

# Styling charts for RSS publications

## Styling charts with different tools

In this section, we discuss the technical details of how to change the style of charts built with some of the most common types of software used to create data visualisations.

### R

R (R Core Team 2021) is a programming language which is popular for statistical computing and graphics. There are many packages with R that can be used to create data visualisations, and we don't aim to cover them all here. Instead, we address the most common methods: built-in base R graphics, and the `{ggplot2}` package (Wickham 2016).

To help authors with styling their charts to fit in with the guidance in this document, we have developed an R package, `{RSSthemes}`. We include some examples of using the package here, but encourage readers to check the GitHub repository for any updates.

We aim to add this package to CRAN in the near future, but in the meantime you can install the development version from GitHub:

```
remotes::install_github("nrennie/RSSthemes")
```

You can then load the package using:

```
library(RSSthemes)
```

## Base R

R has built-in graphics capabilities that allow users to make a wide range of data visualisations without installing any additional packages. This [blog post from Jumping Rivers](#) (“Styling Base R Graphics” 2018) provides instructions on how to style graphics created in base R.

**Example:** changing bar chart colours in base R.

If all of the bars, lines, points, etc. should have the same colour, you can set the `col` argument to have one of the RSS colours. The options are: `signif_red`, `signif_blue`, `signif_green`, `signif_orange`, or `signif_yellow`.

```
barplot(table(mtcars$gear), col = signif_blue)
```

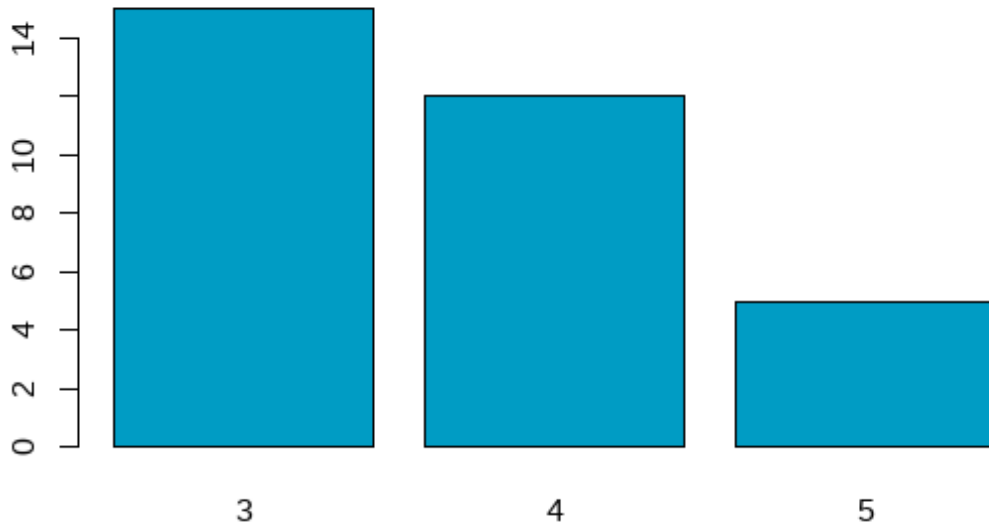


Figure 1: Bar chart with bars coloured in *Significance* blue.

If the colours in your plot are based on values in your data, you can set the default colours using the `palette()` function. Within `{RSSthemes}`, the `set_rss_palette()` function changes the default colours used. There are currently three palettes available in `{RSSthemes}`, although we hope to add more in the future. The options are `signif_qual`, `signif_div`, or `signif_seq`.

```
set_rss_palette("signif_qual")
plot(1:4, 1:4, col=1:4, pch=19, cex=3, xlab="", ylab="")
```

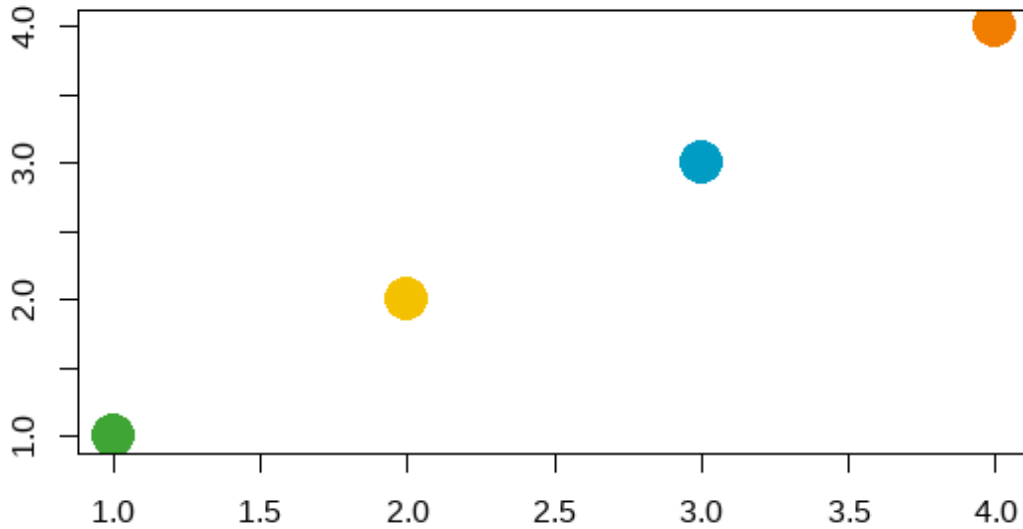


Figure 2: Scatter plot showing the colours from the `signif_qual` palette.

