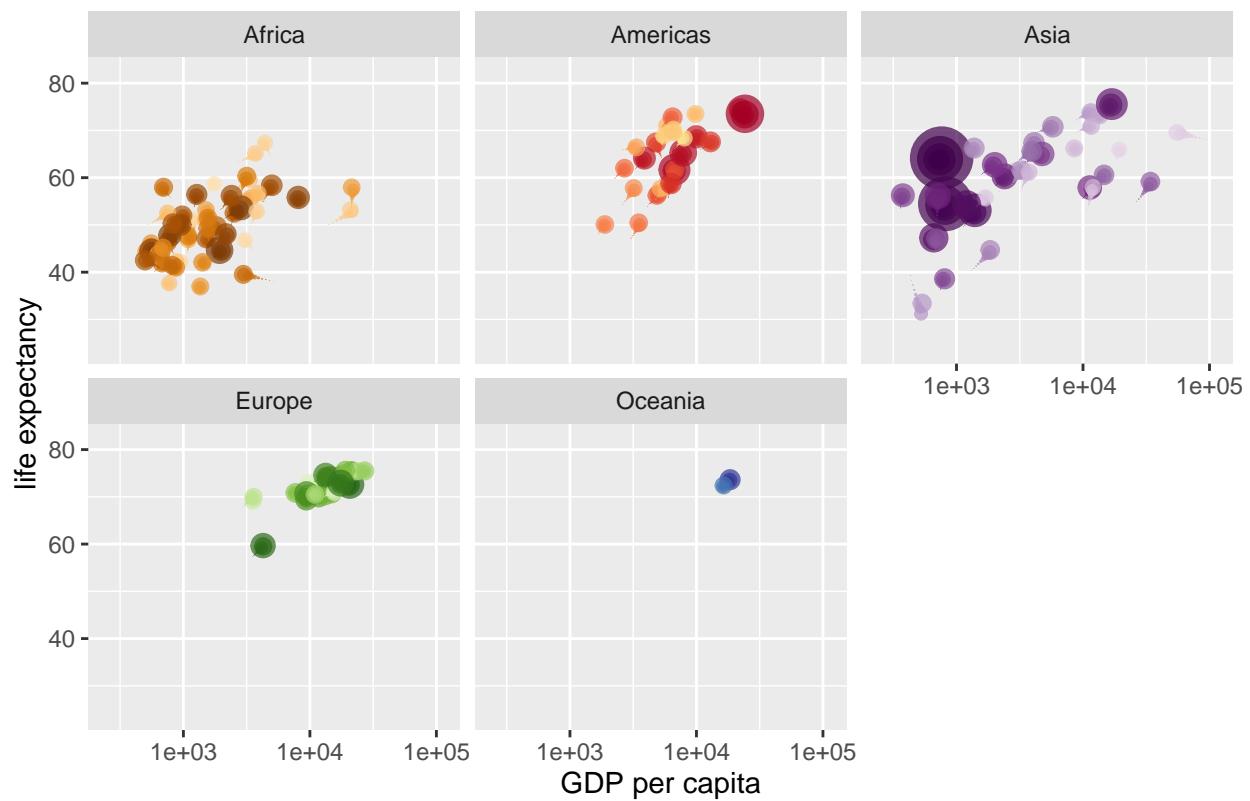
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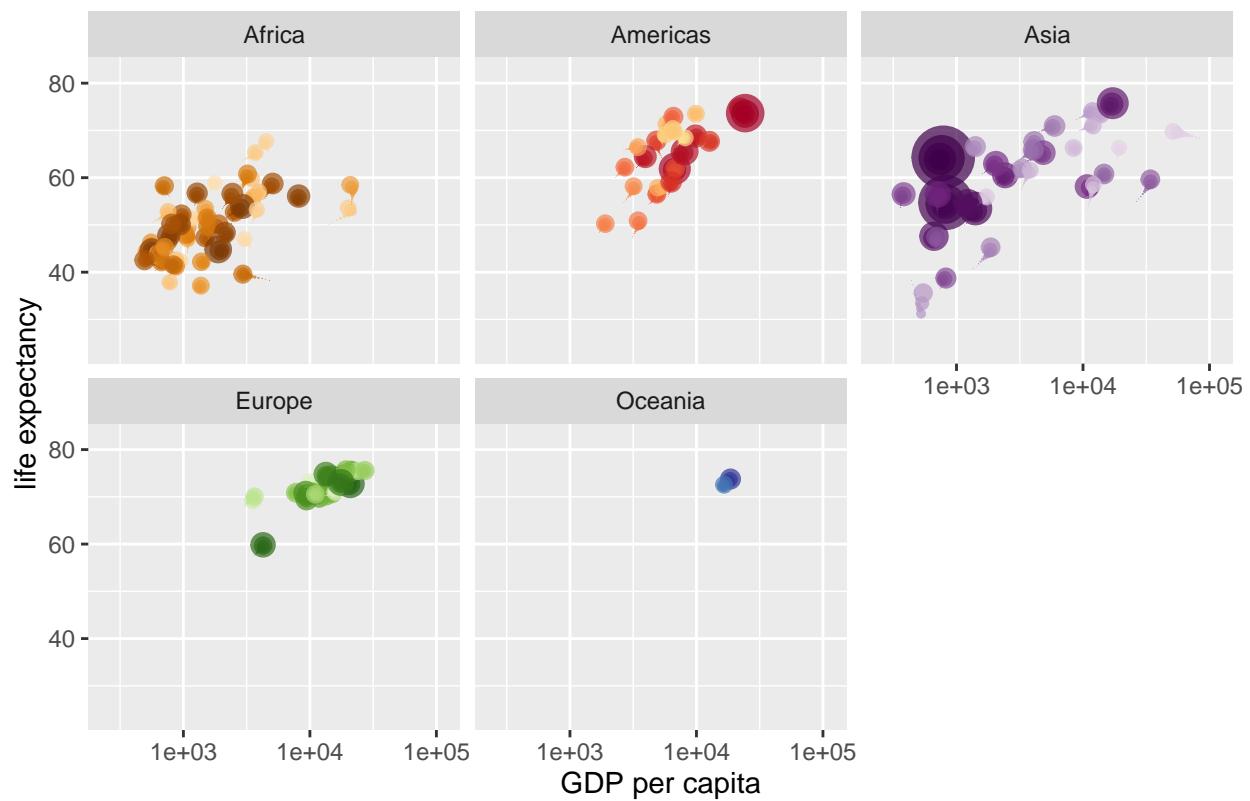
Year: 1977



