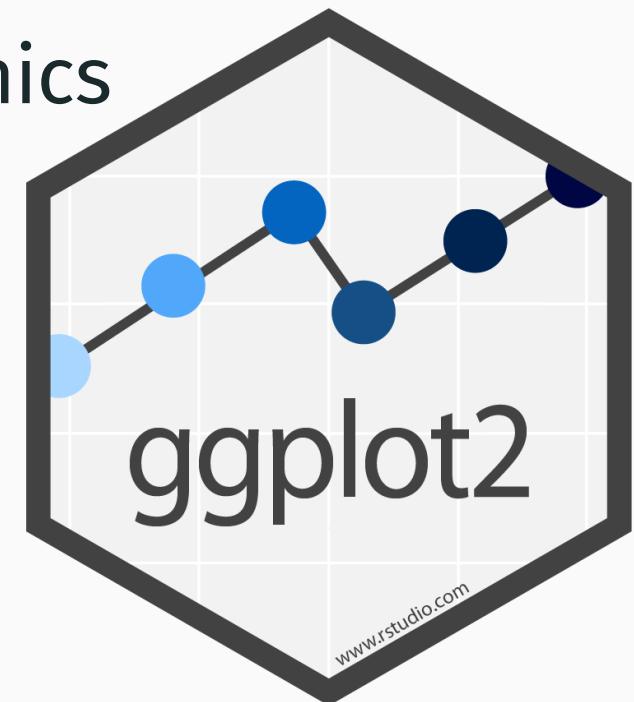


A Gentle Guide to the Grammar of Graphics with `ggplot2`

Garrick Aden-Buie

@grrrck

Slides and code: bit.ly/gentle-ggplot2



Brought to you by the letter...



Why *ggplot2*?



Hadley Wickham

The transferrable skills from *ggplot2* are not the idiosyncrasies of plotting syntax, but a powerful way of thinking about visualisation, as a way of **mapping between variables and the visual properties of geometric objects** that you can perceive.

Why *ggplot2*?

My personal reasons

- Functional data visualization
 1. Wrangle data
 2. Map data to visual elements
 3. Tweak scales, guides, axis, labels, theme
- Easy to reason about how data drives visualization
- Easy to iterate
- Easy to be consistent

What are we getting into?

`ggplot2` is a huge package: philosophy + functions
...but it's very well organized

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...but you'll know *where* and *what* to look for

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G is for getting started

Easy: install the `tidyverse`

```
install.packages('tidyverse')
```

Medium: install just `ggplot2`

```
install.pacakages('ggplot2')
```

Expert: install from GitHub

```
devtools::install_github('tidyverse/ggplot2')
```

G is for getting started

Load the tidyverse

```
library(tidyverse)
```

```
## — Attaching packages
```

```
## ✓ ggplot2 3.1.0      ✓ purrr    0.2.5
## ✓ tibble   1.4.2      ✓ dplyr    0.7.7
## ✓ tidyr    0.8.1      ✓ stringr  1.3.1
## ✓ readr    1.1.1      ✓forcats  0.3.0
```

```
## — Conflicts
```

```
## ✗ dplyr::filter() masks stats::filter()
## ✗ dplyr::lag()    masks stats::lag()
```

G is for getting started

Other packages you'll need for this adventure

We'll use an excerpt of the `gapminder` dataset provided by the `gapminder` package by Jenny Bryan.

<https://github.com/jennybc/gapminder>

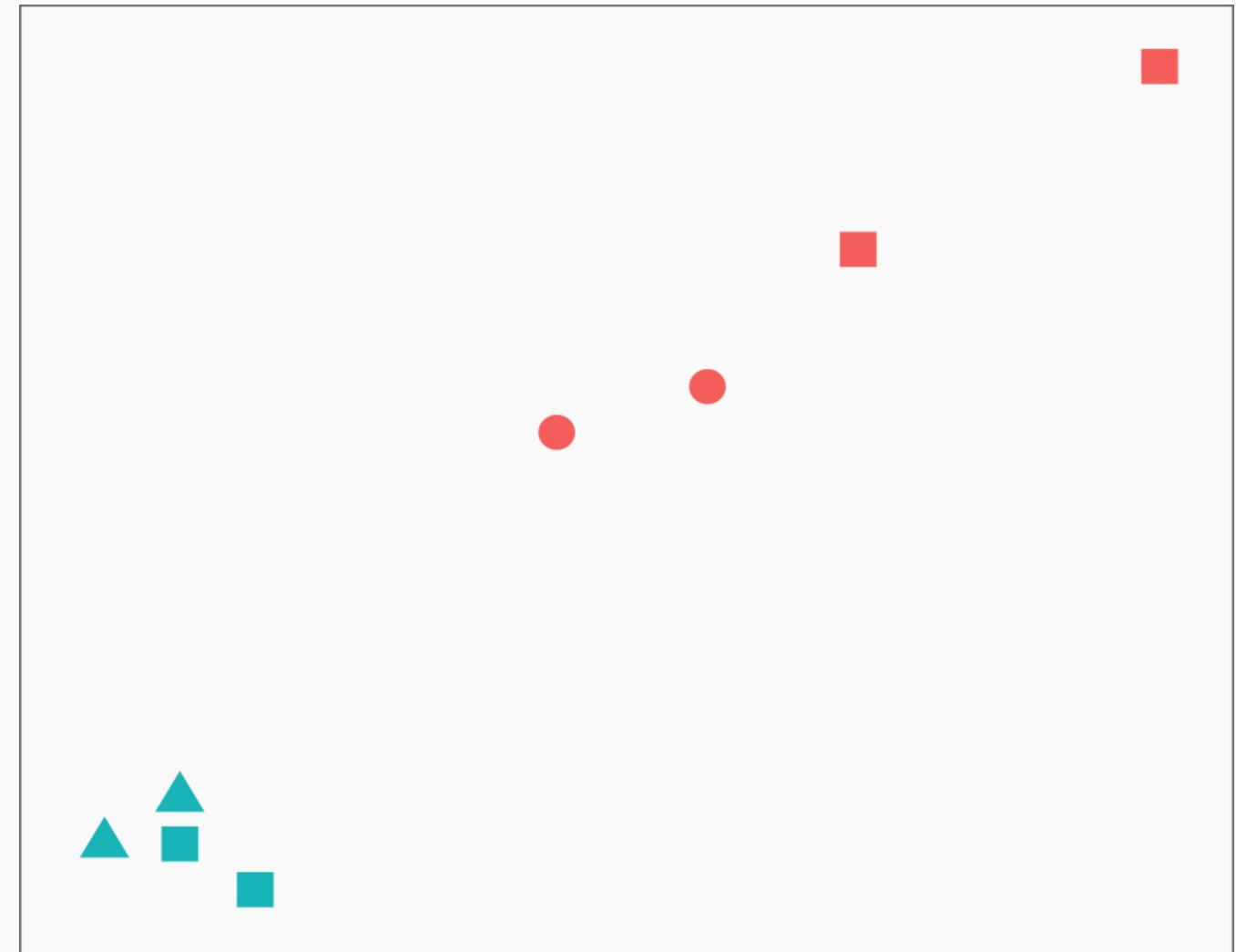
```
## install.packages("gapminder")
library(gapminder)
```

gg is for
Grammar of Graphics

What is a grammar of graphics?

"Good grammar is just the first step
in creating a good sentence."

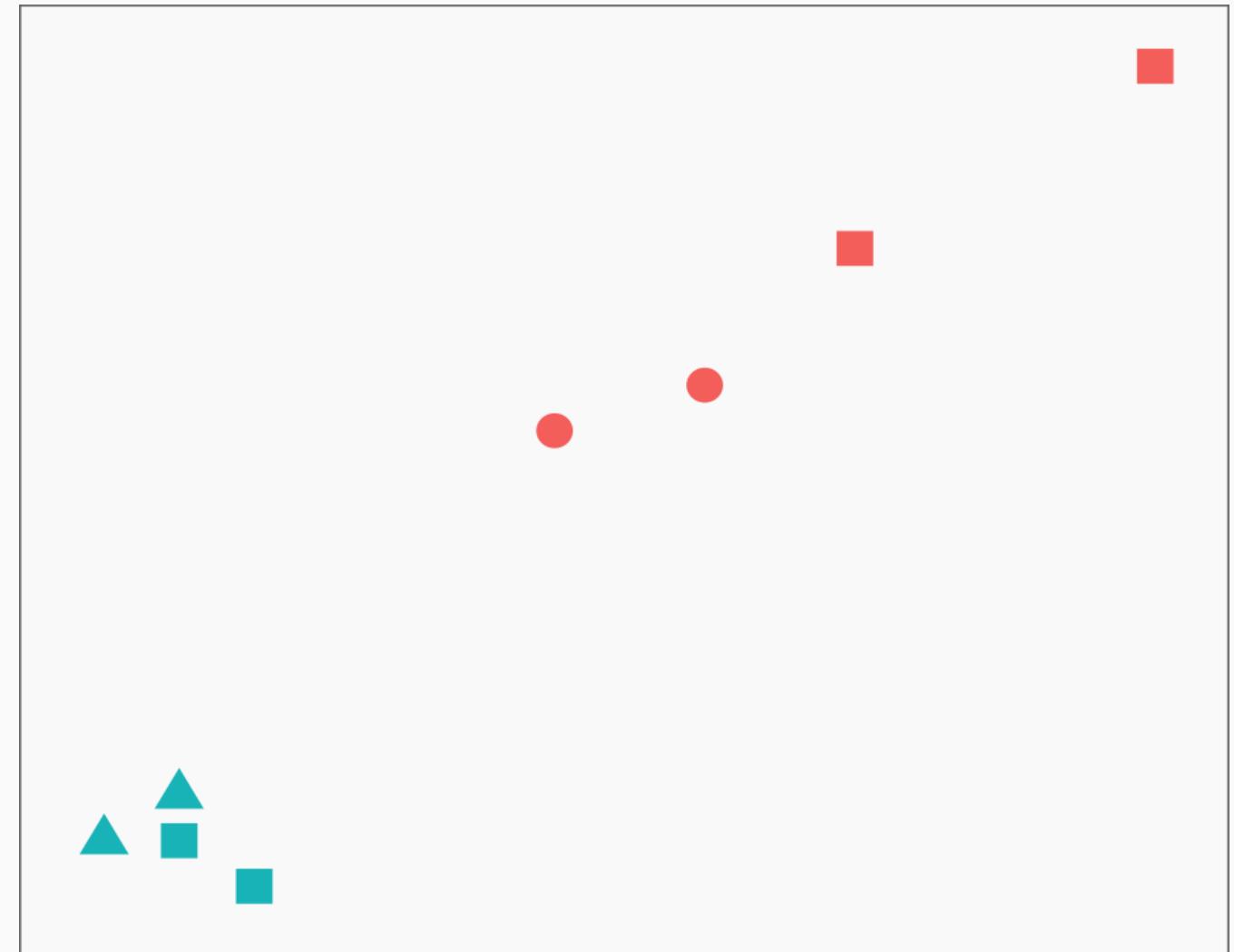
How is the drawing on the right
connected to data?



Guess the data behind this plot?

MPG Ratings of Cars

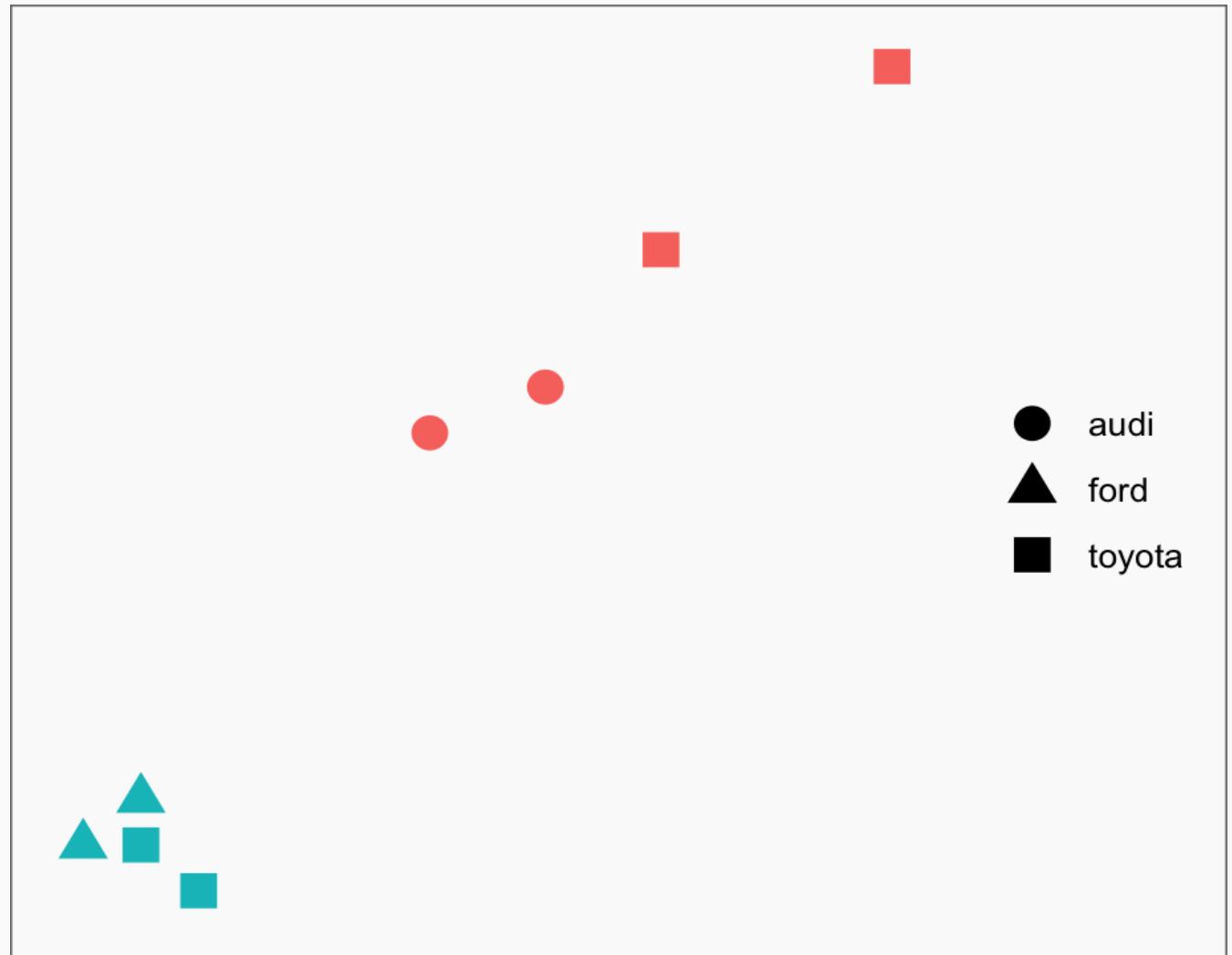
- Manufacturer
- Car Type (Class)
- City MPG
- Highway MPG



Guess the data behind this plot?

MPG Ratings of Cars

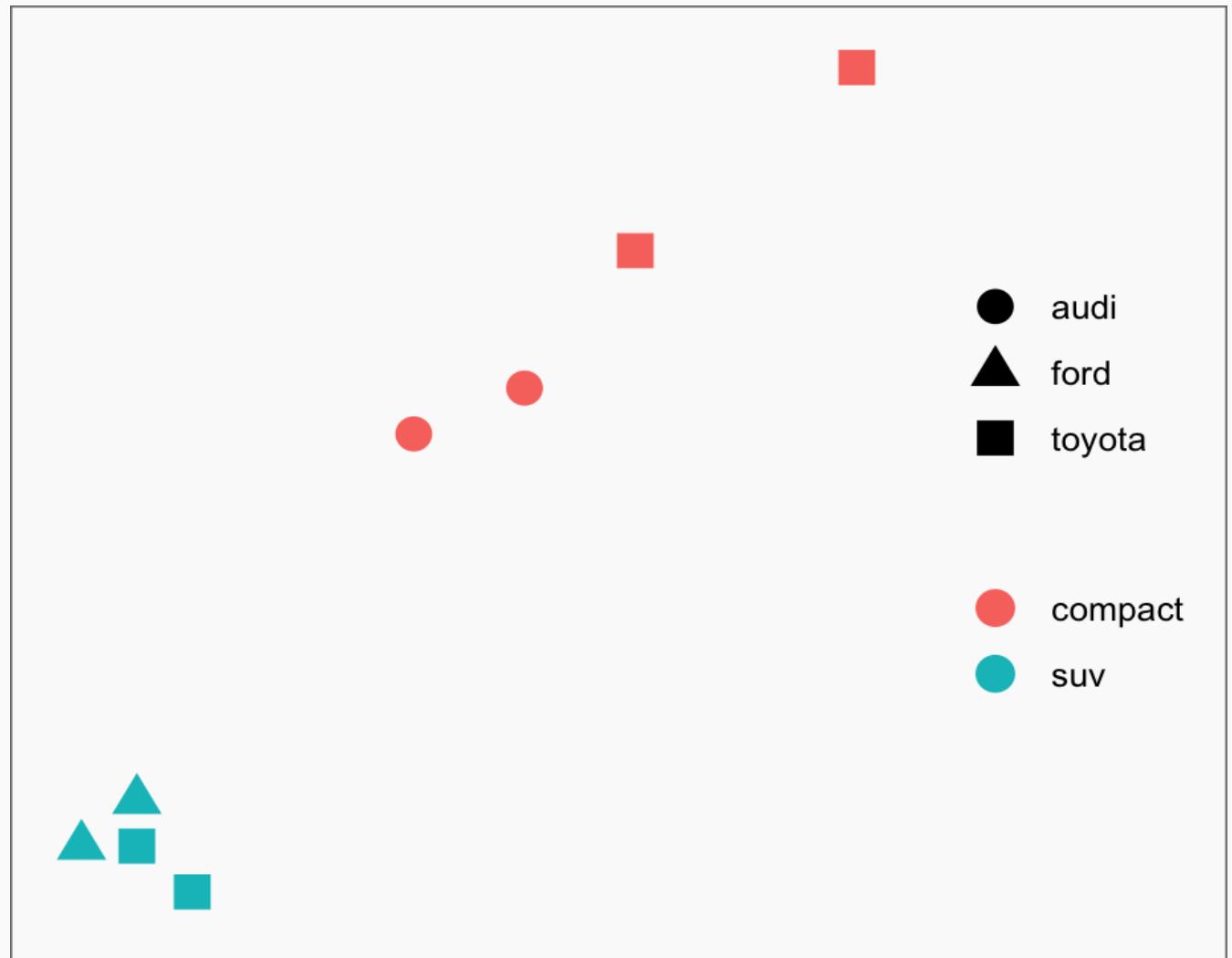
- Manufacturer
- Car Type (Class)
- City MPG
- Highway MPG



Guess the data behind this plot?

MPG Ratings of Cars

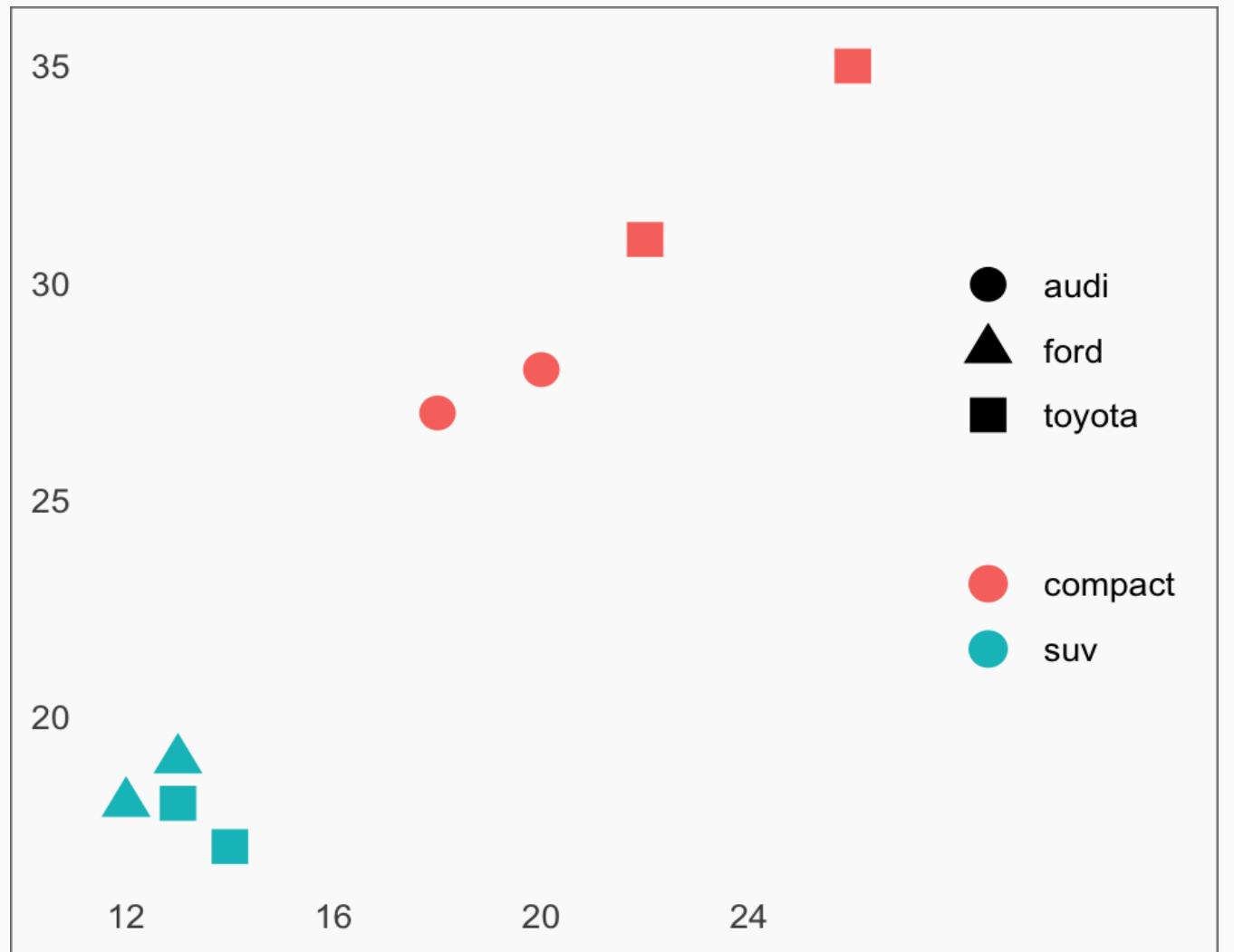
- Manufacturer
- Car Type (Class)
- City MPG
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MPG Ratings of Cars

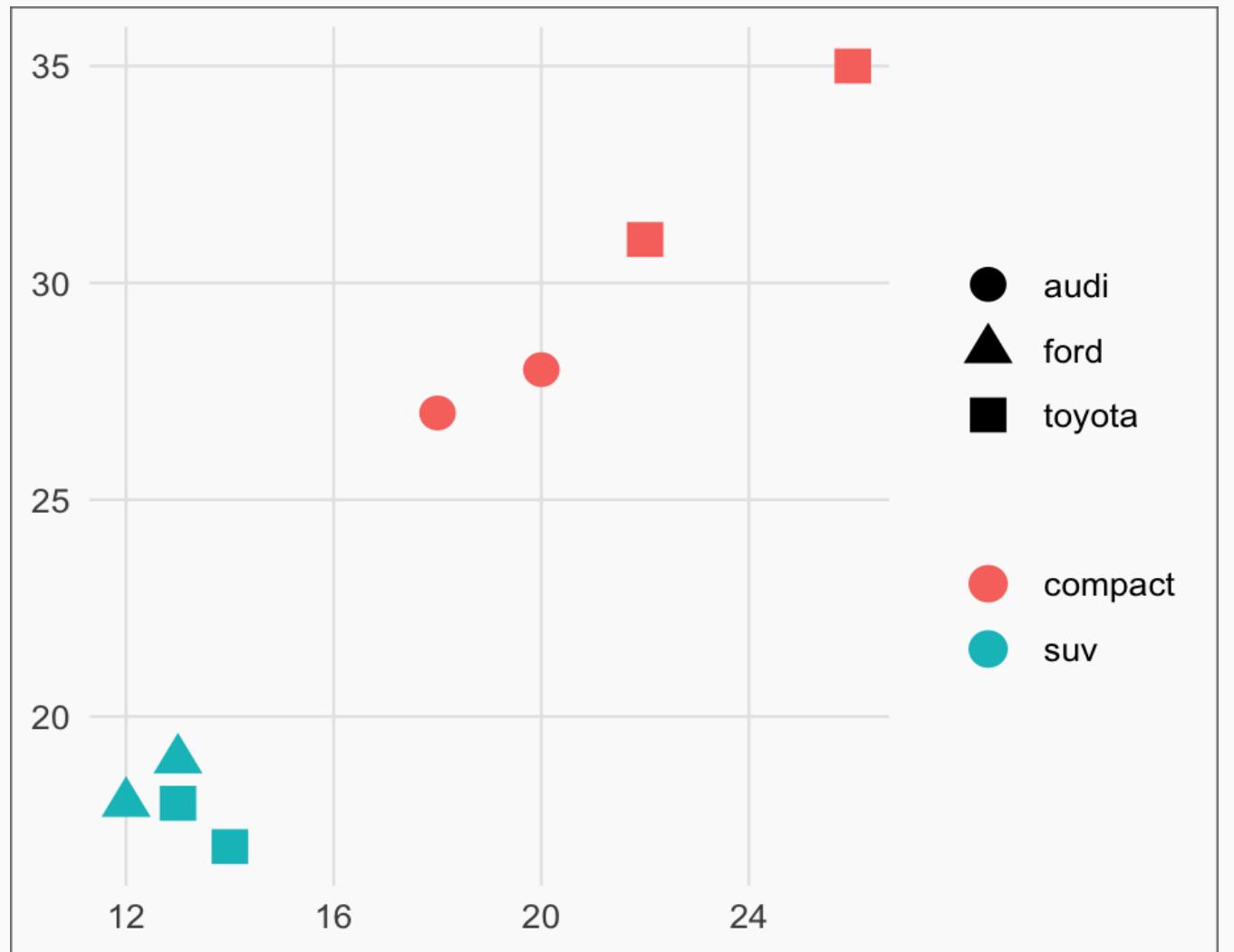
- Manufacturer
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MPG Ratings of Cars

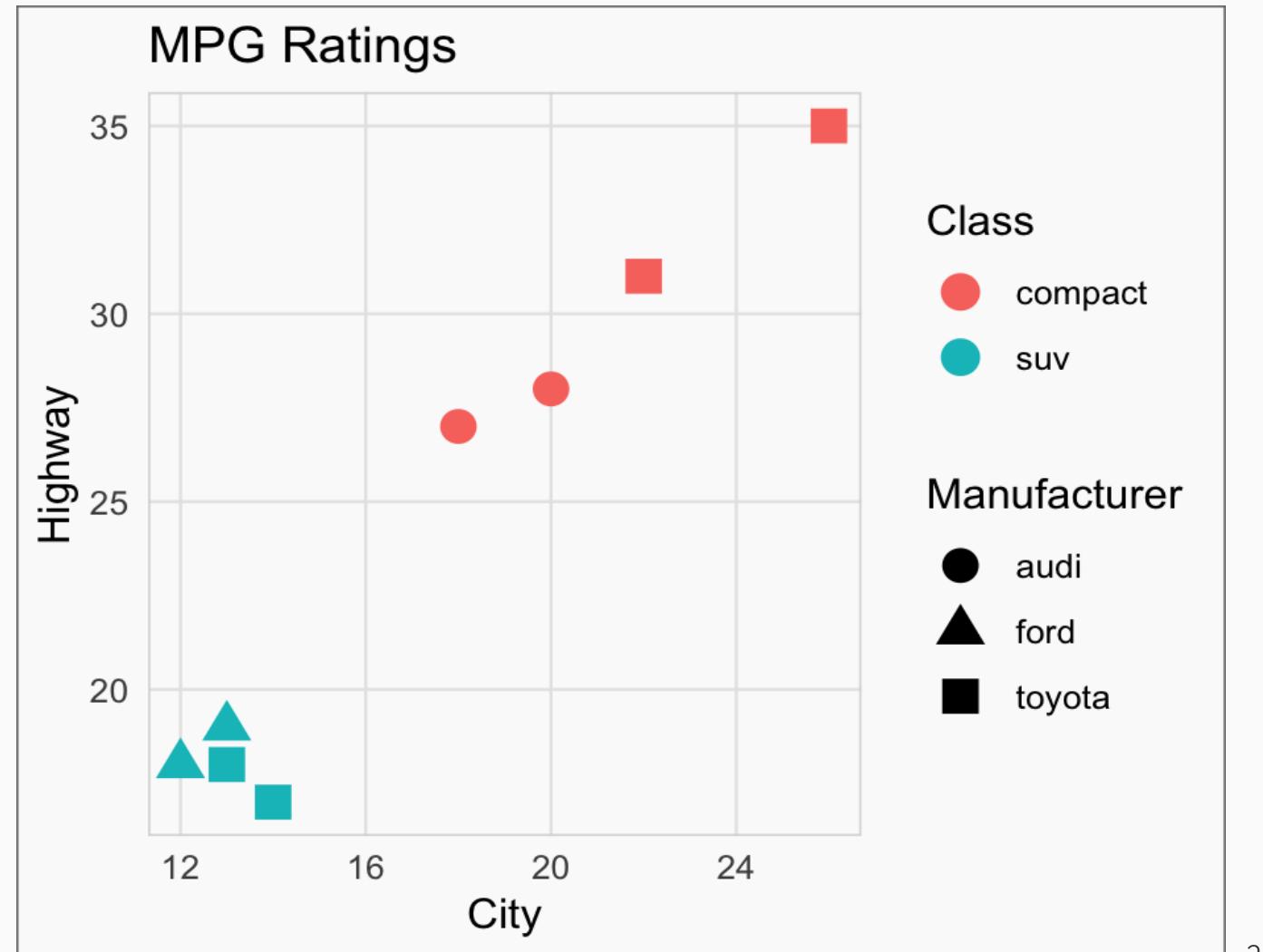
- Manufacturer
- Car Type (Class)
- City MPG
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Guess the data behind this plot?

MPG Ratings of Cars

- Manufacturer
- Car Type (Class)
- City MPG
- Highway MPG



Guess the data behind this plot?

MPG Ratings of Cars

- Manufacturer
- Car Type (Class)
- City MPG
- Highway MPG

manufacturer	class	cty	hwy	model
audi	compact	18	27	a4
audi	compact	20	28	a4 quattro
ford	suv	12	18	expedition 2wd
ford	suv	13	19	explorer 4wd
toyota	suv	14	17	4runner 4wd
toyota	compact	22	31	camry solara
toyota	compact	26	35	corolla
toyota	suv	13	18	land cruiser wagon 4wd

How do we express visuals in words?

- **Data** to be visualized

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How do we express visuals in words?

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- **Statistics** transform data on the way to visualization
- **Coordinates** organize location of geometric objects
- **Scales** define the range of values for aesthetics
- **Facets** group into subplots

gg is for Grammar of Graphics

Data

```
ggplot(data)
```

Tidy Data

1. Each variable forms a **column**
2. Each observation forms a **row**
3. Each observational unit forms a table

gg is for Grammar of Graphics

Data

```
ggplot(data)
```

Tidy Data

1. Each variable forms a **column**
2. Each observation forms a **row**
3. Each observational unit forms a table

Start by asking

1. What information do I want to use in my visualization?
2. Is that data contained in **one column/row** for a given data point?

gg is for Grammar of Graphics

Data

```
ggplot(data)
```

country	1997	2002	2007
Canada	30.30584	31.90227	33.39014
China	1230.07500	1280.40000	1318.68310
United States	272.91176	287.67553	301.13995

gg is for Grammar of Graphics

Data

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Canada	30.30584	31.90227	33.39014
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United States	272.91176	287.67553	301.13995

```
tidy_pop ← gather(messy_pop, 'year', 'pop', -country)
```

country	year	pop
Canada	1997	30.306
China	1997	1230.075
United States	1997	272.912
Canada	2002	31.902
China	2002	1280.40000
United States	2002	287.67553
Canada	2007	33.39014
China	2007	1318.68310
United States	2007	301.13995

gg is for Grammar of Graphics

Data

Map data to visual elements or parameters

Aesthetics

+ aes()

- year
- pop
- country

gg is for Grammar of Graphics

Data

Map data to visual elements or parameters

Aesthetics

+ aes()

- year → **x**
- pop → **y**
- country → *shape, color, etc.*

gg is for Grammar of Graphics

Data

Map data to visual elements or parameters

Aesthetics

+ aes()

```
aes(  
  x = year,  
  y = pop,  
  color = country  
)
```

gg is for Grammar of Graphics

Data

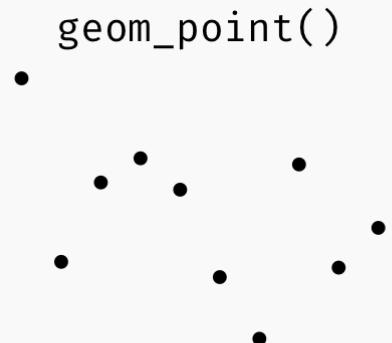
Geometric objects displayed on the plot

Aesthetics

Geoms

+ geom_*()

geom_point()



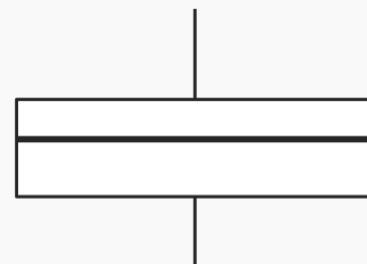
geom_line()



geom_col()



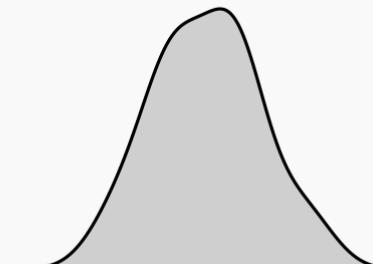
geom_boxplot()



geom_histogram()



geom_density()



gg is for Grammar of Graphics

Data

Aesthetics

Geoms

+ geom_*()

Here are the some of the most widely used geoms

Type	Function
Point	geom_point()
Line	geom_line()
Bar	geom_bar(), geom_col()
Histogram	geom_histogram()
Regression	geom_smooth()
Boxplot	geom_boxplot()
Text	geom_text()
Vert./Horiz. Line	geom_{vh}line()
Count	geom_count()
Density	geom_density()

gg is for Grammar of Graphics

Data

Aesthetics

Geoms

+ geom_*()

See <http://ggplot2.tidyverse.org/reference/> for many more options

```
## [1] "geom_abline"      "geom_area"        "geom_bar"         "geom_bin2d"  
## [5] "geom_blank"        "geom_boxplot"     "geom_col"         "geom_contour"  
## [9] "geom_count"        "geom_crossbar"   "geom_curve"       "geom_density"  
## [13] "geom_density_2d"   "geom_density2d"  "geom_dotplot"    "geom_errorbar"  
## [17] "geom_errorbarh"    "geom_freqpoly"   "geom_hex"        "geom_histogram"  
## [21] "geom_hline"        "geom_jitter"     "geom_label"      "geom_line"  
## [25] "geom_linerange"    "geom_map"        "geom_path"       "geom_point"  
## [29] "geom_pointrange"   "geom_polygon"   "geom_qq"         "geom_qq_line"  
## [33] "geom_quantile"     "geom_raster"    "geom_rect"       "geom_ribbon"  
## [37] "geom_rug"          "geom_segment"   "geom_sf"         "geom_sf_label"  
## [41] "geom_sf_text"      "geom_smooth"    "geom_spoke"      "geom_step"  
## [45] "geom_text"          "geom_tile"      "geom_violin"    "geom_vline"
```

gg is for Grammar of Graphics

Data

Aesthetics

Geoms

+ geom_*

See <http://ggplot2.tidyverse.org/reference/> for many more options

```
## [1] "geom_abline"      "geom_area"        "geom_bar"         "geom_bin2d"  
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## [17] "geom_errorbarh"    "geom_freqpoly"   "geom_hex"        "geom_histogram"  
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## [45] "geom_text"          "geom_tile"      "geom_violin"    "geom_vline"
```

Or just start typing `geom_` in RStudio

```
ggplot(df_geom) +  
  aes(x, y) +
```

Our first plot!

```
ggplot(tidy_pop)
```

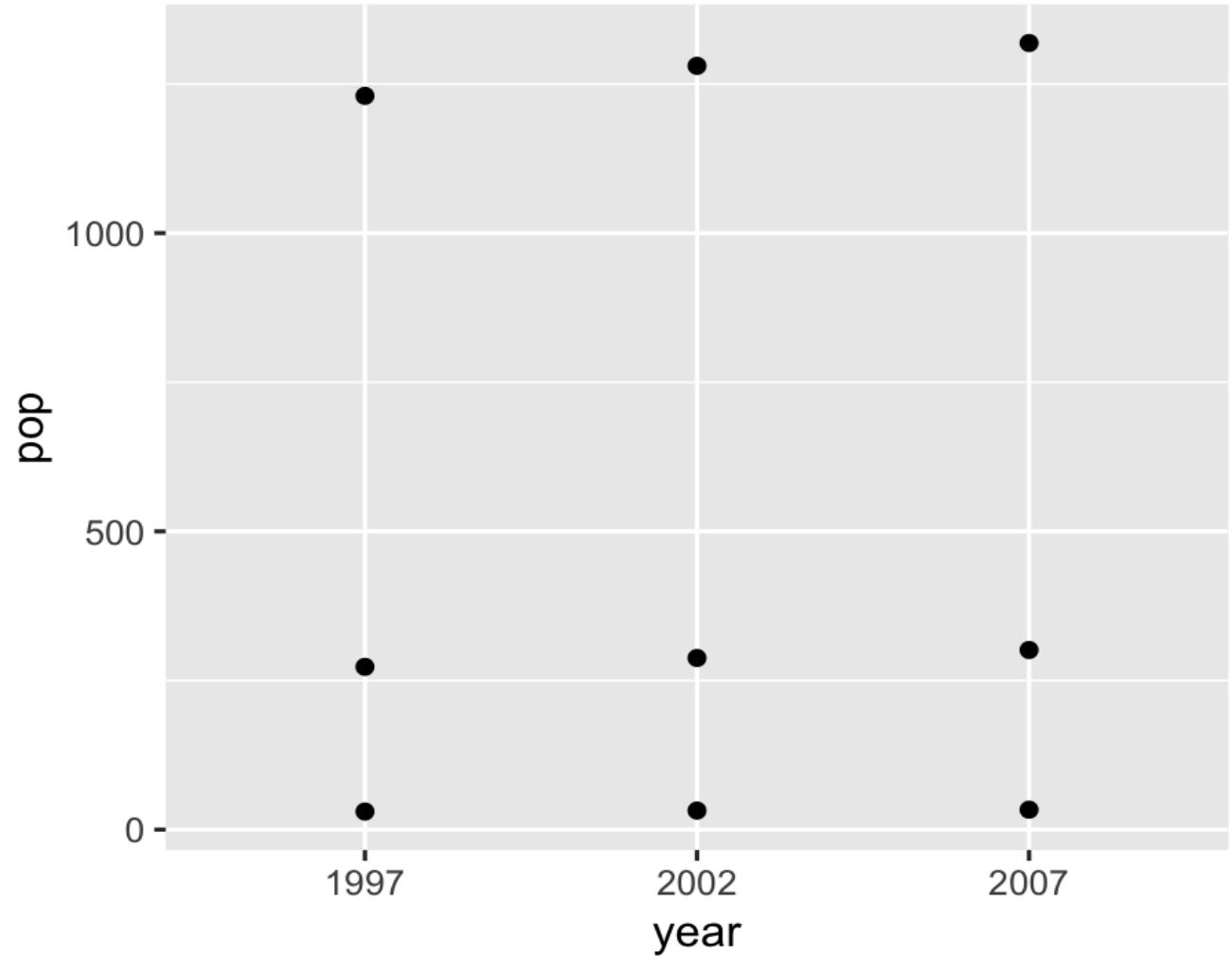
Our first plot!

```
ggplot(tidy_pop) +  
  aes(x = year,  
      y = pop)
```



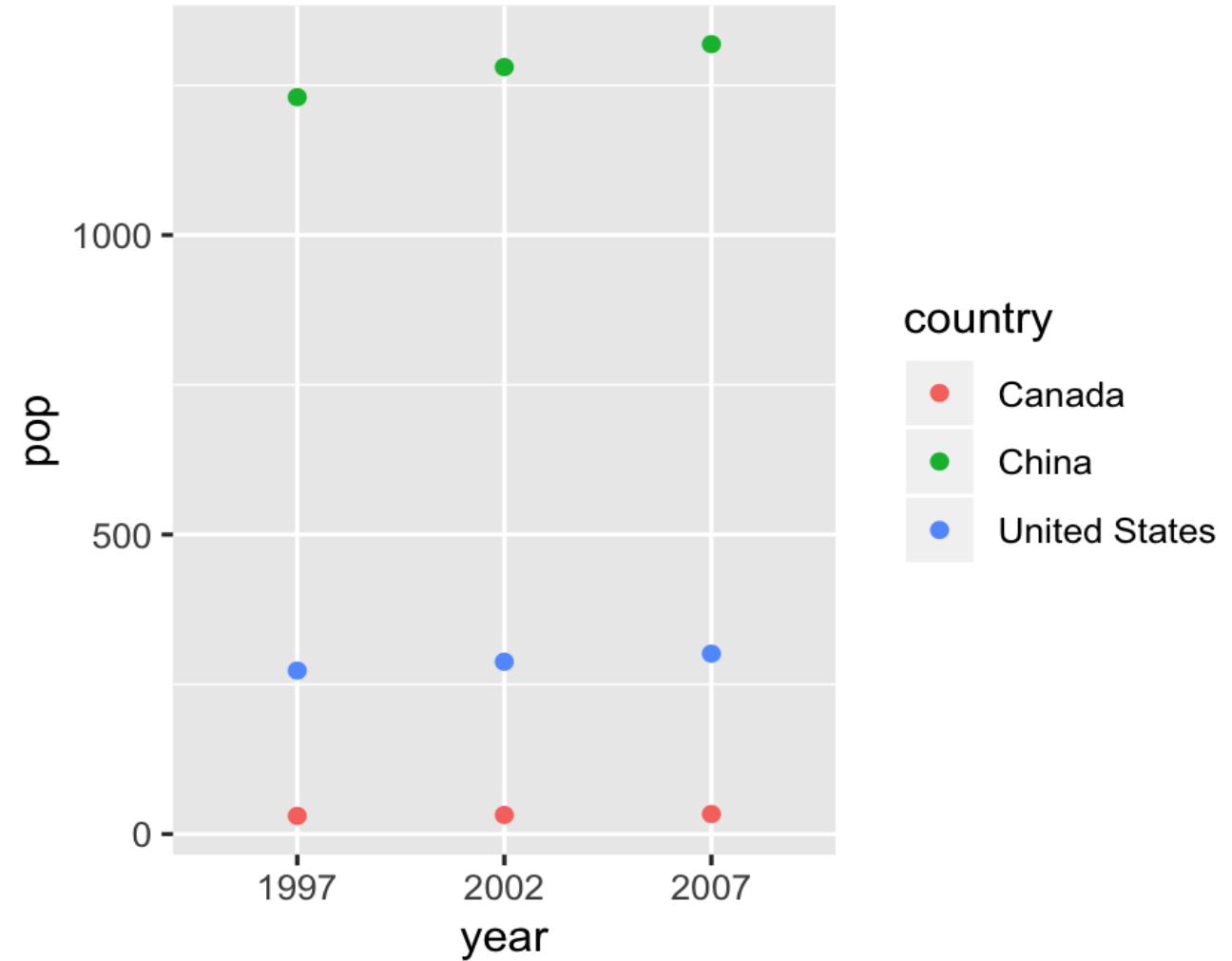
Our first plot!

```
ggplot(tidy_pop) +  
  aes(x = year,  
      y = pop) +  
  geom_point()
```



Our first plot!

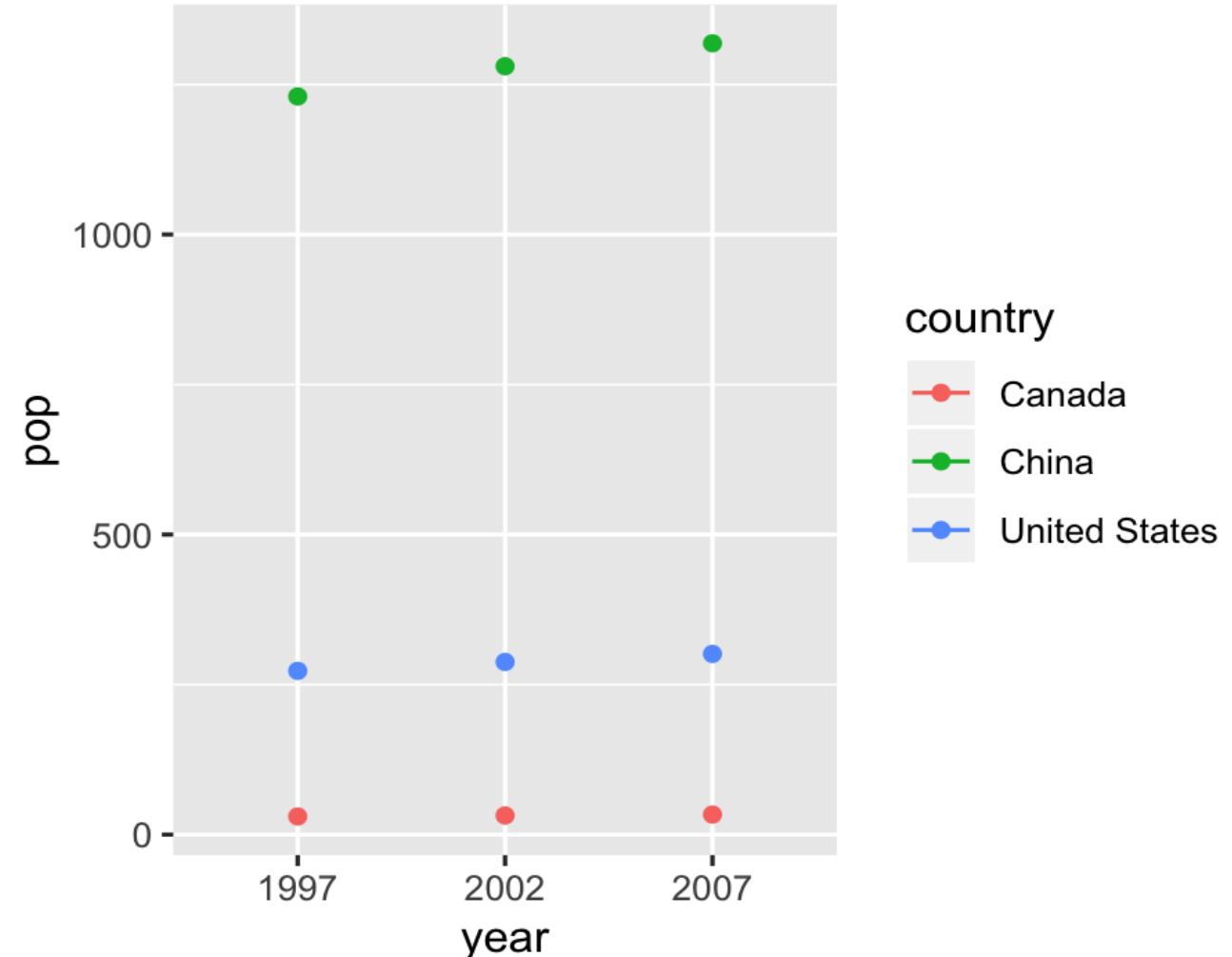
```
ggplot(tidy_pop) +  
  aes(x = year,  
      y = pop,  
      color = country) +  
  geom_point()
```



Our first plot!

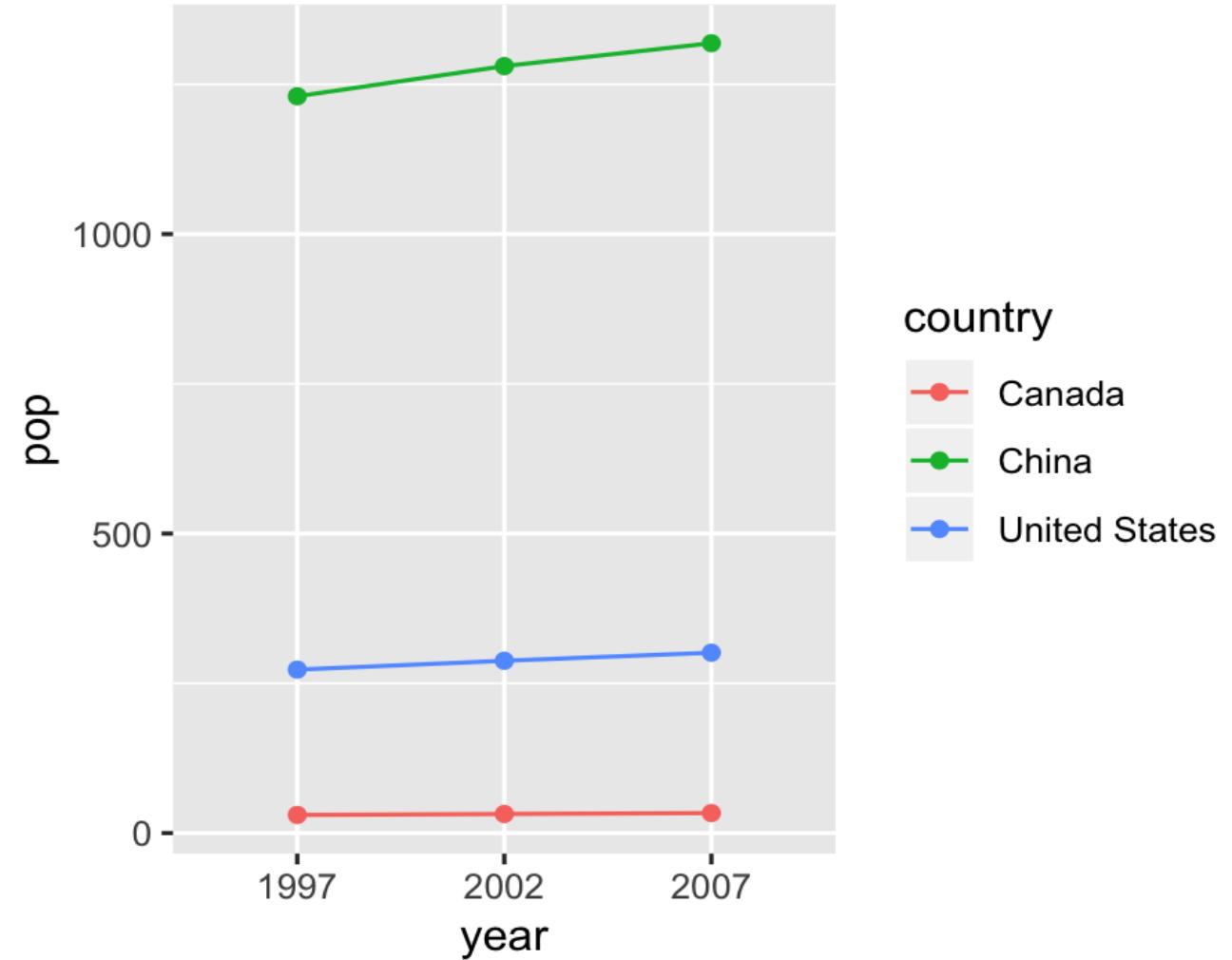
```
ggplot(tidy_pop) +  
  aes(x = year,  
      y = pop,  
      color = country) +  
  geom_point() +  
  geom_line()
```

geom_path: Each group consists
of only one observation.
Do you need to adjust the
group aesthetic?



