Nothing is what it seems to be

When you prepare a chart or a diagram you should remember that your goal is to present the information rather than merely sketch it out. What we see is not always what is on the diagram. Our sight is not a video camera and our brain is not a computer, which measures accurately all the angles, lengths and fields. Originally, the main job of our eyesight was to seek out food and detect threats, which is why our brain is very susceptible to various illusions.

[flowers]

Let’s start by making an example out of these two flowers. Which one has a bigger center section?

Although it’s hard to believe, both centers are equal in size. But our brain increases the contrast when it analyzes the image. Because of this, the center surrounded by big petals looks smaller than when it is surrounded by small ones.

This illusion was named the Titchener illusion, after the psychologist who discovered it.

It is not just the perception of size of various items that can be distorted. The same applies to color intensity.

This is illustrated by the so-called Mach bands.

[gray bands]

Each band below has a uniform color. But notice that towards the right edge, close to adjacent darker color, the shade of gray appears brighter than on the left edge, where it is near the brighter band.

Although the entire band has a uniform color, our perception of brightness depends on the shade of gray of the neighboring bands.

[Poggendorf]

You need to watch out for size, the color and the angles.

In an illusion designed by Poggendorf, one section sticking out of the rectangle on the right is an extension of the section from the left side.

But which one?

Upper or lower section?

Our brain has the tendency to overestimate acute angles. Because of this tendency, the majority of people believe that the upper section is an extension of the left section.

Meanwhile...

[pause]

What about lengths? Are the length estimates not affected by illusions?

This example will answer the question. Which of these sections is longer?

It is hard to resist the perception that it is the one on the right.

But that impression is only made by auxiliary lines which suggest depth.

When designing a chart you should watch out for unnecessary decorations, each of which can distort our perception of what’s important.

In order to accurately portray the information you should take into consideration that some features can be compared more precisely than others.

Is it easy to compare volume of various items?

Which of the barrels below is twice the size of the one on top?

Comparing volume is not easy. Tests of human perception show that our brain has the tendency to underestimate the ratio between different volumes.

It is much easier to compare the length of different sections than the size of irregular-shaped items.

Are fields any good for precise comparisons?

[pause]

Which of these two provinces is bigger?

Comparing irregular shapes is difficult.

They are much easier to compare when they are shown in a simpler manner, for example as stripes of varying length.

[provinces and length]

What about angles? We often see pie charts, is it because it is easy to read values from them despite of how difficult it is?

Let’s try to arrange sections of a pie chart from the smallest to the largest.

It is not that easy. But the same values illustrated using segments of varying length are very easy to compare.

[angles and lengths]

All these examples illustrate the same principle.

When showing number-based information we need to make sure they are read properly. How to do this?

Just follow the KISS rule - Keep It Simple, Stupid