( ) . . , , ,
.[1] , .

```
library(ggplot2)
library(dplyr)
library(ggtext)
plot_data <- ToothGrowth %>%
  mutate(dose = factor(dose)) %>%
  group_by(dose, supp) %>%
  summarise(len = mean(len)) %>%
  ungroup()

# Unstyled plot
ggplot(
  data = plot_data,
  mapping = aes(x = len, y = dose, fill = supp)
) +
  geom_col(position = "dodge")

# Styled plot
ggplot(
  data = plot_data,
  mapping = aes(x = len, y = dose, fill = supp)
) +
  geom_col(
    position = position_dodge(width = 0.7),
    width = 0.7
  ) +
```

[1] GitHub ( ) .

```
  scale_x_continuous(
    limits = c(0, 30),
    name = "    "
  ) +
  geom_text(
    mapping = aes(label = round(len, 0)),
    position = position_dodge(width = 0.7),
    hjust = 1.5,
    size = 6,
    fontface = "bold",
    colour = "white"
  ) +
  scale_fill_manual(values = c("#9B1D20", "#3D5A80")) +
  labs(
    title = "    ",
    subtitle = "60          C 3      (0.5, 1, 2 mg/ )
                        :
       <span style='color: #9B1D20'>**     **</span>
    <span style='color: #3D5A80'>**    **</span>.",
    y = "    (mg/ )"
  ) +
  theme_minimal(base_size = 14) +
  theme(
    legend.position = "none",
    plot.title = element_textbox_simple(face = "bold"),
    plot.subtitle = element_textbox_simple(
      margin = margin(t = 10),
      lineheight = 1.5
    ),
    plot.title.position = "plot",
    plot.margin = margin(15, 10, 10, 15),
    panel.grid = element_blank(),
    axis.text.x = element_blank()
  )
```

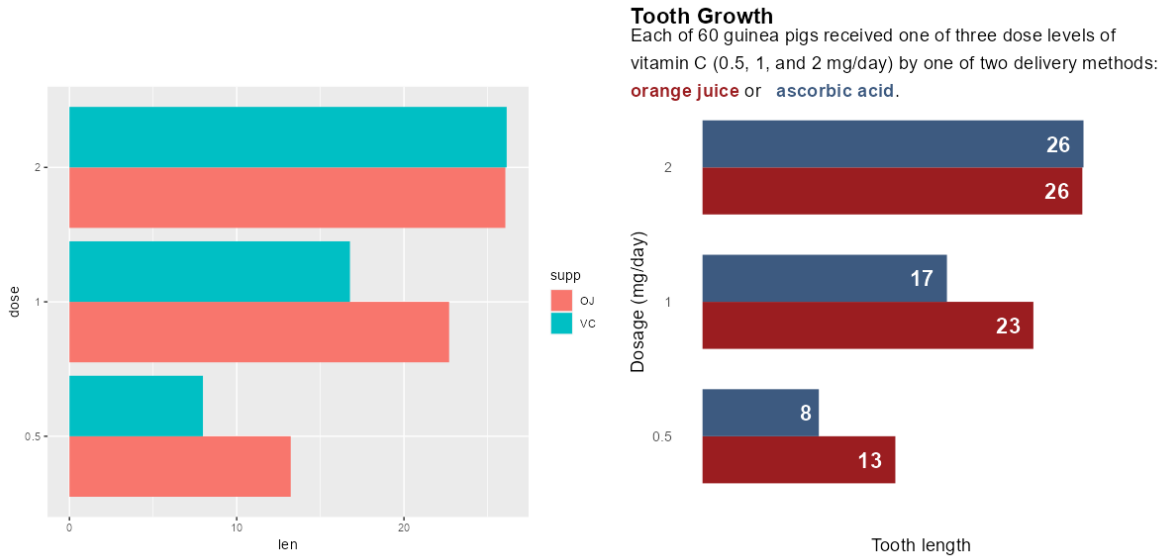

Figure 1: .

