Tufte's Design Rules

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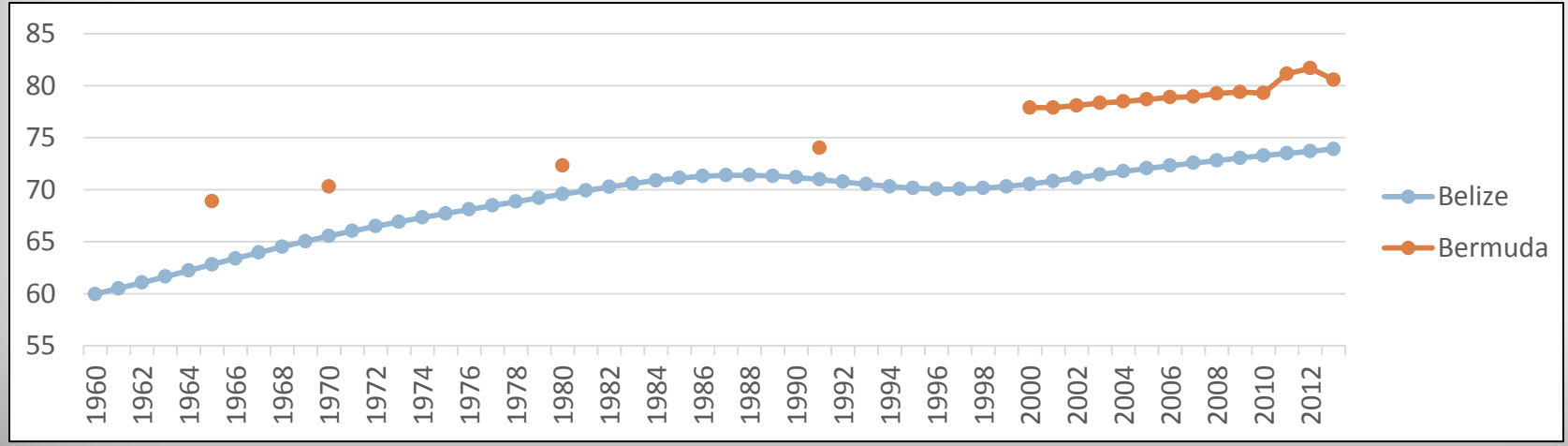
Based loosely on Sealth Reinhold's summary of Edward Tufte's books
http://www.sealthreinhold.com/school/tuftes-rules/

