# Assignment 2: Good and Bad Data Visualization

## Example of Good Data Visualization

Graphical user interface

Description automatically generated

Source: Komissarova, A. (2021). What Americans think about abortion? Tableau Public. https://public.tableau.com/app/profile/anastasia.komissarova/viz/WhatamericansthingaboutabortionMOM/Dashboard1

I selected Anastasia Komissarova’s (2021) data visualization of the results of a Gallop poll on Americans’ view of abortion as an example of a good data visualization for its aesthetic, substantive and perceptual qualities, which are important for designing good data visualization (Zogheib, 2023).

The colours chosen are complementary and easy to differentiate even for those who are colour blind. They can also be interpreted as representative of the views they were assigned. A bold red colour – often associated with warning symbols such as a stop sign (Cherry, 2023) – has been assigned to the view of abortion being illegal in all circumstances. On the opposite end of the colour spectrum, blue is often associated with calmness or trust (Cherry, 2022). A less bold blue colour has been assigned to the opposing view of abortion being legal under any circumstances. An even lighter blue has been assigned to the middle view. Although it is unclear whether this was intentional editorializing, this use of colour helps to reduce the cognitive load on the reader, which is important for a visualization’s perceptual quality in helping readers understand the data intuitively (Zogheib, 2023).

The graphs are well titled and labeled, the units on each axis are consistent between the line graphs, and the value of the last data point for 2021 has been provided for each graph. A legend for the horizontal bar graph shows the percentage proportion of each view, and the actual percentages are also given, which helps the reader make comparisons between views and time period, increasing the visualization’s substantive quality. All of these features, along with the familiarity of the graphs and the concise design, help to further reduce the cognitive load on the reader (Zogheib, 2023). However, the grammatical errors take away from the perceived trustworthiness of the visualization.

## Example of Bad Data Visualization

Chart

Description automatically generated with medium confidence

Source: Moore, B. #TheSDGVizProject - Goal 7: Primary Energy Consumption. Tableau Public. https://public.tableau.com/app/profile/brian.moore7221/viz/TheSDGVizProject-Goal7PrimaryEnergyConsumption/EnergyConsumption

For a bad example of data visualization, I selected Brian Moore’s (2020) “Energy Consumption by Country 1969 – 2018,” partially displayed above, because of the extraneous complexity and lack of clarity in the presentation of the data, which serves to increase the cognitive load on readers and impact the visualization’s aesthetic and perceptual qualities (Zogheib, 2023).

As an interactive data visualization that shows the consumption levels of eight energy sources for each of 64 countries, each in its own graph, the visualization is complex. Clicking on an energy source shows the consumption levels for that source and sorts the countries by decreasing levels. However, because of the number of countries, you have to do a great deal of scrolling to view all of the plots, which makes it difficult to compare between specific countries that are not positioned close to one another. In addition, the legend only appears at the top, which is not helpful when you scroll lower down the page, adding to the cognitive load and negatively impacting the perceptual quality of the visualization.

At the beginning, I had trouble understanding how to interpret the graphs as they did not include clear labels or units that might help signal how to read them other than as showing proportions, or provide any explanation of whether the shape held any significant meaning, making the graphs more difficult to interpret and impacting its perceptual quality.

The visualization is also designed with exploratory composition, which increases the cognitive load (Zogheib, 2023). It is not immediately clear that you can hover your mouse over an area of a graph, which would cause a text box to appear, containing information about the time period as well as the amount and percentage of consumption for that energy source. A reader may easily miss this feature, which was not adequately explained in the introductory text.

One way to improve the data visualization is to change the chart type to one that is more familiar and easier to interpret, which would help reduce the cognitive load. For example, a bar graph with five 10-year time periods on one axis and the percentage consumption level on the other axis, and each bar showing the percentage consumption for each energy source, would make it easier to compare the consumption between time periods for a given country.

A text box can still appear with more information (e.g., terawatts per hour) when hovering over a section of a bar, but it would be less essential if missed. Clearer instructions could also be provided to explain how to access this feature.

Alternatively, a horizontal side bar with countries on the y-axis and the percentage of consumption levels on the x-axis, with bars showing the proportion for each energy source, could make it easier to compare data between countries without having to scroll as much. Readers can click on a decade, and the graph would change to show the data for that decade. This would help to decrease the cognitive load.

## References

Cherry, K. (2023, March 16). Red color psychology: the color red is associated with both positive and negative emotions. Verywell. <https://www.verywellmind.com/the-color-psychology-of-red-2795821>

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Komissarova, A. (2021, September 7). What Americans think about abortion? Tableau Public. <https://public.tableau.com/app/profile/anastasia.komissarova/viz/WhatamericansthingaboutabortionMOM/Dashboard1>

Moore, B. (2020, August 27). #TheSDGVizProject - Goal 7: Primary Energy Consumption. Tableau Public. <https://public.tableau.com/app/profile/brian.moore7221/viz/TheSDGVizProject-Goal7PrimaryEnergyConsumption/EnergyConsumption>

Zogheib, C. (2023). Graphing our data: choosing the right visualization. Data Visualization [PowerPoint presentation]. Toronto: Data Sciences Institute, University of Toronto.