ggplot2 Basic Line Plot for Multiple Time Series

Fan Wang

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1 ggplot Line Plot Basics

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1.1 Two Time Series

Given three time series, we plot them jointly.

First, we construct a dataframe.

```
# Load data, and treat index as "year"
# pretend data to be country-data
df_attitude <- as_tibble(attitude) %>%
  rowid_to_column(var = "year") %>%
  select(year, rating, complaints, learning) %>%
  rename(stats_usa = rating,
         stats_canada = complaints,
         stats_uk = learning)

# Wide to Long
df_attitude <- df_attitude %>%
  pivot_longer(cols = starts_with('stats_'),
               names_to = c('country'),
               names_pattern = paste0("stats_(.*)"),
               values_to = "rating")

# Print
kable(df_attitude[1:10,]) %>% kable_styling_fc()
```

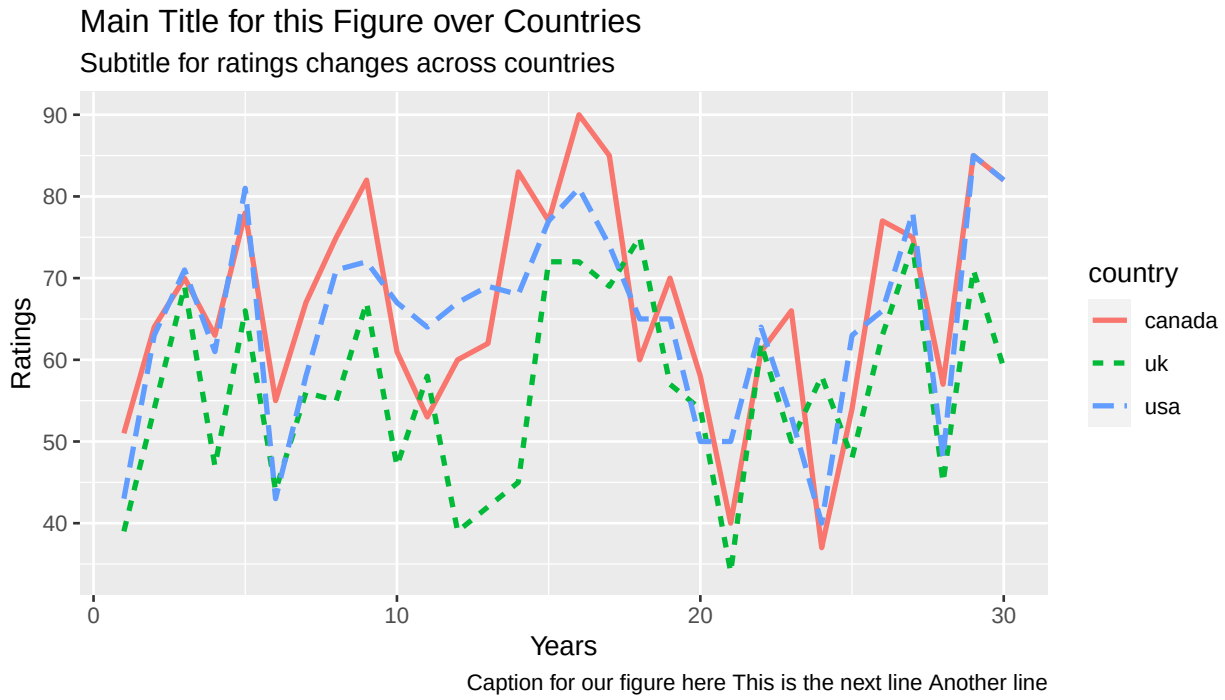
Second, we generate a basic visualizations with default values.

```
# basic chart with two lines
pl_lines_basic <- df_attitude %>%
  ggplot(aes(x=year, y=rating,
    color=country, linetype=country)) +
  geom_line(size = 1) +
  labs(x = paste0("Years"),
```

year	country	rating
1	usa	43
1	canada	51
1	uk	39
2	usa	63
2	canada	64
2	uk	54
3	usa	71
3	canada	70
3	uk	69
4	usa	61

```
        y = paste0("Ratings"),
        title = paste(
         "Main Title for this Figure over",
         "Countries", sep=" "),
        subtitle = paste(
         "Subtitle for ratings changes across",
         "countries", sep=" "),
        caption = paste(
         "Caption for our figure here ",
         "This is the next line ",
         "Another line", sep=""))

# print figure
print(pl_lines_basic)
```



Third, we generate a more customized visualization with customized: (1) colors and shapes for lines; (2) x- and y-axis limits, labels, and breaks; (3) customized legend position.

```r
# basic chart with two lines
pl_lines <- df_attitude %>%
  ggplot(aes(x=year, y=rating,
    color=country, linetype=country, shape=country)) +
  geom_line(size=1)

# Titles
st_x = "Years"
st_y = "Ratings"
st_subtitle = "Ratings changes across countries"
pl_lines <- pl_lines +
  labs(
    x = st_x,
    y = st_y,
    subtitle = st_subtitle)

# Figure improvements
# set shapes and colors
ar_st_labels <- c(
  bquote("Canada"),
  bquote("UK"),
  bquote("USA"))

ar_st_colours <- c("#85ccff", "#026aa3", "red")
ar_st_linetypes <- c("solid", "dashed", "longdash")
pl_lines <- pl_lines +
  scale_colour_manual(values = ar_st_colours, labels = ar_st_labels) +
  scale_shape_discrete(labels = ar_st_labels) +
  scale_linetype_manual(values = ar_st_linetypes, labels = ar_st_labels)

# Axis
x_labels <- c("Yr 1990", "Year 2000", "Y 2010", "y-2015", "2020 (year)")
x_breaks <- c(0, 10, 20, 25, 30)
x_min <- 0
x_max <- 30

y_breaks <- seq(30, 90, length.out=6)
y_labels <- paste0('y=', y_breaks)
y_min <- 30
y_max <- 90

pl_lines <- pl_lines +
  scale_x_continuous(
    labels = x_labels, breaks = x_breaks,
    limits = c(x_min, x_max)
  ) +
  theme(axis.text.x = element_text(
    # Adjust x-label angle
    angle = 45,
    # Adjust x-label distance to x-axis (up vs down)
    hjust = 0.4,
    # Adjust x-label left vs right wwith respect ot break point
    vjust = 0.5)) +
```

```
  scale_y_continuous(
    labels = y_labels, breaks = y_breaks,
    limits = c(y_min, y_max)
  )

# print figure
print(pl_lines)
```