Run `palette("default")` to reset to original base R colours.

**Example:** changing the styling of base R plots.

Within the `plot()` function (and related base R plotting functions such as `barplot()`, and `hist()`), there are arguments to control how the non-data elements of the plot look. For example, the `family` argument changes which font family is used. You can also set many of these arguments globally by calling the `par()` function. Within `{RSSthemes}`, there is a function `set_signif_par()` which sets some default options, including the text alignment and font for all base R plots. We also recommend adding reference lines using the `abline()` function.

```
set_signif_par()
plot(1:4, 1:4, col=1:4, pch=19, cex=3, xlab="", ylab="",
     main = "My Significance Plot",
```

```
sub = "Source: data source")
abline(h=1:4, v=1:4, col = "lightgrey")
```

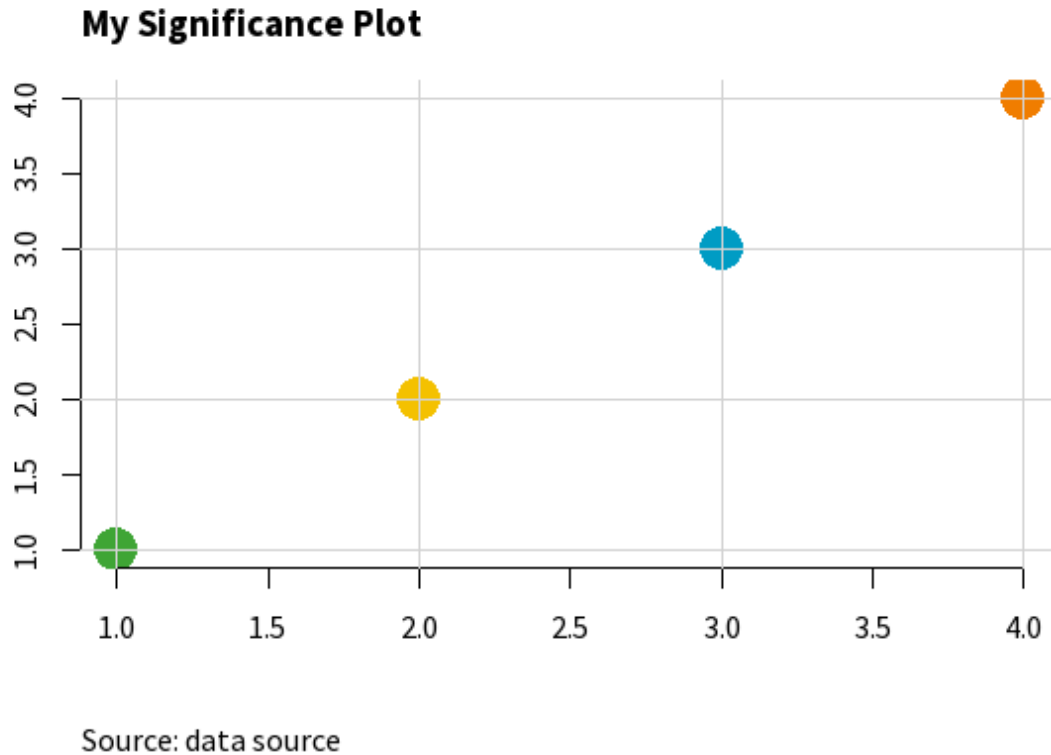


Figure 3: Scatter plot showing the base R styling implemented by `set_signif_par()`.

## {ggplot2}

{ggplot2} is an R package within the {tidyverse} framework specifically for creating data visualisations. The [package documentation](#) provides guidance on how to create different types of charts. Advice on [changing the colours](#) and [styles](#) of {ggplot2} visualisations, can be found in the [ggplot2: Elegant Graphics for Data Analysis](#) book by Hadley Wickham (Wickham 2016).

