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Data Visualization
Pie Chart

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Pie Chart

- A pie chart (or a circle chart) is a circular statistical graphic, which is divided into slices to illustrate numerical proportion.

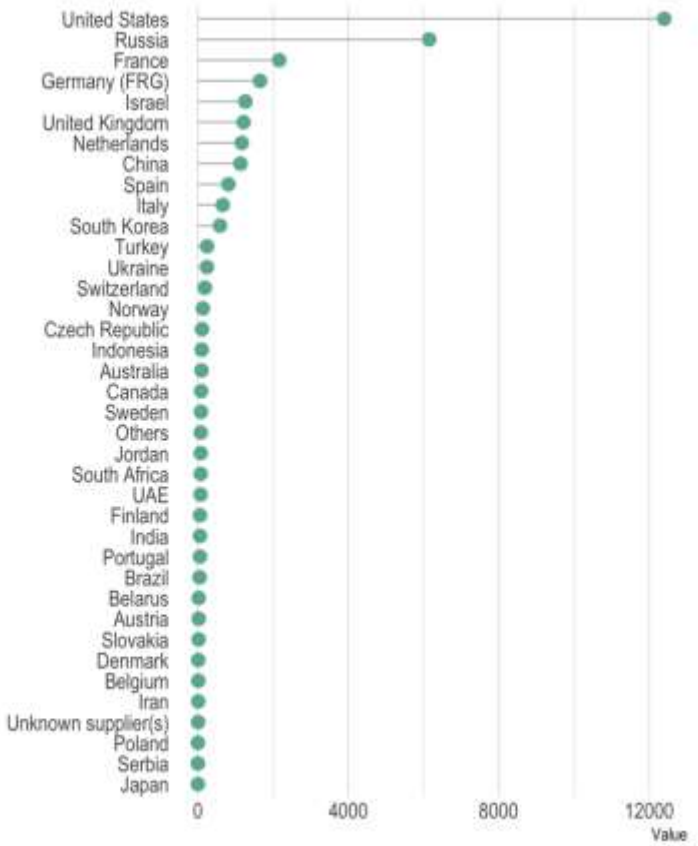
How Much Water Do We Use?

Source: American Water Works Association Research Foundation, "Residential End Uses of Water." 1999

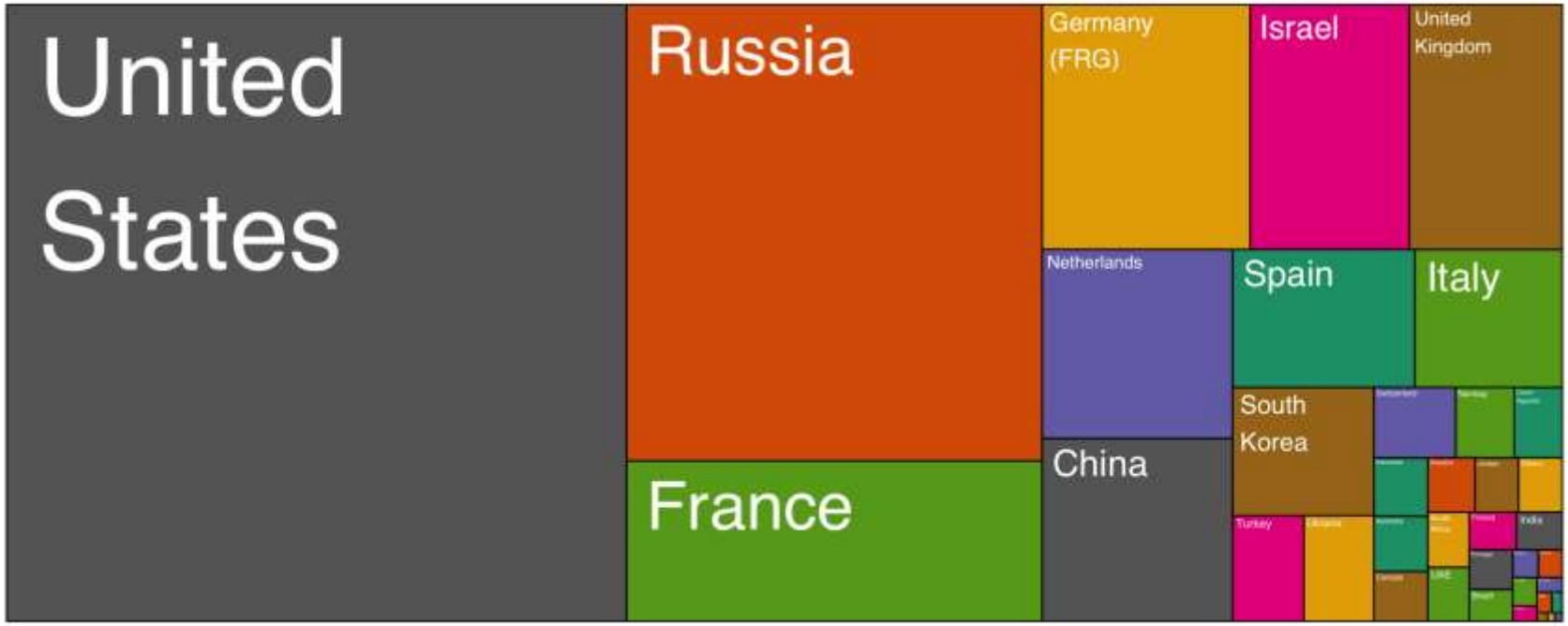
bad features to pie chart

- 3d
- legend aside
- percentages that do not sum to 100
- too many items
- exploded pie charts

The barplot is the best alternative to pie plots. If you have many values to display, you can also consider a lollipop plot that is a bit more elegant in my opinion. Here is an example based on the amount of weapons sold by a few countries in the world:



Another possibility would be to create a treemap if your goal is to describe what the whole is composed of.



Advantages of a Pie Chart

- A simple and easy-to-understand picture.
- It represents data visually as a fractional part of a whole, which can be an effective communication tool for the even uninformed audience.
- It enables the audience to see a data comparison at a glance to make an immediate analysis or to understand information quickly.
- The need for readers to examine or measure underlying numbers themselves can be removed by using this chart.
- To emphasize points you want to make, you can manipulate pieces of data in the pie chart.

