STORYTELLING WITH DATA I

Strategic design + visual perception

Why should we invest time in this?

Solving the problem is only half the work.

The other half is **communicating the solution**.

> “**There are stories in the numbers** that will be perceived and acted upon or will go unnoticed and be ignored, depending on our knowledge of visual design and our ability to apply that knowledge to the important task of communication.”
> –Stephen Few

Overview

We must continually seek to draw attention to the most important data.

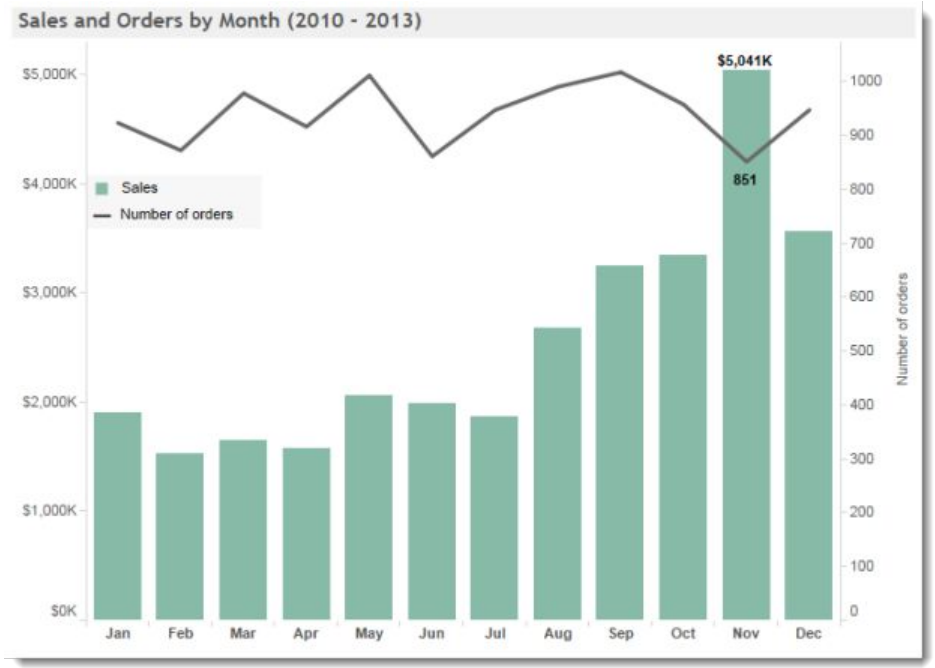
This requires:

- Identifying what the most important data is [Strategic design]
- Designing your visual to highlight this data and remove distractions [Visual perception]

Strategic design

“The true promise of the information age isn't tons of data but decisions and actions that are better because they're based on an understanding of what's really going on in the world.”
–Stephen Few

Is this a good chart?