Let's set up a basic data set to make some plots with {ggplot2}.

```
library(ggplot2)
plot_df <- data.frame(x = LETTERS[1:4],
                      y = 1:4)
```

**Example:** changing the non-mapped colours in {ggplot2}.

In {ggplot2}, the `colour` (or `color`) argument changes the colour that outlines an element, and `fill` changes the colour that fills the element. If all of the, e.g., bars, lines, or points should have the same colour, you can set either the `fill` or `colour` arguments to have one of the RSS colours. The options are: `signif_red`, `signif_blue`, `signif_green`, `signif_orange`, or `signif_yellow`.

```
ggplot(data = plot_df,  
       mapping = aes(x = x, y = y)) +  
  geom_col(fill = signif_yellow)
```

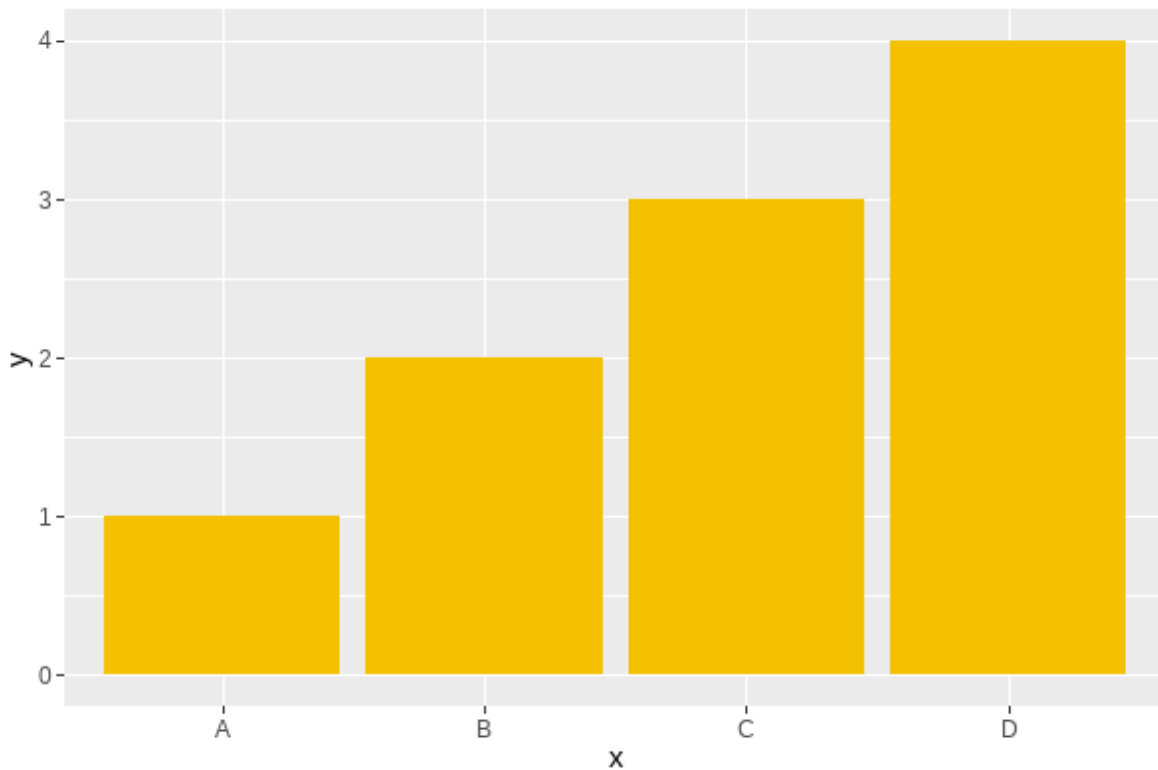


Figure 4: Bar chart with bars coloured yellow.

**Example:** using a discrete colour scale in {ggplot2}.

For working with qualitative (discrete) data, the best palette to use is "`signif_qual`". This palette currently only contains four colours.

- Discrete (fill) scale: `scale_fill_rss_d()`

```
ggplot(data = plot_df,
       mapping = aes(x = x, y = y, fill = x)) +
  geom_col() +
  scale_fill_rss_d(palette = "signif_qual")
```