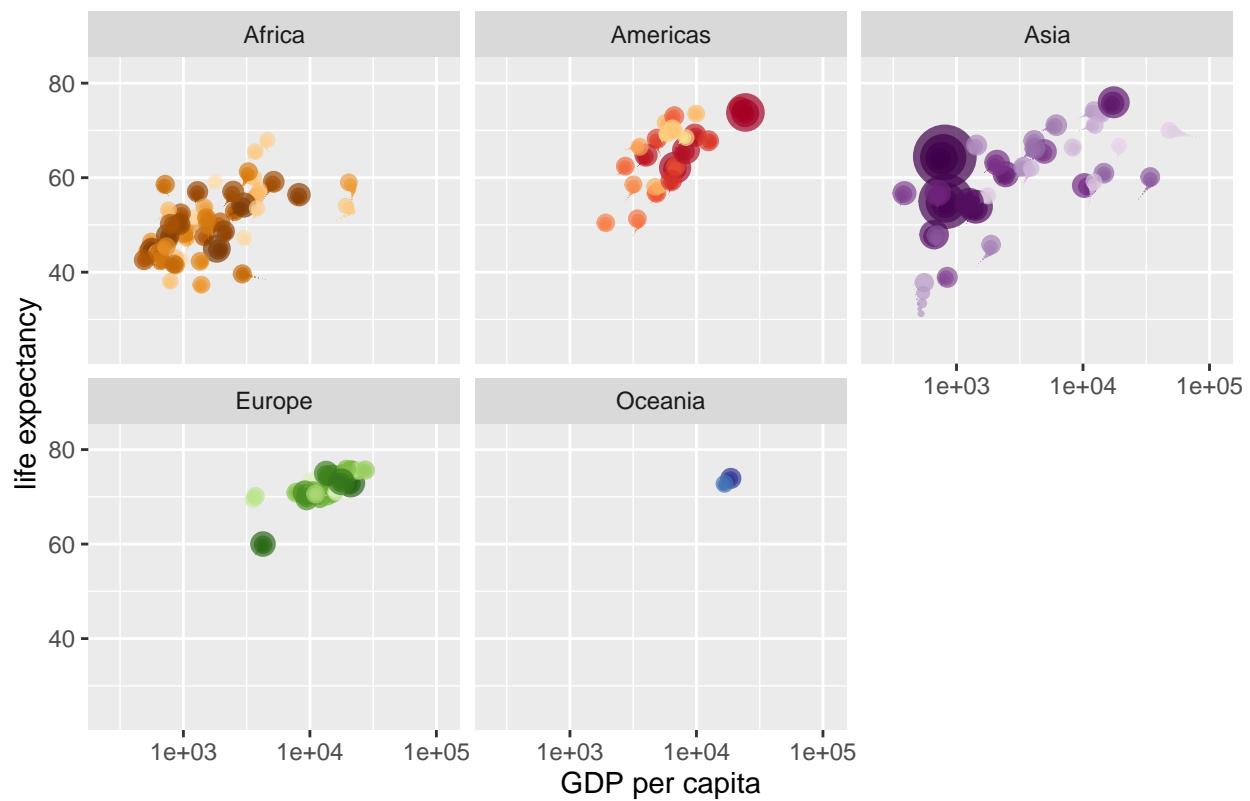
Year: 1978



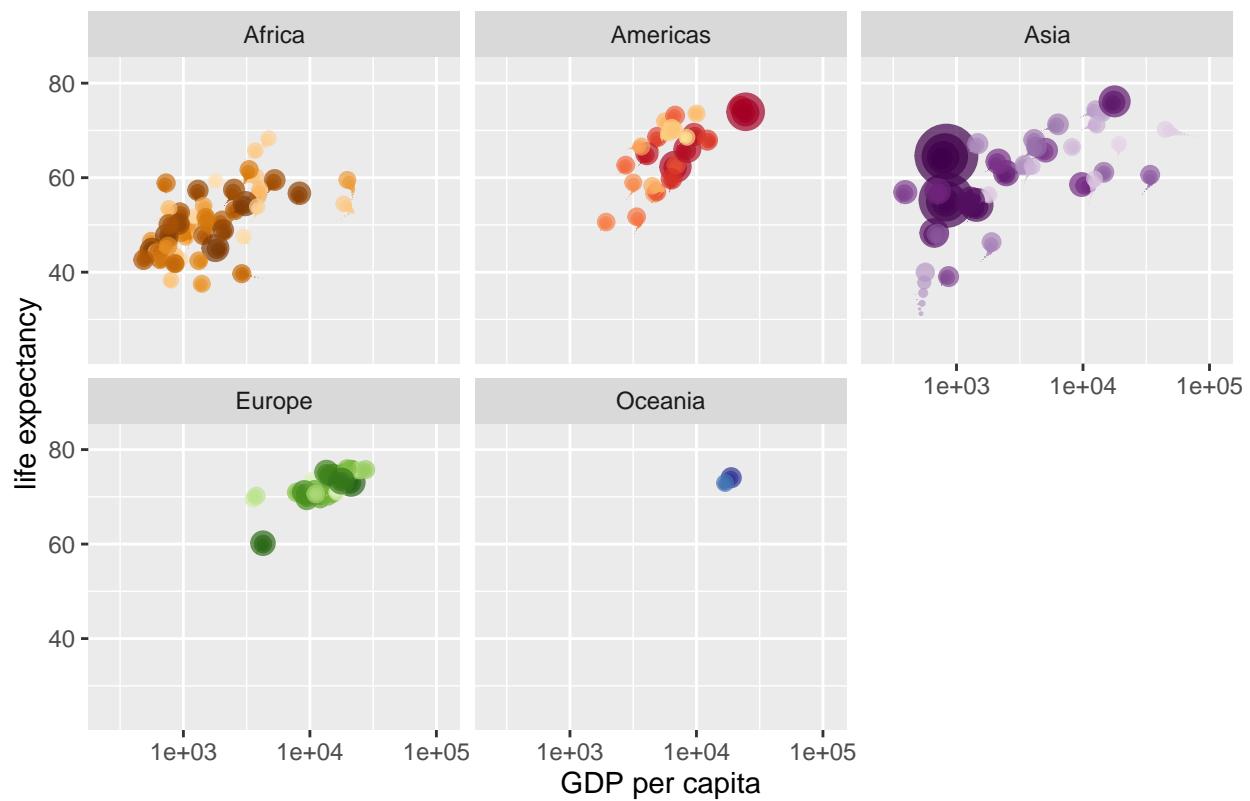
Year: 1978



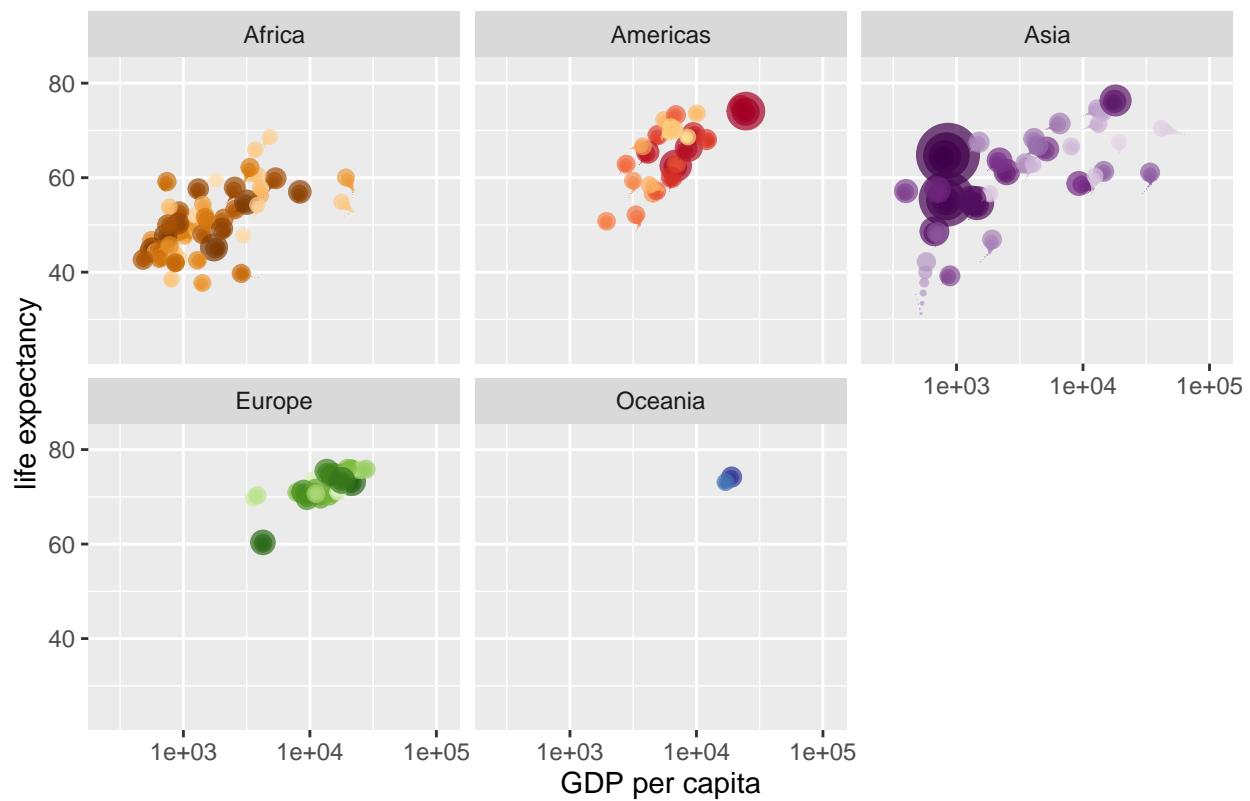
Year: 1979



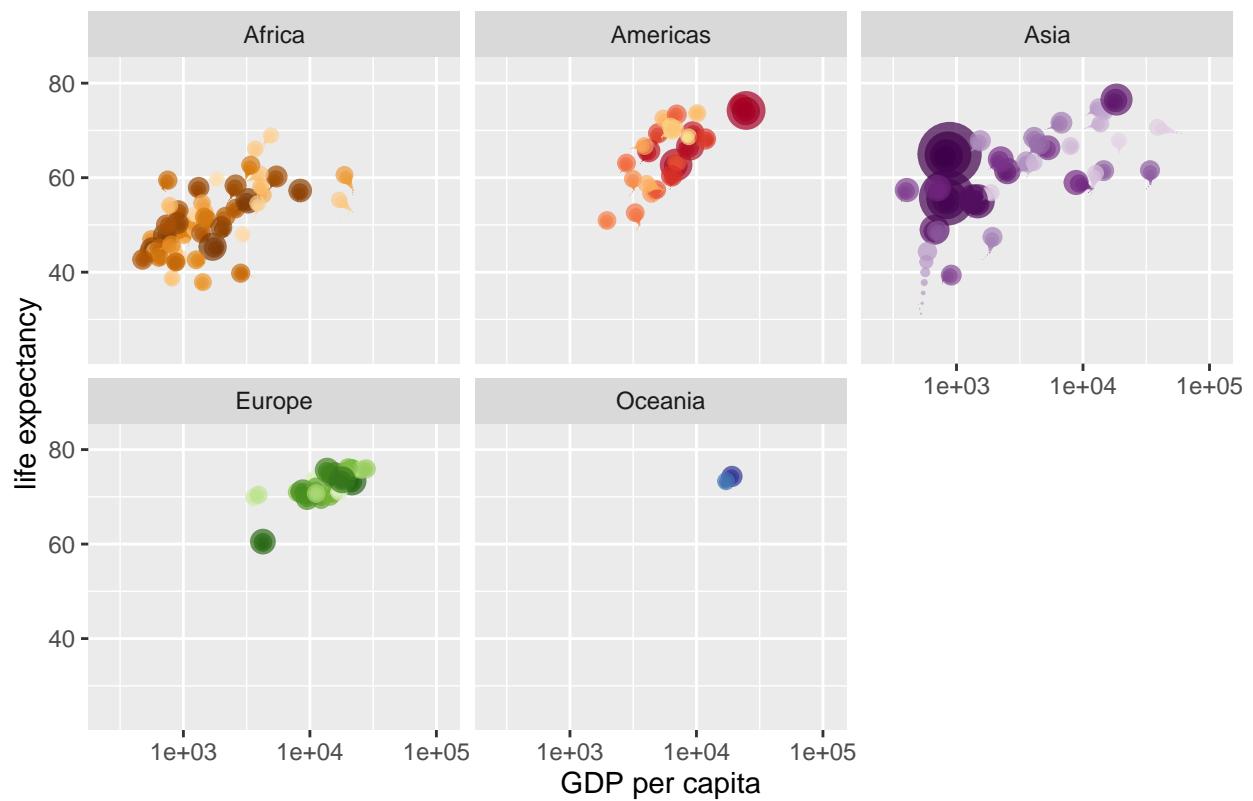
Year: 1979



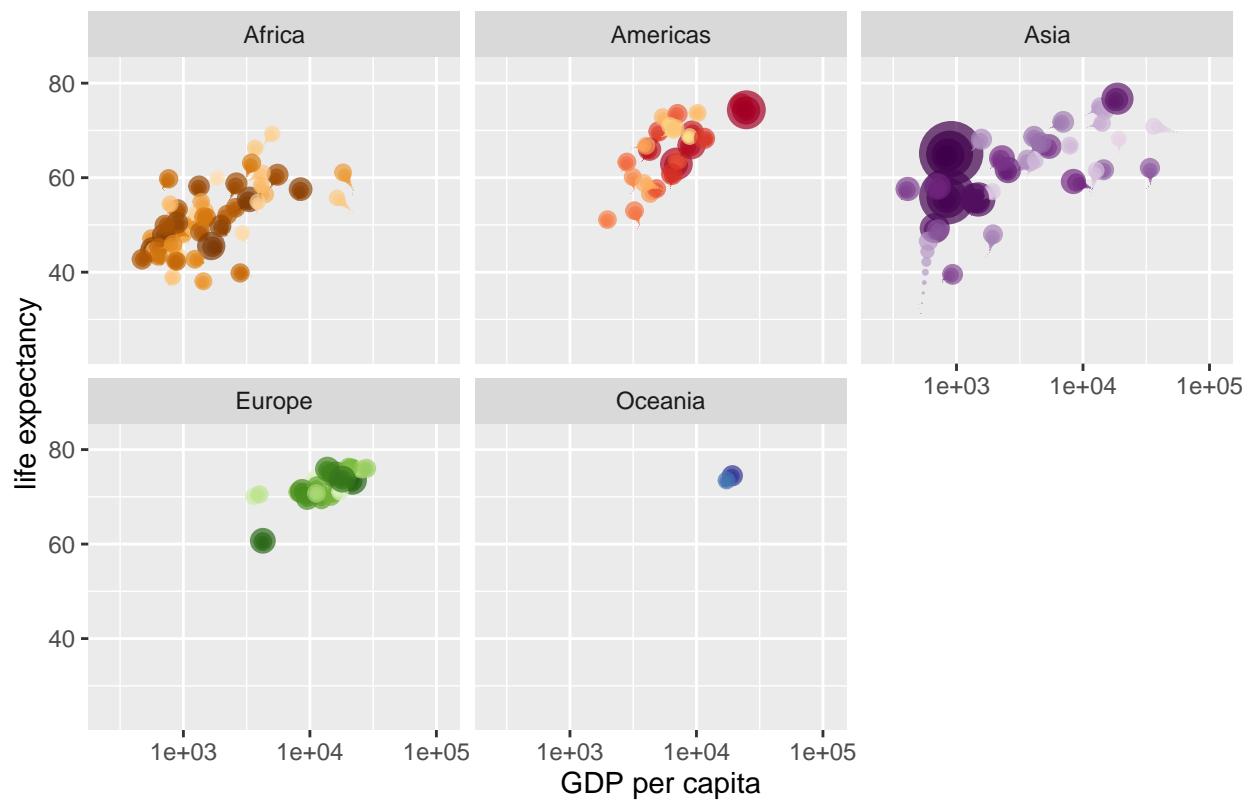
Year: 1980



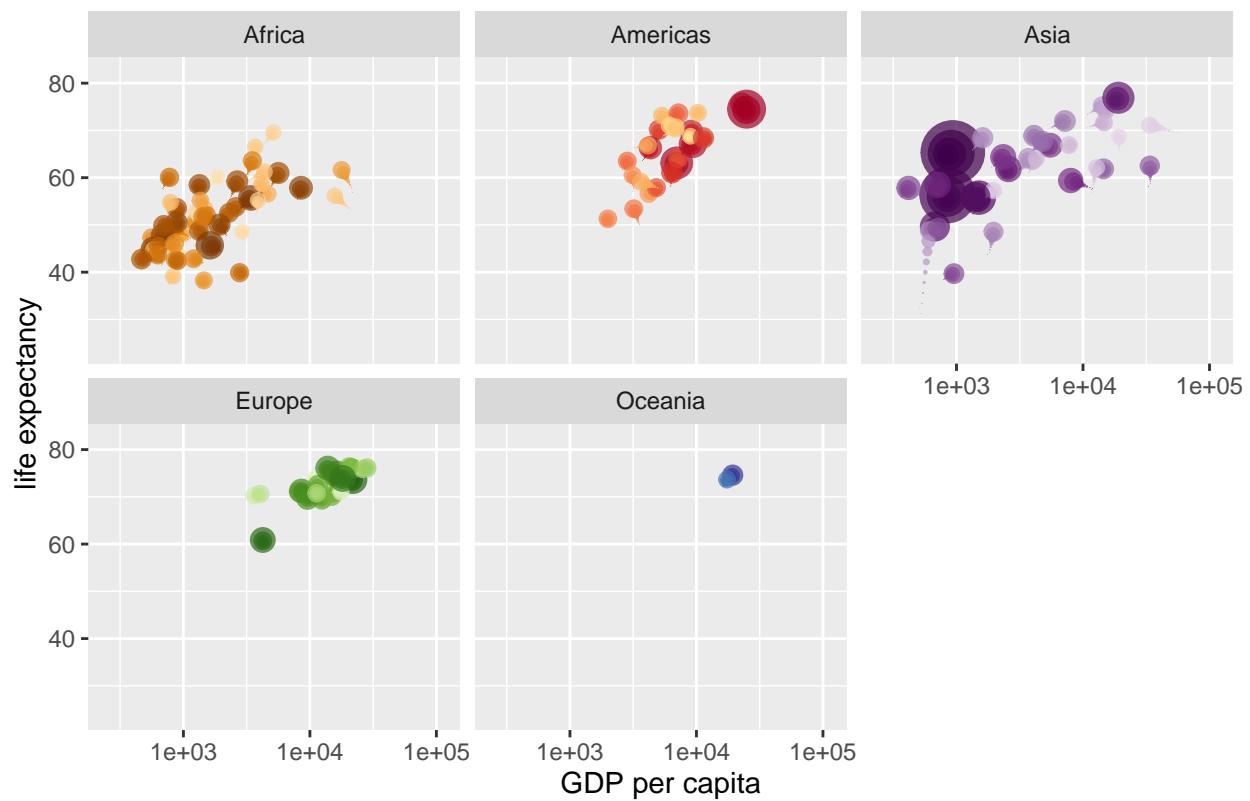
Year: 1980



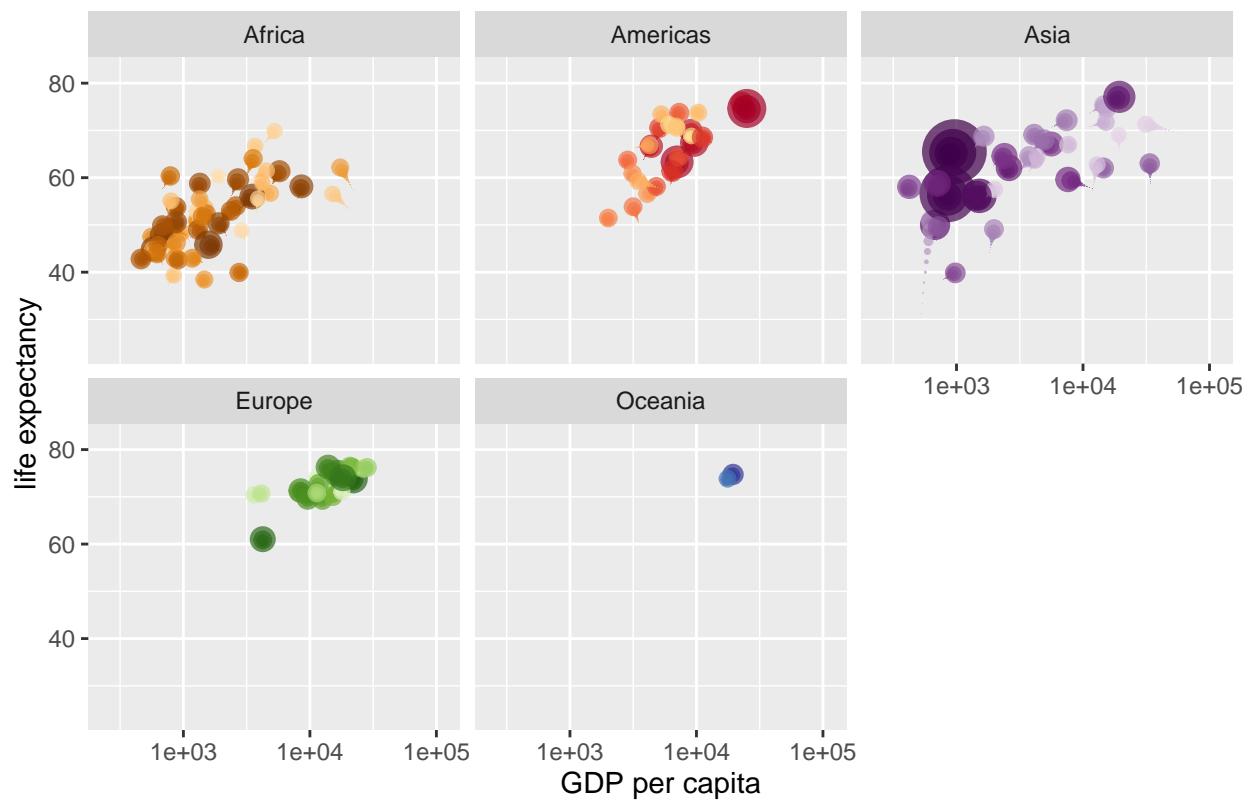
Year: 1981



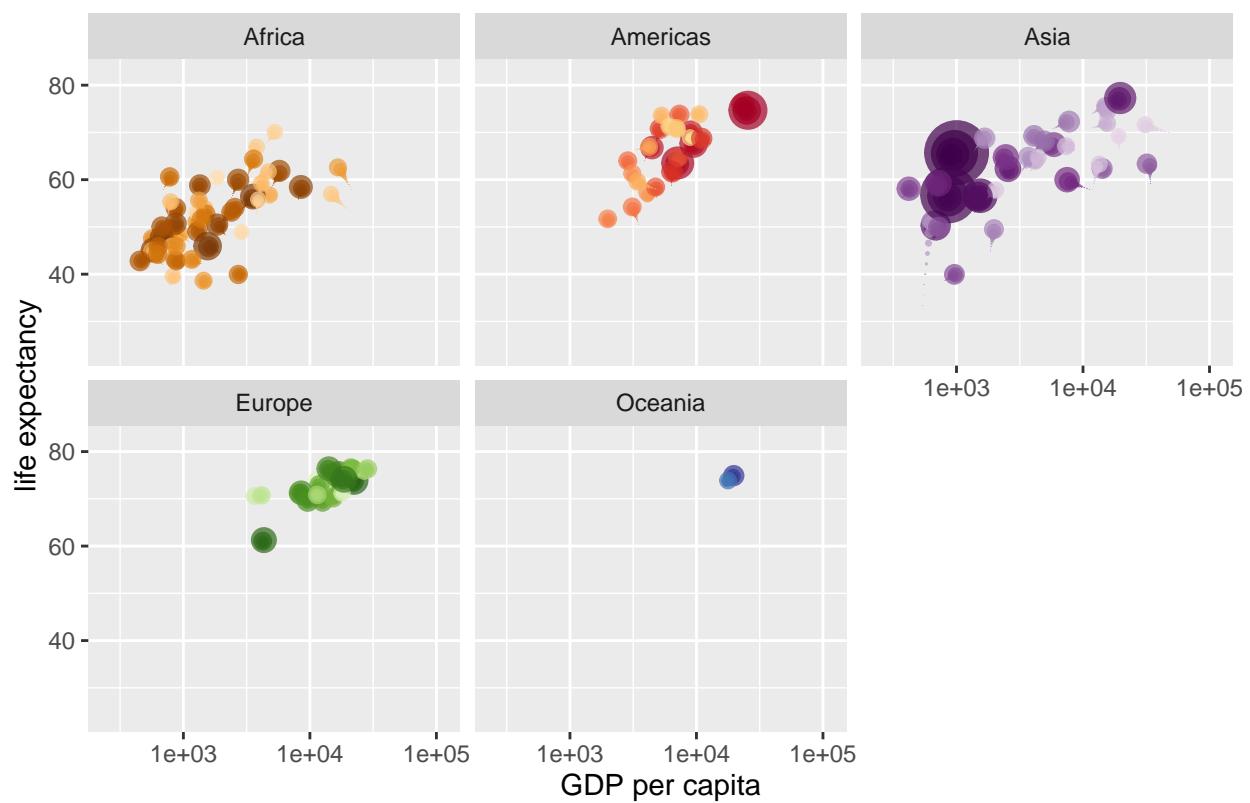
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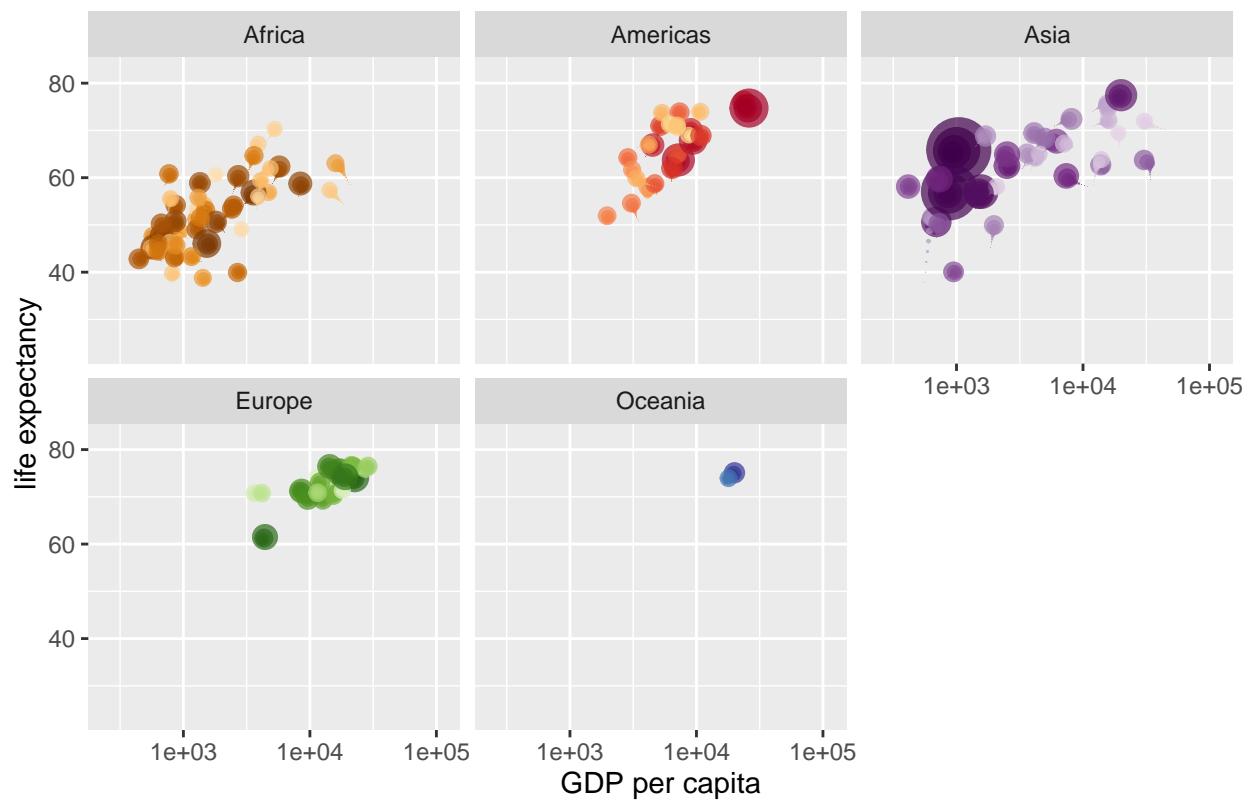
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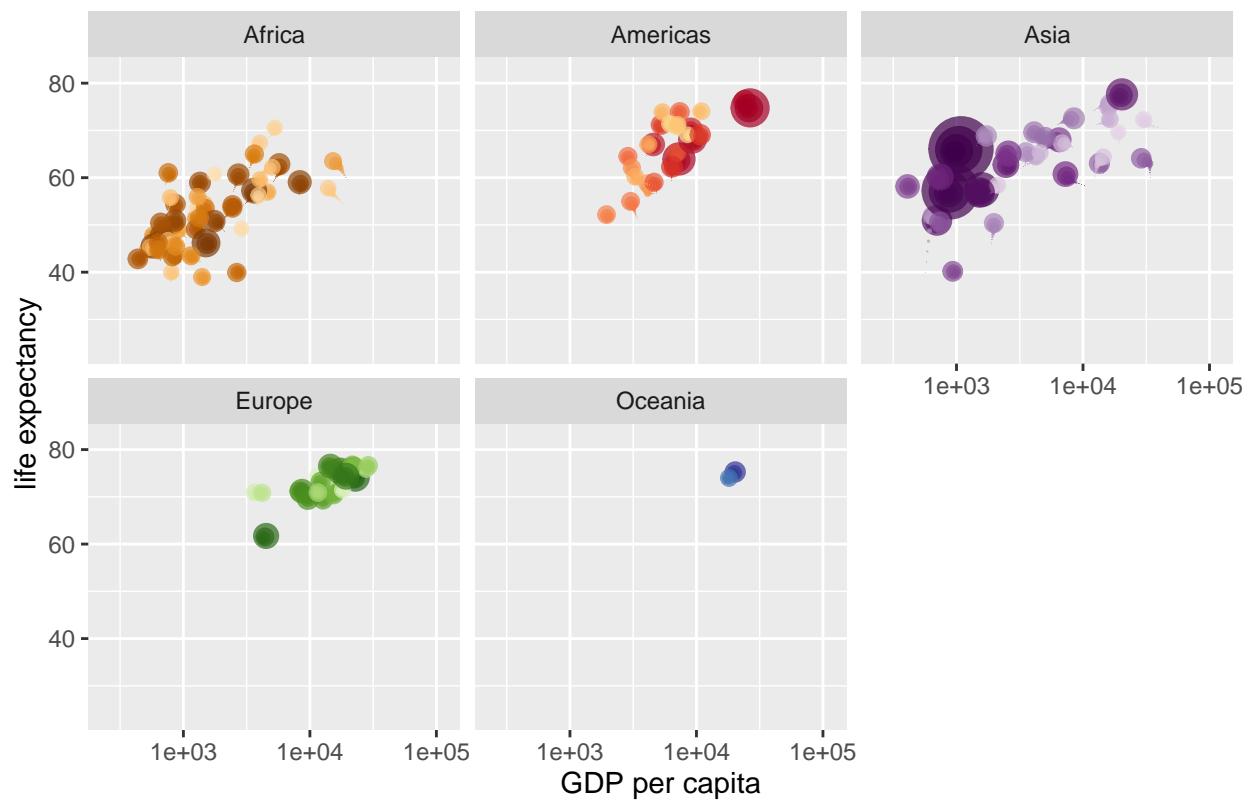
Year: 1983