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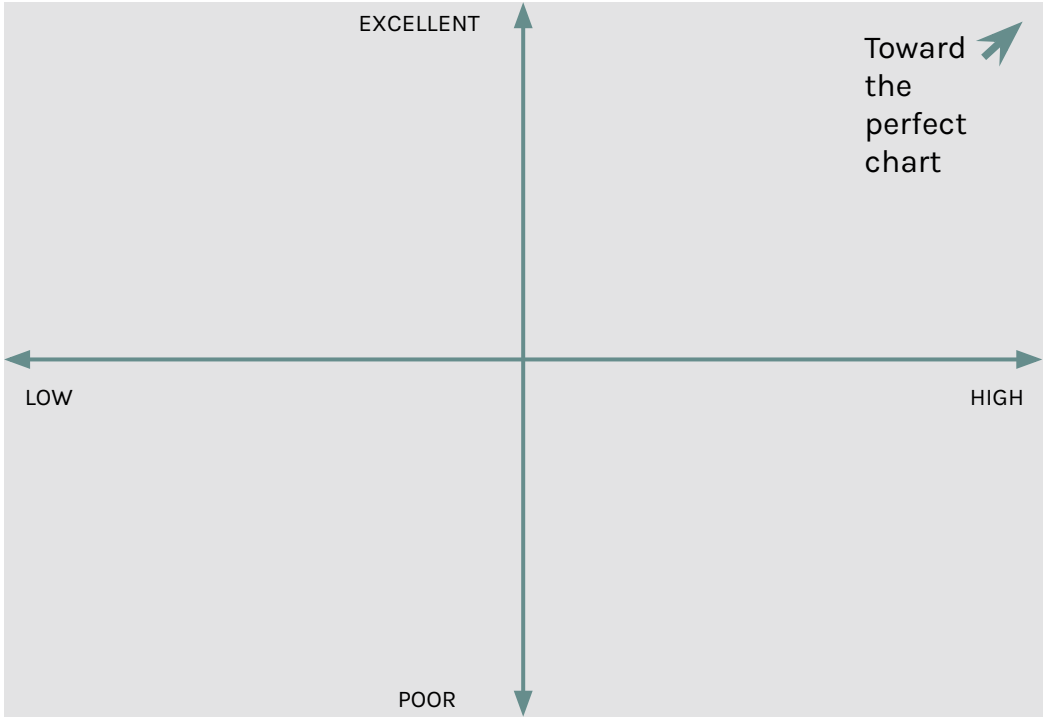
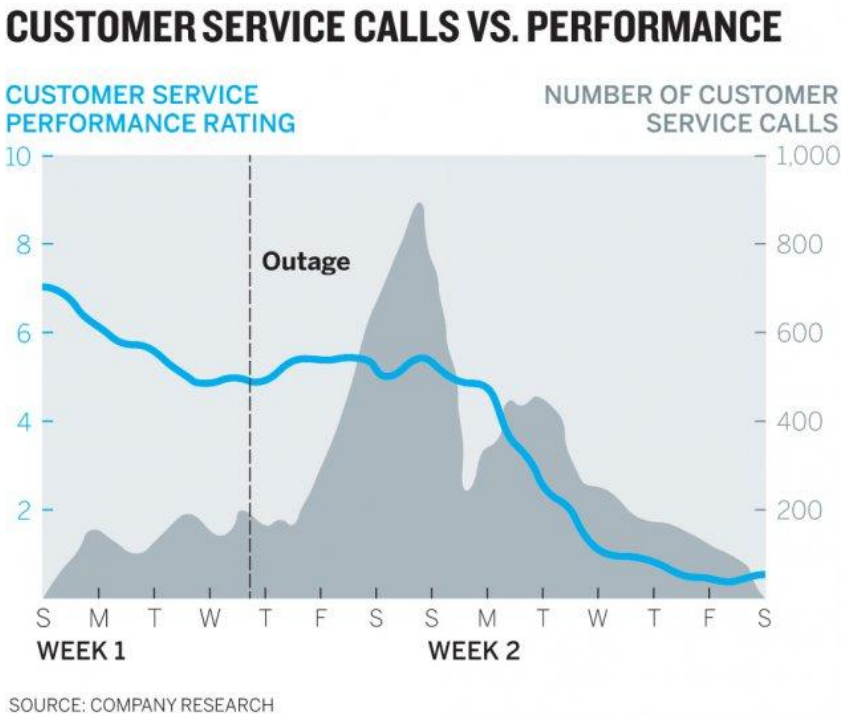
But first, a framework!



