gganimate

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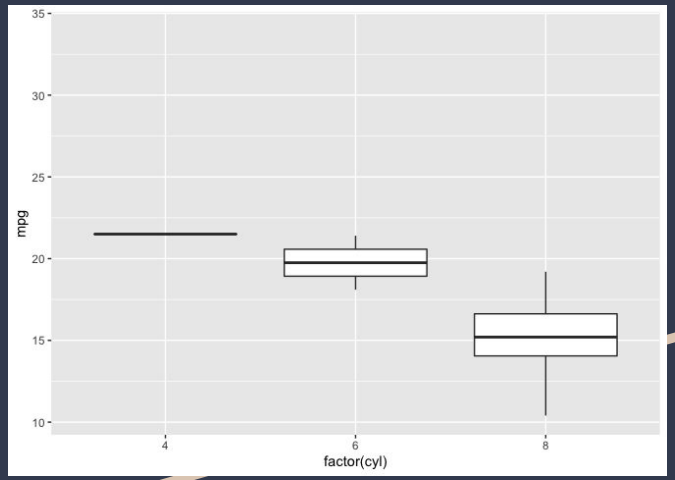
When to use gganimate package



We can use gganimate whenever we want to add a fourth dimension of time to a graph!

You can apply this to any kind of geom/ graph type

Because of this, many data styles work, it just depends on what data styles your desired graph type accepts.

(i.e. continuous vs. continuous for a scatterplot; continuous vs. categorical for a boxplot, bar graph, etc.)

transition_states function

- First, install and load ggplot, gganimate, and gifski, and make an initial ggplot graph

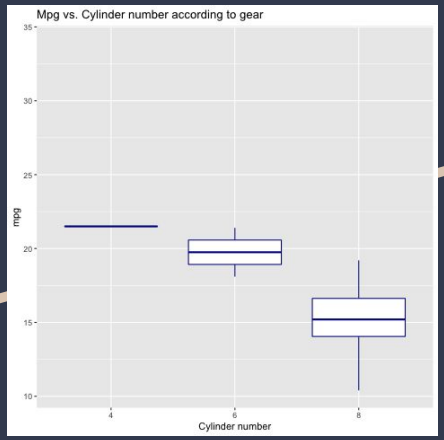
```
library(ggplot2)
install.packages("gganimate")
library(gganimate)
install.packages("gifski")
library(gifski)

data(mtcars)
ggplot(mtcars, aes(x= factor(cyl), y=mpg)) + geom_boxplot(col='darkblue') + labs(x='Cylinder number',
y='mpg', title= 'Mpg vs. Cylinder number according to gear') -> car
```

- The transition_states() function gets it to move to different versions of the graph, to show how this information looks as a third variable changes

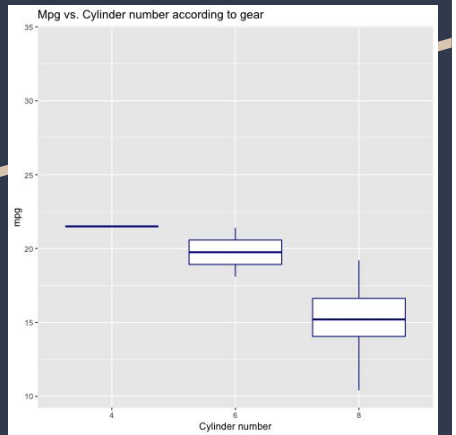
- In this function, put the variable, then transition_length and state_length arguments

  - These represent the ratio of how long it transitions between 2 of the graphs, and how long it rests on 1 graph

```
car+
        transition_states(factor(gear),
transition_length=1, state_length=6)
```




```
car+
        transition_states(factor(gear),
transition_length=6, state_length=1)
```

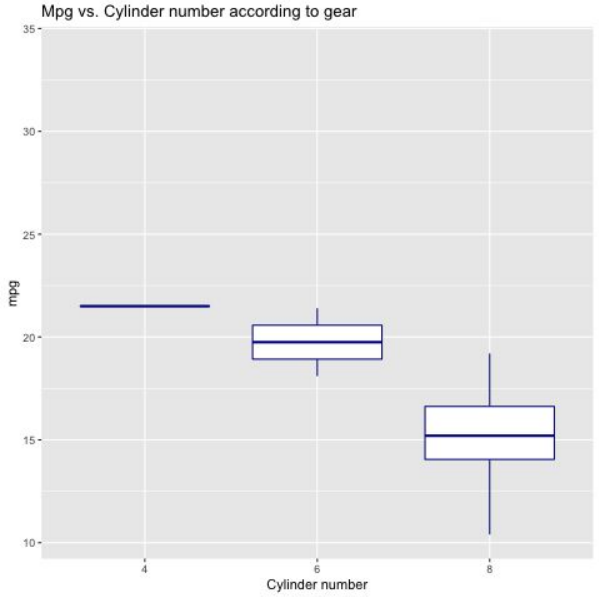


Enter/ Exit functions

- Certain elements in a graph may disappear, and we can control how they fade in/ out with enter_* and exit_* functions.