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. ? Beecham et al. (2021)

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```
library(dplyr)
library(ggplot2)
plot_data <- mtcars %>%
  mutate(car = rownames(mtcars))

# Colour all bars
ggplot(
  data = plot_data,
  mapping = aes(
    y = reorder(car, disp),
    x = disp,
    fill = car
  )
) +
  geom_col() +
  labs(
```

```
    x = "  1",
    y = ""
  ) +
  coord_cartesian(expand = FALSE) +
  theme_minimal(base_size = 14) +
  theme(
    legend.position = "none",
    legend.title = element_blank(),
    plot.title = element_text(
      face = "bold",
      margin = margin(b = 10)
    ),
    plot.title.position = "plot",
    plot.margin = margin(15, 10, 10, 15)
  )

# Highlight one bar
ggplot(
  data = plot_data,
  mapping = aes(
    y = reorder(car, disp),
    x = disp,
    fill = (car == "Maserati Bora")
  )
) +
  geom_col() +
  scale_fill_manual(values = c("#AFE1AF", "#7a9d7a")) +
  labs(
    x = "  1",
    y = ""
  ) +
  coord_cartesian(expand = FALSE) +
  theme_minimal(base_size = 14) +
  theme(
    legend.position = "none",
    legend.title = element_blank(),
    plot.title = element_text(
      face = "bold",
      margin = margin(b = 10)
    ),
    plot.title.position = "plot",
    plot.margin = margin(15, 10, 10, 15)
```

```
  )
```

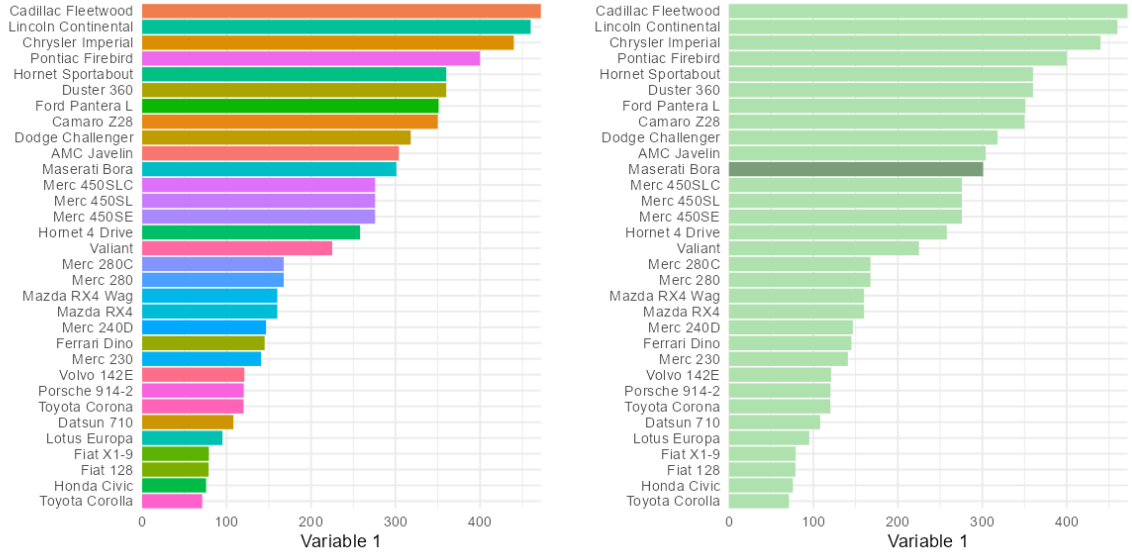

Figure 2: .

y , (:) .

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```
library(readr)
library(dplyr)
library(tidyr)
library(ggplot2)
wheels <- read_csv(
  "https://raw.githubusercontent.com/rfordatascience/tidytuesday/master/data/2022/2022-08-09/
  )
plot_data <- wheels %>%
  select(country, height, diameter) %>%
  drop_na() %>%
  filter(country %in% c("USA", "Japan"))

# Colour only
ggplot(
  data = plot_data,
  mapping = aes(
```

```
    x = diameter,
    y = height,
    colour = country
  )
) +
  geom_point(size = 3, alpha = 0.8) +
  scale_x_continuous(limits = c(0, 800)) +
  scale_y_continuous(limits = c(0, 800)) +
  scale_colour_brewer(palette = "Dark2") +
  coord_cartesian(expand = FALSE) +
  labs(
    title = "  ",
    x = "  (ft)",
    y = "  (ft)"
  ) +
  theme_minimal(base_size = 14) +
  theme(
    legend.position = "top",
    legend.title = element_blank(),
    plot.title = element_text(
      face = "bold",
      margin = margin(b = 10)
    ),
    plot.title.position = "plot",
    plot.margin = margin(15, 10, 10, 15)
  )

# Shapes and colours
ggplot(
  data = plot_data,
  mapping = aes(
    x = diameter,
    y = height,
    colour = country,
    shape = country
  )
) +
  geom_point(size = 3, alpha = 0.8) +
  scale_x_continuous(limits = c(0, 800)) +
  scale_y_continuous(limits = c(0, 800)) +
  scale_colour_brewer(palette = "Dark2") +
  coord_cartesian(expand = FALSE) +
```

```
labs(
  title = "   ",
  x = "   (ft)",
  y = "   (ft)"
) +
theme_minimal(base_size = 14) +
theme(
  legend.position = "top",
  legend.title = element_blank(),
  plot.title = element_text(
    face = "bold",
    margin = margin(b = 10)
  ),
  plot.title.position = "plot",
  plot.margin = margin(15, 10, 10, 15)
)
```