Source: HBR Good Charts

Exercise: Strategic design

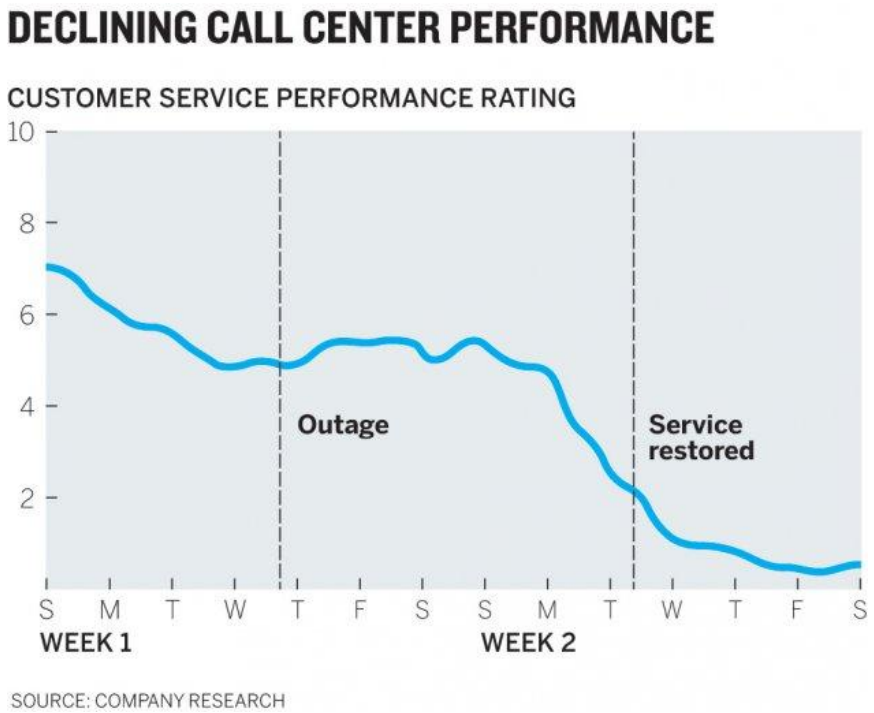
What do you see? What is the key take-away?



Source: HBR Good Charts

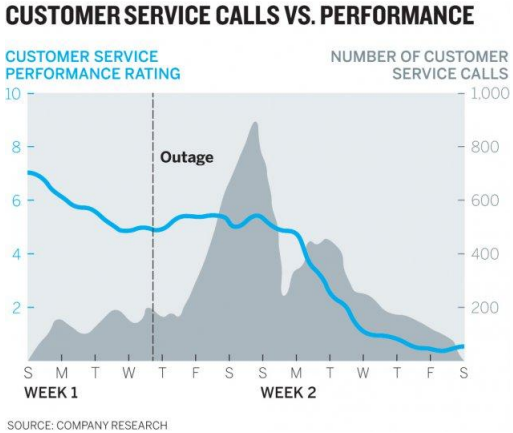
Exercise: Strategic design

Now what is the key take-away?

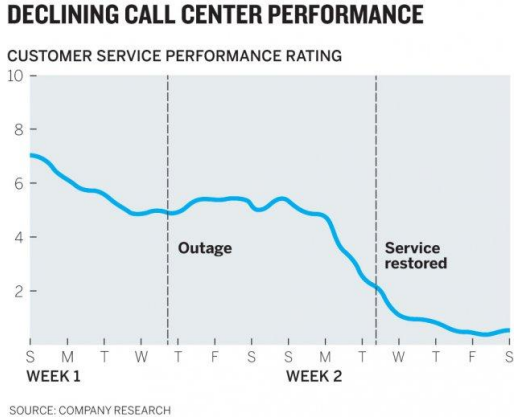


Source: HBR Good Charts

The graphic should support the key message you want to convey



Message: The outage triggered a surge in customer service calls, which has since fallen to regular levels



Message: Customer service issues are systemic – they were declining before the outage and have continued to decline despite service restoration

Source: HBR Good Charts

To communicate your key message effectively, be user-centered in your design

Key questions

Who is the audience?

- What are their needs?

What is the use case?

- What decision will your audience be using the data to inform?

