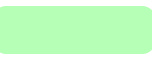# AFTER_SCALE

Use this cheat sheet to manipulate colors after your aesthetic mappings. For example, change the saturation of a color or its brightness. You can also use after_scale to manipulate aesthetics based on a different mapping.

Color manipulation functions from the prismatic package

These colors come from the prismatic package by Emil Hvitfeldt. They allow to manipulate the brightness, saturation, transparency and hue of colors. They also allow to simulate colors for color blind people and to convert colors to grayscale. Install the package with install.packages("prismatic").

DARKEN OR LIGHTEN THE COLORS

clr_darken("green", .3)

clr_lighten("green", .3)

CHANGE SATURATION OF COLORS

clr_desaturate("green", .5)

clr_saturate("green", .5)

CHECK COLORS FOR COLOR BLINDNESS

clr_protan("green")

clr_deutan("green")

clr_tritan("green")

CHANGE TRANSPARENCY

clr_alpha("green", .3)

CHANGE HUE

clr_negate("green", .5)

clr_rotate("green", 180)

CONVERT COLORS TO GRAY

clr_grayscale("green")

Use these functions for after_scale

Plot without after_scale

Normally, you map your data to the aesthetics of geometric objects. However, after the aesthetic mapping, you have limited options for manipulate the colors of the geometric objects (for example, fill and border color). For example, you could change the transparency with an alpha value.

```
ggplot(mpg, aes(class, hwy)) +
  geom_boxplot(aes(fill = class))
```
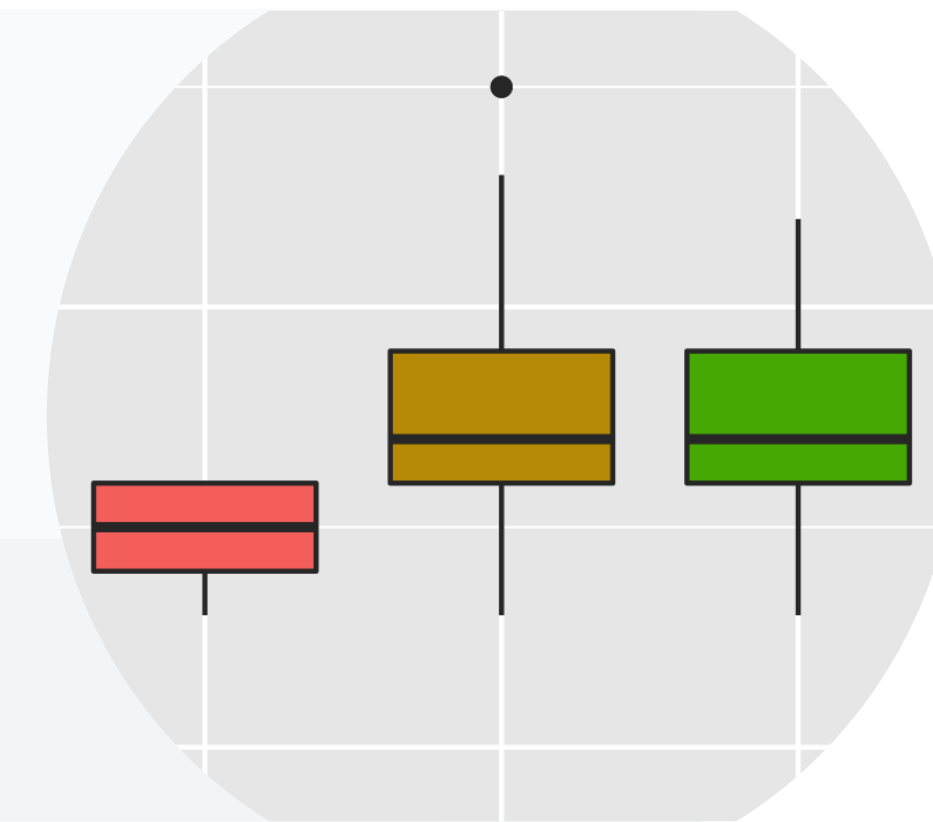
Modify a single aesthetic after the mapping

