ITI0209: User Interfaces

15. Visualizations Continued.

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Data are facts.

Information is the meaning that human being assigns to these facts. It brings context to the data, turning what would otherwise be meaningless content into something comprehensible and usable.

Let's Recap:

Good graphs should tell a story and be memorable, but also have a low information to ink ratio and not mislead the viewer.

Choice of colour when designing charts and graphs is also important to allow for colour blindness and black and white printing.

Data Visualization Workflow: 1/6

Understand the context. Who? What? How?

Therefore, the first lesson is to understand the context and then embarking on your journey of utilizing the data as per the understood context.

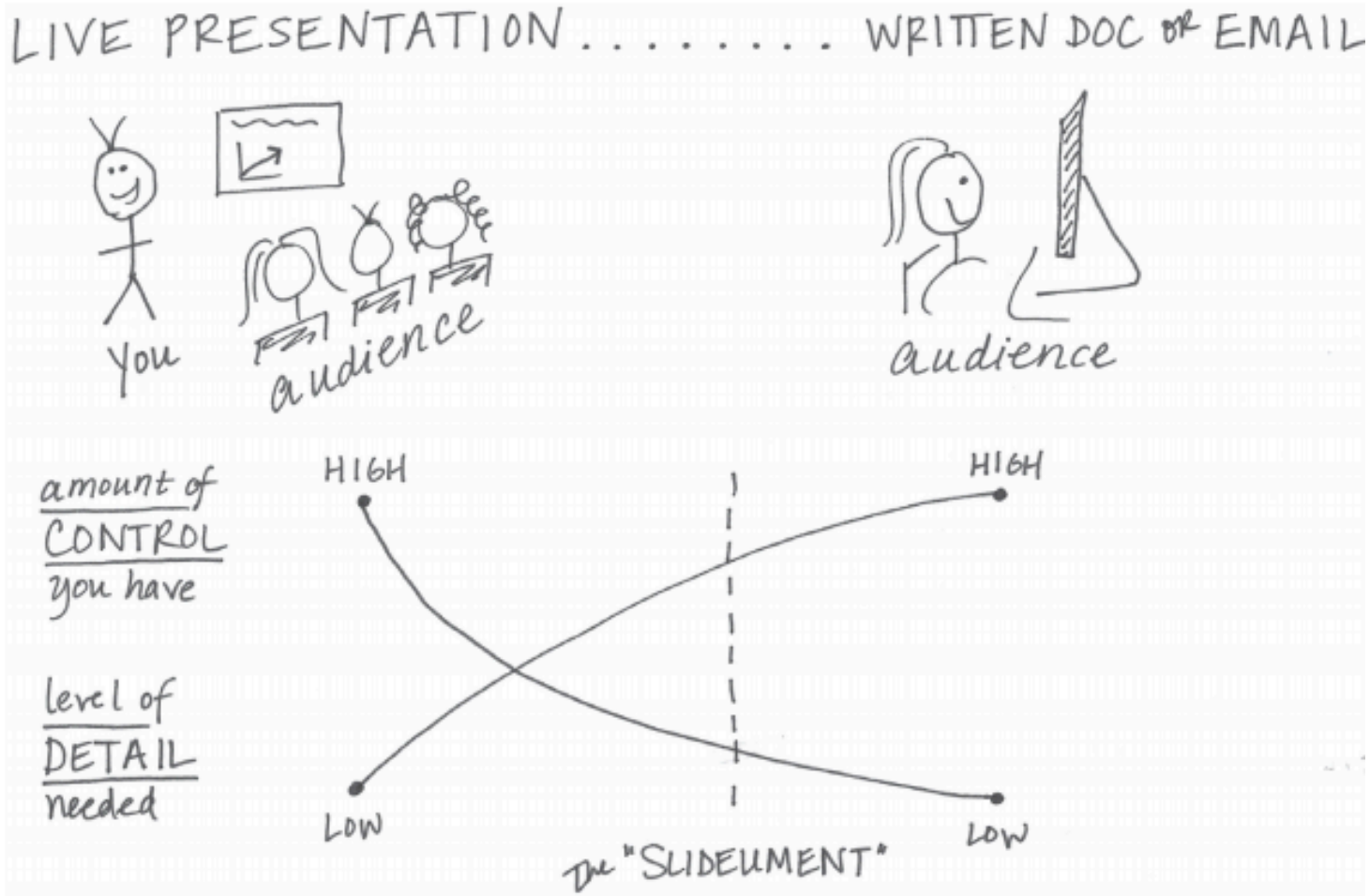


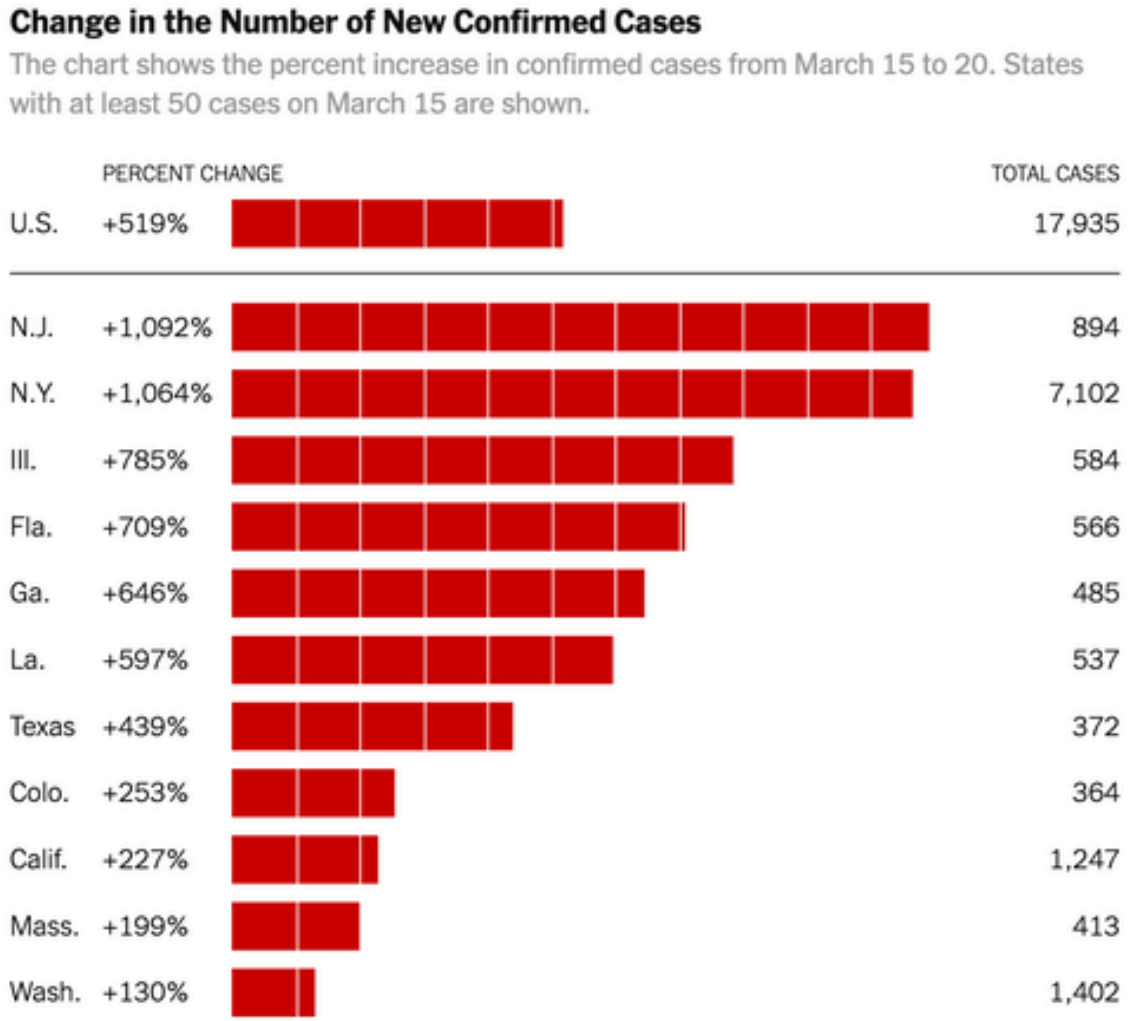
FIGURE 1.1 Communication mechanism continuum