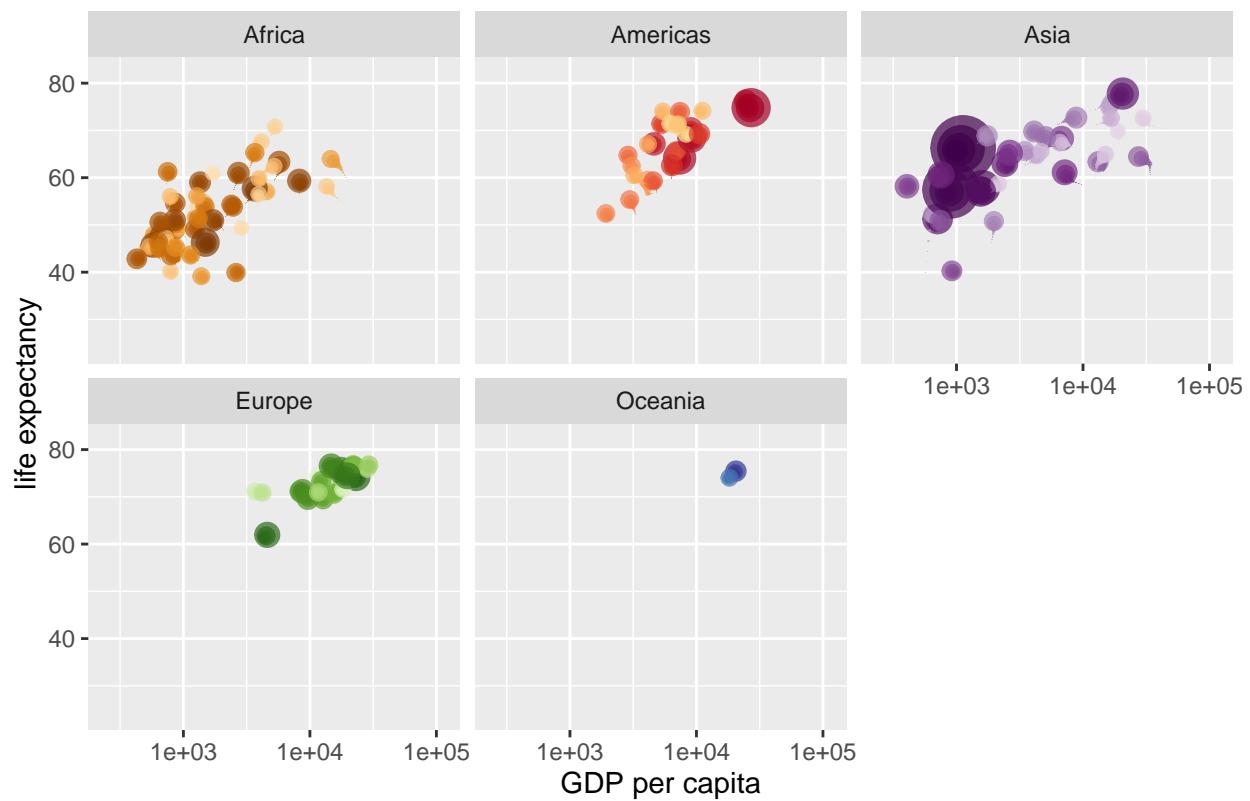
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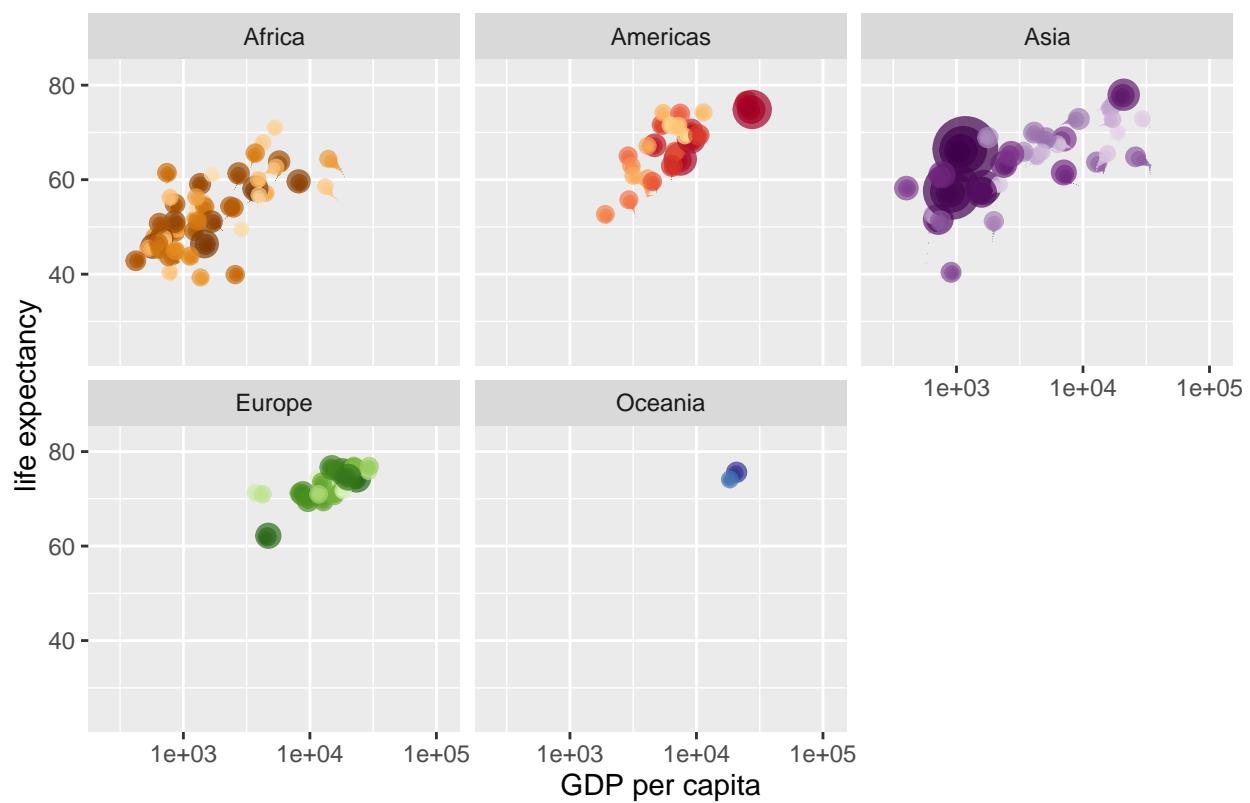
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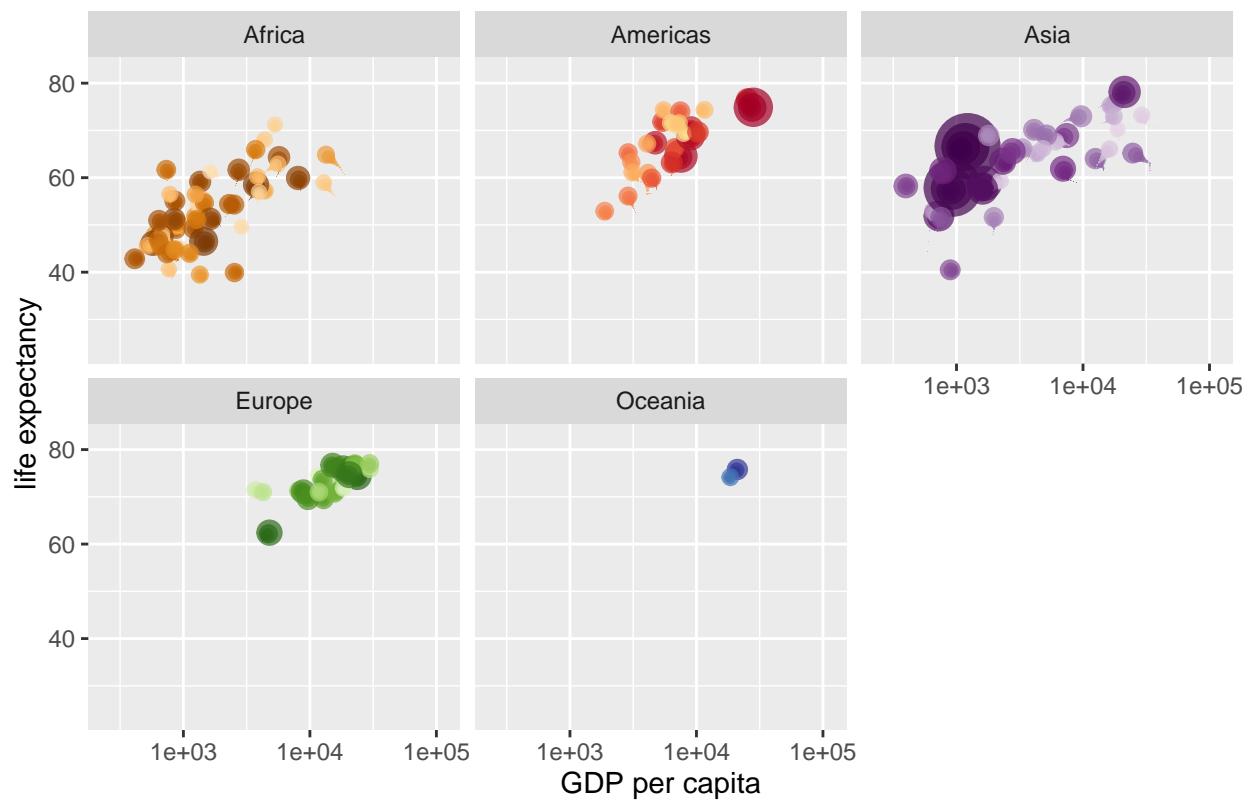
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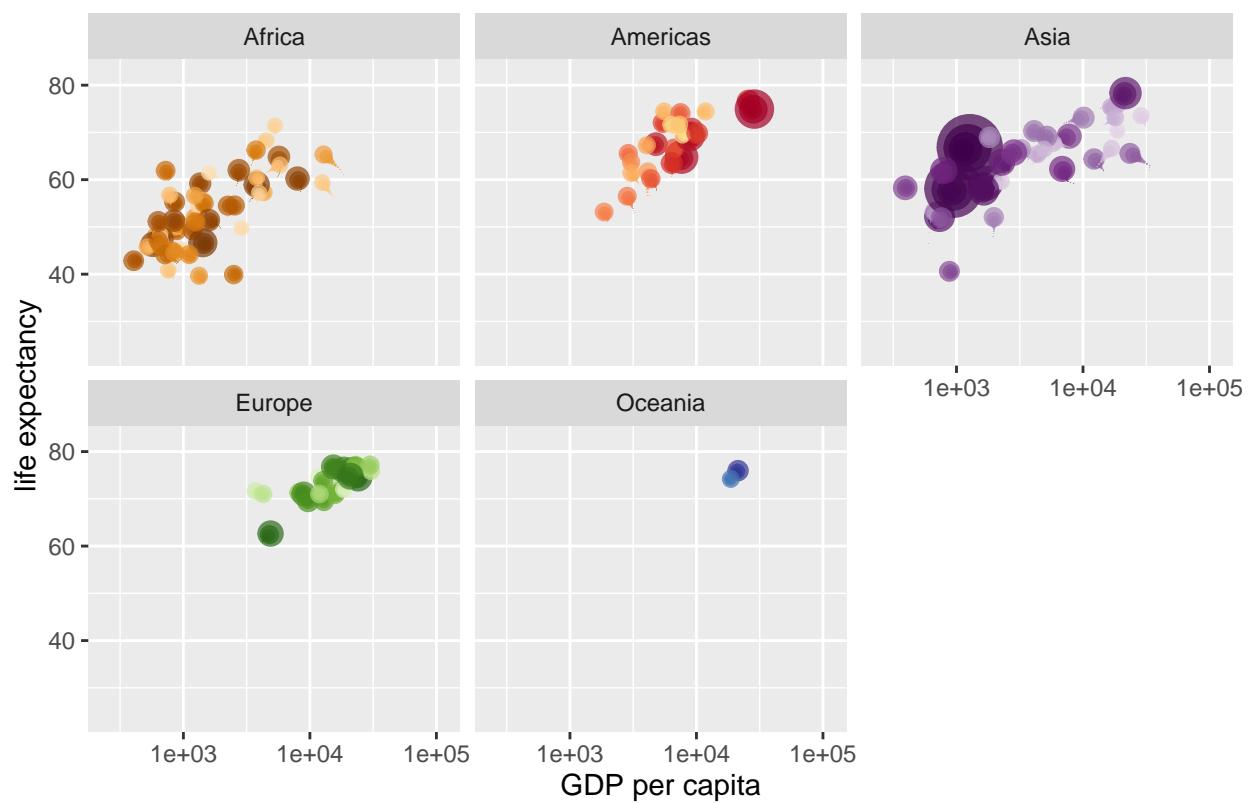
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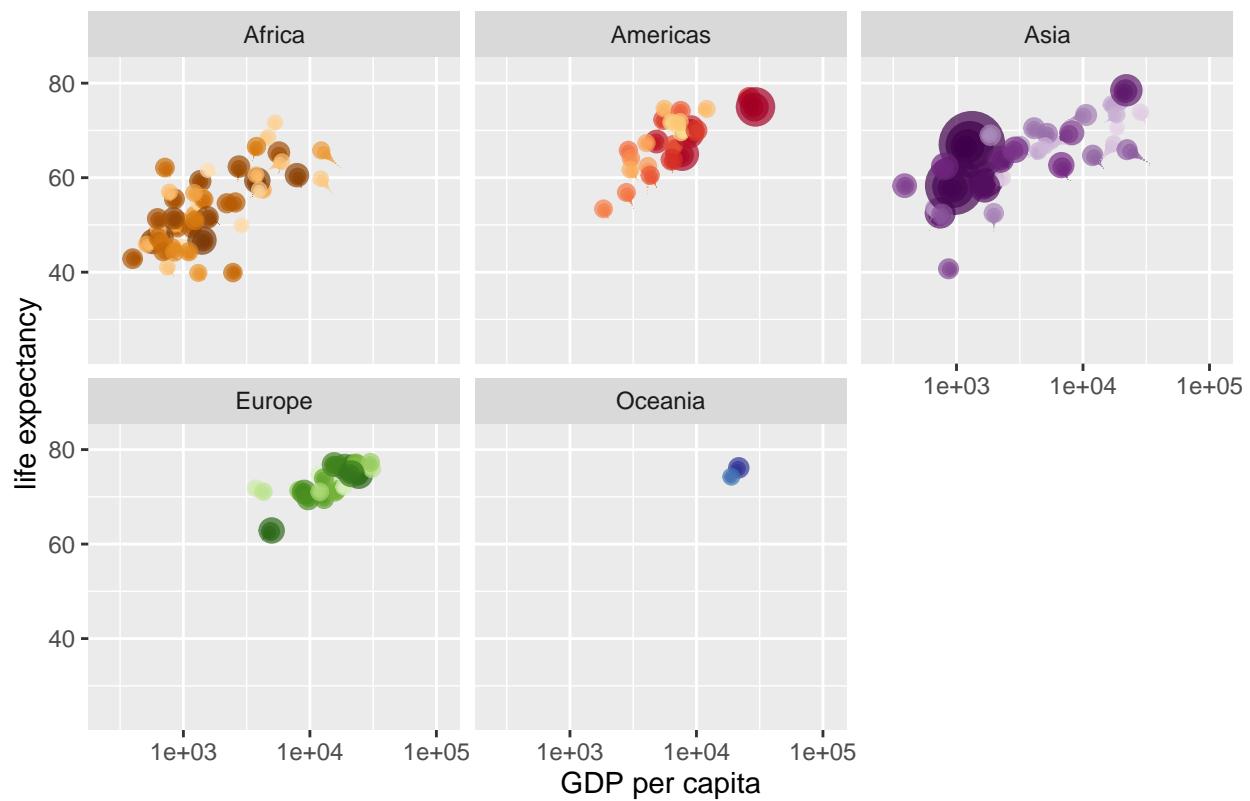
Year: 1985



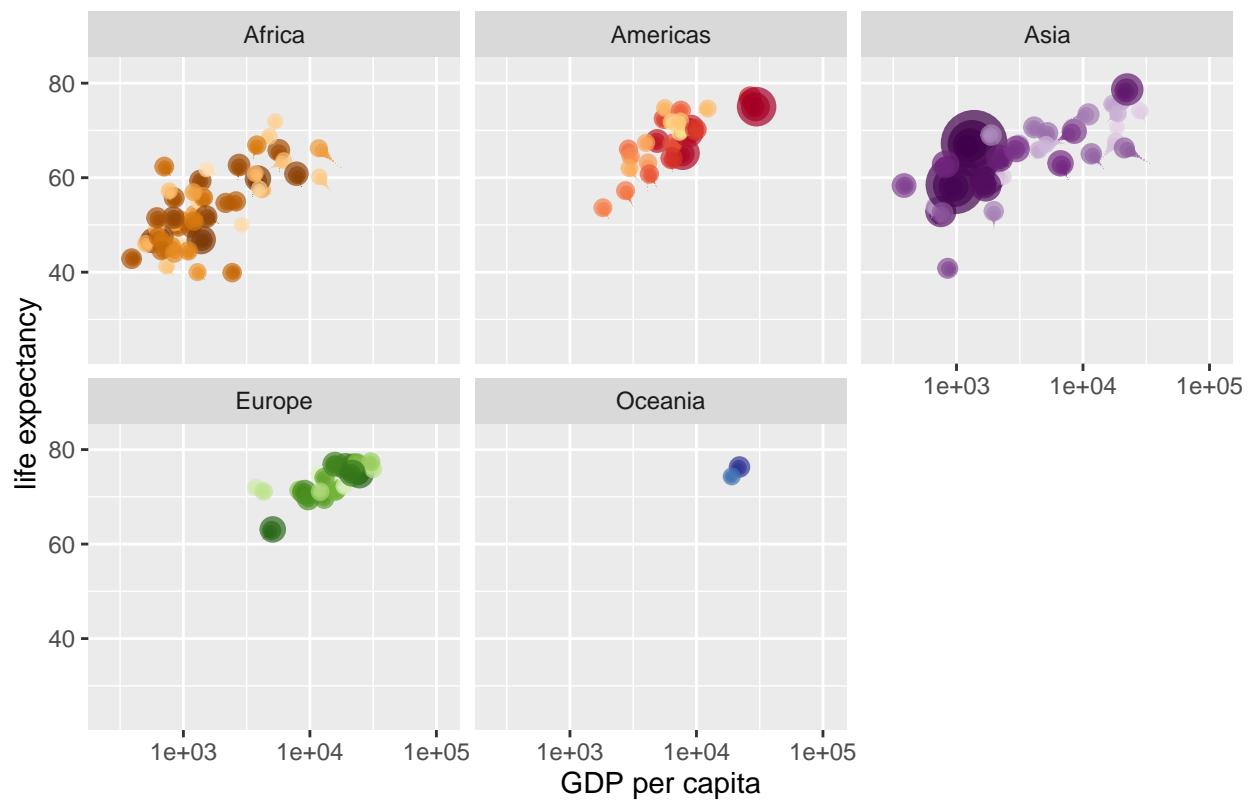
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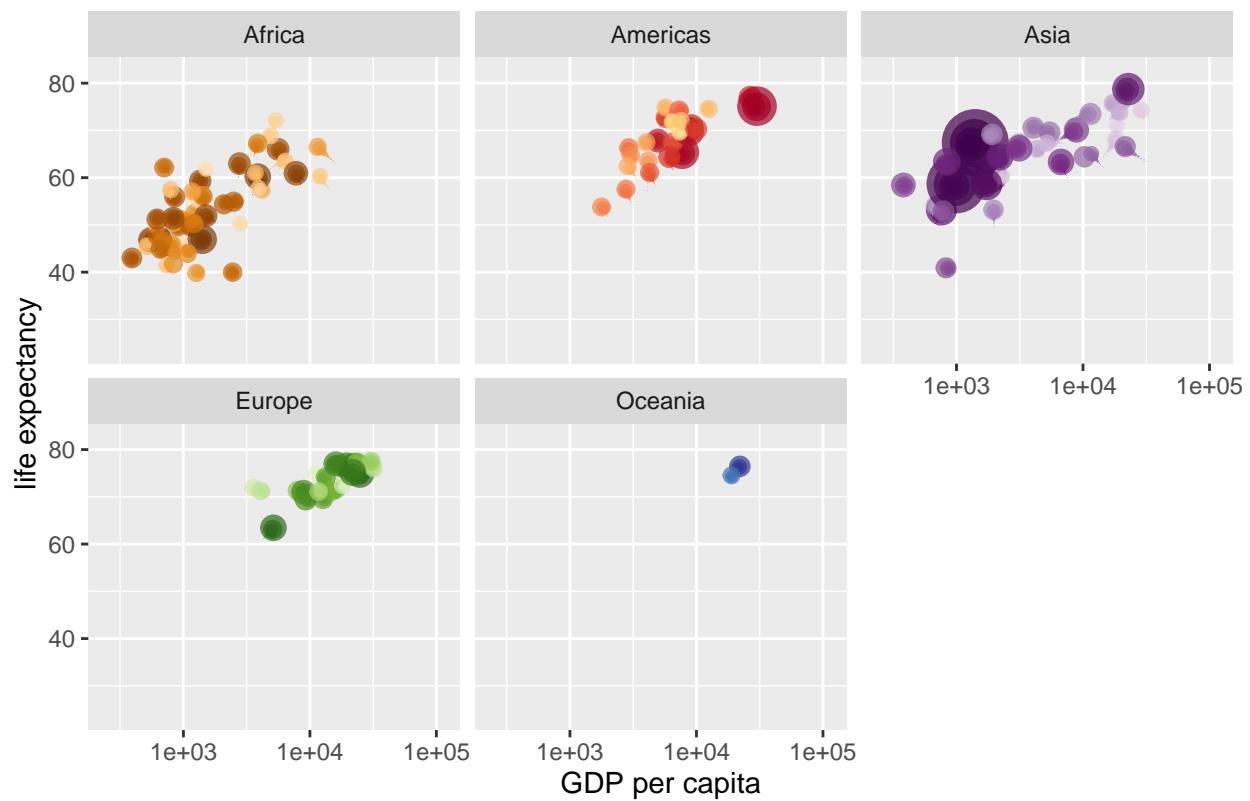
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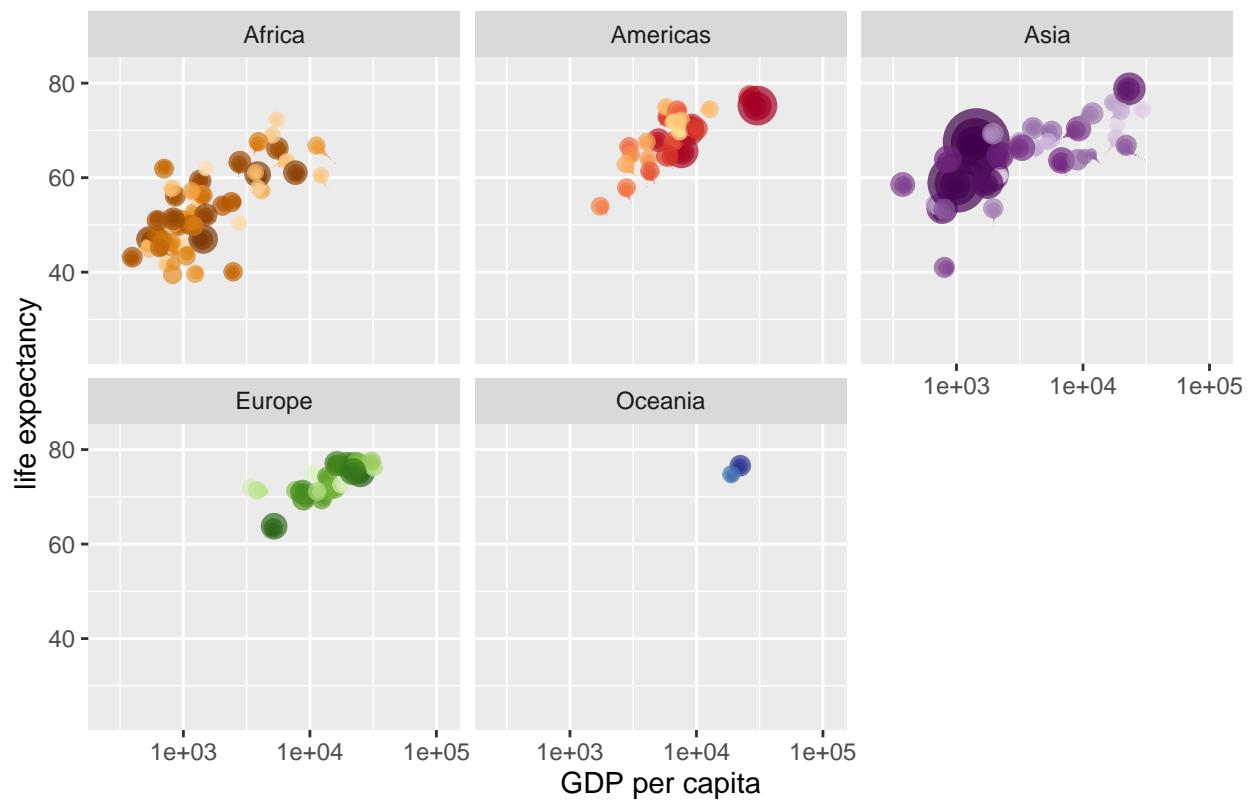
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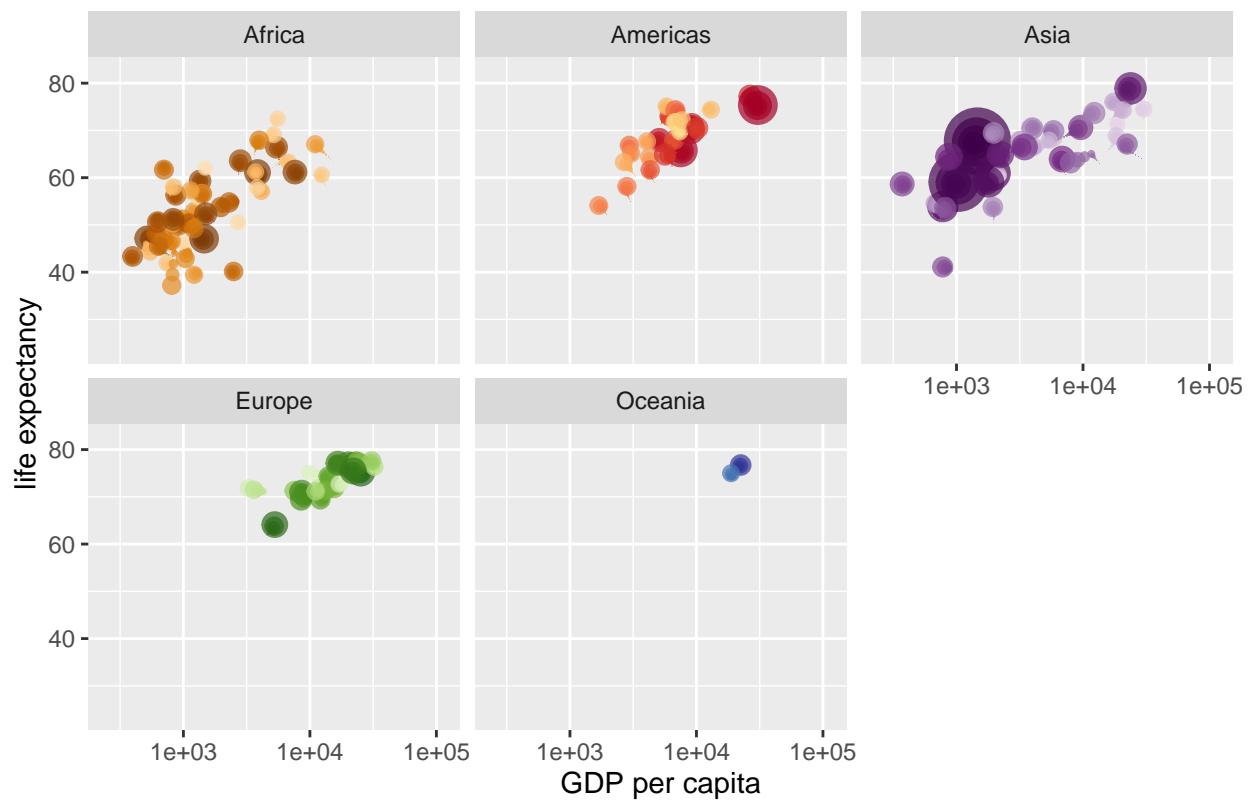
Year: 1988