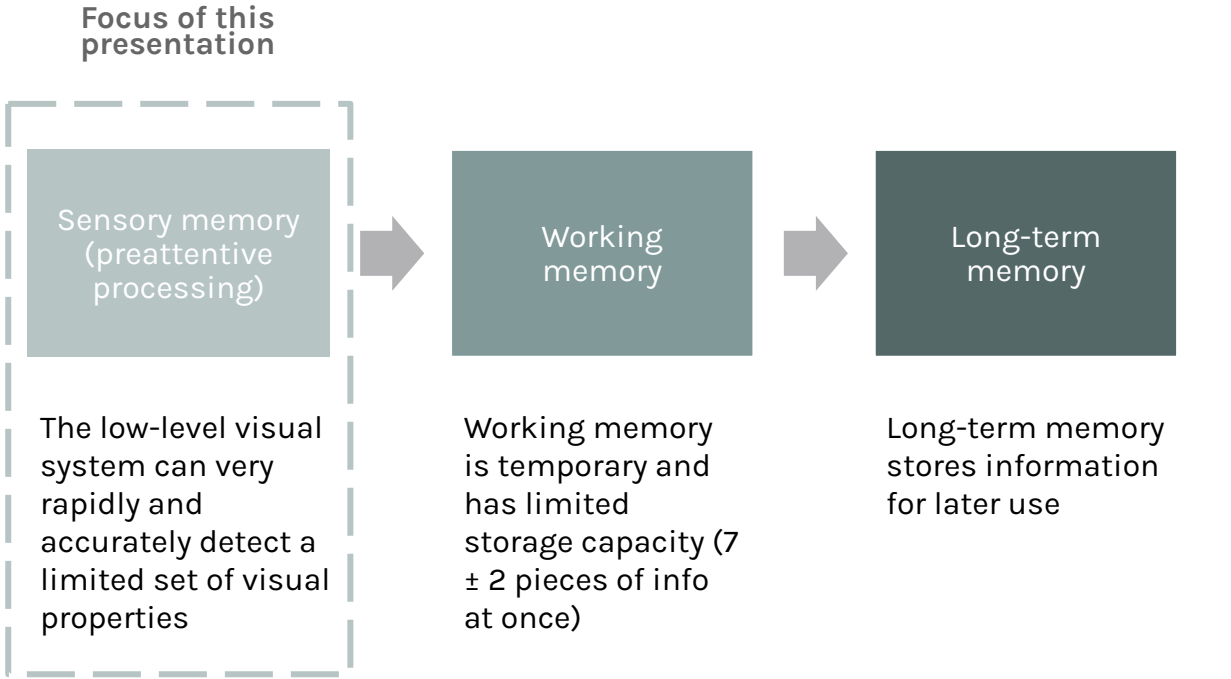
What am I trying to show?

- What are my objectives?
- What is the key message I am trying to convey?

Designing for the mind

“Above all, show the data.” –Edward Tufte

Understanding visual perception allows us to design more effective graphical communication



Your goal is to reduce the cognitive energy the reader must use to get to the conclusion you (the designer) are trying to show with the data