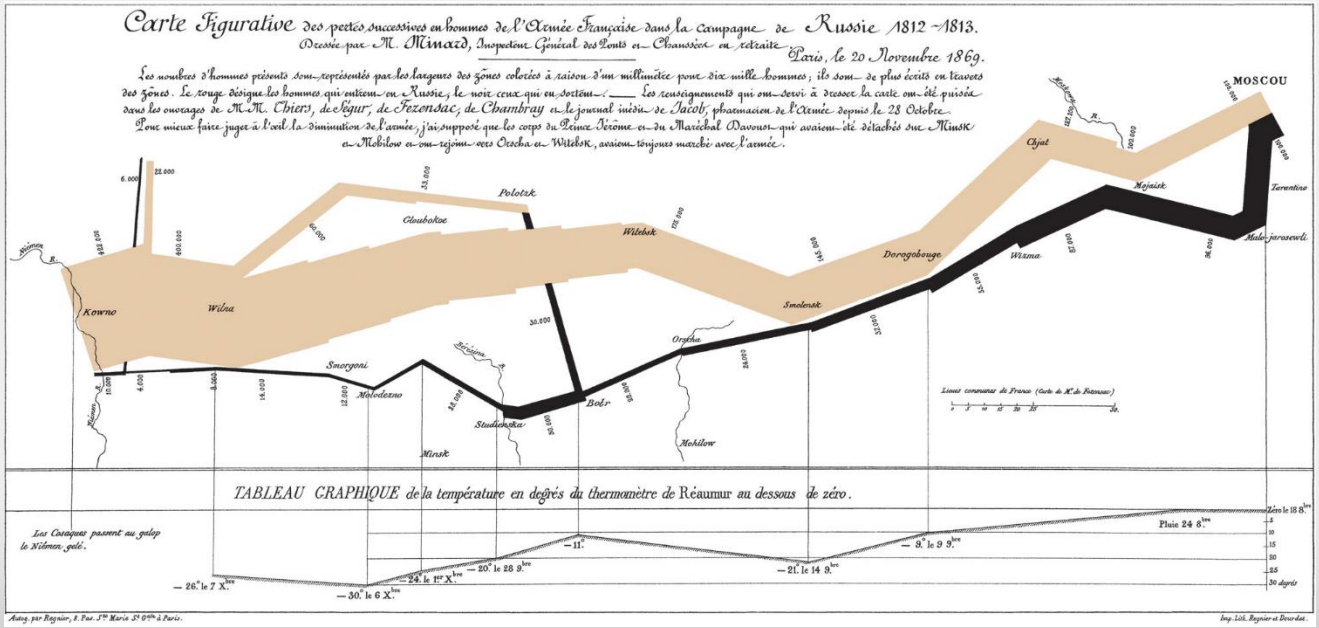
Let the Data Speak

- Avoid summaries and aggregations
- Show where data is missing but don't let it distract the viewer
- Rely on the deductive, inductive and abductive reasoning of the viewer



A Picture is Worth a Thousand Words

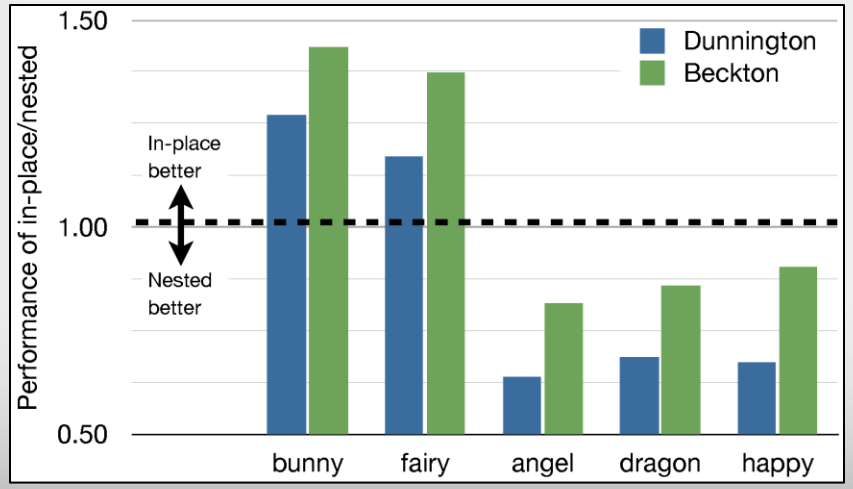
- Consider using pictures/icons/glyphs in place of words
- Tufte: “Only a picture can carry such a volume of data in such a small space”

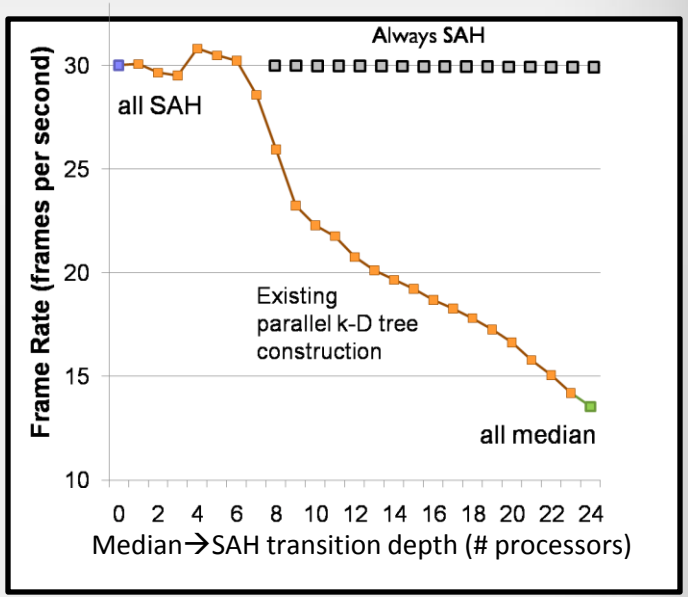


Charles Minard, 1869

Annotation

- Label your axes!
- Pictures still need words
- Label should stand out from data