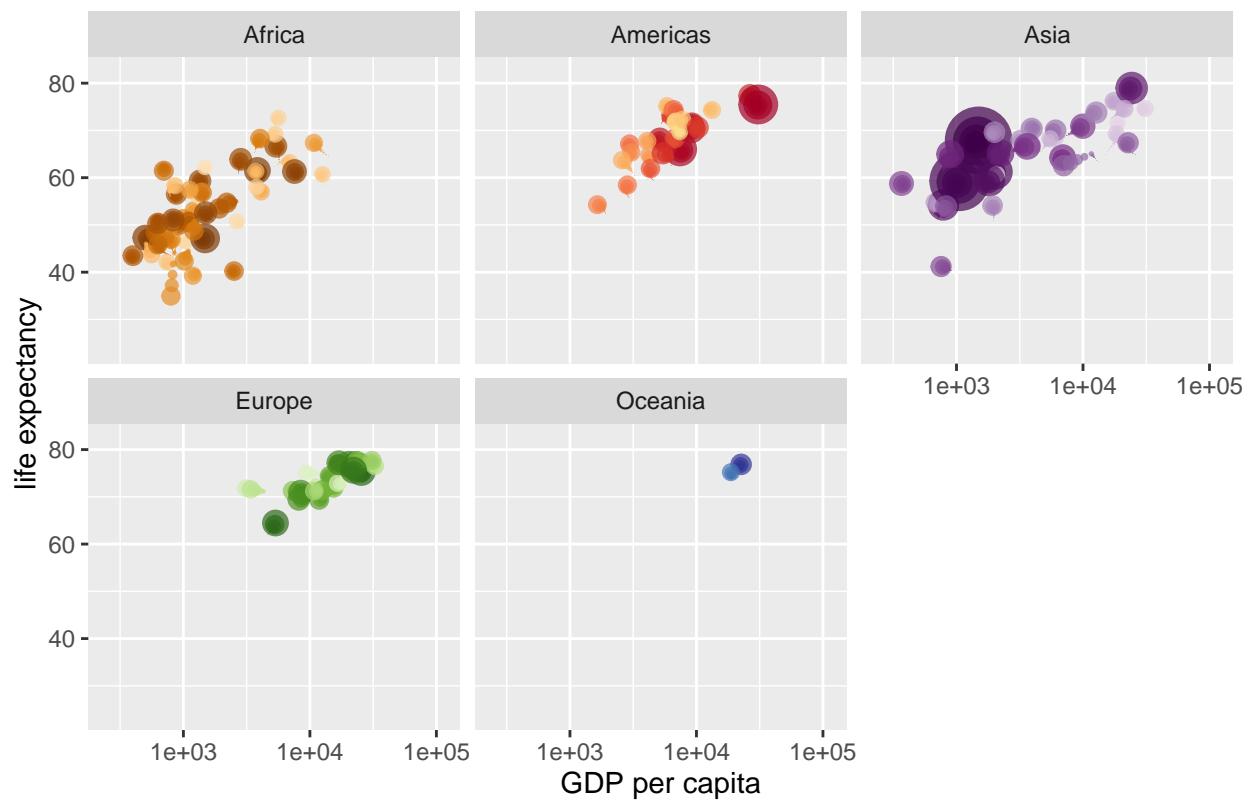
Year: 1988



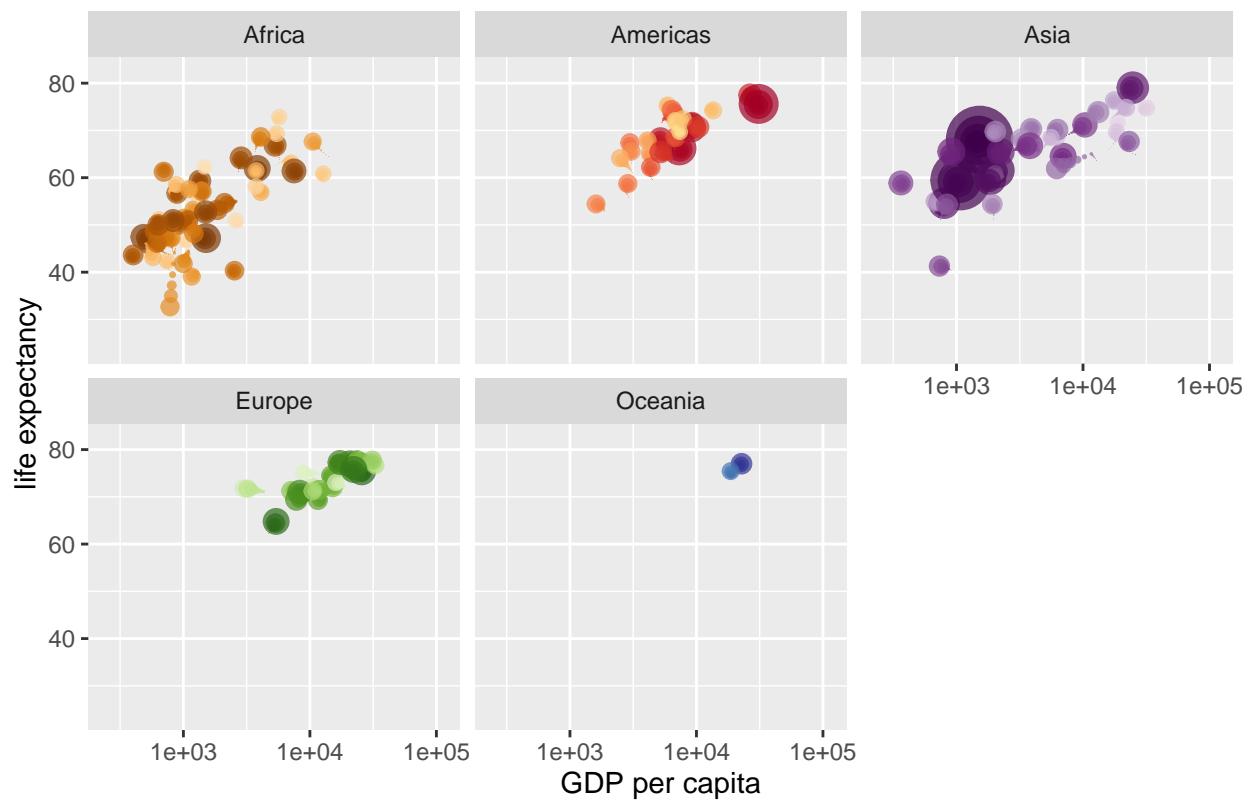
Year: 1989



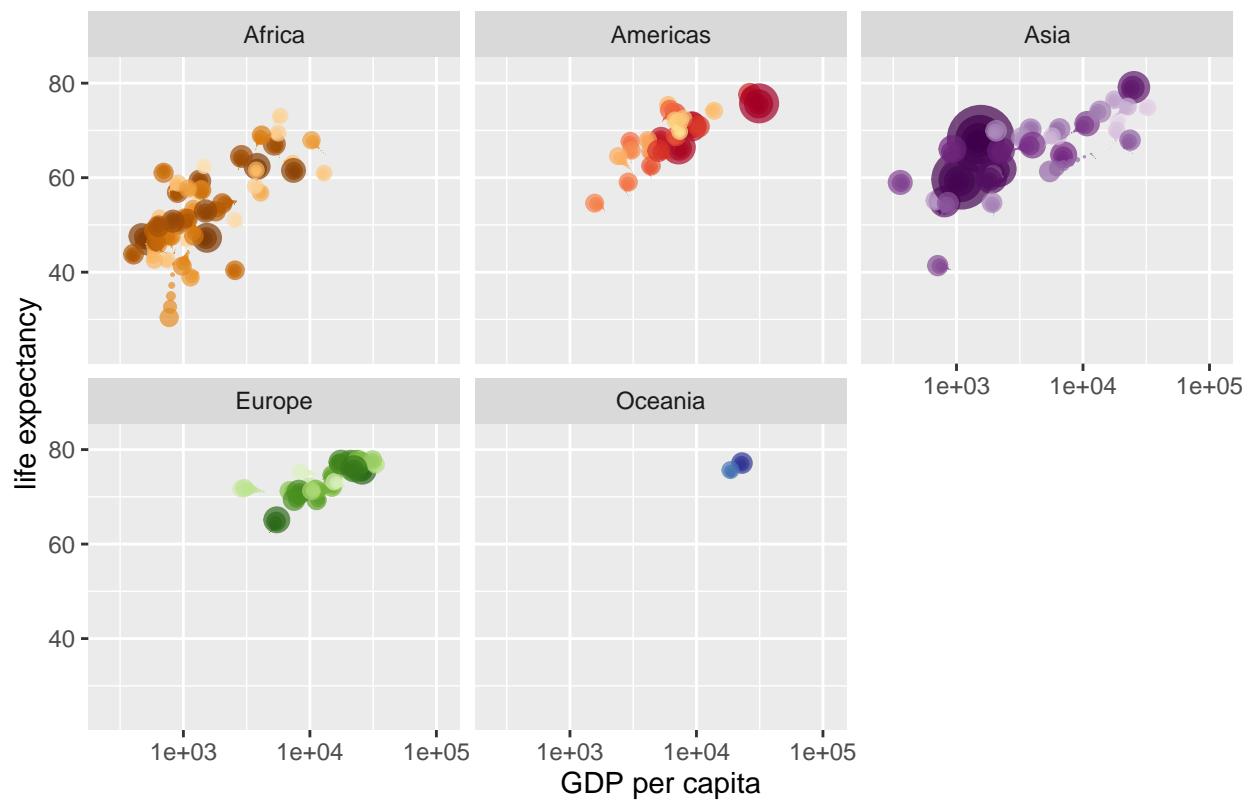
Year: 1989



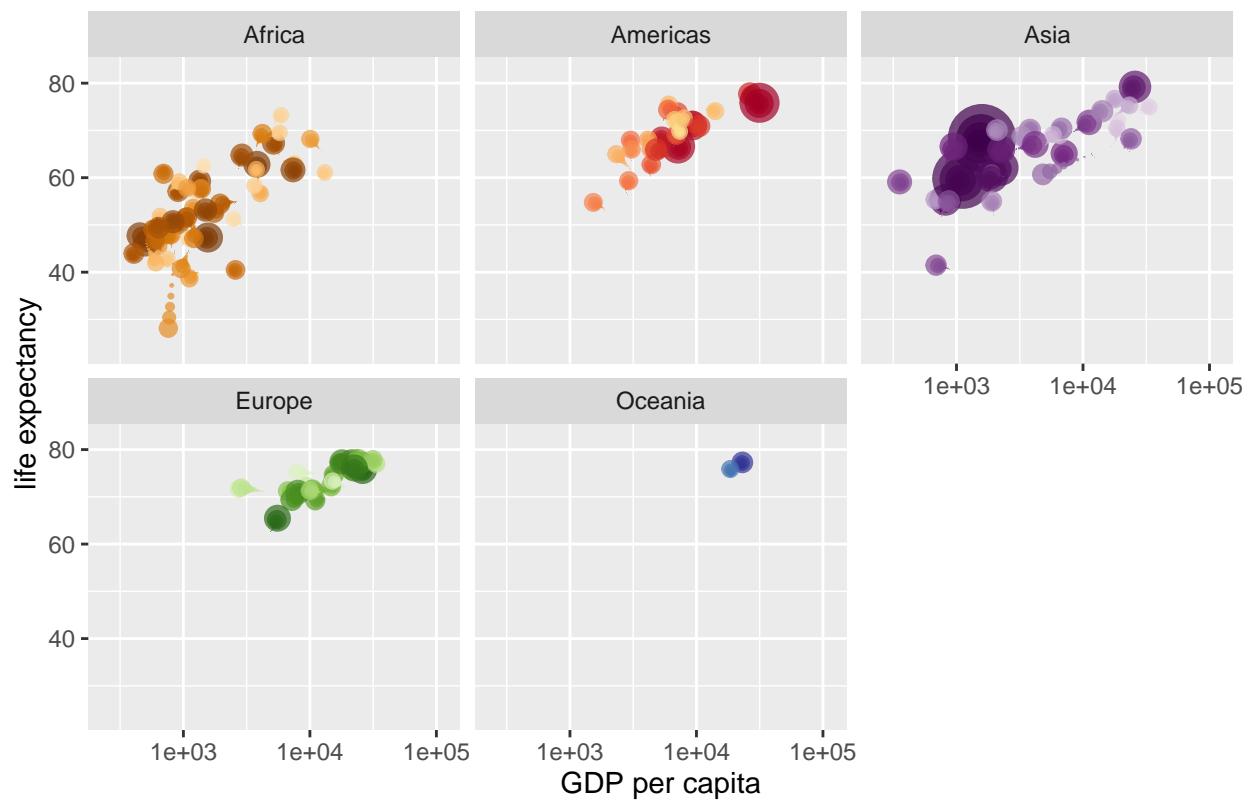
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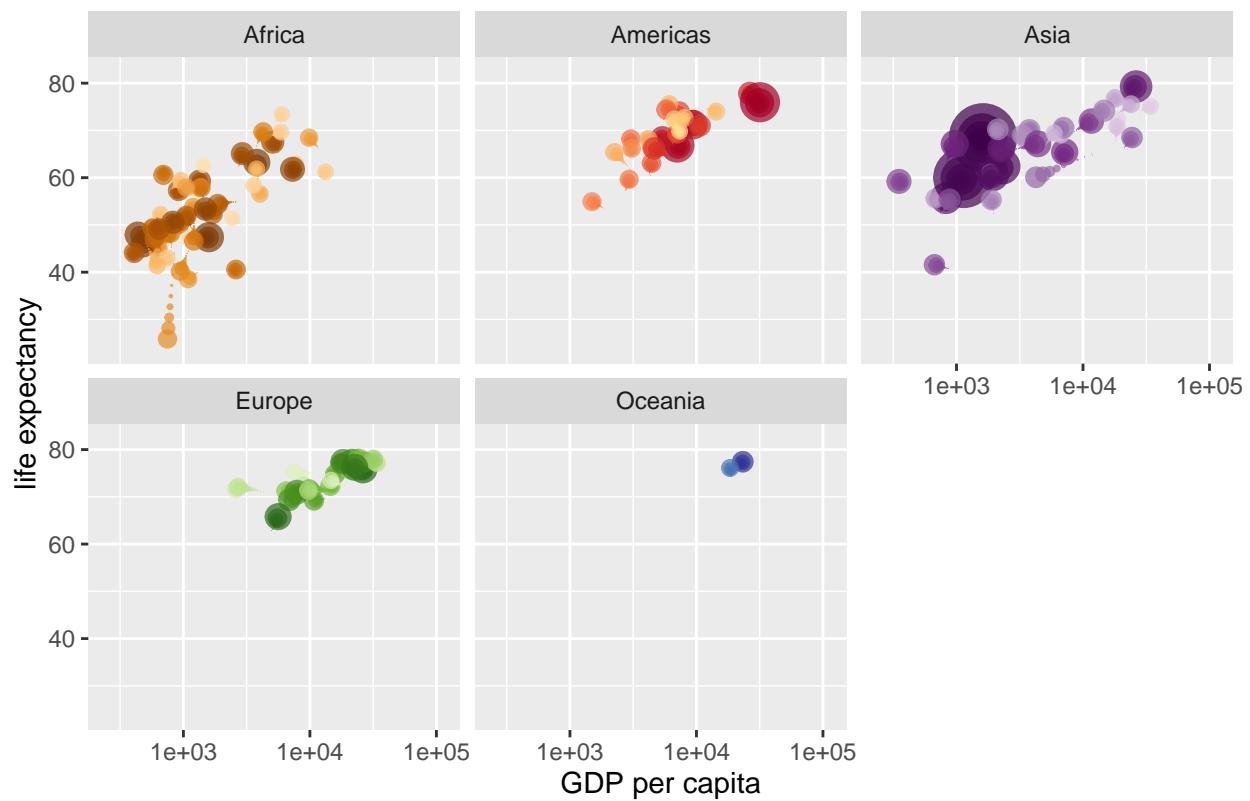
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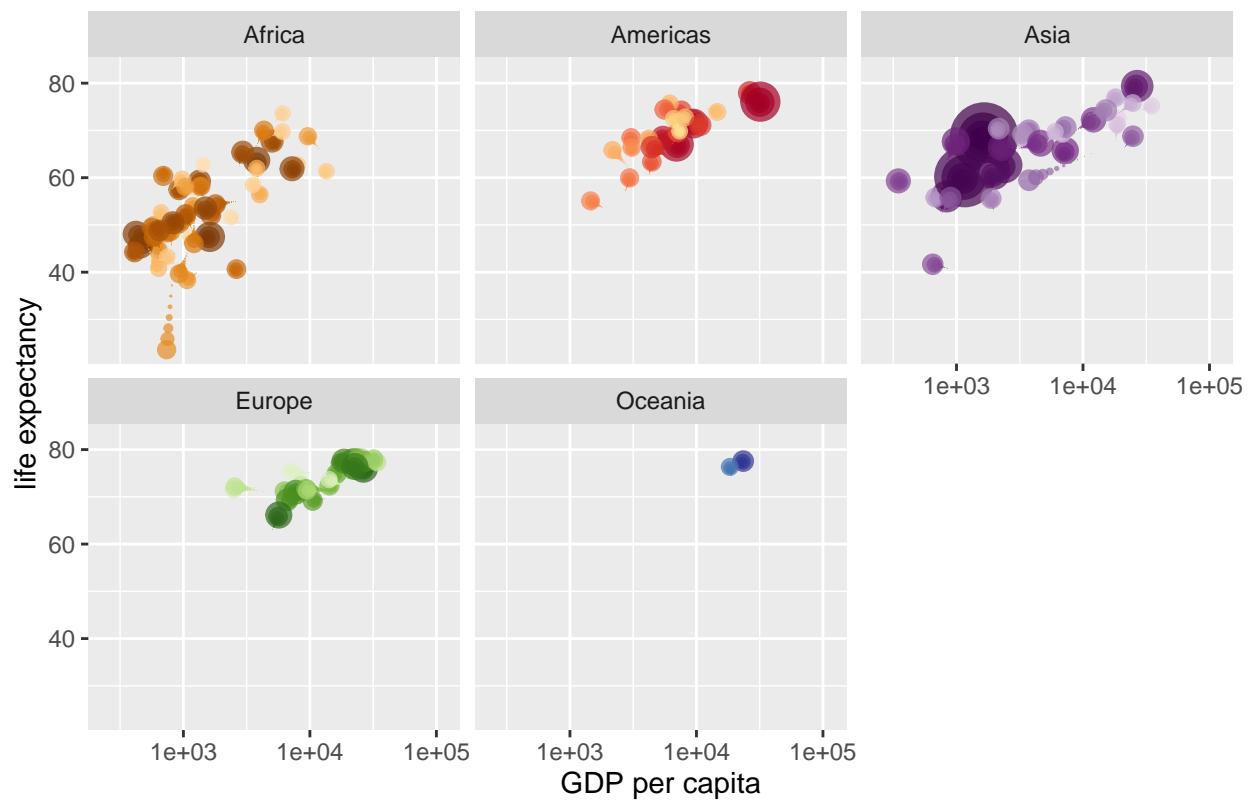
Year: 1991