Exercise: Attentive vs pre-attentive processing

Count the number of times the number 5 appears in the figure below

Source: Stephen Few

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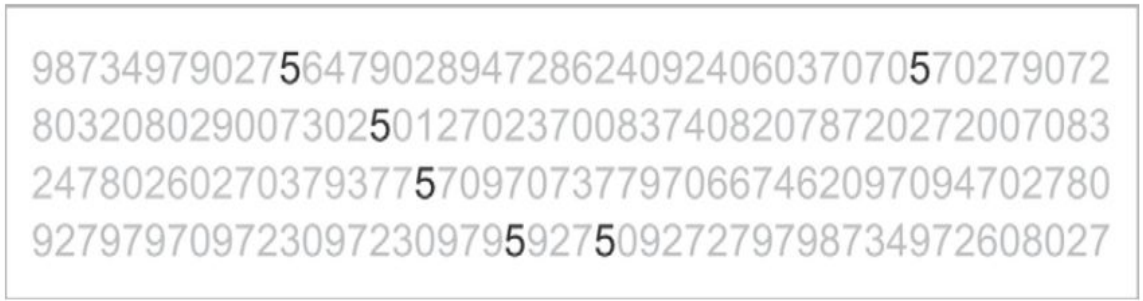
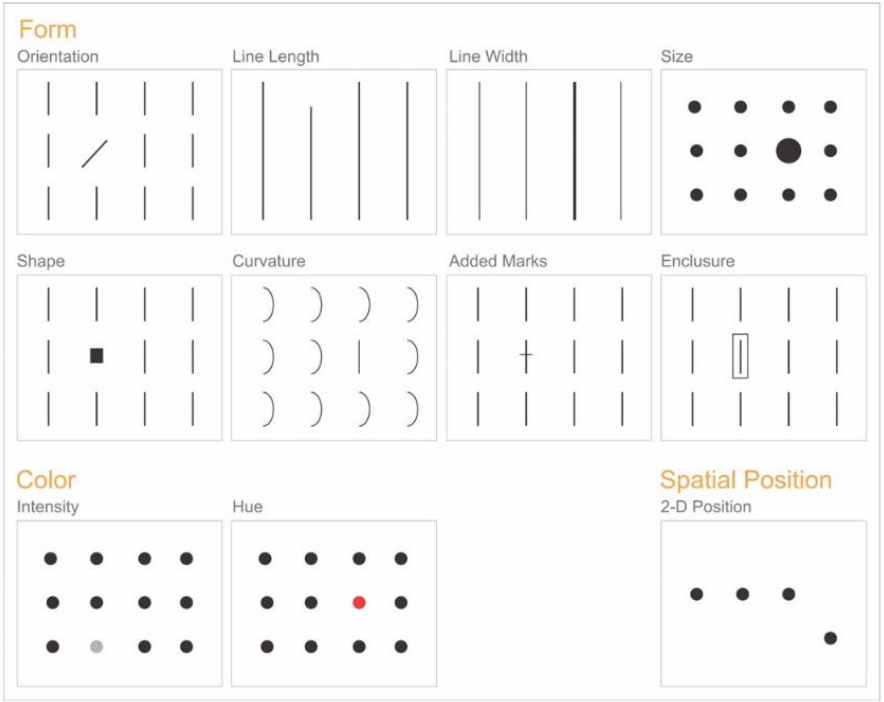


Source: Stephen Few

Preattentive attributes fall in three broad categories: form, color, and spatial position

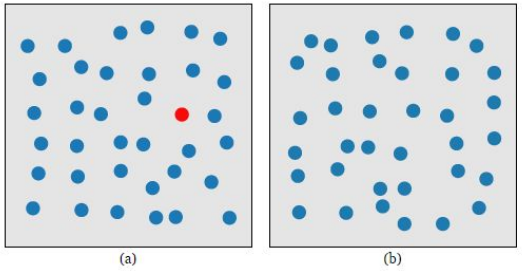


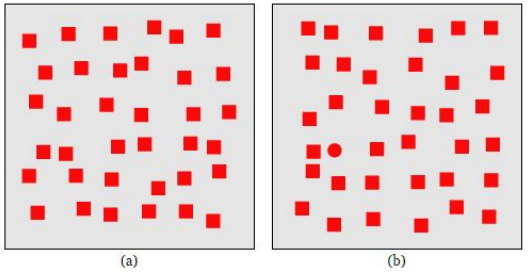
Visual attributes are not perceptually equal. Some can be use to encode quantitative values with a degree of precision (e.g. line length and 2-D position) and others are better for showing relative value (e.g. color intensity)