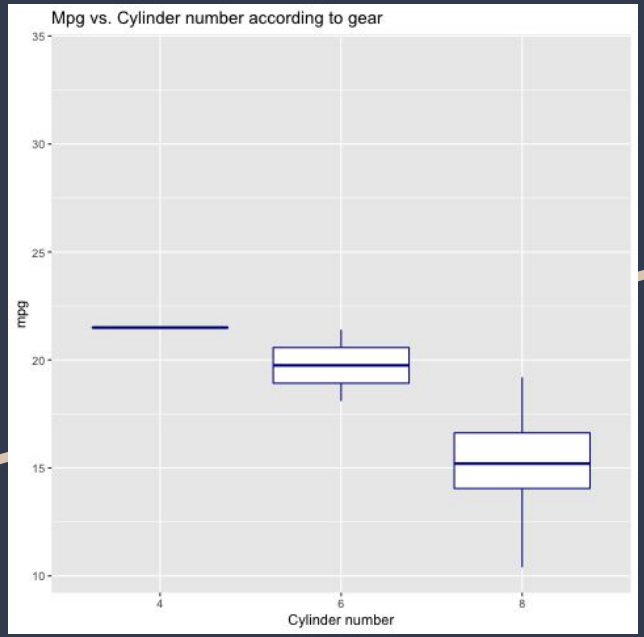
- Things you can input as “*” are grow, appear, fade, disappear, shrink, fly, drift, etc.

```
car + enter_fade() + exit_shrink()
```



ease_aes function

```
car+ ease_aes("elastic-in-out")
```



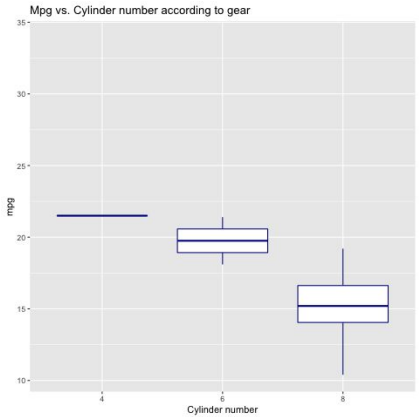
- To control the way the transition state moves, use ease_aes()

- The default is linear (transitions move at a constant speed from one graph to the next), but we can set to be quadratic, sine, exponential, elastic, back, bounce, etc.

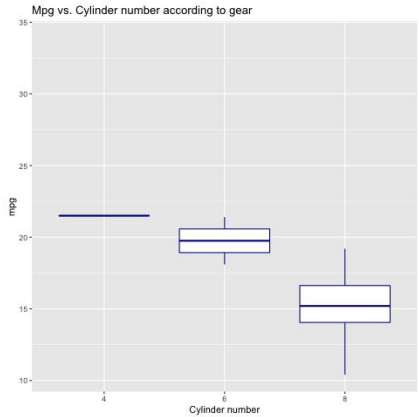
- It's almost like controlling the acceleration of the graphic

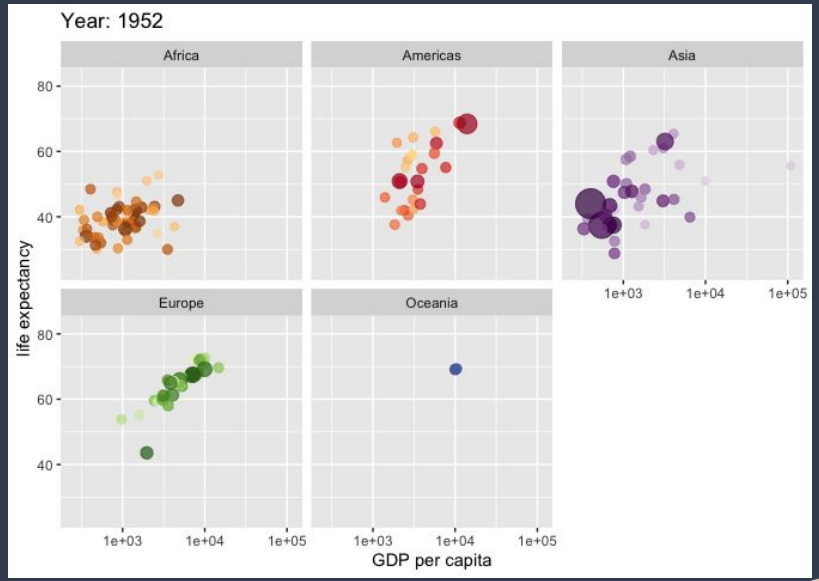
- Add an -in modifier to apply that acceleration as-is. Add an -out modifier to apply it in reverse. Add -in-out modifier to apply it like a mirror image.

```
car+ ease_aes("exponential-out")
```




```
car+ ease_aes("exponential-in")
```