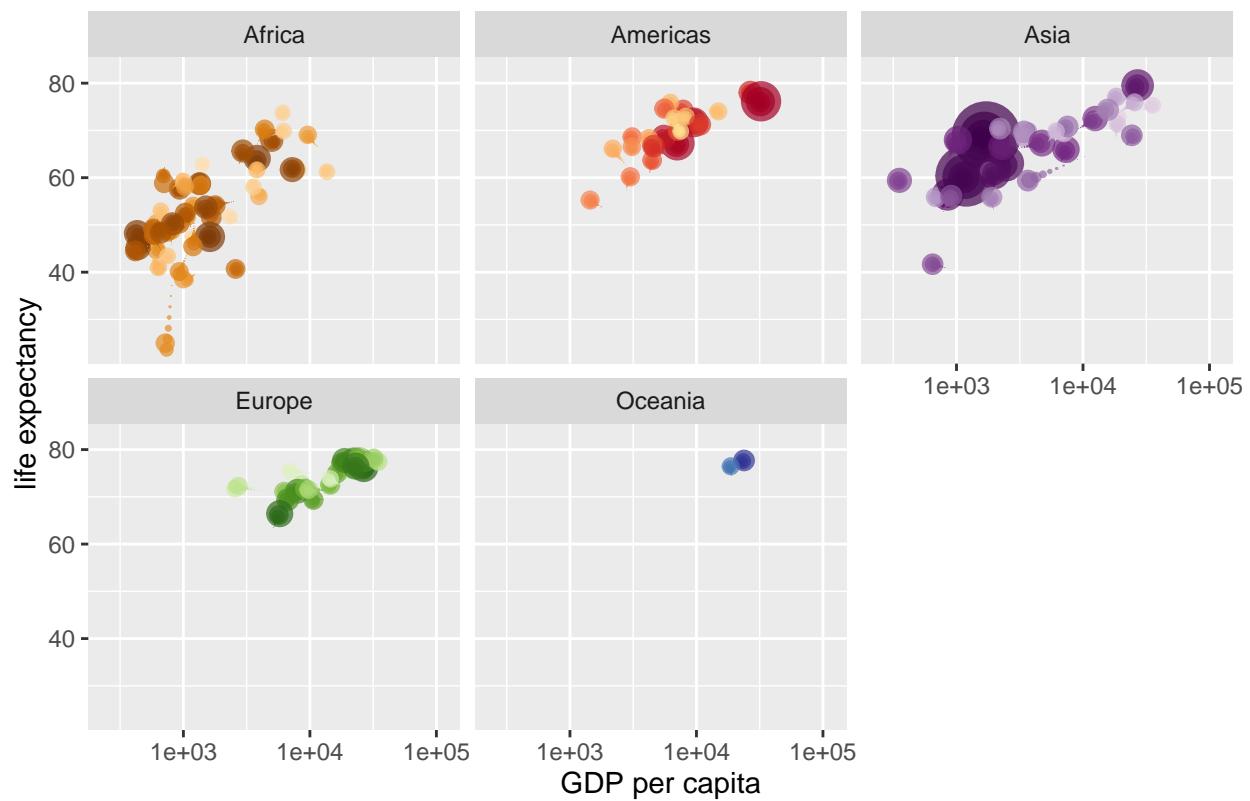
Year: 1991



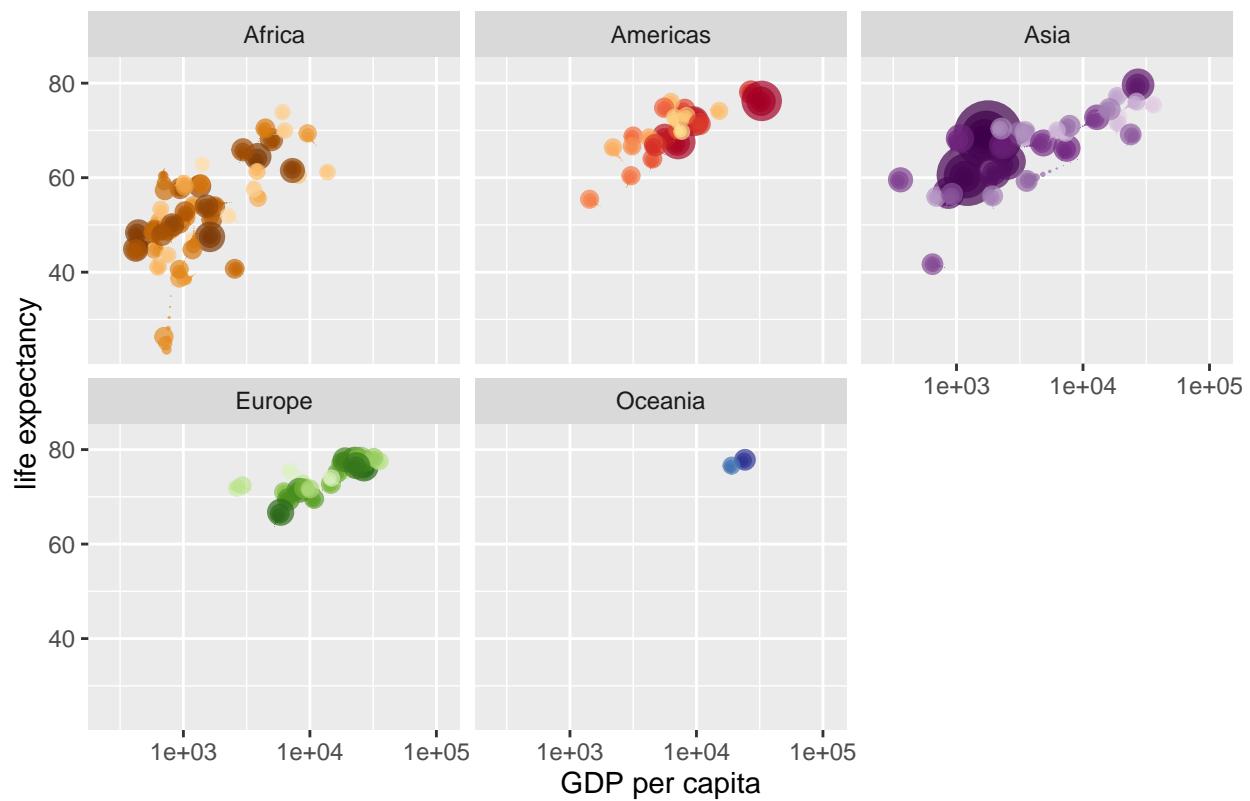
Year: 1992



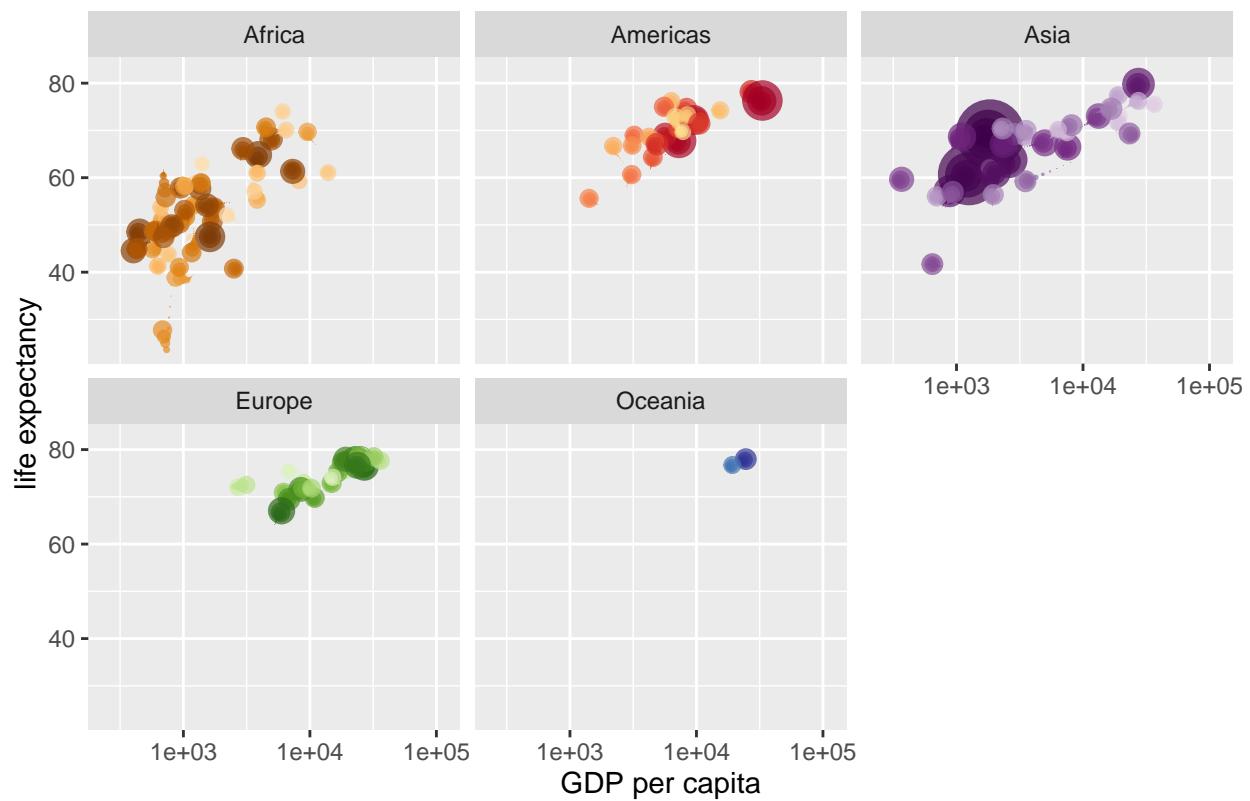
Year: 1993



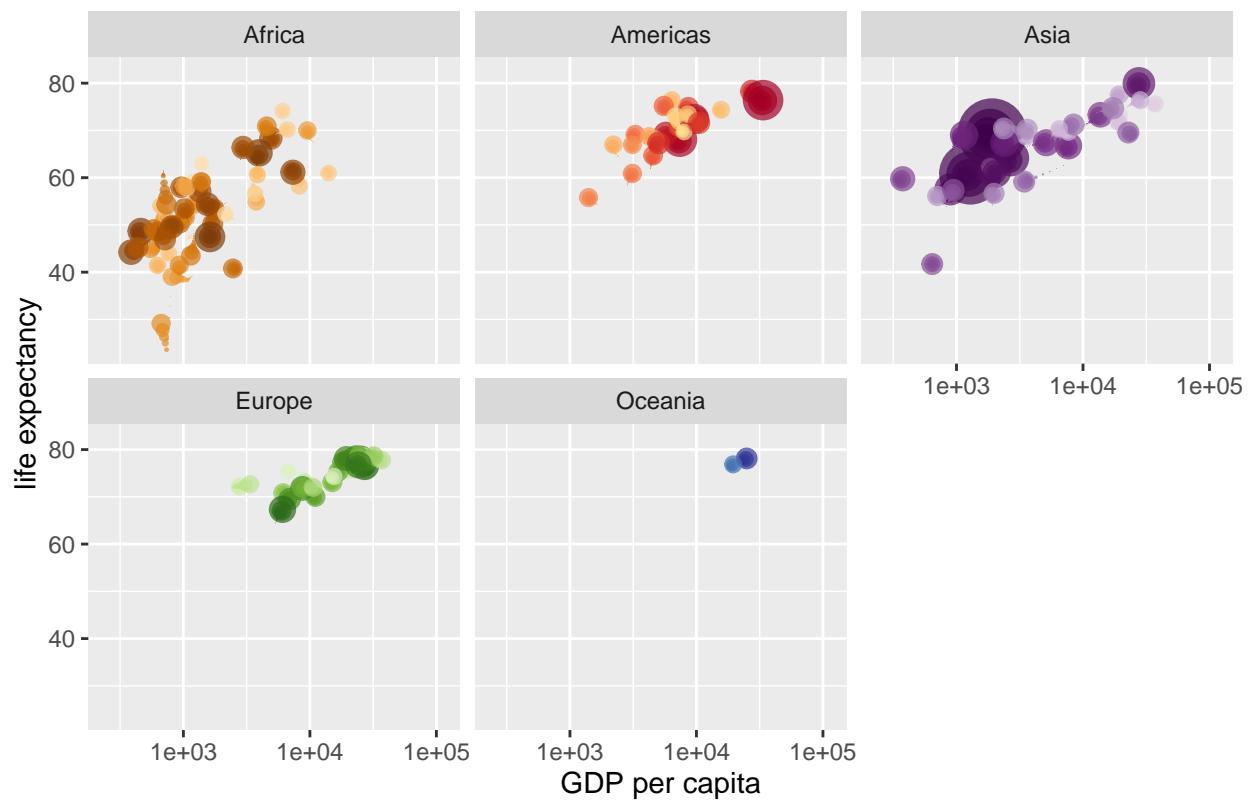
Year: 1993



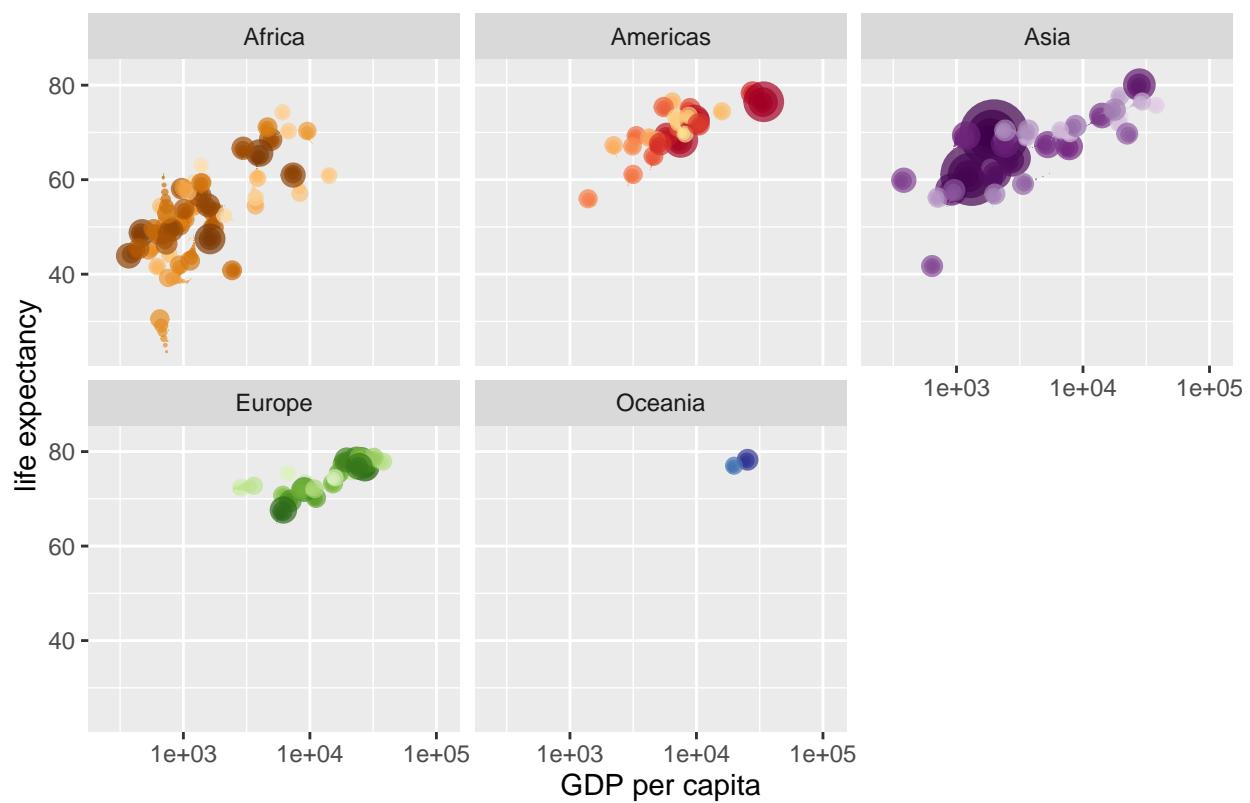
Year: 1994



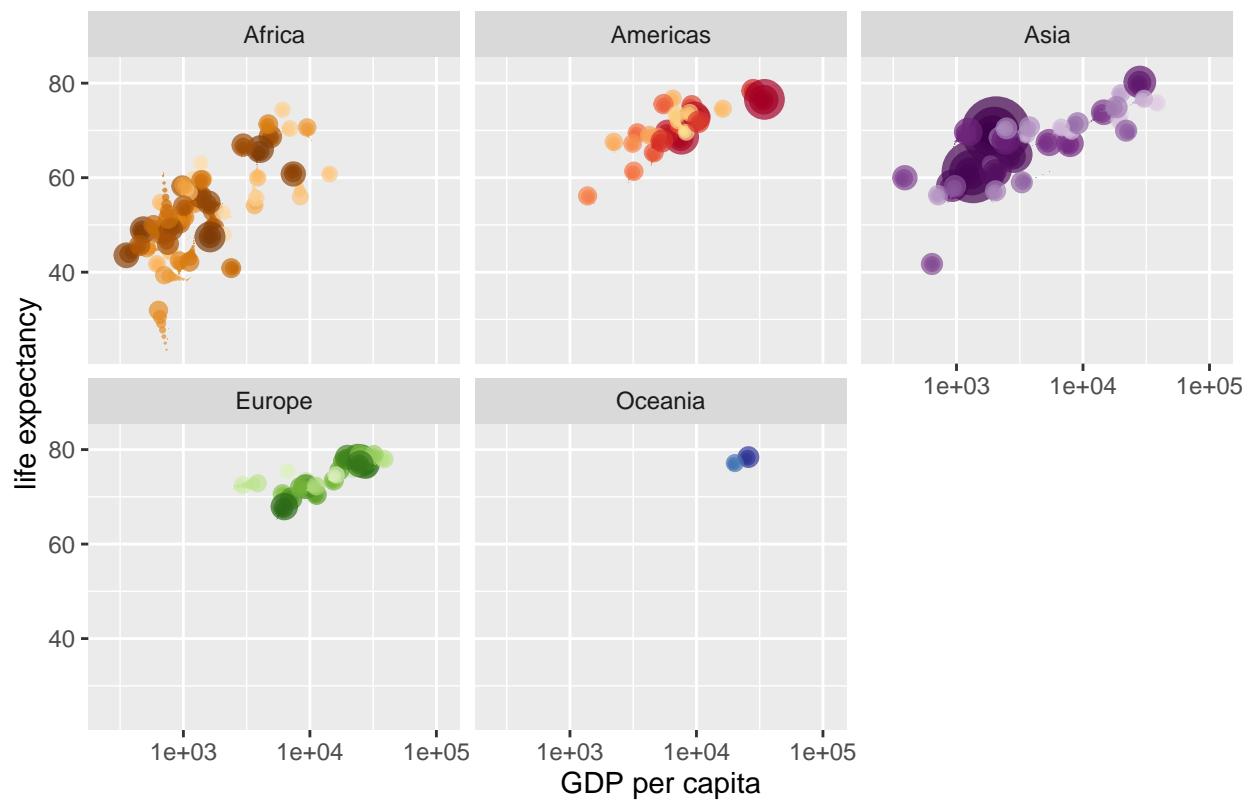
Year: 1994



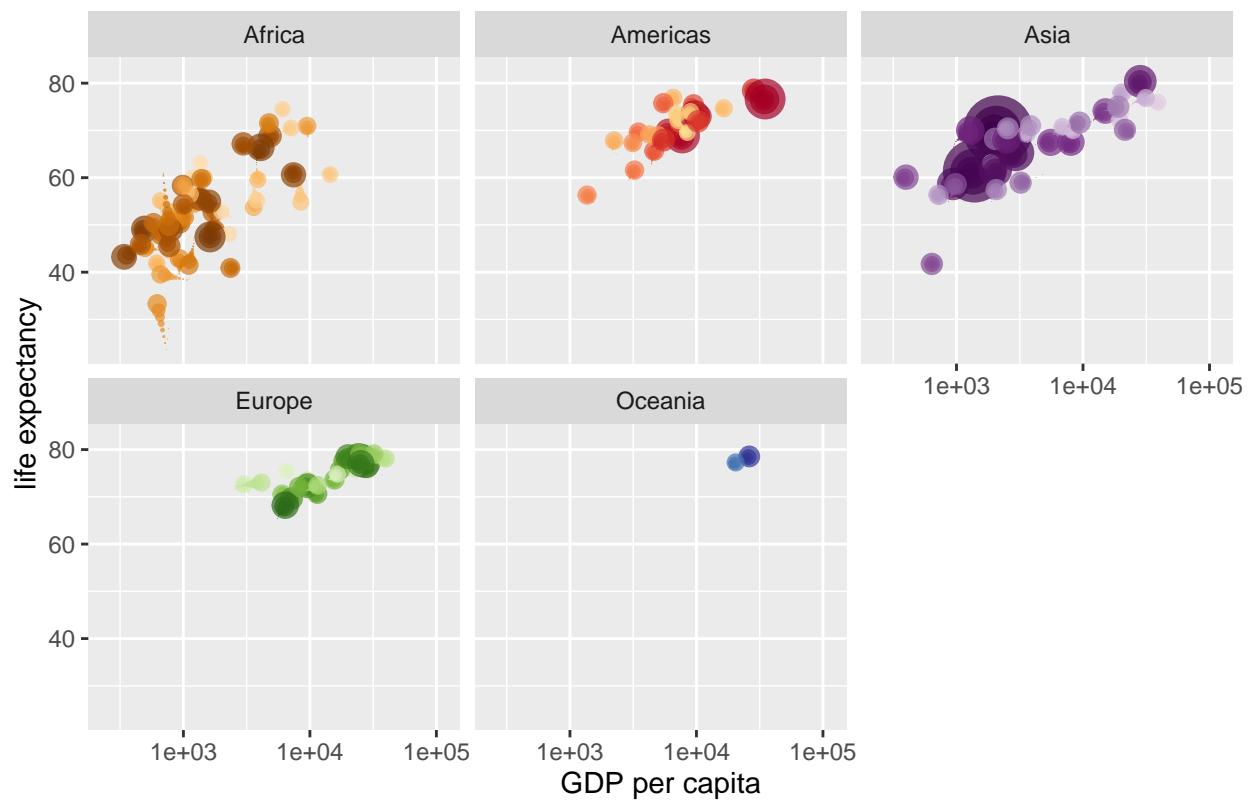
Year: 1995



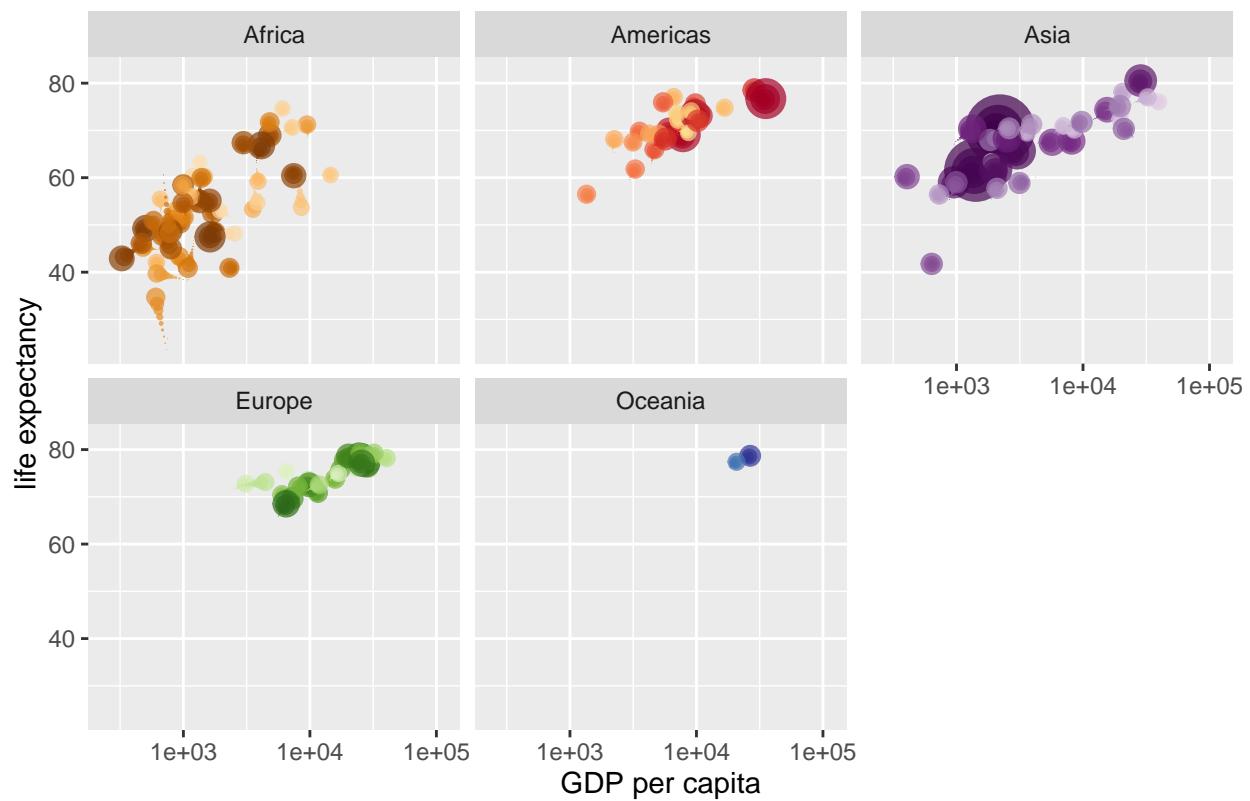
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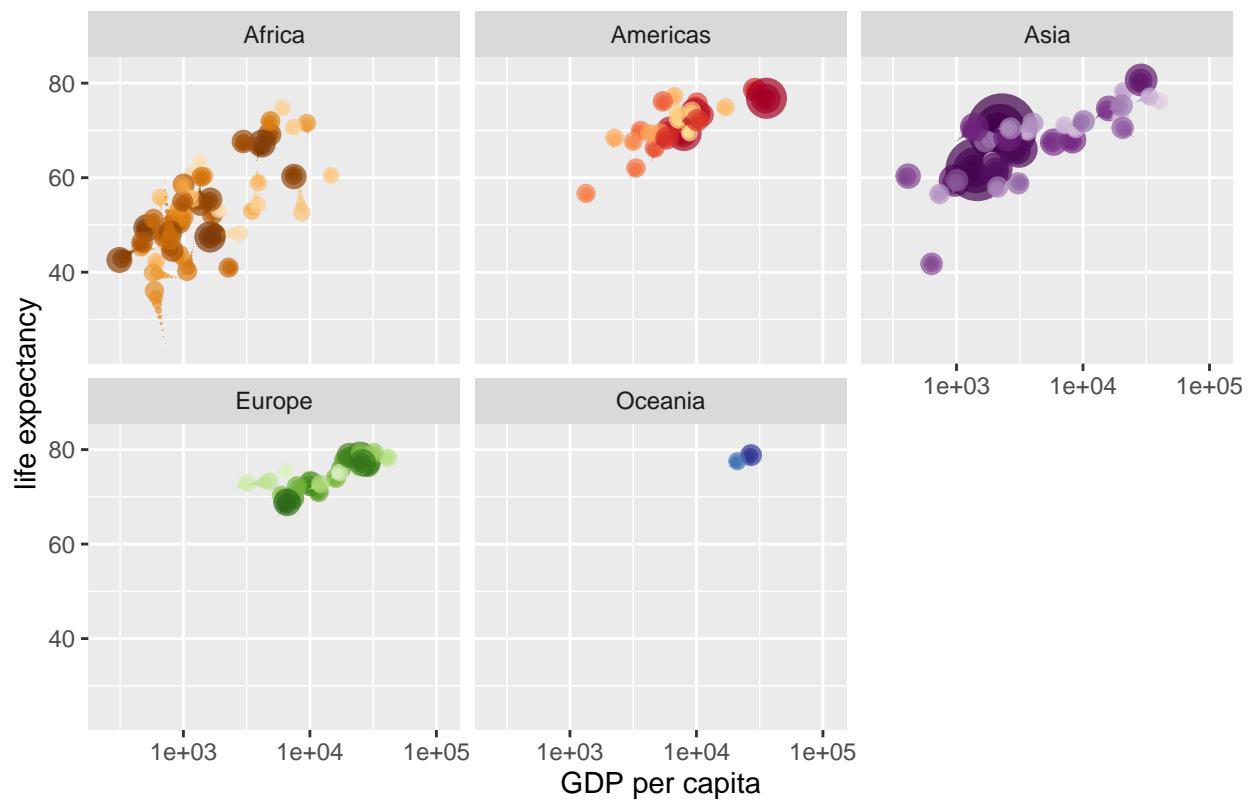