Disadvantages

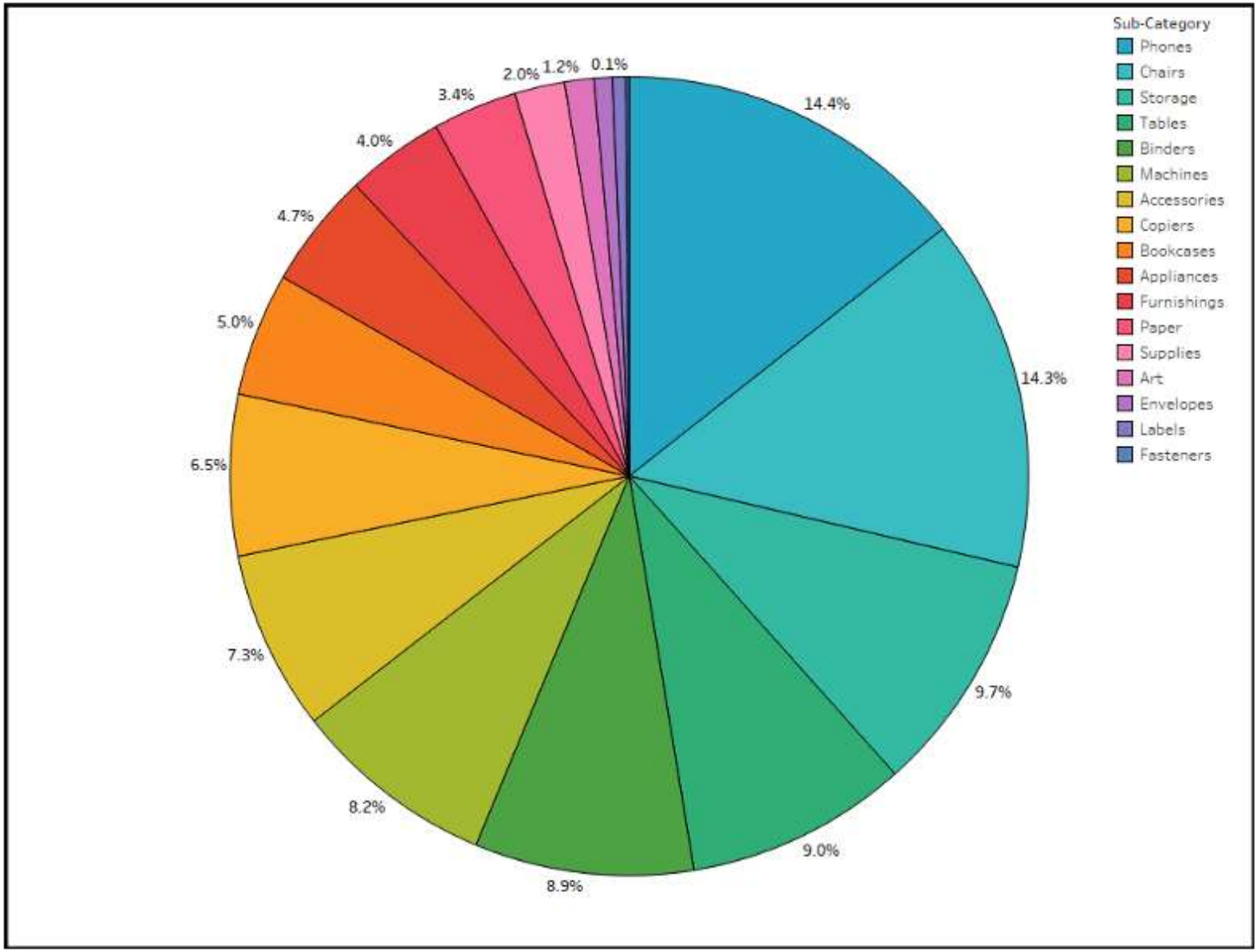
- They cannot show more than a few values, because as the number of values shown increases, the size of each segment/slice becomes smaller. This makes them unsuitable for large amounts of data.
- They take up more space than their alternatives, like a 100% Stacked Bar Chart for example. Mainly due to their size and for the usual need for a legend.
- They are not great for making accurate comparisons between groups of Pie Charts. This being that it is harder to distinguish the size of items via area when it is for length.

- If too many pieces of data are used, pie chart becomes less effective.
- They themselves may become crowded and hard to read if there are too many pieces of data, and even if you add data labels and numbers may not help here.
- You need a series to compare multiple sets as this chart only represents one data set.
- To analyze and assimilate information quickly, this may make it more difficult for readers
- As the reader has to factor in angles and compare non-adjacent slices, it has its problems in comparing the data slices.
- To make decisions based on visual impact rather than data analysis leads readers to draw inaccurate conclusions
- Negative Pie / positive Pie cannot be understood until I hover the pointer on the pie. So when Negative data present, pie chart is a bad option