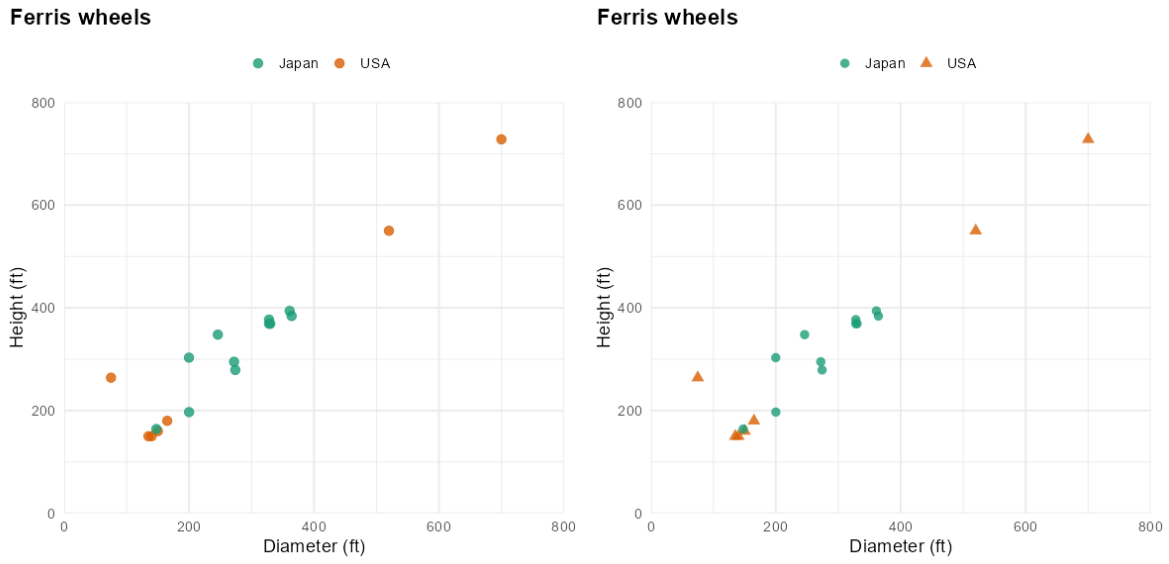

Figure 3: .