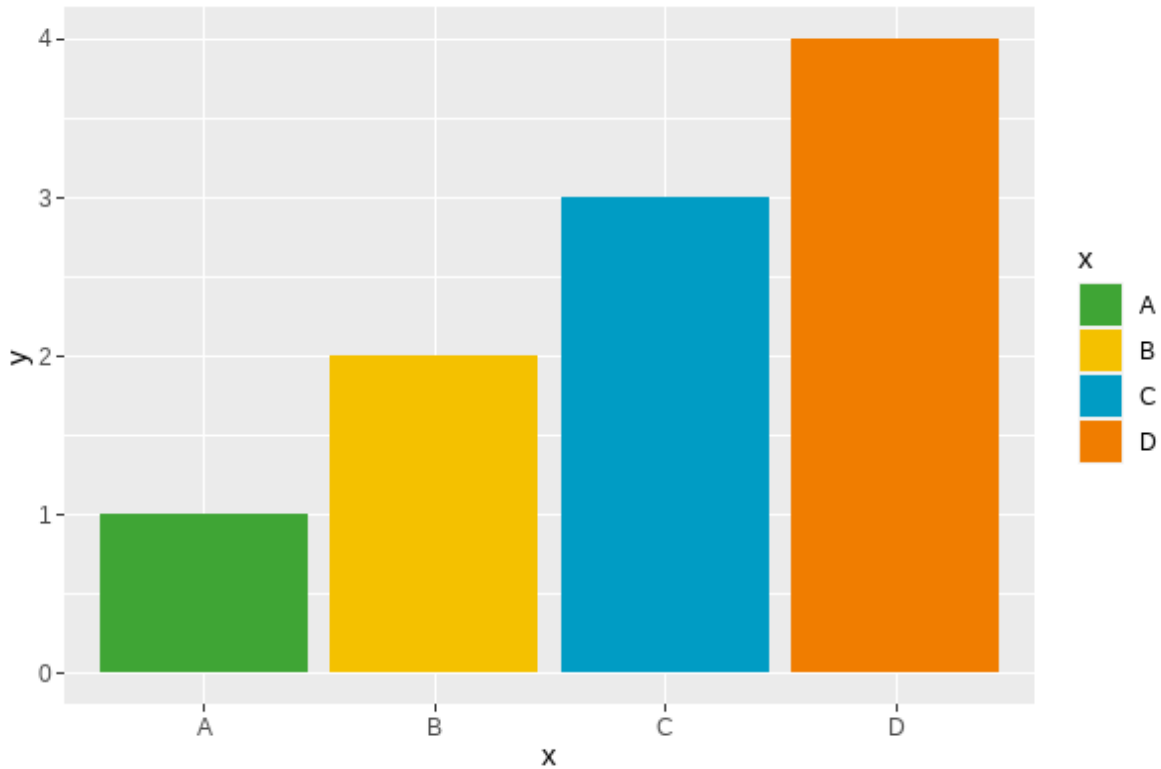


Figure 5: Bar chart with colours from `signif_qual`.

- Discrete (colour) scale: `scale_colour_rss_d()`

```
ggplot(data = plot_df,
       mapping = aes(x = x, y = y, colour = x)) +
  geom_point(size = 4) +
  scale_colour_rss_d(palette = "signif_qual")
```

**Example:** using a continuous colour scale in `{ggplot2}`.

Continuous colour scales may be sequential or diverging. For working with sequential (continuous) data, the best palette to use is `"signif_seq"`.

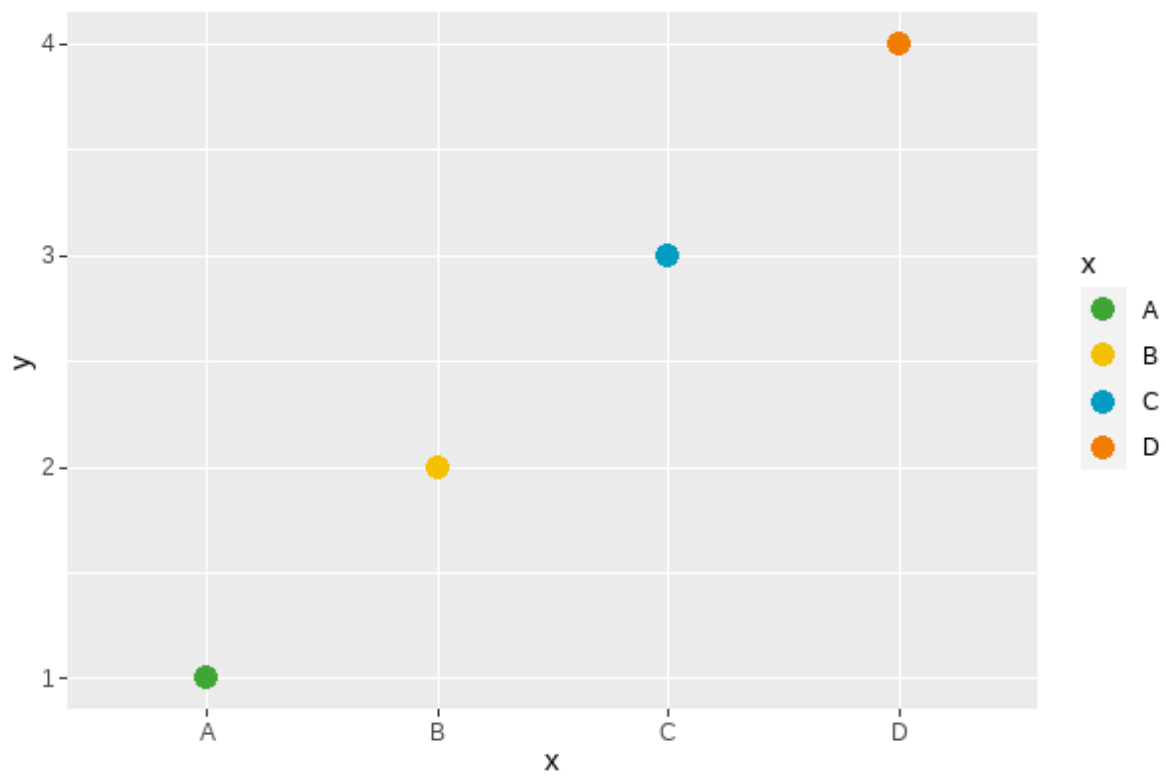


Figure 6: Scatter plot with colours from `signif_qual`.