Data Visualization Workflow: 2/6

Choose an appropriate visual display

We covered it during the previous class :)

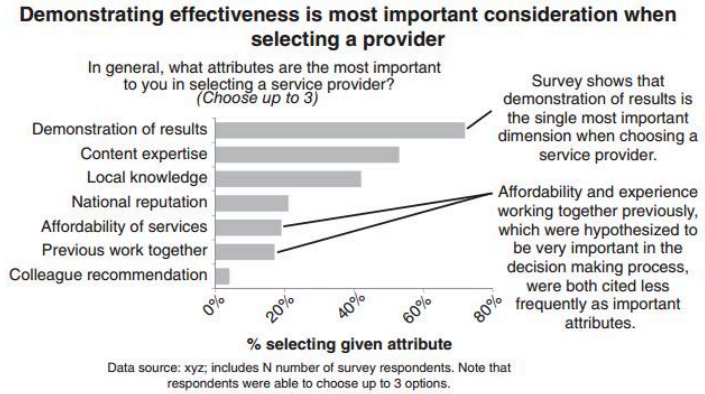
(Nussbaumer, p36)

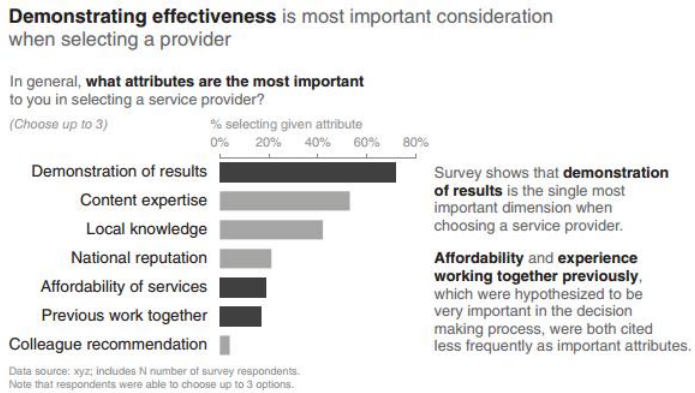


Data Visualization Workflow: 3/6

Eliminate clutter

Clutter is visual elements that take up space but don’t increase understanding.



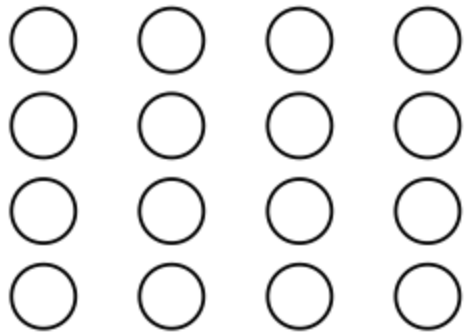


Data Visualization Workflow: 4/6

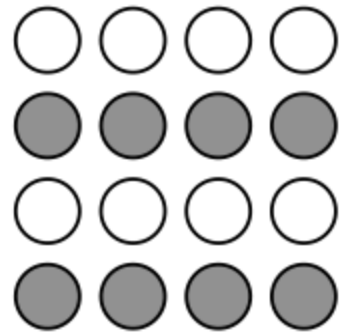
Focus attention where you want it

- **Proximity** is that human tendency to think physically close object as belonging to the same group.
- **Similarity** means that, objects that are of similar colour, shape, size, or orientation are perceived as related or belonging to part of a group.
- **Enclosure:** we think of objects that are physically enclosed together as belonging to part of a group. Furthermore, humans like simplicity rather than complexity:
- **Continuity** is the human tendency to seek the most smooth path and even create one even if explicitly no such continuity exists.