Specific Bits

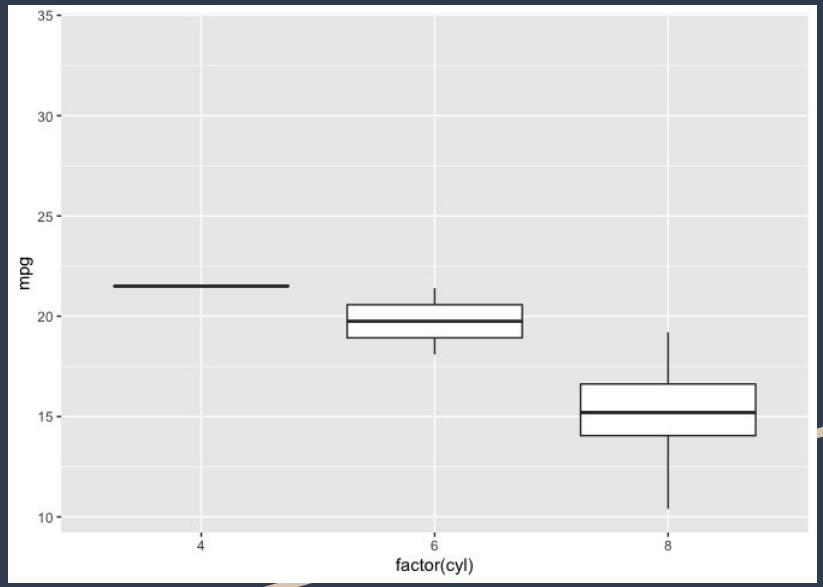
- ggplot(gapminder, aes())
  - GDP per capita as x-axis
  - Life expectancy is y-axis
  - Our size of dot is a representation of population
  - Each different color dot on the data is a different country.
- Facet_wrap: categorizes the countries into their corresponding continents
- Scale_size(range=c()): Codes for how many data points are for each country
- Title = **'Year: {frame_time}'**: Allows for the change of years to correspond on the title.

Types of Geom Used

- **geom_point**: Used to create the scatter plot with the given data
  - Alpha changes the opacity of the each point

```
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) +
  # Specific Bits
  labs(title = 'Year: {frame_time}', x = 'GDP per capita', y = 'life expectancy') +
  transition_time(year) +
  ease_aes('linear')
```

Arguments



- **ease_aes()-** the command that adds animation to the graph/can represent several functions

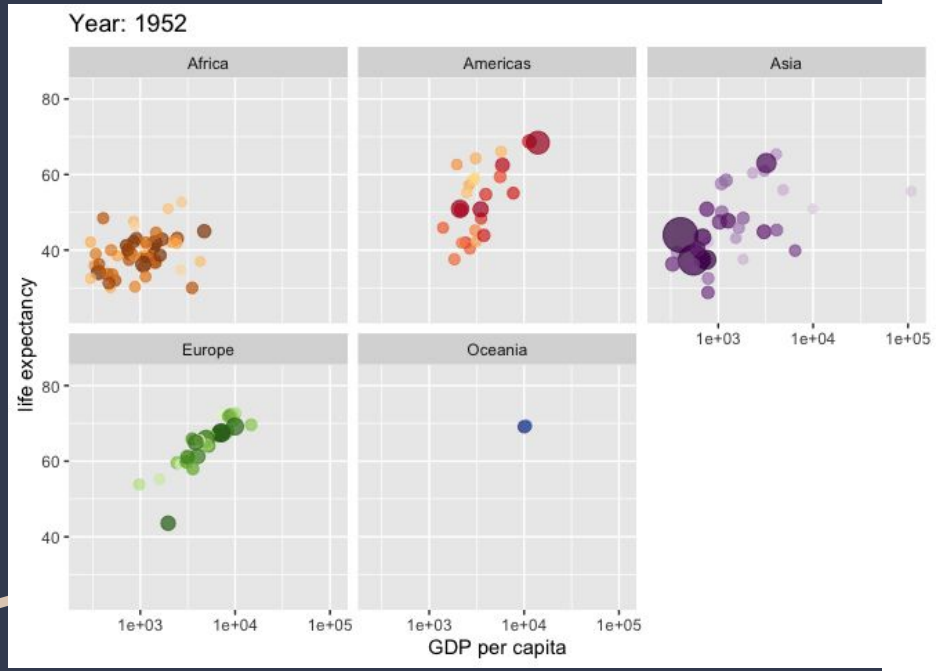
Enter/exit functions

- **enter_appear** or **exit_dissappear**- will make elements appear at the start or end of transition
- **enter_recolor** or **exit_recolor-** will change the colour and/or fill of the elements making them gradually change
- **enter_fade** or **exit_fade**- will make elements fade in/out during transition
- **enter_fly** or **exit_fly**- sets a specific x or y value that the elements will enter to or exit from
- **enter_grow** or **exit_shrink-** Will let elements grow/shrink from/to points of zero existence

Transition States

- **transition_length**- length of transition
- **state_length**- length of pauses at each state

Arguments



Scale

- **scale_color_manual-**These functions allow you to specify your own set of mappings from levels in the data to aesthetic values.
- **Scale_x_log10():** Converts the GDP per capita to function notation

Transition

- **transition_time**(year)- In this data each year of data is saved as a picture and when it is added it allows for the picture to change.

Legend

- **show.legend=FALSE**- Encodes the ggplot and geom_point into a gif