- Continuous (fill) scale: `scale_fill_rss_c()`

```
ggplot(data = plot_df,
       mapping = aes(x = x, y = y, fill = y)) +
  geom_col() +
  scale_fill_rss_c(palette = "signif_seq")
```

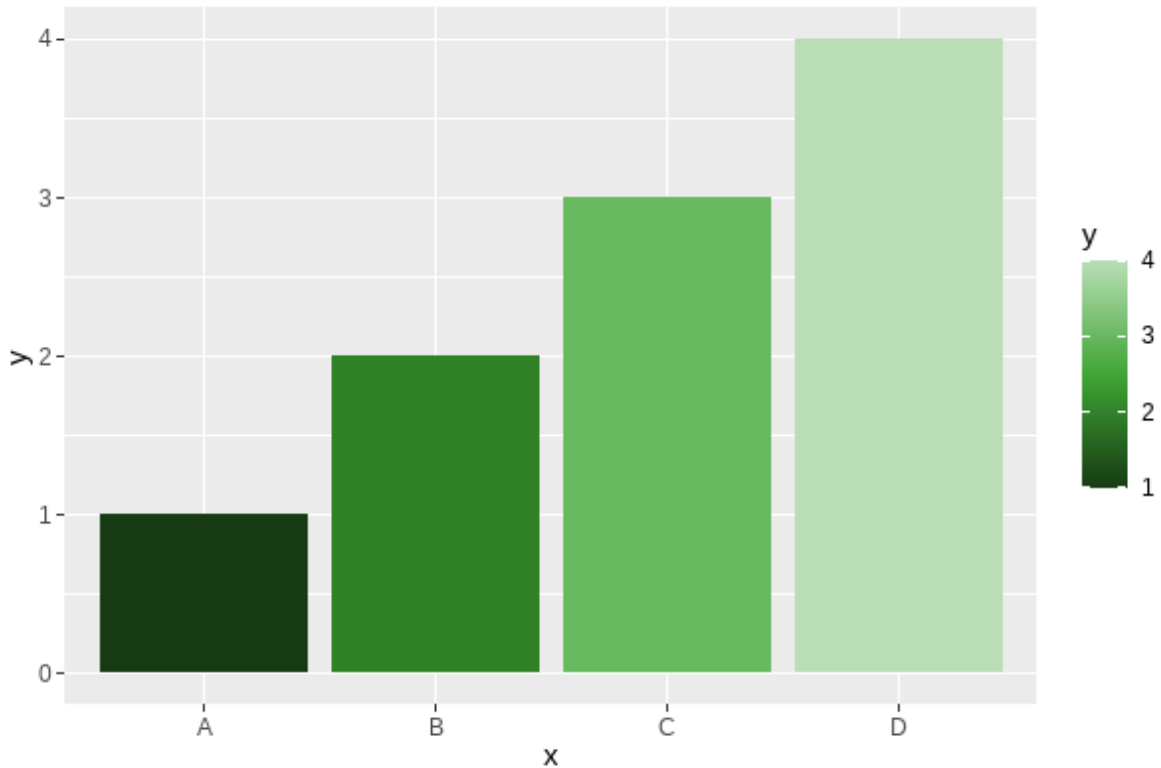


Figure 7: Bar chart showing sequential green colour palette.

- Continuous (colour) scale: `scale_colour_rss_c()`

```
ggplot(data = plot_df,
       mapping = aes(x = x, y = y, colour = y)) +
  geom_point(size = 4) +
  scale_colour_rss_c(palette = "signif_seq")
```

For working with diverging (continuous) data, the best palette to use is "signif\_div".