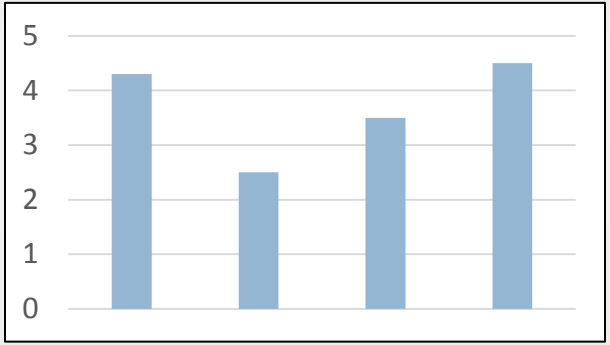


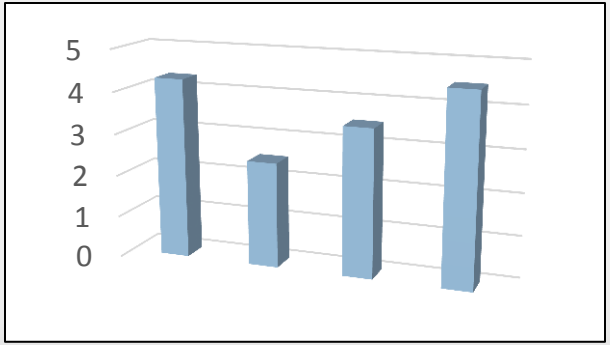


Choi et al. Parallel SAH k-D Tree Construction. Proc. High Performance Graphics, 2010

Chartjunk

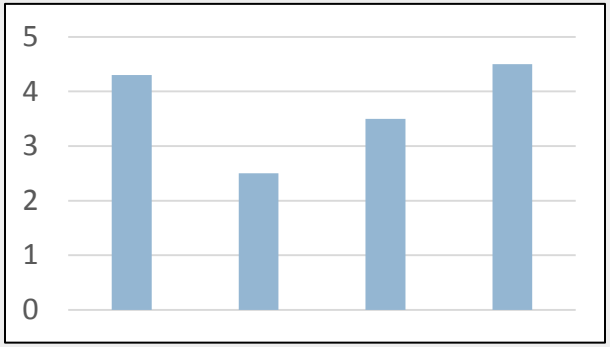
- Making a visualization look prettier often makes it less effective at communicating its data
- Using 3-D can make a 2-D boring chart more engaging
- Using 3-D can often lead to erroneous interpretations

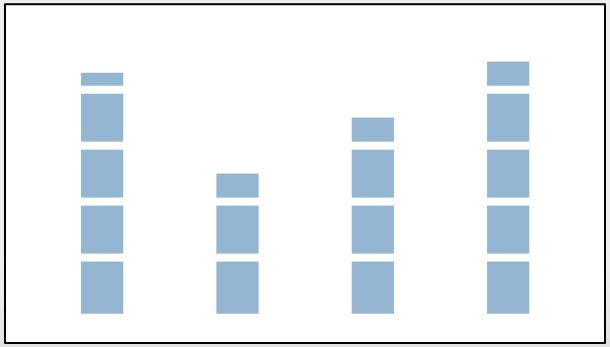




The Data-Ink Ratio

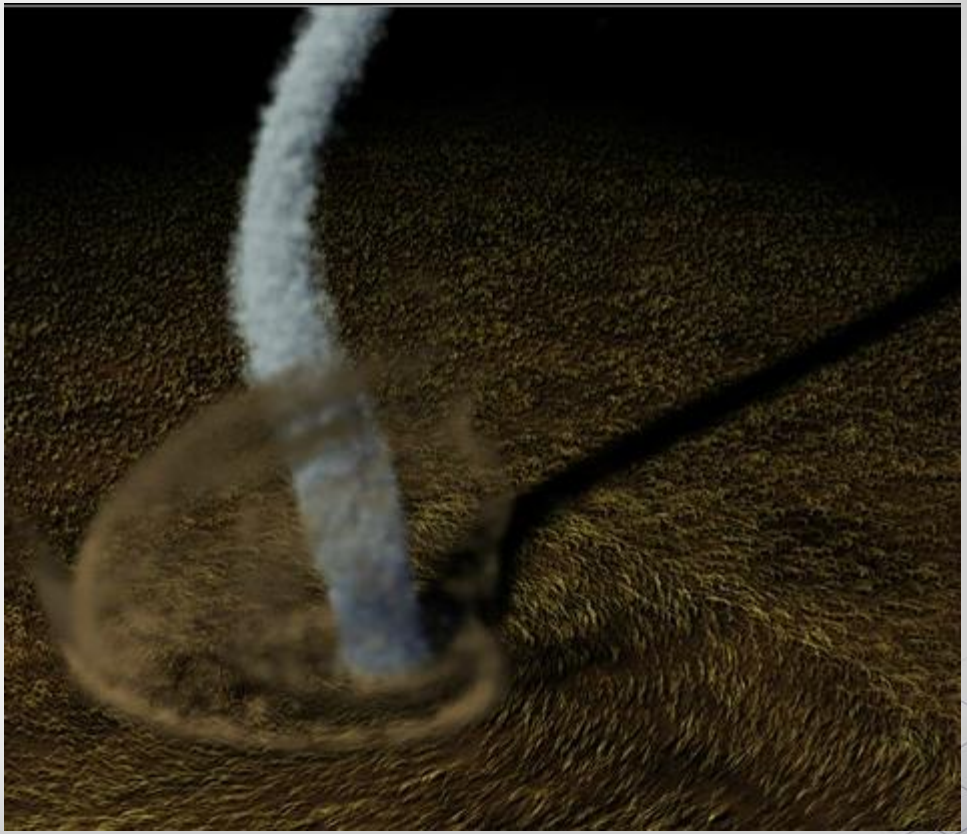
- Maximize the ratio of data to ink in your visualization
- Don’t waste ink on elements of the visualization not associated with data
- Tufte’s minimalism





