Assignment 1

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1 Analysis and criticism

1.1 Analysis of the infographic

The infographic *Nutritional Values* by Dan Marsiglio [1] pictures the nutritional comparison between processed and wholesome food. The author visualizes three different infographics for the different food groups and compares their nutritional values; the first graph compares the cost per calorie, the following one contrasts the calories per *100g* and the last graphic shows how much sugar is contained in *100g*. The author gives the example that wholesome food is more expensive since the ratio of value to calorie for an apple is higher compared to a bag of potato chips. Marsiglio based his visualizations on the layout of a common supermarket and suggests the reader sticking to the perimeter of the supermarket to find the natural food. Processed food containing the most calories by weight is located at the centre of the grocery store.

1.2 Criticism of the visual design

In this section, the three infographics *Nutritional Values* by Dan Marsiglio [1] will be criticised according to the visual design principles from the lecture notes. These design principles were defined by Edward Tufte[2]. Since the three illustrations are very similar in design, the criticism will cover the overall design principle choices.

1.2.1 Perception and cognition

On first sight of the infographics as a viewer, there is no immediate understanding of the given information. There are too many bright colours which can distract the viewer to localize the main message or information of the visual design. Further, the visual design carries no preattentive attributes, except the black food labels but many of them are obscured by other visual components or are drowning in the variety of colours which are

more distracting than communicating the information with clarity. Thus, on first sight, the infographics are flawed for immediate perception.

The reasons which cause the infographics to be unsatisfactory are the poorly chosen design principles by the author. Instead of the *preattentive processing* paradigm, the author uses the data-driven, Bottom-up approach. Therefore, the graphs should be perceived with the visual processing paradigm and require from the viewer an attentive perception and parallel processing to extract low-level properties of the visual scene. The attentive approach is slow to perceive and viewers easily forget the main message and essential information of the infographic. Furthermore, the visual representation is not friendly for viewers who might suffer from colour blindness since the author uses a wide subset of colours in his visual design.

1.2.2 Deficiency of design priniciples by Edward Tufte

Principles of Graphical Excellence. Complex ideas should be communicated with clarity, precision and efficiency. Further, The viewer should be able to grasp the ideas of the visualization quick with the least amount of ink in the smallest space. The infographics by Dan Marsiglio [1] are inefficient and do not incorporate these principles to guarantee clarity.

Principles of Graphical Integrity. The principles of graphical integrity define graphical designs to be detailed and labelled with clarity. However, the food visual components in Dan Marsiglio's infographics [1] obscure the actual information and data found in the background. This deficiency impedes the viewer to perceive the message communicated by the author. The *Lie factor* of this infographic does not provide the desired proportionality of represented numbers since it includes redundant design variation instead of showing data variation. Furthermore, the graphics are represented in three dimensions which makes it more complex than the data it visualizes. According to Tufte, the visual representation's dimensions should not exceed the dimensions of the data.

Principles of Data Graphics.

Tufte's first principle of data graphics defines, *'Above all else show the data'* [2]. Although, Marsiglio was determined to illustrate the data redundantly in the form of visual food components. The author was too focused on communicating the message where the wholesome food is located in a supermarket and neglected the more important data.

The graphical ink should favourably present new information. It should eliminate or deemphasize redundant and non-data ink without any loss of data, thus maximizing the *data-ink ratio* and *data density*. Whereas, in Marsiglio's infographic, the viewer is overwhelmed with redundant information in the form of *3d* visual food components and unnecessary food labels which reduces the *data-ink ratio*. The graph in the background which represents the concrete data is cluttered with *chartjunk*.

The data of the infographic does not stand out since the non-data ink is given more weight than the data-ink. Further, the viewers' eyes are drawn to contrast found in the *3d* components which lead their attention away from the data. Different colours are

used for the different food choices even though they are represented in a single related dataset. This could lead the viewer to differentiate the relationship of the data entries.

Rules by Stephen Few about using colour in charts and graphs. [3] Different colours should only be used when the data entries in the dataset should be distinguished. However, with Marsiglio's infographic the different colours were used only for aesthetic purposes and to complement the visual food components. The differentiation of colours is misused since the data entries are related in the dataset. Furthermore, the author uses a combination of red and green in the same illustration which can be inconvenient for viewers with colour blindness to distinguish visual elements. To highlight important information, bright and dark colours should be used. However, the infographic highlights the non-essential components and distracts the viewer from the data in the background which are displayed in light colours.

2 Assessment of redesign

In this section, the redesign of Dan Marsiglio's infographic [1] will be described according to Edward Tufte's design principles [2].

Deemphasize the non data-ink. The original graphic has a very low data-ink ratio. Visual representation of the groceries in the graphics is totally unnecessary, since they are labeled with text too. About 60% of the graphics are non-data ink, which causes a very low data-ink ratio

Deemphasize the realistic layout of the grocery store. We think, that because of the message of this infographic is important. the purpose is to show, that being stuck to the periphery of the supermarket makes it easier to buy healthy products. We kept this property, but our graphic shows the layout from above in 2 dimensions. For the floor-plan is used only a light grey color, which is not misleading for the reader.