Alternatives to a Pie Chart

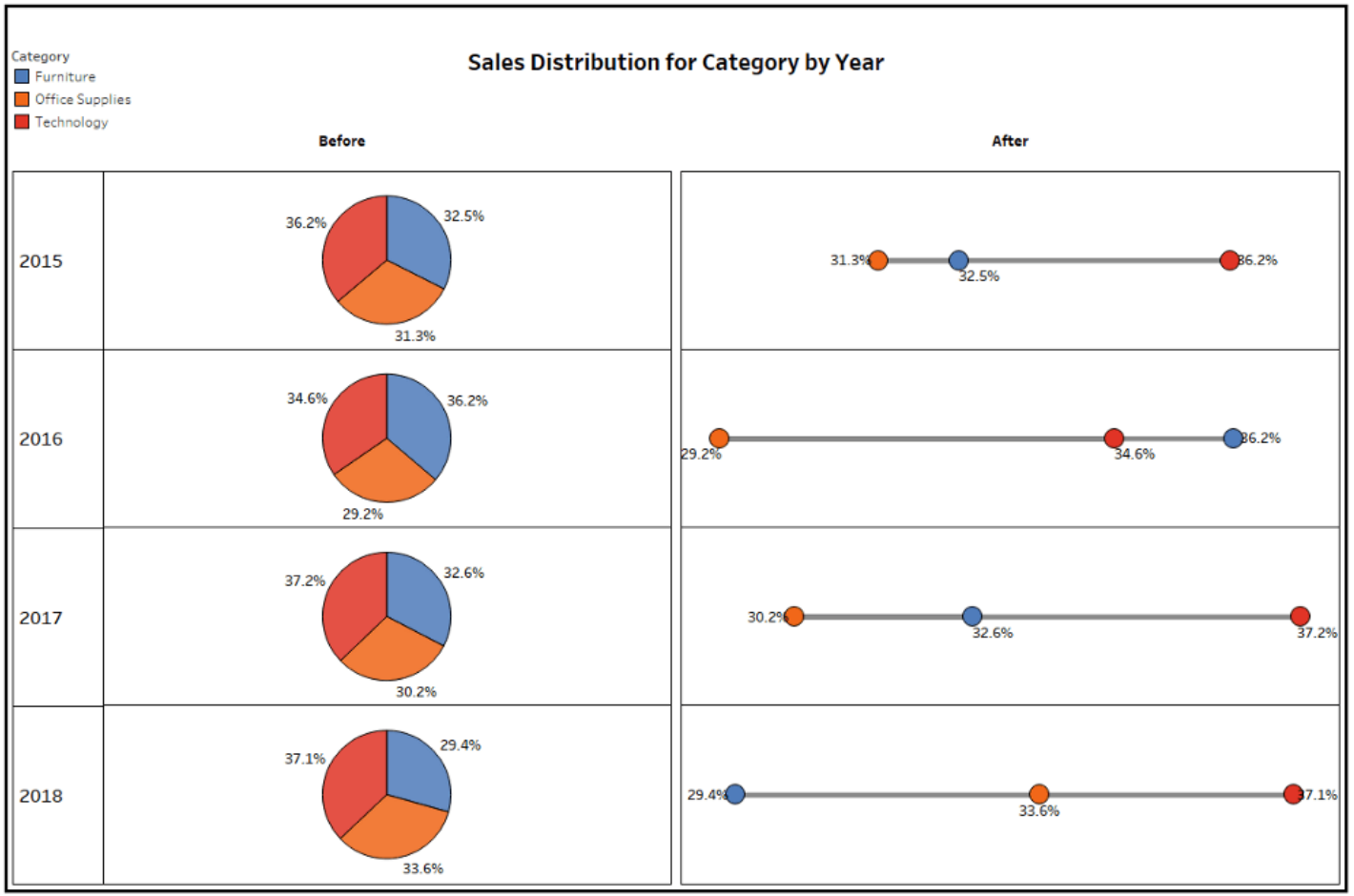
- If you are handling many pieces of data or want to make comparisons between data sets, other charts and graphs may be a better option
- To add the ability to display multiple datasets, doughnut charts share the circular shape and overall functionality of pie charts.
- To make it easier to compare segments, you can place data labels and totals in the doughnut hole
- To allow quick comparison and measurement, bar graphs can be represented data by length.
- Presenting many pieces of data at a time or want to compare different sets of data in a single chart may be easier to read
- Also, Treemap can be used as a way to display categorical values as a percentage of the total.

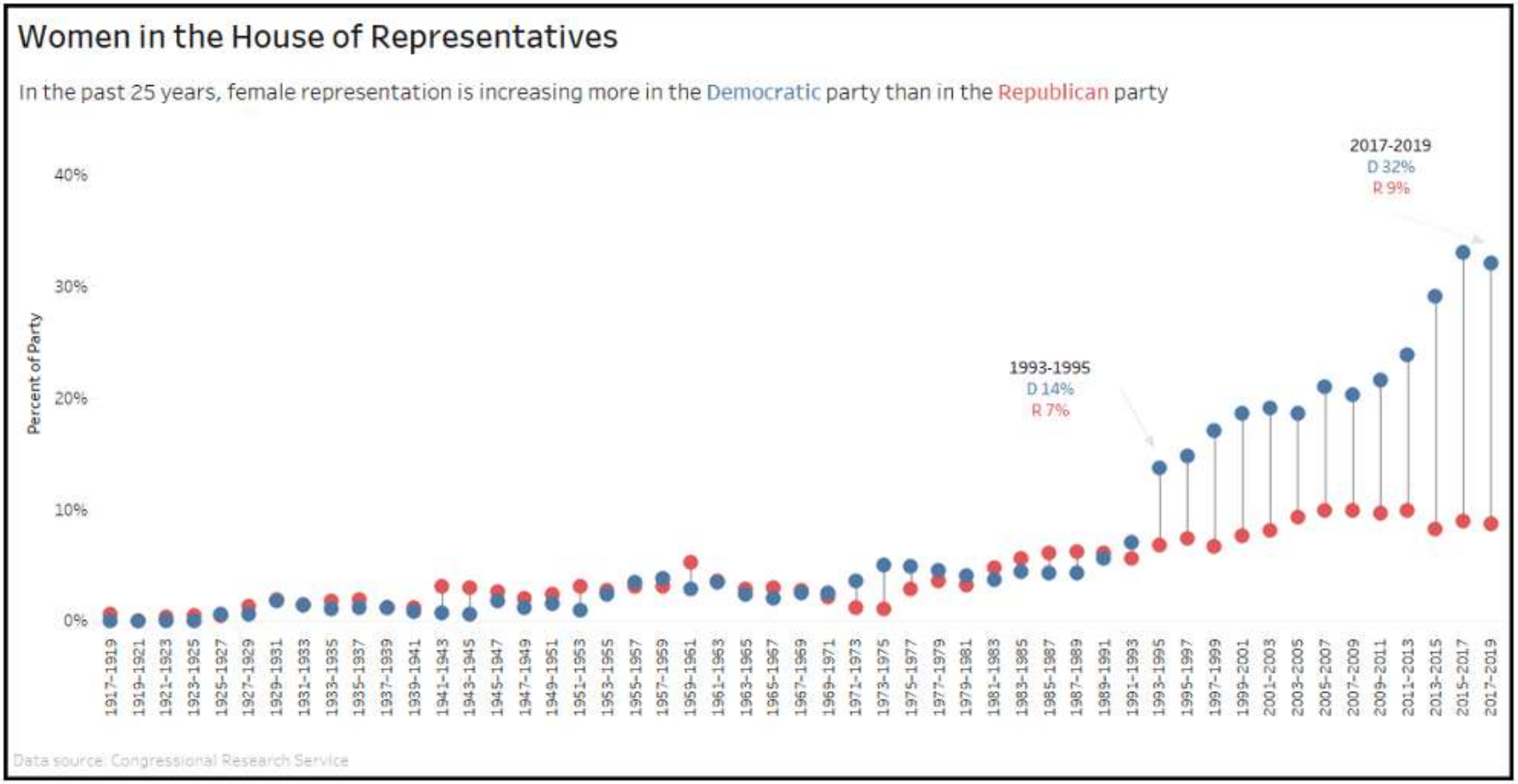
Insert Generic Pie Chart on Sales Here



- *Edward Tufte—who said, "The only worse design than a pie chart is several of them"—I am not of the opinion that pie charts should never be used. I just think they should be used less often.*