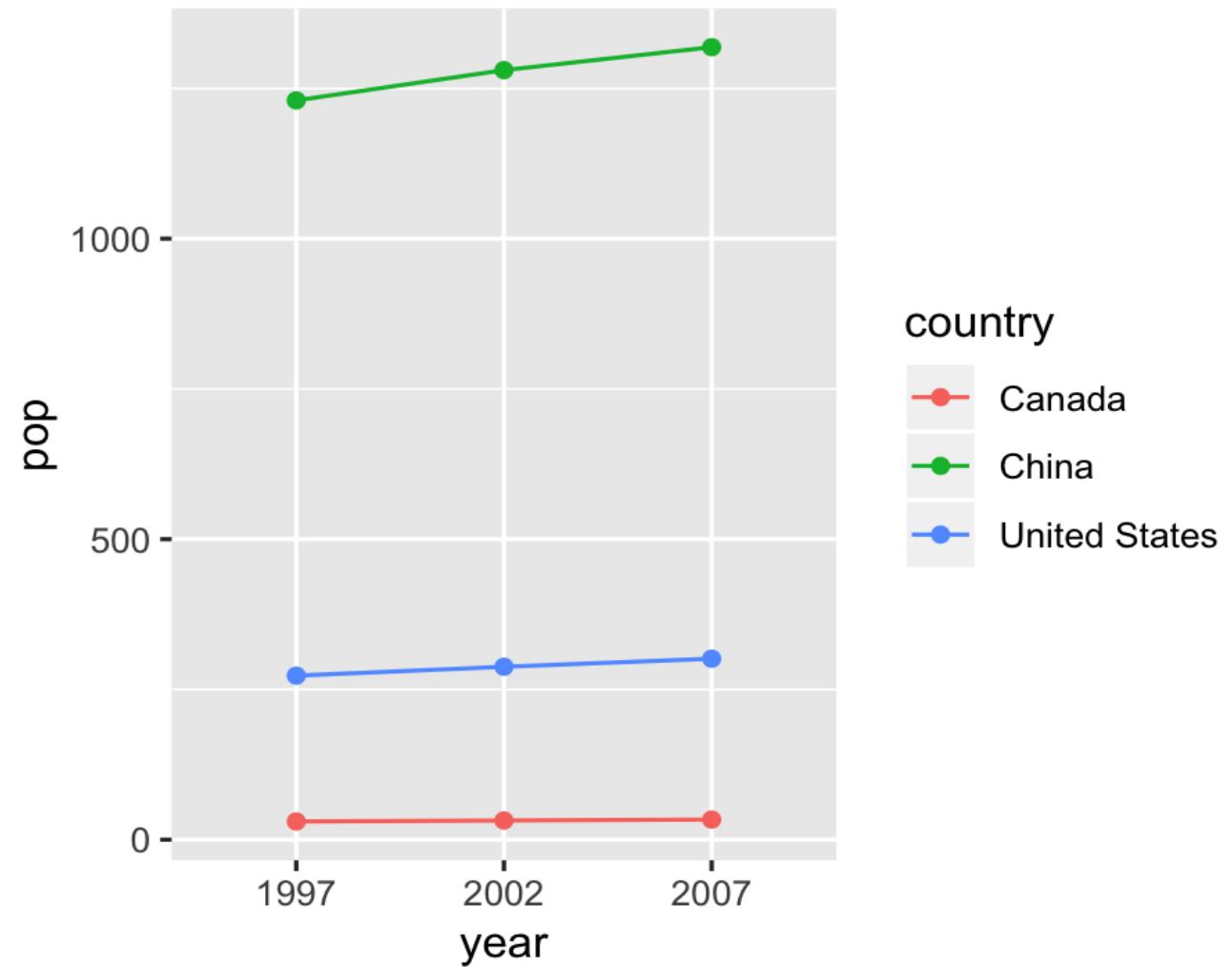
Our first plot!

```
ggplot(tidy_pop) +  
  aes(x = year,  
      y = pop,  
      color = country) +  
  geom_point() +  
  geom_line(  
    aes(group = country))
```



Our first plot!

```
g <- ggplot(tidy_pop) +  
  aes(x = year,  
      y = pop,  
      color = country) +  
  geom_point() +  
  geom_line(  
    aes(group = country))  
  
g
```



gg is for Grammar of Graphics

Data

```
geom_*(mapping, data, stat, position)
```

Aesthetics

- `data` Geoms can have their own data

Geoms

```
+ geom_()
```

- `map` Geoms can have their own aesthetics
 - Inherits global aesthetics
 - Have geom-specific aesthetics
 - `geom_point` needs `x` and `y`, optional `shape`, `color`, `size`, etc.
 - `geom_ribbon` requires `x`, `ymin` and `ymax`, optional `fill`
 - `?geom_ribbon`

gg is for Grammar of Graphics

Data

```
geom_*(mapping, data, stat, position)
```

Aesthetics

- `stat` Some geoms apply further transformations to the data

Geoms

```
+ geom_()
```

- `stat` Some respect `stat = 'identity'`
 - Ex: `geom_histogram` uses `stat_bin()` to group observations
- `position` Some adjust location of objects
 - `'dodge'`, `'stack'`, `'jitter'`

gg is for Grammar of Graphics

Data

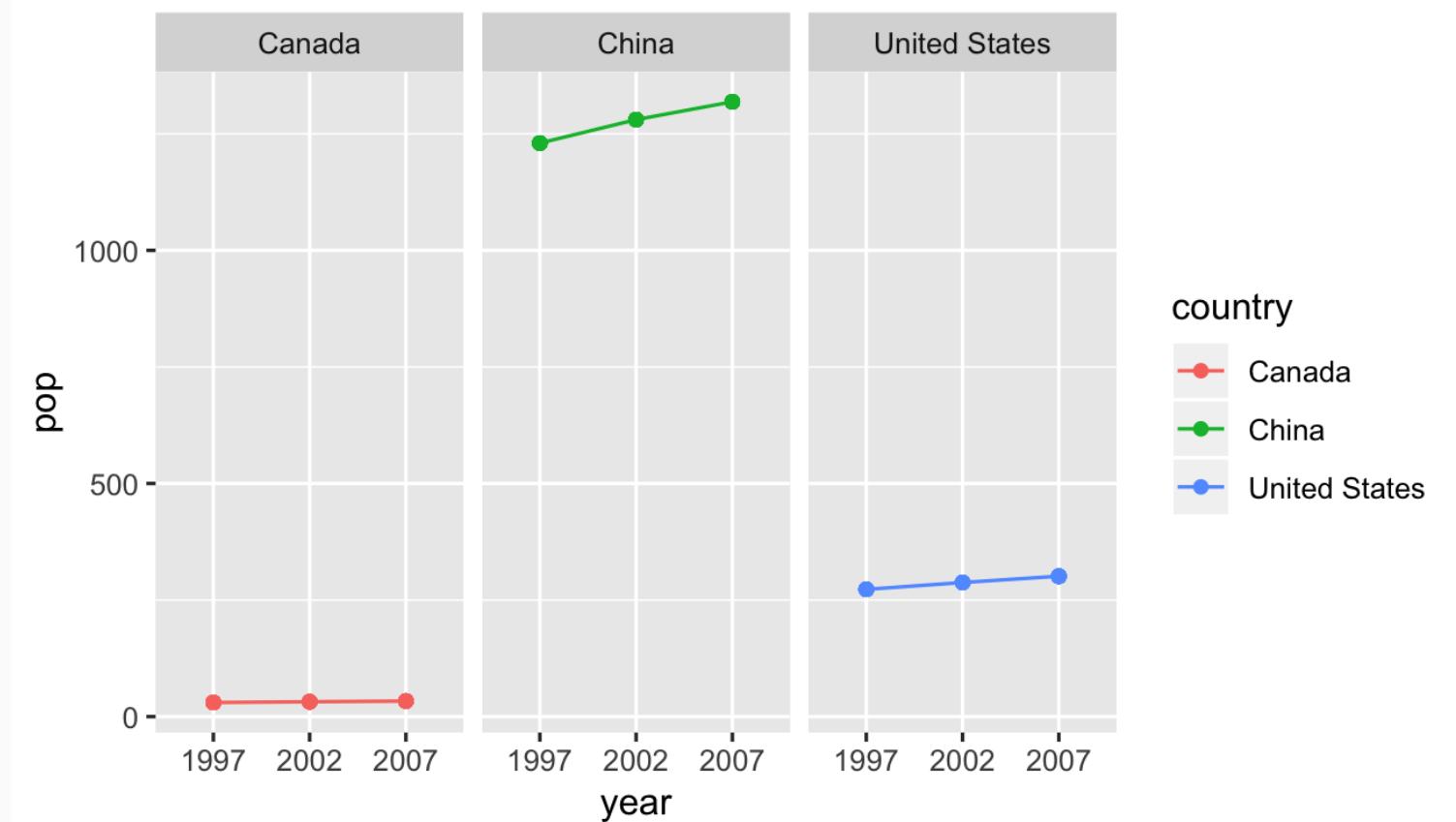
```
g + facet_wrap(~ country)
```

Aesthetics

Geoms

Facet

```
+facet_wrap()  
+facet_grid()
```



gg is for Grammar of Graphics

Data

```
g + facet_grid(continent ~ country)
```

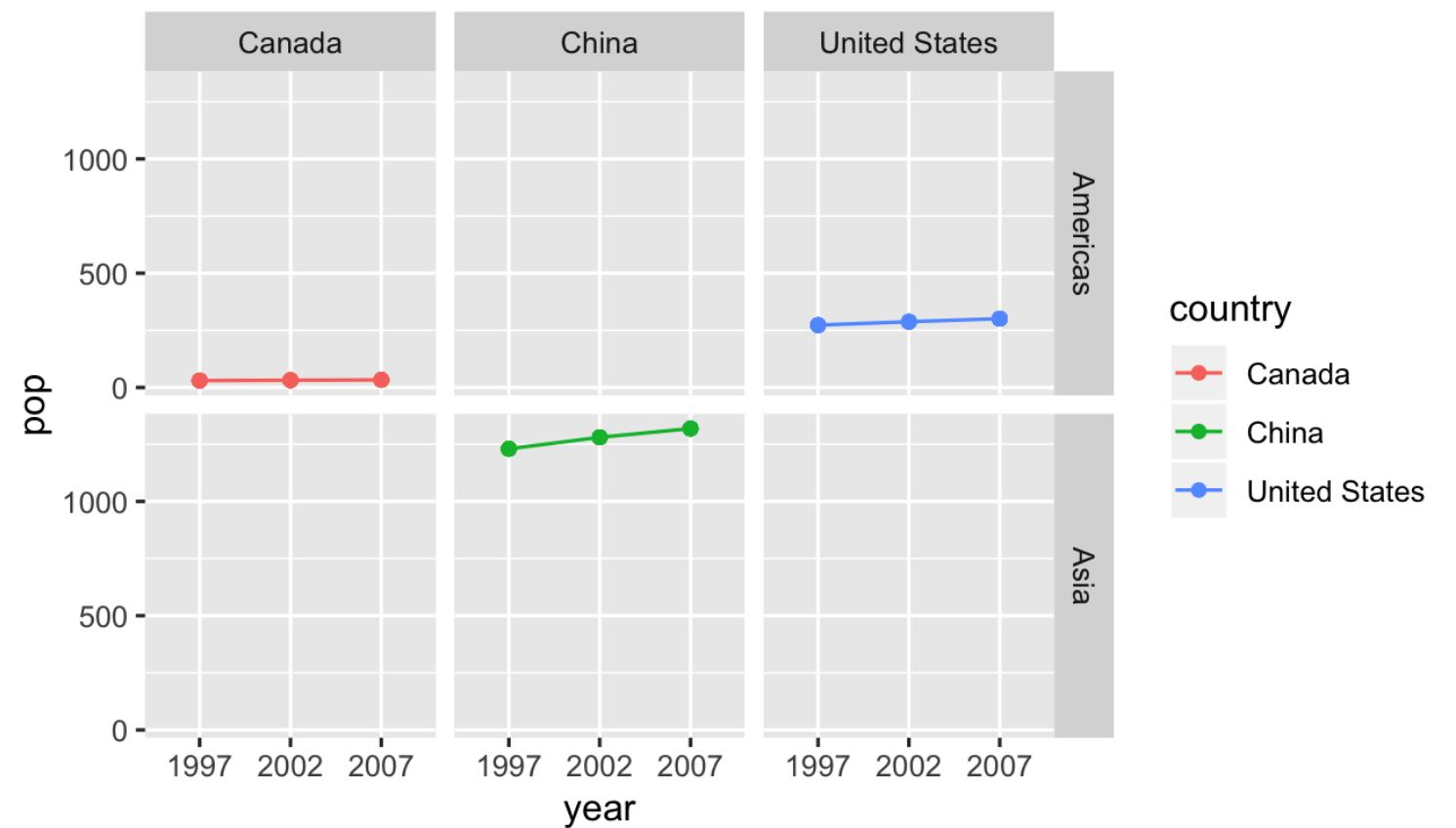
Aesthetics

Geoms

Facet

```
+facet_wrap()
```

```
+facet_grid()
```



gg is for Grammar of Graphics

Data

```
gg + labs(x = "Year", y = "Population")
```

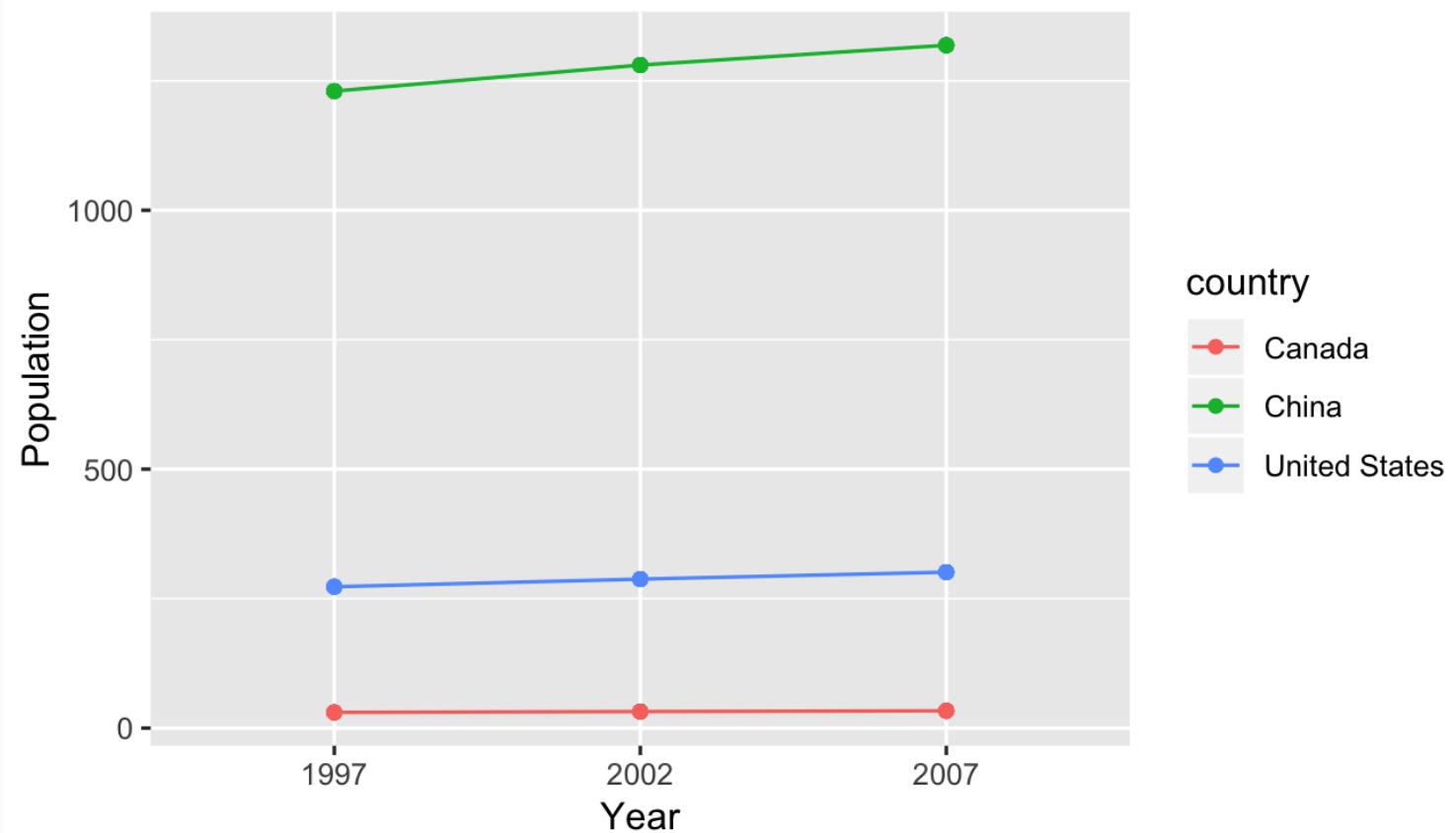
Aesthetics

Geoms

Facet

Labels

```
+ labs()
```



gg is for Grammar of Graphics

Data

```
g + coord_flip()
```

Aesthetics

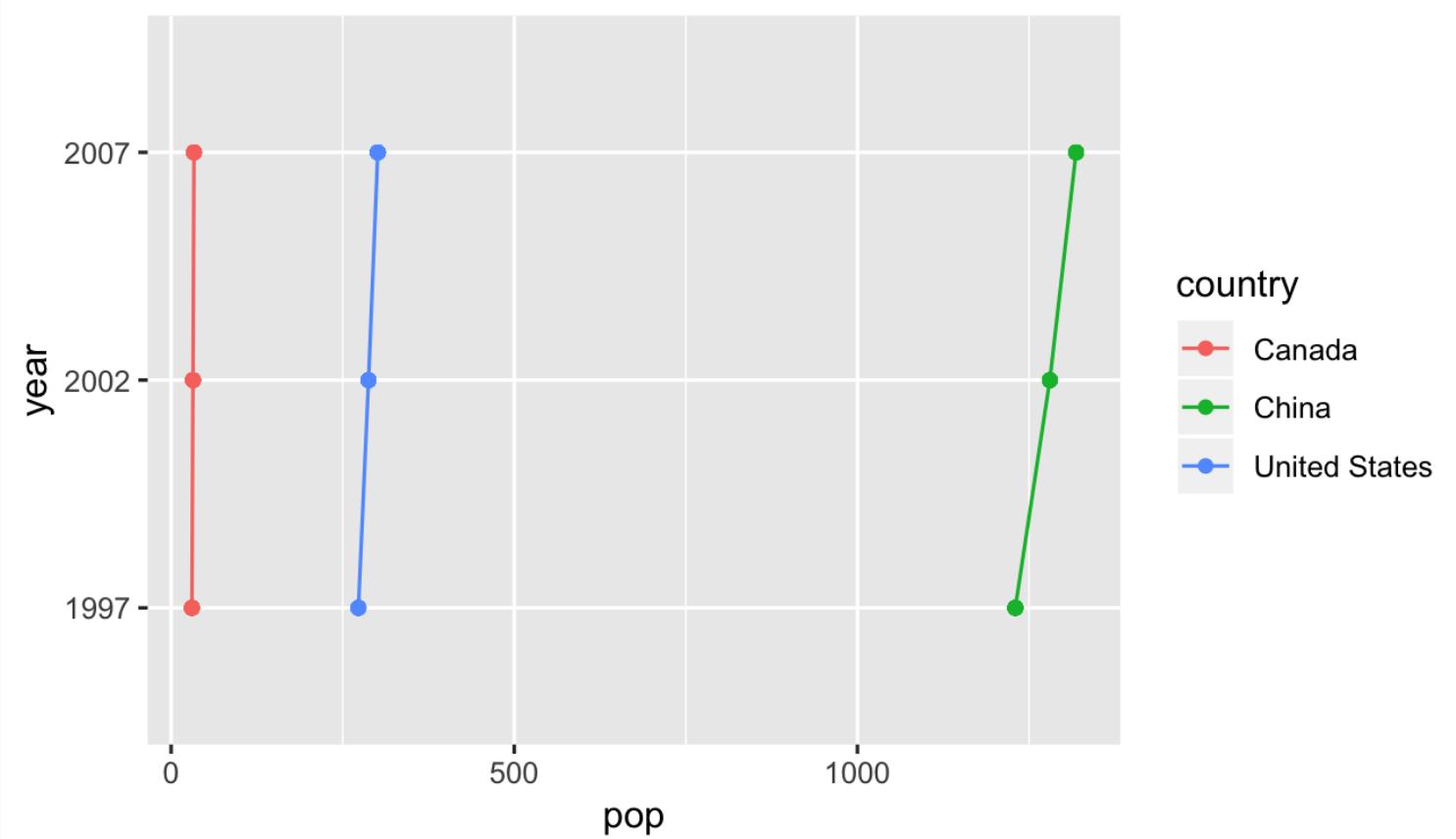
Geoms

Facet

Labels

Coords

```
+ coord_*( )
```



gg is for Grammar of Graphics

Data

```
g + coord_polar()
```

Aesthetics

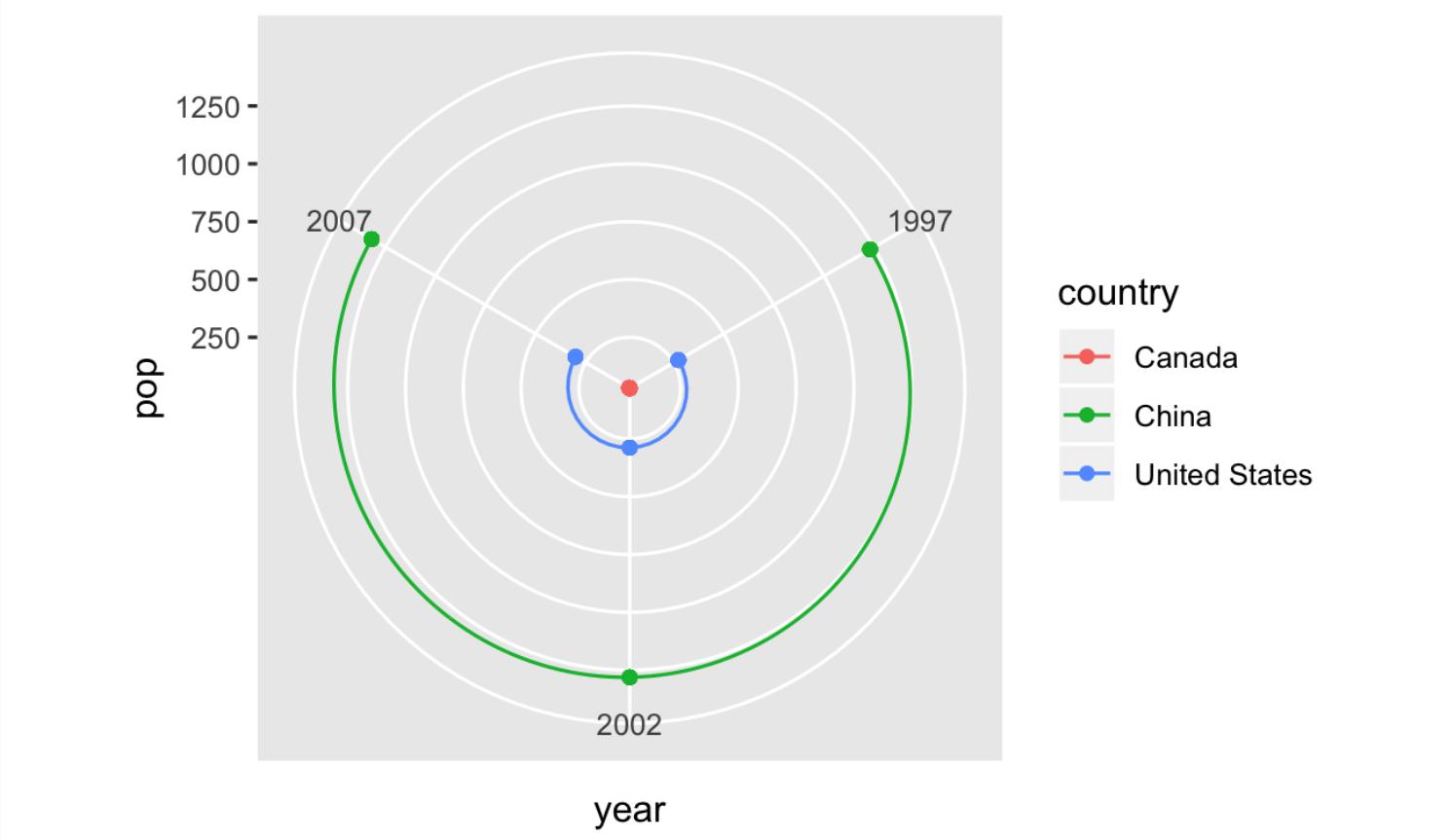
Geoms

Facet

Labels

Coords

```
+ coord_*( )
```



gg is for Grammar of Graphics

Data

```
scale + _ + <aes> + _ + <type> + ()
```

Aesthetics

What parameter do you want to adjust? → <aes>

What type is the parameter? → <type>

Geoms

- I want to change my discrete x-axis

```
scale_x_discrete()
```

- I want to change range of point sizes from continuous variable

```
scale_size_continuous()
```

- I want to rescale y-axis as log

```
scale_y_log10()
```

- I want to use a different color palette

```
scale_fill_discrete()
```

```
scale_color_manual()
```

Facet

Labels

Coords

Scales

```
+ scale_*_*()
```

gg is for Grammar of Graphics

Data

```
g + scale_color_manual(values = c("peru", "pink", "plum"))
```

Aesthetics

Geoms

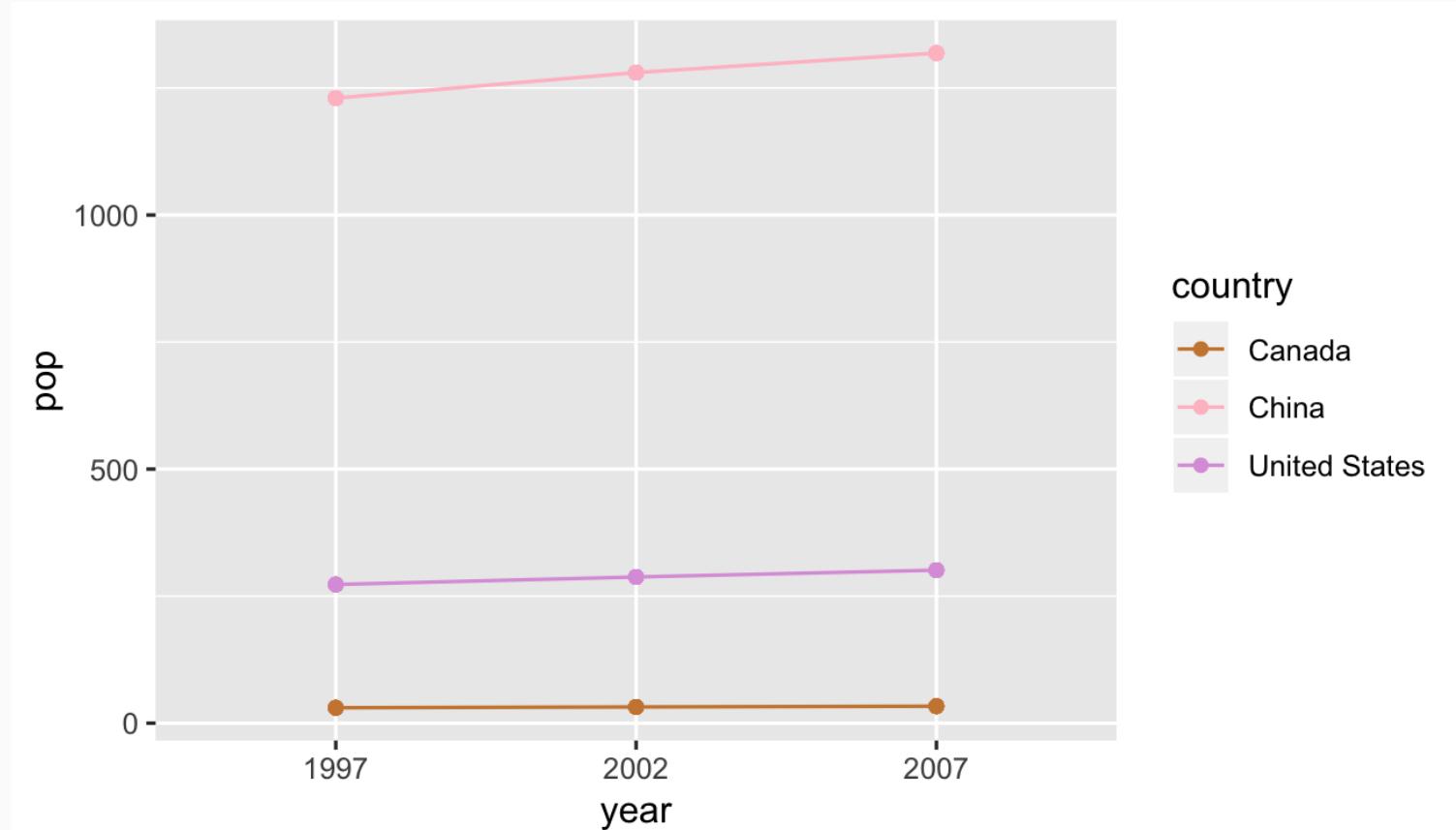
Facet

Labels

Coords

Scales

```
+ scale_*_*()
```



gg is for Grammar of Graphics

Data

```
g + scale_y_log10()
```

Aesthetics

Geoms

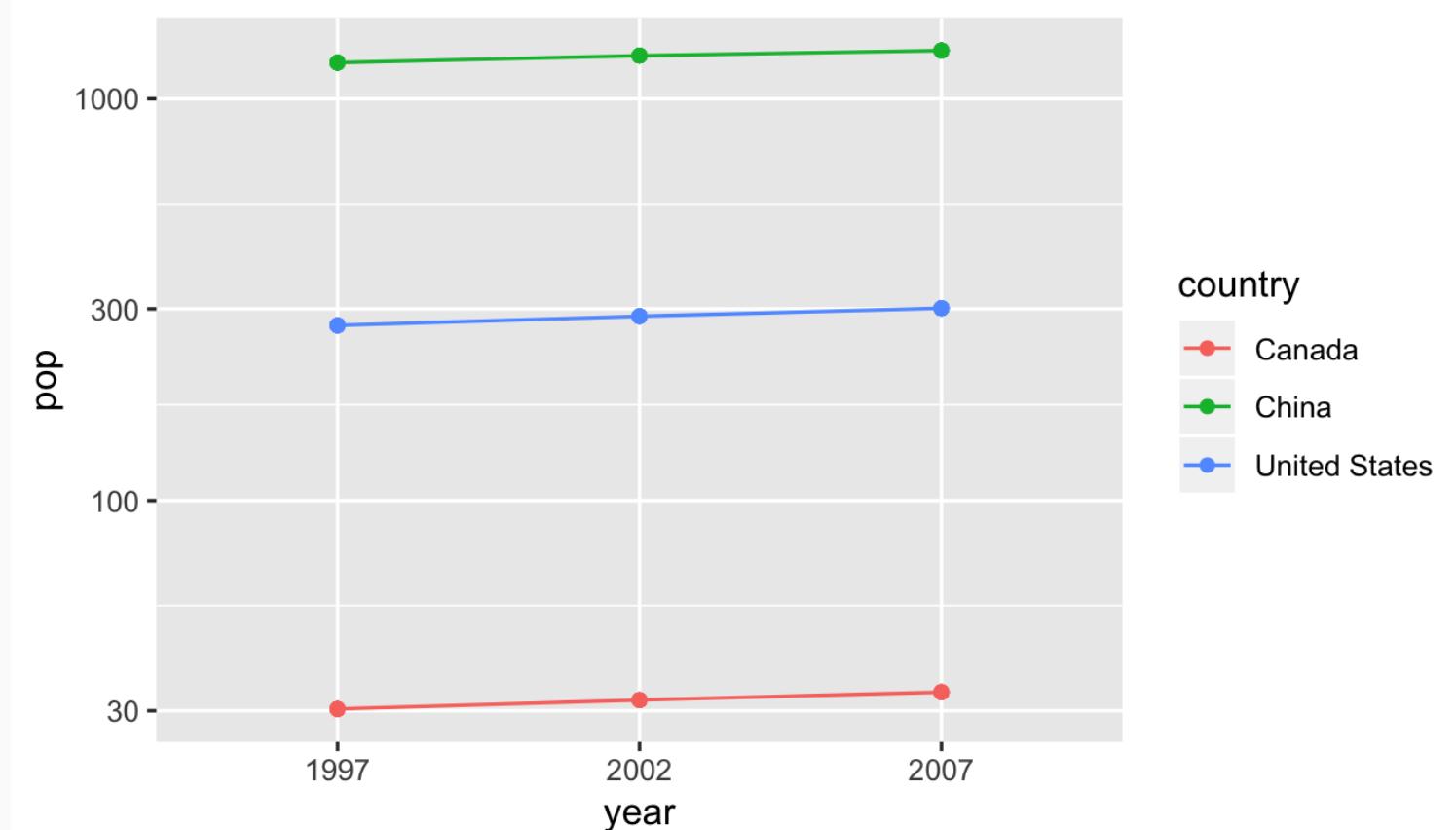
Facet

Labels

Coords

Scales

```
+ scale_*_*()
```



gg is for Grammar of Graphics

Data

```
g + scale_x_discrete(labels = c("MCMXCVII", "MMII", "MMVII"))
```

Aesthetics

Geoms

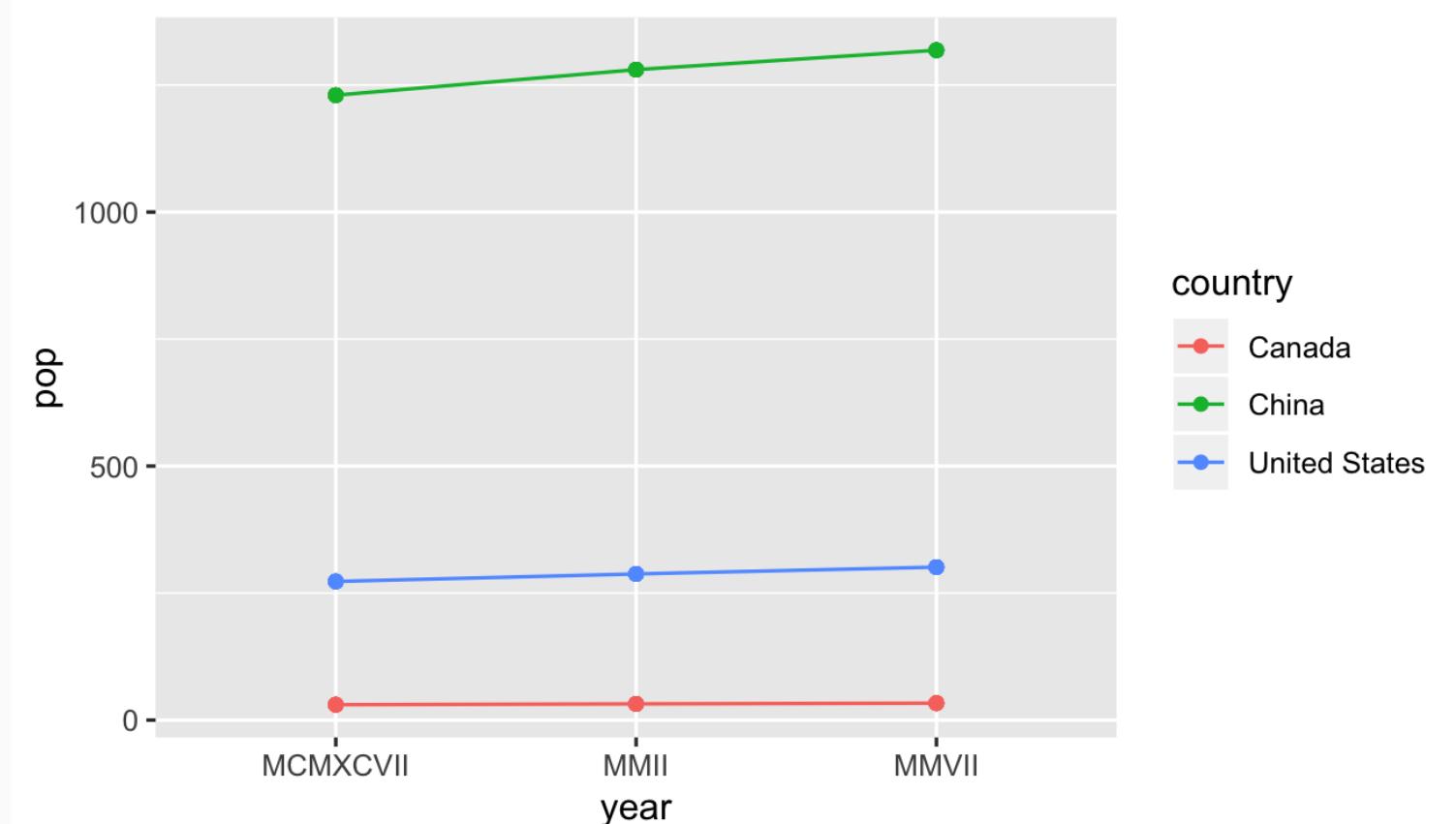
Facet

Labels

Coords

Scales

```
+ scale_*_()
```



gg is for Grammar of Graphics

Data

Change the appearance of plot decorations
i.e. things that aren't mapped to data

Aesthetics

A few "starter" themes ship with the package

Geoms

- `g + theme_bw()`
- `g + theme_dark()`
- `g + theme_gray()`
- `g + theme_light()`
- `g + theme_minimal()`

Facet

Labels

Coords

Scales

Theme

`+ theme()`

gg is for Grammar of Graphics

Data

Huge number of parameters, grouped by plot area:

Aesthetics

- Global options: `line`, `rect`, `text`, `title`
- `axis`: x-, y- or other axis title, ticks, lines

Geoms

- `legend`: Plot legends

Facet

- `panel`: Actual plot area
- `plot`: Whole image
- `strip`: Facet labels

Labels

Coords

Scales

Theme

+ `theme()`

gg is for Grammar of Graphics

Data

Theme options are supported by helper functions:

Aesthetics

- `element_blank()` removes the element
- `element_line()`
- `element_rect()`
- `element_text()`

Geoms

Facet

Labels

Coords

Scales

Theme

+ `theme()`

gg is for Grammar of Graphics

Data

```
g + theme_bw()
```

Aesthetics

Geoms

Facet

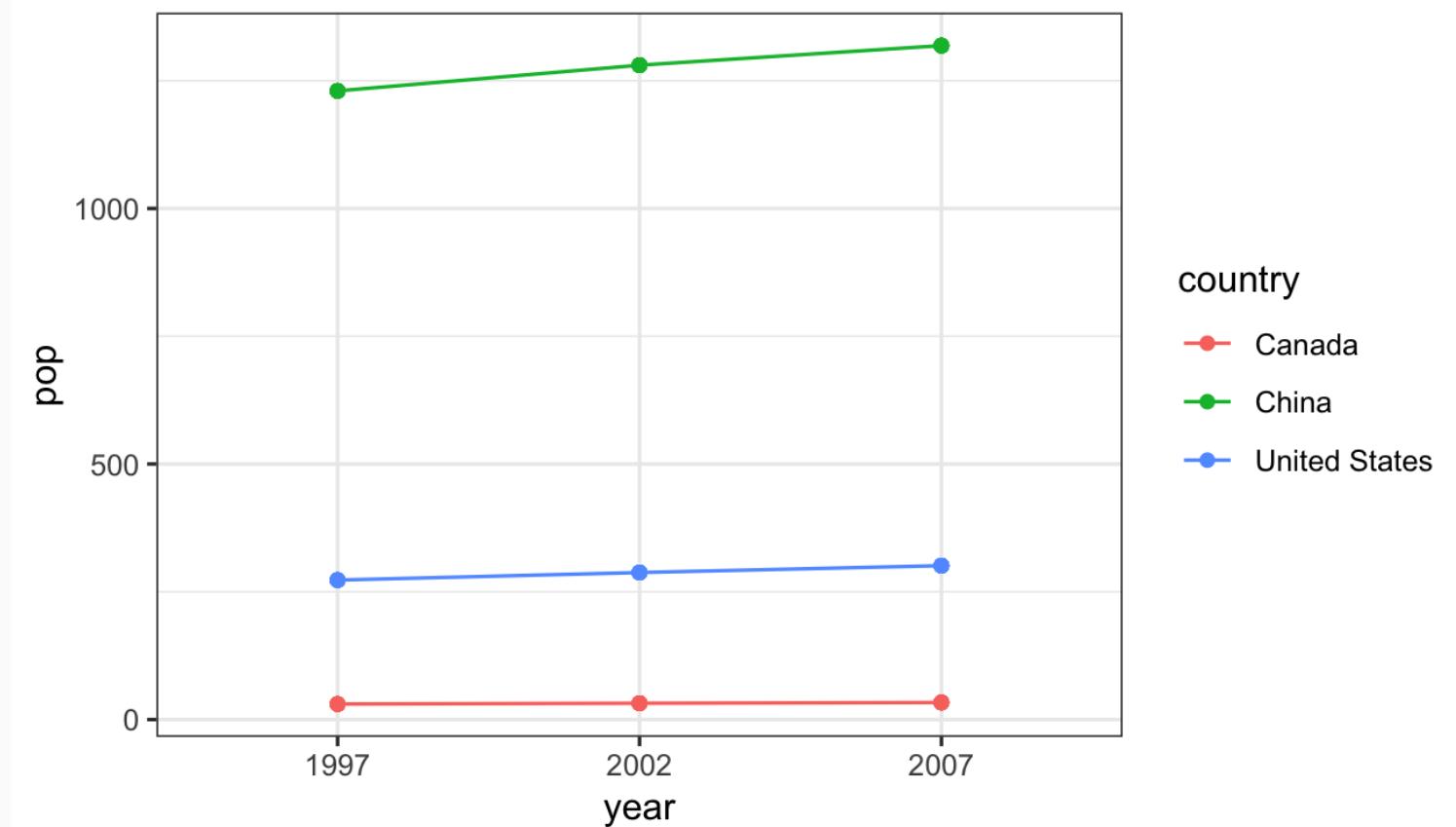
Labels

Coords

Scales

Theme

```
+ theme()
```



gg is for Grammar of Graphics

Data

```
g + theme_minimal() + theme(text = element_text(family = "Palatino"))
```

Aesthetics

Geoms

Facet

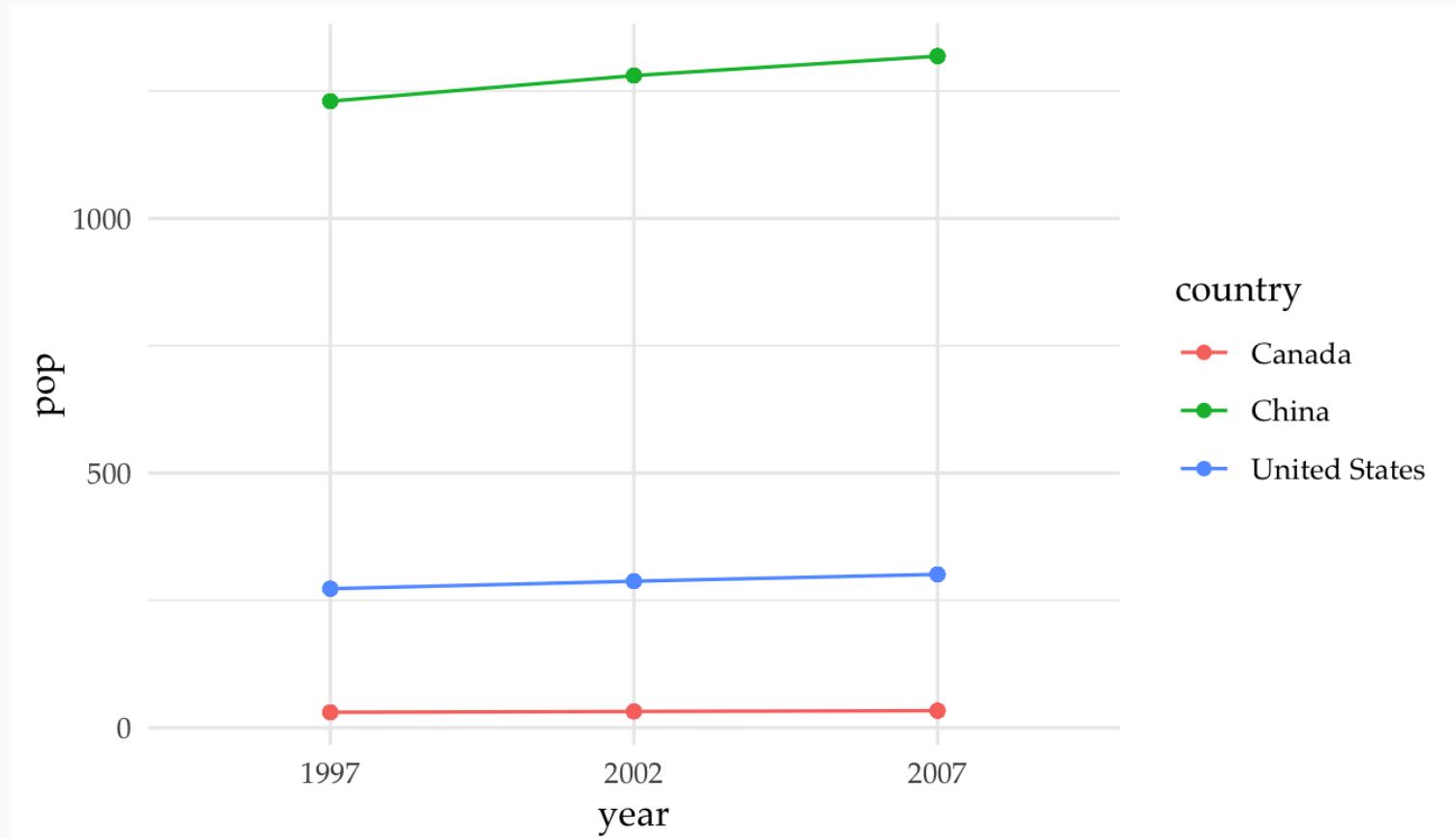
Labels

Coords

Scales

Theme

```
+ theme()
```



gg is for Grammar of Graphics

Data

You can also set the theme globally with `theme_set()`

Aesthetics

```
my_theme ← theme_bw() +  
  theme(  
    text = element_text(family = "Palatino", size = 12),  
    panel.border = element_rect(colour = 'grey80'),  
    panel.grid.minor = element_blank()  
)  
  
theme_set(my_theme)
```

Labels

Coords

Scales

All plots will now use this theme!