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- **(Sequential)**: ( ) (:).
- **(Diverging)**: (:).
- **(Qualitative)**: (:).

```
library(ggplot2)
library(PrettyCols)

# Sequential
ggplot(
  data = data.frame(x = 1:7, y = 1),
  mapping = aes(x = x, y = y, fill = x)
) +
  geom_tile() +
  labs(title = "  (Sequential)") +
  scale_fill_pretty_c("Teals") +
  theme_void() +
  theme(
    legend.position = "none",
    plot.title = element_text(size = 20, face = "bold"),
    plot.margin = margin(15, 10, 10, 15)
  )

# Diverging
ggplot(
  data = data.frame(x = 1:7, y = 1),
  mapping = aes(x = x, y = y, fill = x - mean(x))
) +
  geom_tile() +
  labs(title = "  (Diverging)") +
  scale_fill_gradient2(low = "#f1a340", high = "#998ec3") +
  theme_void() +
  theme(
    legend.position = "none",
    plot.title = element_text(size = 20, face = "bold"),
    plot.margin = margin(15, 10, 10, 15)
  )

# Qualitative
ggplot(
  data = data.frame(x = 1:7, y = 1),
  mapping = aes(x = x, y = y, fill = factor(x))
) +
  geom_tile() +
```

```
  labs(title = "  (Qualitative)") +
  scale_fill_brewer(palette = "Dark2") +
  theme_void() +
  theme(
    legend.position = "none",
    plot.title = element_text(size = 20, face = "bold"),
    plot.margin = margin(15, 10, 10, 15)
  )
```