The tri-bell chart




Women in the House of Representatives
In the past 25 years, female representation is increasing more in the Democratic party than in the Republican party
2017-2019
D 32%
R 9%
1993-1995
D 14%
R 7%
Percent of Party
40%
30%
20%
10%
0%
1917-1919
1919-1921
1921-1923
1923-1925
1925-1927
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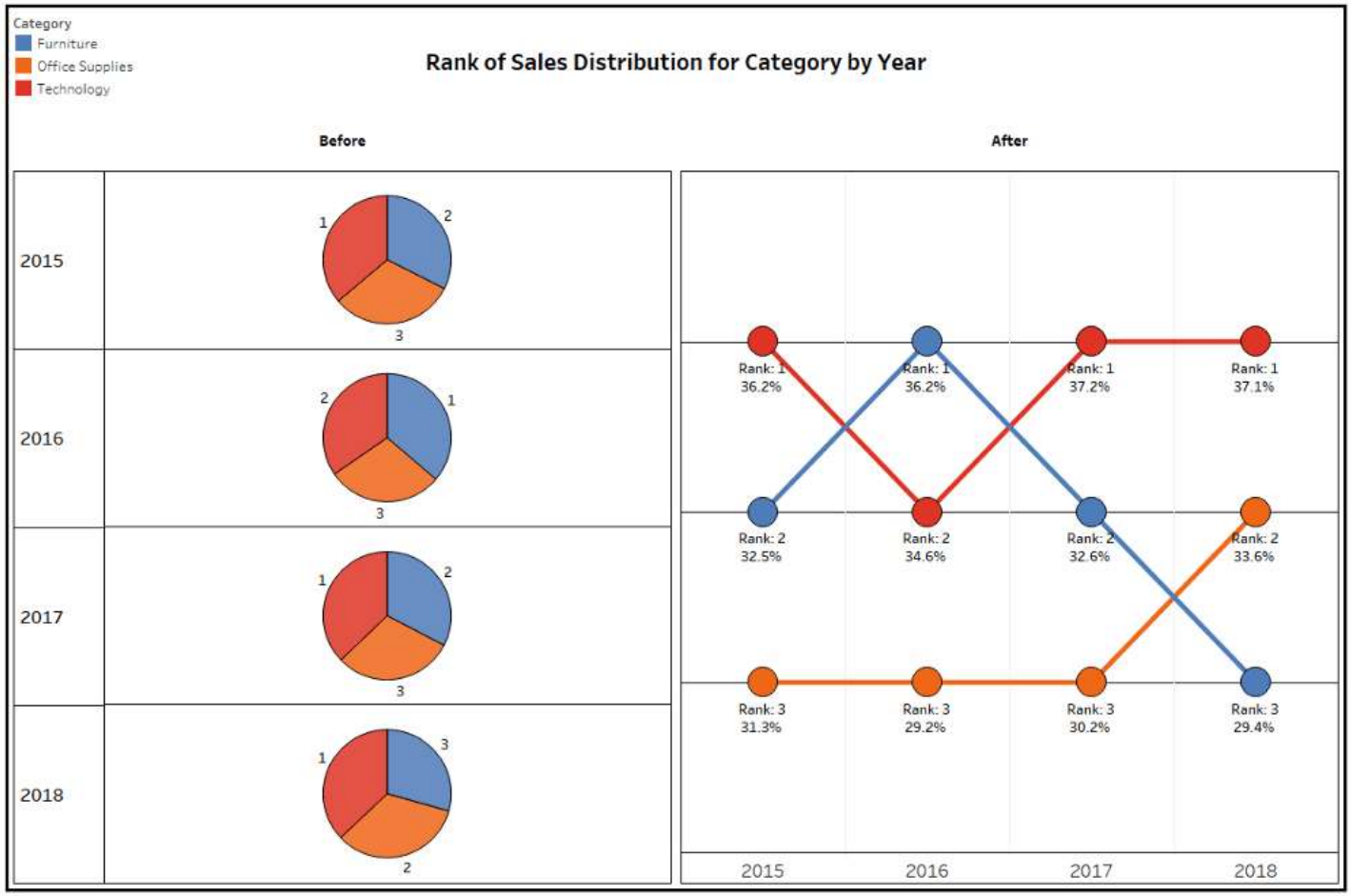
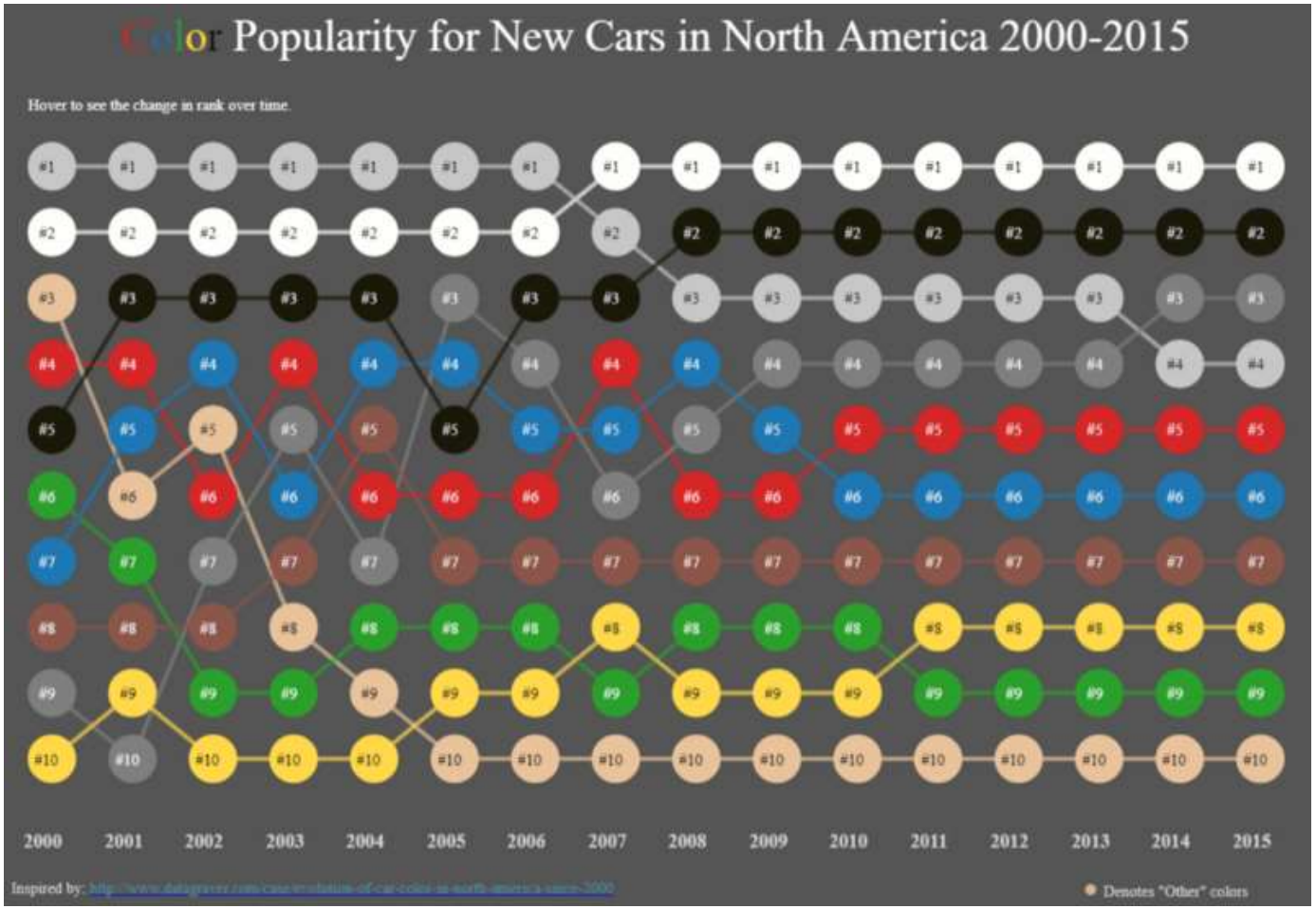
2017-2019
Data source: Congressional Research Service