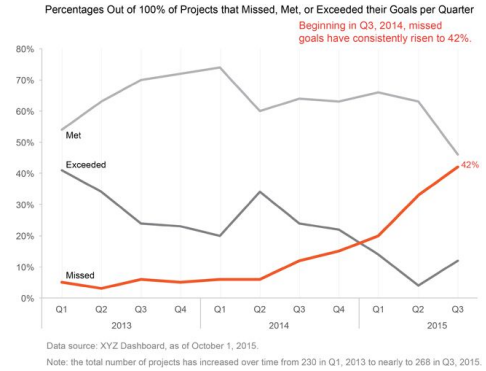
Source: Stephen Few

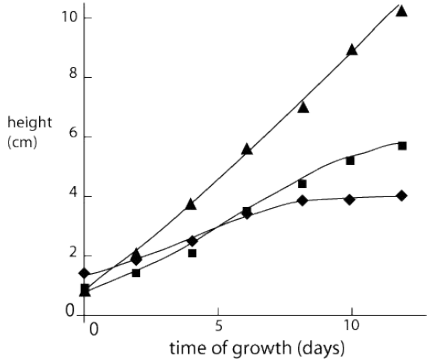
Exercise: Hierarchy of preattentive attributes

Spot the difference









Source: Christopher Healey

Be mindful to stay within the limits of working memory

According to research, when reading graphs, we can only distinguish preattentively between about:

- Eight different hues
- Four different orientations
- Four different sizes

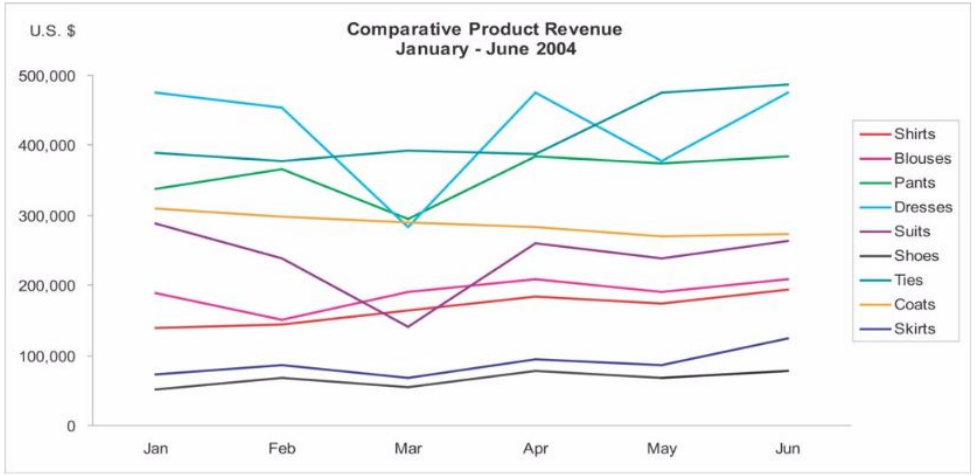
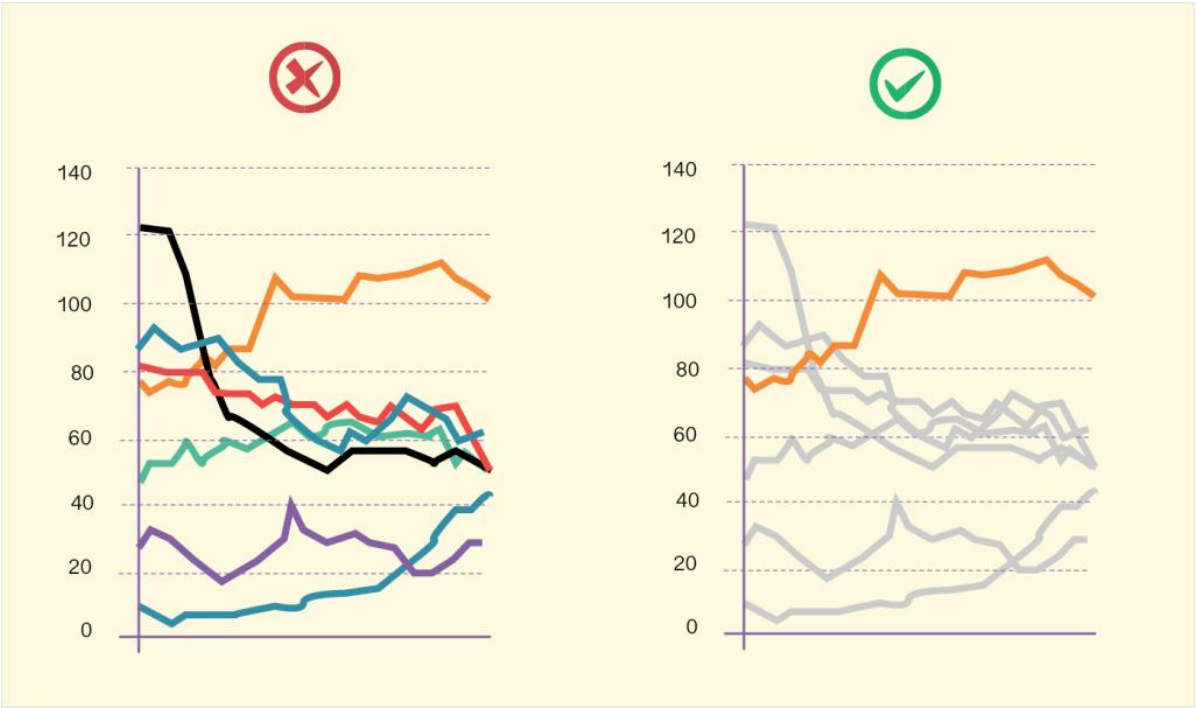