Theme

```
+ theme()
```

gg is for Grammar of Graphics

Data

Aesthetics

Geoms

Facet

Labels

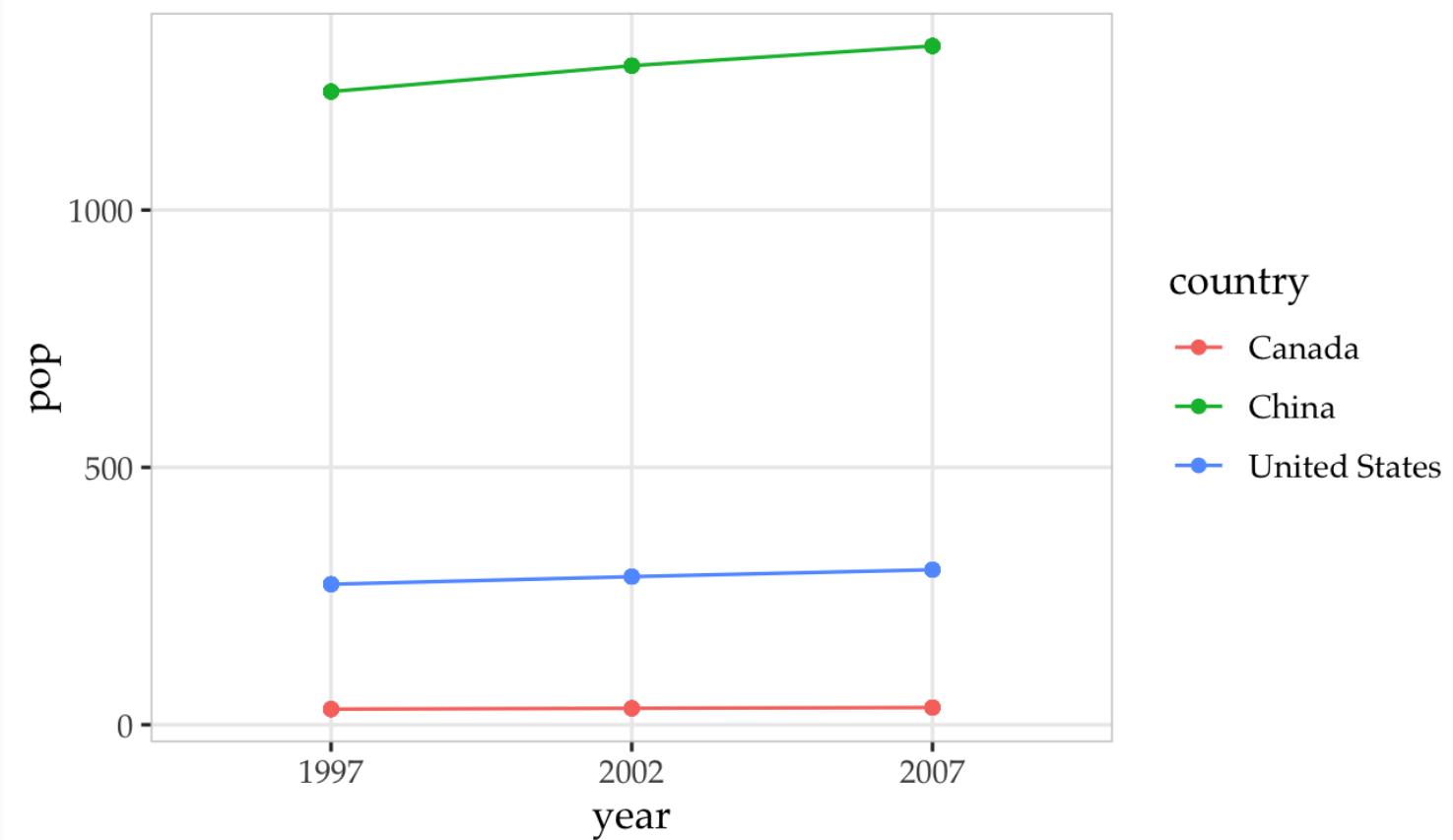
Coords

Scales

Theme

+ theme()

g



gg is for Grammar of Graphics

Data

```
g + theme(legend.position = 'bottom')
```

Aesthetics

Geoms

Facet

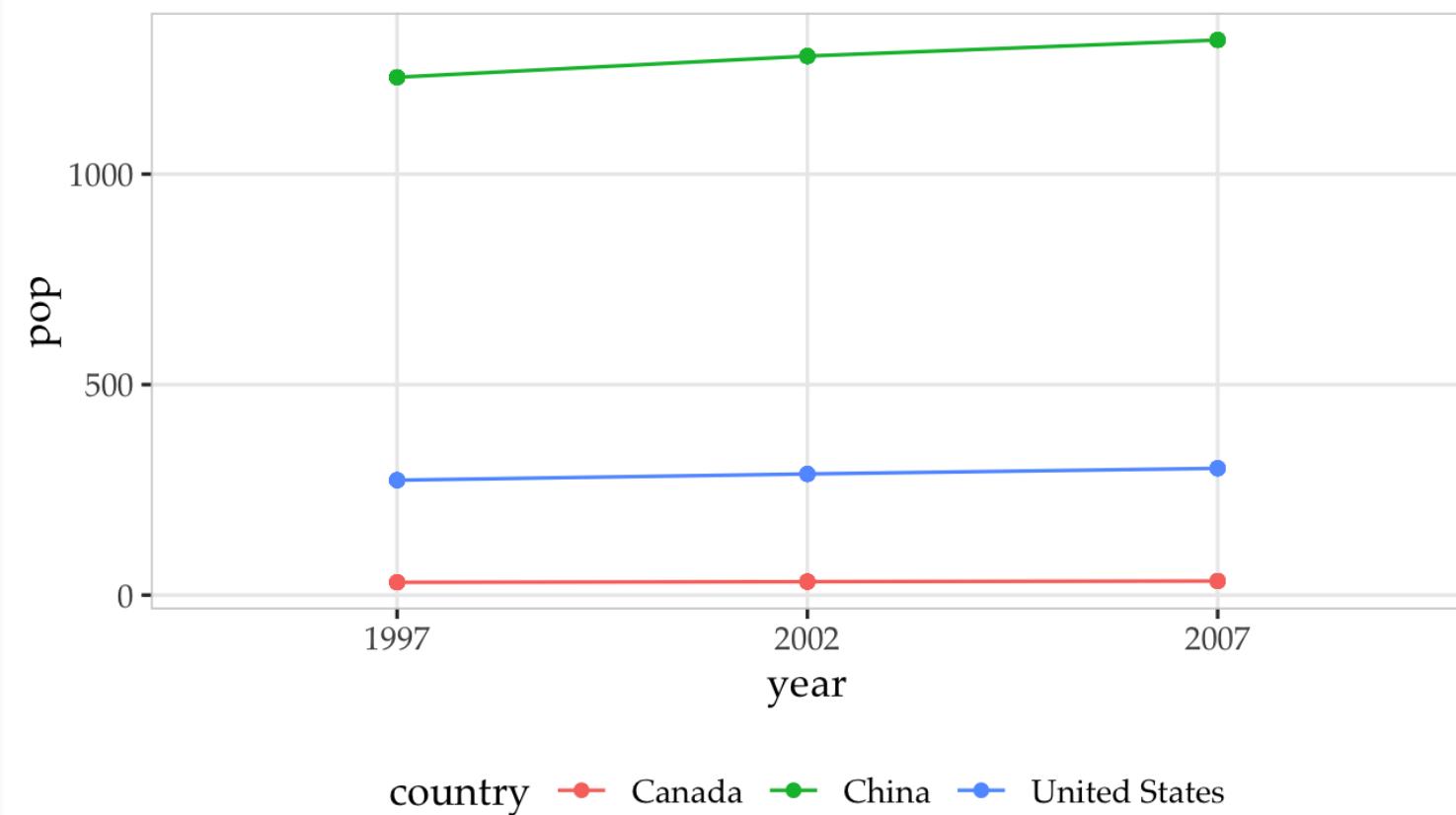
Labels

Coords

Scales

Theme

```
+ theme()
```



Save Your Work

To save your plot, use **ggsave**

```
ggsave(  
  filename = "my_plot.png",  
  plot = my_plot,  
  width = 10,  
  height = 8,  
  dpi = 100,  
  device = "png"  
)
```

You have the power!



"Live" Coding

```
library(gapminder)
```

```
head(gapminder)
```

country	continent	year	lifeExp	pop	gdpPercap
Afghanistan	Asia	1952	28.801	8425333	779.4453
Afghanistan	Asia	1957	30.332	9240934	820.8530
Afghanistan	Asia	1962	31.997	10267083	853.1007
Afghanistan	Asia	1967	34.020	11537966	836.1971
Afghanistan	Asia	1972	36.088	13079460	739.9811
Afghanistan	Asia	1977	38.438	14880372	786.1134

glimpse(gapminder)

Observations: 1,704

Variables: 6

```
$ country    <fct> Afghanistan, Afghanistan, Afghanistan, Afghanistan, Afghanistan,  
$ continent <fct> Asia,  
$ year       <int> 1952, 1957, 1962, 1967, 1972, 1977, 1982, 1987, 1992, 1997, 2002,  
$ lifeExp    <dbl> 28.801, 30.332, 31.997, 34.020, 36.088, 38.438, 39.854, 40.822, 41.  
$ pop        <int> 8425333, 9240934, 10267083, 11537966, 13079460, 14880372, 12881811  
$ gdpPercap  <dbl> 779.4453, 820.8530, 853.1007, 836.1971, 739.9811, 786.1134, 978.0
```

glimpse(gapminder)

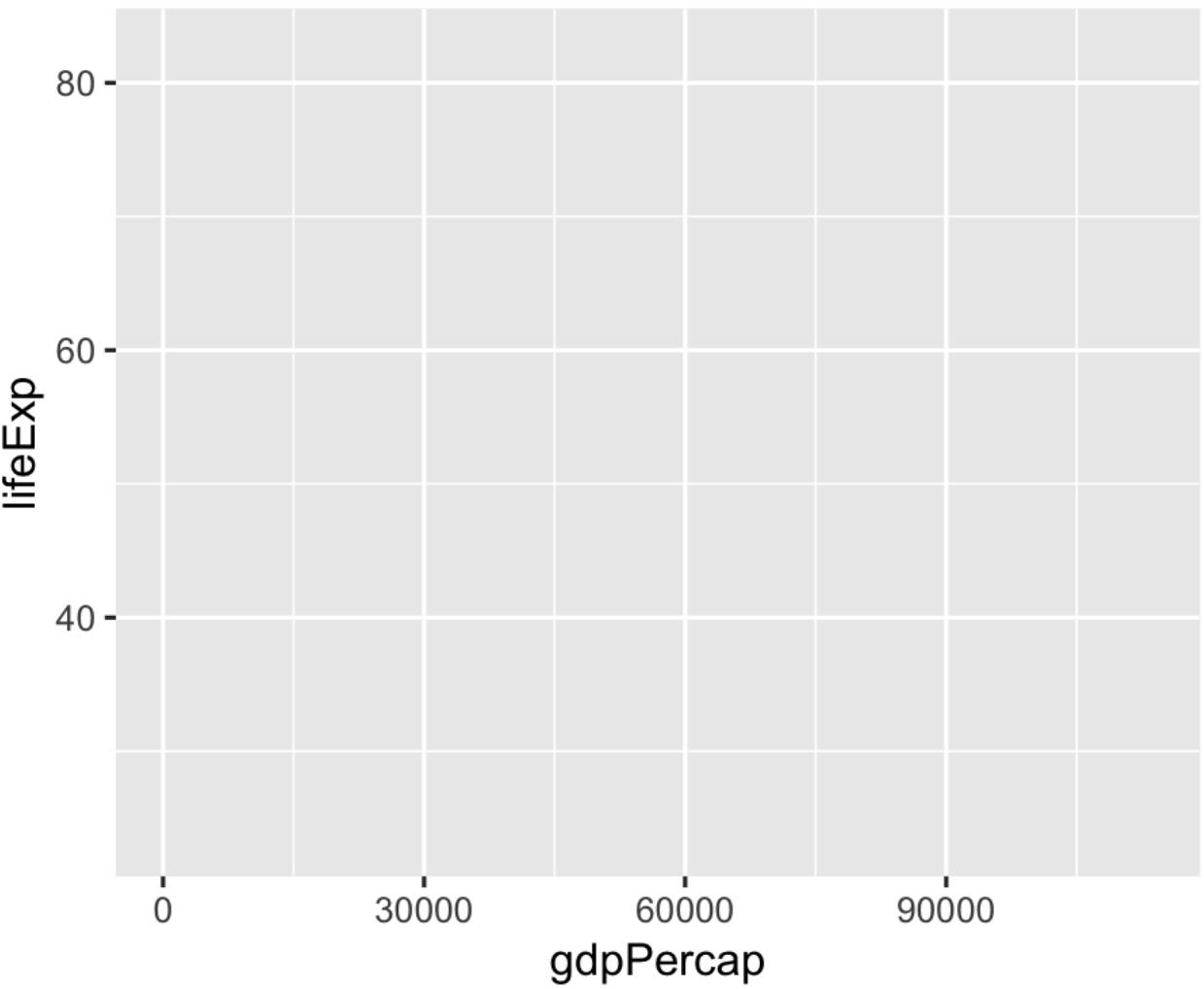
Observations: 1,704

Variables: 6

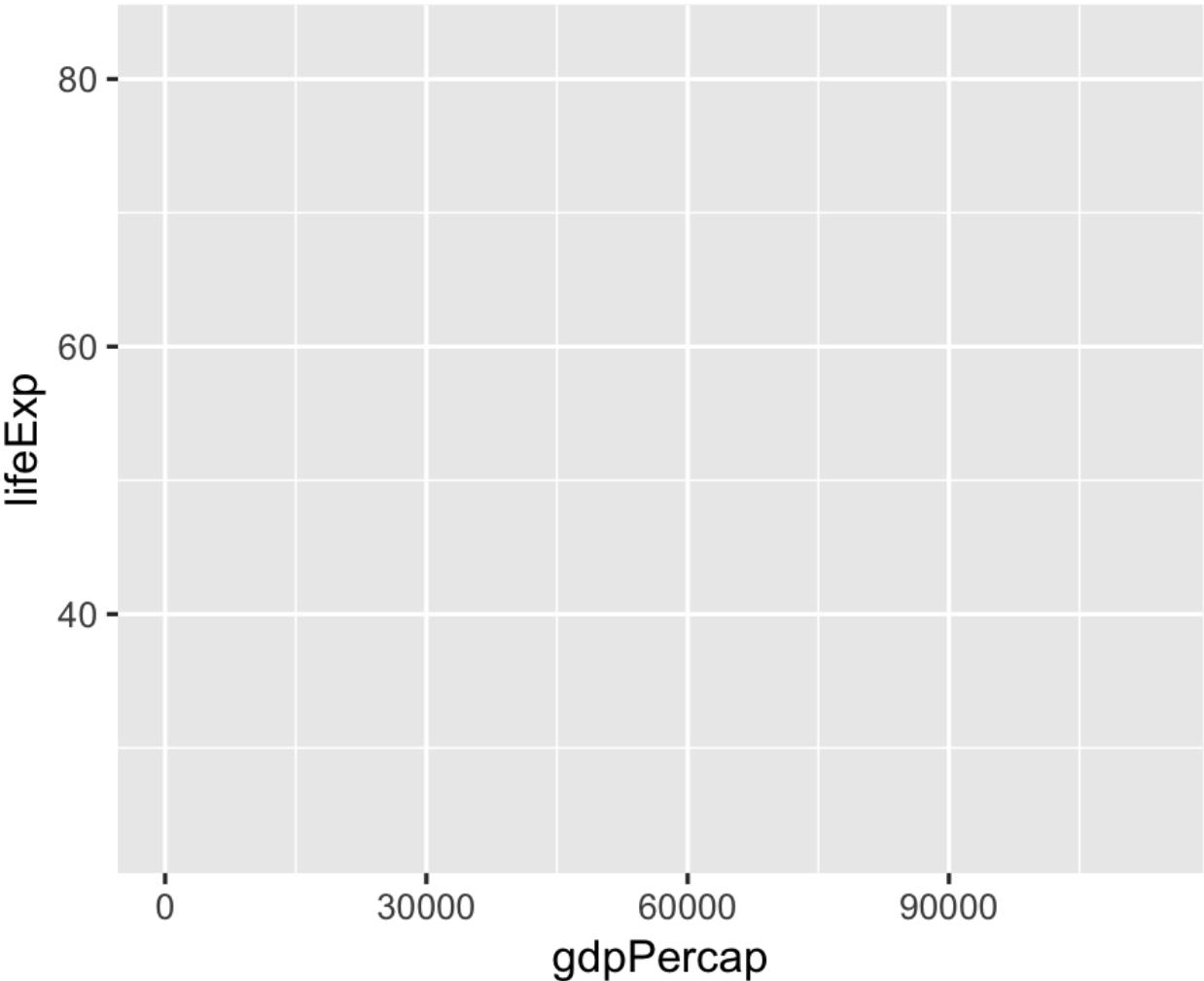
```
$ country    <fct> Afghanistan, Afghanistan, Afghanistan, Afghanistan, Afghanistan,  
$ continent <fct> Asia,  
$ year       <int> 1952, 1957, 1962, 1967, 1972, 1977, 1982, 1987, 1992, 1997, 2002,  
$ lifeExp    <dbl> 28.801, 30.332, 31.997, 34.020, 36.088, 38.438, 39.854, 40.822, 41.  
$ pop        <int> 8425333, 9240934, 10267083, 11537966, 13079460, 14880372, 12881811  
$ gdpPercap  <dbl> 779.4453, 820.8530, 853.1007, 836.1971, 739.9811, 786.1134, 978.0
```

Let's start with `lifeExp` VS `gdpPercap`

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

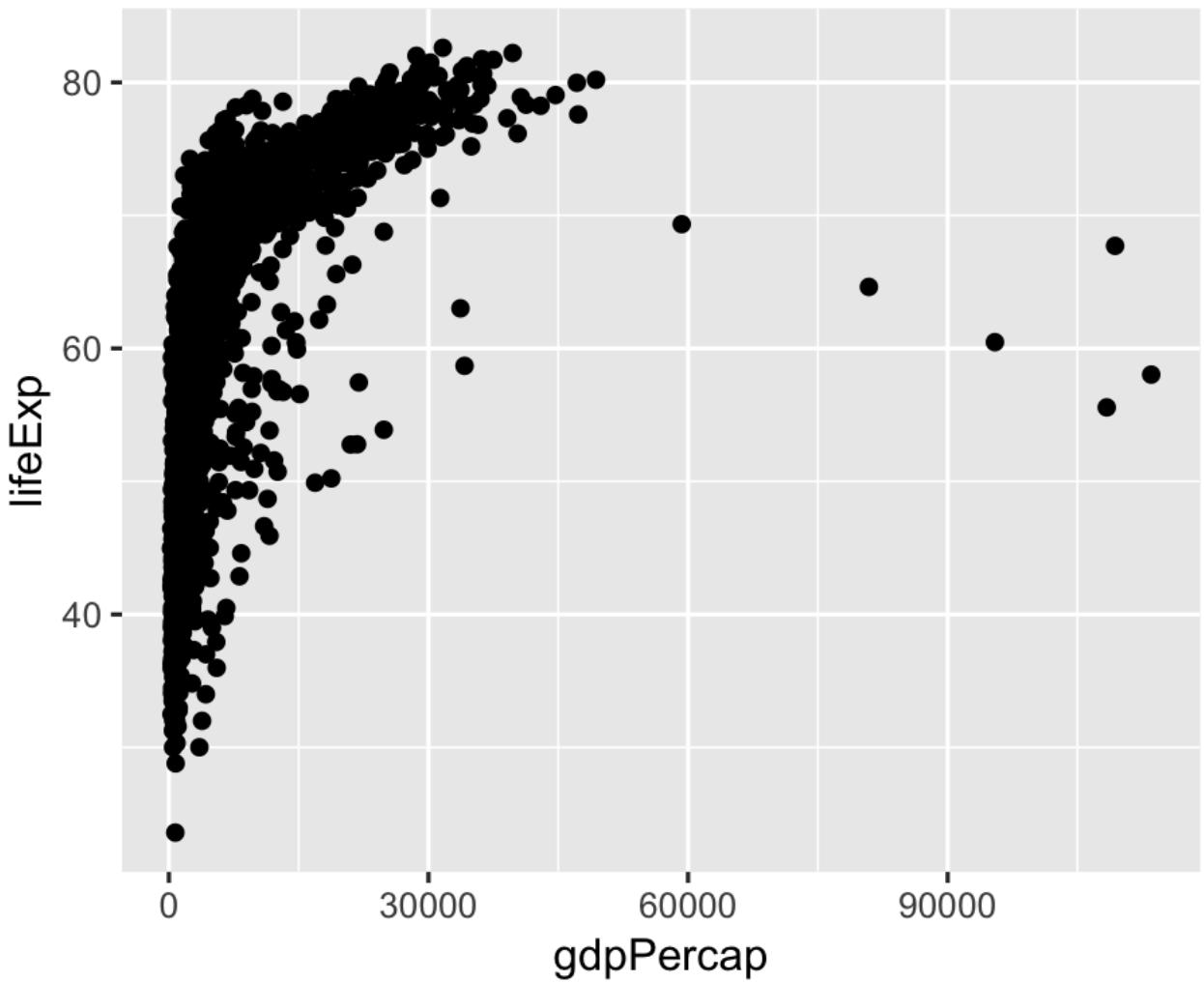


```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp)
```

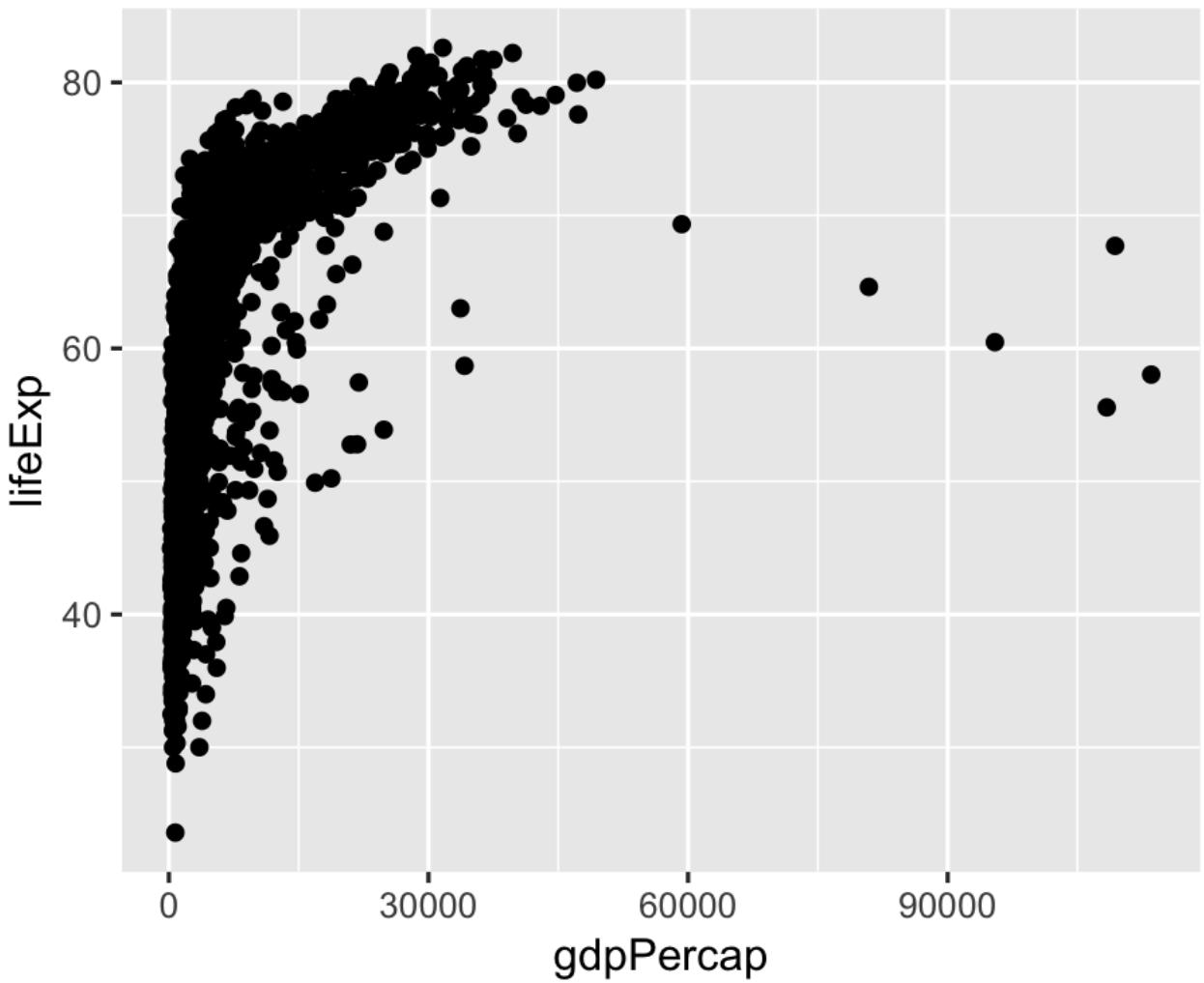


Add points...

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

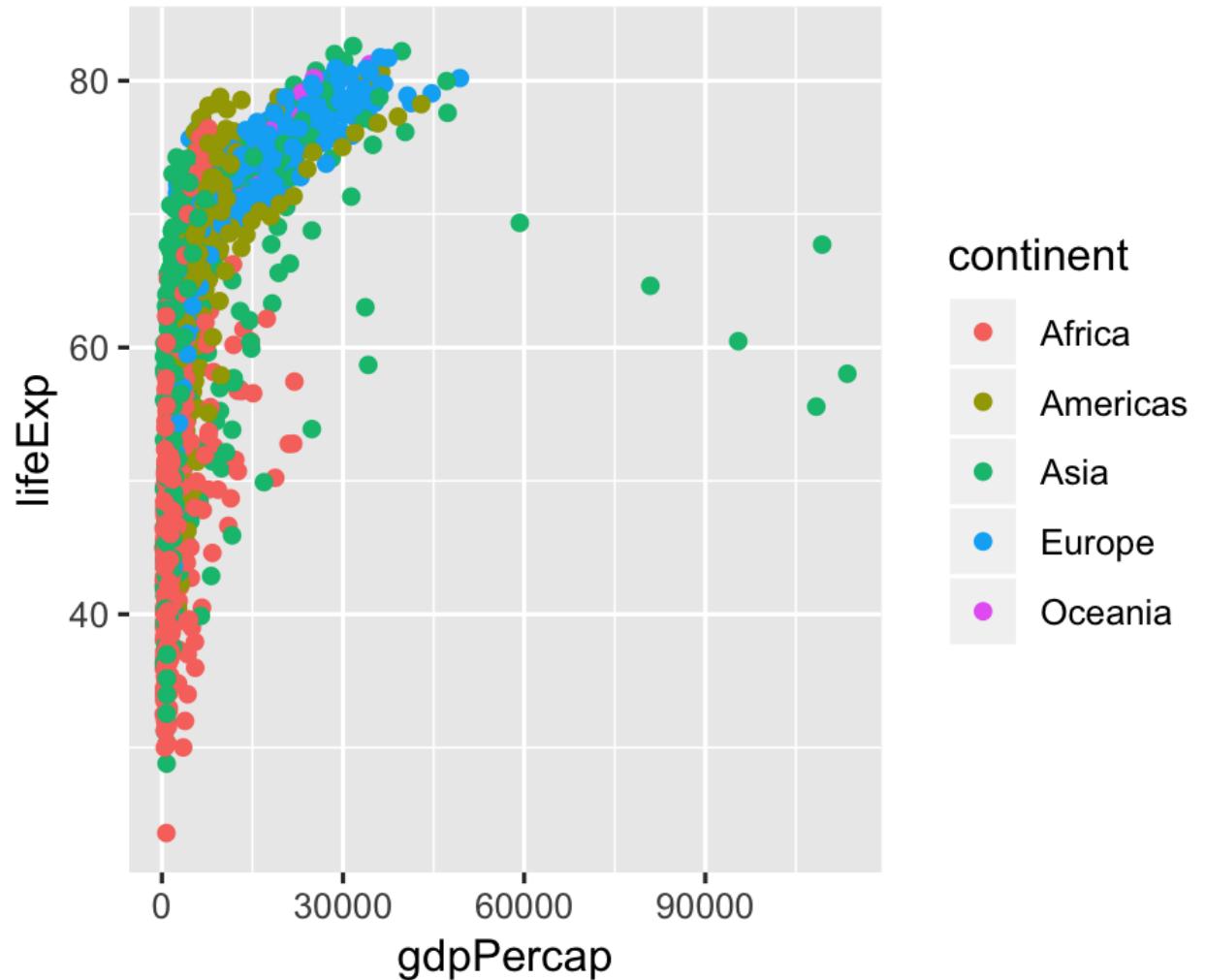


```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp) +  
  geom_point()
```

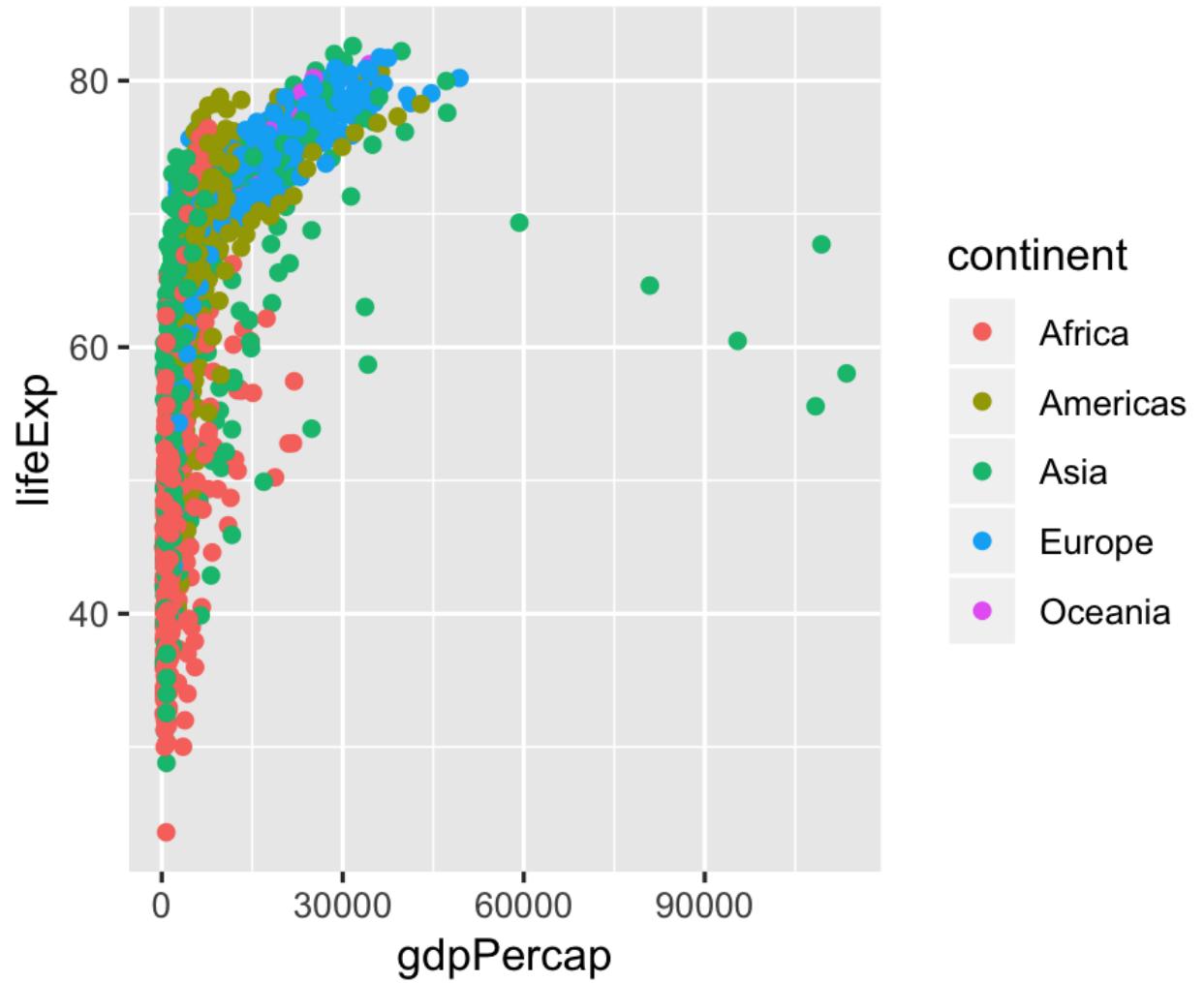


How can I tell countries apart?

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

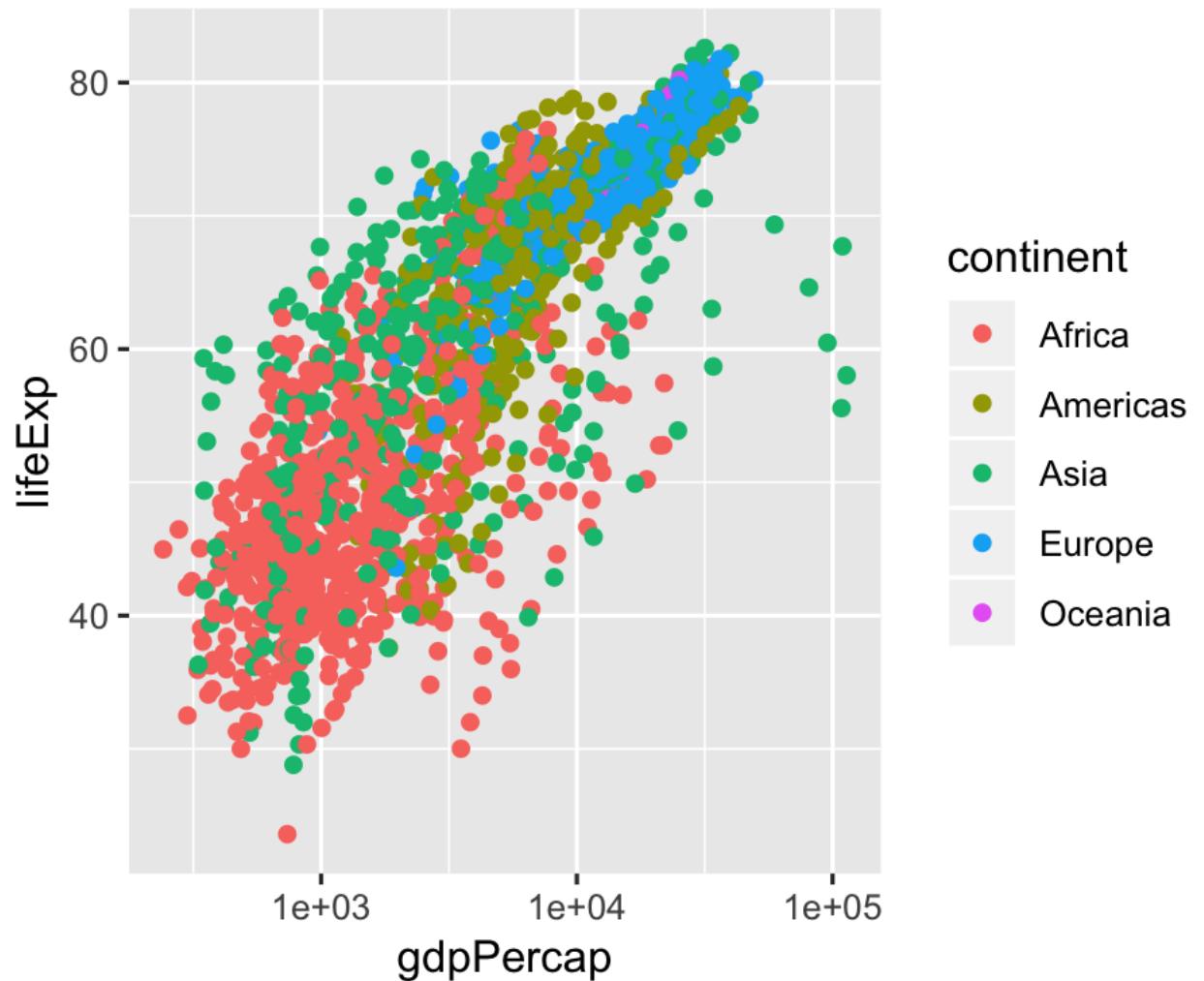


```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_point()
```

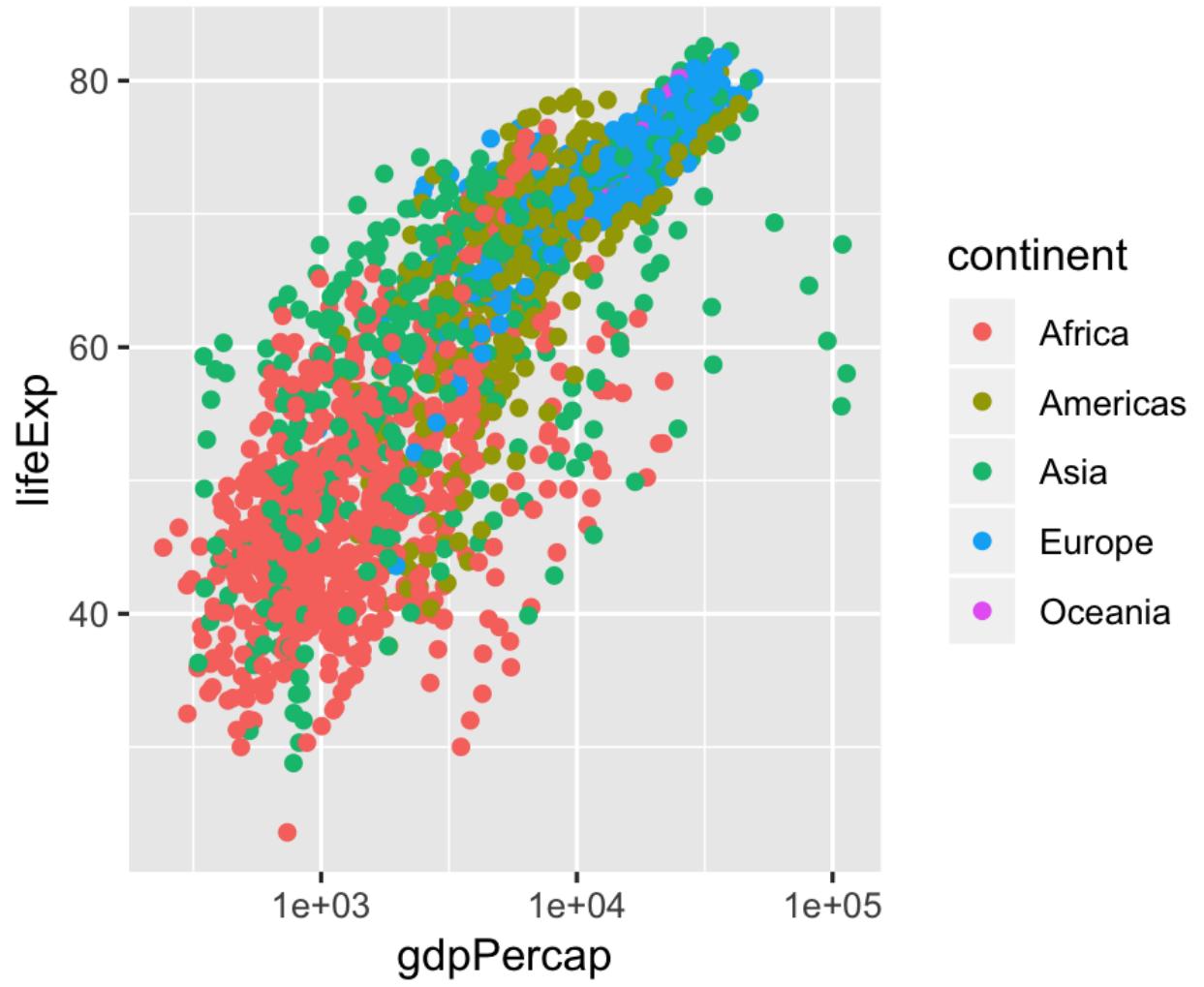


GDP is squished together on the left

```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_point() +  
  scale_x_log10()
```



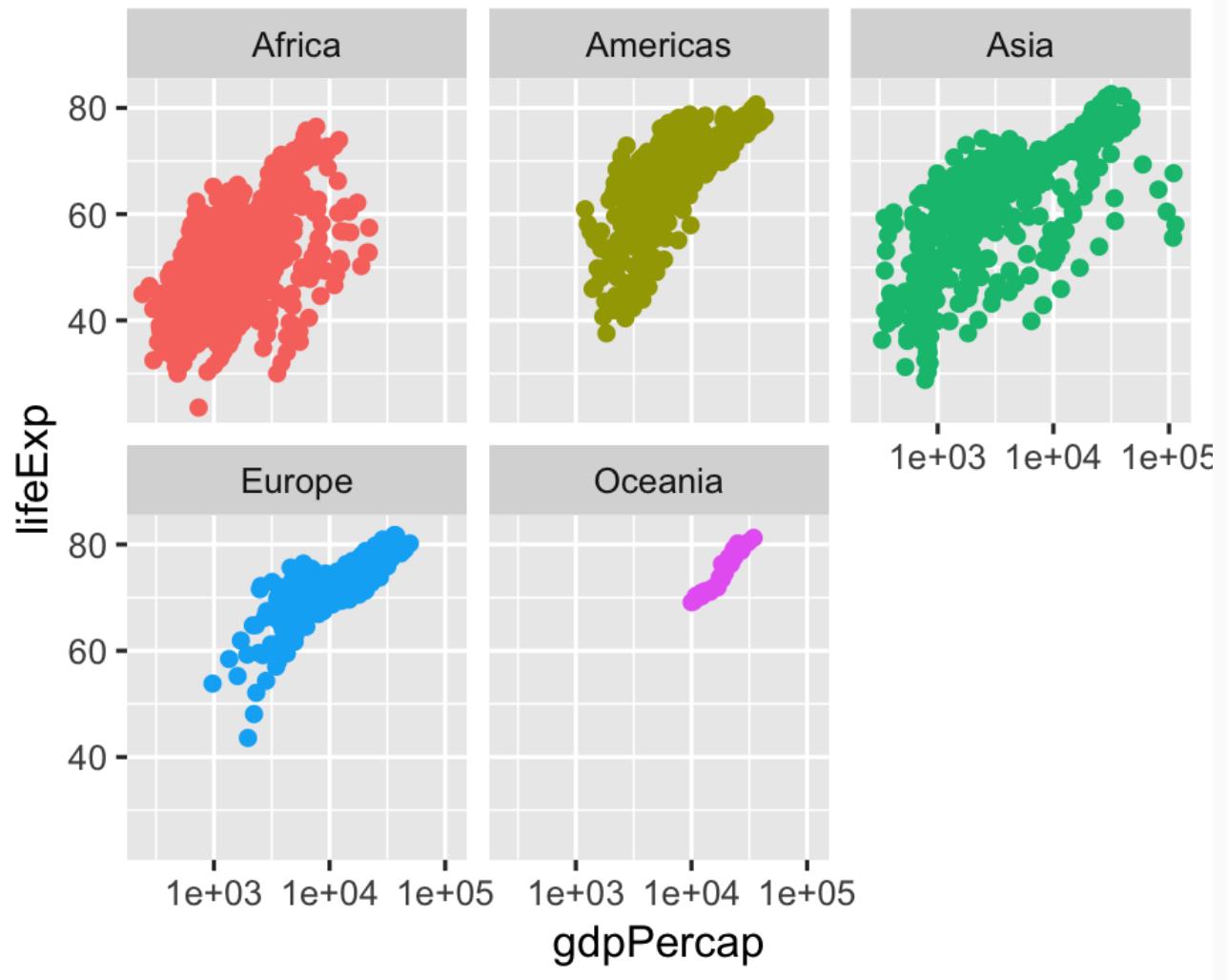
```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_point() +  
  scale_x_log10()
```



Still lots of overlap in the countries...

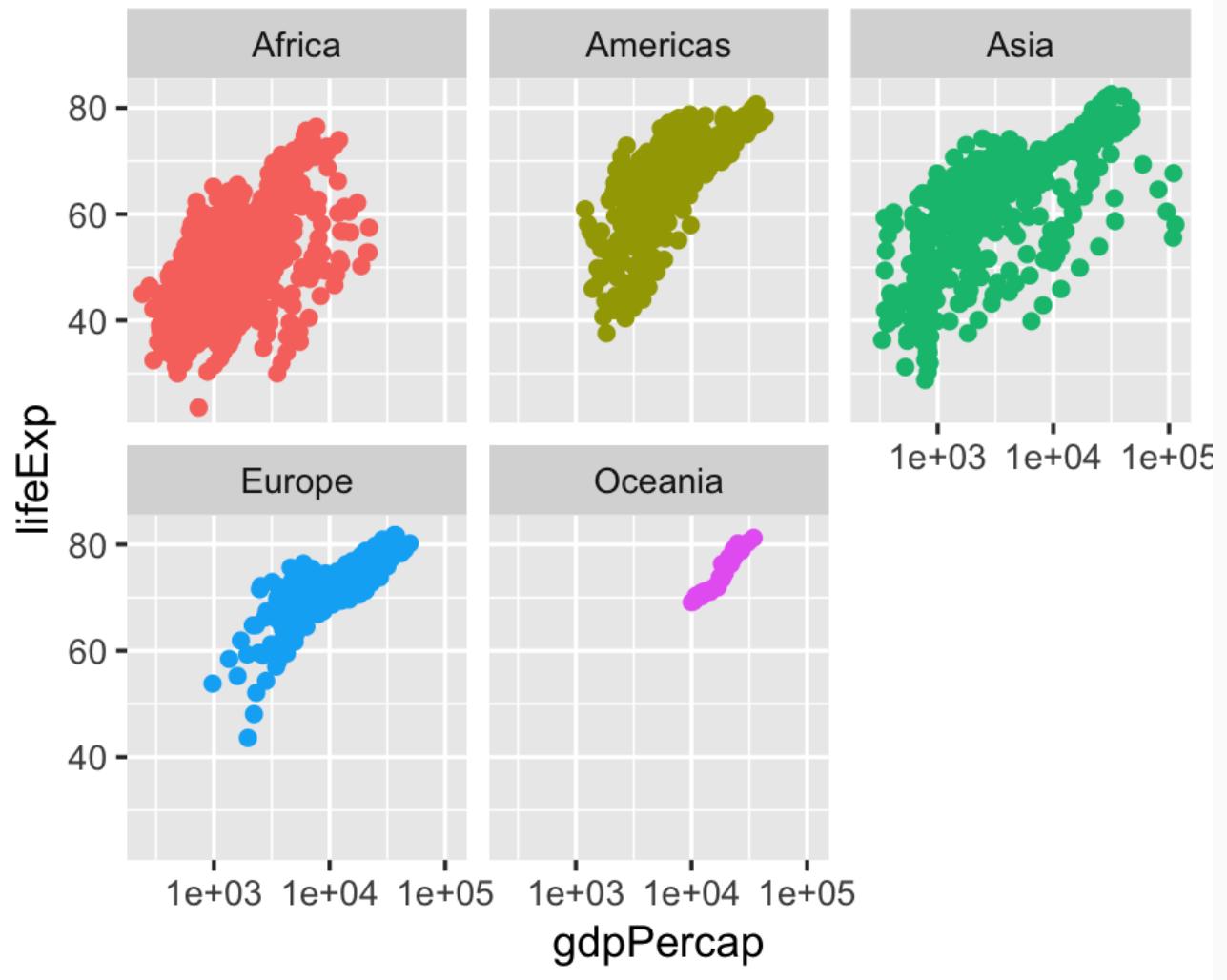
```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_point() +  
  scale_x_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

No need for color legend thanks to
facet titles



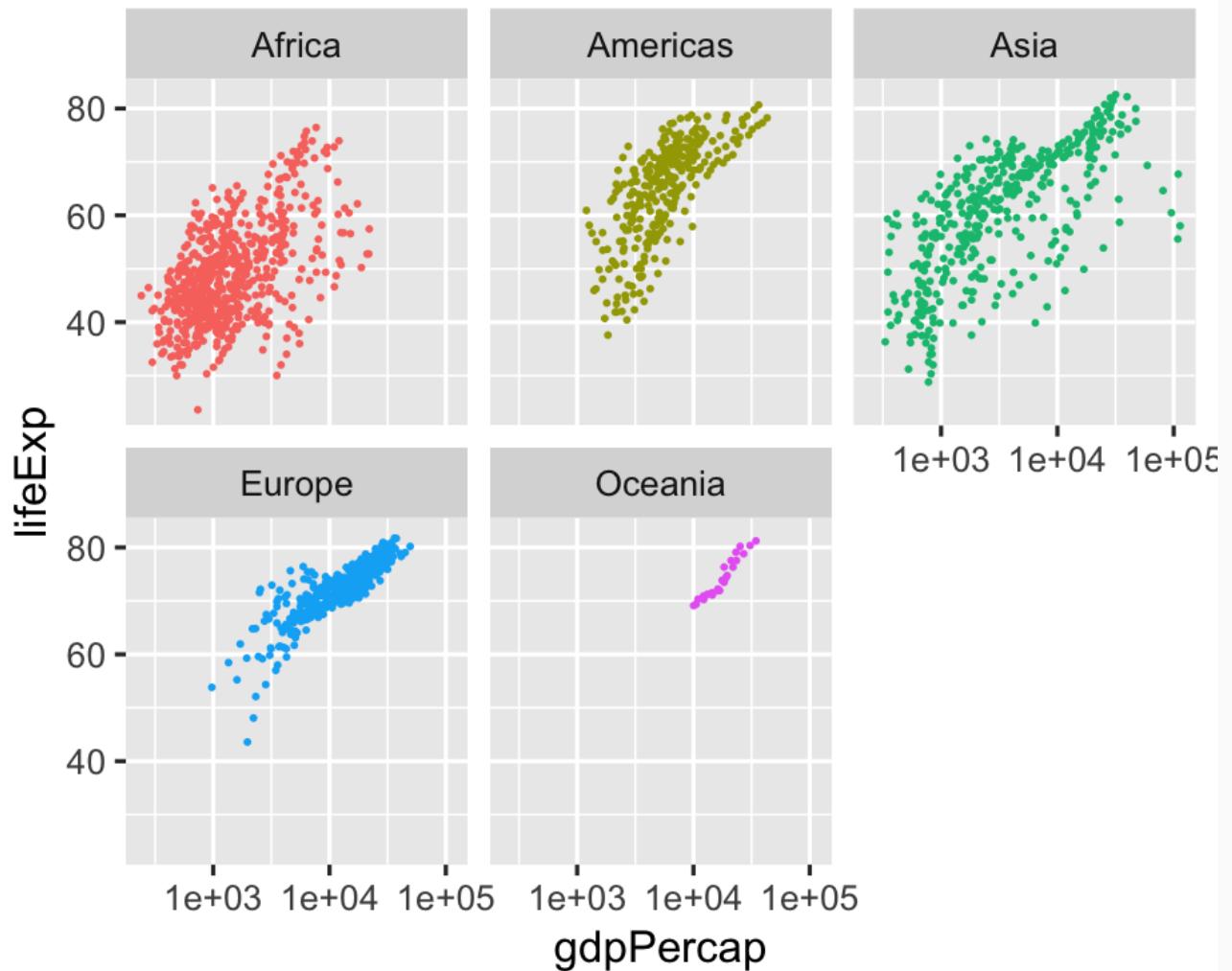
```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_point() +  
  scale_x_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