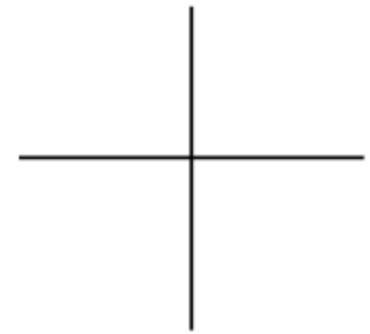
proximity



similarity

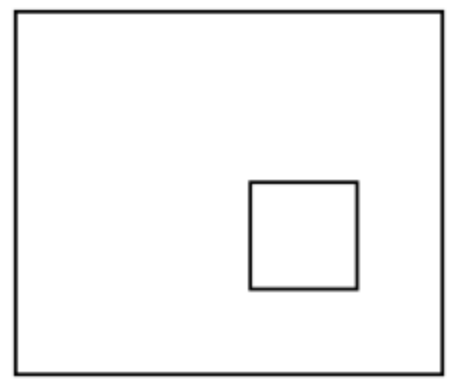


continuity

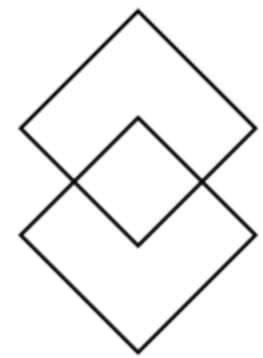


closure

area



symmetry



Data Visualization Workflow: 5/6

Think like a designer .. and above all else show data.

Graphical elegance is often found in simplicity of design and complexity of data.

Think like a designer

- **Make it legible:** use a consistent, easy-to-read font (consider both typeface and size). *Make the visual accessible with text.*
- **Keep it clean:** make your data visualization approachable by leveraging visual affordances.
- **Use straightforward language:** choose simple language over complex, choose fewer words over more words, define any specialized language and spell out acronyms.
- **Remove unnecessary complexity:** when making a choice between simple and complicated, favor simple.
- **Align elements to improve aesthetics**

Data Visualization Workflow: 6/6

Tell a story

3-minute story: if you had only three minutes to tell your audience what they need to know, what would you say?’

Therefore it is important to understand the context and then embarking on your journey of utilizing the data as per the understood context.

20.3
15.2
14.6
11.3
10.1
8.4
5.1
81
123
182
227
255
291
357

Friendly vs Unfriendly Data Graphics

(Tufte. p183, "Aesthetics and Technique in Data Graphical Design)

More Tips. Friendly Graphs

- Words are spelled out, no mysterious encodings
- Words run from left to right
- Little messages help explain data
- Shadings, hatches and colors are avoided.
- Labels are placed on graphics itself, so no legend is required
- Graphics attract viewers, provokes curiosity, every visual characteristic has meaning
- Colors are chosen so color blind can read them
- Type is clear and precise
- Type is upper and lowercase