To manipulate the color or fill aesthetic after the mapping, use the stage function. The first argument is the variable you want to map to the fill or color aesthetic. The second argument is the after_scale function. Use one of the color manipulation functions on the left.

```
ggplot(mpg, aes(class, hwy)) +
  geom_boxplot(aes(fill = stage(class,
                    after_scale = invert_color(fill))))
```
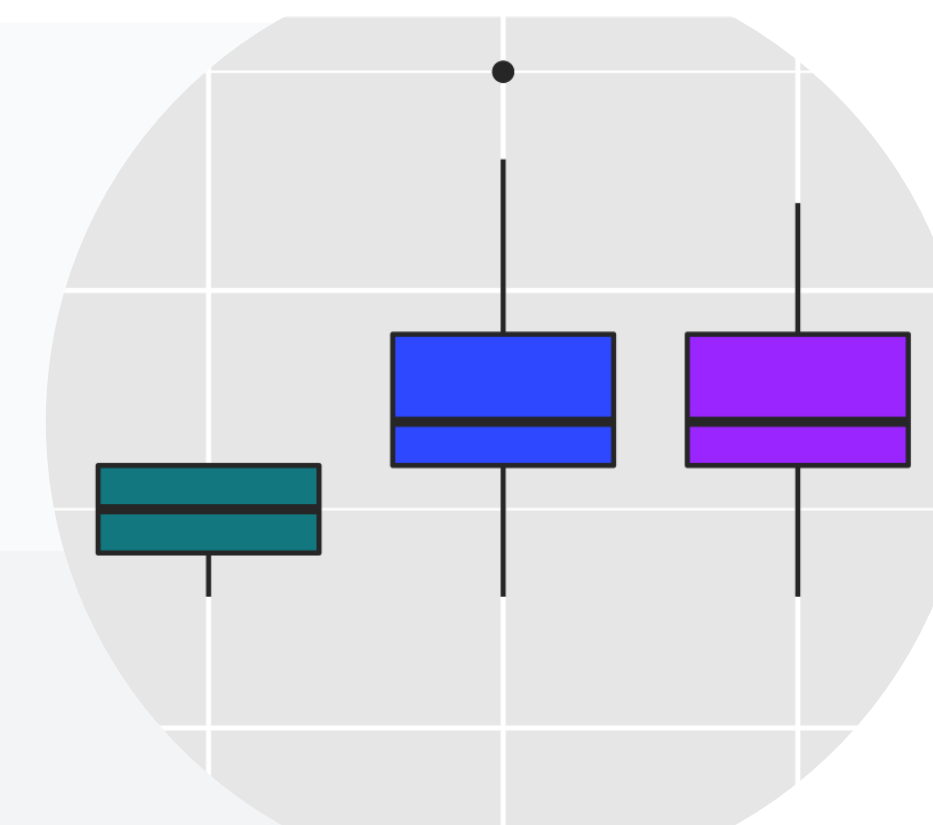
Manipulate an aesthetic based on another mapping

Sometimes you want to use the same colors for two aesthetics. Often, the second color should be slightly different from the first. For example, you may want the border color to be slightly darker than the fill color. In these cases, you should use the after_scale function directly for an aesthetic mapping.

```
ggplot(mpg, aes(class, hwy)) +
  geom_boxplot(aes(fill = class,
                   color = after_scale(clr_darken(fill, .3))))
```
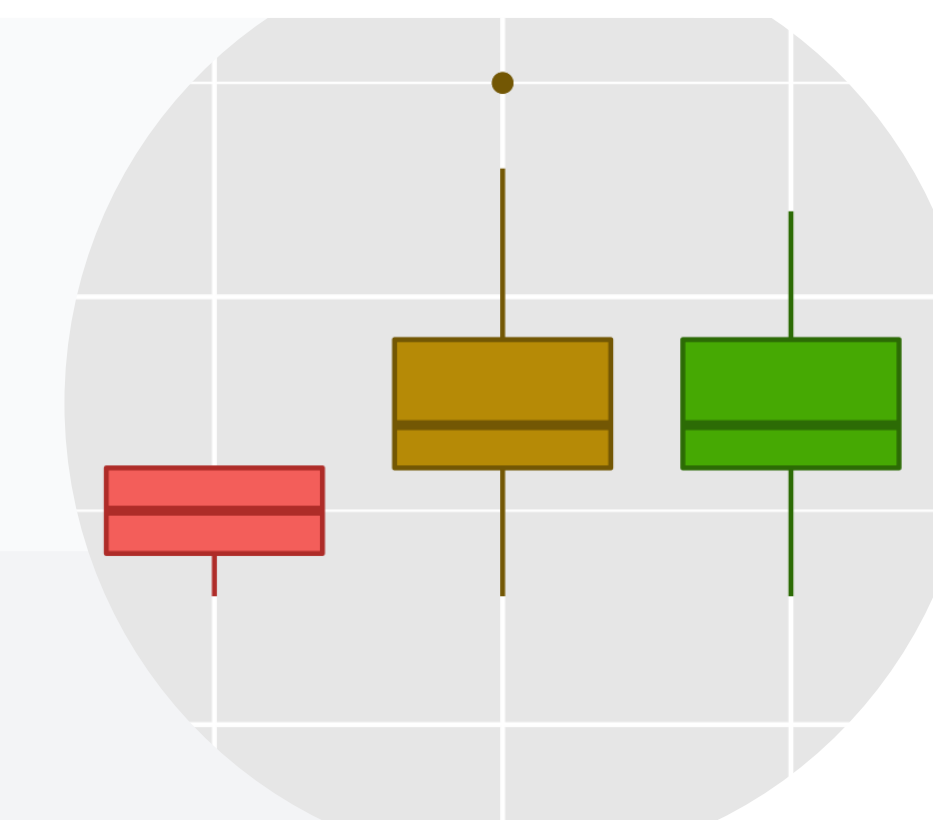
Manipulate a color multiple times after the mapping

There may be times when you want to manipulate a color twice after the aesthetic mapping. For example, you may want to reduce the saturation of a color and then make it darker. For these use cases, you can nest the color manipulation functions.

```
ggplot(mpg, aes(class, hwy)) +
  geom_boxplot(aes(fill = class,
                   color = after_scale(clr_darken(clr_desaturate(fill, .7), .3))))
```