No need for color legend thanks to
facet titles

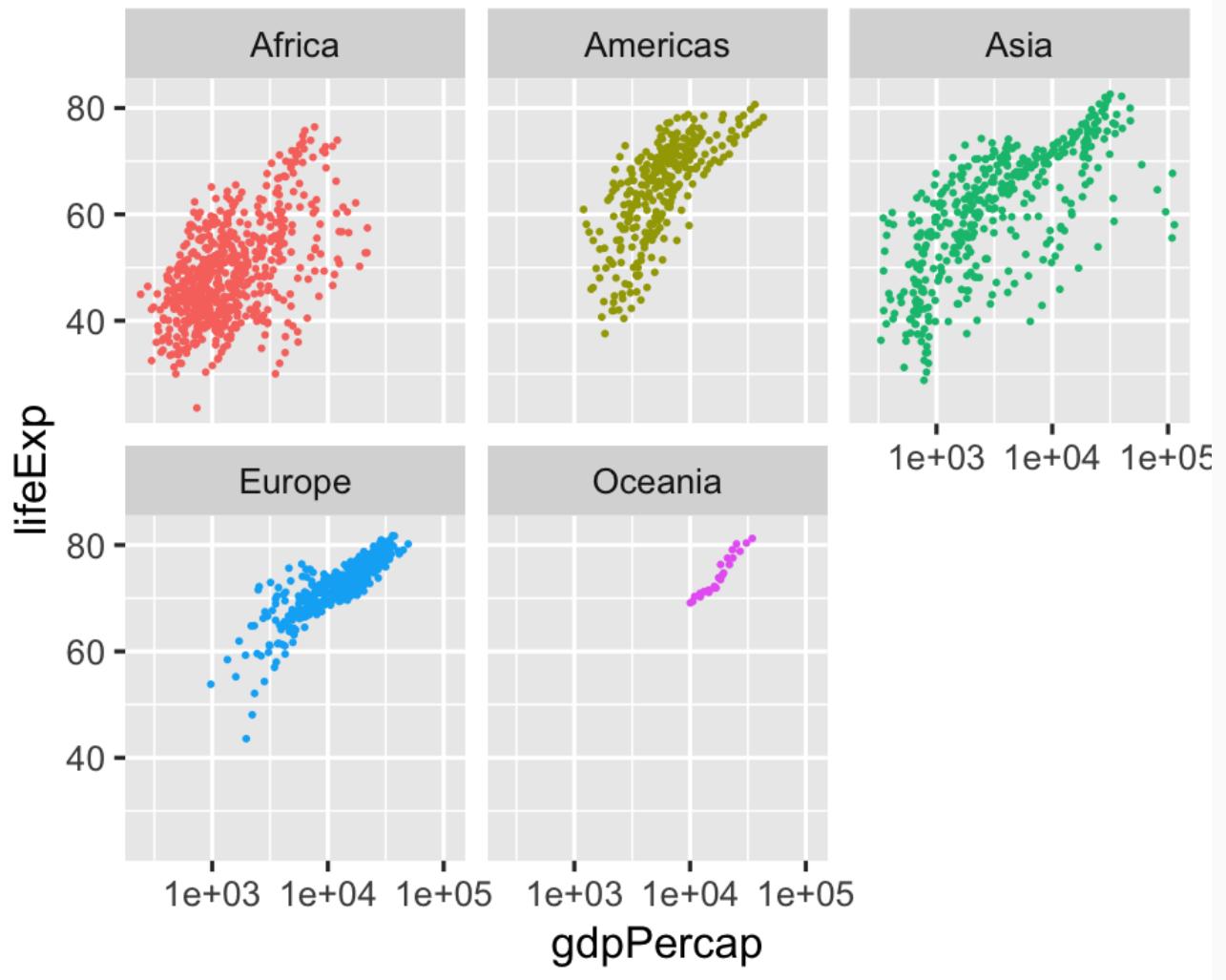


Lots of overplotting due to point size

```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_point(size = 0.25) +  
  scale_x_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

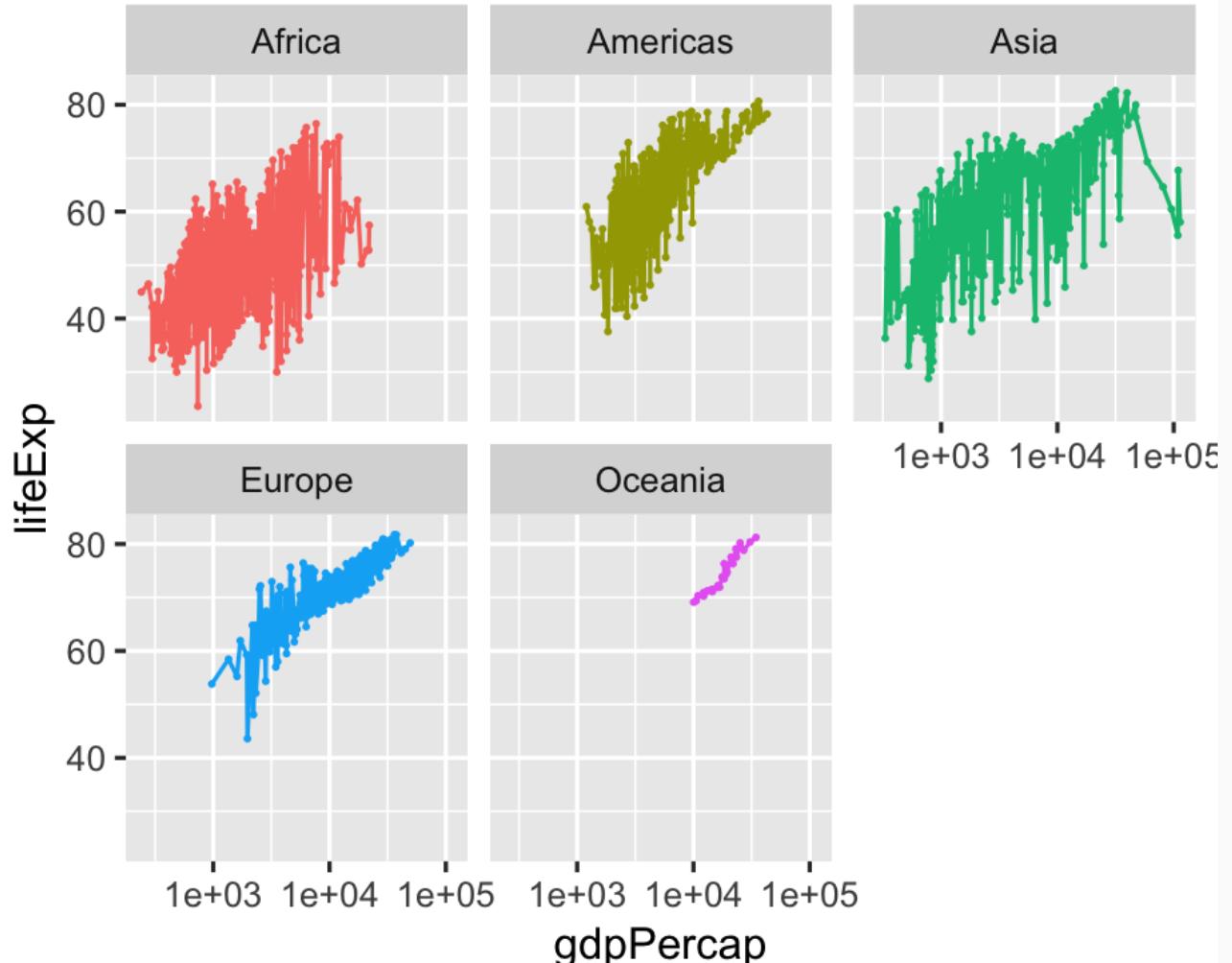


```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_point(size = 0.25) +  
  scale_x_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

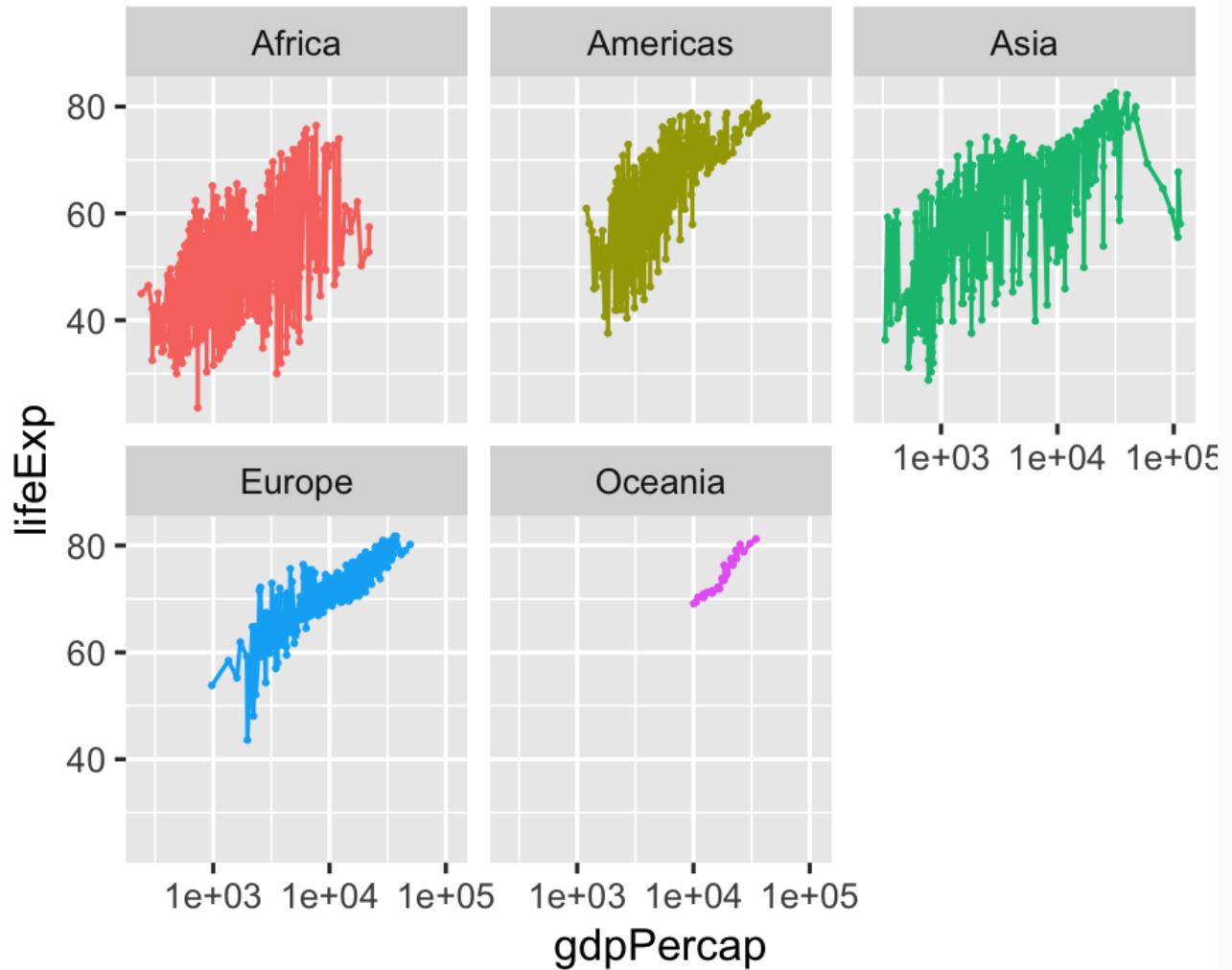


Is there a trend?

```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_line() +  
  geom_point(size = 0.25) +  
  scale_x_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

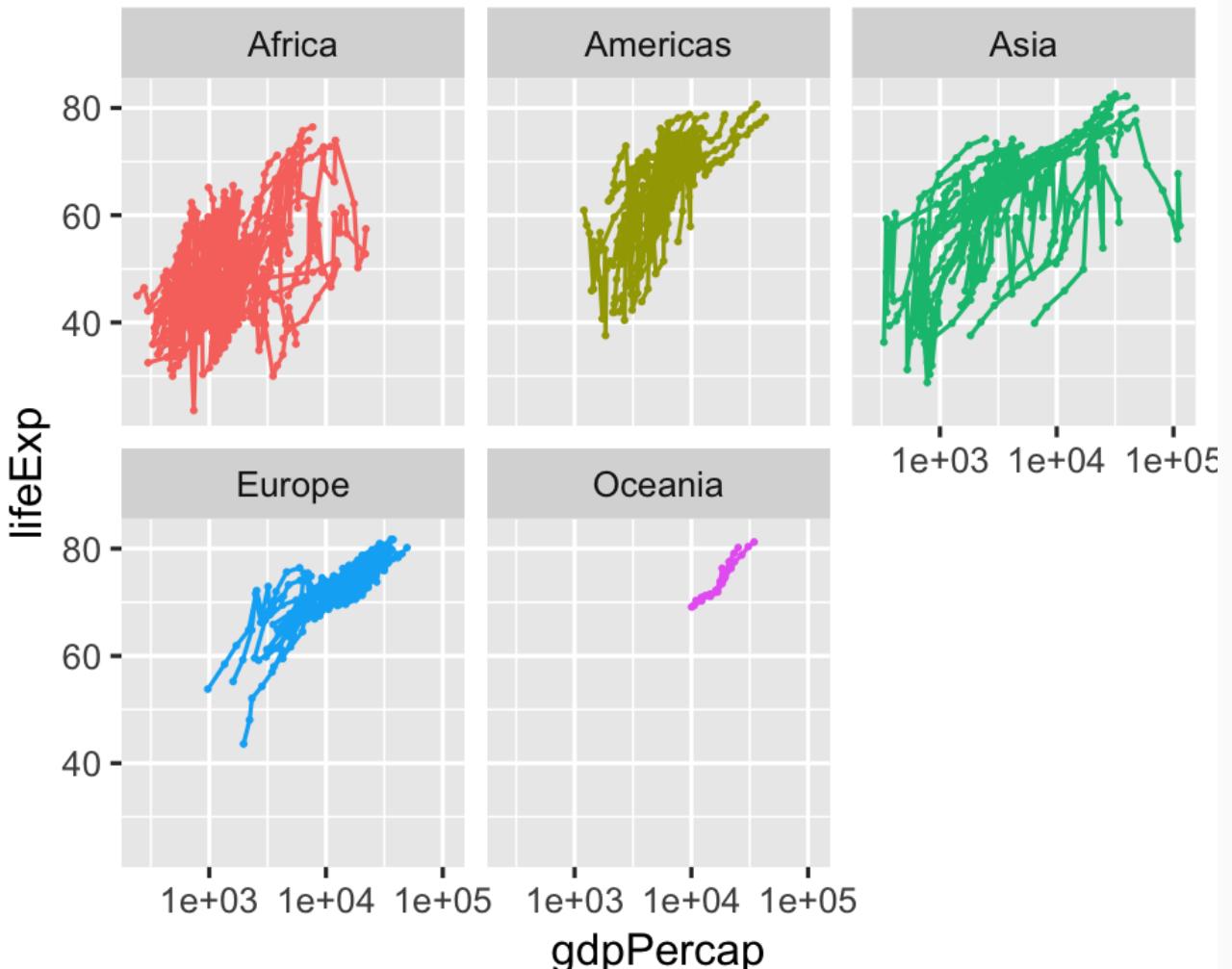


```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_line() +  
  geom_point(size = 0.25) +  
  scale_x_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

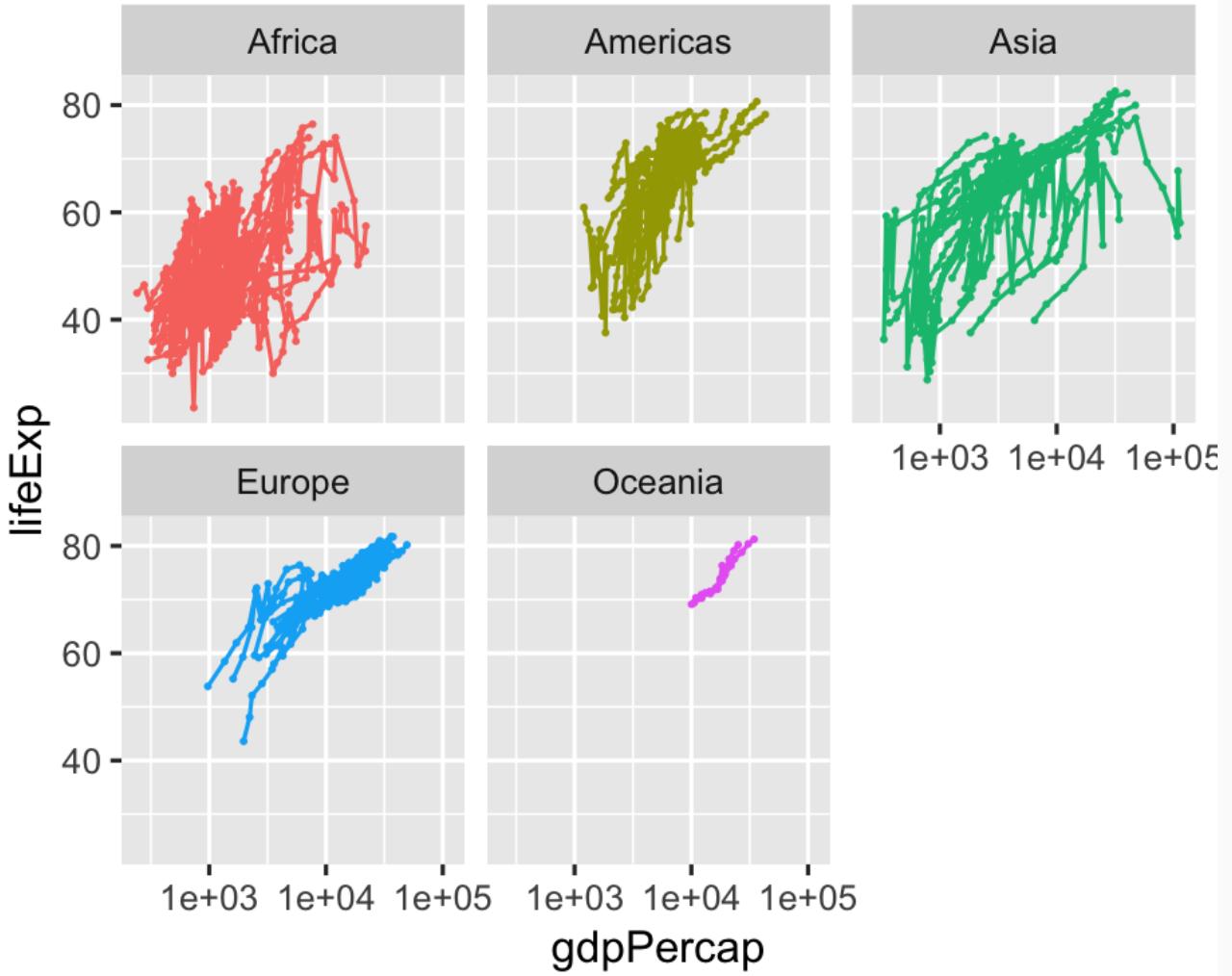


Okay, that line just connected all of
the points sequentially...

```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country)  
  ) +  
  geom_point(size = 0.25) +  
  scale_x_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

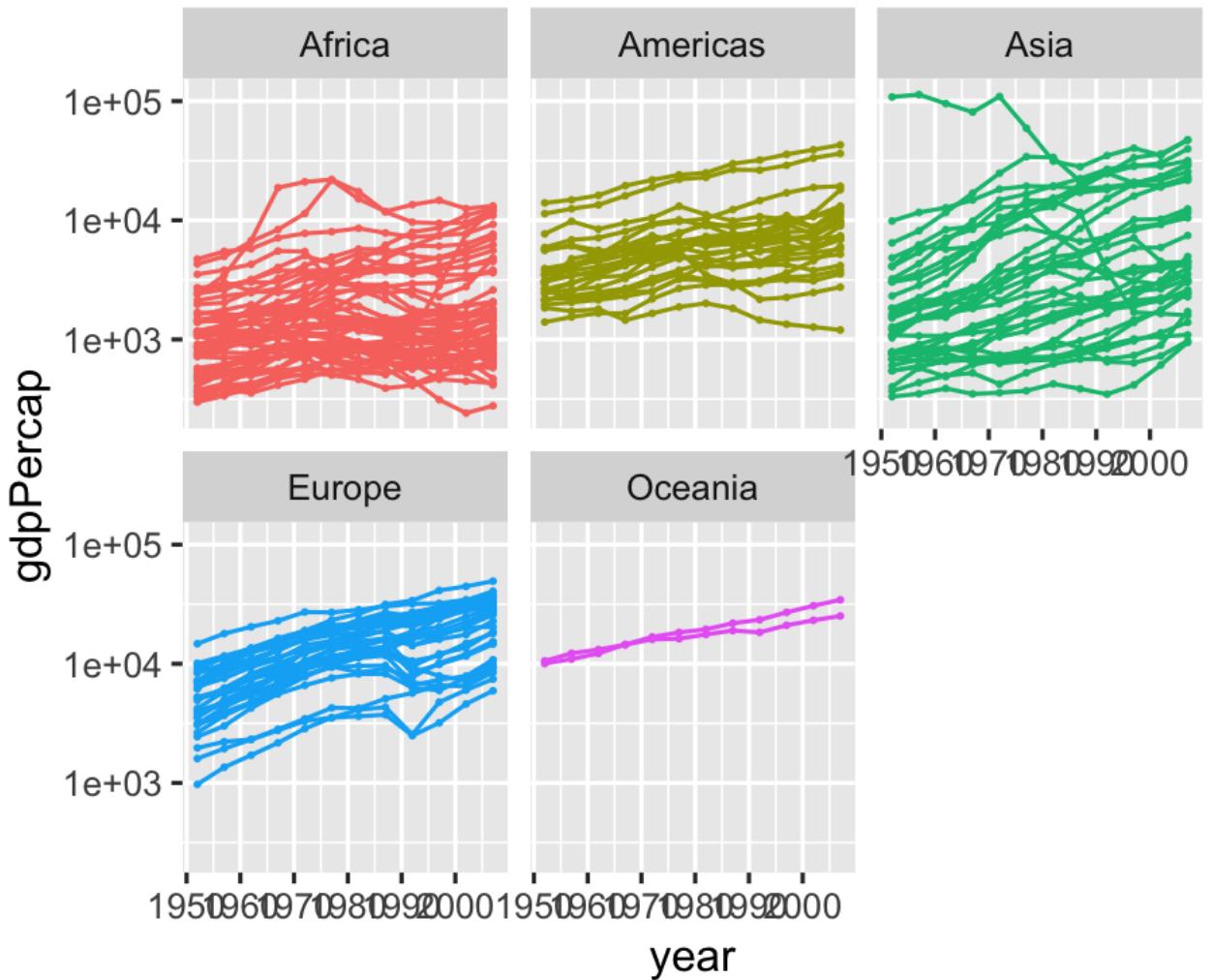


```
ggplot(gapminder) +  
  aes(x = gdpPercap,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country)  
  ) +  
  geom_point(size = 0.25) +  
  scale_x_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

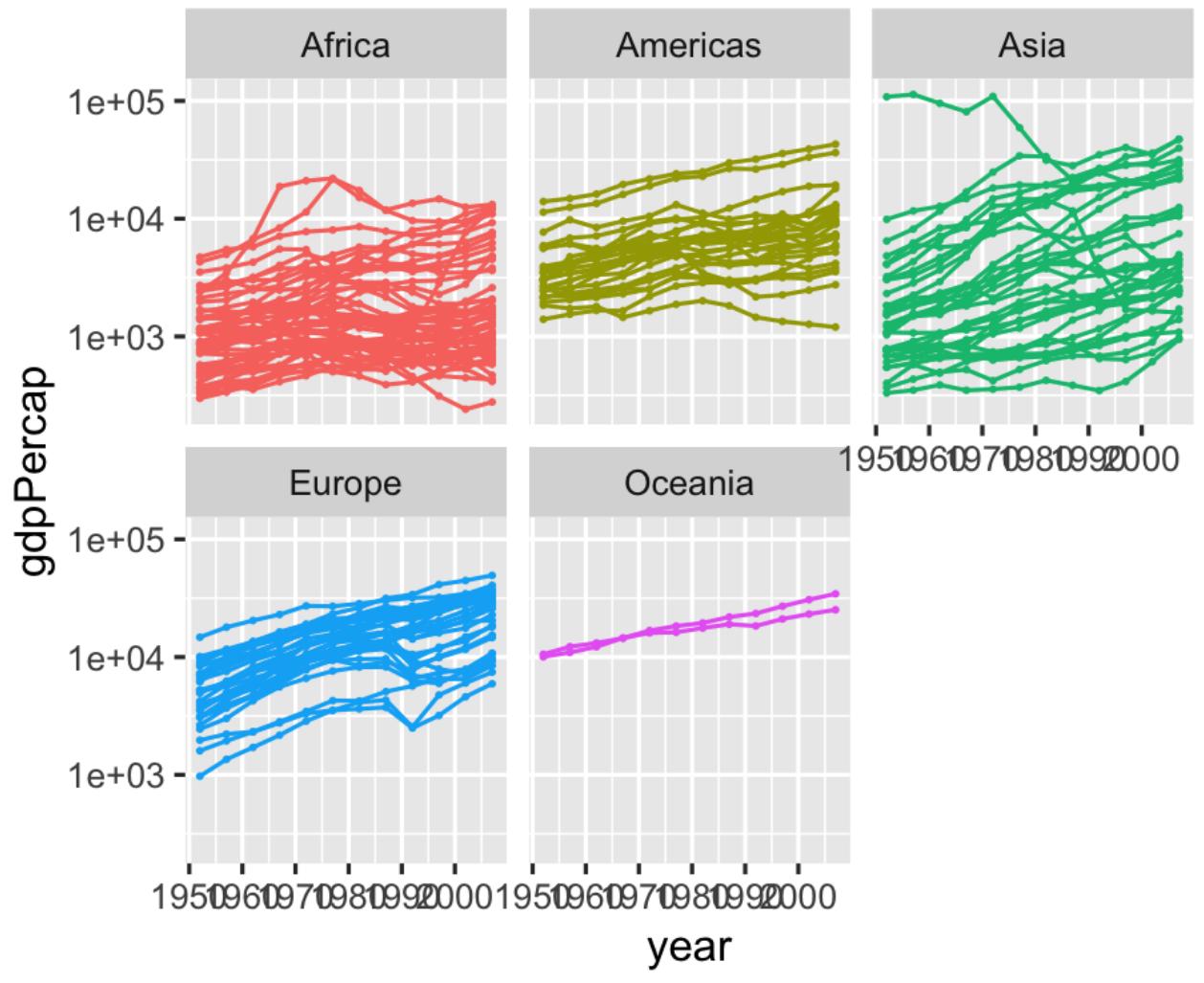


We need time on x-axis!

```
ggplot(gapminder) +  
  aes(x = year,  
      y = gdpPercap,  
      color = continent) +  
  geom_line(  
    aes(group = country)  
  ) +  
  geom_point(size = 0.25) +  
  scale_y_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

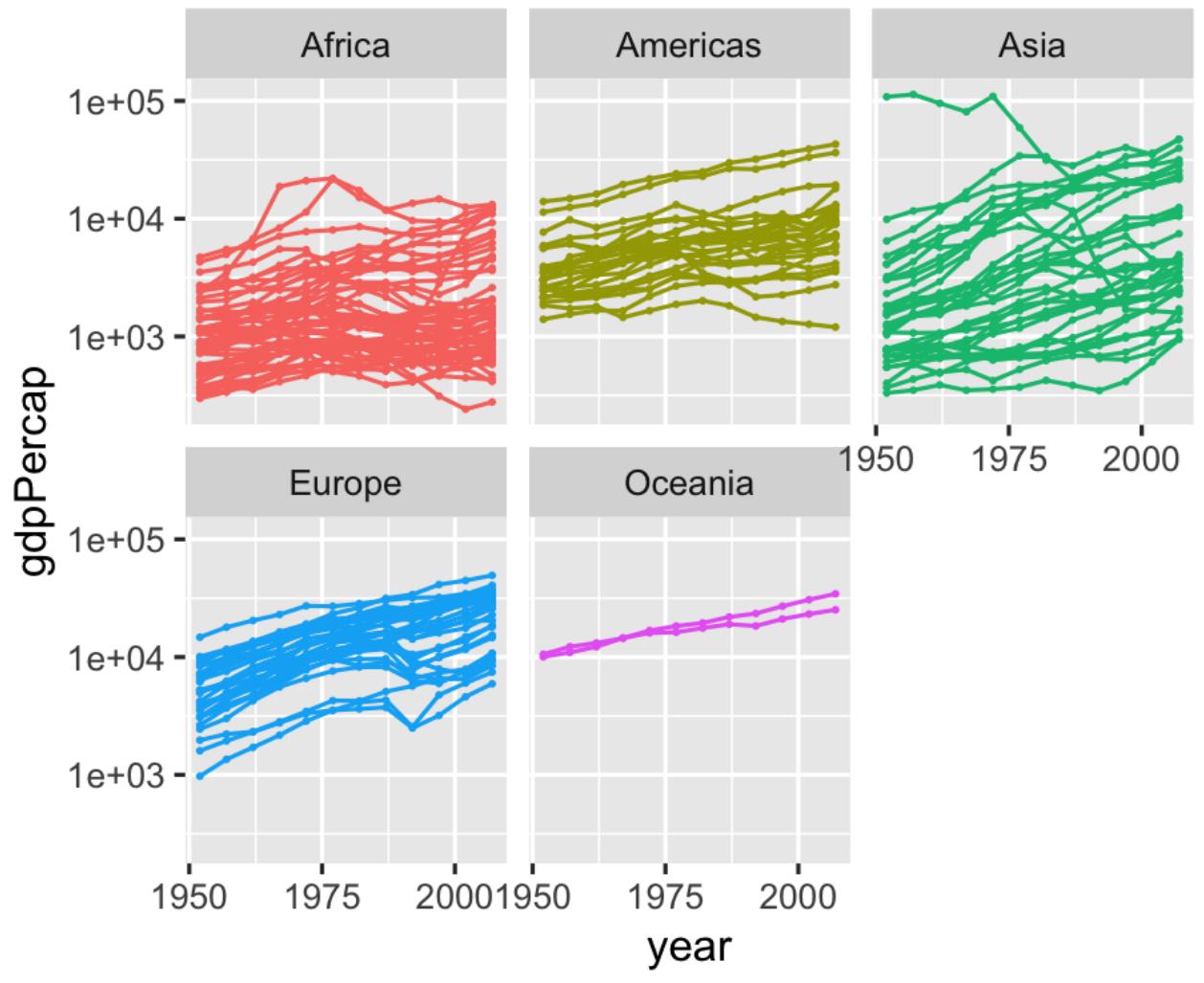


```
ggplot(gapminder) +  
  aes(x = year,  
      y = gdpPercap,  
      color = continent) +  
  geom_line(  
    aes(group = country)  
  ) +  
  geom_point(size = 0.25) +  
  scale_y_log10() +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

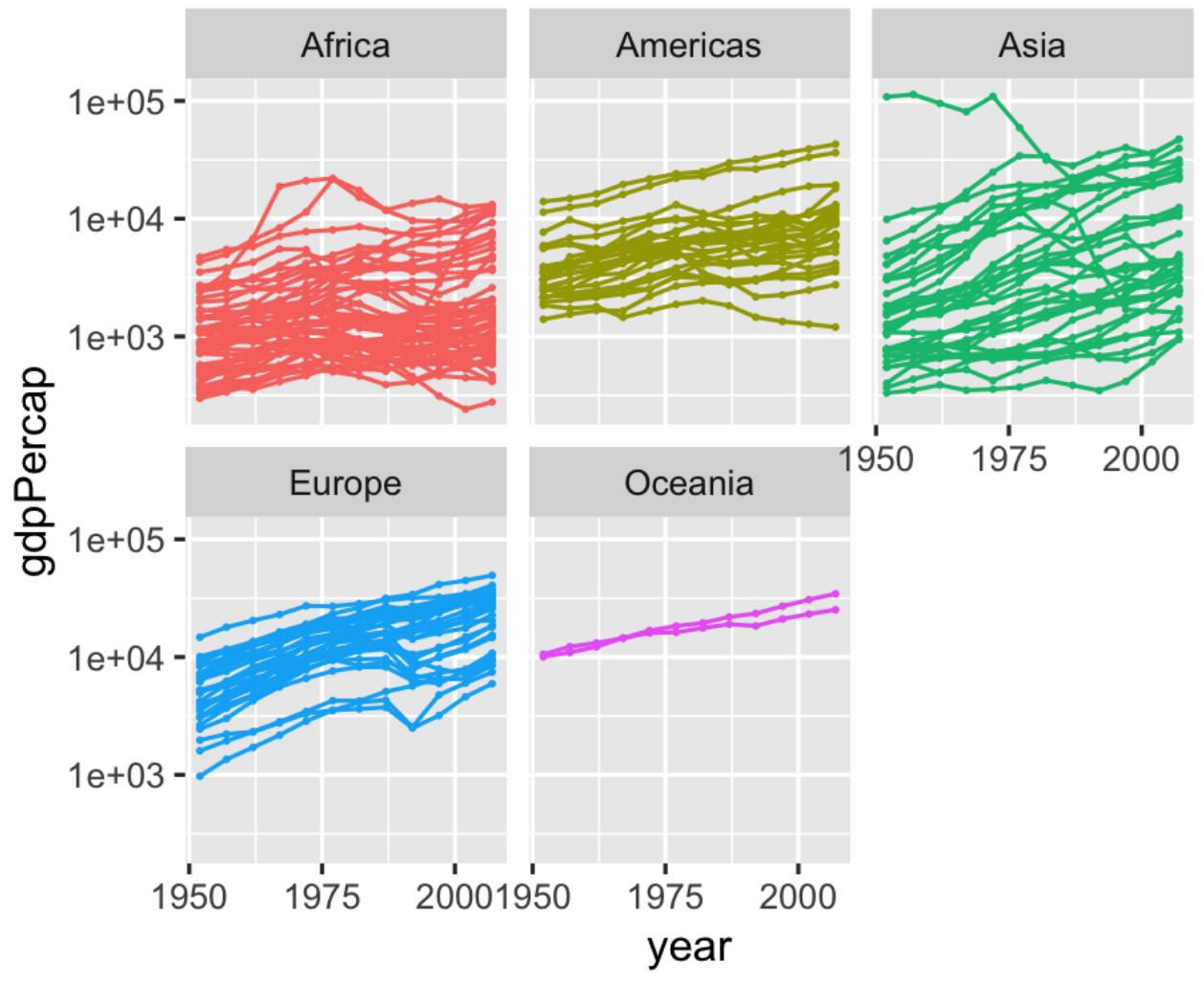


Can't see x-axis labels, though

```
ggplot(gapminder) +  
  aes(x = year,  
      y = gdpPercap,  
      color = continent) +  
  geom_line(  
    aes(group = country)  
  ) +  
  geom_point(size = 0.25) +  
  scale_y_log10() +  
  scale_x_continuous(breaks =  
    seq(1950, 2000, 25))  
  ) +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

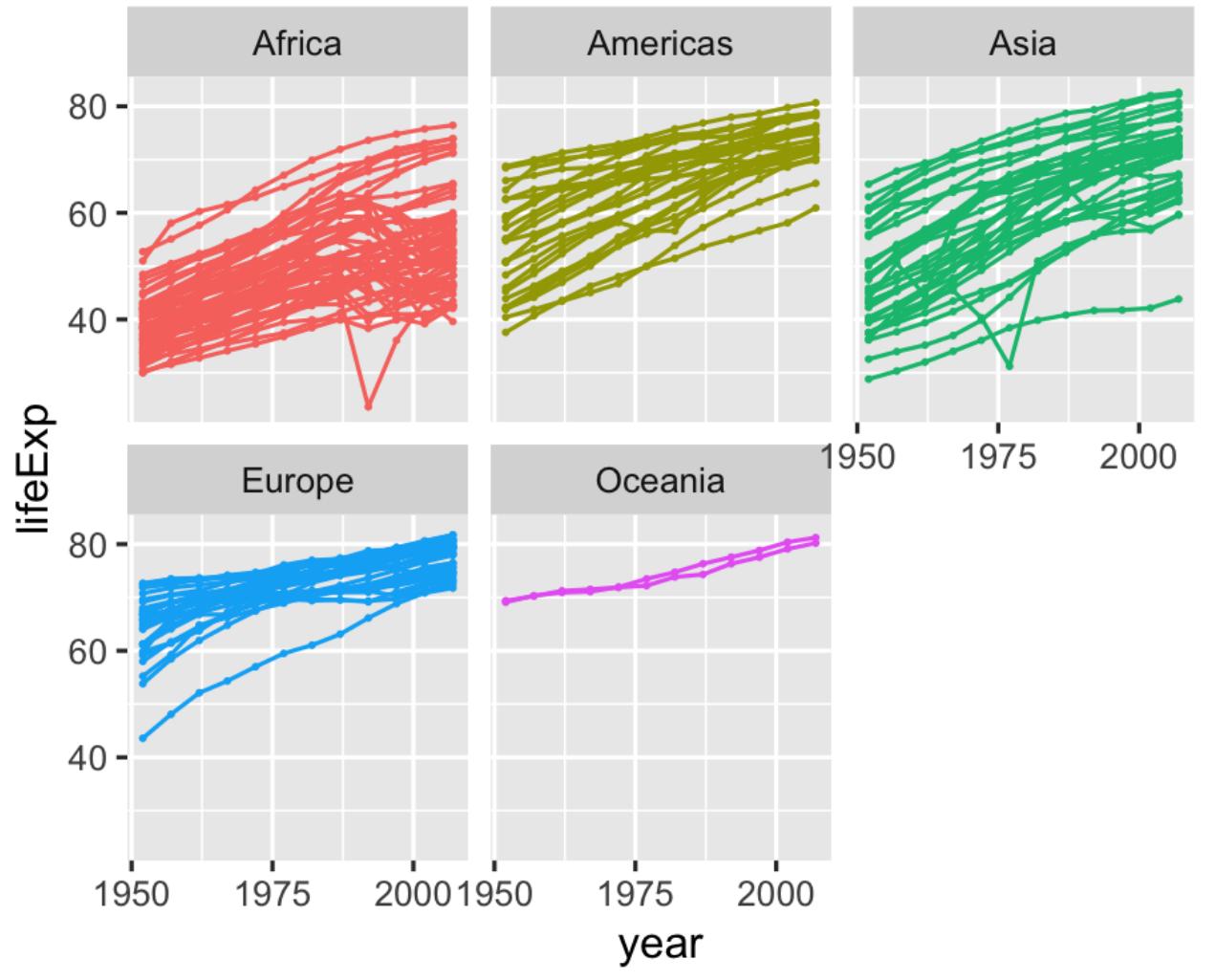


```
ggplot(gapminder) +  
  aes(x = year,  
      y = gdpPercap,  
      color = continent) +  
  geom_line(  
    aes(group = country)  
  ) +  
  geom_point(size = 0.25) +  
  scale_y_log10() +  
  scale_x_continuous(breaks =  
    seq(1950, 2000, 25))  
  ) +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

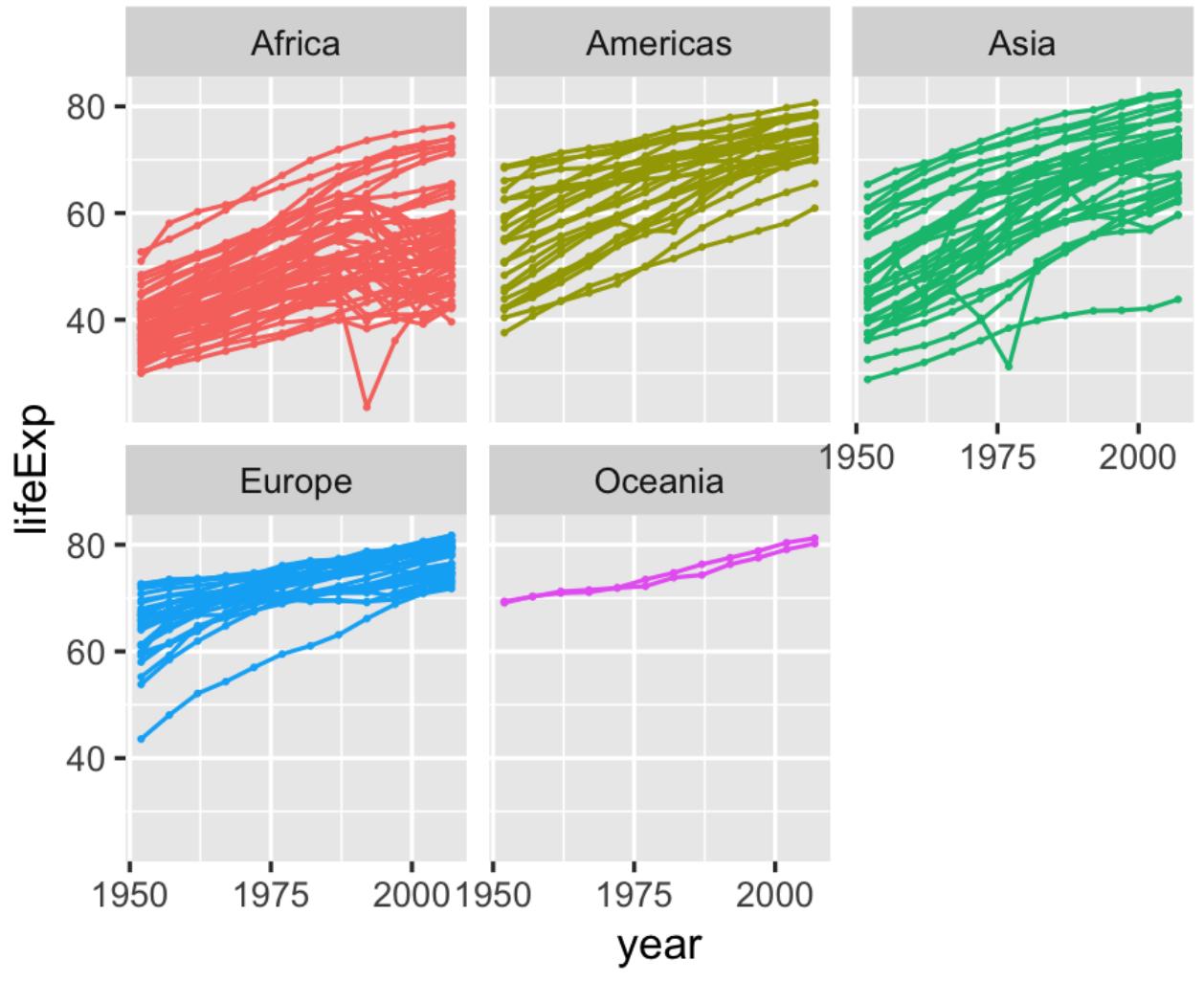


What about life expectancy?

```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country)  
) +  
  geom_point(size = 0.25) +  
  #scale_y_log10() +  
  scale_x_continuous(breaks =  
    seq(1950, 2000, 25))  
  ) +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

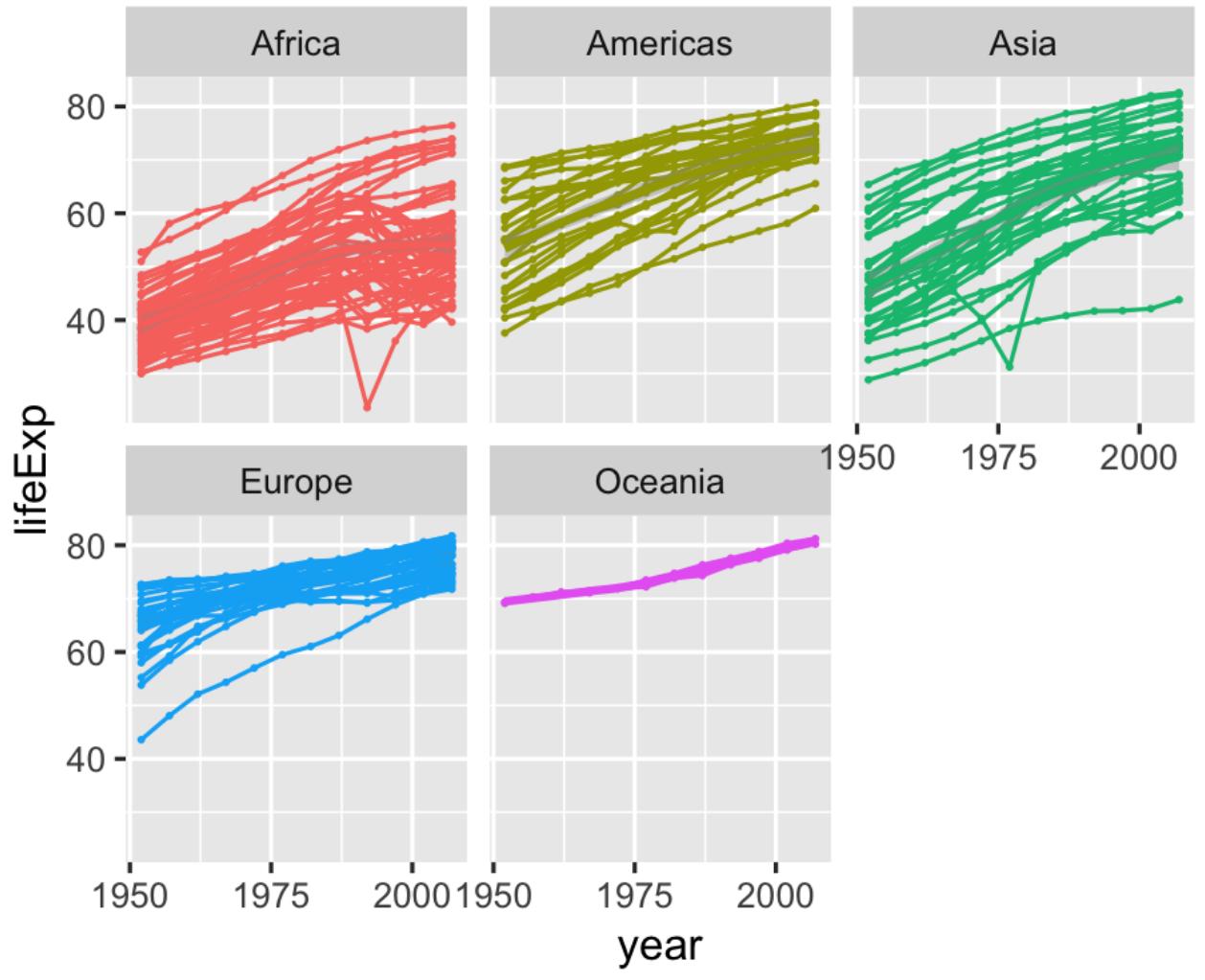


```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country)  
) +  
  geom_point(size = 0.25) +  
  #scale_y_log10() +  
  scale_x_continuous(breaks =  
    seq(1950, 2000, 25))  
  ) +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

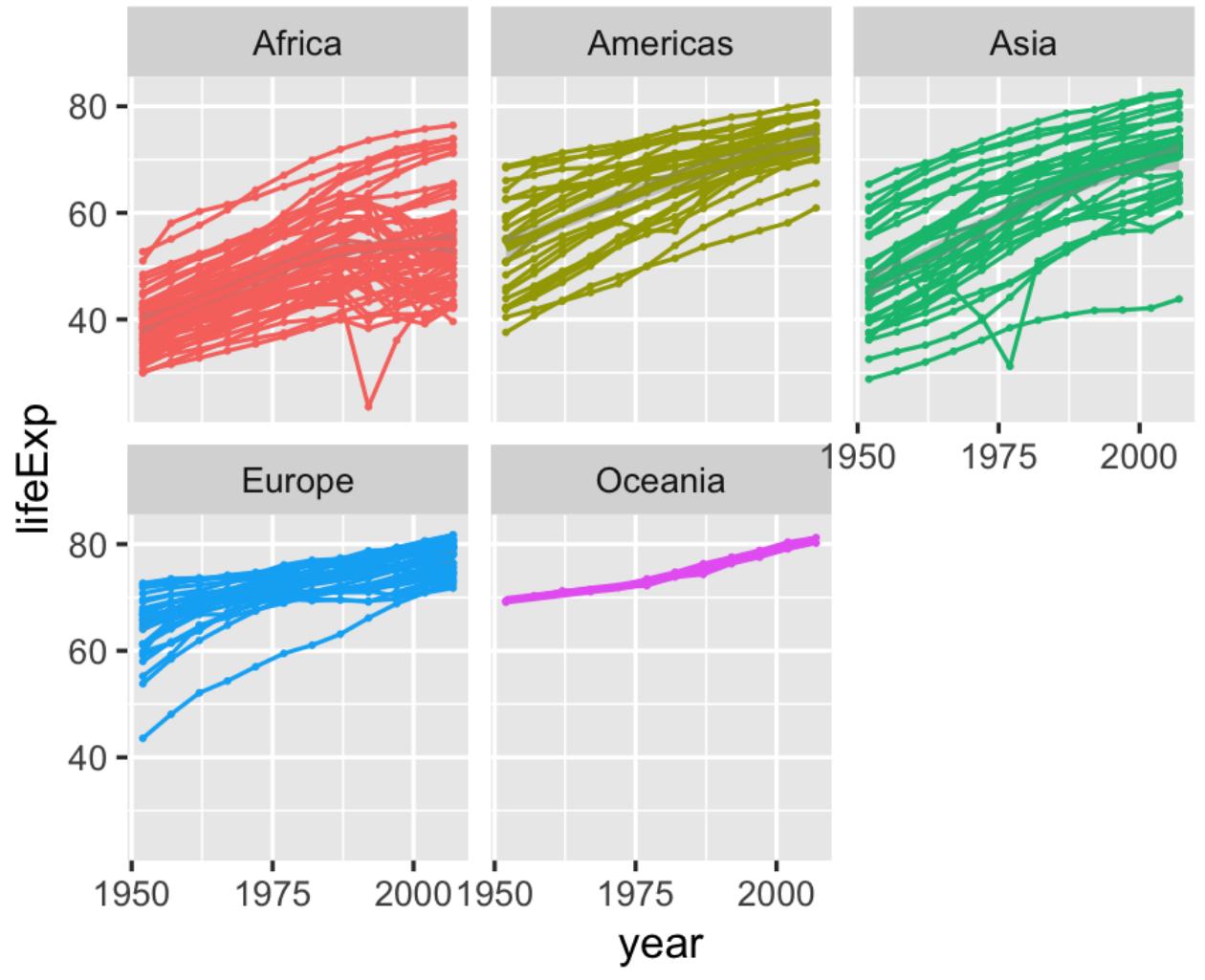


Okay, let's add a trend line

```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country))  
  +  
  geom_point(size = 0.25) +  
  geom_smooth() +  
  scale_x_continuous(breaks =  
    seq(1950, 2000, 25))  
  +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

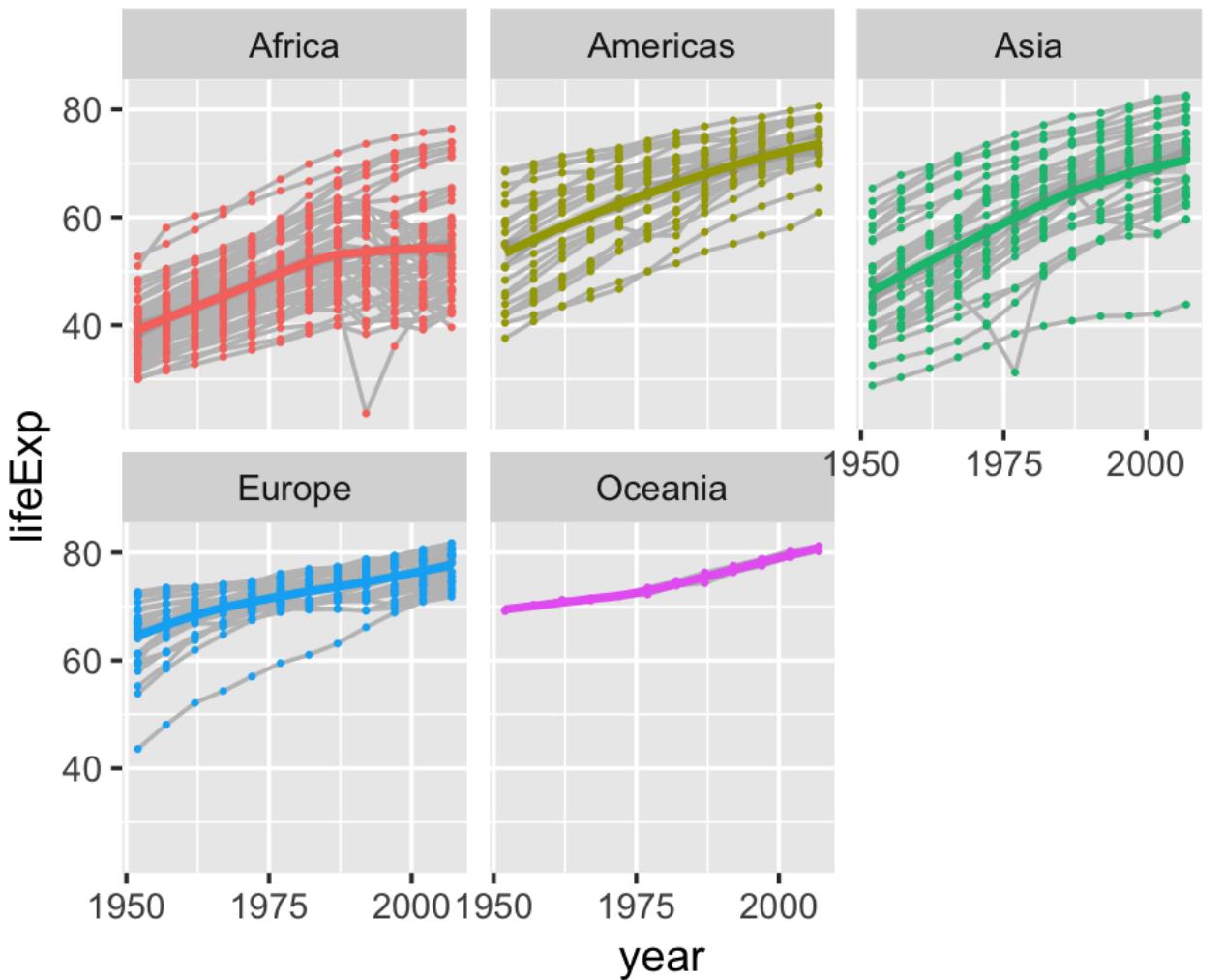


