Rainbow, rose and pie charts are other types of graphical plot you can use to visualise your data, and with a few changes to your `ggplot2` code you can make a drastically different chart.

Rose charts

Rose charts are similar to pie charts with differences being shown by how far each sector extends from the middle circle. A rose chart is a type of **polar chart** and is also known as a **coxcomb chart**.

Rose charts are **most** suitable when:

- each sector of data is cyclical
- data is directional
- data is being displayed to those without a thorough technical understanding of the content.

Rose charts are **least** suitable when:

- there are no subtle differences looking to be displayed
- you need to display your data as percentage of a whole.

Created by Florence Nightingale, the following chart indicates the number of deaths that occurred from preventable diseases (in blue), those that were the results of wounds (in red), and those due to other causes (in black).
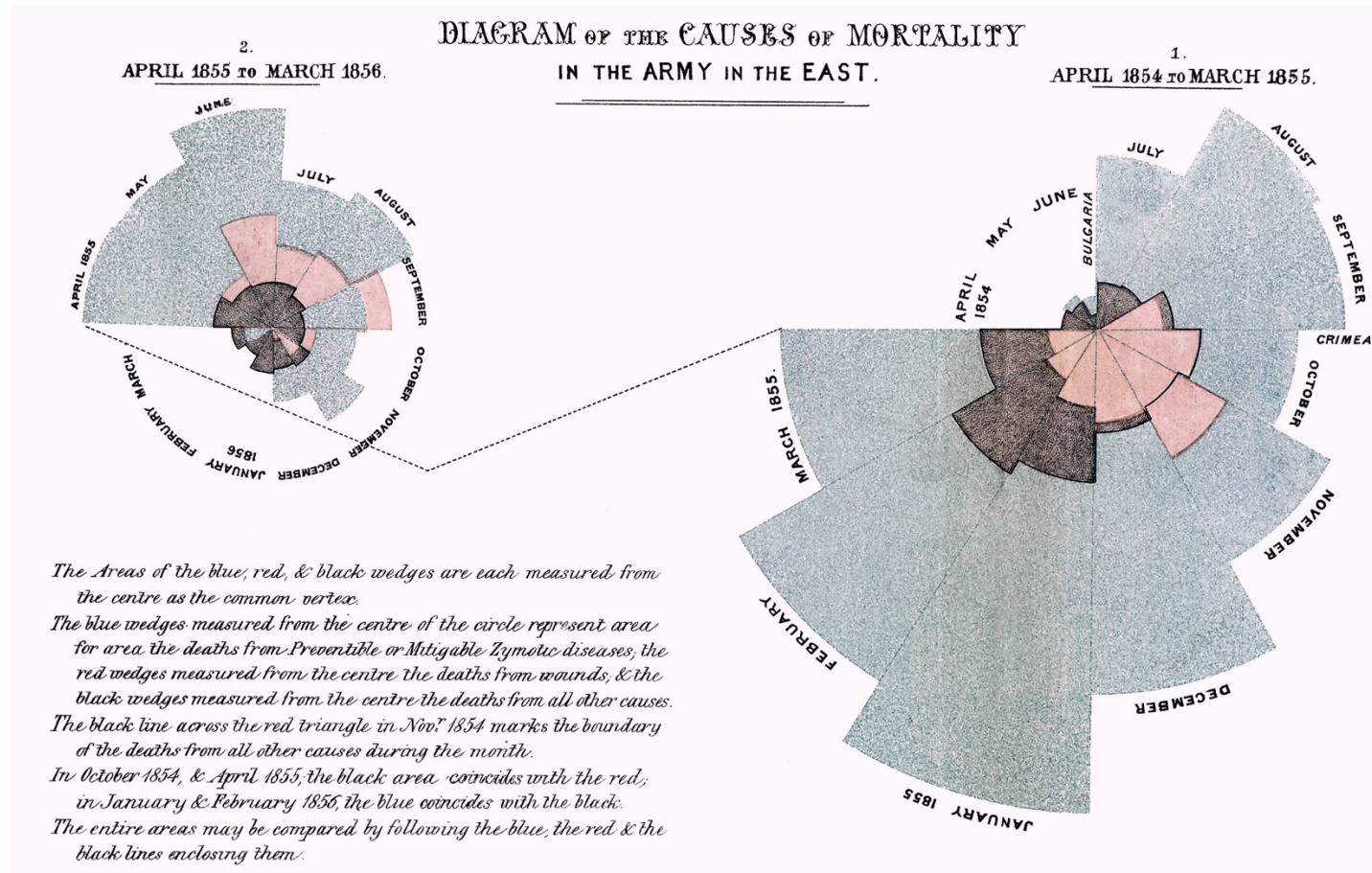
Read more about the usage of rose charts.