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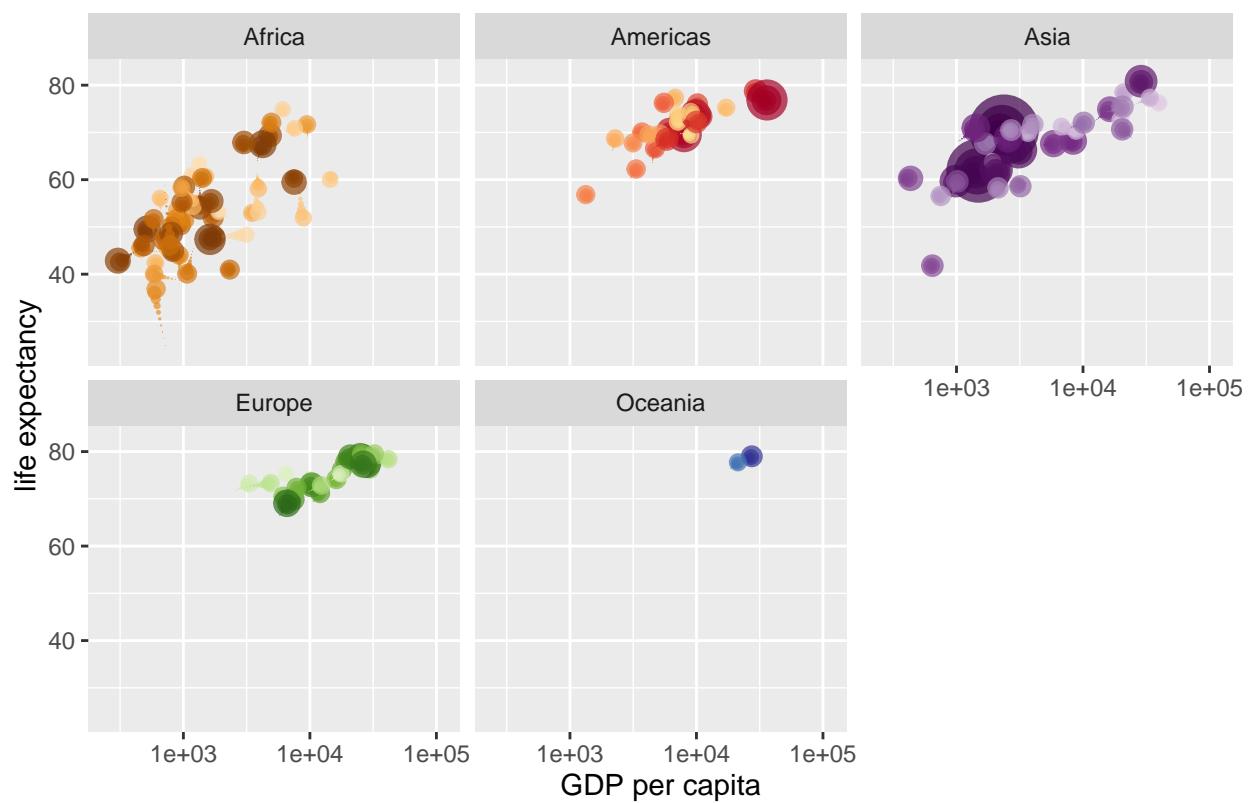
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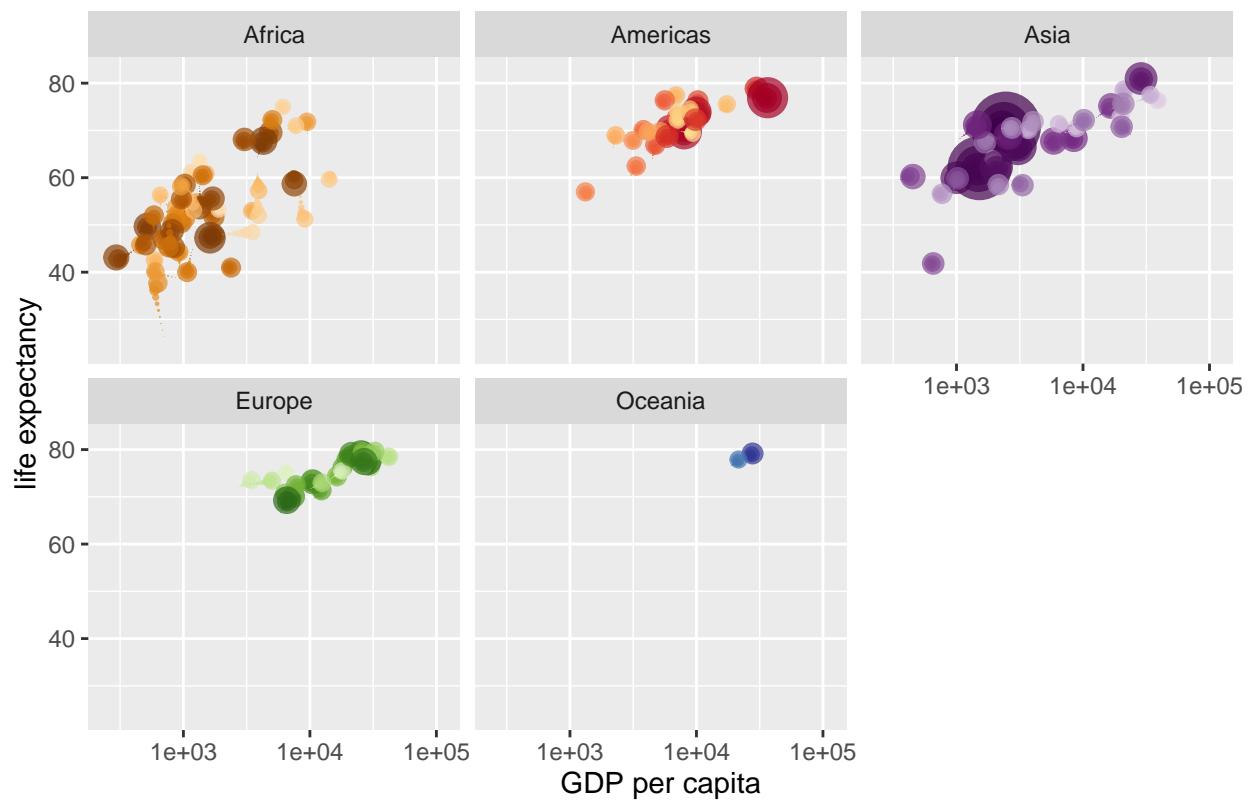
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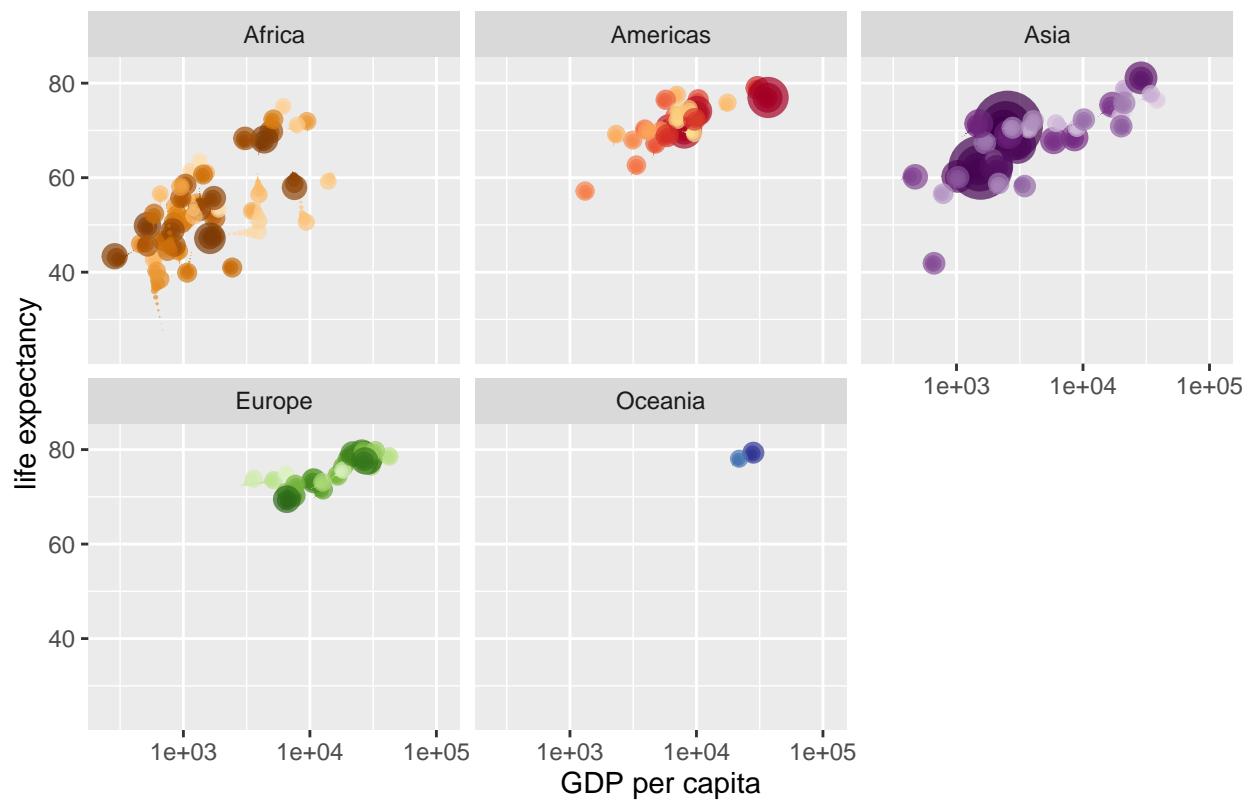
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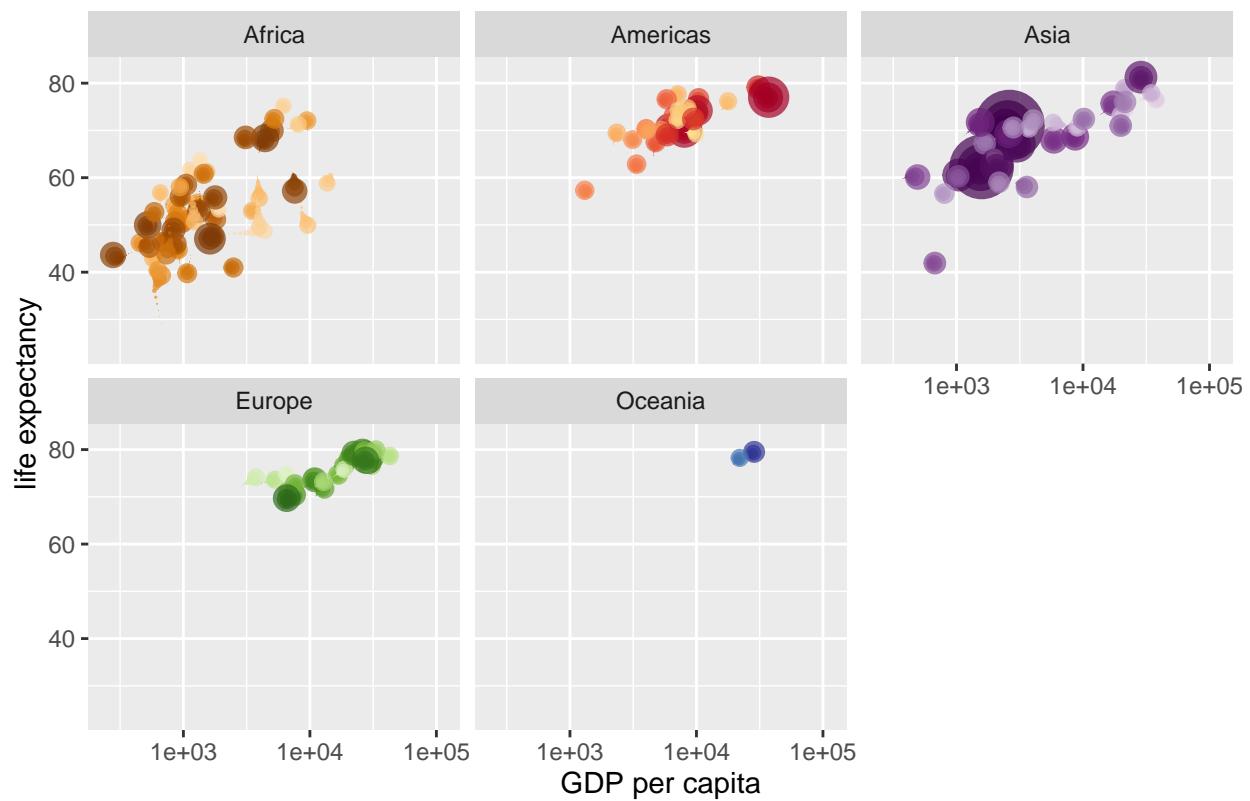
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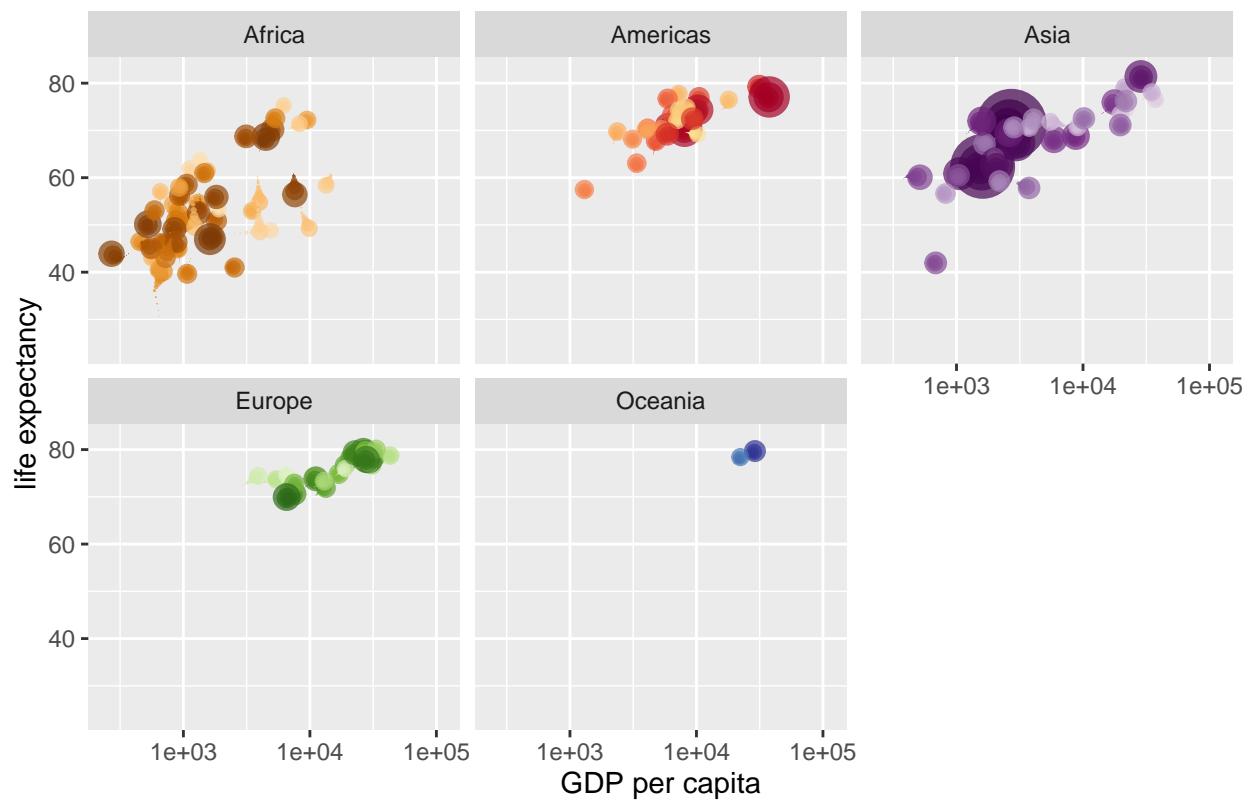
Year: 1999