The bump chart



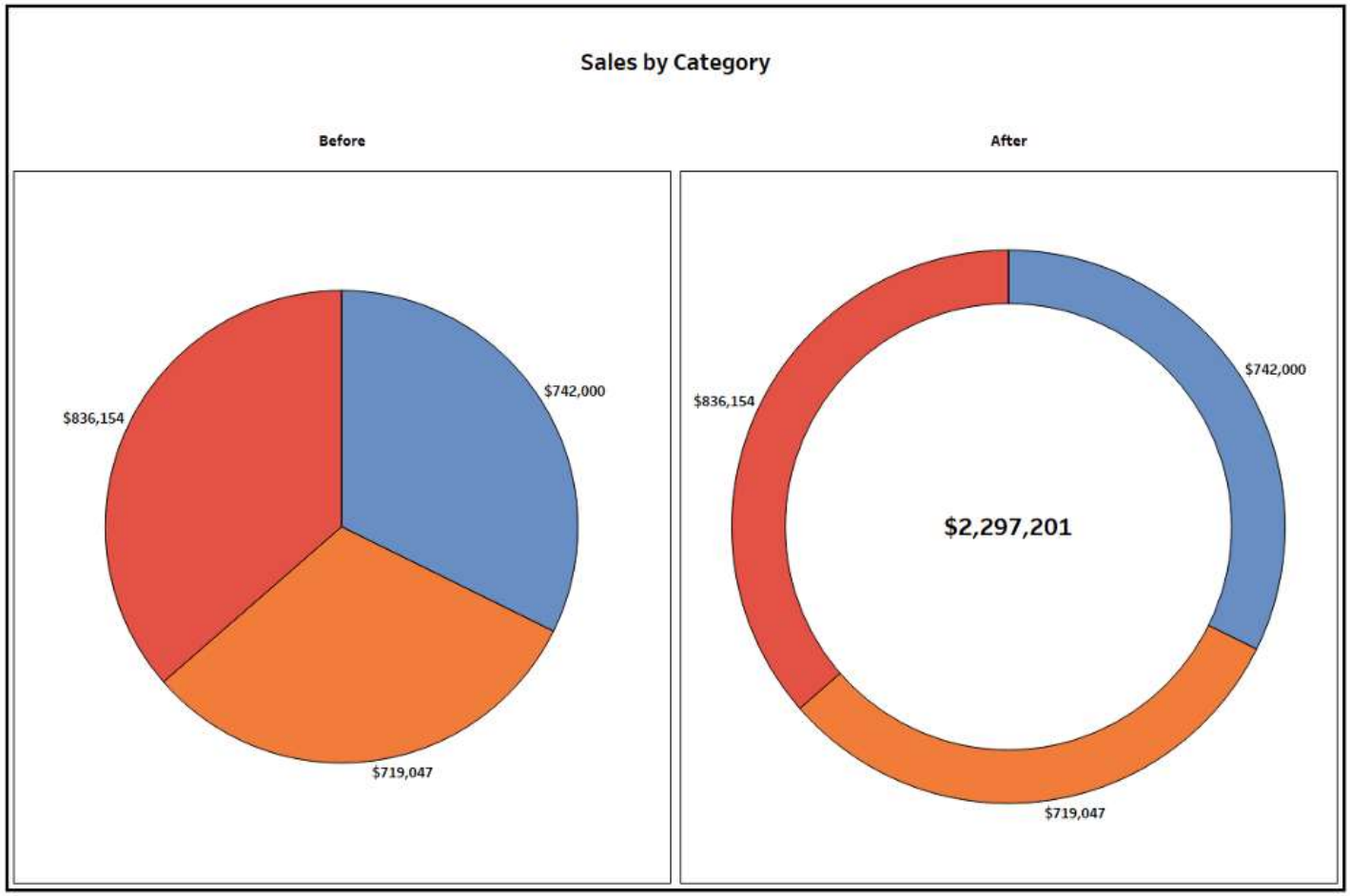
- The greatest pro for the bump chart is that it’s really effective at visualizing ranks.
- But, for the cons, they can get noisy if ranks change a lot or if you have many categories. And like the dumbbell chart, viewers likely won’t realize you are comparing parts with the whole.