Augmented data-ink. In the graphic of Dan Marsiglio the reader has to read all the values explicitly from the 3 dimensional graphic, which is inefficient. In our graphic the values are directly labeled. It guarantees the reader easier and faster reading and interpretation.

Preattentive processing. As in the last point mentioned, the perspectivic projection of the 3 dimensional space makes the reading of the original infographic very hard. At first sight it's also ambiguous, what is the purpose of the changing height of the columns. Our solution has a 2 dimensional floor-plan with normalized graphs, which makes easy to compare the 3 attribution (cost, calories, sugar) of the diverse groups of groceries.

Declutter. A significant part of the original infographic is chartjunk (like already discussed in the first point). We threw away every non-essential elements of the graph, including the 3 dimensional perspective.

Colors. We used only blue color to make it easy to read for color-blind people as well, and two shades of it. Dark for the processed food, and light for the non-processed

Regrouping. The data in the original chart is split up to 3 separate figures representing the values of the cost, calories and sugar, respectively. Splitting up the visual representing of the information for one type of product into 3 different charts makes the overall comparison of the products hard. That is the reason, why we've regrouped the data. our infographic has a separate diagram for each productgroup, with every data normalized between 0 and 1, corresponding Tufte's principle of graphical integrity. This makes for the reader easy to compare the properties of the productgroups.

Background-foreground. In Dan Marsiglio's graphic the chartjunk takes up a lot of space in the foreground, and the data seems to be only secondary, it is represented in the background with light colors and thin lines. Our graphic uses saturated colors for the data in the foreground, and light, neutral grey color for the supermarket floor-plan (the secondary data) in the background.

The above mentioned design suggestions are summarized in the visual graphic in Figure 1 in the Appendix.

References

[1] D. Marsiglio, "Nutritional values," *Wired*, vol. 16.01, p. 44, 2008.

[2] E. R. Tufte, *The Visual Display of Quantitative Information*. Cheshire, Connecticut: Graphics Press, 2001.

[3] S. Few, "Perceptual edge elegance through simplicity." `https://perceptualedge.com/articles/ie/elegance.pdf`, accessed 07/05/20.

3 Appendix

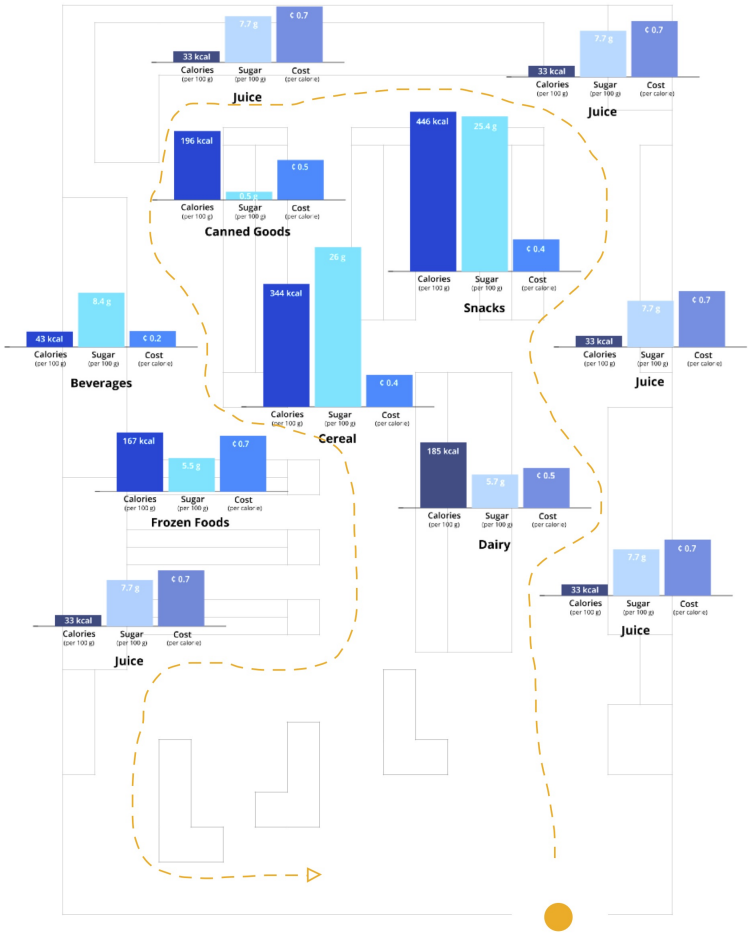

Figure 1: Redesign of Dan Marsiglio's infographic about nutritional values in a supermarket. A *.jpg* file will be provided in the submission folder.