```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country))  
  +  
  geom_point(size = 0.25) +  
  geom_smooth() +  
  scale_x_continuous(breaks =  
    seq(1950, 2000, 25))  
  +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

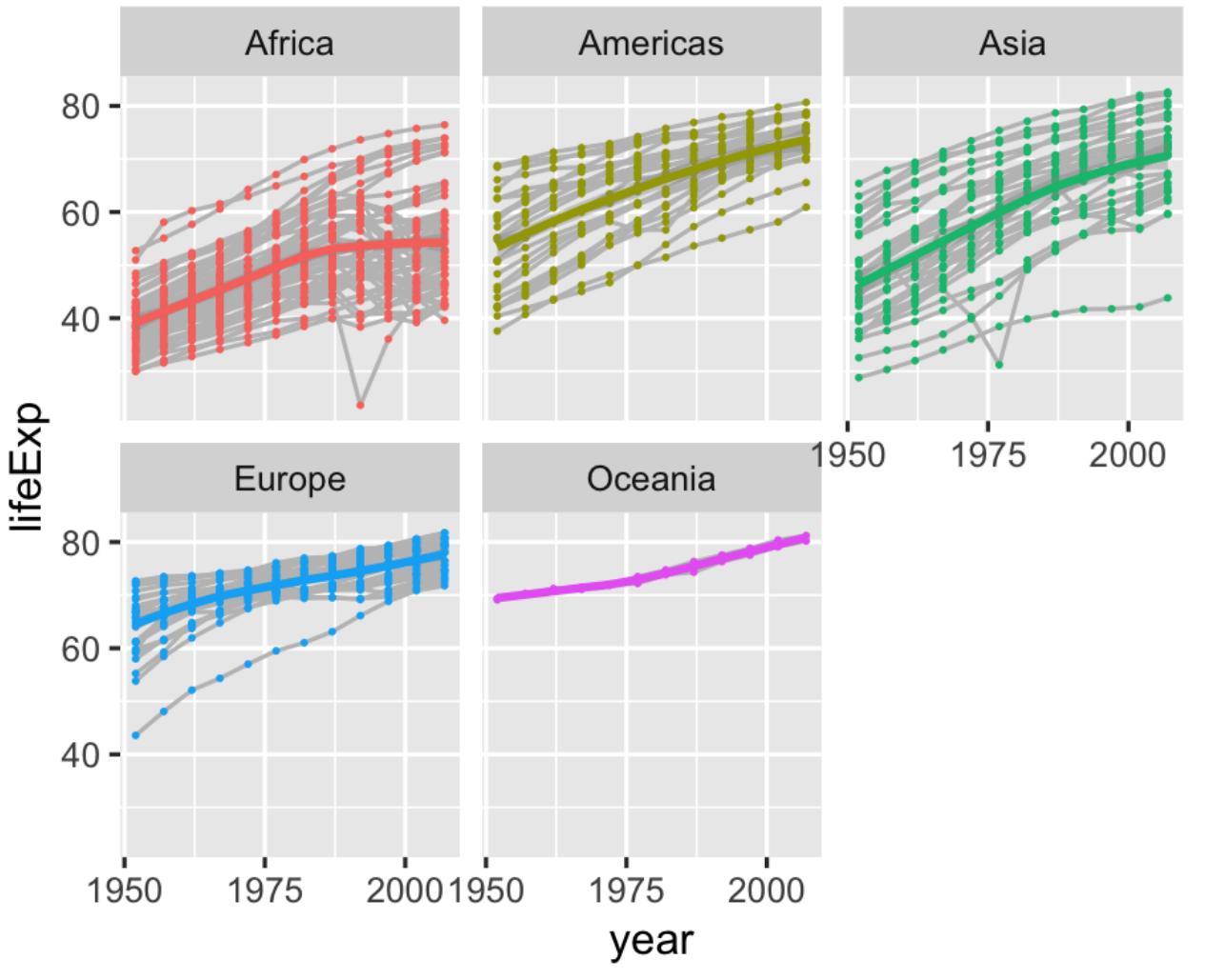


De-emphasize individual countries

```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_point(size = 0.25) +  
  geom_smooth() +  
  scale_x_continuous(breaks =  
    seq(1950, 2000, 25))  
  ) +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```

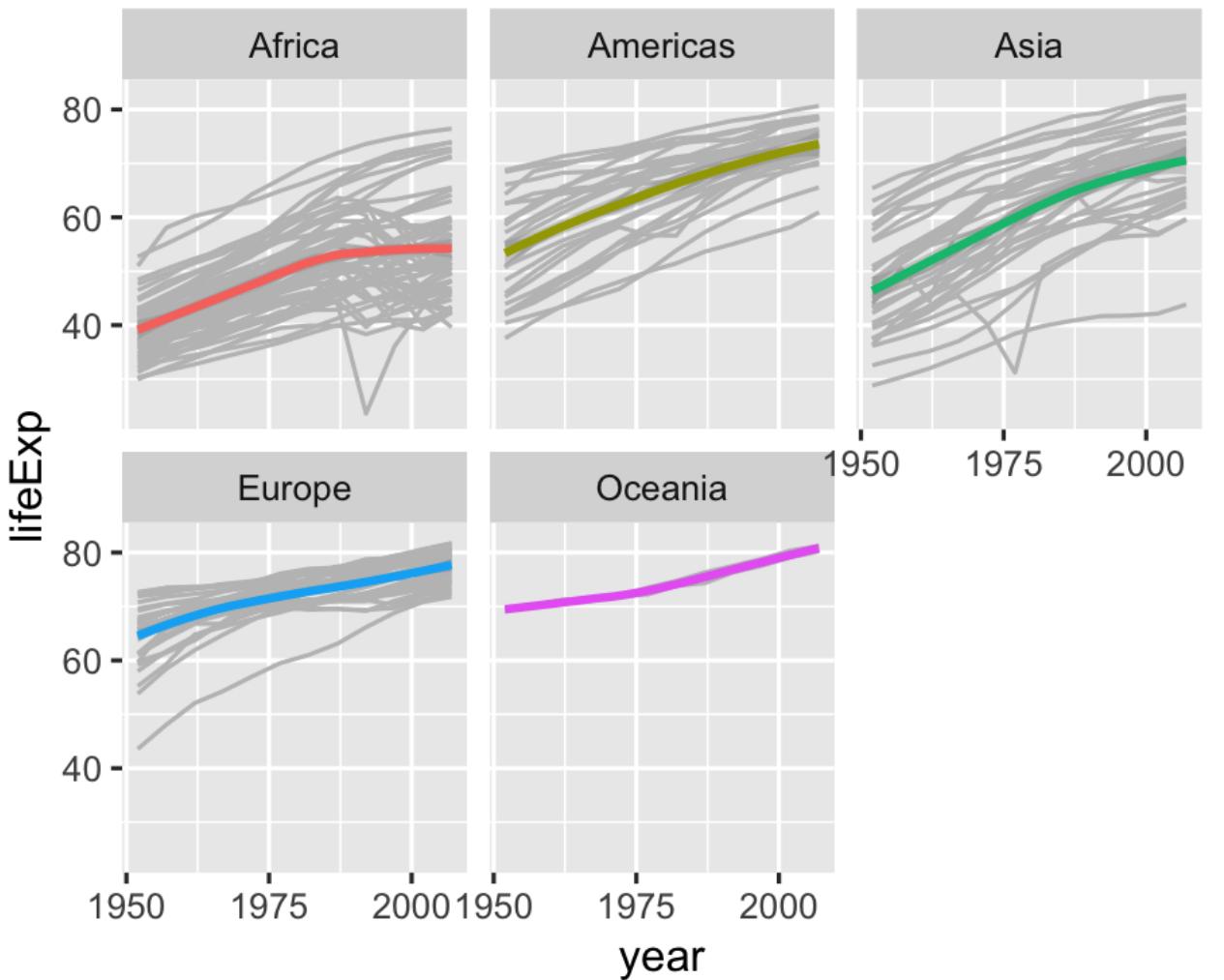


```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_point(size = 0.25) +  
  geom_smooth() +  
  scale_x_continuous(breaks =  
    seq(1950, 2000, 25))  
  ) +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```



Points are still in the way

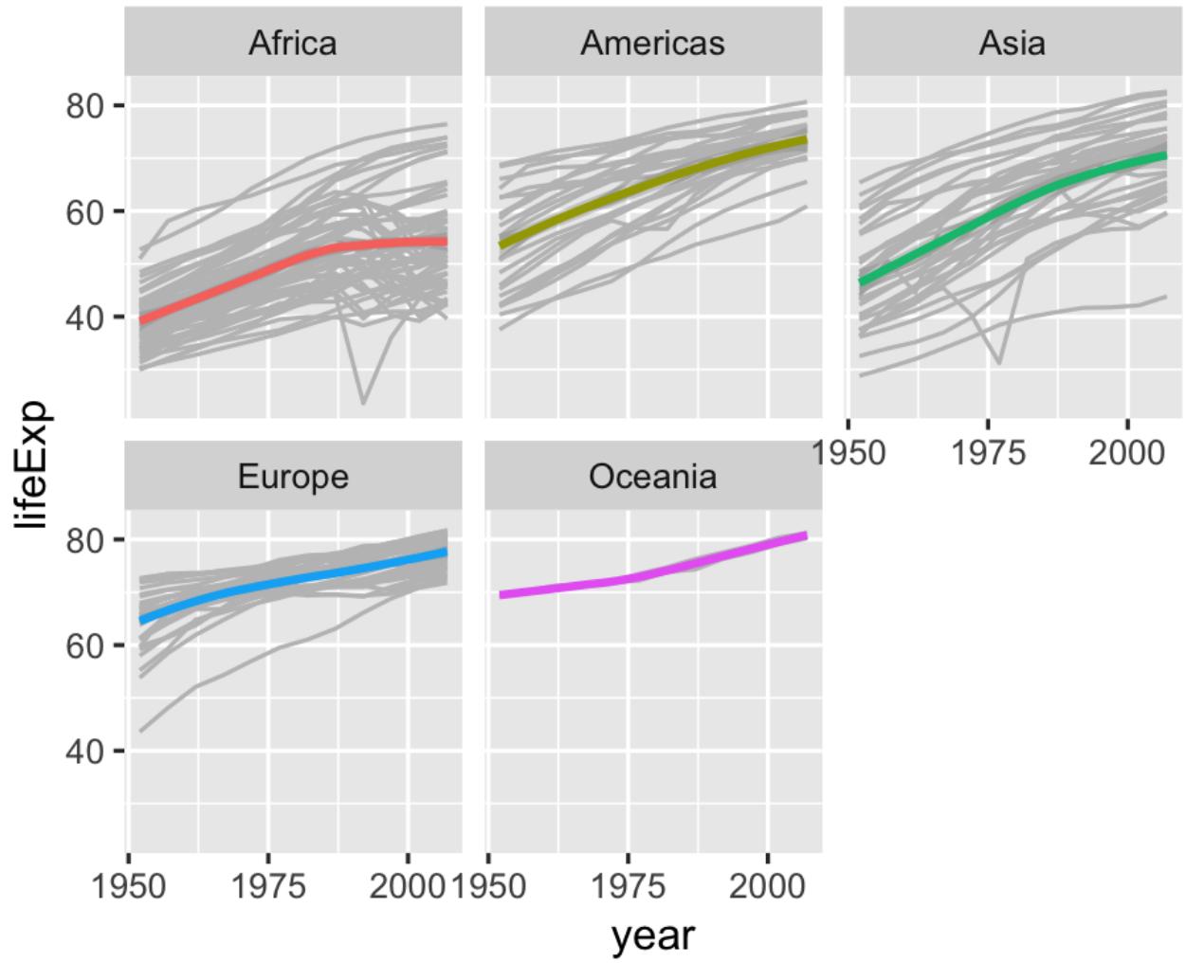
```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
  ) +  
  #geom_point(size = 0.25) +  
  geom_smooth() +  
  scale_x_continuous(breaks =  
    seq(1950, 2000, 25))  
  ) +  
  facet_wrap(~ continent) +  
  guides(color = FALSE)
```



```

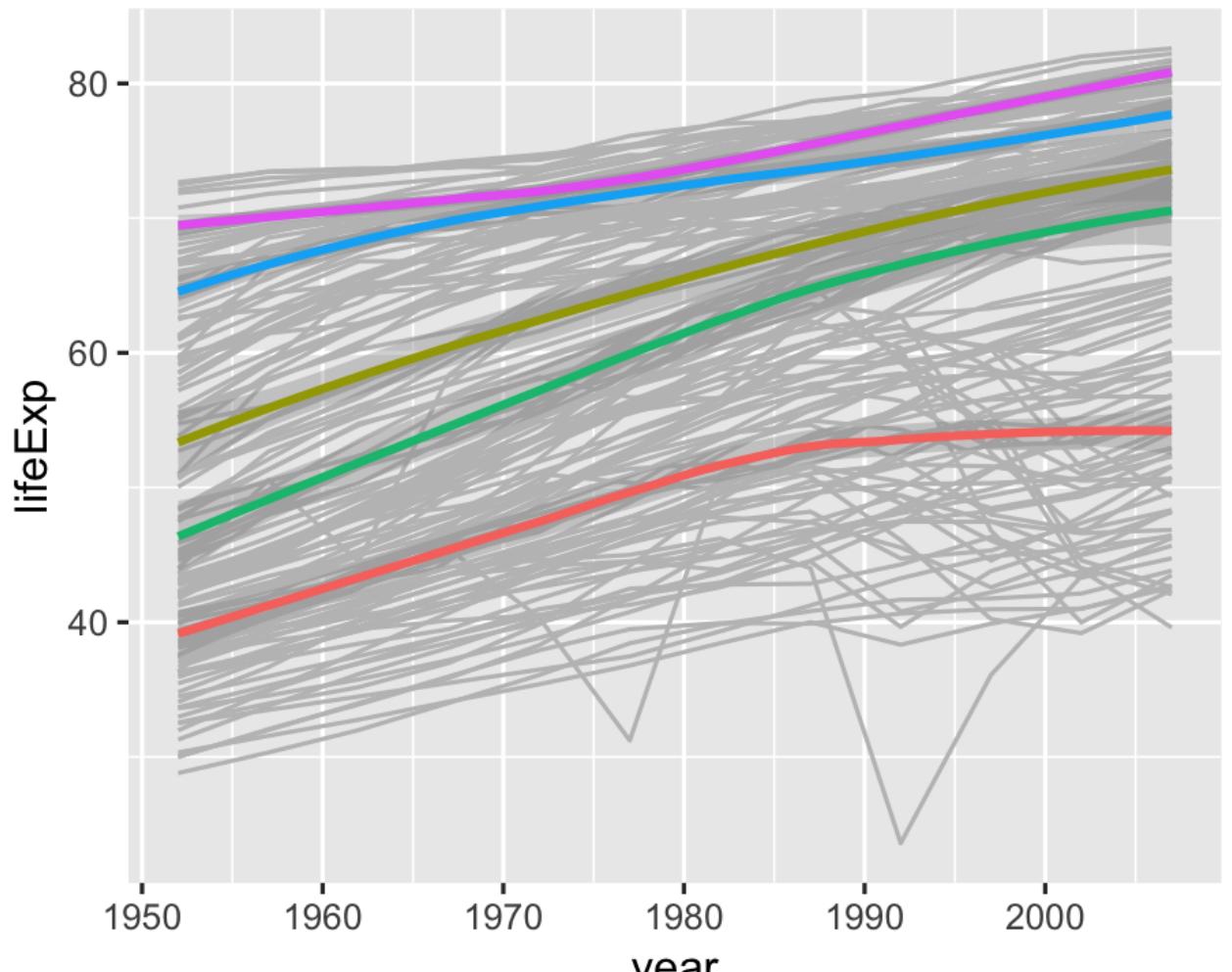
ggplot(gapminder) +
  aes(x = year,
      y = lifeExp,
      color = continent) +
  geom_line(
    aes(group = country),
    color = "grey75"
  ) +
  #geom_point(size = 0.25) +
  geom_smooth() +
  scale_x_continuous(breaks =
    seq(1950, 2000, 25))
  ) +
  facet_wrap(~ continent) +
  guides(color = FALSE)

```

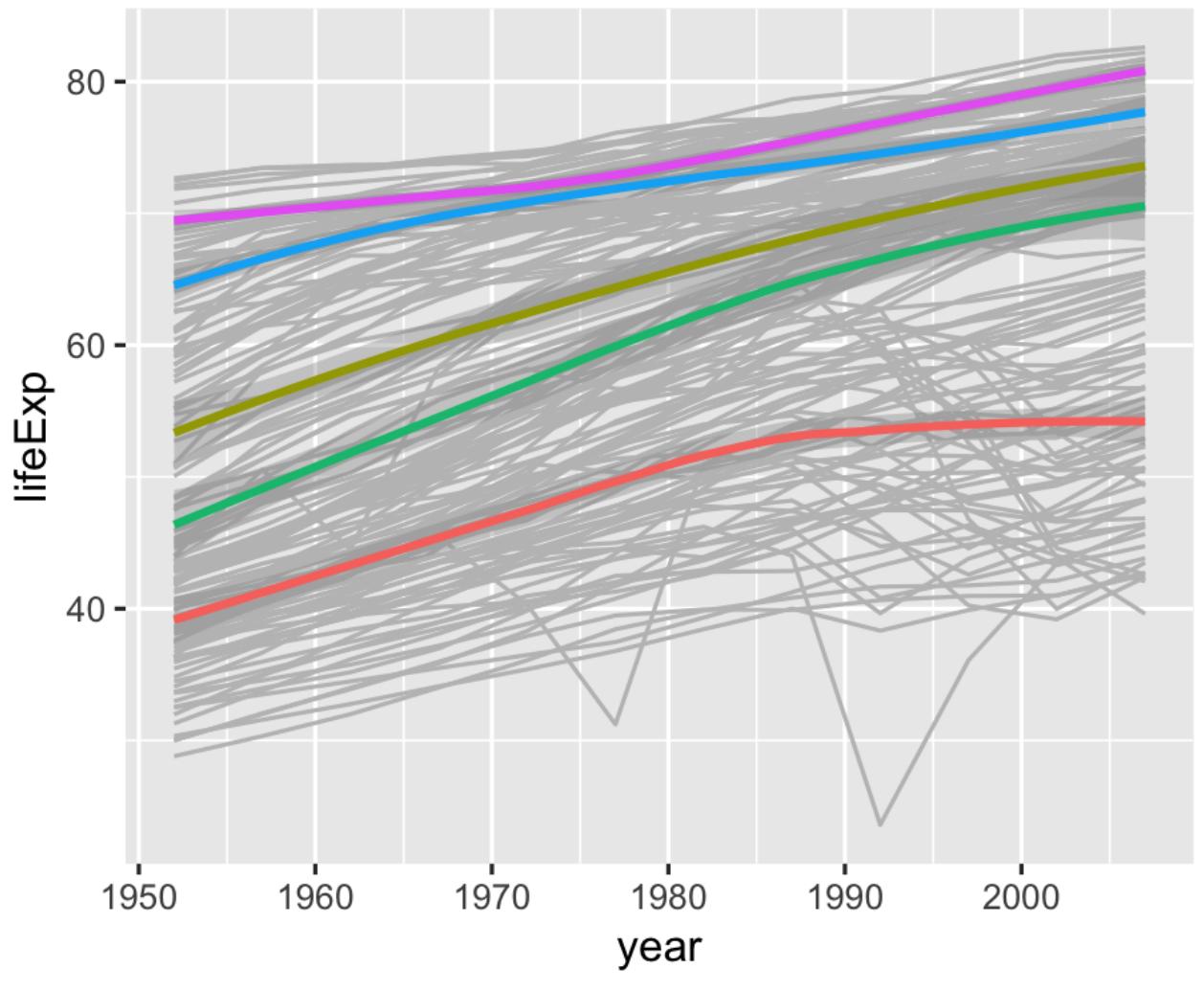


Let's compare continents

```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_smooth() +  
  # scale_x_continuous(  
  #   breaks =  
  #     seq(1950, 2000, 25)  
  # ) +  
  # facet_wrap(~ continent) +  
  guides(color = FALSE)
```

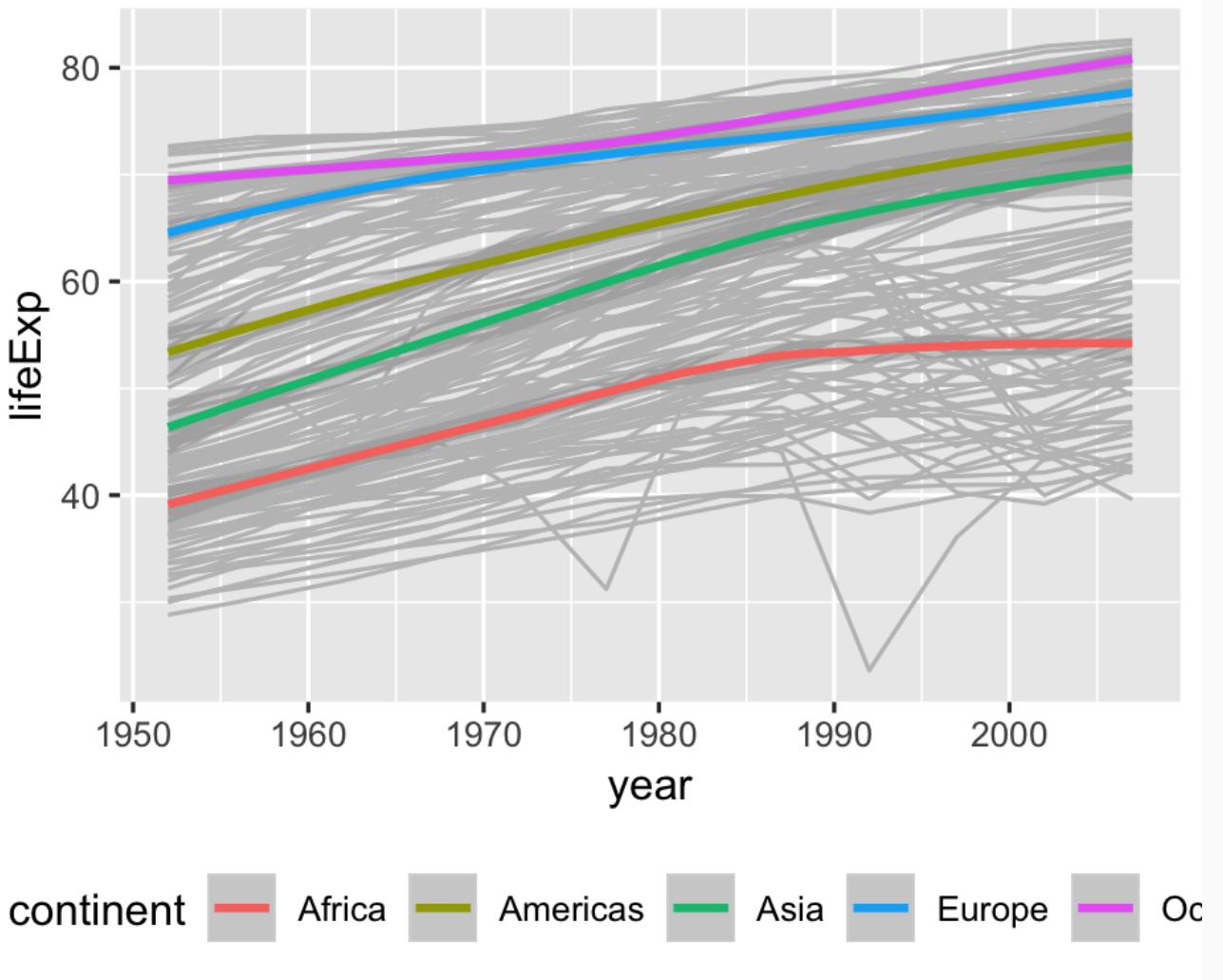


```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_smooth() +  
  # scale_x_continuous(  
  #   breaks =  
  #     seq(1950, 2000, 25)  
  # ) +  
  # facet_wrap(~ continent) +  
  guides(color = FALSE)
```

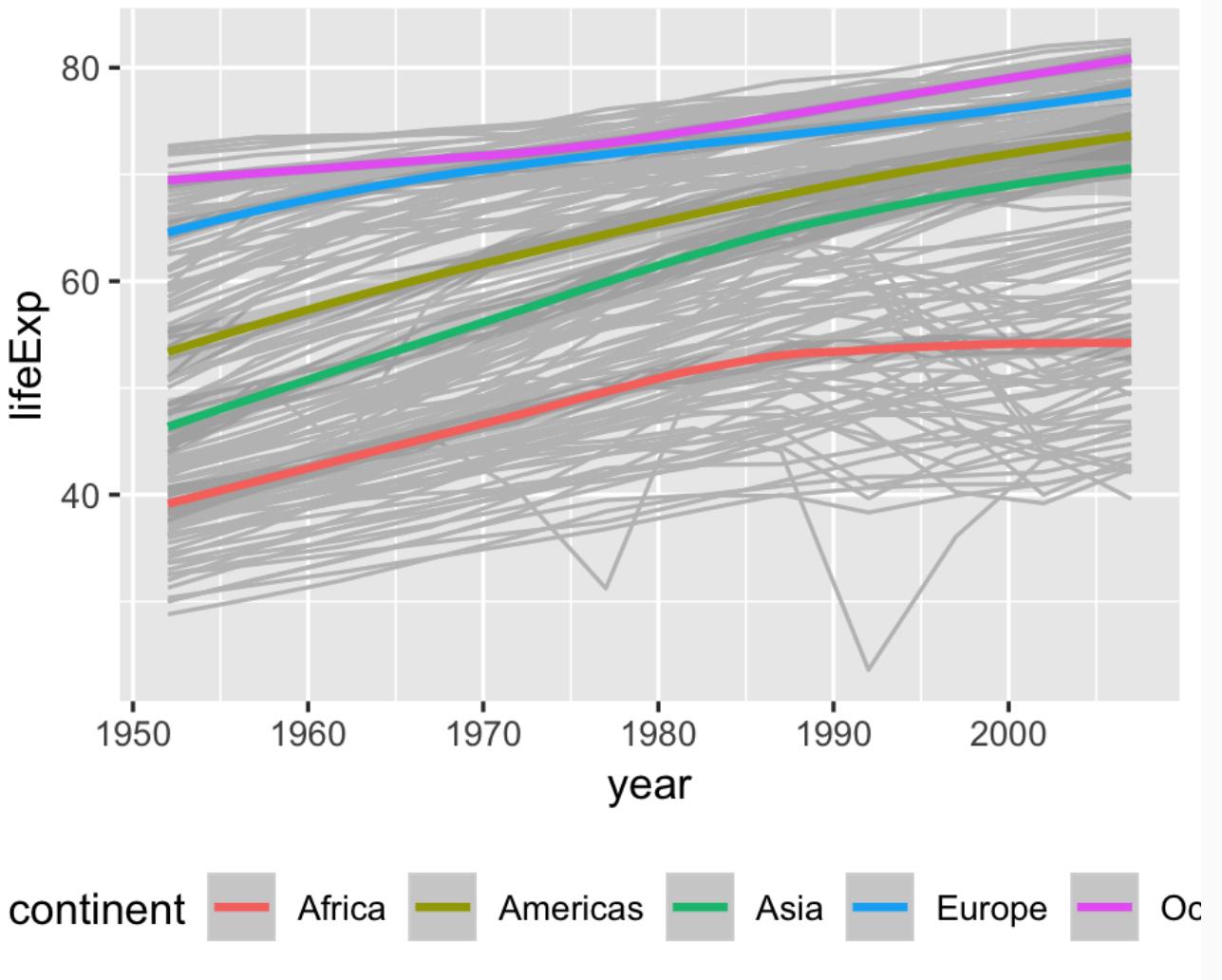


Wait, what color is each continent?

```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_smooth() +  
  theme(  
    legend.position = "bottom"  
)
```

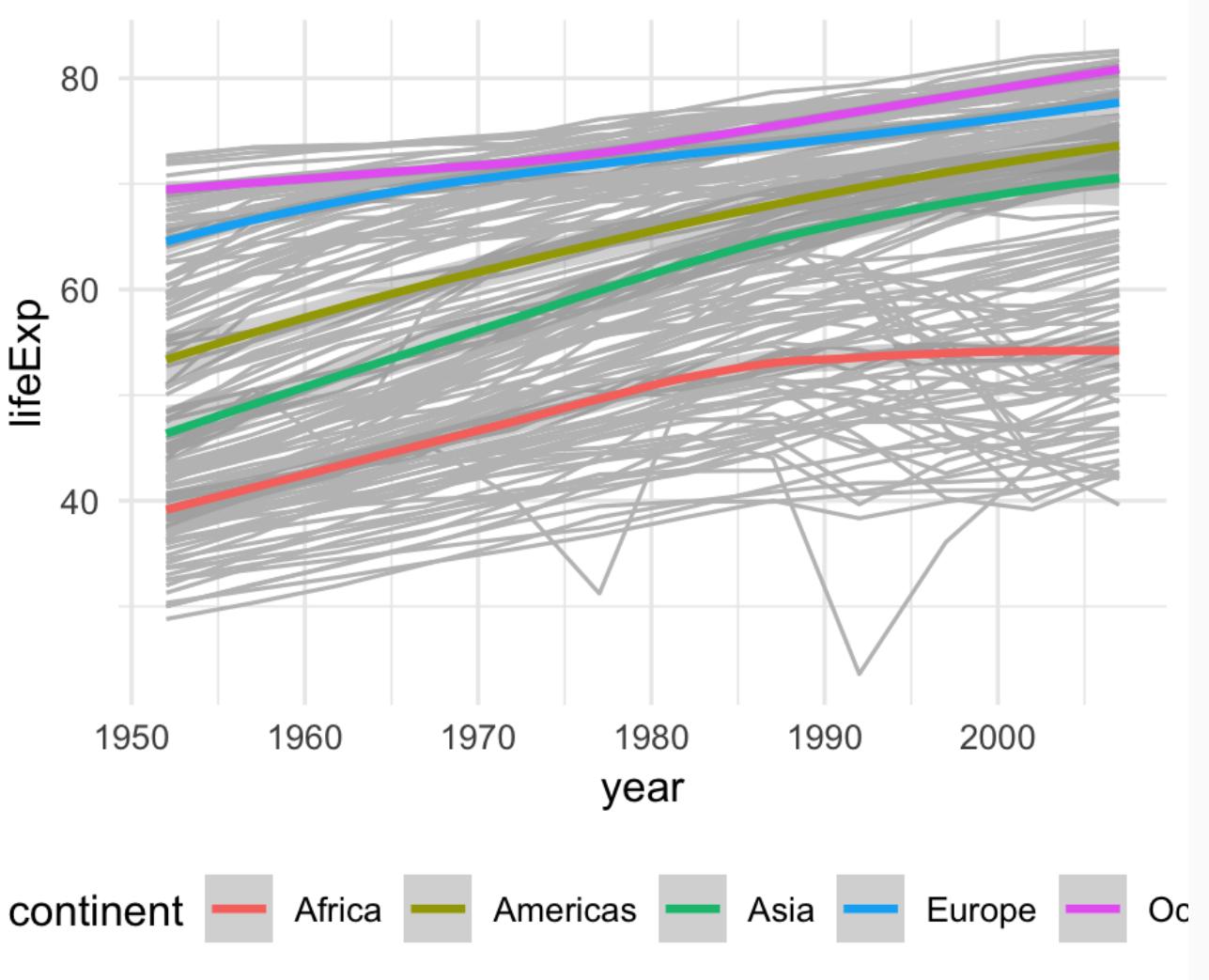


```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_smooth() +  
  theme(  
    legend.position = "bottom"  
)
```

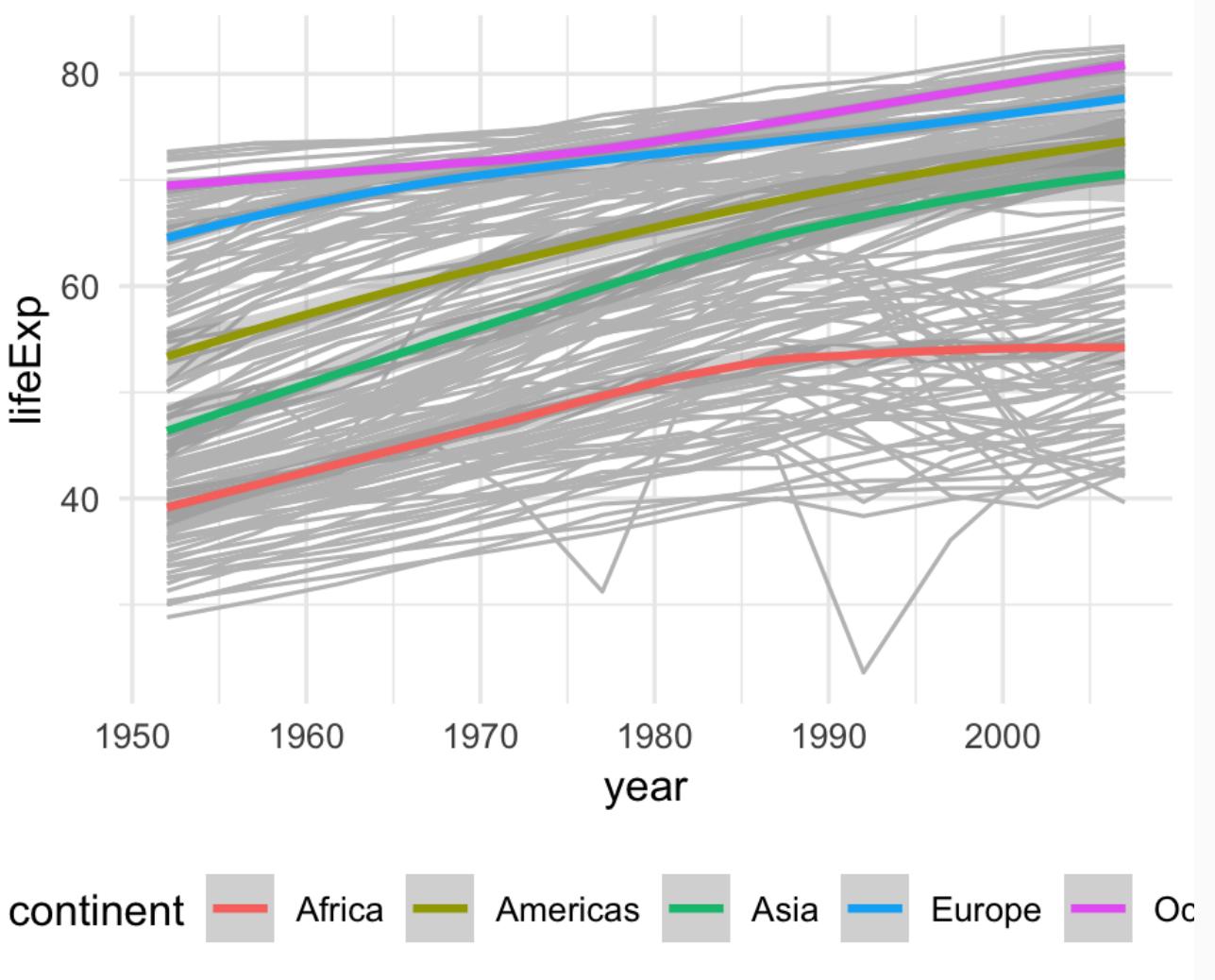


Let's try the minimal theme

```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_smooth() +  
  theme_minimal() +  
  theme(  
    legend.position = "bottom"  
)
```

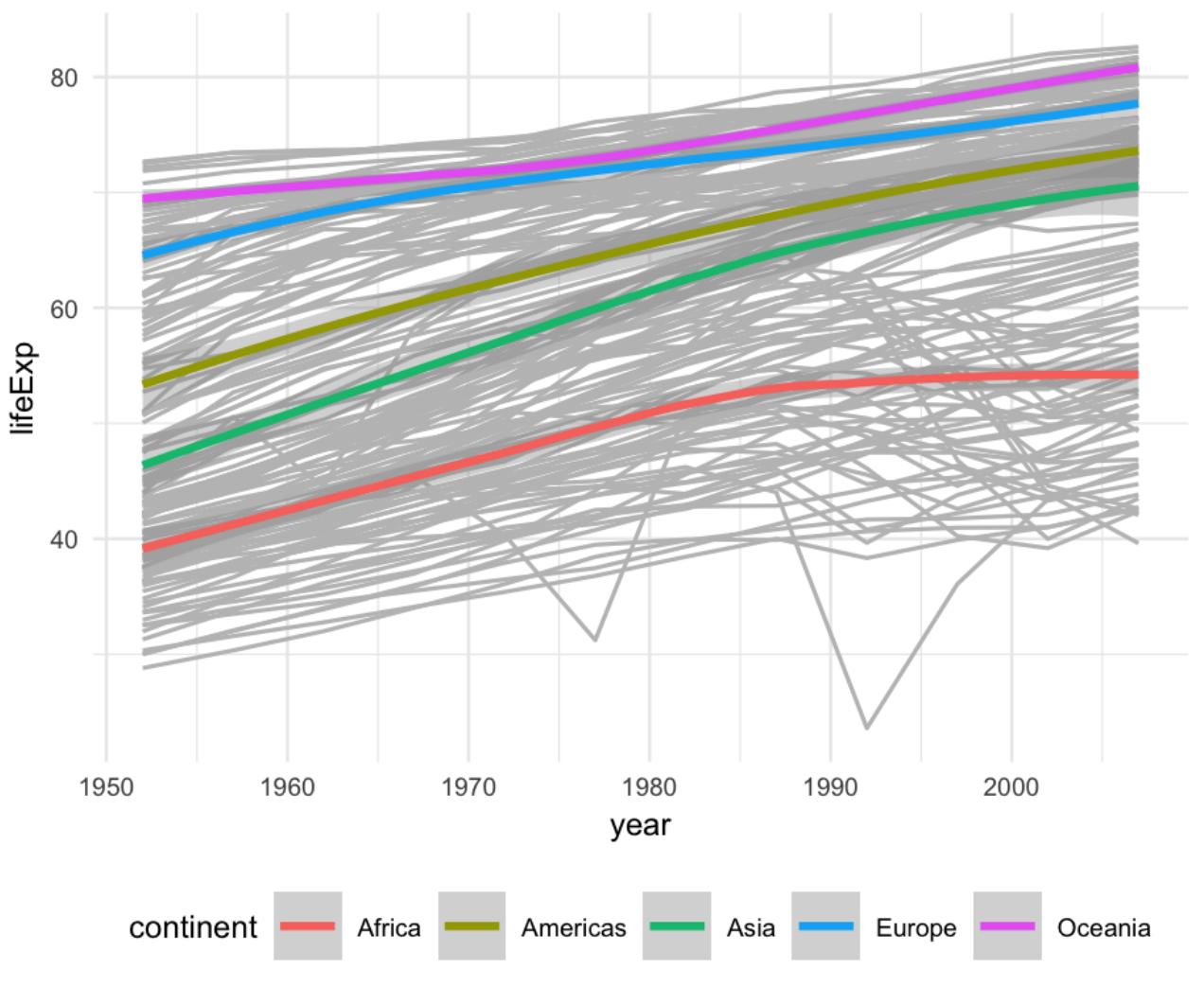


```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_smooth() +  
  theme_minimal() +  
  theme(  
    legend.position = "bottom"  
)
```

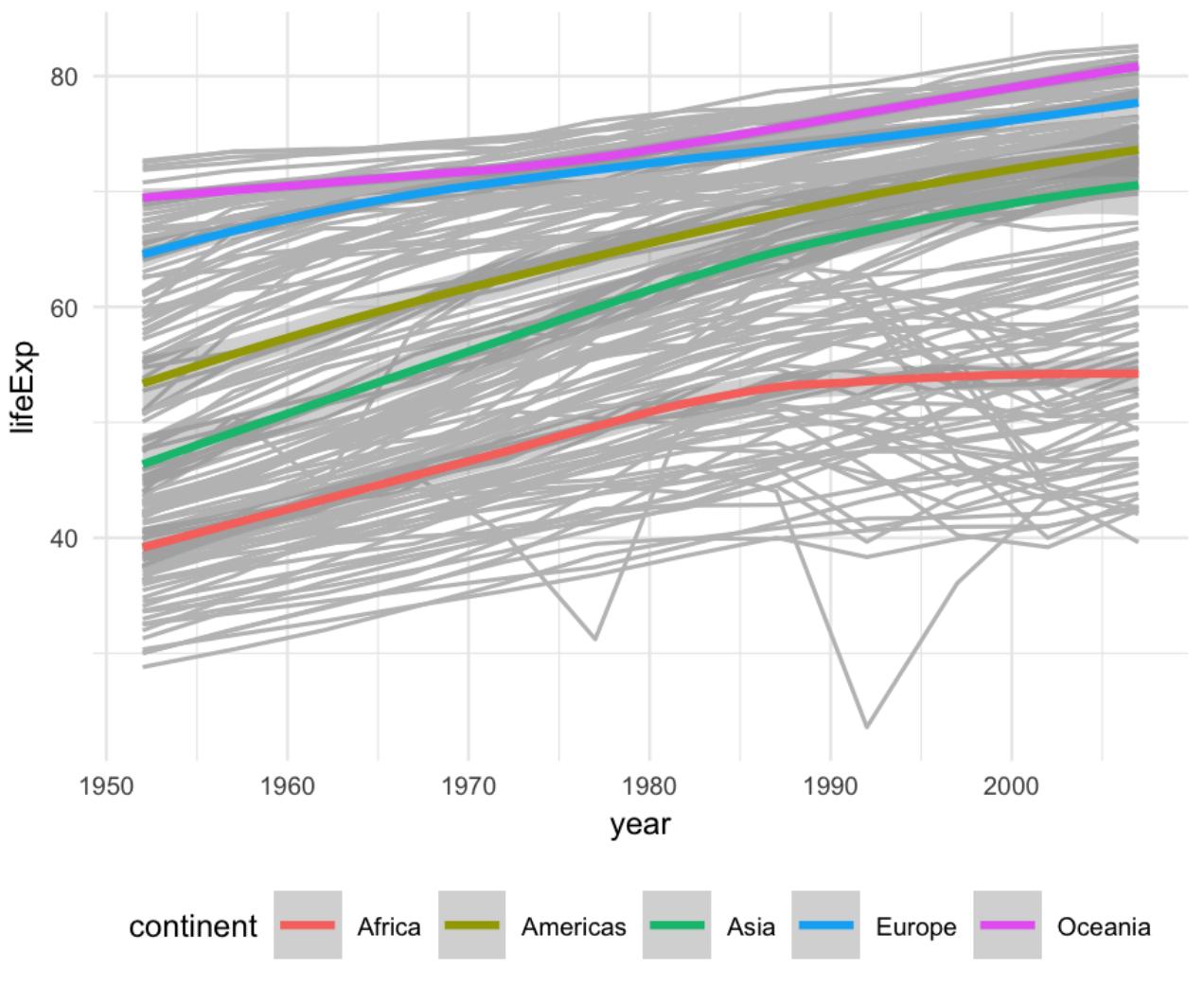


Fonts are kind of big

```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_smooth() +  
  theme_minimal(  
    base_size = 8) +  
  theme(  
    legend.position = "bottom"  
)
```



```
ggplot(gapminder) +  
  aes(x = year,  
      y = lifeExp,  
      color = continent) +  
  geom_line(  
    aes(group = country),  
    color = "grey75"  
) +  
  geom_smooth() +  
  theme_minimal(  
    base_size = 8) +  
  theme(  
    legend.position = "bottom"  
)
```



Cool, let's switch gears

```

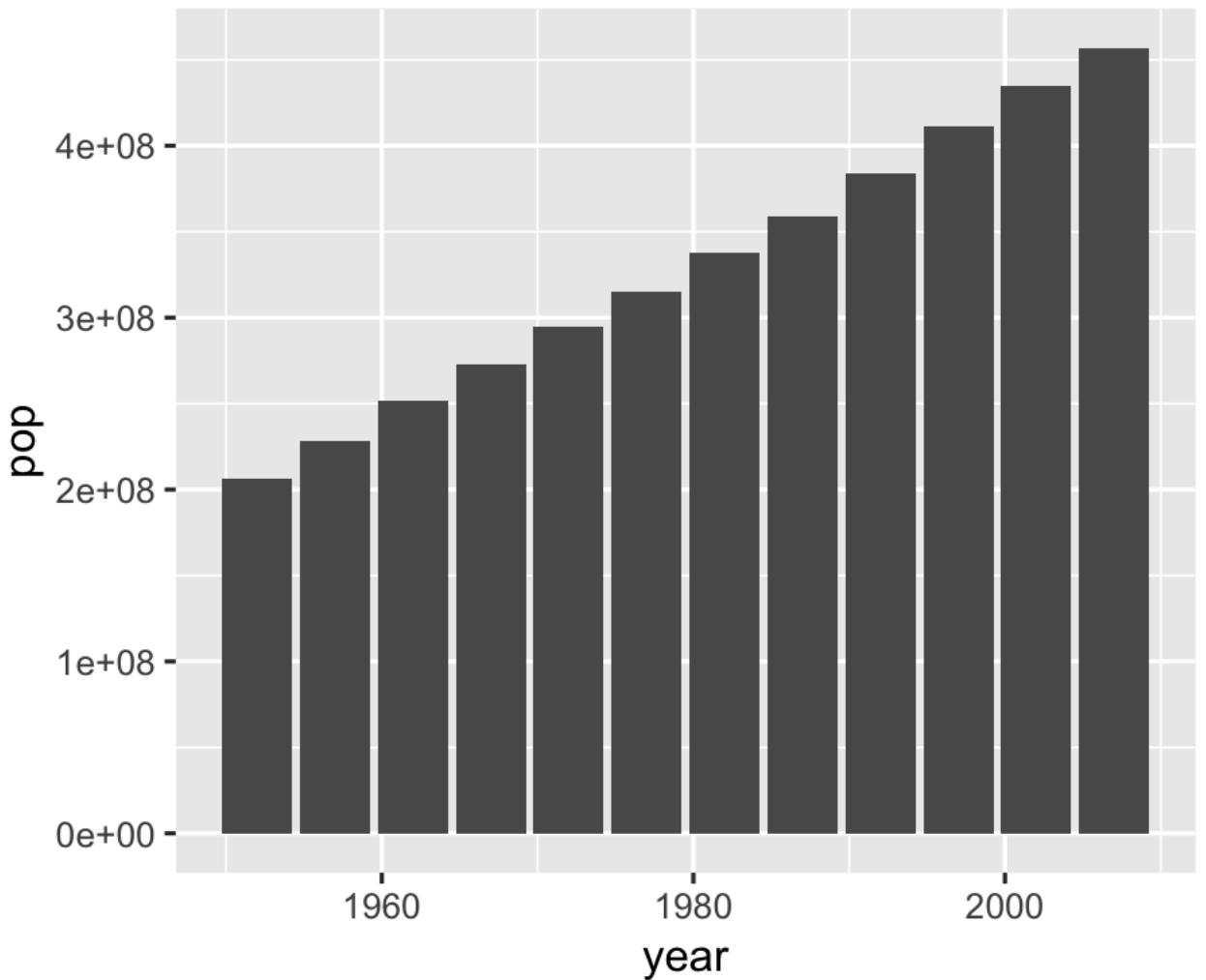
americas <-
gapminder %>%
filter(
  country %in% c(
    "United States",
    "Canada",
    "Mexico",
    "Ecuador"
  )
)

```

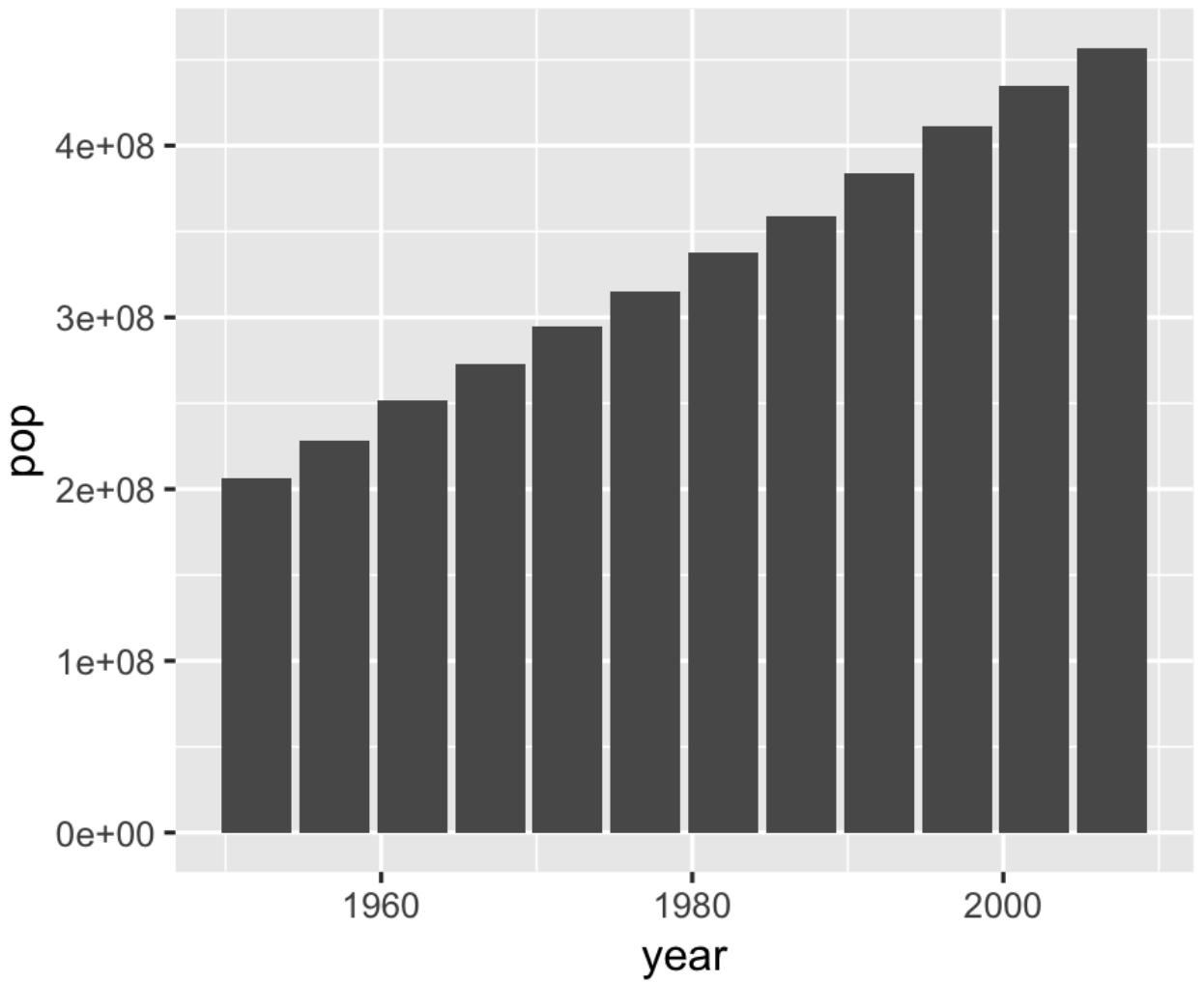
Let's look at four countries in more detail. How do their populations compare to each other?