Micro/Macro

- Fine micro-level details become texture when viewed at the macro level
- Create interactive zoomable interfaces when possible
- Leads to part of Schneiderman's mantra: overview first, then details on demand



NCSA

Information Layers

- Different elements of a visualization should have different appearance
- Use multiple, redundant visual differences

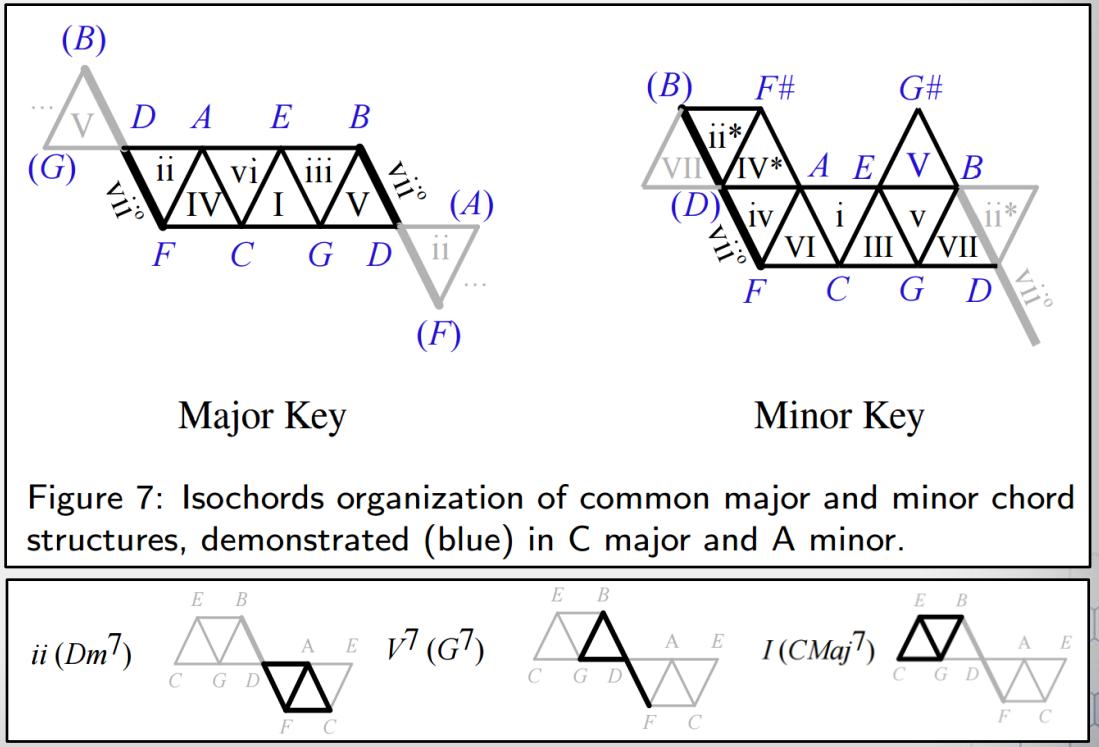
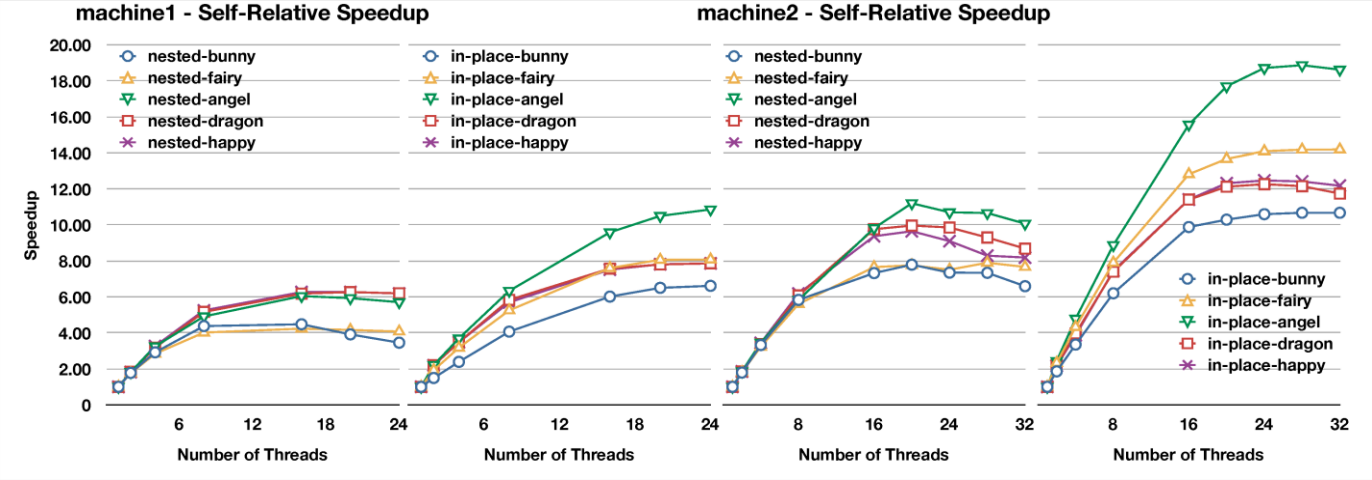