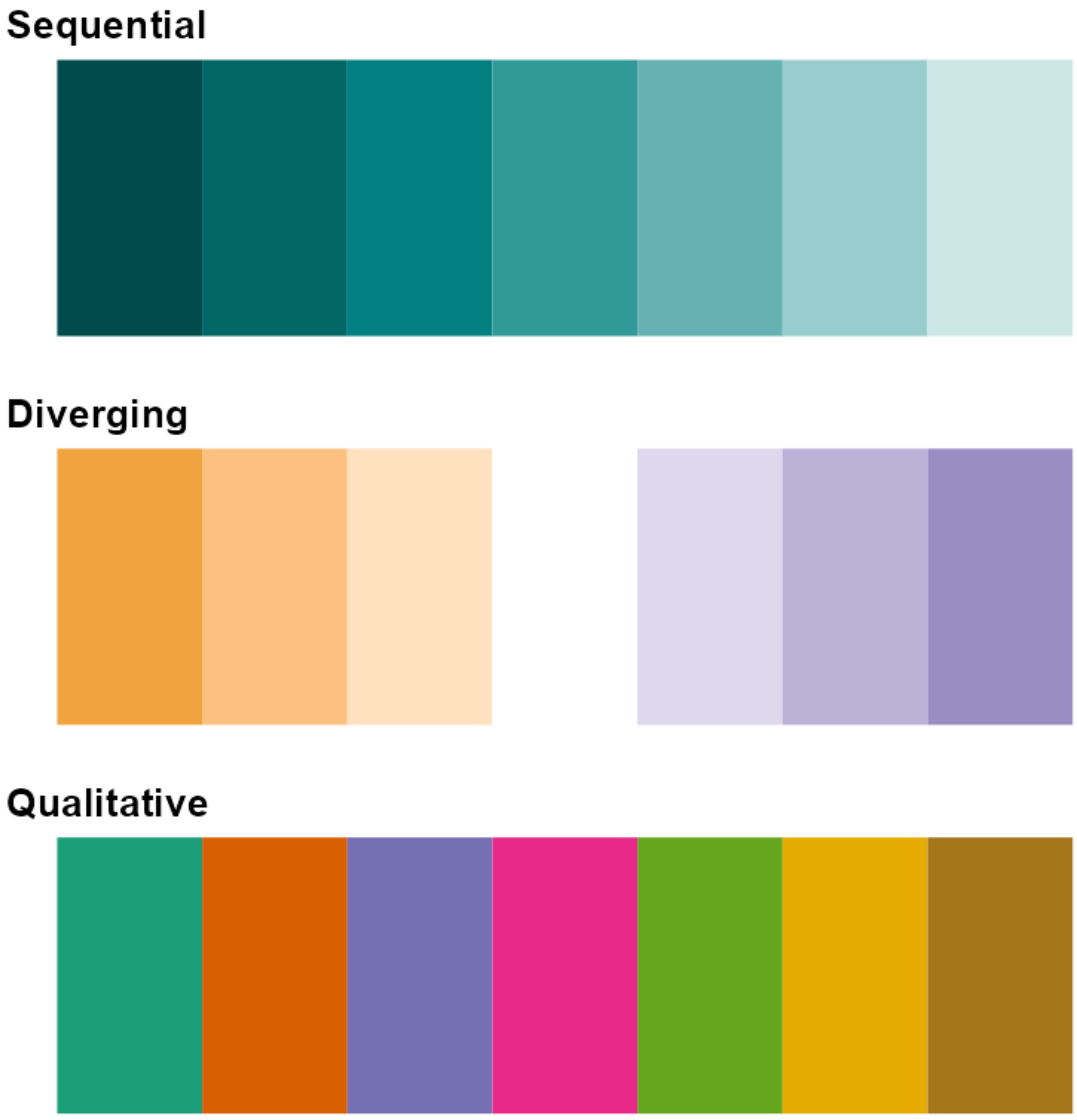

Figure 4: .

. . . (“Coblis — Color Blindness Simulator” n.d.)
. .
(luminosity) . Tennekes and Puts (2023) .

Tennekes and Puts (2023) ( ) . Paul Tol (2021)
.

```
library(ggplot2)
library(dplyr)
library(ggtext)
library(colorblindr)
plot_data <- ToothGrowth %>%
  mutate(dose = factor(dose)) %>%
  group_by(dose, supp) %>%
  summarise(len = mean(len)) %>%
  ungroup()

g <- ggplot(
  data = plot_data,
  mapping = aes(x = len, y = dose, fill = supp)
) +
  geom_col(
    position = position_dodge(width = 0.7),
    width = 0.7
  ) +
  scale_x_continuous(
    limits = c(0, 30),
    name = "   "
  ) +
  geom_text(
    mapping = aes(label = round(len, 0)),
    position = position_dodge(width = 0.7),
    hjust = 1.5,
    size = 6,
    fontface = "bold",
    colour = "white"
  ) +
  scale_fill_manual(values = c("#9B1D20", "#3D5A80")) +
  labs(
    title = "   ",
    subtitle = "60         C 3     (0.5, 1, 2 mg/ )
                        :
       <span style='color: #9B1D20'>**    **</span>
    <span style='color: #3D5A80'>**    **</span>.",
    y = "   (mg/ )"
  ) +
  theme_minimal(base_size = 14) +
```

```
  theme(
    legend.position = "none",
    plot.title = element_textbox_simple(face = "bold"),
    plot.subtitle = element_textbox_simple(
      margin = margin(t = 10),
      lineheight = 1.5
    ),
    plot.title.position = "plot",
    plot.margin = margin(15, 10, 10, 15),
    panel.grid = element_blank(),
    axis.text.x = element_blank()
  )

cvd_grid(g)
```