country	continent	year	lifeExp	pop	gdpPerCap
Canada	Americas	1952	68.750	14785584	11367.161
Canada	Americas	1957	69.960	17010154	12489.950
Canada	Americas	1962	71.300	18985849	13462.486
Canada	Americas	1967	72.130	20819767	16076.588
Canada	Americas	1972	72.880	22284500	18970.571
Canada	Americas	1977	74.210	23796400	22090.883
Canada	Americas	1982	75.760	25201900	22898.792
Canada	Americas	1987	76.860	26549700	26626.515
Canada	Americas	1992	77.950	28523502	26342.884
Canada	Americas	1997	78.610	30305843	28954.926
Canada	Americas	2002	79.770	31902268	33328.965
Canada	Americas	2007	80.653	33390141	36319.235

```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop  
) +  
  geom_col()
```

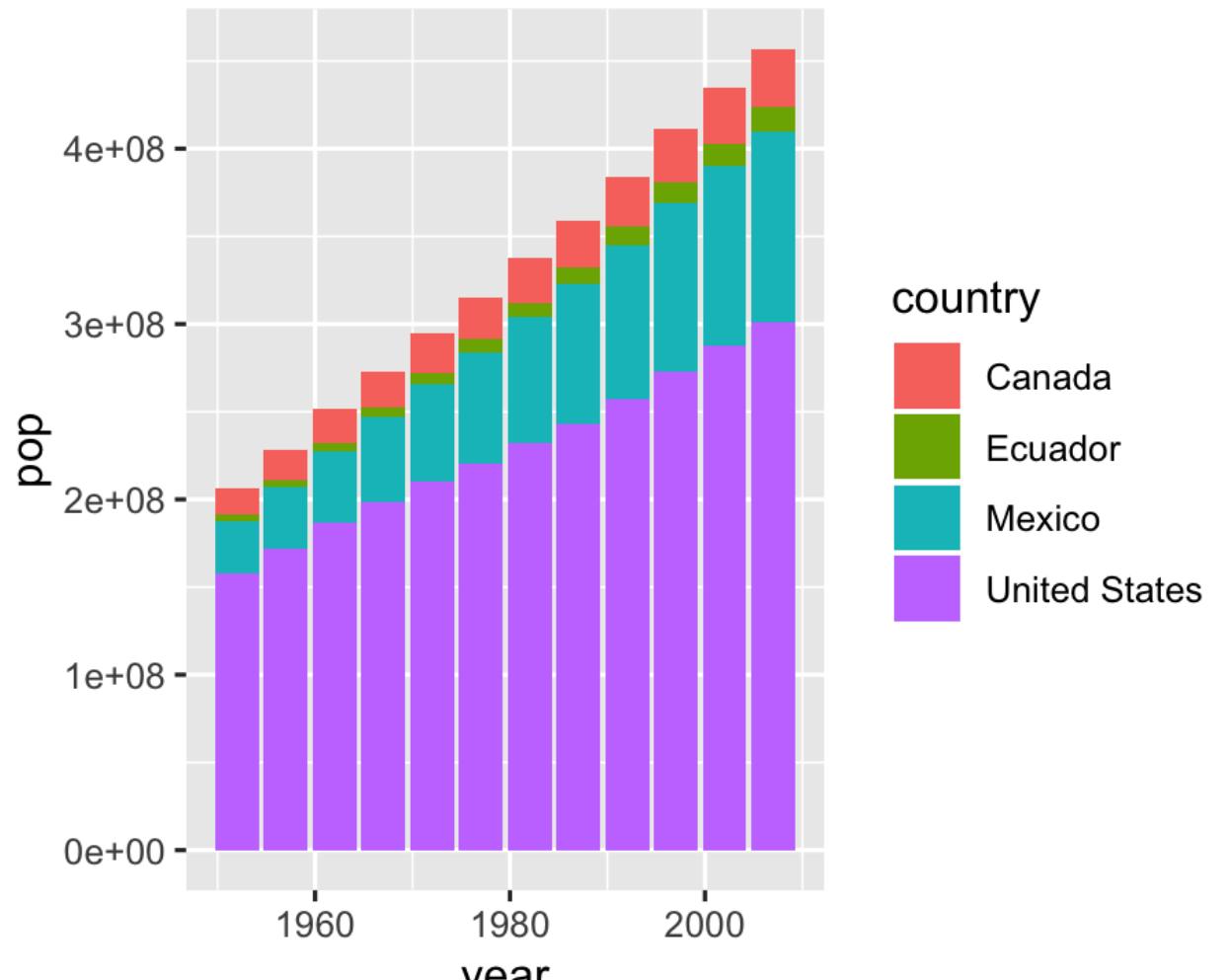


```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop  
) +  
  geom_col()
```

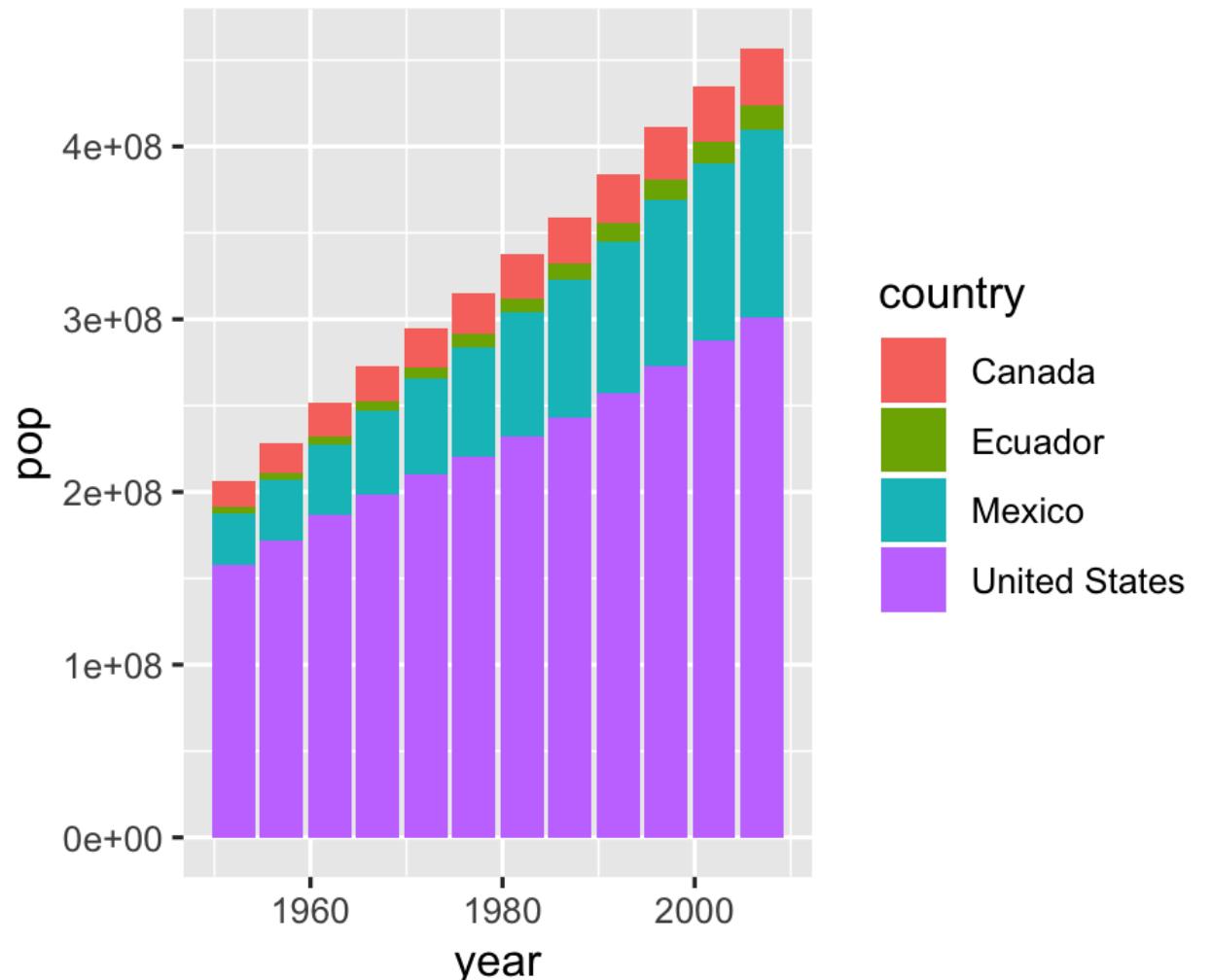


Yeah, but how many people are in each country?

```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop,  
    fill = country  
) +  
  geom_col()
```



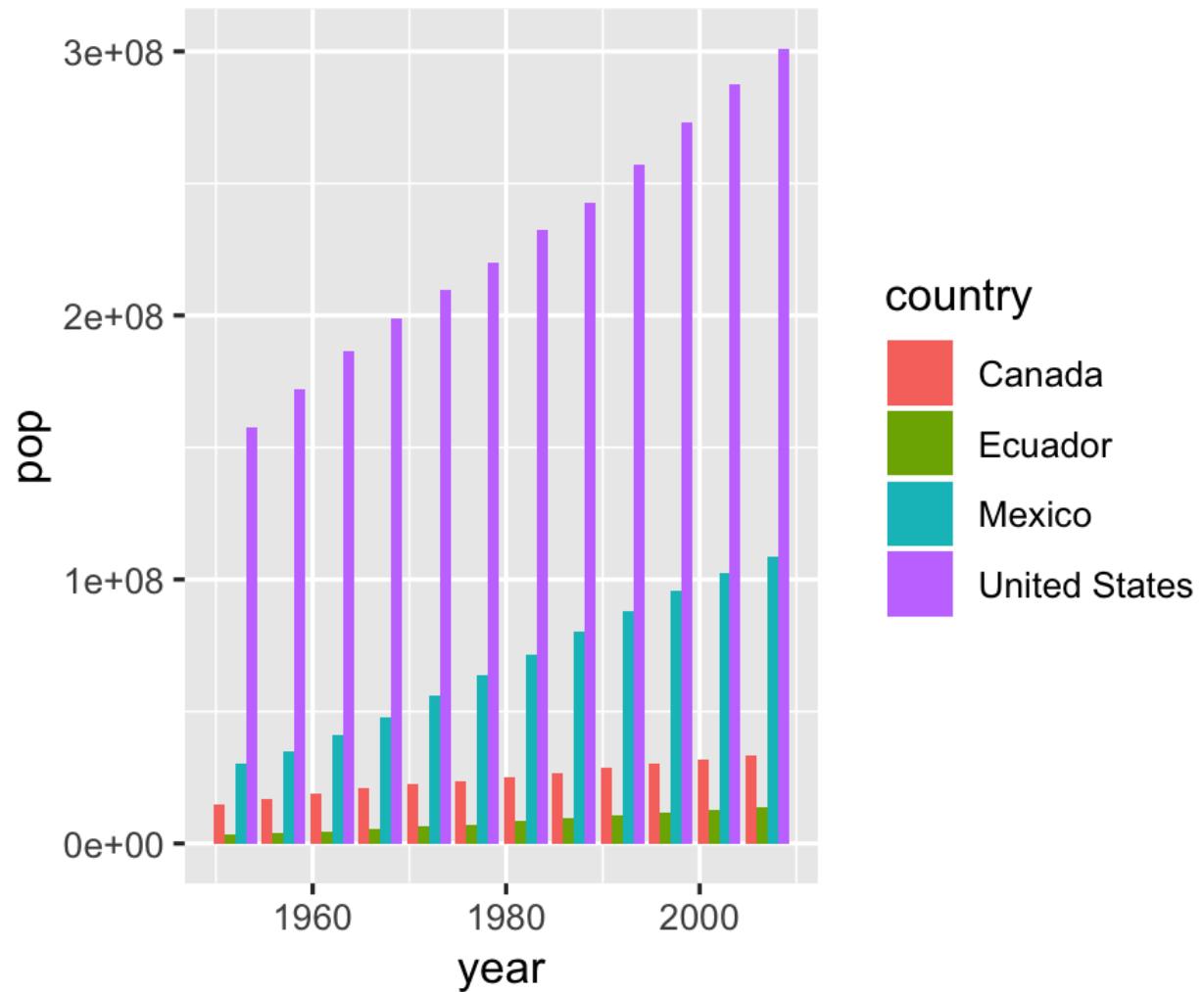
```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop,  
    fill = country  
) +  
  geom_col()
```



Bars are "stacked", can we separate?

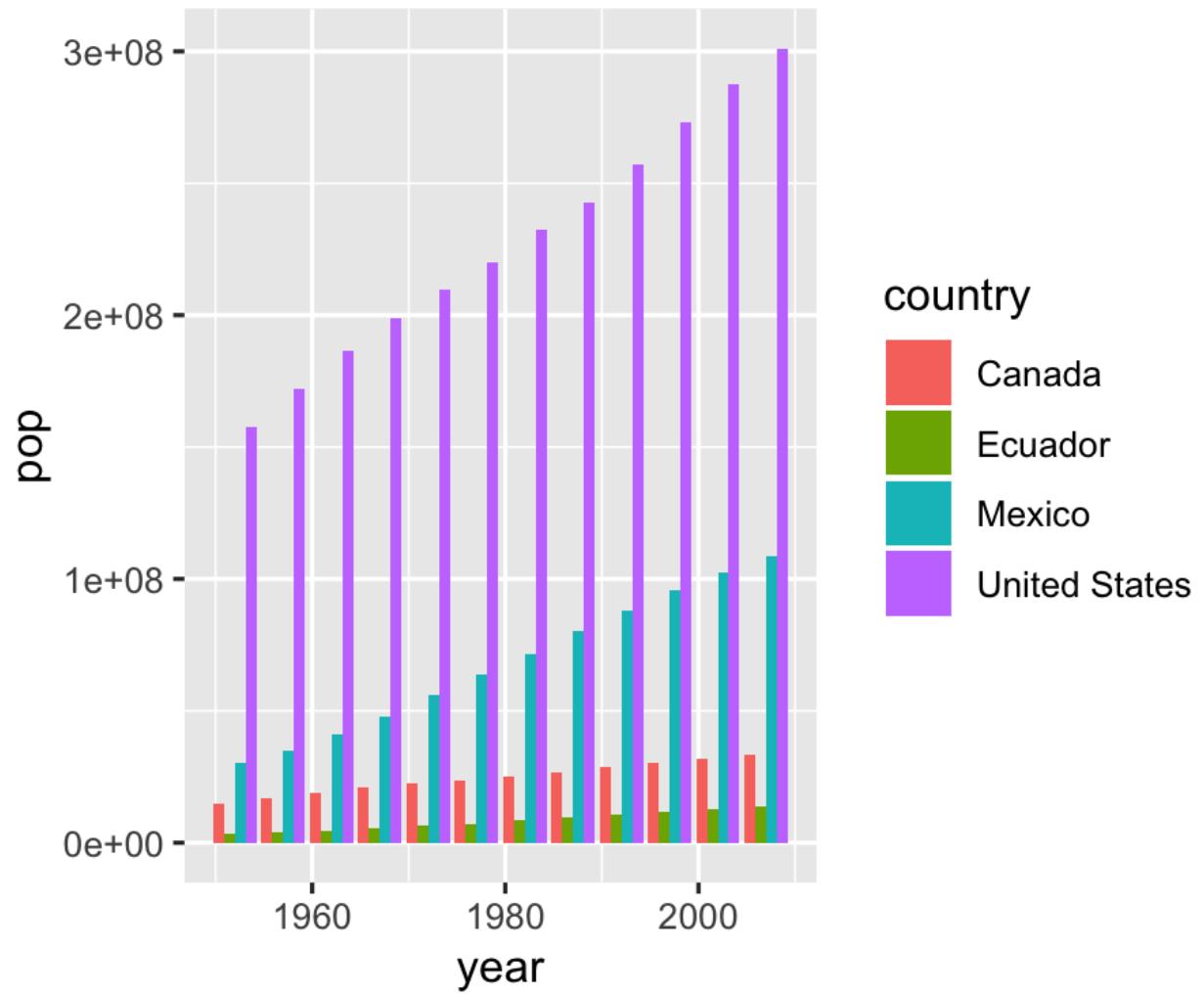
```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
)
```

`position = "dodge"` places objects
next to each other instead of
overlapping



```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
)
```

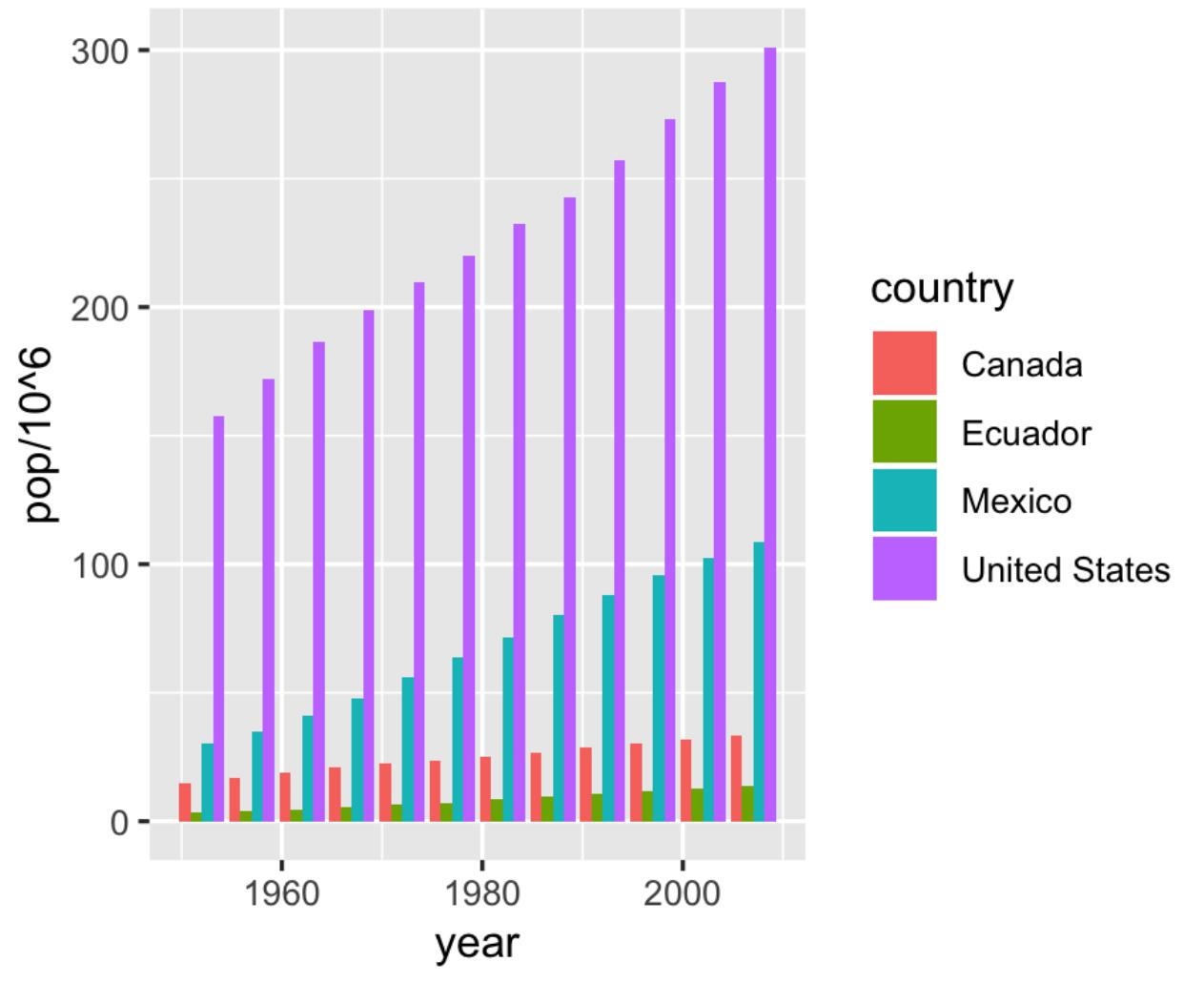
position = "dodge" places objects
next to each other instead of
overlapping



What is scientific notation anyway?

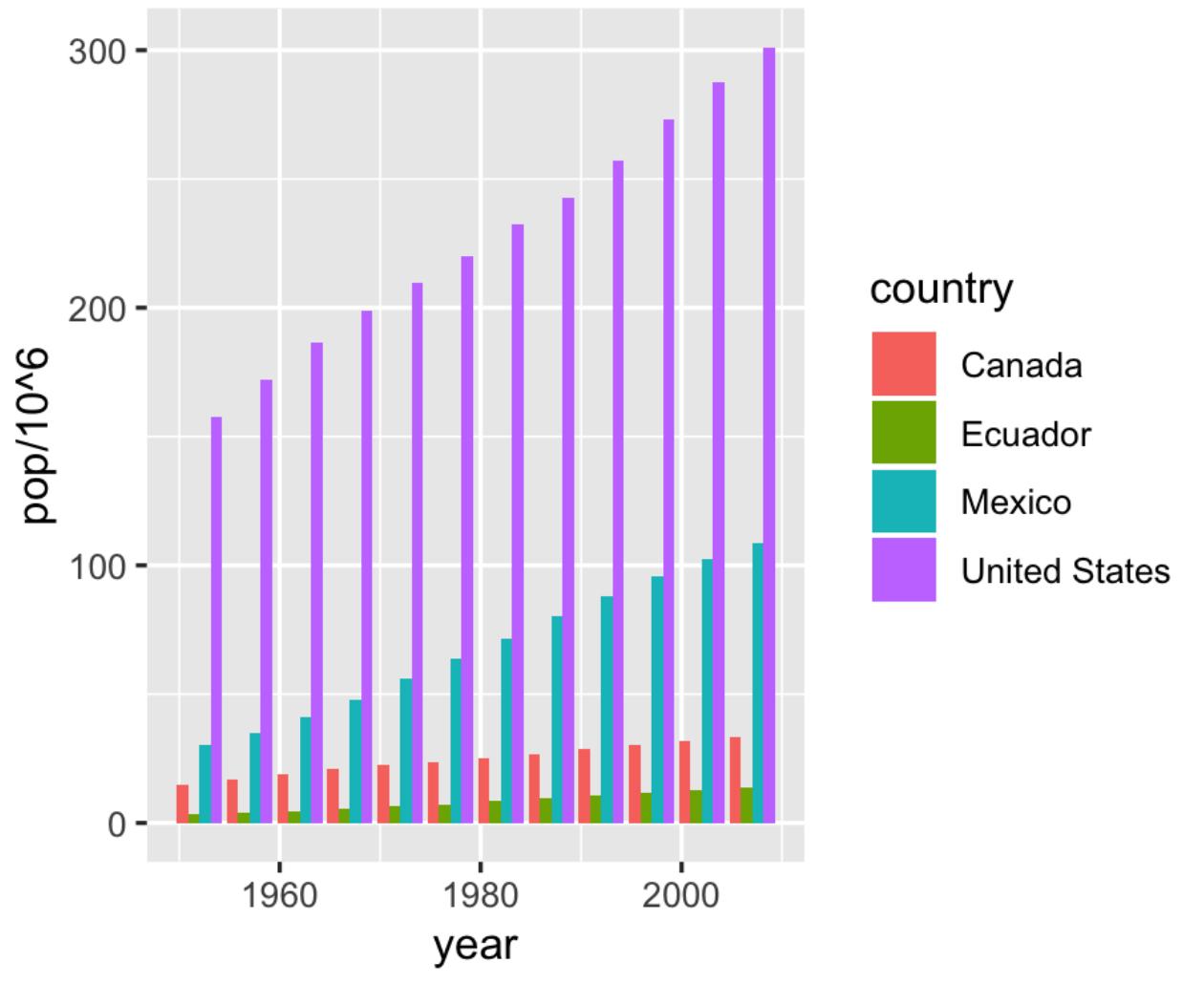
```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop / 10^6,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
)
```

ggplot aesthetics can take
expressions!



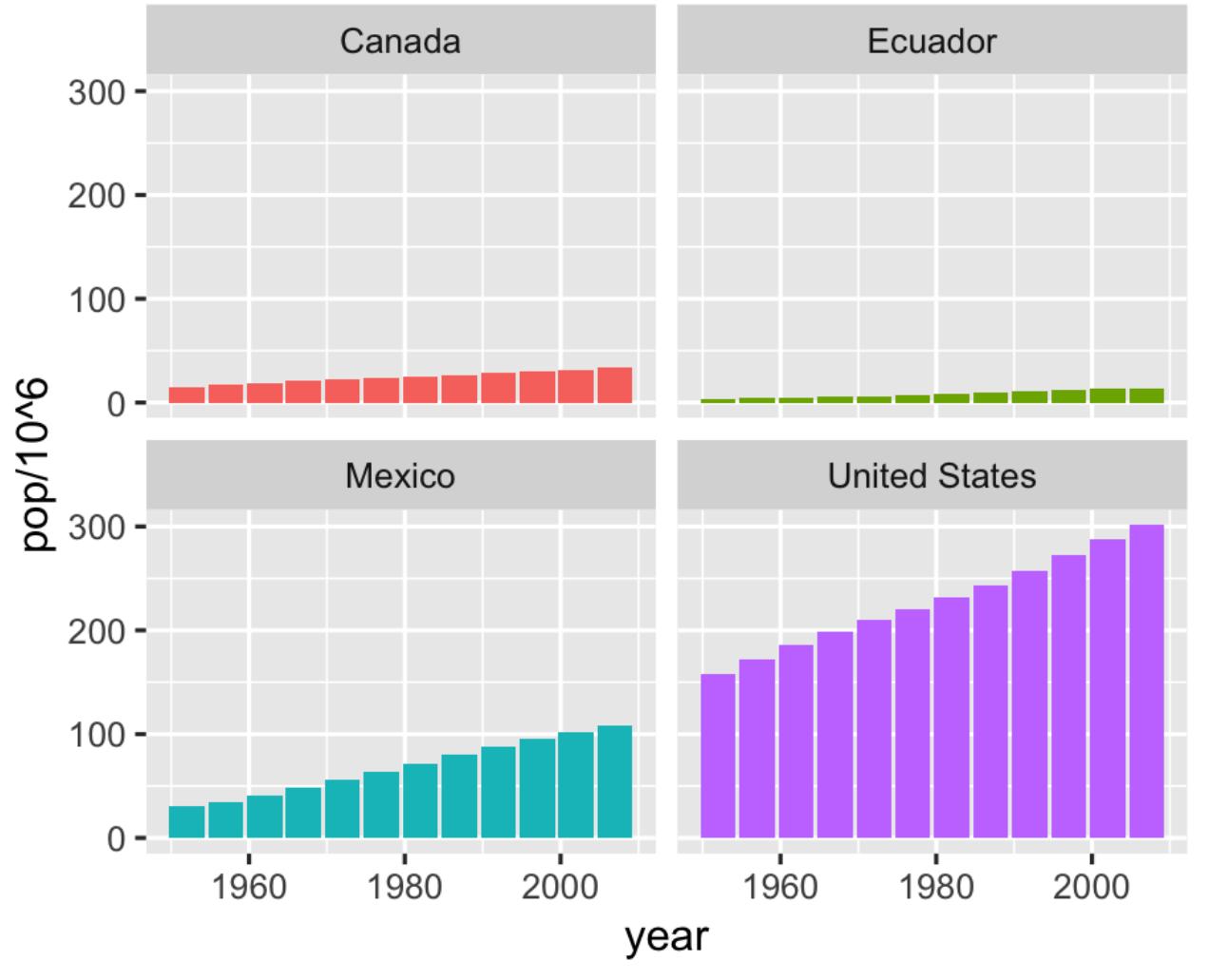
```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop / 10^6,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
)
```

ggplot aesthetics can take
expressions!

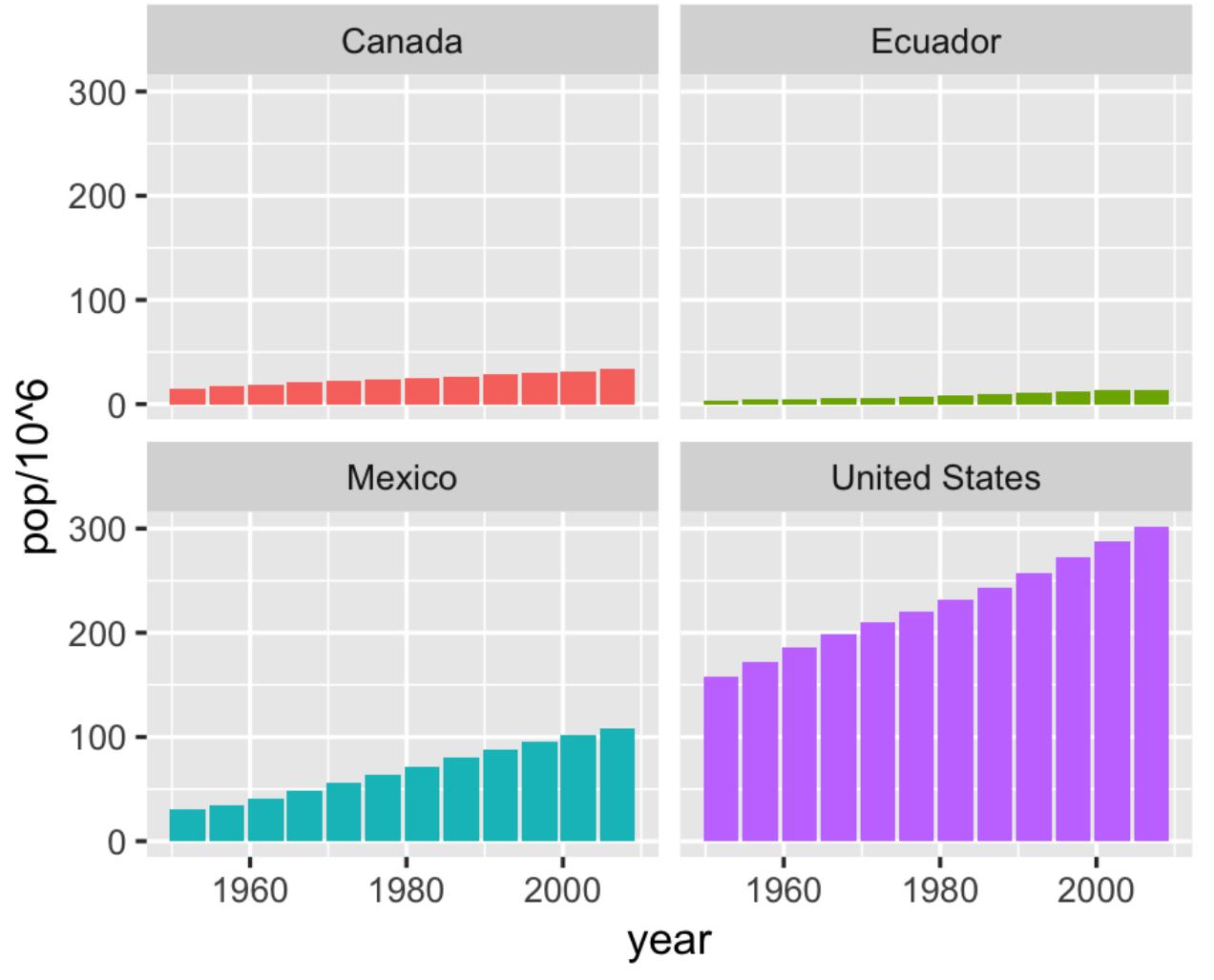


Might be easier to see countries
individually

```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop / 10^6,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
) +  
  facet_wrap(~ country) +  
  guides(fill = FALSE)
```

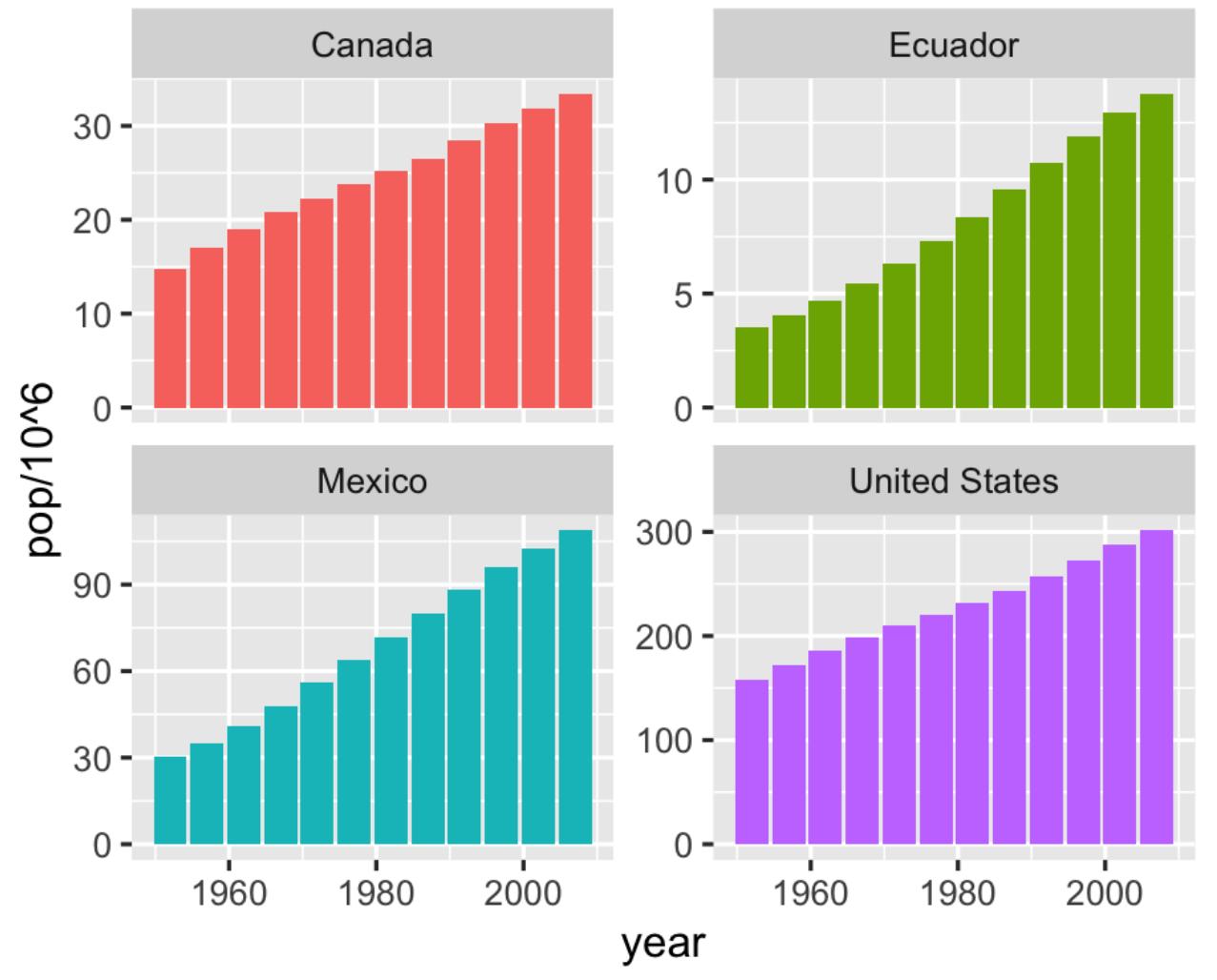


```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop / 10^6,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
) +  
  facet_wrap(~ country) +  
  guides(fill = FALSE)
```

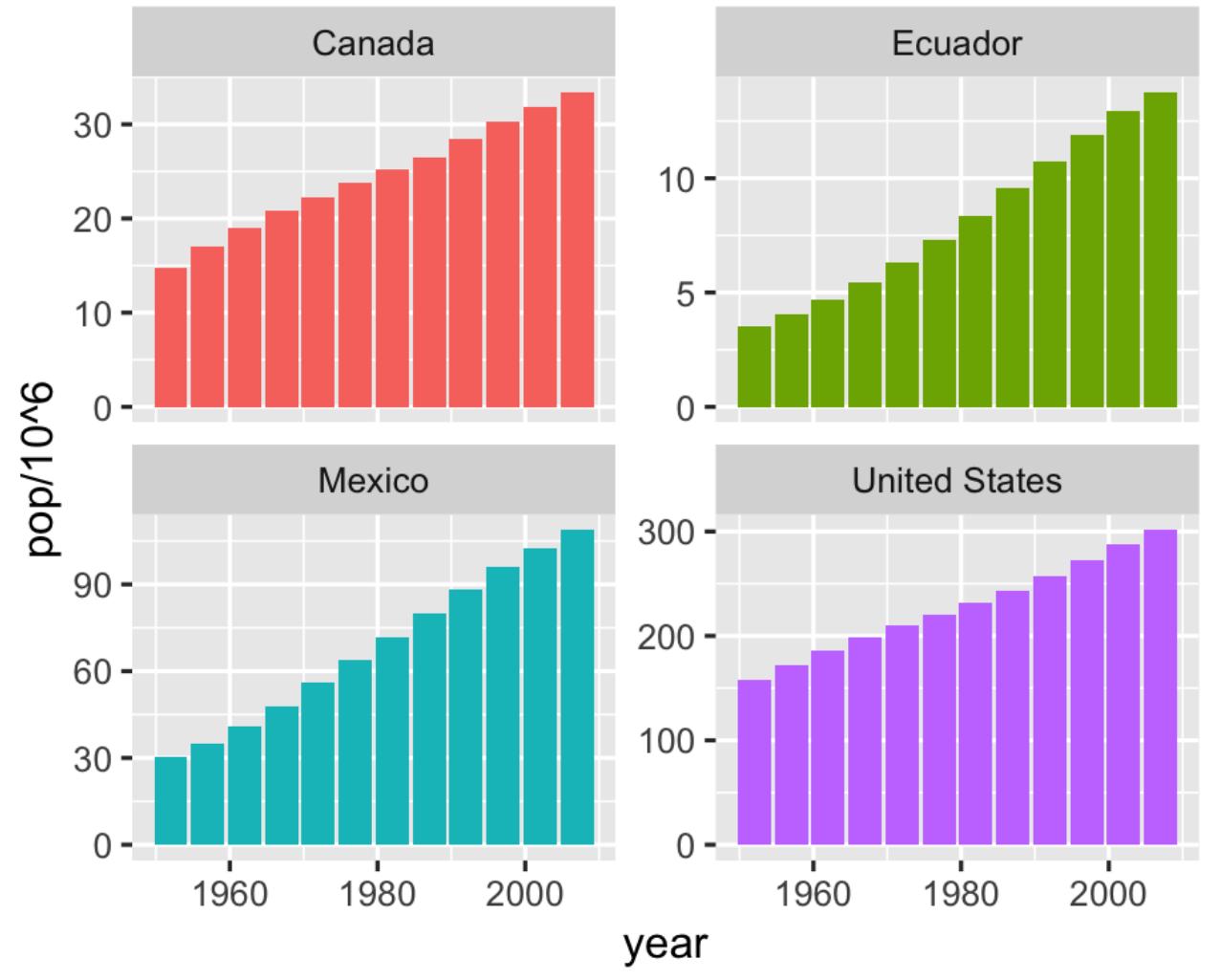


Let range of y-axis vary in each plot

```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop / 10^6,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
) +  
  facet_wrap(~ country,  
            scales = "free_y") +  
  guides(fill = FALSE)
```

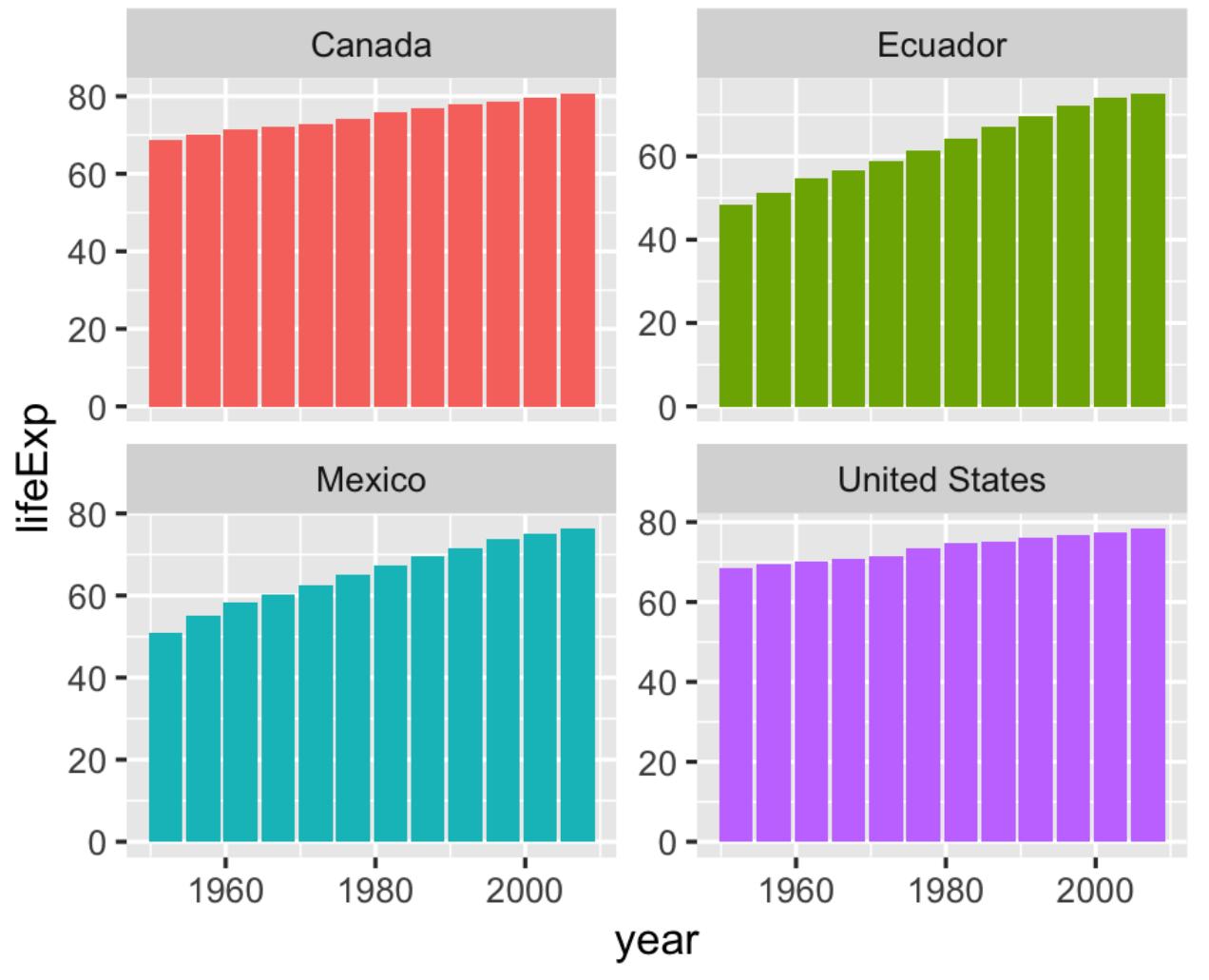


```
ggplot(americas) +  
  aes(  
    x = year,  
    y = pop / 10^6,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
) +  
  facet_wrap(~ country,  
            scales = "free_y") +  
  guides(fill = FALSE)
```

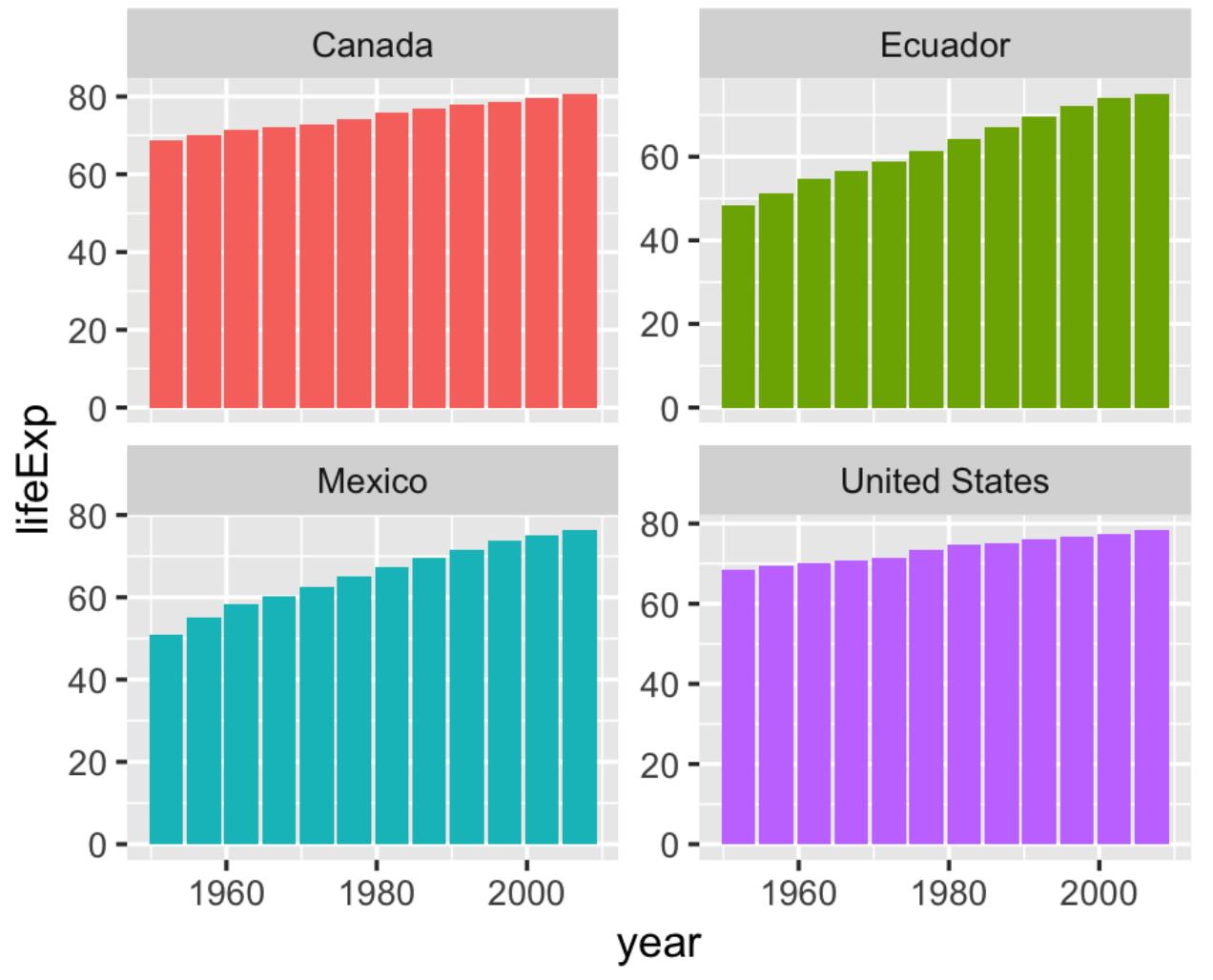


What about life expectancy again?

```
ggplot(americas) +  
  aes(  
    x = year,  
    y = lifeExp,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
) +  
  facet_wrap(~ country,  
            scales = "free_y") +  
  guides(fill = FALSE)
```

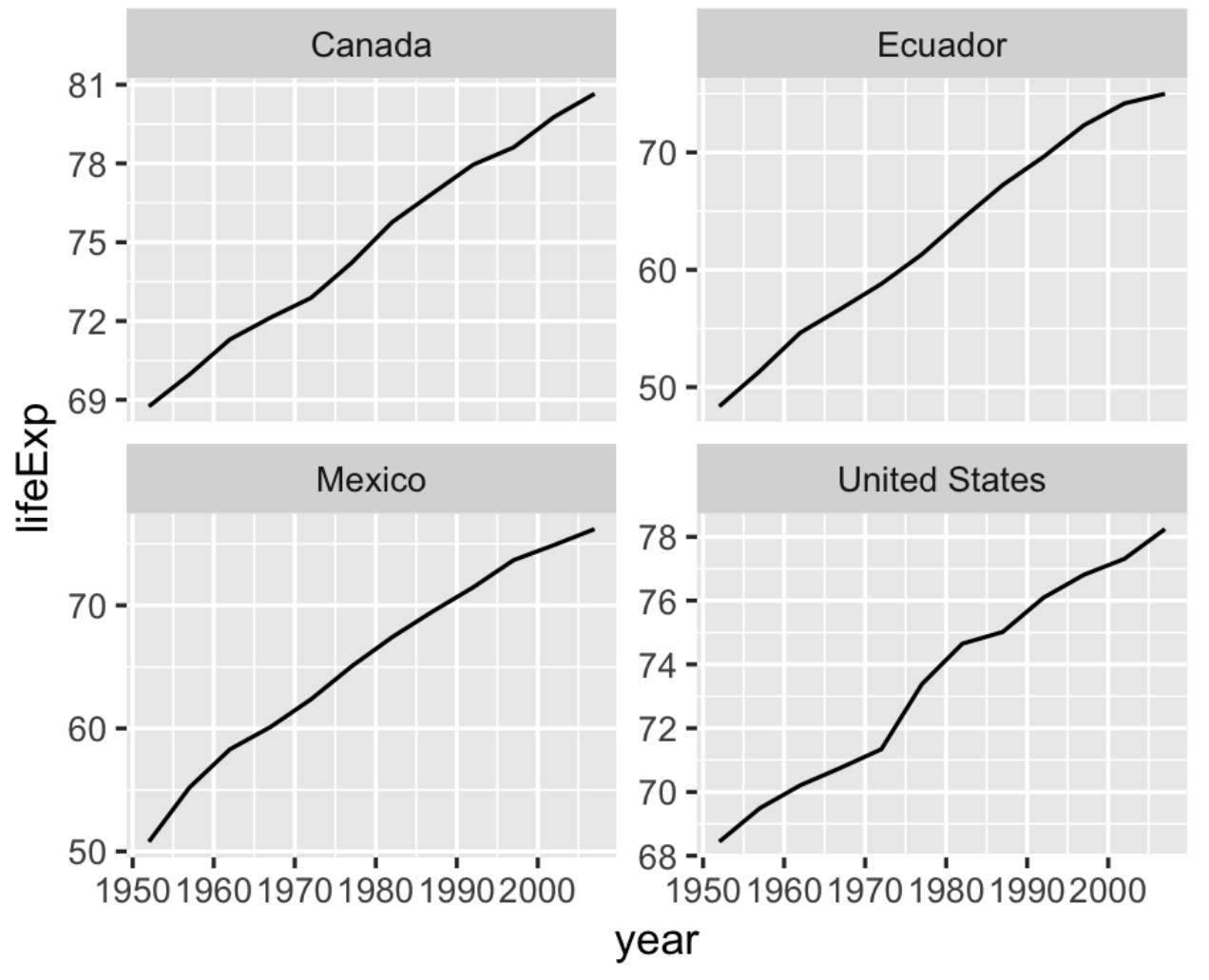


```
ggplot(americas) +  
  aes(  
    x = year,  
    y = lifeExp,  
    fill = country  
) +  
  geom_col(  
    position = "dodge"  
) +  
  facet_wrap(~ country,  
            scales = "free_y") +  
  guides(fill = FALSE)
```