Here's an effective bump chart example that displays the popularity ranks of new car colors and how they've changed over 16 years:



The donut

In the example below, even though it's the same shape as a pie chart, the donut conveys information a bit differently:

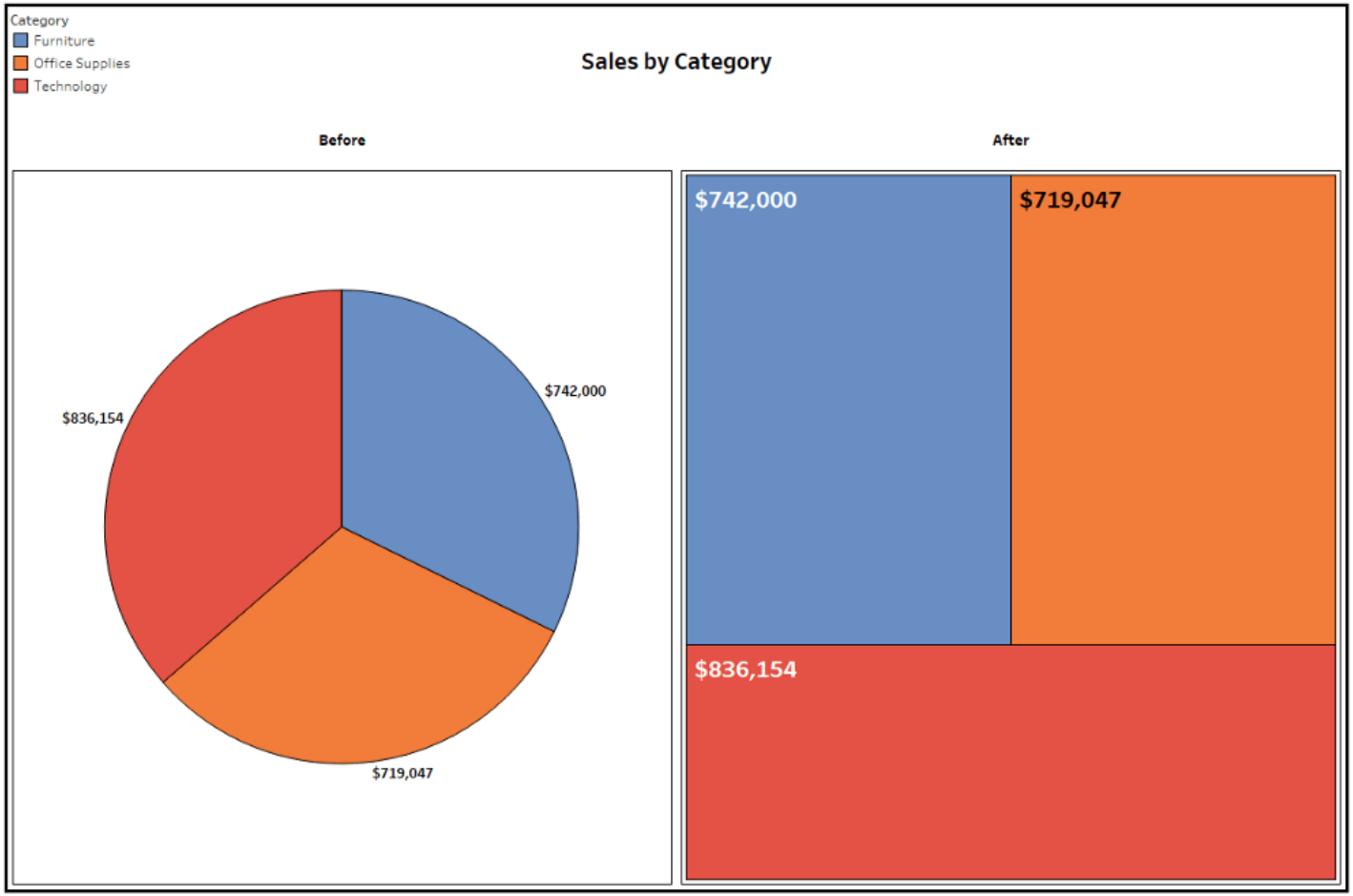


It can be done, though. Here's an example of a donut that is effective at using the ring's shading to display salaries in proportion to each other:

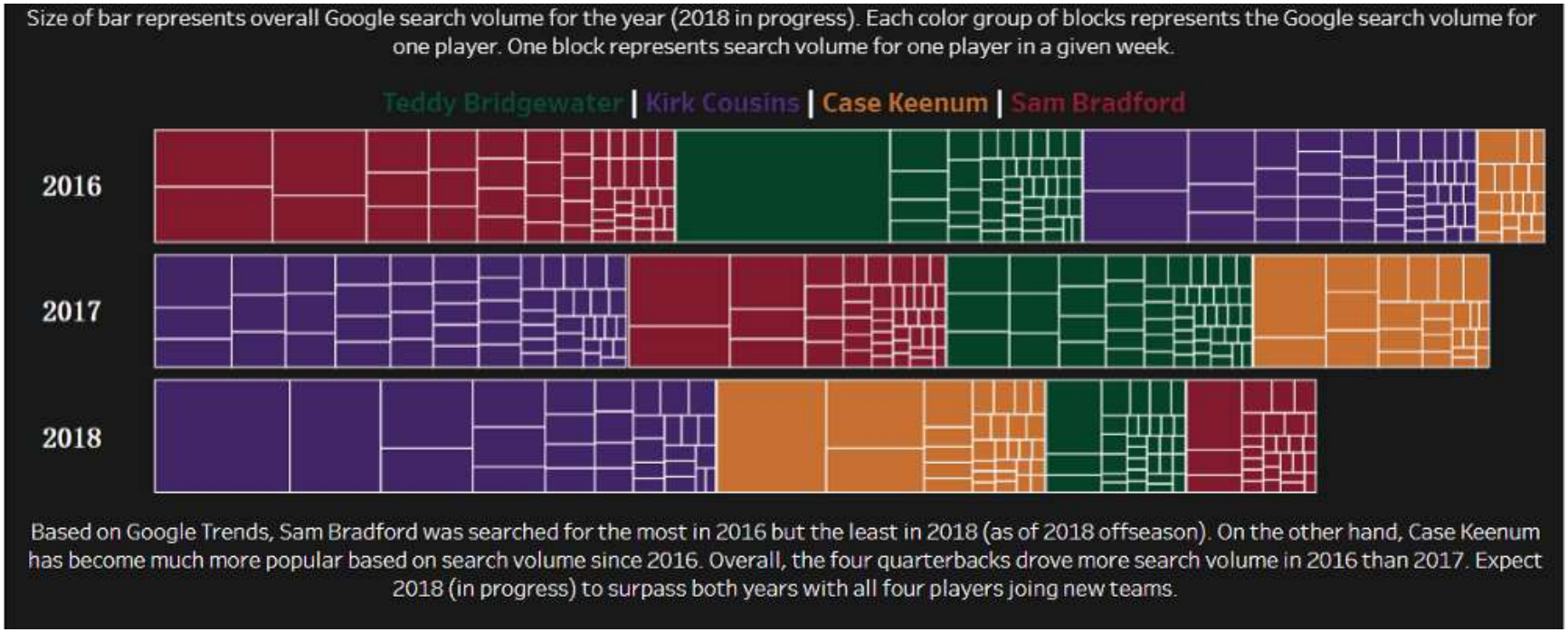
Source: Visualization by Ryan Sleeper with data from SeanLahman