- Continuous (fill) scale: `scale_fill_rss_c()`



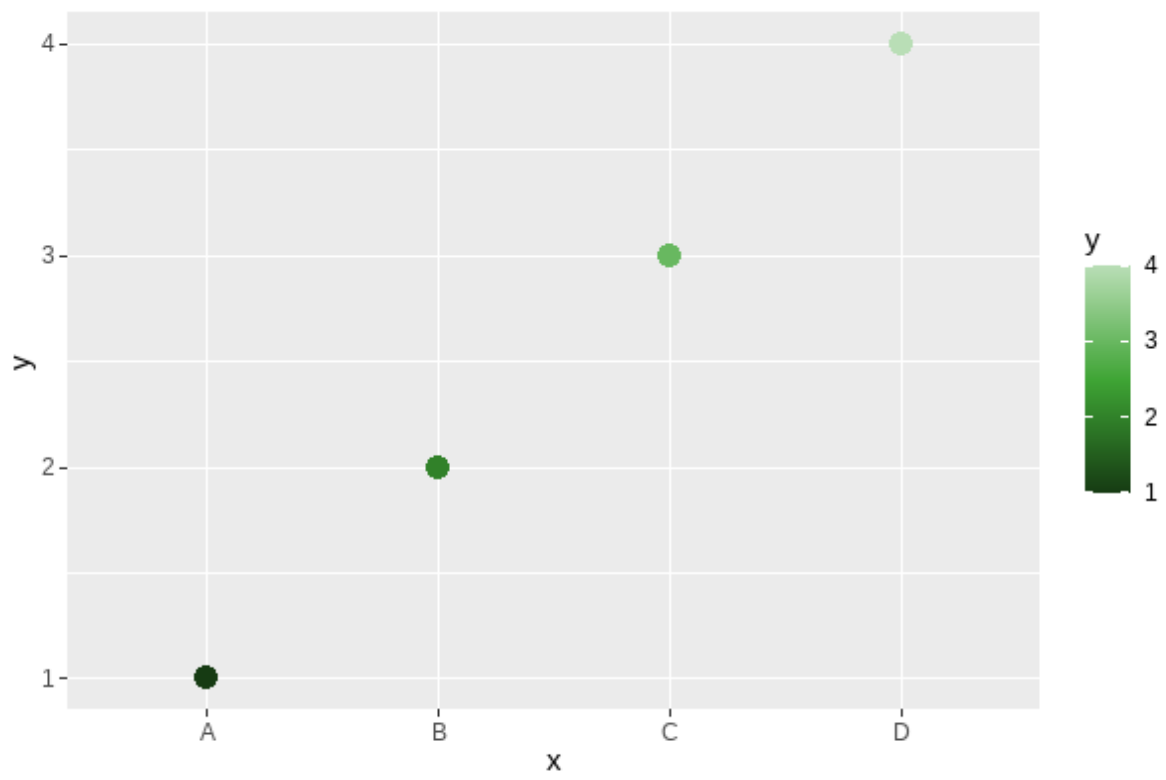


Figure 8: Scatter plot showing sequential green colour palette.

```
ggplot(data = plot_df,
       mapping = aes(x = x, y = y, fill = y)) +
  geom_col() +
  scale_fill_rss_c(palette = "signif_div")
```

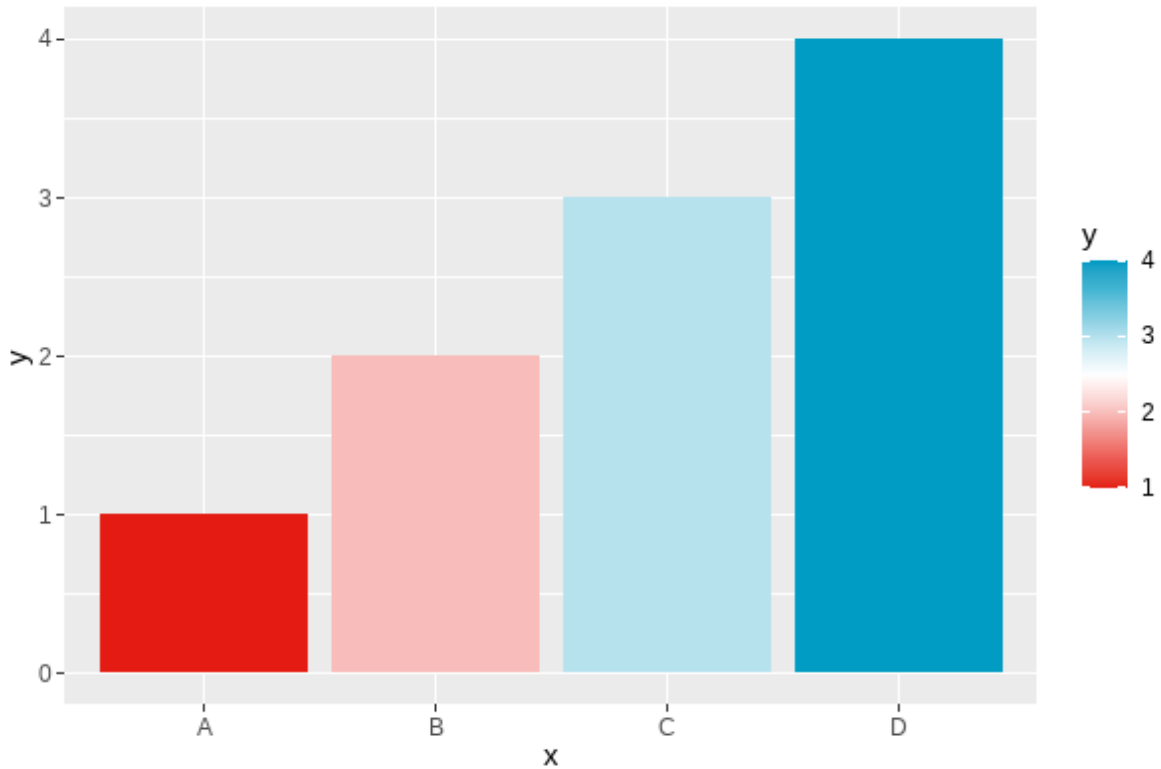


Figure 9: Bar chart showing diverging red to blue palette.