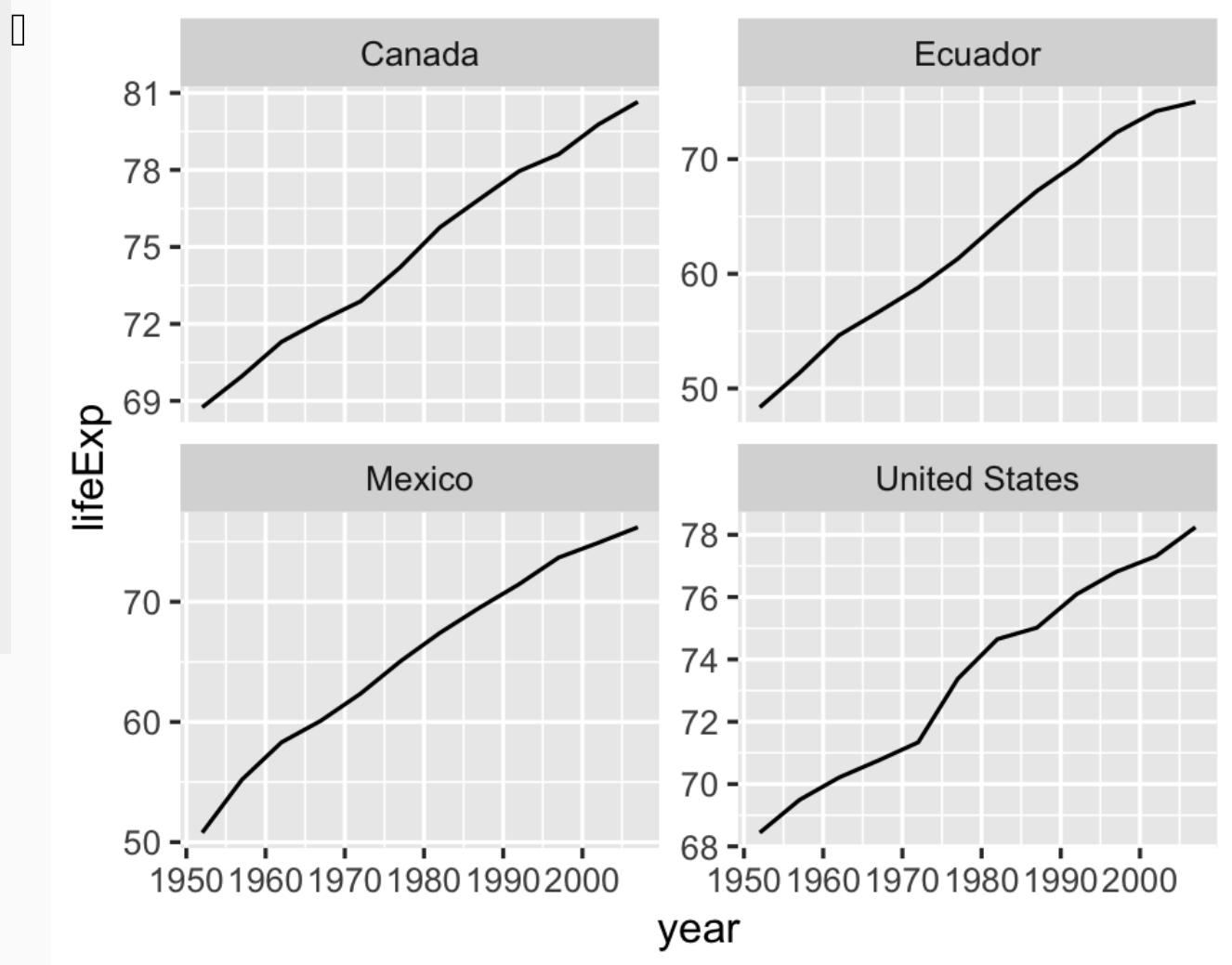


This should really be `~` instead of `~`

```
ggplot(americas) +  
  aes(  
    x = year,  
    y = lifeExp,  
    fill = country  
) +  
  geom_line() +  
  facet_wrap(~ country,  
            scales = "free_y") +  
  guides(fill = FALSE)
```

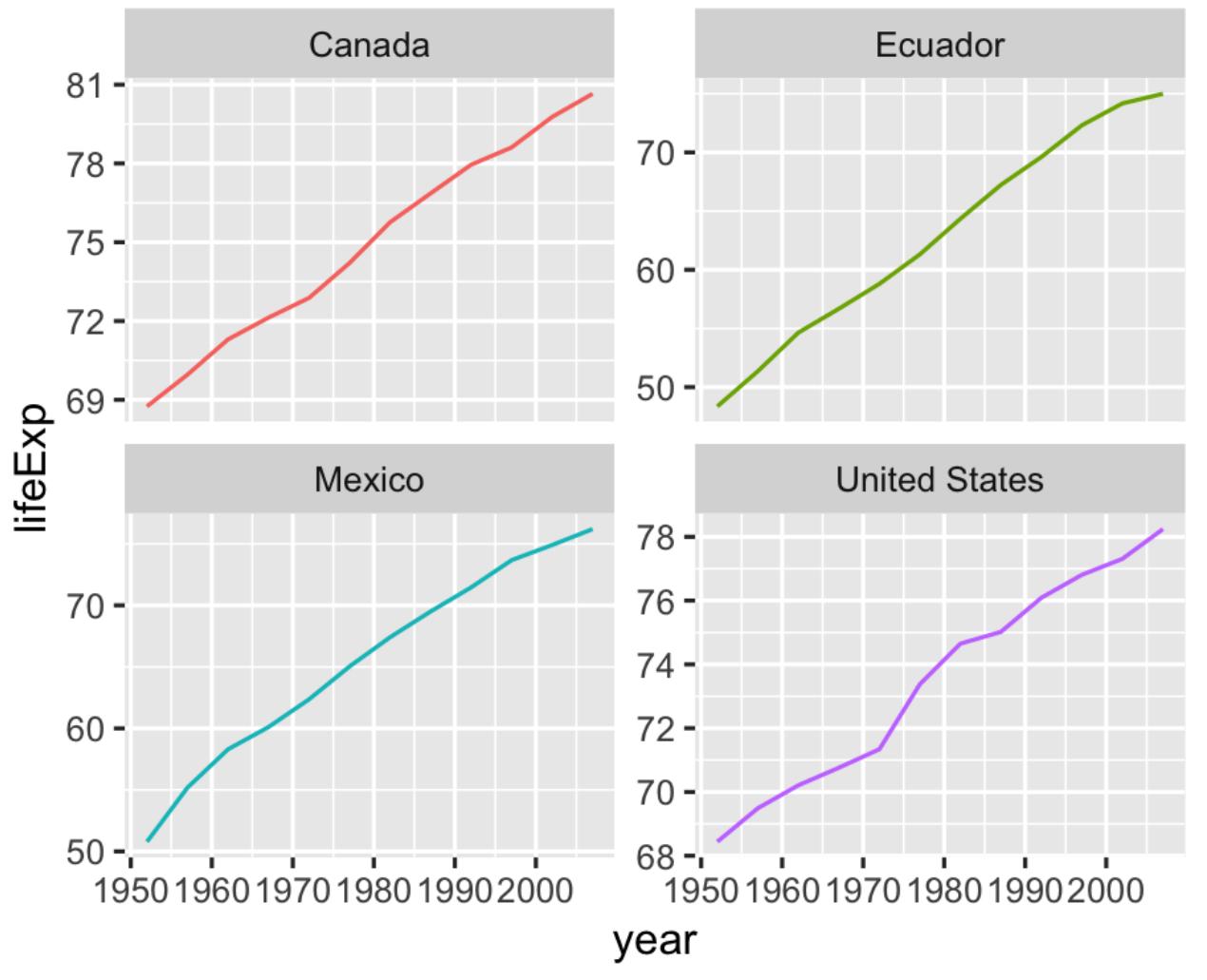


```
ggplot(americas) +  
  aes(  
    x = year,  
    y = lifeExp,  
    fill = country  
) +  
  geom_line() +  
  facet_wrap(~ country,  
            scales = "free_y") +  
  guides(fill = FALSE)
```

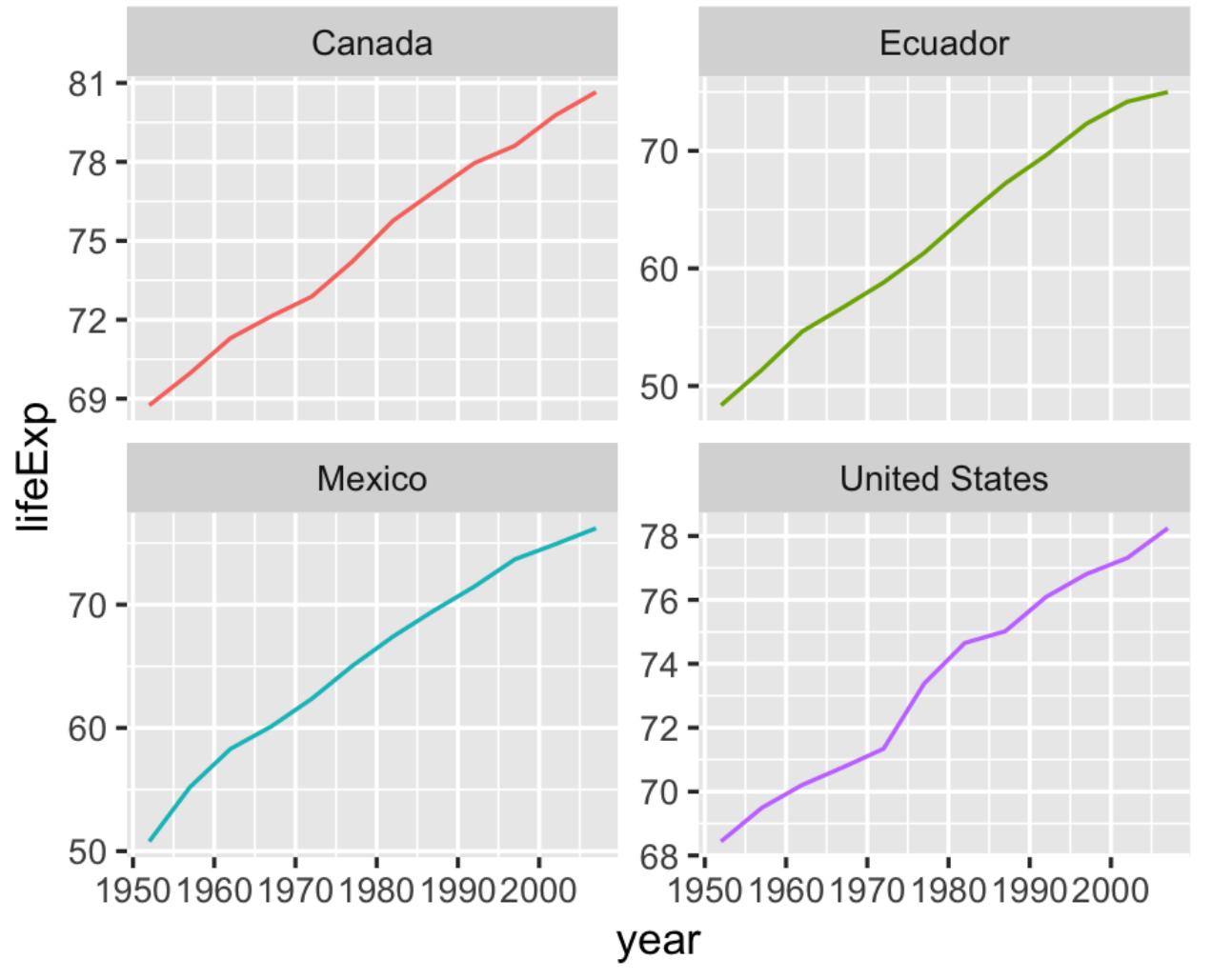


are **filled**, ☒ are **colored**

```
ggplot(americas) +  
  aes(  
    x = year,  
    y = lifeExp,  
    color = country  
) +  
  geom_line() +  
  facet_wrap(~ country,  
            scales = "free_y") +  
  guides(color = FALSE)
```

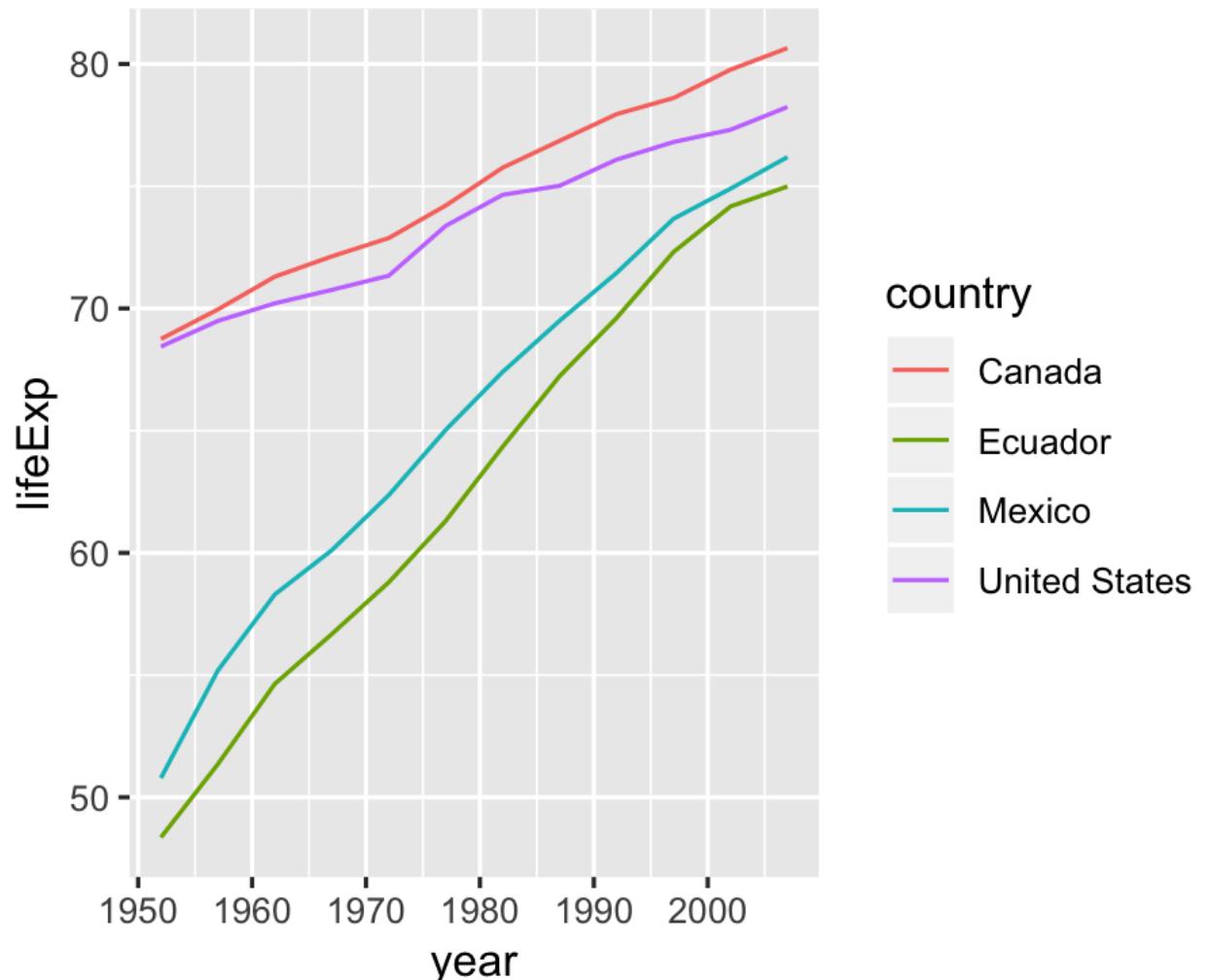


```
ggplot(americas) +  
  aes(  
    x = year,  
    y = lifeExp,  
    color = country  
) +  
  geom_line() +  
  facet_wrap(~ country,  
            scales = "free_y") +  
  guides(color = FALSE)
```

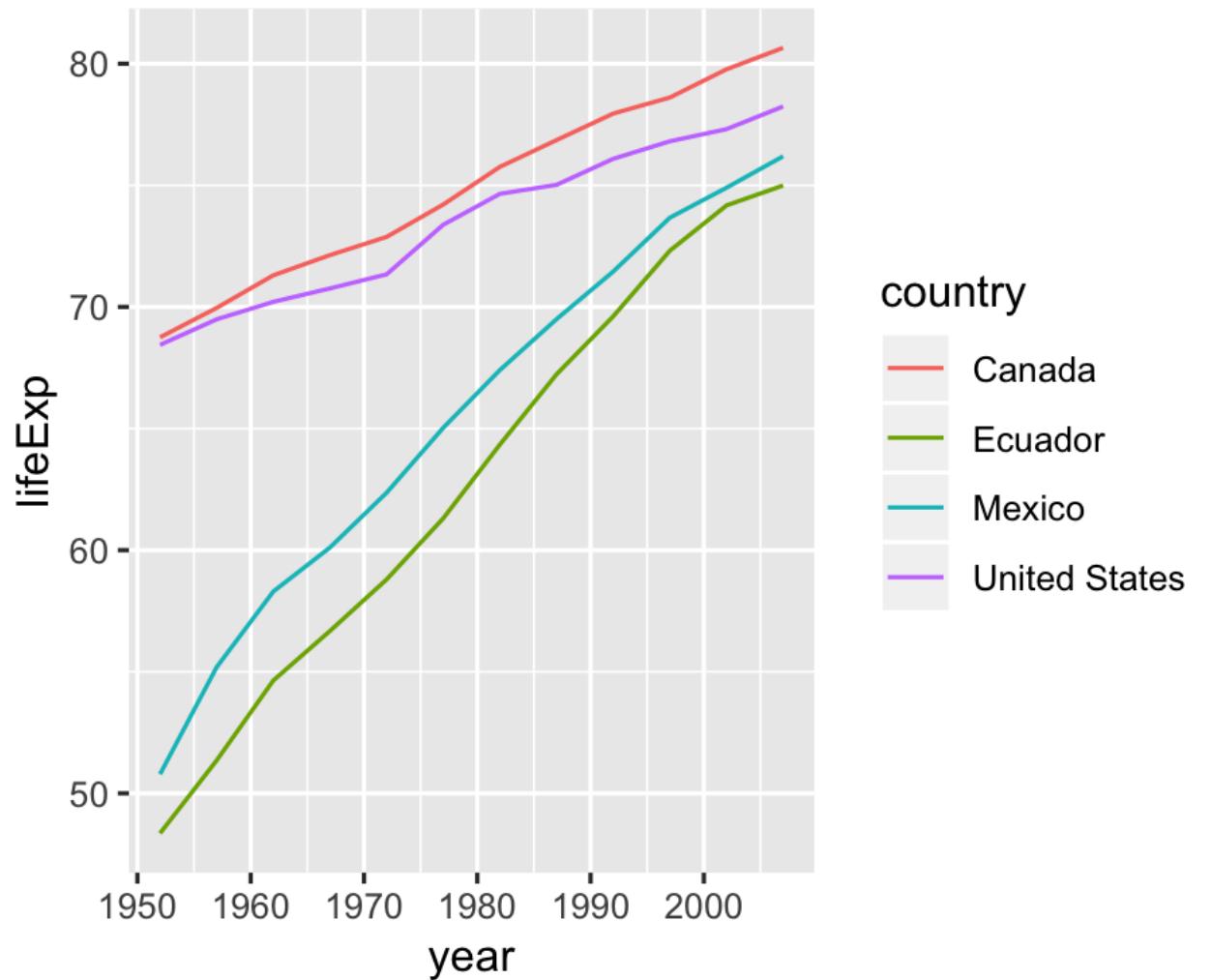


Altogether now!

```
ggplot(americas) +  
  aes(  
    x = year,  
    y = lifeExp,  
    color = country  
) +  
  geom_line()
```



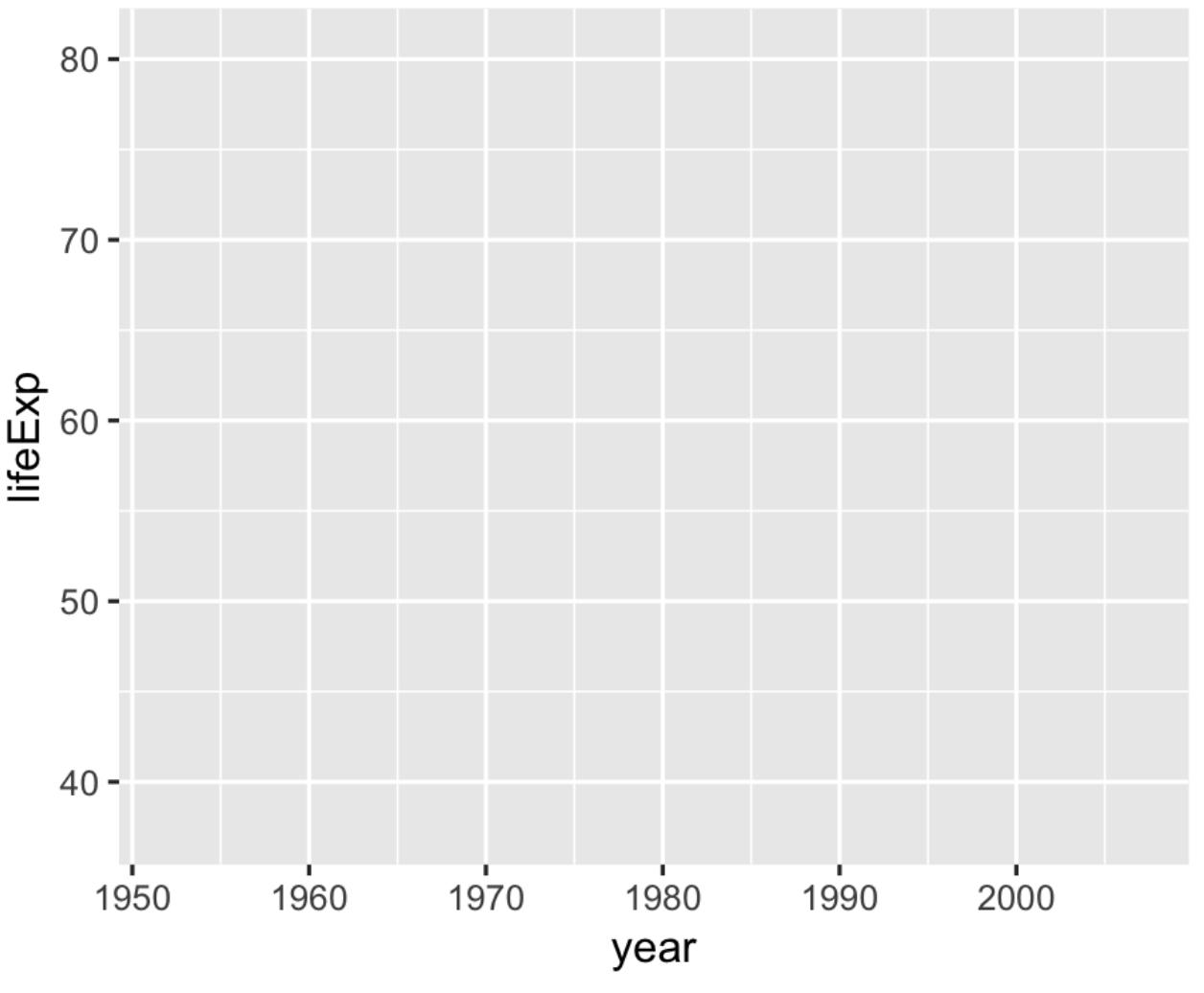
```
ggplot(americas) +  
  aes(  
    x = year,  
    y = lifeExp,  
    color = country  
) +  
  geom_line()
```



Okay, changing gears again. What is range of life expectancy in Americas?

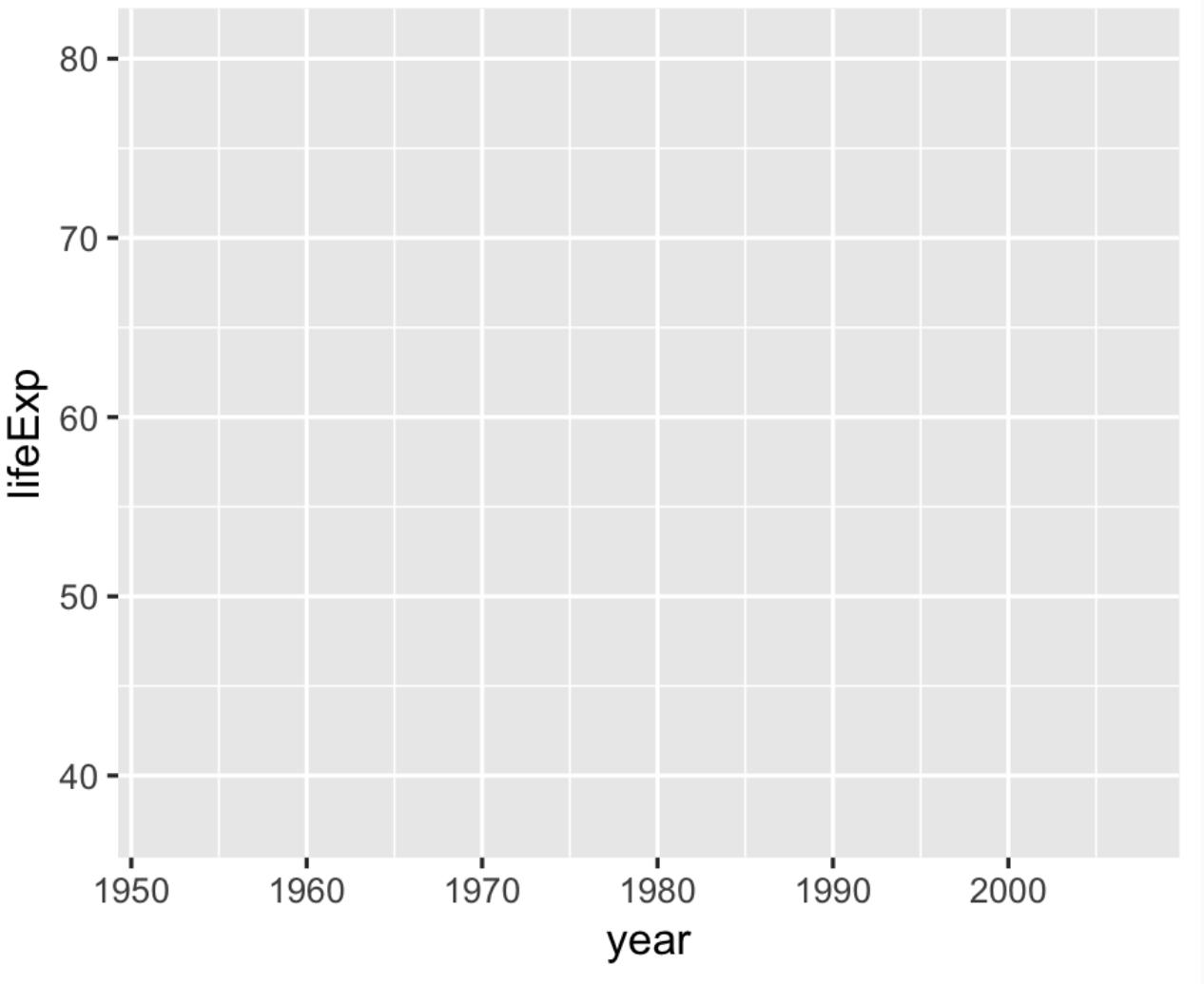
```
gapminder %>%  
  filter(  
    continent = "Americas"  
) %>%  
  ggplot() +  
  aes(  
    x = year,  
    y = lifeExp  
)
```

You can pipe into `ggplot()`!
Just watch for `%>%` changing to `+`



```
gapminder %>%  
  filter(  
    continent = "Americas"  
) %>%  
  ggplot() +  
  aes(  
    x = year,  
    y = lifeExp  
)
```

You can pipe into `ggplot()`!
Just watch for `%>%` changing to `+`



Boxplot for life expectancy range

```
gapminder %>%
  filter(
    continent = "Americas"
  ) %>%
  ggplot() +
  aes(
    x = year,
    y = lifeExp
  ) +
  geom_boxplot()
```

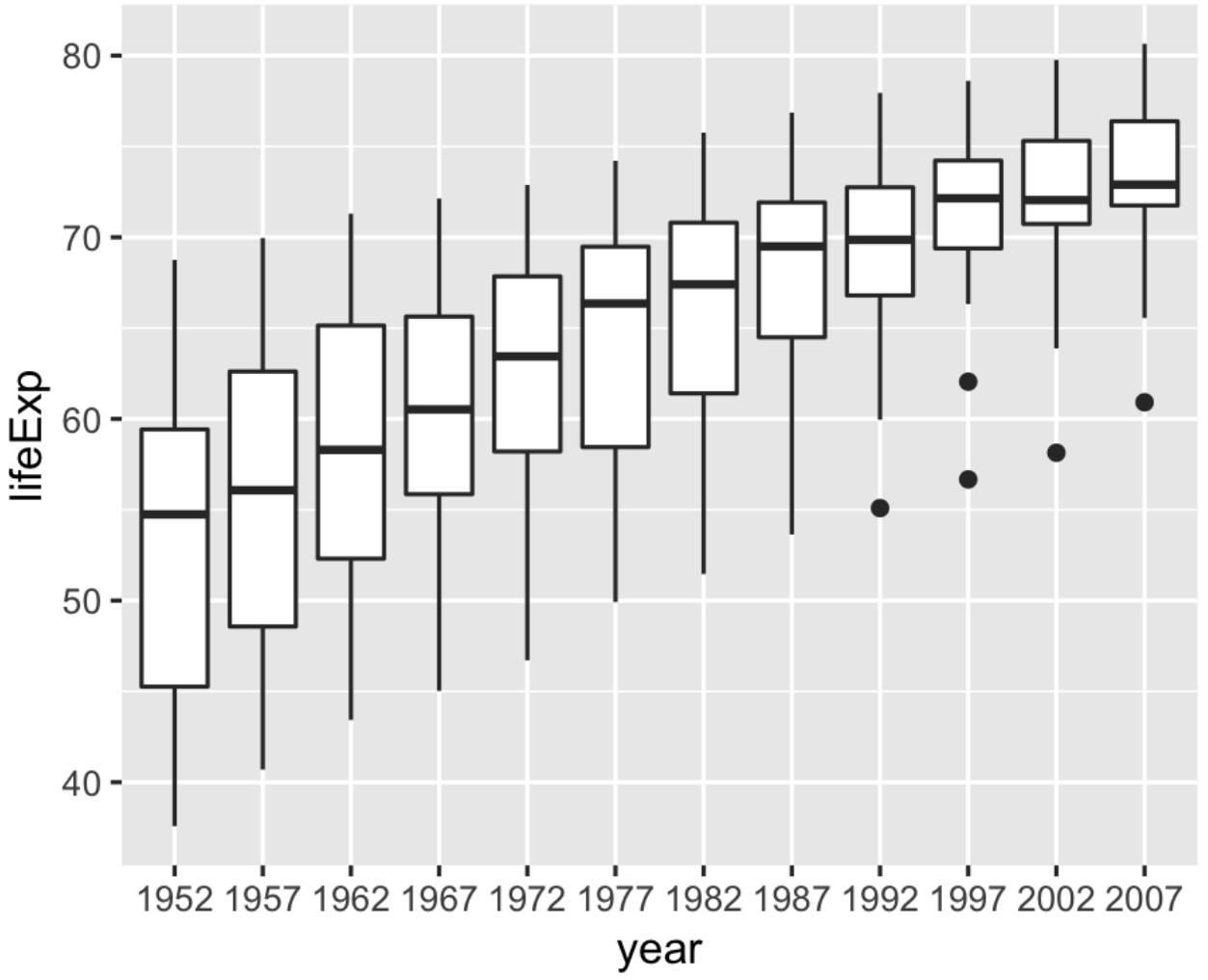


```
gapminder %>%  
  filter(  
    continent = "Americas"  
) %>%  
  ggplot() +  
  aes(  
    x = year,  
    y = lifeExp  
) +  
  geom_boxplot()
```

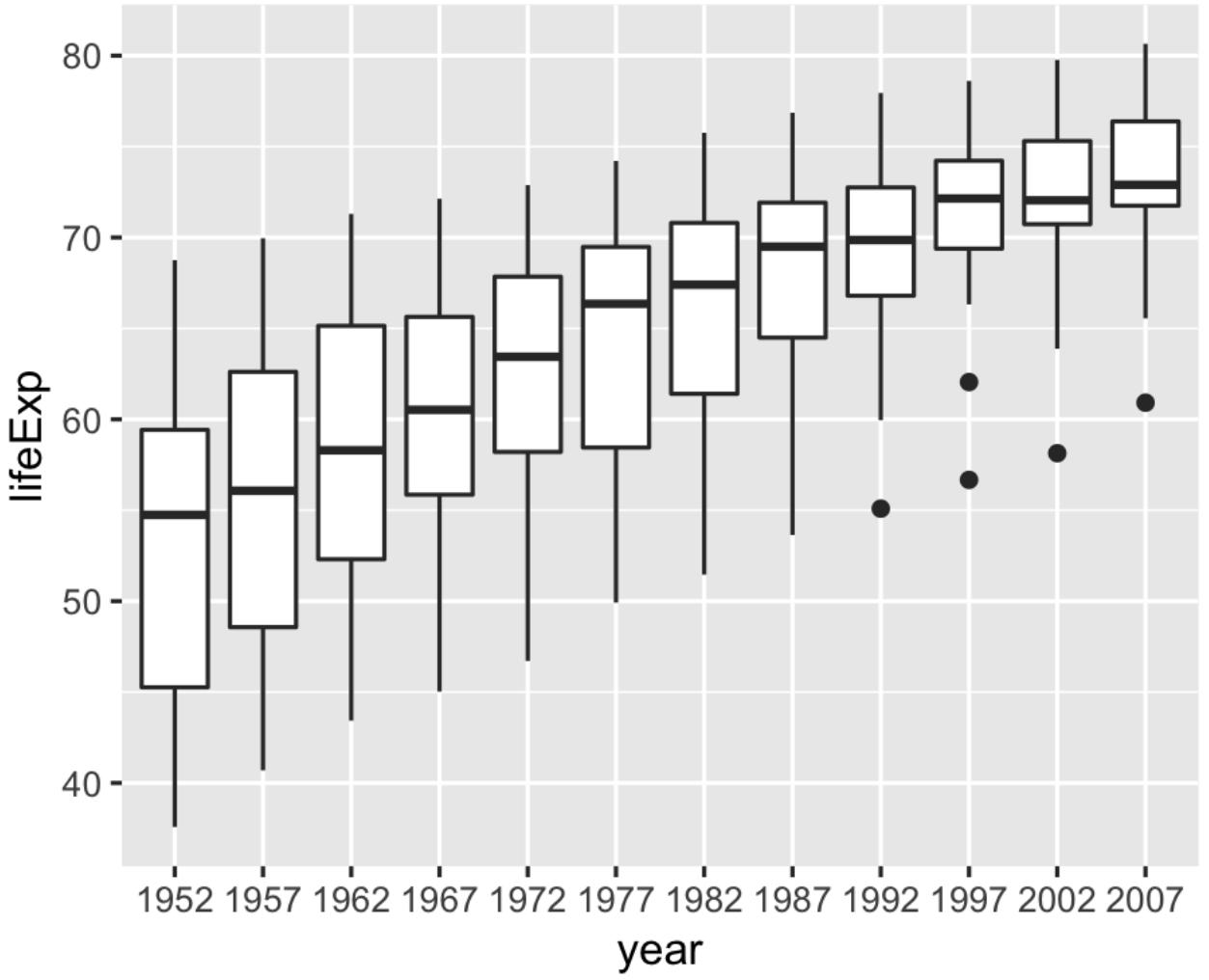


Why not boxplots by year?

```
gapminder %>%
  filter(
    continent = "Americas"
  ) %>%
  mutate(
    year = factor(year)
  ) %>%
  ggplot() +
  aes(
    x = year,
    y = lifeExp
  ) +
  geom_boxplot()
```

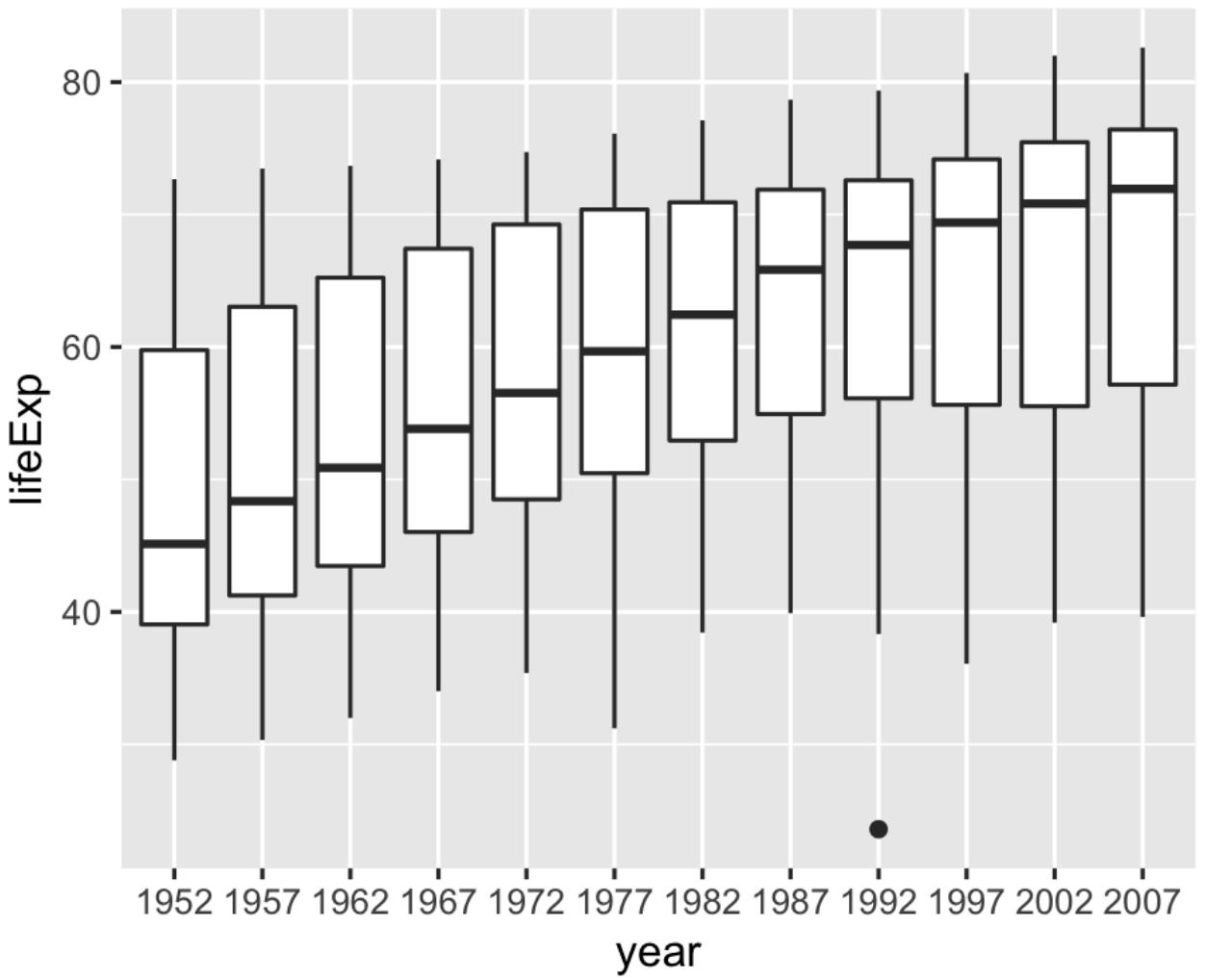


```
gapminder %>%
  filter(
    continent = "Americas"
  ) %>%
  mutate(
    year = factor(year)
  ) %>%
  ggplot() +
  aes(
    x = year,
    y = lifeExp
  ) +
  geom_boxplot()
```

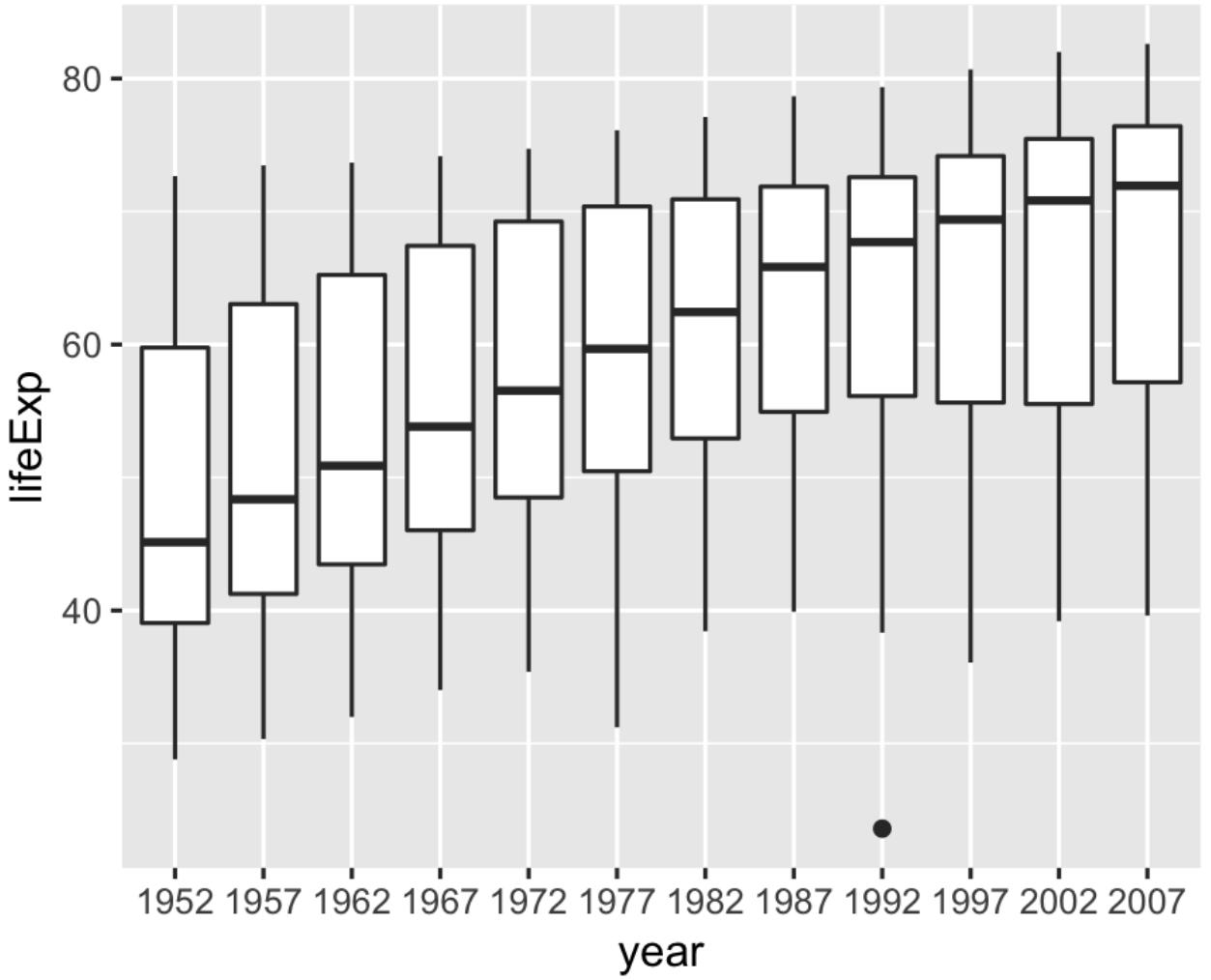


OK, what about global life expectancy?

```
gapminder %>%  
  # filter(  
  #   continent = "Americas"  
  # ) %>%  
  mutate(  
    year = factor(year)  
  ) %>%  
  ggplot() +  
  aes(  
    x = year,  
    y = lifeExp  
  ) +  
  geom_boxplot()
```

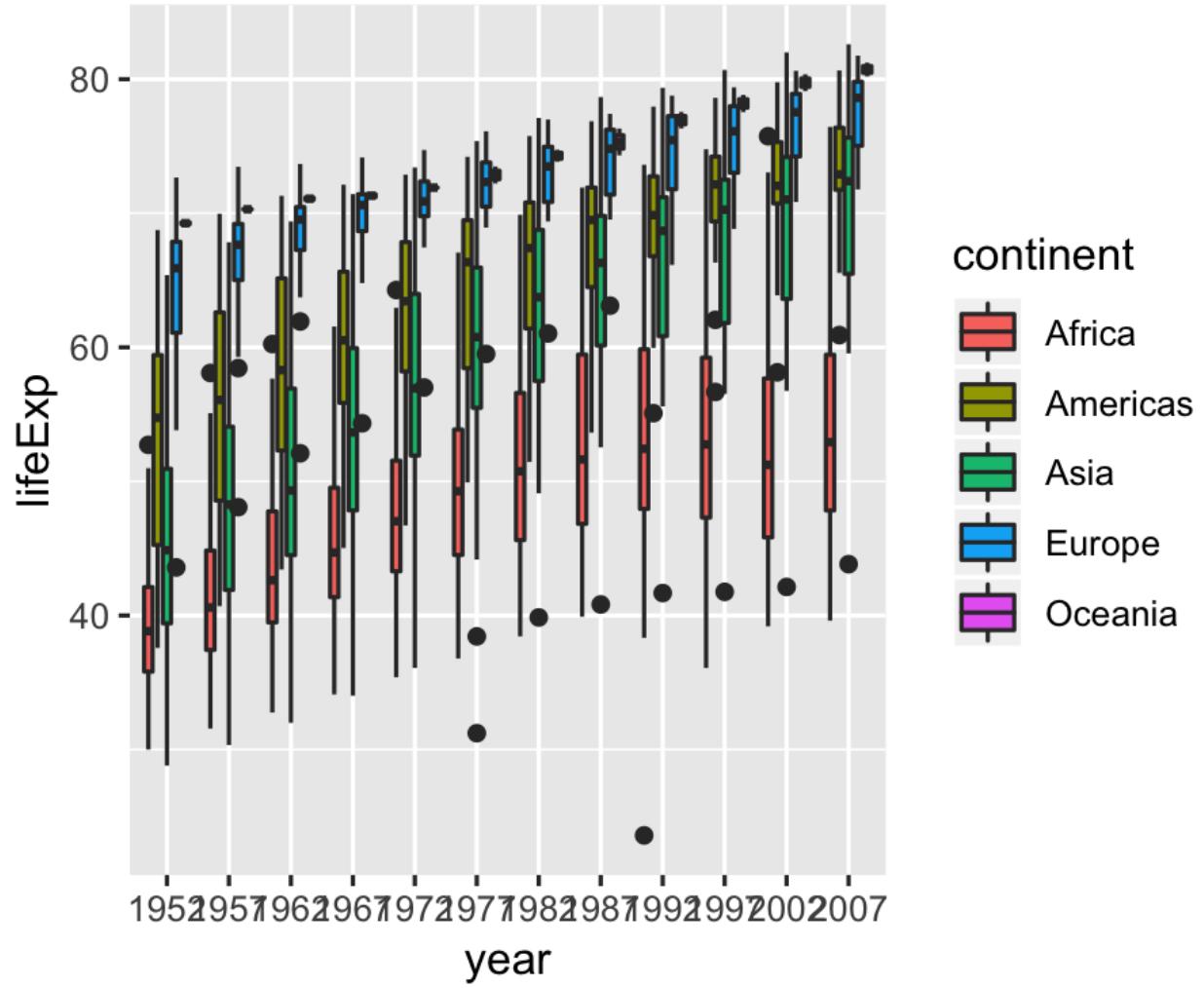


```
gapminder %>%  
  # filter(  
  #   continent = "Americas"  
  # ) %>%  
  mutate(  
    year = factor(year)  
  ) %>%  
  ggplot() +  
  aes(  
    x = year,  
    y = lifeExp  
  ) +  
  geom_boxplot()
```

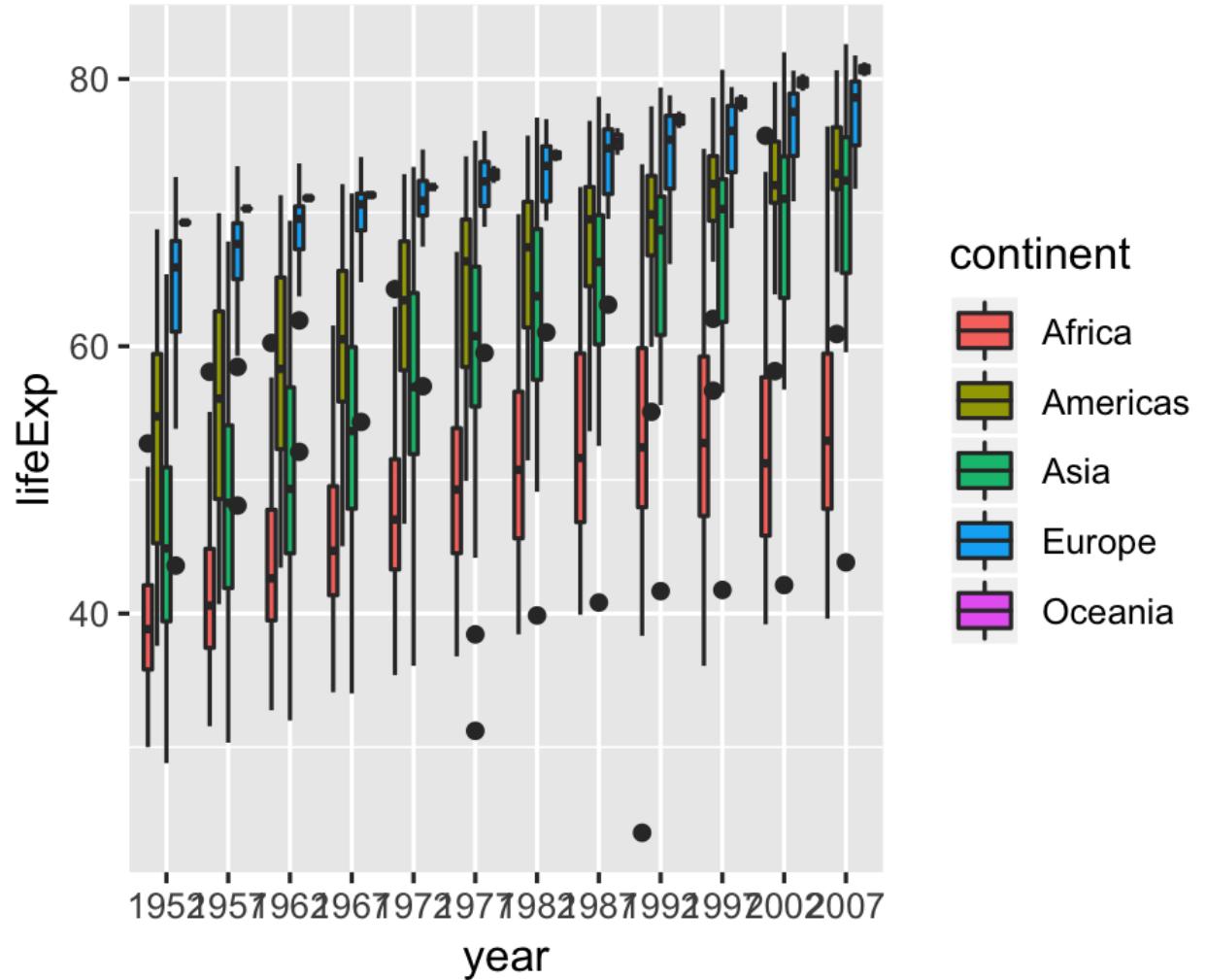


Can we have cute little boxplots for each continent?

```
gapminder %>%
  mutate(
    year = factor(year)
  ) %>%
  ggplot() +
  aes(
    x = year,
    y = lifeExp,
    fill = continent
  ) +
  geom_boxplot()
```