Figure 2: Example of a graph that exceeds the limits of short-term memory.

Source: Stephen Few

Use preattentive attributes to direct your reader's attention and highlight your message

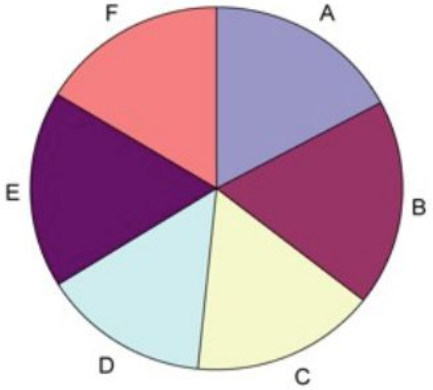


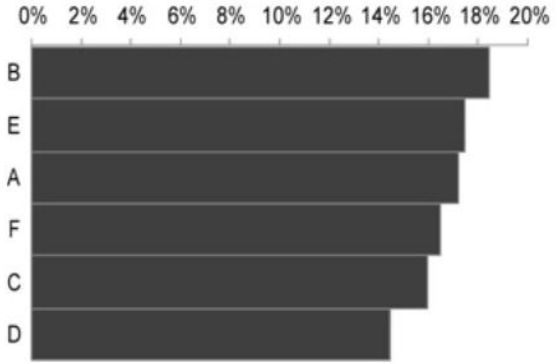
When everything stands out, nothing stands out

Source: Nayomi Chibana

Sidenote: Our minds our terrible at measuring surface areas

Limit the use of pie charts and other surface-area based visuals to approximate comparisons