If you want to centre the diverging scale around a different value, you can alternatively pass the pre-defined colours from `{RSSthemes}` into `scale_fill_gradient2()` in `{ggplot2}`:

```
ggplot(data = plot_df,
       mapping = aes(x = x, y = y, fill = y)) +
  geom_col() +
  scale_fill_gradient2(low = signif_red, high = signif_blue, midpoint = 2)
```

**Example:** changing the theme in `{ggplot2}`.

Within `{ggplot2}`, themes allow you to control the appearance of the non-data elements of your plot. The default theme is `theme_grey()` which has a darker background. We recommend

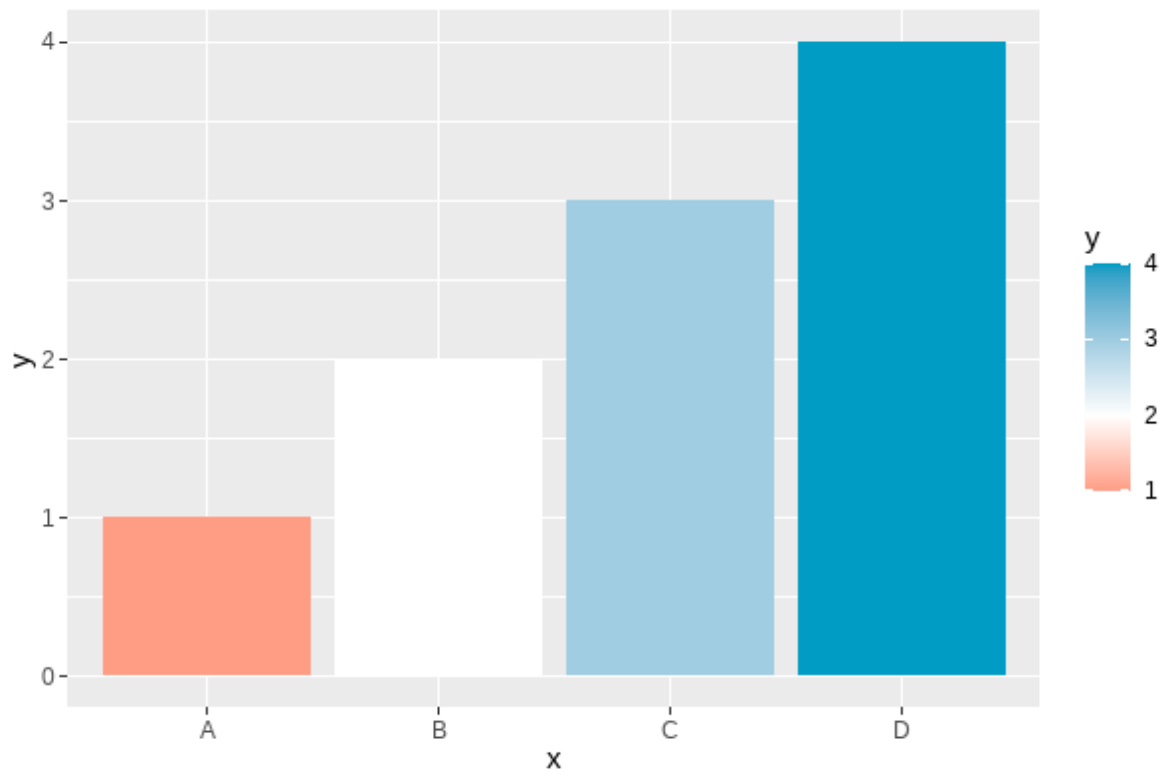


Figure 10: Bar chart showing diverging red to blue palette centred at 2.

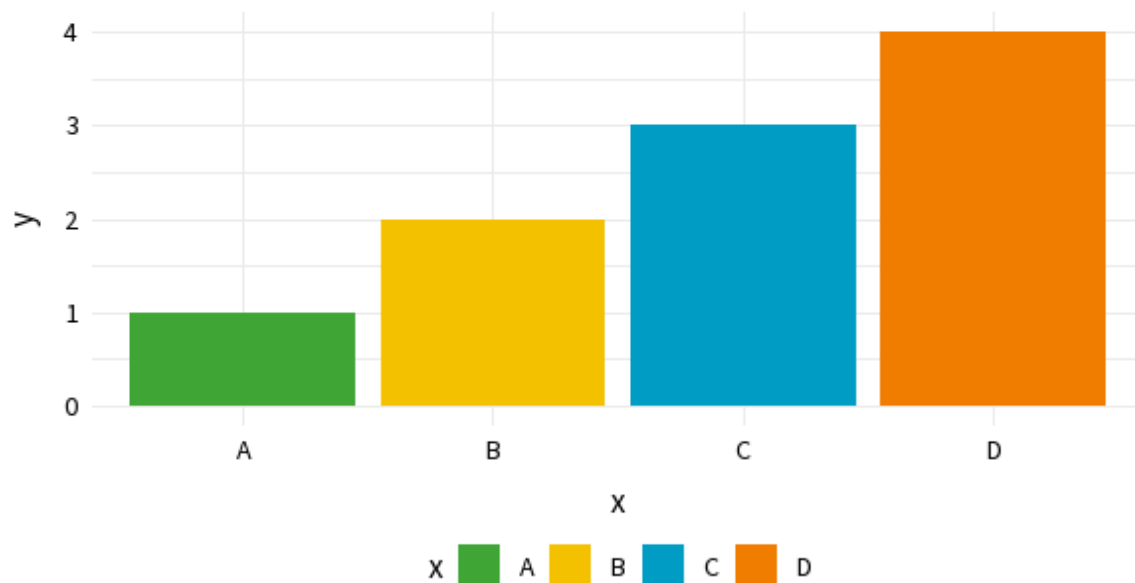
using a white or transparent background, such as those created with `theme_minimal()` or `theme_bw()`.