Pie charts

Pie charts are circular graphs that display the composition of a whole. A pie chart displays categorical data, displaying it as a percentage of a whole dataset.

Pie charts are **most** suitable when the data is being displayed as the composition of a whole.

Pie charts are **least** suitable when:

- you have a large number of categories
- only small variations between quantities of the data is to be displayed.

Read more about why pie charts are data visualisation's greatest villain.

Rainbow charts

Rainbow charts are control charts that allow various values on a single chart. Each value has its own colour.

Consider the following rainbow chart:
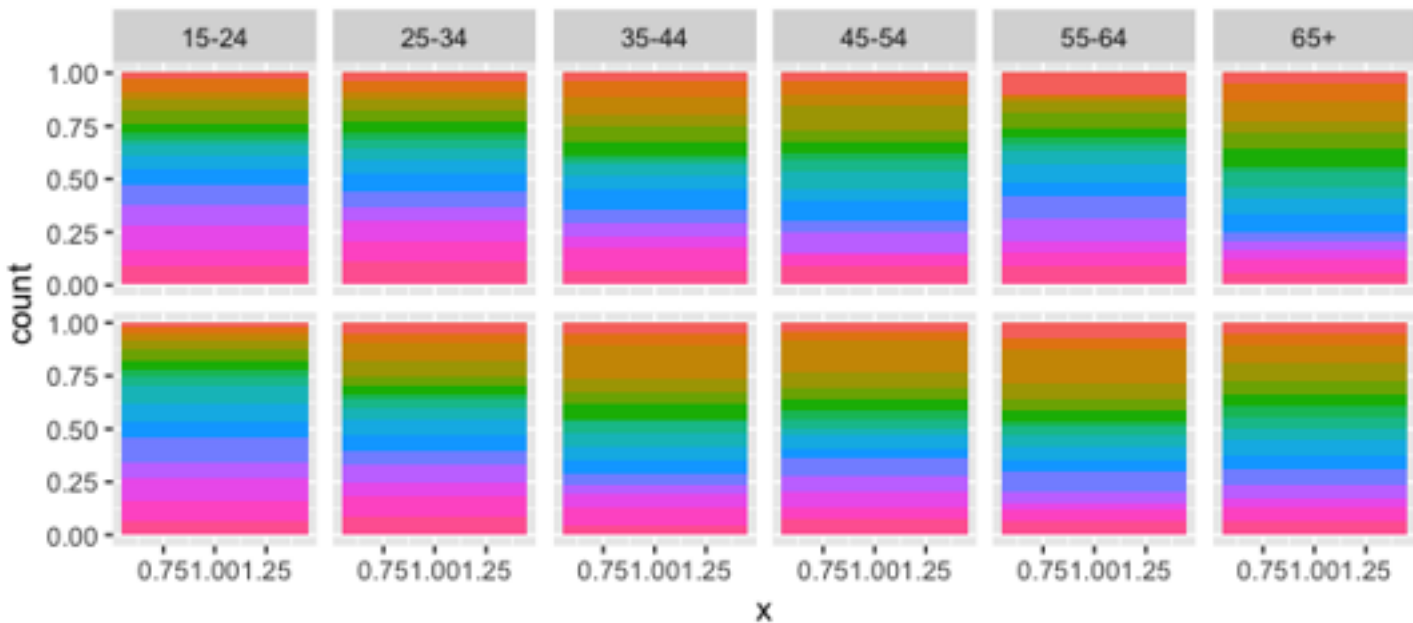
The chart is visually appealing, but it's difficult to interpret. In what way could you use **ggplot2** to make the chart easier to interpret?

Read and review

Notice how the aesthetic mappings are different: **year** is now mapped to fill the bar with colours and a single number **(not a variable)** is mapped to the x-axis, resulting in a single stacked bar chart.

You can change **year** to be a category rather than a number by wrapping it around the **factor()** function. Below is the code chunk that produced the rainbox chart above:

```
rainbow <- ggplot(tb_au, aes(x = 1, y = count, fill = factor(year))) +
  geom_bar(stat = "identity", position="fill") +
  facet_grid(sex ~ age_group)
rainbow
```

Changing coordinates

You can further manipulate the chart by changing the cartesian coordinates to **polar** which will then lay everything out in **circles**, rather than **rectangles**.