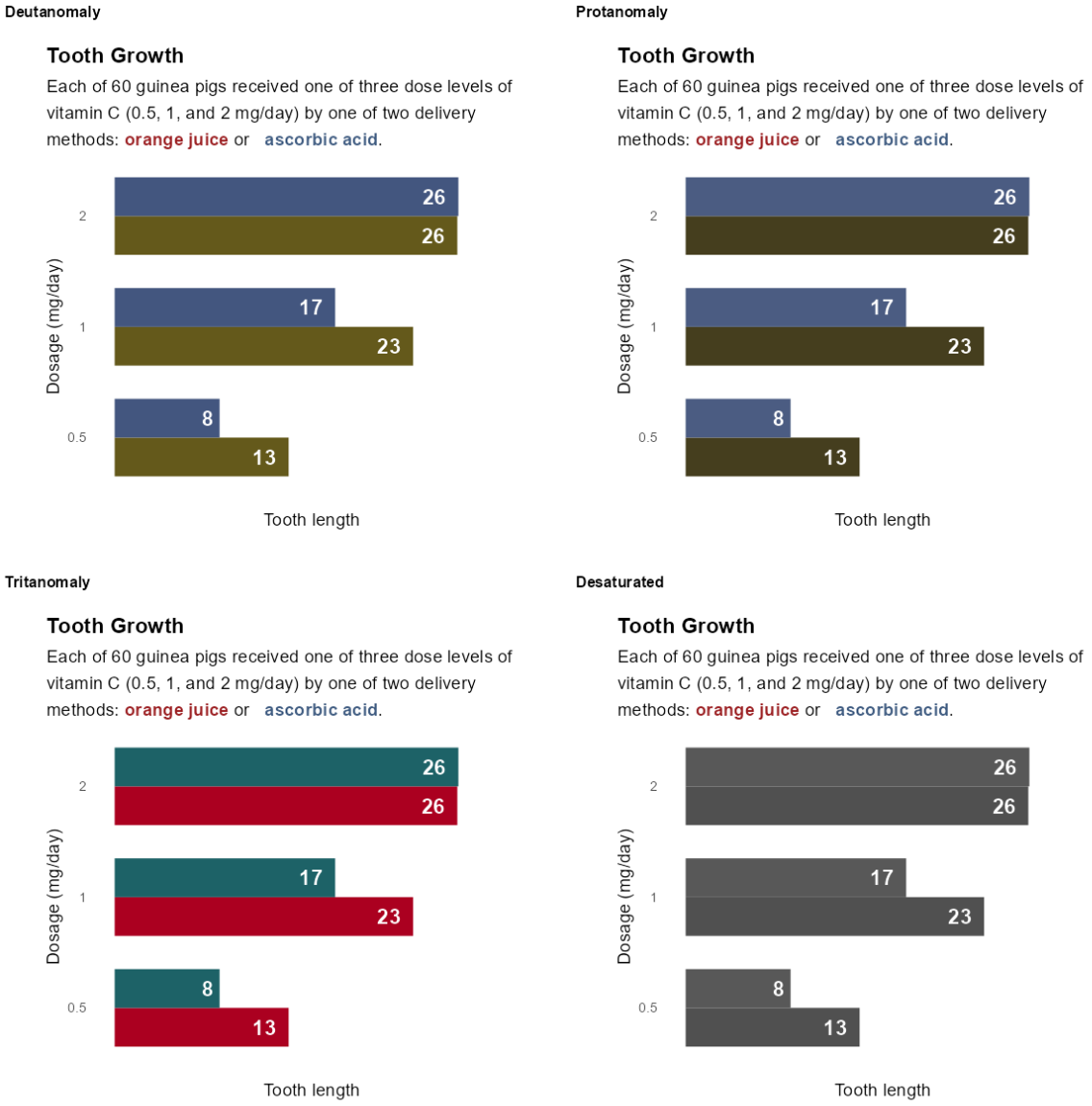

Figure 5: .

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. Muth (2018) , .

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```
library(ggplot2)
library(dplyr)
plot_data <- ToothGrowth %>%
  mutate(dose = factor(dose)) %>%
  group_by(dose, supp) %>%
  summarise(len = mean(len)) %>%
  ungroup()

# Not annotated
ggplot(
  data = plot_data,
  mapping = aes(
    x = len,
    y = dose,
    fill = supp
  )
) +
  geom_col(
    position = position_dodge(width = 0.7),
    width = 0.7
  ) +
  scale_x_continuous(
    limits = c(0, 30),
    name = "   "
  ) +
```

```r
  scale_fill_manual(
    name = "  : ",
    values = c("#9B1D20", "#3D5A80")
  ) +
  labs(
    title = "    ",
    y = "  "
  ) +
  theme_minimal(base_size = 14) +
  theme(
    legend.position = "top",
    plot.title = element_text(face = "bold"),
    plot.title.position = "plot",
    plot.margin = margin(15, 10, 10, 15)
  )