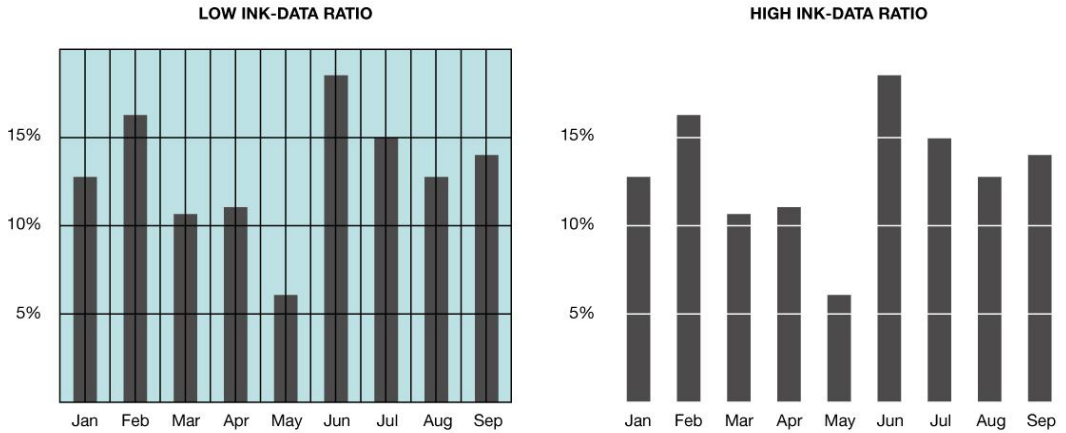
Source: Stephen Few

One simple concept to help apply these principles of perception is the data-ink ratio

The **data-ink ratio** is the proportion of a graphic's ink devoted to the display quantitative values (data)

When designing a graphic, seek to:

1. Remove / mute the non-data ink
2. Enhance the most important data ink



Source: Edward Tufte

Data-ink optimization in action!

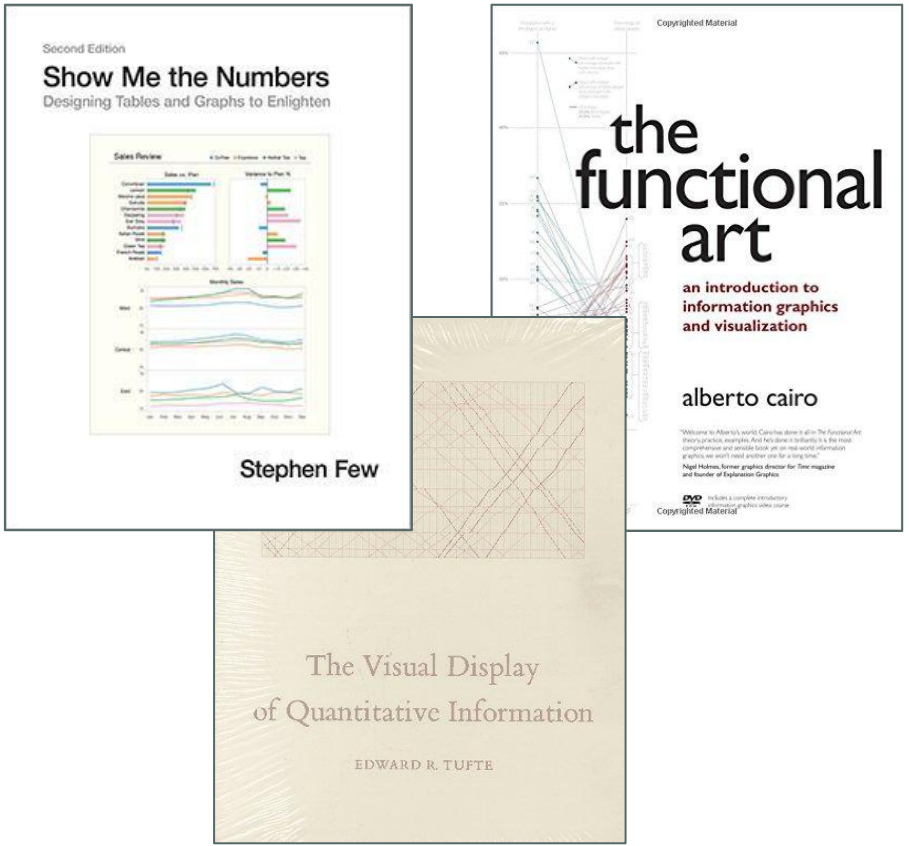
Conclusion

We must continually seek to draw attention to the most important data.

This requires:

- Identifying what the most important data is
- Designing your visual to highlight this data and remove distractions

This presentation stands on the shoulders of giants



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