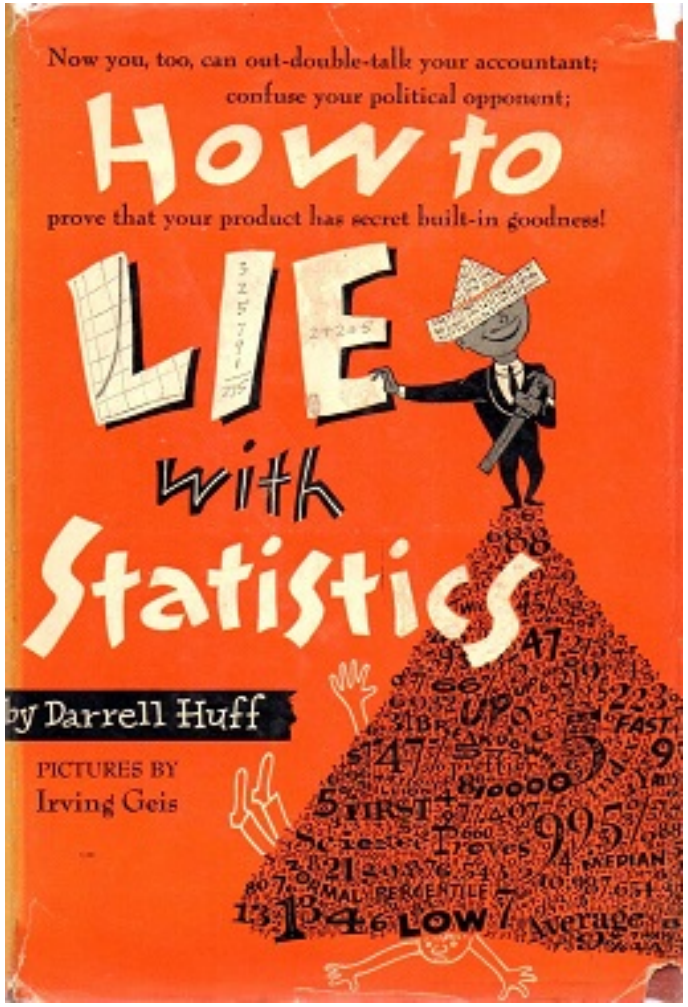
More tips. Unfriendly Graphs

- Use of abbreviations
- Words run vertically, particularily along y-axis. Words run in differnet directions
- Graphic is cryptic and needs repeated references to scattered text
- Obscure codings need to go back to legend and graphic
- Chartjunk
- Design insensitive to color defunct
- Type is overbearing
- Type is all capitals

Common Mistakes

- Leaving gaps/changing the scale in vertical axes
- Uneven shading/colours
- Unfair emphasis on some sections
- Distorting areas in histograms (bar widths should always be equal)
- Use of 3-dimensions instead of two
- Misleading use of pictograms

See also: https://mathspace.co/textbooks/syllabuses/Syllabus-463/topics/Topic-8888/



Main Takeaways

- Simpler is most often better.
- More information is better than less information.
- Do not assume your audience is stupid.
- Tables usually outperform graphics in reporting on small data sets of 20 numbers or less.
- Graphical excellence is nearly always multivariate.
- Time-series is the most common graphical design.
- Data is plural for datum. Datum = 1 data point.