Figure 7: Isochords organization of common major and minor chord structures, demonstrated (blue) in C major and A minor.

Bergstrom, Karahalios, Hart. Isochords: Visualizing Structure in Music. Proc. Graphics Interface, 2007

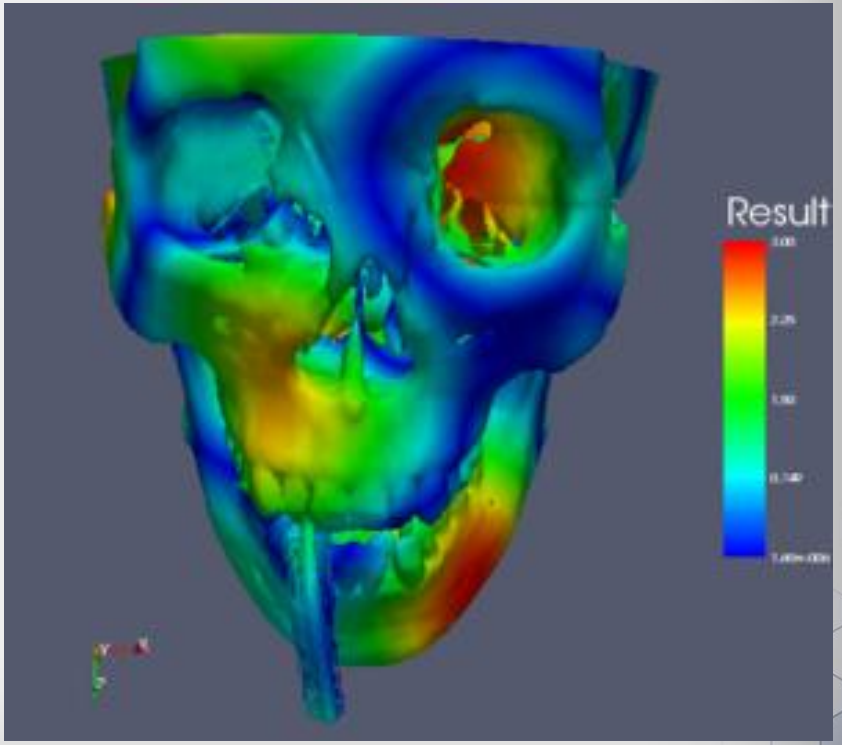
Multiples

- Maintain a consistent design
- Do not change appearance for the sake of change only
- Consistent appearance puts emphasis on data, not the visual design
- Changes in design can distract from irregularities in the data



Color

- Color can be helpful, if used properly
- Color can be harmful, if used naively
- Rainbow not always the best choice



© 2007 Moreland & Taylor from ParaView default color map documentation

Narrative

- What story is your data visualization telling?
- What is happening, over time, across space?