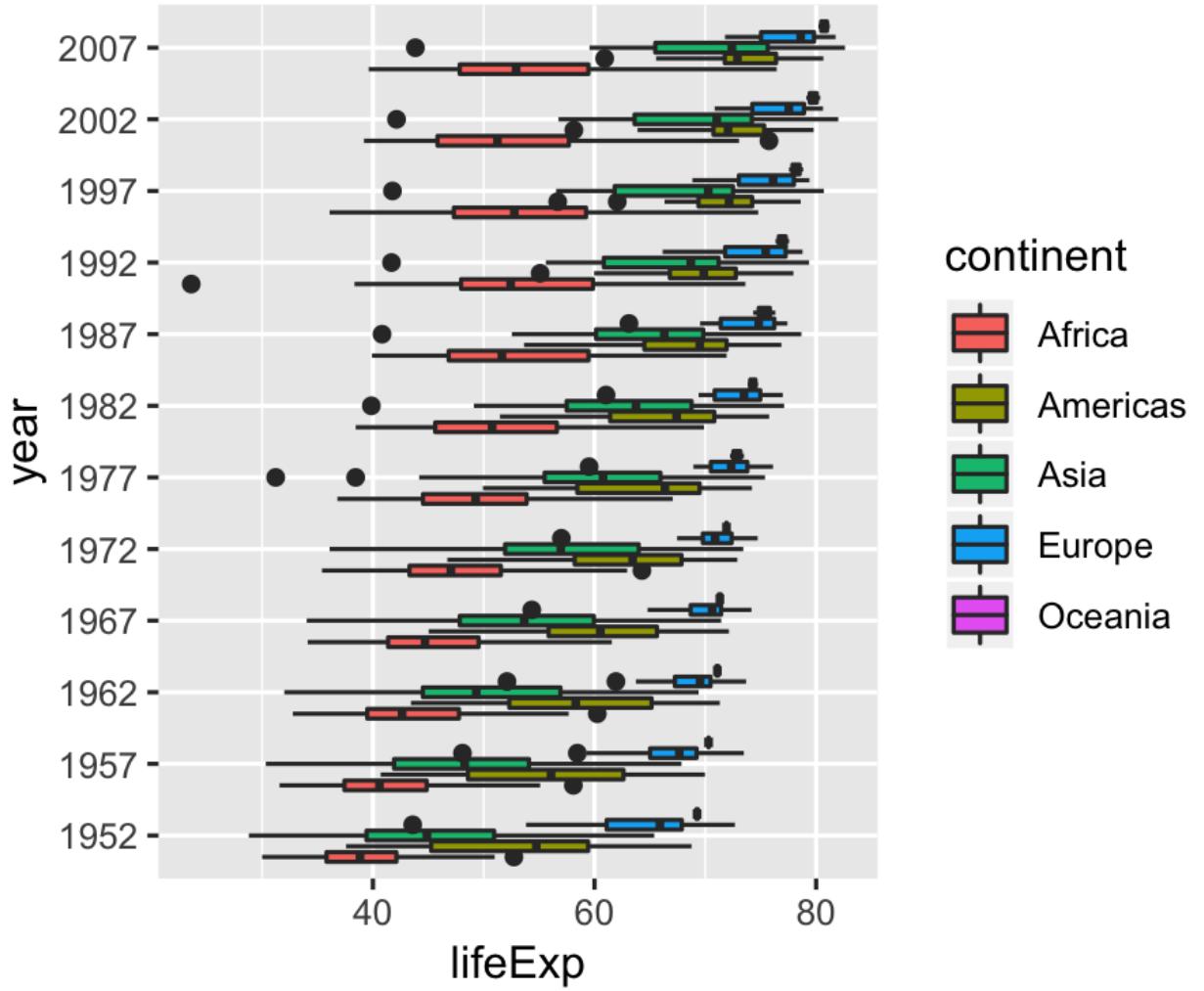


```
gapminder %>%
  mutate(
    year = factor(year)
  ) %>%
  ggplot() +
  aes(
    x = year,
    y = lifeExp,
    fill = continent
  ) +
  geom_boxplot()
```

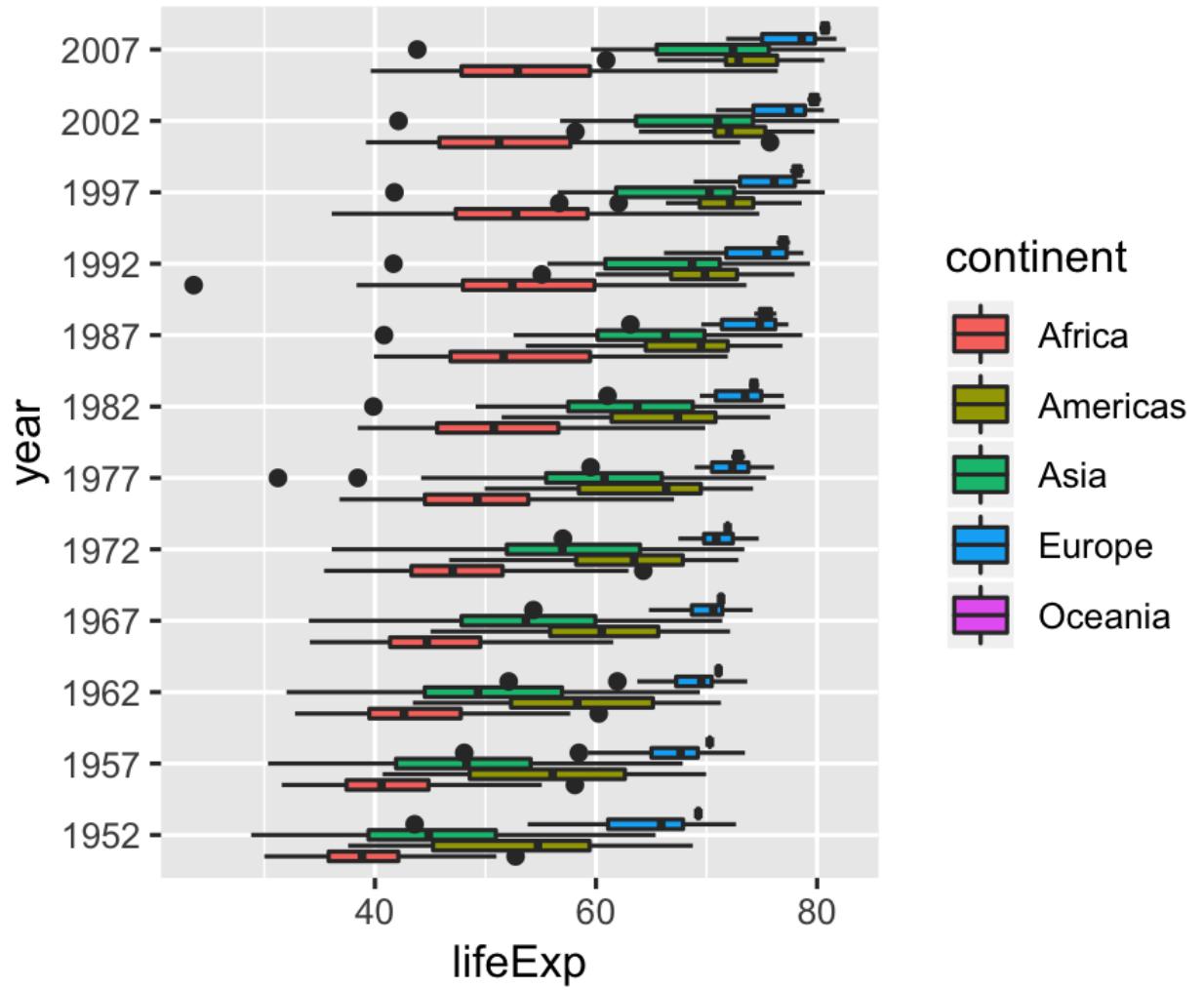


Hard to read years, let's rotate ☺

```
gapminder %>%
  mutate(
    year = factor(year)
  ) %>%
  ggplot() +
  aes(
    x = year,
    y = lifeExp,
    fill = continent
  ) +
  geom_boxplot() +
  coord_flip()
```

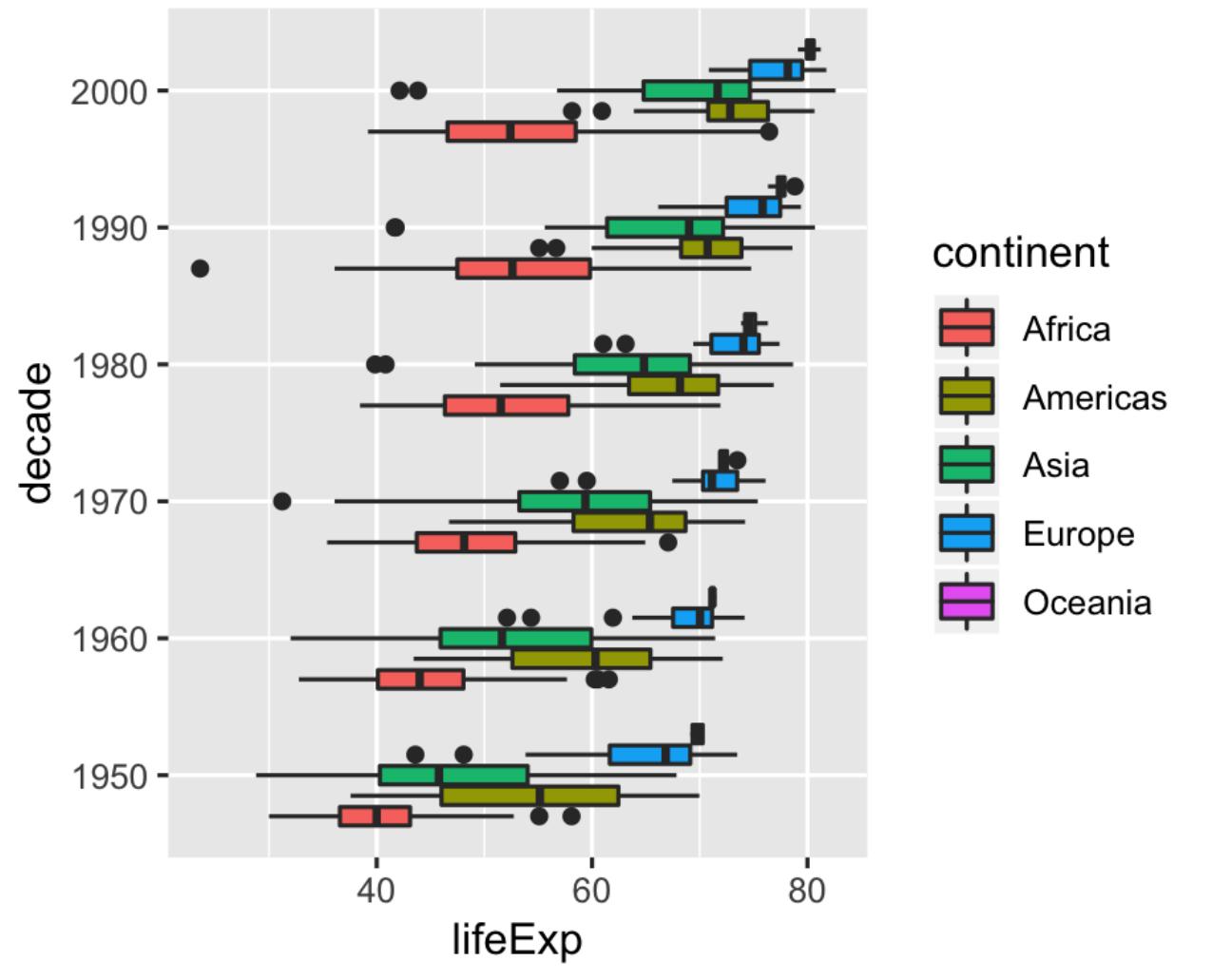


```
gapminder %>%
  mutate(
    year = factor(year)
  ) %>%
  ggplot() +
  aes(
    x = year,
    y = lifeExp,
    fill = continent
  ) +
  geom_boxplot() +
  coord_flip()
```



Use `dplyr` to group by decade

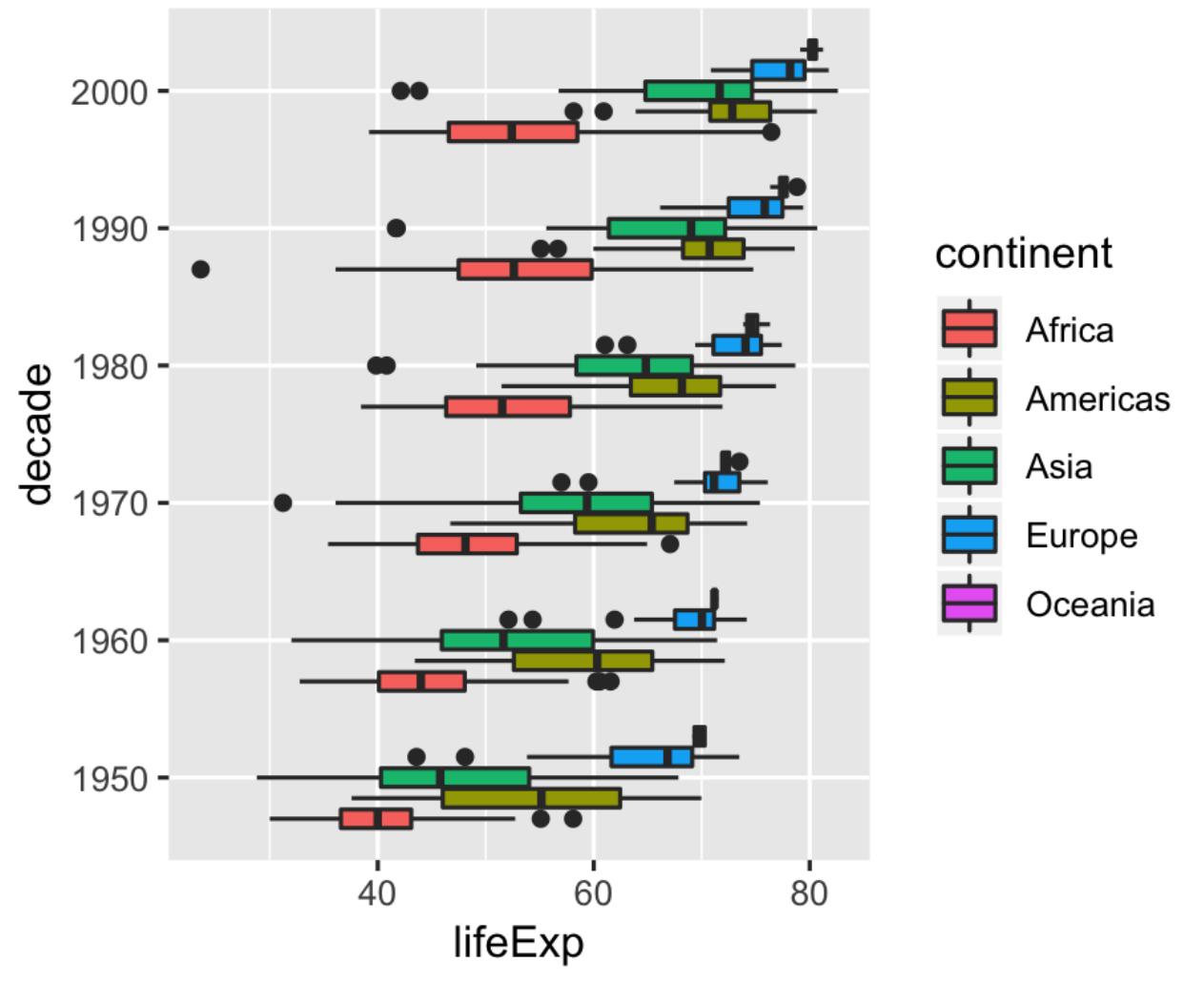
```
gapminder %>%
  mutate(
    decade = floor(year / 10),
    decade = decade * 10,
    decade = factor(decade)
  ) %>%
  ggplot() +
  aes(
    x = decade,
    y = lifeExp,
    fill = continent
  ) +
  geom_boxplot() +
  coord_flip()
```



```

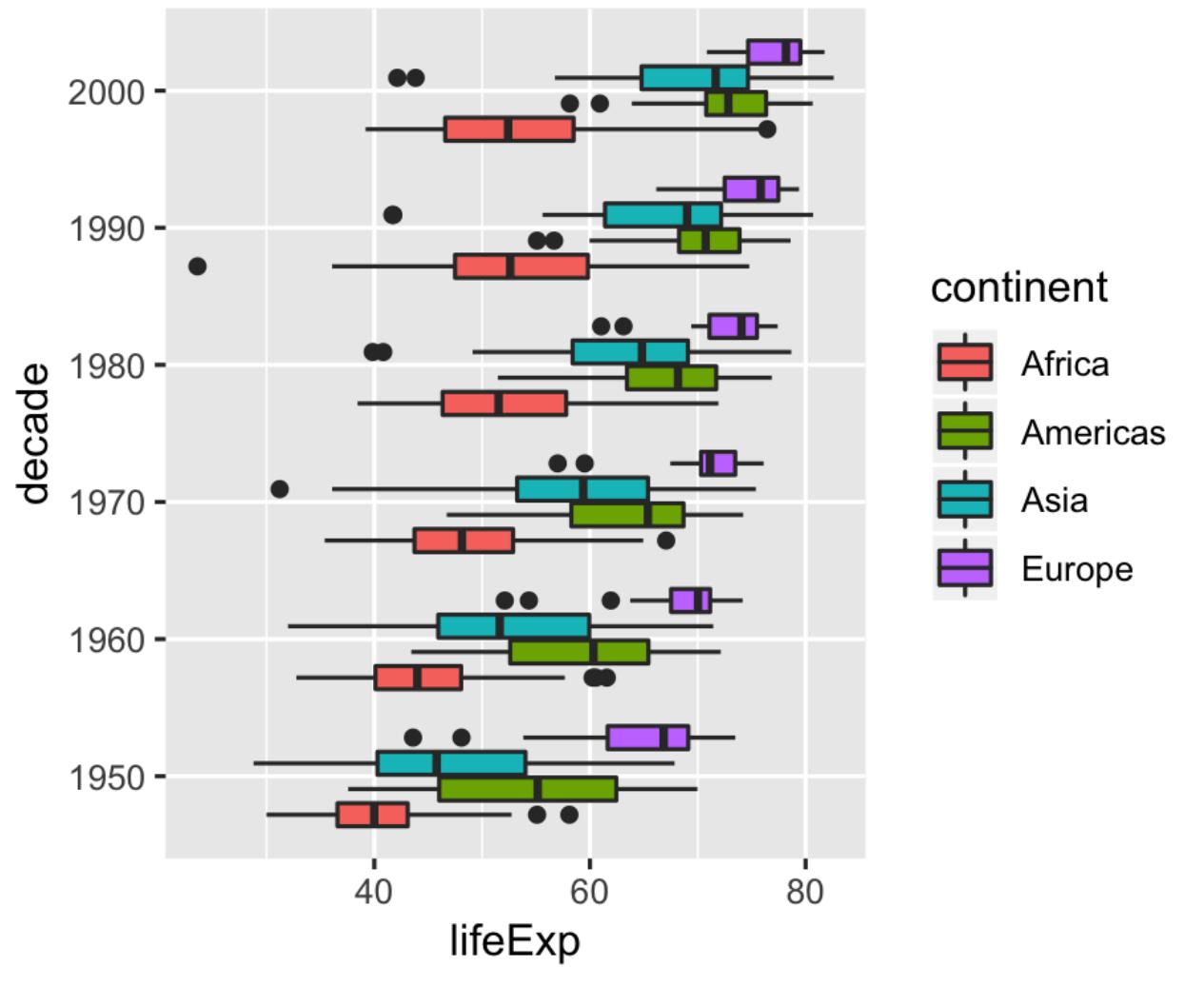
gapminder %>%
  mutate(
    decade = floor(year / 10),
    decade = decade * 10,
    decade = factor(decade)
  ) %>%
  ggplot() +
  aes(
    x = decade,
    y = lifeExp,
    fill = continent
  ) +
  geom_boxplot() +
  coord_flip()

```



Let's hide Oceania, sorry 🙏🙏🙏

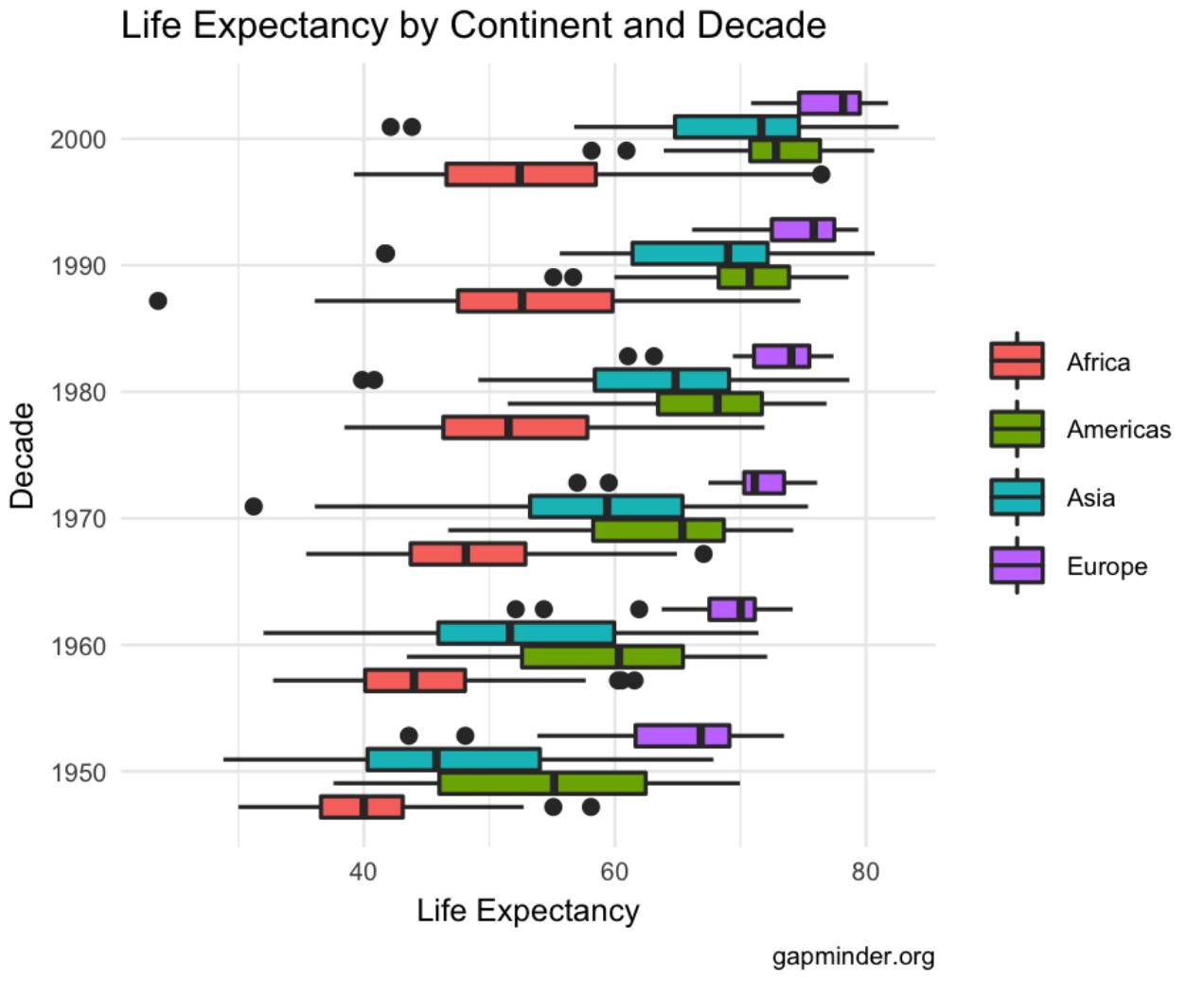
```
g <- gapminder %>%
  filter(
    continent != "Oceania"
  ) %>%
  mutate(
    decade = floor(year / 10)
  ) %>%
  ggplot() +
  aes(
    x = decade,
    y = lifeExp,
    fill = continent
  ) +
  geom_boxplot() +
  coord_flip()
```



```
g +
  theme_minimal(8) +
  labs(
    y = "Life Expectancy",
    x = "Decade",
    fill = NULL,
    title = "Life Expectancy by Continent and Decade",
    caption = "gapminder.org"
  )
```

Note `x` and `y` are *original aesthetics*,
`coord_flip()` happens *after*.

Remove labels by setting `= NULL`.



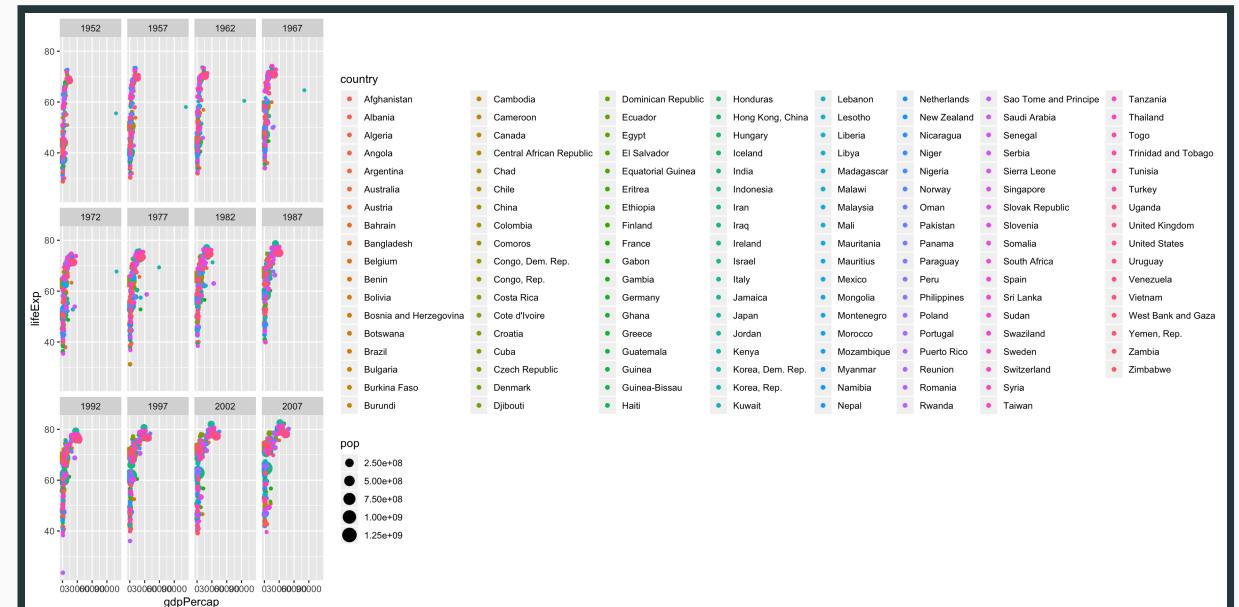
Level up

Inspired by "The Best Stats You've Ever Seen" by Hans Rosling

http://www.ted.com/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen

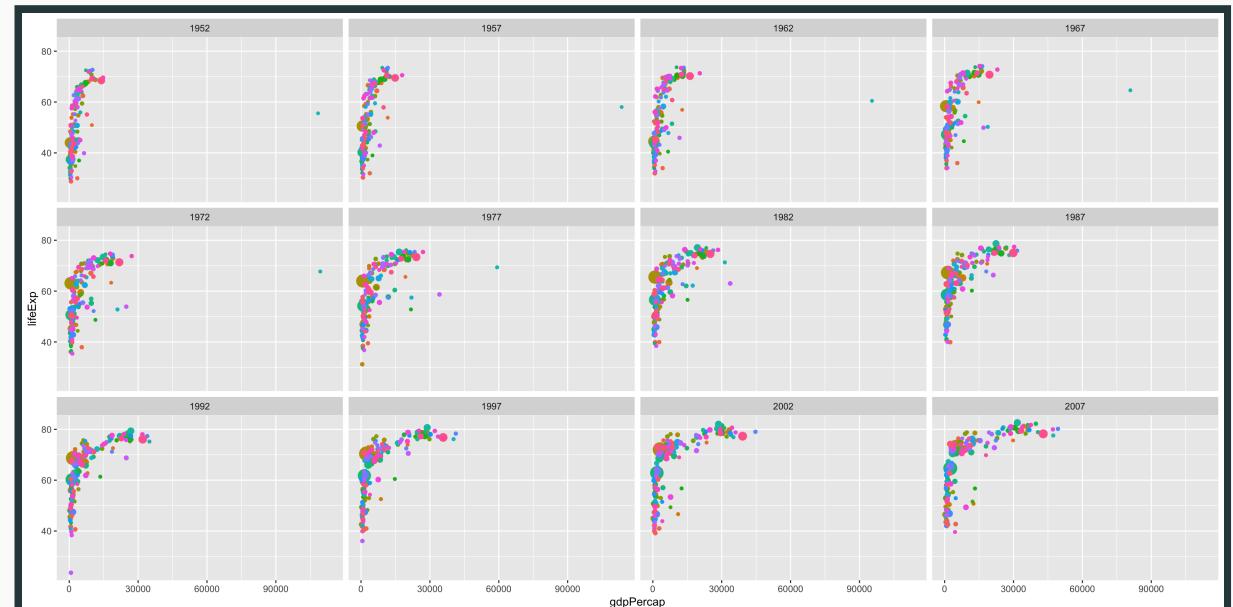
Create the initial layout

```
g_hr ←  
  ggplot(gapminder) +  
  aes(x = gdpPercap, y = lifeExp, size = pop, color = country) +  
  geom_point() +  
  facet_wrap(~year)
```



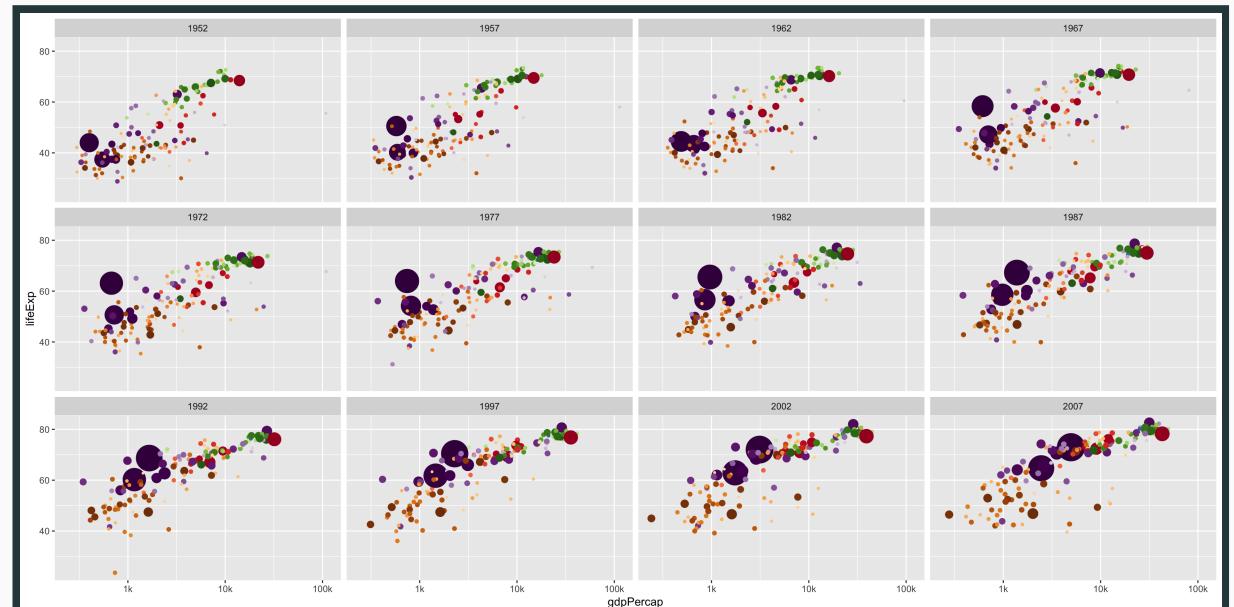
Hide the guides

```
g_hr <-  
  ggplot(gapminder) +  
  aes(x = gdpPercap, y = lifeExp, size = pop, color = country) +  
  geom_point() +  
  facet_wrap(~year) +  
  guides(color = FALSE, size = FALSE)
```



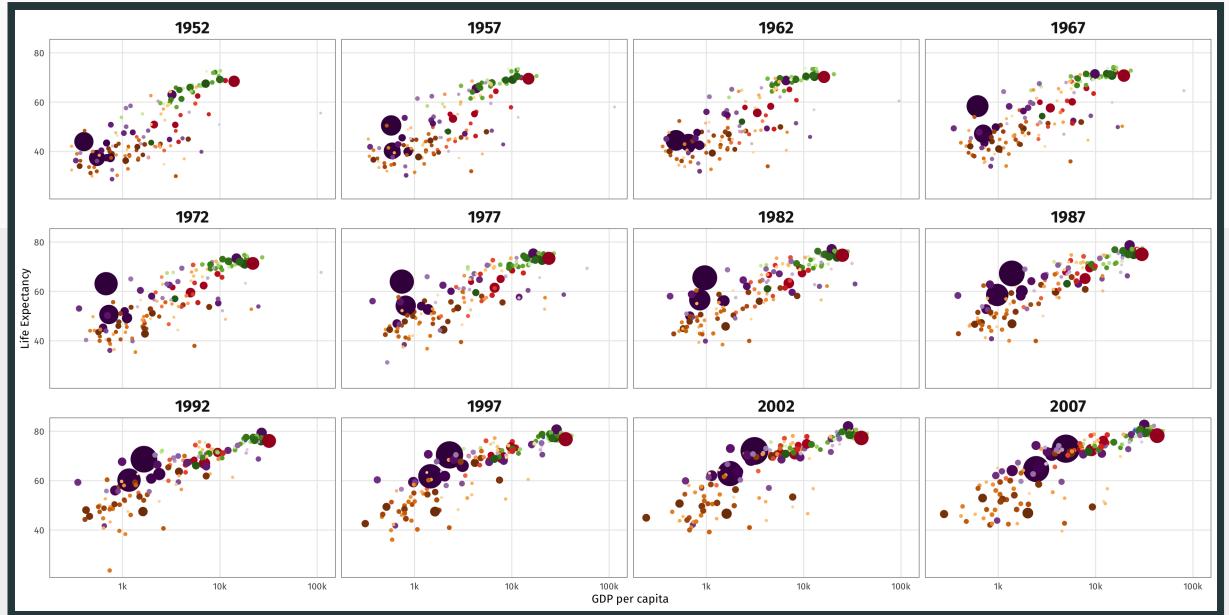
Adjust scales of x-axis, color, and size

```
g_hr <-  
  g_hr +  
  scale_x_log10(breaks = c(10^3, 10^4, 10^5), labels = c("1k", "10k", "100k"))  
  scale_color_manual(values = gapminder::country_colors) +  
  scale_size(range = c(0.5, 12))
```



Tweak Annotations

```
g_hr <-  
  g_hr +  
  labs(  
    x = "GDP per capita",  
    y = "Life Expectancy"  
  ) +  
  theme_minimal(base_family = "Fira Sans") +  
  theme(  
    strip.text = element_text(size = 16, face = "bold"),  
    panel.border = element_rect(fill = NA, color = "grey40"),  
    panel.grid.minor = element_blank()  
)
```



The final code and plot

```
ggplot(gapminder) +  
  aes(x = gdpPercap, y = lifeExp, size = pop, color = country) +  
  geom_point() +  
  facet_wrap(~year) +  
  guides(color = FALSE, size = FALSE) +  
  scale_x_log10(  
    breaks = c(10^3, 10^4, 10^5),  
    labels = c("1k", "10k", "100k")) +  
  scale_color_manual(values = gapminder::country_colors) +  
  scale_size(range = c(0.5, 12)) +  
  labs(  
    x = "GDP per capita",  
    y = "Life Expectancy") +  
  theme_minimal(14, base_family = "Fira Sans") +  
  theme(  
    strip.text = element_text(size = 16, face = "bold"),  
    panel.border = element_rect(fill = NA, color = "grey40"),  
    panel.grid.minor = element_blank())
```



Special Bonus: Animated!

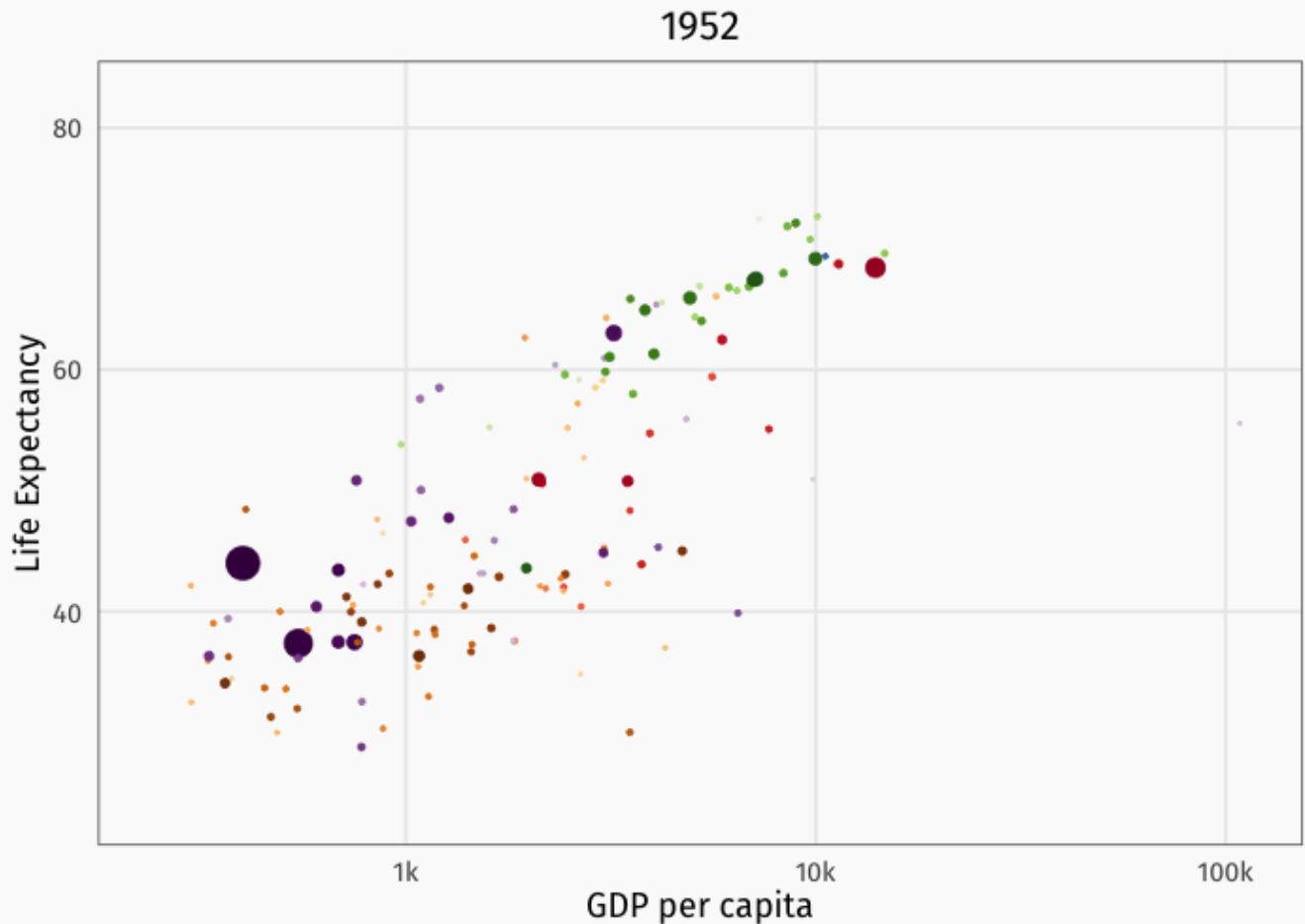
```
# library(devtools)
# install_github("thomasp85/gganimate")
library(gganimate)

# Same plot without facet_wrap()
g_hra +
  transition_states(year, 1, 0) +
  ggtitle("{closest_state}")
```

Special Bonus: Animated!

```
# library(devtools)
# install_github("thomasp85/gganimate")
library(gganimate)

# Same plot without facet_wrap()
g_hra +
  transition_states(year, 1, 0) +
  ggtitle("{closest_state}")
```



g is for Goodbye

Stack Exchange is Awesome

The screenshot shows the Stack Exchange search interface. At the top, there's a navigation bar with the Stack Exchange logo, a search icon, and links for "All Sites", "Top Users", and "Newsletters". Below the header, a search bar contains the query "fill geom_area [ggplot2]". To the right of the search bar are a clear button with an 'X' and a search button with a magnifying glass. Underneath the search bar, the text "About 1,100 results (0.21 seconds)" is displayed. On the right side of the search results area, there's a "Sort by" dropdown set to "Relevance". At the bottom of the search results section, it says "powered by Google" and "Custom Search".

Stack Exchange is Awesome

1 Answer

active

oldest

votes



7

You need to make a new grouping variable for each positive/negative segment. To make the transitions less "blocky", you can just first interpolate the data:



```
require(ggplot2)

# Load data
df = read.table('data.txt', header=T)
df$created = as.POSIXct(df$created, tz='UTC')

# Interpolate data
lin_interp = function(x, y, length.out=100) {
  approx(x, y, xout=seq(min(x), max(x), length.out=length.out))$y
}
created.interp = lin_interp(df$created, df$created)
created.interp = as.POSIXct(created.interp, origin='1970-01-01', tz='UTC')
score.interp = lin_interp(df$created, df$score)
df.interp = data.frame(created=created.interp, score=score.interp)
```

ggplot2 Extensions: ggplot2-exts.org

ggplot2 extensions - gallery Add Your Extension | ggplot2-exts.org

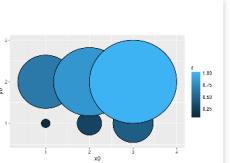
37 registered extensions available to explore

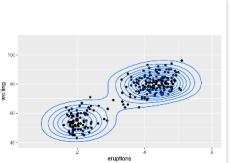
Sort: Github stars Text Filter: search name, author, descrip Author Filter Tag Filter CRAN Only:

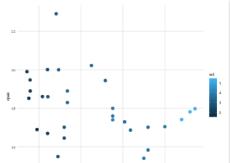
Showing 31 of 37

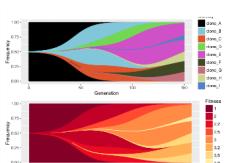
ggQC  Star
Use ggQC to plot single, faceted and multi-layered quality control charts.
• **author:** Kenneth Grey
• **tags:** QC, Xmr, XbarR, SixSigma, Visualization
• **js libraries:**

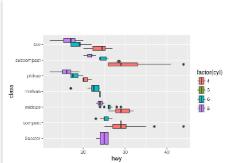
ggedit  Star
ggedit is aimed to interactively edit ggplot layers, scales and themes aesthetics
• **author:** yonide
• **tags:** visualization, interactive, shiny, general
• **js libraries:**

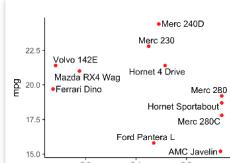
ggforce  Star
ggforce is aimed at providing missing functionality to ggplot2 through the extension system introduced with ggplot2 v2.0.0.
• **author:** thomasp85
• **tags:** visualization, general
• **js libraries:**

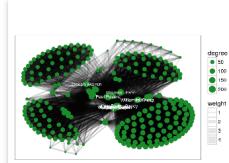
ggalt  Star
A compendium of 'geoms', 'coords' and 'stats' for 'ggplot2'.
• **author:** hrbrmstr
• **tags:** visualization, general
• **js libraries:**

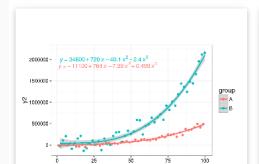
ggiraph  Star
htmlwidget to make 'ggplot' graphics interactive.
• **author:** daviddahel
• **tags:** visualization, general
• **js libraries:**

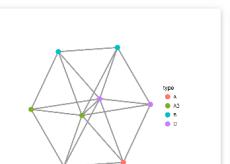
ggmuller  Star
Creates Muller plots for visualizing evolutionary dynamics.
• **author:** robjohnnoble
• **tags:** visualization, evolution, dynamics
• **js libraries:**

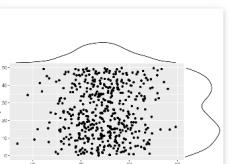
ggstance  Star
ggstance implements horizontal versions of common ggplot2 geoms.
• **author:** lionel
• **tags:** visualization, general
• **js libraries:**

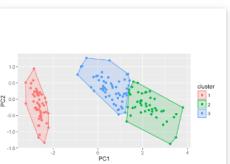
ggrepel  Star
Repel overlapping text labels away from each other.
• **author:** slowkow
• **tags:** visualization, general
• **js libraries:**

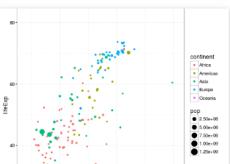
ggraph  Star
ggraph is tailored at plotting graph-like data structures (graphs, networks, trees, hierarchies...).
• **author:** thomasp85
• **tags:** visualization, general
• **js libraries:**

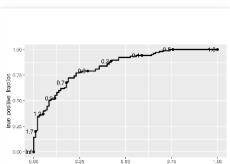
ggpmisc  Star
Miscellaneous Extensions to 'ggplot2'.
• **author:**
• **tags:** visualization, general
• **js libraries:**

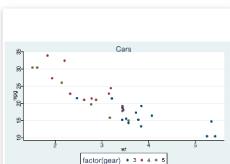
geomnet  Star
geomnet implements network visualizations in ggplot2 via geom.net.
• **author:** sctyner
• **tags:** visualization, general
• **js libraries:**

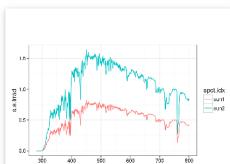
ggExtra  Star
ggExtra lets you add marginal density plots or histograms to ggplot2 scatterplots.
• **author:** daattali
• **tags:** histogram, marginal, density
• **js libraries:**

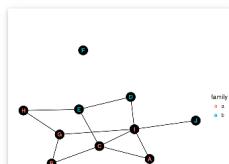
ggfortify  Star
The unified interface to ggplot2 many popular statistical package results.
• **author:** terrylangyan
• **tags:** visualization, general
• **js libraries:**

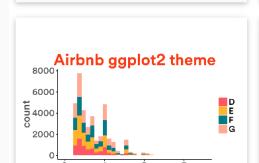
ggridanimate  Star
ggridanimate wraps the animation package to create animated ggplot2 plots.
• **author:** dgrtwo
• **tags:** visualization, general
• **js libraries:**

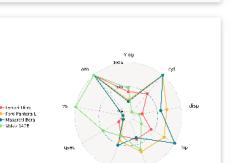
plotROC  Star
plotROC provides functions to generate an interactive ROC curve plot for web use, and print versions.
• **author:** sacharme
• **tags:** visualization, general
• **js libraries:**

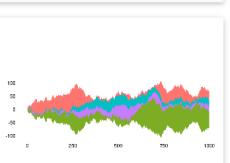
ggthemes  Star
Some extra geoms, scales, and themes for ggplot.
• **author:** jrmold
• **tags:** visualization, general
• **js libraries:**

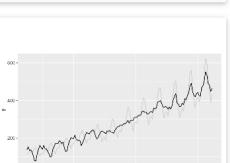
ggspectra  Star
ggspectra extends ggplot2 with stats, geoms and annotations suitable for light spectra.
• **author:**
• **tags:** visualization, general
• **js libraries:**

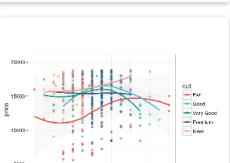
ggnetwork  Star
The ggnetwork package provides a way to build network plots with ggplot2.
• **author:** briatte
• **tags:** visualization, general
• **js libraries:**

Airbnb ggplot2 theme 
ggplot2 tech themes, scales, and geoms.
• **author:** ricardo-bion

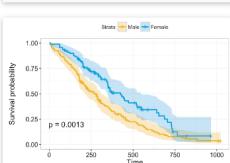
ggradar  Star
ggradar allows you to build radar charts with ggplot2.

ggTimeSeries  Star
This R package offers novel time series visualisations.

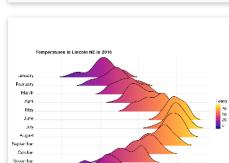
ggseas  Star
Seasonal adjustment on the fly extension for ggplot2.

ggsci  Star
A collection of 'ggplot2' color palettes inspired by scientific journals and science fiction TV

ggmosaic  Star
ggmosaic implements mosaic plots in 'ggplot2' via geom.mosaic.

survminer  Star
Drawing Survival Curves using 'ggplot2'
• **author:** kassambara

GGally  Star
ggally extends 'ggplot2' by adding several functions to reduce the complexity of

ggridges  Star
Ridgeplot plot geoms for 'ggplot2'
• **author:** clauswilke

ggplot2 and beyond

Learn more

- **ggplot2 docs:** <http://ggplot2.tidyverse.org/>
- **R4DS - Data visualization:** <http://r4ds.had.co.nz/data-visualisation.html>
- **Hadley Wickham's ggplot2 book:** <https://www.amazon.com/dp/0387981403/>

Noteworthy RStudio Add-Ins

- **esquisse:** Interactively build ggplot2 plots
- **ggplotThemeAssist:** Customize your ggplot theme interactively
- **ggedit:** Layer, scale, and theme editing

Practice and Review

#TidyTuesday

- <https://github.com/rfordatascience/tidytuesday>

Fun Datasets

- `fivethirtyeight`
- `nycflights`
- `ggplot2movies`

Review

- Slides and code on GitHub: <http://github.com/gadenbuie/gentle-ggplot2>

Thanks!

@grrrck

github.com/gadenbuie

Garrick Aden-Buie