Inspiration

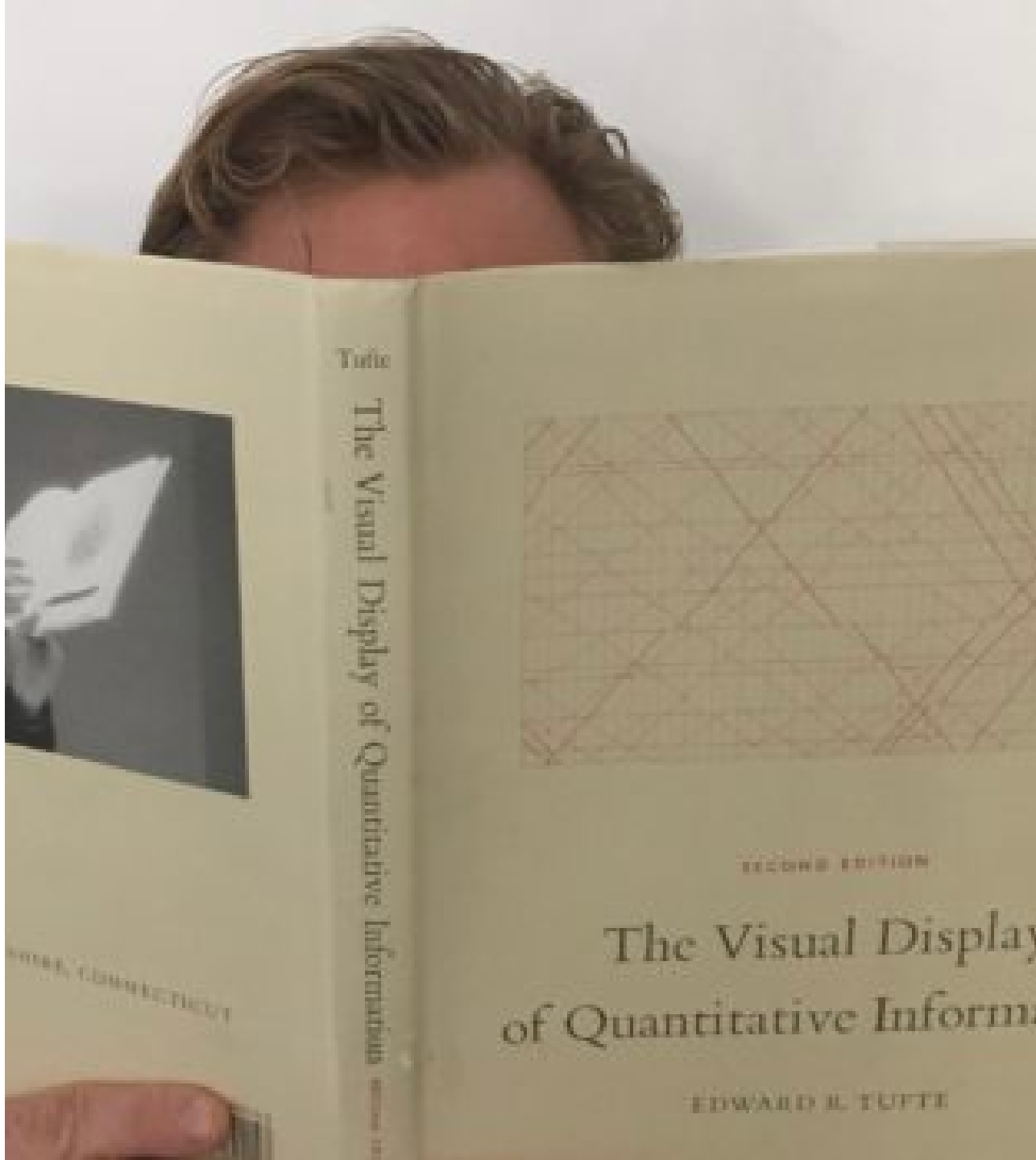
- Data is Beautiful Subreddit. https://www.reddit.com/r/dataisbeautiful/
- Data is Ugly Subreddit. https://www.reddit.com/r/dataisugly/
- Information is Beautiful. https://informationisbeautiful.net/
- Beautiful News. https://informationisbeautiful.net/beautifulnews/
- 10 Of The Best Data Visualization Examples From History & Today. https://www.tableau.com/learn/articles/best-beautiful-data-visualization-examples