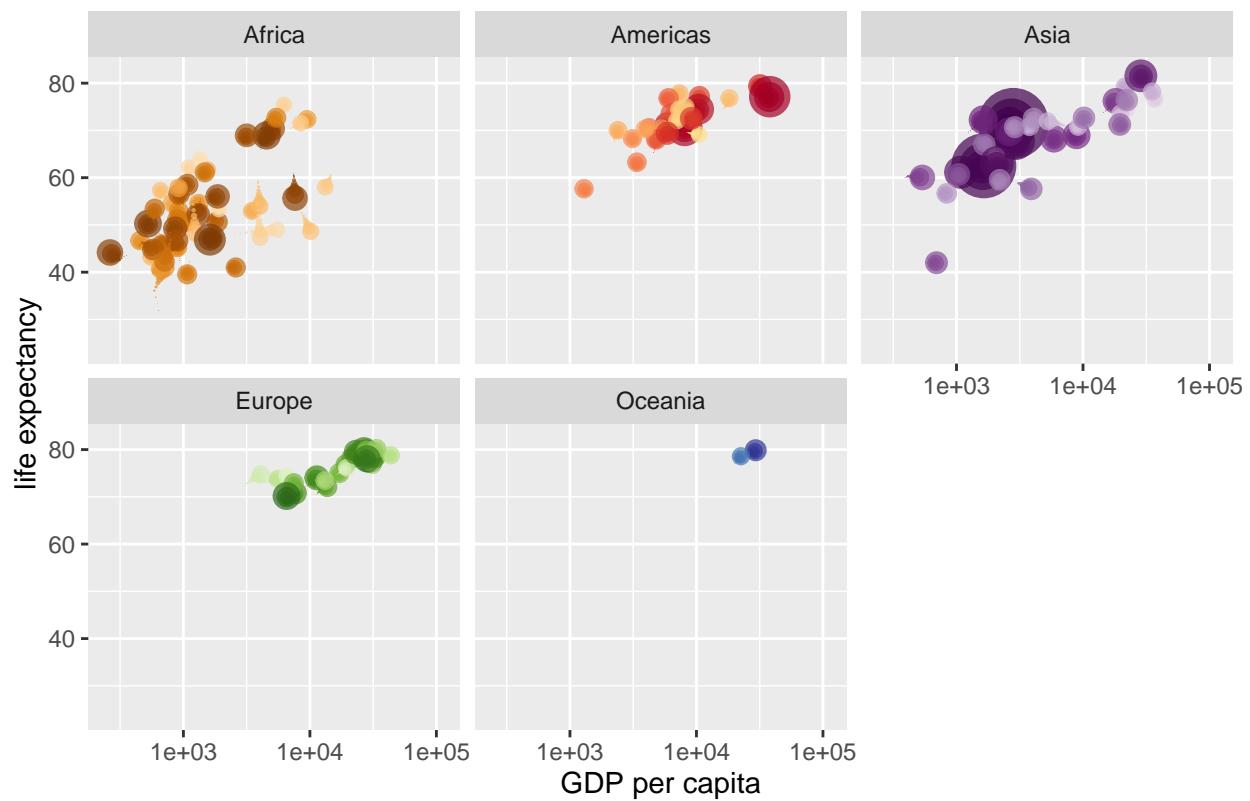
Year: 1999



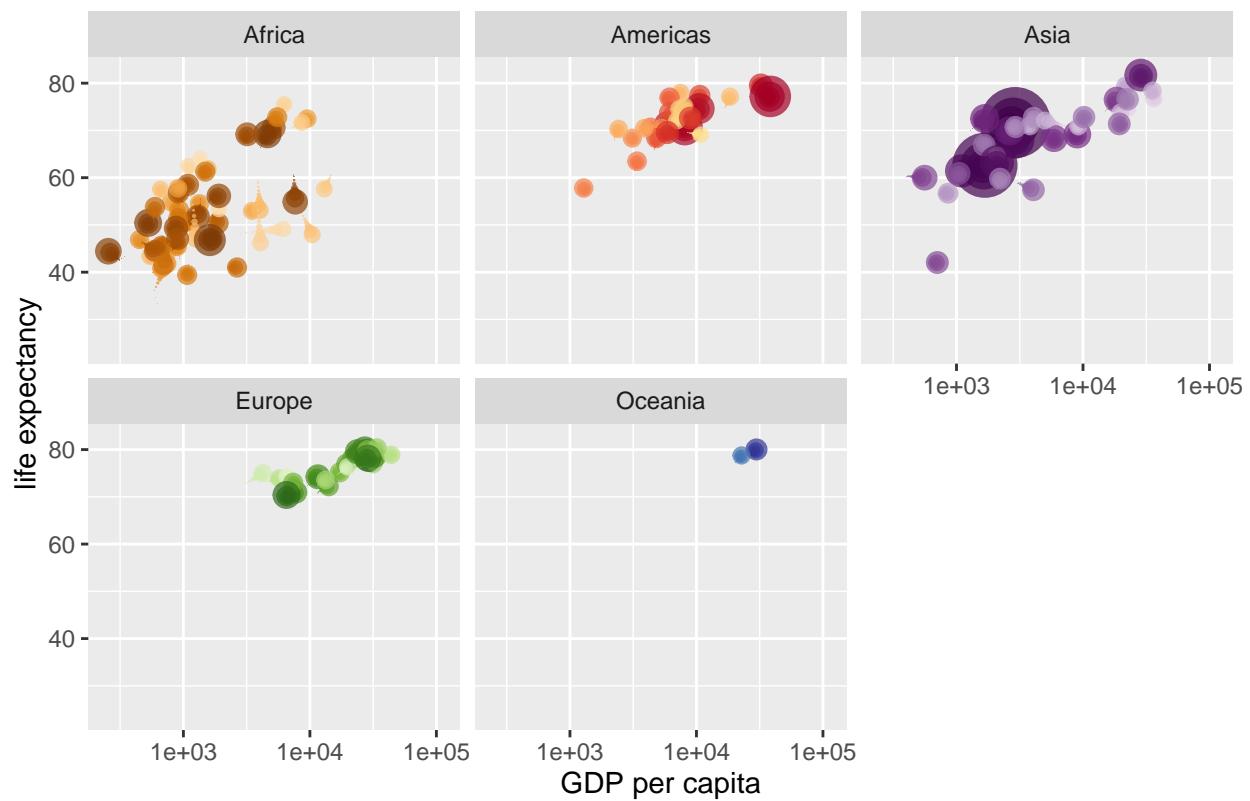
Year: 2000



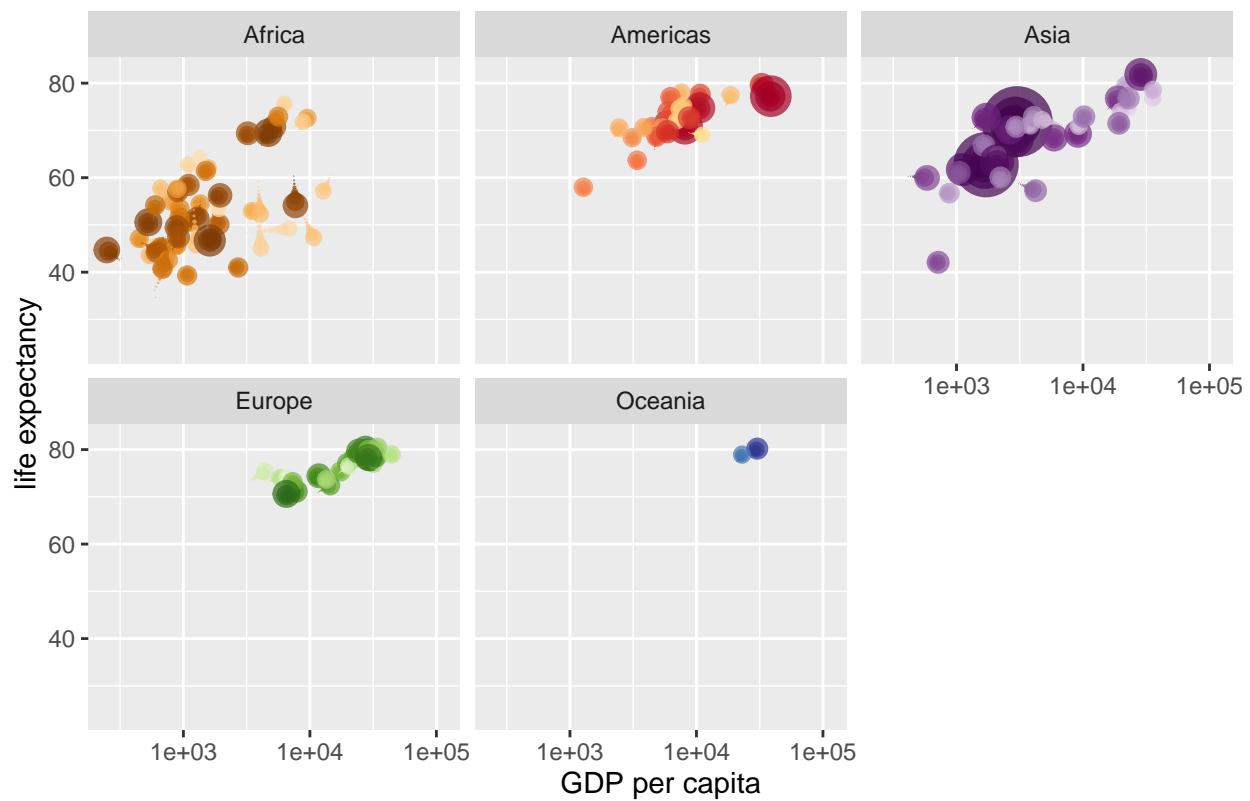
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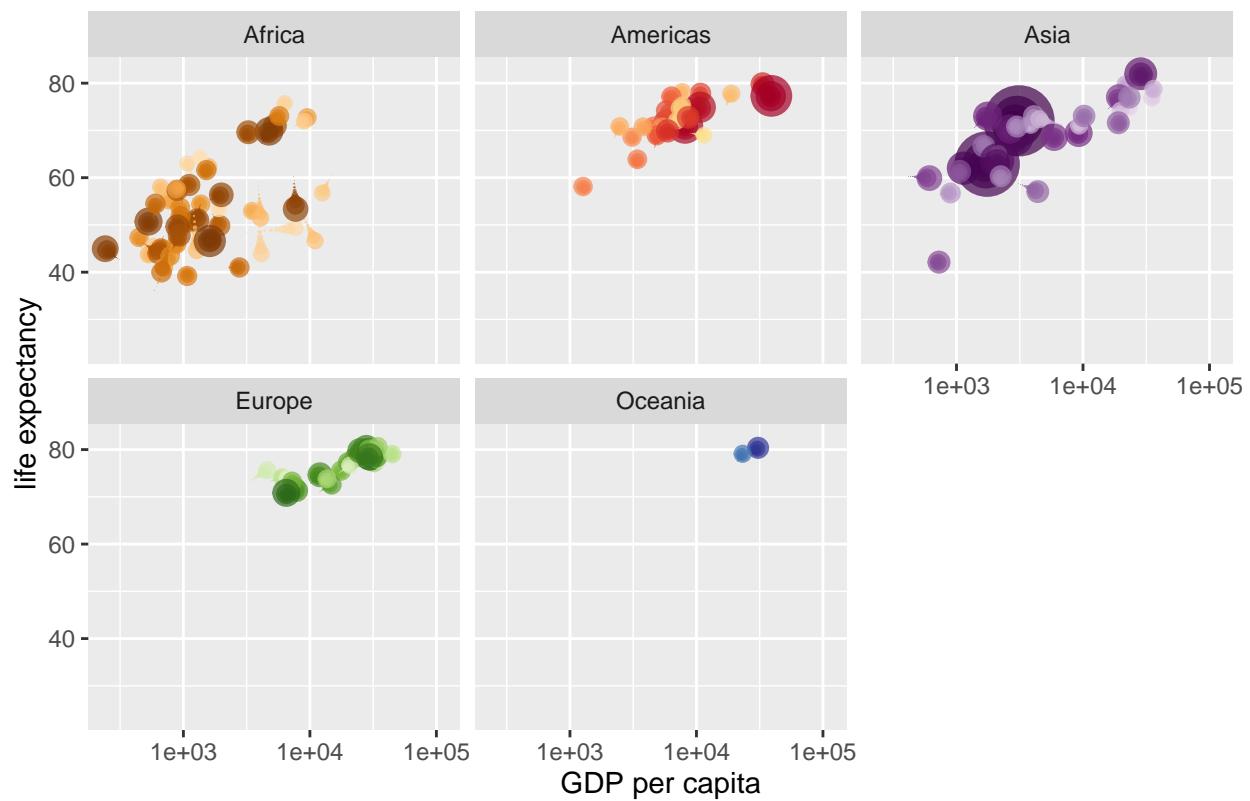
Year: 2001



