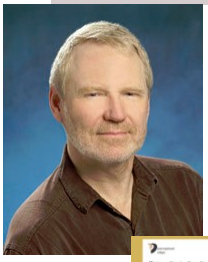
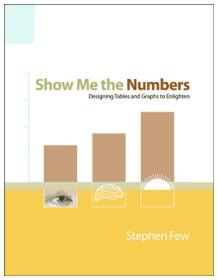
Topic Notes

Few's Design Guidance

CS 7450 - Information Visualization
September 9, 2013
John Stasko

Today's Agenda





Stephen Few &
Perceptual Edge

Stephen Few's Guidance

- Excellent advice for the design of tables and graphs
- Page references are from *Now You See It*
- Let's review some of his recommendations
  - We explored chapters 1-4 earlier
  - Today we examine chapters 5-12

Analytic Techniques & Practices

- Some examples he has highlighted
  - Optimal quantitative scales
  - Reference lines and regions
  - Trellises and crosstabs
  - Multiple concurrent views and brushing
  - Focus and context together
  - Details on demand
  - Over-plotting reduction

Add Reference Lines

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More Reference Lines

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Trellis Display

Typically varies on one variable

p. 100

Crosstab

Varies across more than one variable

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Crosstab

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Multiple Concurrent Views

Vintage infovis

p. 107

Concurrent Views

- He calls such things *faceted analytical displays*
  - Sometimes that term is used in other ways in infovis
- As opposed to *dashboards*
  - They are for monitoring, not analysis

Overplotting

Too many data points

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Overplotting Solutions

- Reducing size of data objects
- Removing all fill color from data objects
- Changing the shape of data objects
- Jittering data objects
- Making data objects transparent
- Encoding the density of values
- Reducing the number of values
  - Aggregating the data
  - Filtering the data
  - Breaking the data into a series of separate graphs
  - Statistically sampling the data

Quantitative Data

- Fundamental visualization techniques

Time Series Data

- Patterns to be shown
  - Trend
  - Variability
  - Rate of change
  - Co-variation
  - Cycles
  - Exceptions

Time Series Visualizations

- Effective visualization techniques include…

Line Graphs

When to use:

When quantitative values change during a continuous period of time

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Bar Graphs

When to use:

When you want to support the comparison of individual values

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Dot Plots

When to use:

When analyzing values that are spaced at irregular intervals of time

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Radar Graphs

When to use:

When you want to represent data across the cyclical nature of time

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Heatmaps

When to use:

When you want to display a large quantity of cyclical data (too much for radar)

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Box Plots

When to use:

You want to show how values are distributed across a range and how that distribution changes over time

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Animated Scatterplots

When to use:

To compare how two quantitative variables change over time

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Banking to 45°

Same diagram, just drawn at different aspect ratios

People interpret the diagrams better when lines are around 45°, not too flat, not too steep

p. 171

Question

Which is increasing at a faster rate, hardware sales or software sales?

Log scale shows this

Both at same rate, 10%

p. 172

Patterns

Daily sales

Average per day

p. 176

Cycle Plot

Combines visualizations from two prior graphs

p. 177

A Story

How much wine of different varieties is produced?

p. 191-2

Pareto Chart

Shows individual contributors and increasing total

80/20 rule –
80% of effect comes from 20%

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Bump Chart

Shows how ranking relationships change over time

p. 201

Deviation Analysis

Do you show the two values in question or the difference of the two?

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Distribution Analysis Views

- Histogram
- Frequency polygon
- Strip plot
- Stem-and-leaf plot

Histogram

p. 225

Frequency Plot

p. 226

Strip Plot

p. 227

Stem-and-leaf Plot

p. 228

Comparisons

Note how first one's curve is smooth (not such a noticeable difference). Second one is more noticeable. Same data.

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Correlation Analysis

Bleah. How can we clean this up?

p. 276

Crosstab

p. 277

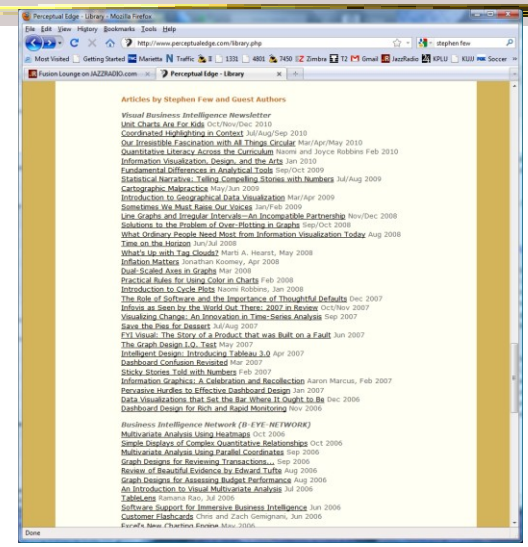
Color Choice in Heatmaps

Argues that black should not be used as a middle value because of its saliency (visual prominence)