The Visual Display of Quantitative Information

Edward R. Tufte

2001

https://www.goodreads.com/book/show/17744

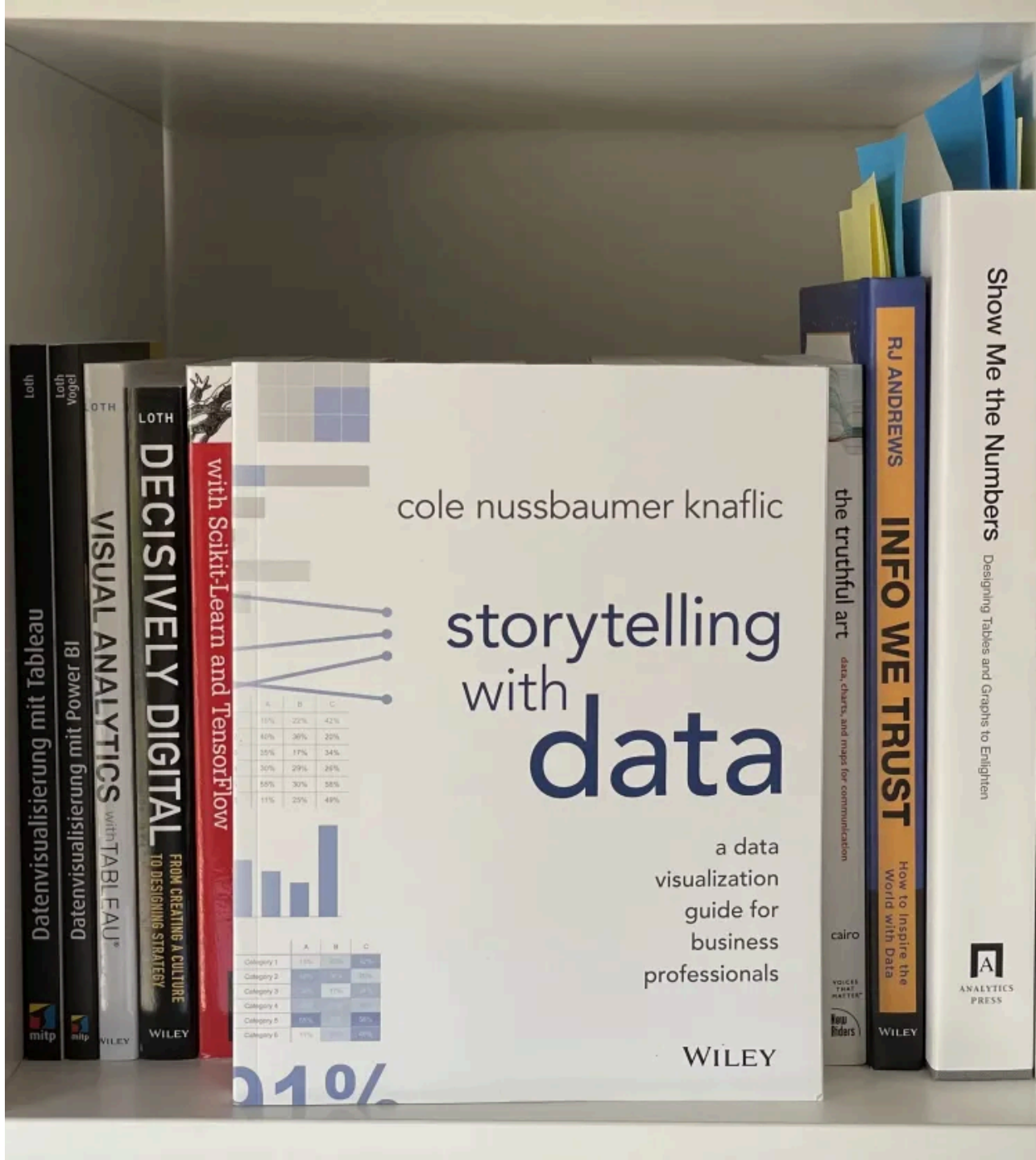


Storytelling with Data: A Data Visualization Guide for Business Professionals

Cole Nussbaumer Knaflic

2015

https://www.goodreads.com/book/show/26535513



References

- The beauty of data visualization - David McCandless. https://www.youtube.com/watch?v=5Zg-C8AAIGg
- The Gospel According to Tufte. http://www-personal.umich.edu/~jpboyd/eng403_chap2_tuftegospel.pdf
- Graphical Integrity and Redesign. http://jcsites.juniata.edu/faculty/rhodes/ida/graphicalIntRedes.html
- Easy Graph Mistakes to Avoid
  So avoid them. https://nickch-k.github.io/DataCommSlides/Easy_Mistakes_to_Avoid.html

Thank you!