You can also use `theme_significance()` from `{RSSthemes}` which additionally sets the plot font to one of those used in *Significance* magazine. Check that you have already run `library(RSSthemes)` to ensure the fonts load correctly.

```
ggplot(data = plot_df,
       mapping = aes(x = x, y = y, fill = x)) +
  geom_col() +
  labs(title = "My Significance Plot",
       subtitle = "Some longer sentence explaining what is happening in the chart.",
       caption = "Source: name of data source") +
  scale_fill_rss_d(palette = "signif_qual") +
  theme_significance()
```

## My Significance Plot

Some longer sentence explaining what is happening in the chart.



Source: name of data source

Figure 11: Bar chart styled with `theme_significance()`.

If you find a bug in the `{RSSthemes}` package, or something that isn't working quite as you expected, please submit a [GitHub issue](#).

## Publication specifications

The following information should be used to design graphs and charts that meet RSS publication requirements. Details include page sizes and column widths, font types and sizes, and image resolutions and file formats.

### *Significance Magazine*

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Page size	(W) 212.55 mm x (H) 263.65 mm
Text area	(W) 188 mm x (H) 212 mm
Image resolution	300 dpi (print quality)
Recommended image file formats	jpeg, png

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### Notebook section

Uses four-column layout.

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1x column width	45 mm
2x column width	93 mm
3x column width	140 mm
4x column width	188 mm
Body font	Meta Serif OT, Book
Font size	8.5 pt
Section colour	Red: (in <code>RSSthemes</code> package use <code>signif_red</code> )
	<ul style="list-style-type: none"><li>• CMYK = 0, 96, 98, 1</li><li>• RGB = 228, 27, 18</li><li>• Hex code = #e41b12</li></ul>

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### Features section

Uses three-column layout.

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1x column width	60 mm
2x column width	124 mm
3x column width	188 mm

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Body font	Source Sans Pro, Regular
Font size	9 pt
Section colour	Green: (in <code>RSSthemes</code> package use <code>signif_green</code> )
	<ul style="list-style-type: none"> <li>• CMYK = 75, 5, 100, 0</li> <li>• RGB = 63, 165, 53</li> <li>• Hex code = #3fa535</li> </ul>

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### Profiles / Perspectives / Statscom section

Uses three-column layout.

---

1x column width	60 mm
2x column width	124 mm
3x column width	188 mm
Body font	Meta Serif OT, Book
Font size	8.5 pt
Section colours: Profiles	Blue: (in <code>RSSthemes</code> package use <code>signif_blue</code> )
	<ul style="list-style-type: none"> <li>• CMYK = 78, 19, 15, 1</li> <li>• RGB = 0, 156, 196</li> <li>• Hex code = #009cc4</li> </ul>

Perspectives	Yellow: (in <code>RSSthemes</code> package use <code>signif_yellow</code> )
	<ul style="list-style-type: none"> <li>• CMYK = 5, 24, 95, 1</li> <li>• RGB = 244, 193, 0</li> <li>• Hex code = #f4c100</li> </ul>

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Statscomm

Orange:  
(in `RSSthemes` package use `signif_orange`)

- CMYK = 0, 60, 99, 0
  - RGB = 240, 125, 0
  - Hex code = #f07d00
- 

## Journal of the Royal Statistical Society Series A

Uses a single-column layout.

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Page size	(W) 189 mm x (H) 246 mm
Text area	(W) 136 mm x (H) 217 mm
Body font	Sabon LT Std Roman
Font size	9.25 pt
Image resolution	300 dpi (print quality)
Recommended image file formats	jpeg, png

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R Core Team. 2021. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. <https://www.R-project.org/>.

“Styling Base r Graphics.” 2018. Jumping Rivers. 2018. <https://www.jumpingrivers.com/blog/styling-base-r-graphics/>.

Wickham, Hadley. 2016. *Ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York. <https://ggplot2.tidyverse.org>.