When you use polar coordinates, **one axis** is mapped to an **angle**, rather than a position, as shown in the following rose chart:
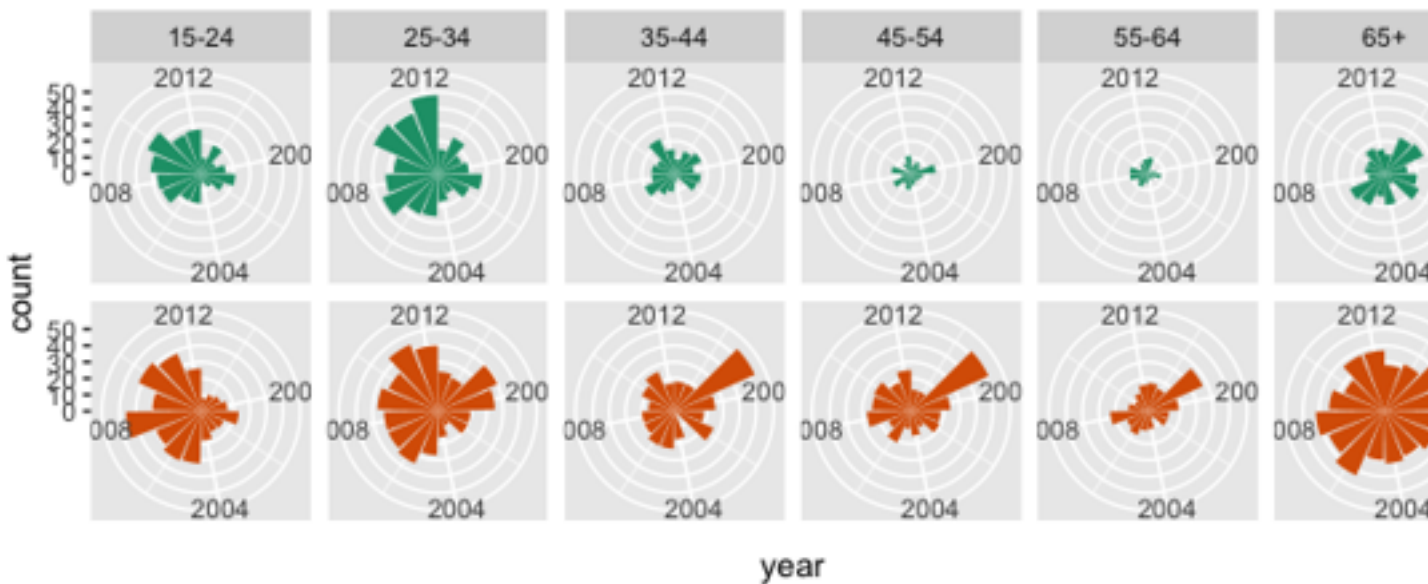

The **year** (which was laid out on the x-axis) now corresponds to an angle around a circle going clockwise, rather than a straight line.

This layout emphasises more clearly that middle age groups have low TB incidences across the years.