The treemap

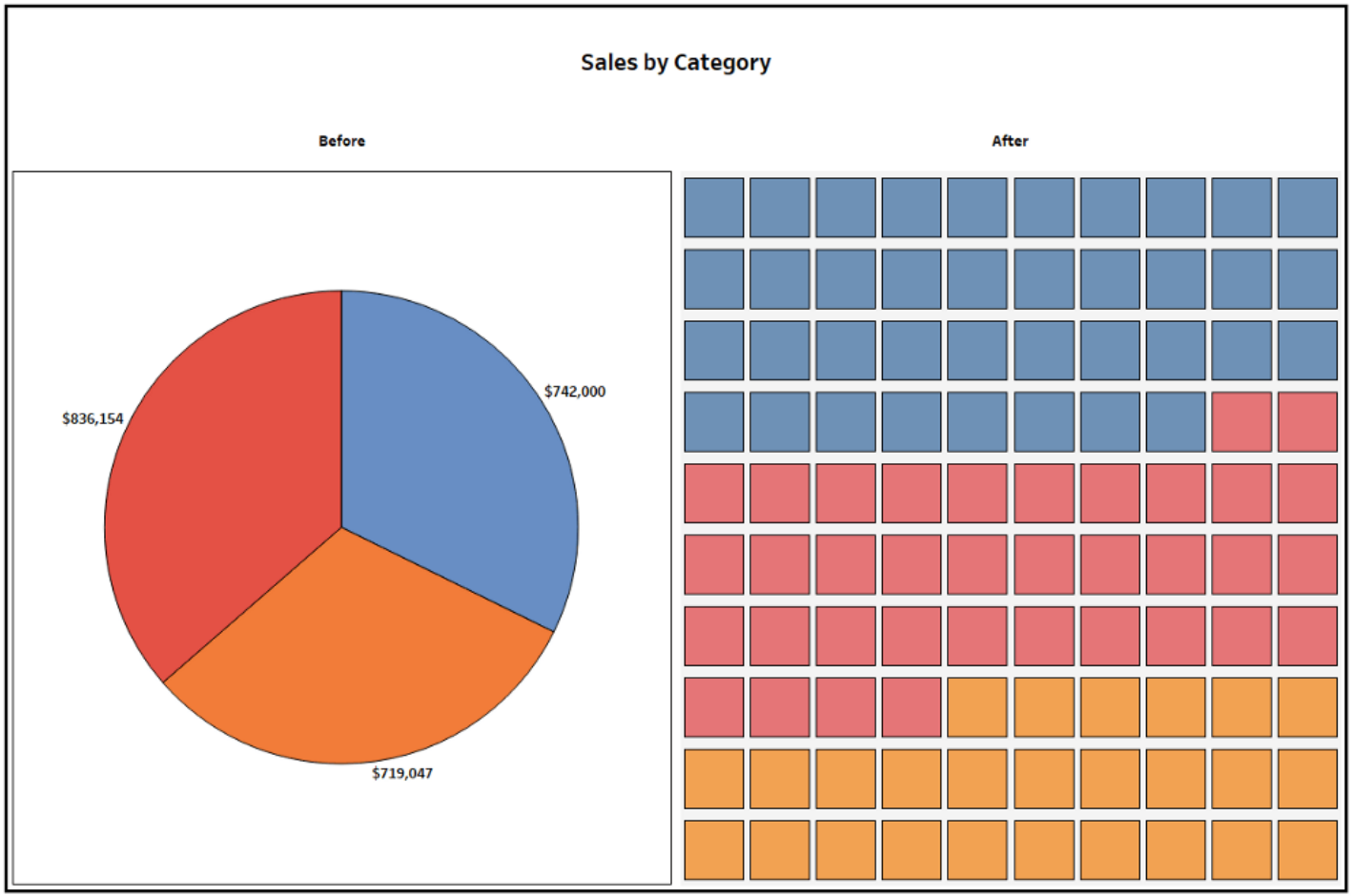
- A primary argument against the pie chart is that humans are not good at detecting differences between angle sizes. Treemaps alleviate this by using area instead of angles to designate proportion. Using the same data as in the donut format above, this version uses sized rectangles:


Category
Furniture
Office Supplies
Technology
Sales by Category
Before
After
$742,000
$719,047
$836,154
$742,000
$719,047
$836,154

Here's another treemap example that aims to show a lot of comparative information in its visualization of the weekly volume of Google searches of four football players across years:

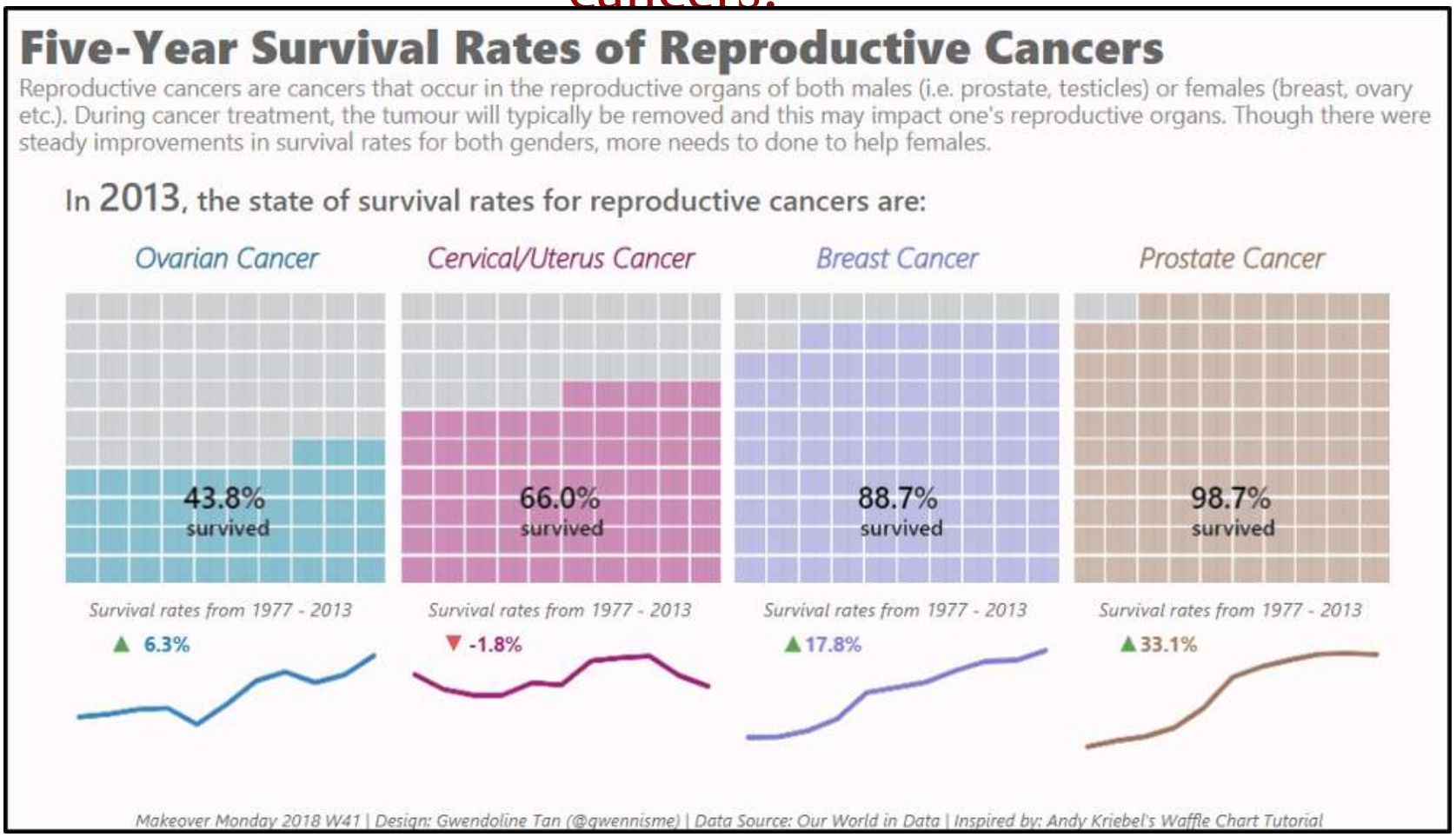


The waffle chart



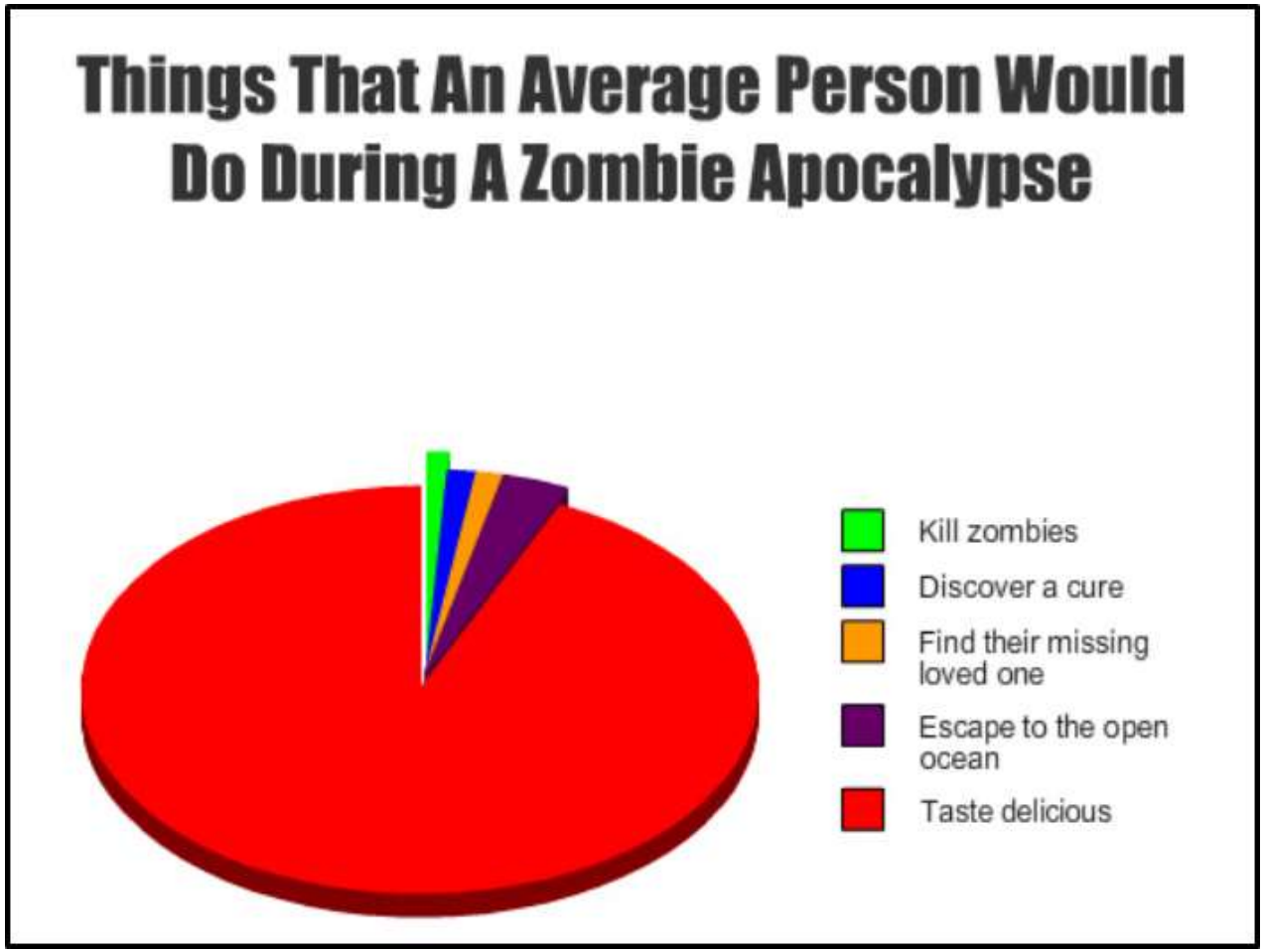
- The key pro is its diversity. It can show individual parts of a whole and compare single percentages, but another advantage—similar to treemaps—is that proportions are more clearly represented by area instead of angles.
- The cons are that it becomes too complicated when too many segments are involved and the individualized spaces don’t leave a good spot to put numbers or much text within the visual itself.

Here's another waffle chart example that neatly displays comparative survival rates for types of cancers:



Source: Visualization by Gwendoline Tan with data from Our World in Data

Fun time


Things That An Average Person Would Do During A Zombie Apocalypse
Kill zombies
Discover a cure
Find their missing loved one
Escape to the open ocean
Taste delicious

Question ?