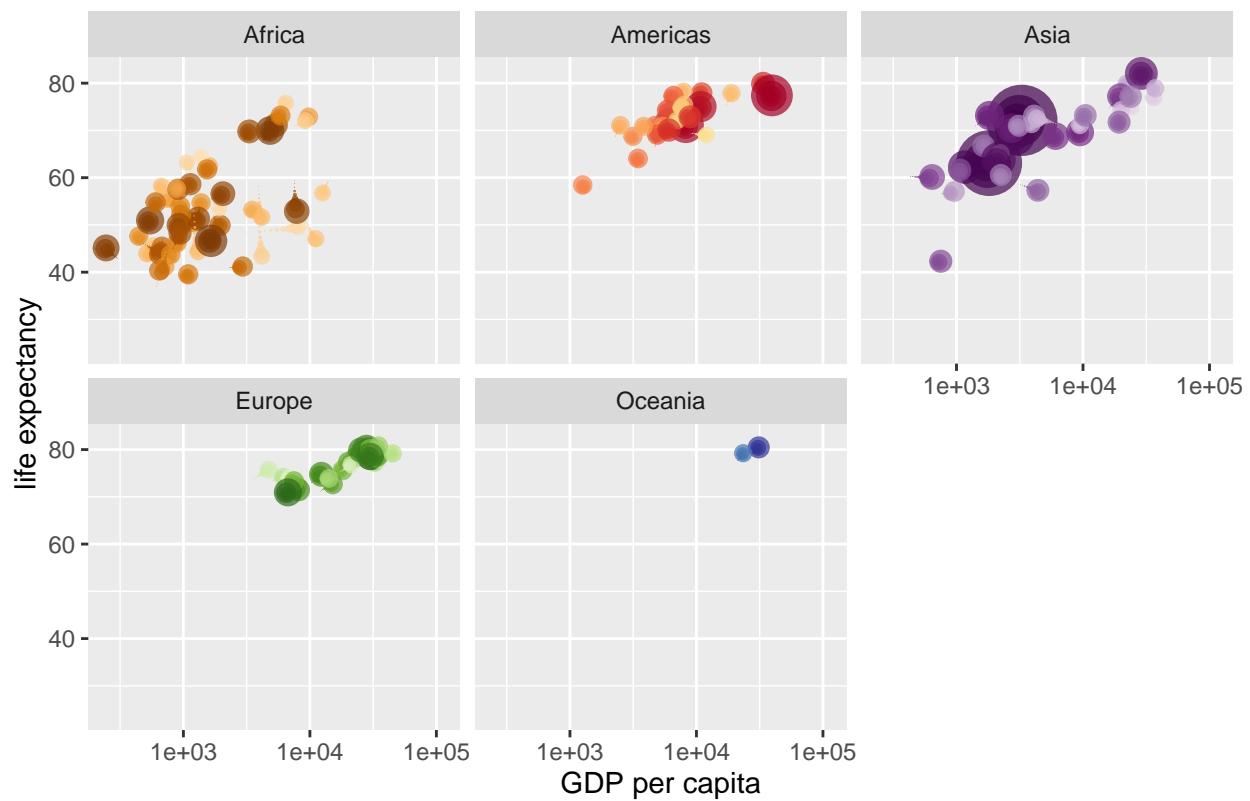
Year: 2001



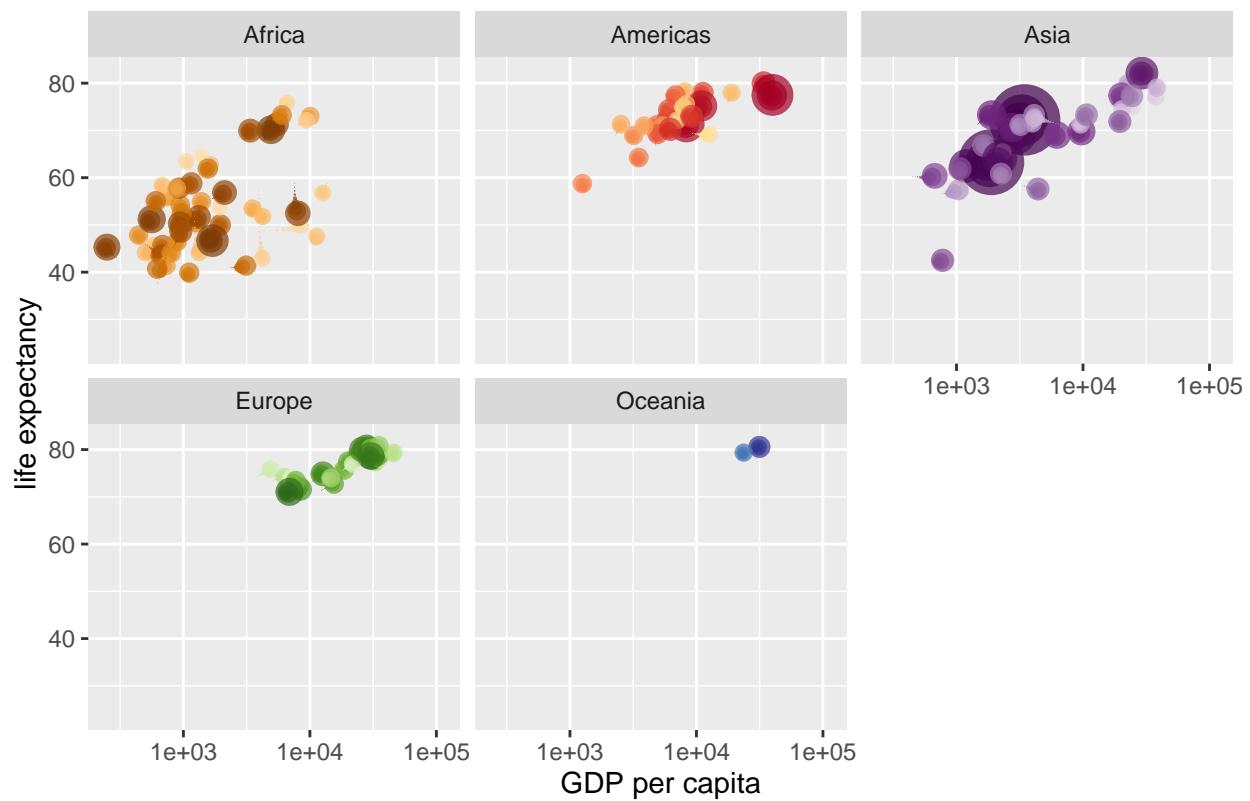
Year: 2002



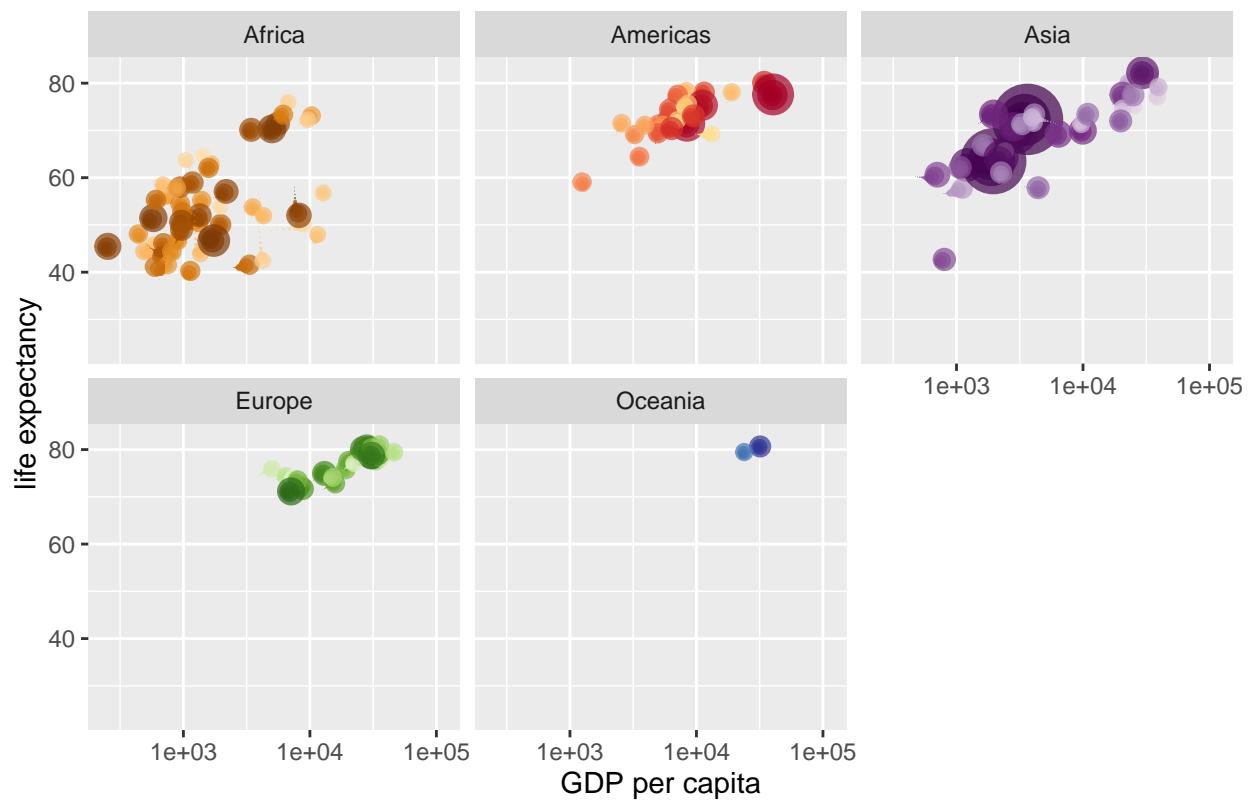
Year: 2003



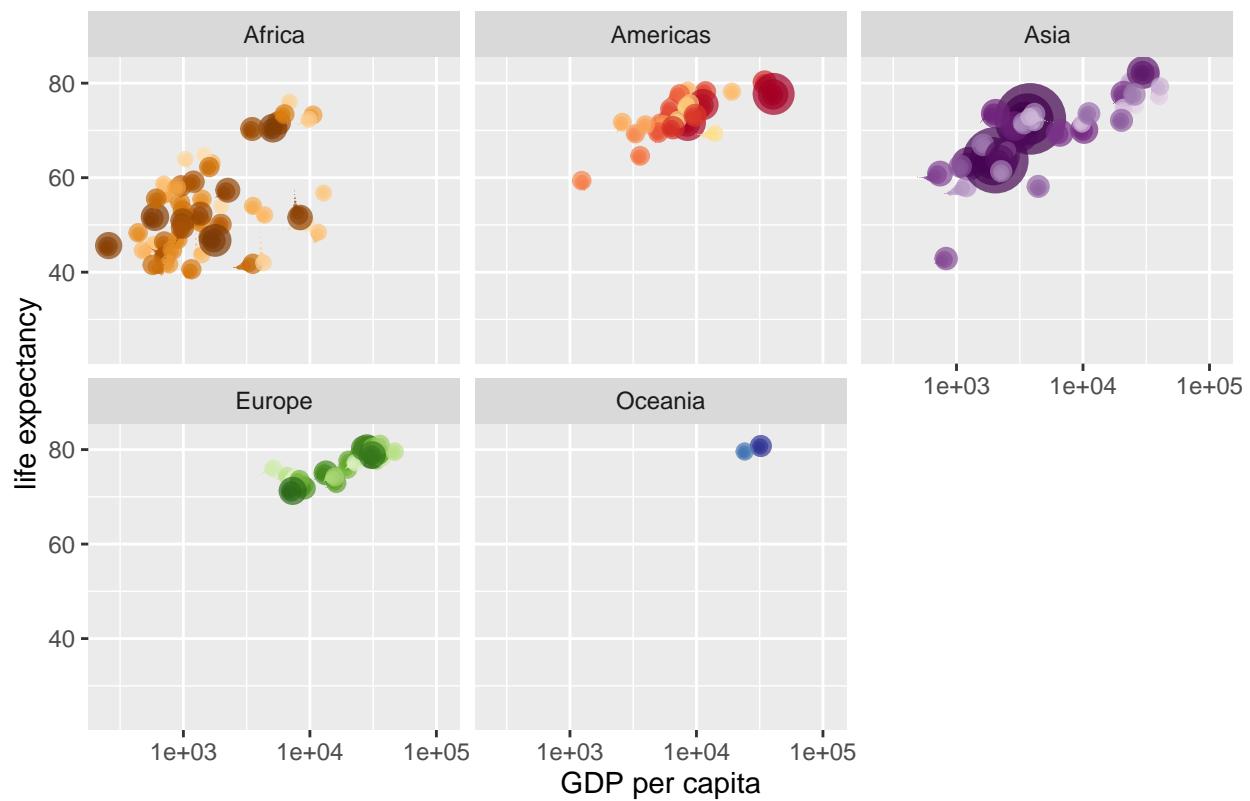
Year: 2003



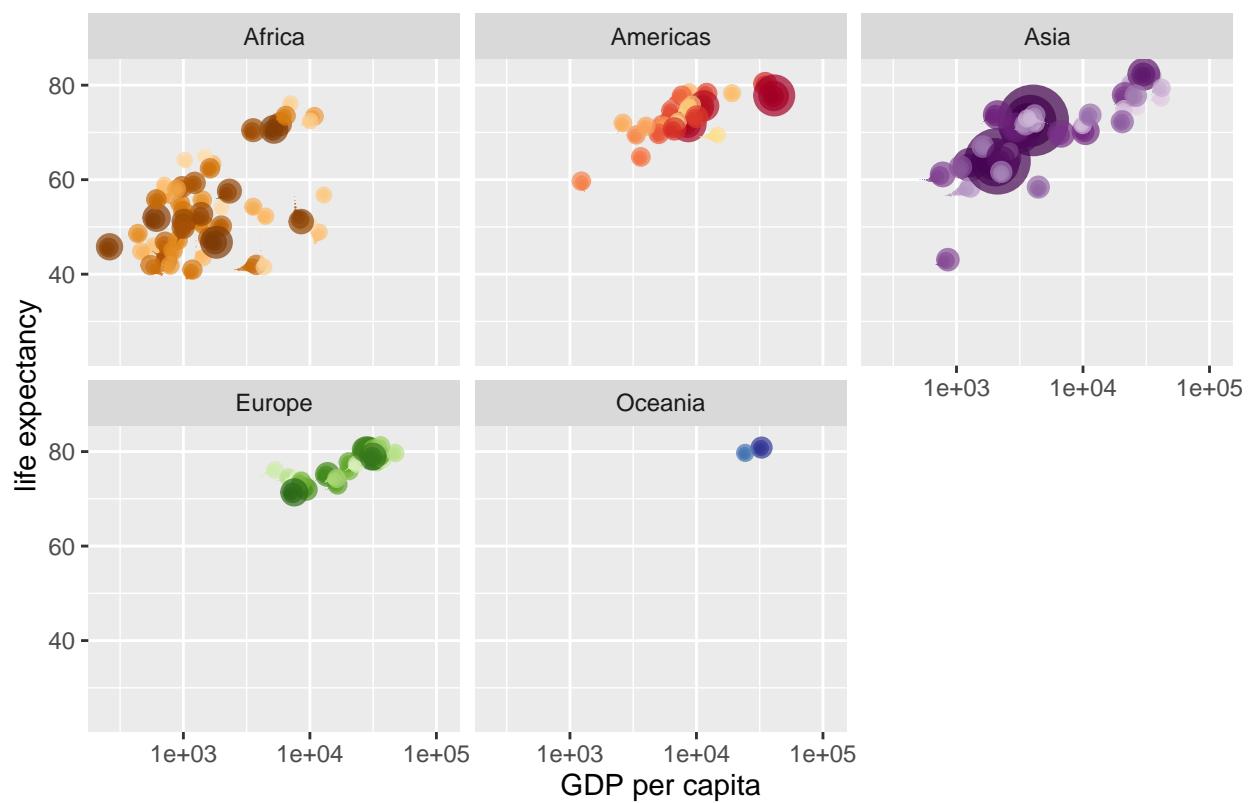
Year: 2004



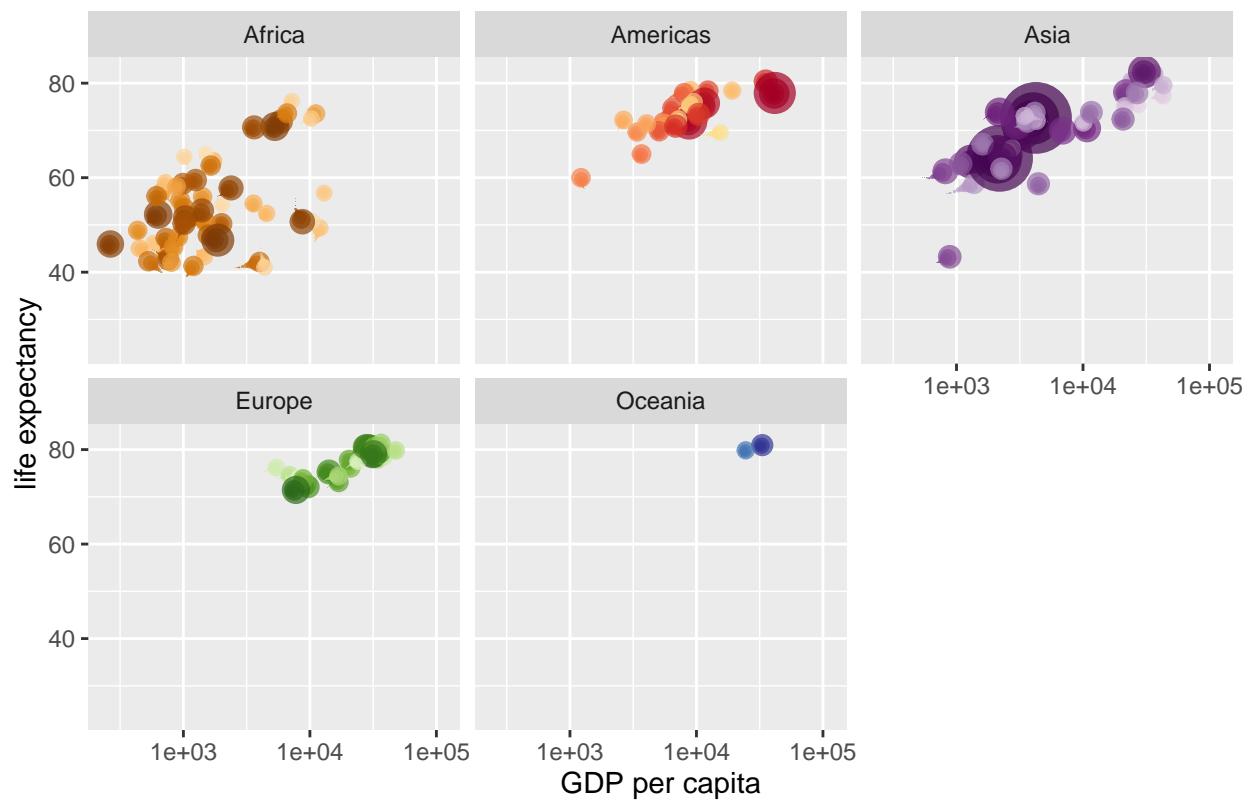
Year: 2004



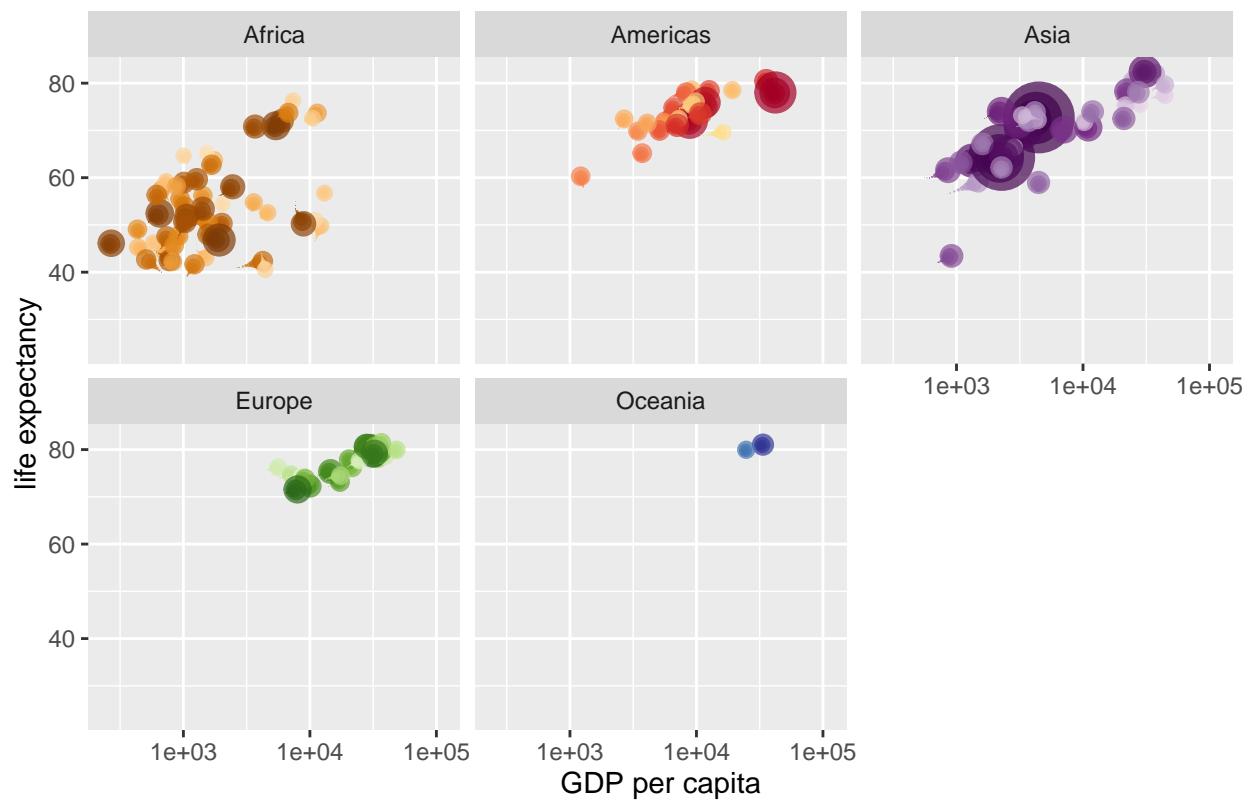
Year: 2005



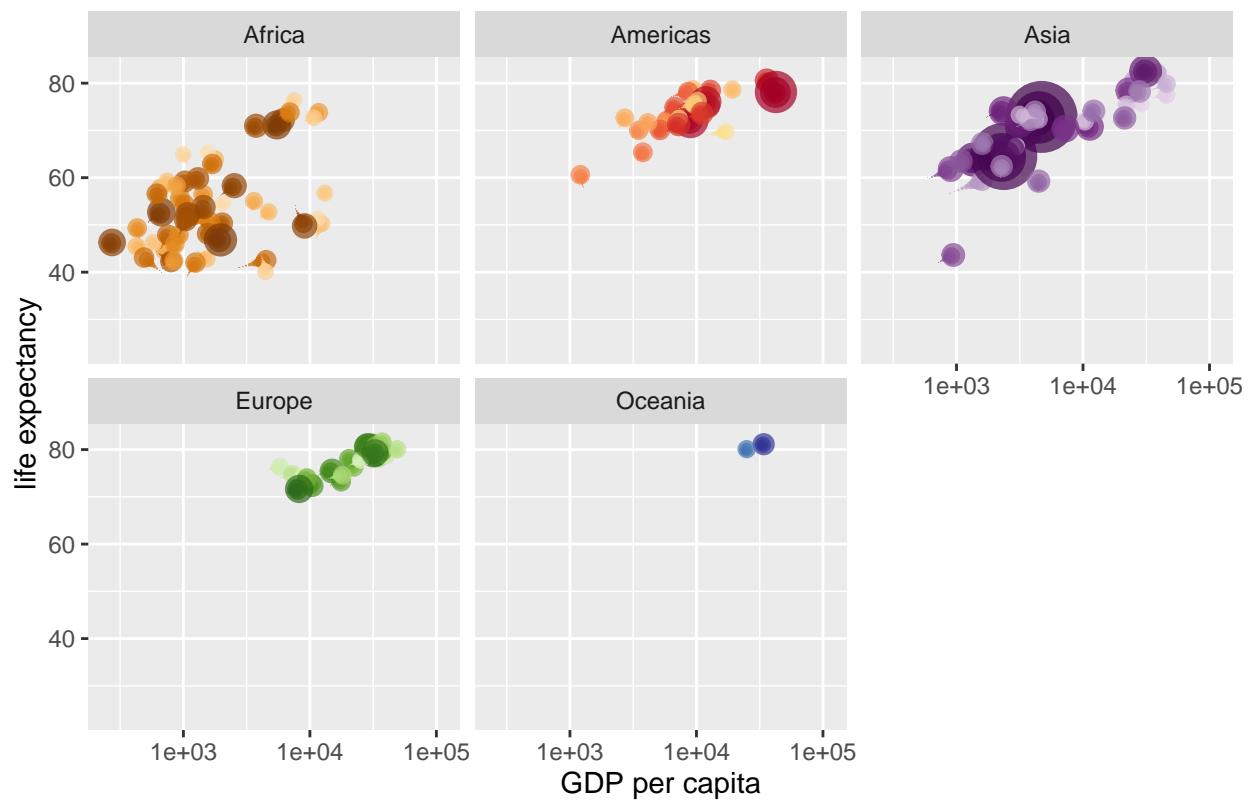
Year: 2005



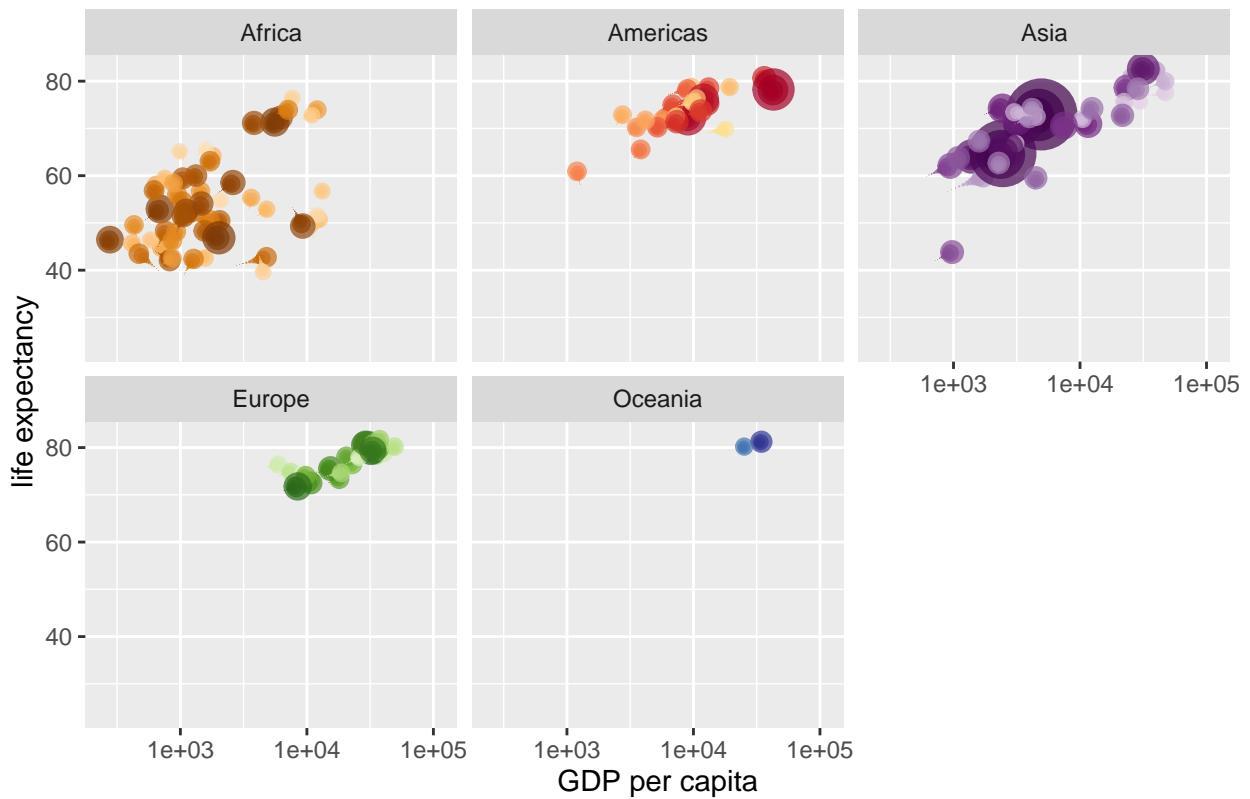
Year: 2006



Year: 2006



Year: 2007

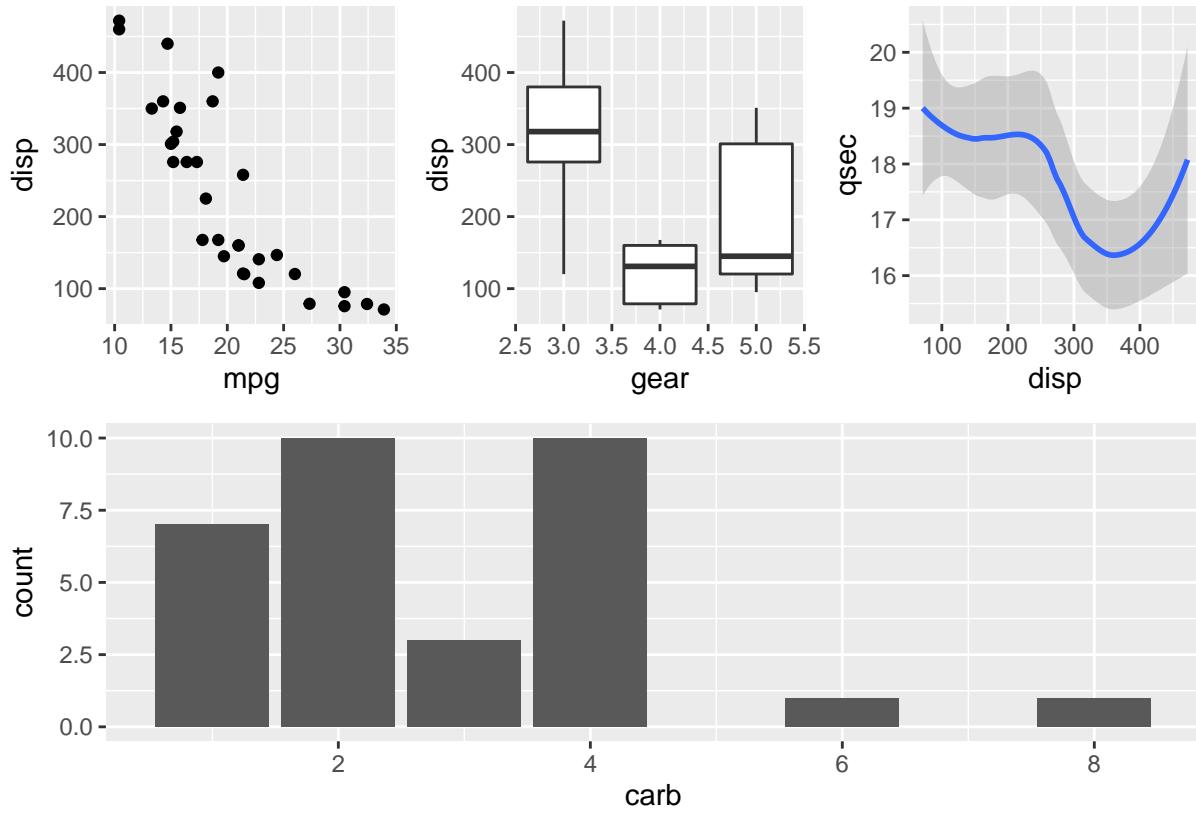


```
# install.packages("patchwork")
library(patchwork)
```

```
## Warning: package 'patchwork' was built under R version 4.0.2
```

```
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'
```



```
sessionInfo()
```

```
## R version 4.0.0 (2020-04-24)
## Platform: x86_64-apple-darwin17.0 (64-bit)
## Running under: macOS 10.16
##
## Matrix products: default
## BLAS:    /Library/Frameworks/R.framework/Versions/4.0/Resources/lib/libRblas.dylib
## LAPACK:  /Library/Frameworks/R.framework/Versions/4.0/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
##
## attached base packages:
## [1] stats      graphics   grDevices  utils       datasets   methods    base
##
## other attached packages:
## [1] patchwork_1.1.1 gganimate_1.0.7  png_0.1-7      gifski_1.4.3-1
## [5] dplyr_1.0.7     gapminder_0.3.0  ggplot2_3.3.5
##
## loaded via a namespace (and not attached):
## [1] progress_1.2.2   tidyselect_1.1.1  xfun_0.29        purrr_0.3.4
## [5] splines_4.0.0    lattice_0.20-45   colorspace_2.0-2  vctrs_0.3.8
## [9] generics_0.1.0   htmltools_0.5.2   yaml_2.2.1       mgcv_1.8-37
## [13] utf8_1.2.2      rlang_0.4.11     pillar_1.6.3     glue_1.4.2
## [17] withr_2.4.2     DBI_1.1.1       tweenr_1.0.2     plyr_1.8.6
```

```
## [21] lifecycle_1.0.1    stringr_1.4.0      munsell_0.5.0    gtable_0.3.0
## [25] evaluate_0.14     labeling_0.4.2    knitr_1.36       fastmap_1.1.0
## [29] fansi_0.5.0       highr_0.9        Rcpp_1.0.7       scales_1.1.1
## [33] farver_2.1.0      hms_1.1.1        digest_0.6.28   stringi_1.7.5
## [37] grid_4.0.0         cli_3.0.1        tools_4.0.0      magrittr_2.0.1
## [41] tibble_3.1.5       crayon_1.4.1     pkgconfig_2.0.3 ellipsis_0.3.2
## [45] Matrix_1.3-4      prettyunits_1.1.1 assertthat_0.2.1 rmarkdown_2.11
## [49] rstudioapi_0.13   R6_2.5.1         nlme_3.1-153    compiler_4.0.0
```