Read and review

The code looks the same as the separate bar chart example, with an additional specification `coord_polar()`:

```
p <- ggplot(tb_au, aes(x = year, y = count, fill = sex)) +
  geom_bar(stat = "identity") +
  facet_grid(sex ~ age_group) +
  scale_fill_brewer(palette="Dark2") +
  coord_polar()
p
```
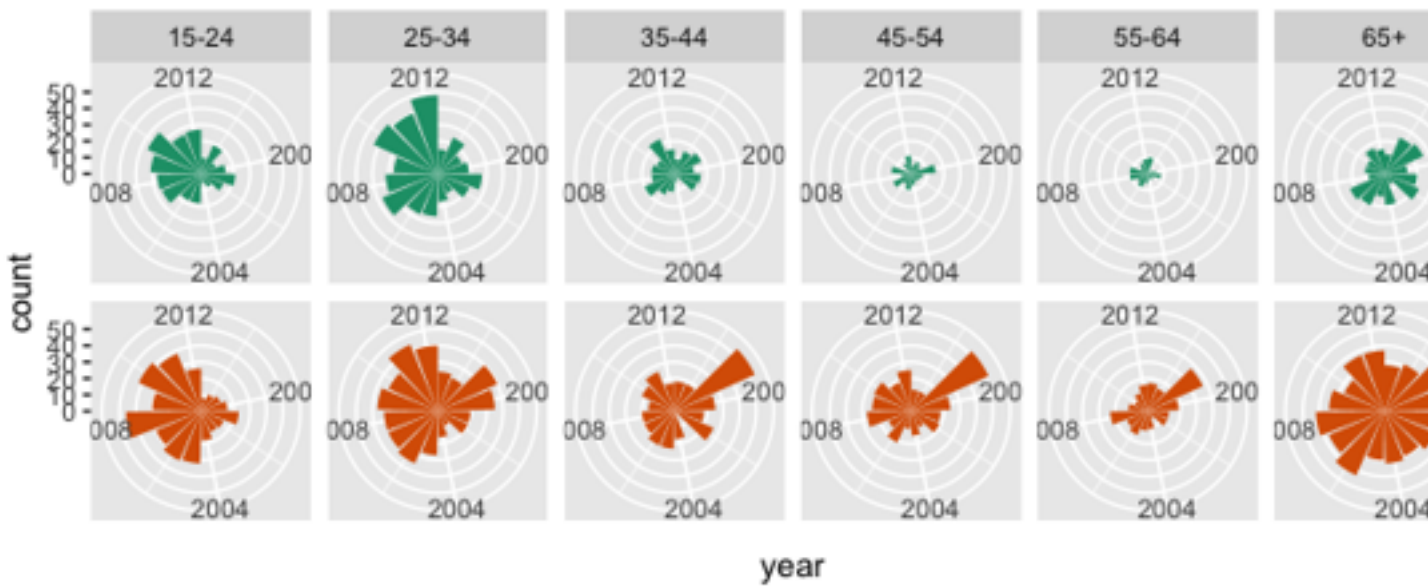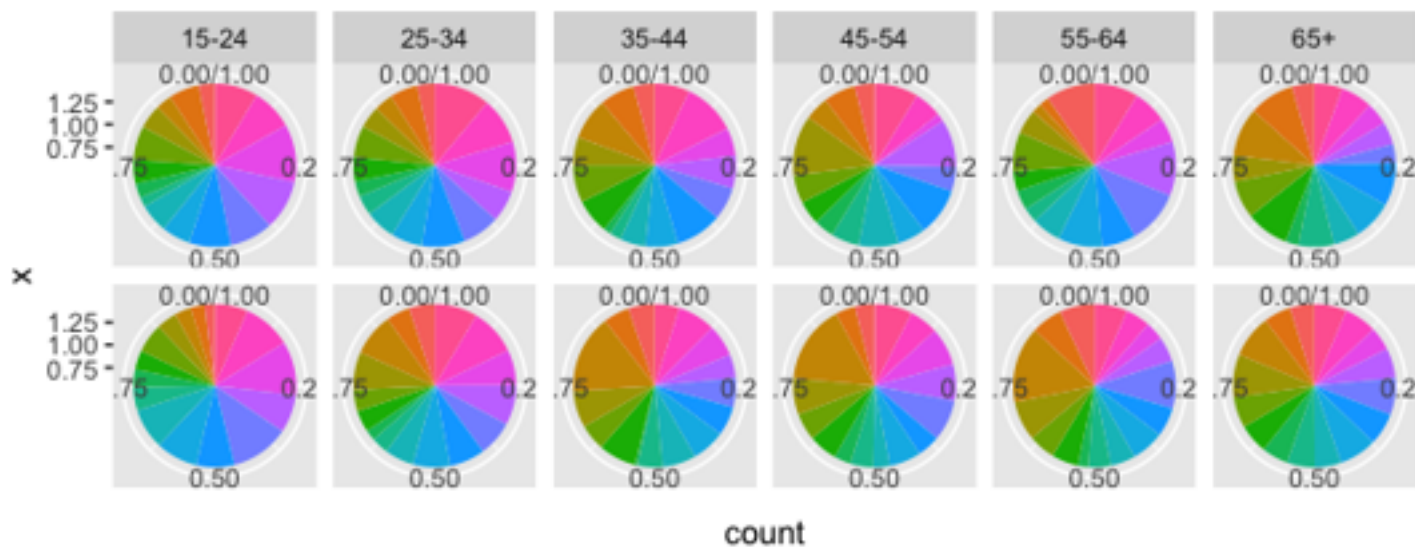
Transform from rainbow to pie

You can continue to use polar coordinates to modify your rainbow chart and transform it into a pie chart.

Read and review

The code is the same as before, but this time you want to have the **y-axis** represent the **angle** around the circle. You can do this by entering **coord_polar(theta = "y")**.

```
rainbow +
  coord_polar(theta = "y")
```

By doing this, you get another pretty chart that's difficult to interpret and unuseful for making comparisons across age groups.

Tell us how you went

Within the **Comments**, share with other learners your experience of creating your own rainbow, rose and pie charts.

Also let other learners know how you'd use each chart type to communicate an aspect of the TB outbreak, for example, male incidents of TB compared to female, the incidents of TB across age groups, and more.