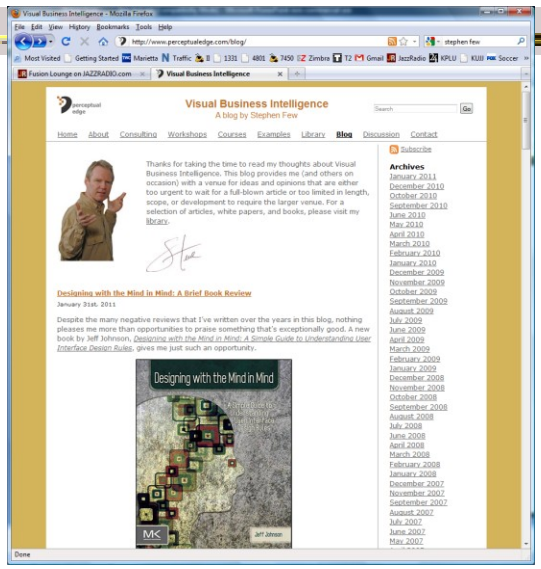
Some people are red-green color blind too

p. 285-7

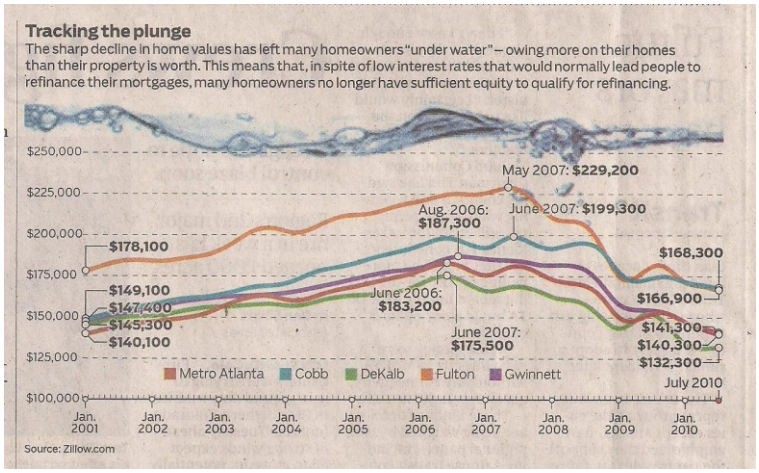
Further Articles



Blog



Critique It



AJC, July 2010

Reminder

- HW 2 due Wednesday
  - Design a table and a graph
  - Submit 2 copies

Project

- Proposals due next Monday
- More ideas
- Looking for teammates?

What are you Listening to?

- Represent music listening histories

- What would you want to show?
- How might you visualize it?

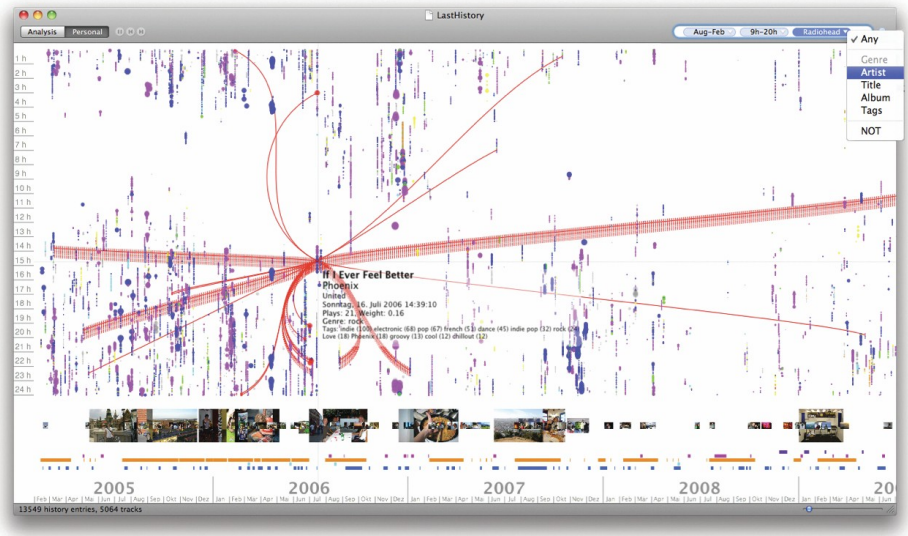
Nice example of a project

LastHistory

- Visualizing a person's listening history from last.fm
- Want to support
  - Analysis
  - Reminiscing
- Potential to synchronize with photos and calendar entries from that time

Baur et al
TVCG (InfoVis) '10

Video



Upcoming

- Multivariate Visual Representations 1
  - Reading
    Inselberg '97

- Multivariate Visual Representations 2
  - Reading
    Keim et al '02