# Annotated
ggplot(
  data = plot_data,
  mapping = aes(
    x = len,
    y = dose,
    fill = supp
  )
) +
  geom_col(
    position = position_dodge(width = 0.7),
    width = 0.7
  ) +
  scale_x_continuous(
    limits = c(0, 30),
    name = "    "
  ) +
  geom_text(
    mapping = aes(label = round(len, 0)),
    position = position_dodge(width = 0.7),
    hjust = 1.5,
    size = 6,
    fontface = "bold",
    colour = "white"
  ) +
  scale_fill_manual(
```

```
  name = "  : ",
  values = c("#9B1D20", "#3D5A80")
) +
labs(
  title = "    ",
  y = "  "
) +
theme_minimal(base_size = 14) +
theme(
  legend.position = "top",
  plot.title = element_text(face = "bold"),
  plot.title.position = "plot",
  plot.margin = margin(15, 10, 10, 15)
)
```

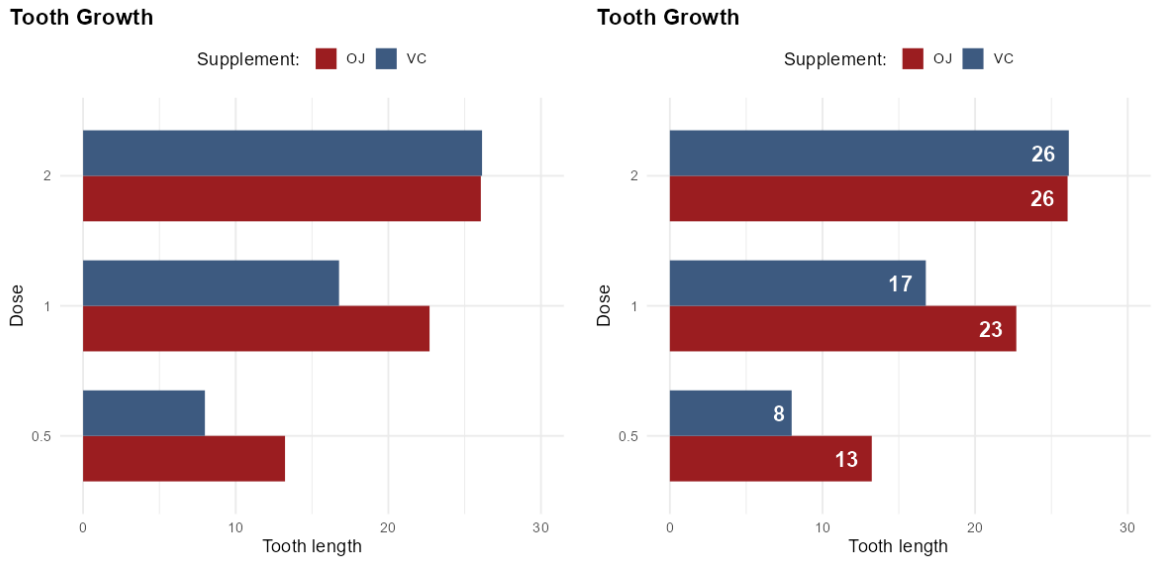

Figure 6: .

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- . 2008 2008 .
- . “Chart Titles and Text” (n.d.) 3~4 .

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- **(Serif)**: . . ( )
- **(Sans serif)**: . ( )
- **(Monospace)**: .

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(: Times New Roman) . .
. Arial, Calibri, Verdana .

Dyslexie OpenDyslexic . Atkinson Hyperlegible Braille Institute of America , . Braille Institute Google Fonts . Wery and Diliberto (2017). .

, . I, l, 1 . . Source Sans Pro Verdana .

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(Rello and Baeza-Yates 2016). (!).

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- 12pt .
- I, l, 1 .
- (2).
- ( ) .

(Alternative text) .

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Green (2023) Mine Dogucu . Cesal (2020)

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