Maximizing the signal, decreasing the noise:

Skills for speaking and designing clearly

Webinar for Plantae
By Tobias Baskin
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#15, \( A = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \), \( B = \begin{pmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{1}{2} \end{pmatrix} \), \( P_0 \leftarrow \vec{v} \rightarrow P_1 \), \( (x_0, y_0) = \left( \frac{1}{\sqrt{3}}, 0 \right) \), \( (x_0, y_0) = \left( \frac{1}{2}, \frac{-\sqrt{3}}{2} \right) \), \( (x_{n+1}, y_{n+1}) = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} x_n \\ y_n \end{pmatrix} \), \( P_n = (x_n, y_n) \)
https://goodyfeed.com/5-reasons-why-we-like-having-a-young-lecturer/
While you are reading the snappy or profound title up here you are not listening to me.
SPEAKING

- Face the audience, always.
- Point with your up-stage hand.
- Project a positive vibe.
- Mark beginning, middle, and end.
- You are the show.
Designing
Making Figures
Edward Tufte  http://www.edwardtufte.com/tufte/index
LOOK AT ALL MY FAR OUT COOL DATA!

AMAZING STUFF
- This is the induction of coolness provided that the square root of sausage = 5
- Intensification of the mean
- Auxin reveled to smoke in triplicate or quintuplicate.

BORING STUFF
- Peanut butter falsification
- Lotus blossom shipping humongous containers
- Clams vote without rhyme or reason
- Lunch is a thing that makes the walrus scream

WACHSTUFF
- This is the induction of coolness provided that the square root of sausage = 5
- Intensification of the mean
- Auxin reveled to smoke in triplicate or quintuplicate.

MADE YOU LOOK
- Peanut butter falsification
- Lotus blossom shipping humongous containers
- Clams vote without rhyme or reason
- Lunch is a thing that makes the walrus scream

RHUBARB
- This is the induction of coolness provided that the square root of sausage = 5
- Intensification of the mean
- Auxin reveled to smoke in triplicate or quintuplicate.
Don’t lie
1958 — EISENHOWER: $1.00

1963 — KENNEDY: 94¢

1968 — JOHNSON: 83¢

1973 — NIXON: 64¢

1978 — CARTER: 44¢ (August)

Purchasing Power of the Diminishing Dollar

Source: Labor Department
Appeals to the eye
Figure 3: DSI Comparison
Top Ten Countries in Approval of Russian Leadership, 2010
©2012 "Ranking America" (http://rankingamerica.wordpress.com)

percent of respondents who approve of the job performance of Russia's leadership

Data from Gallup
http://www.gallup.com/poll/128210/Gallup-Global-Reports.aspx
Multivariate
The data map

All types of cancer, white females; age-adjusted rate by county, 1950–1969
The time series
Relational graphics

(x ≠ time or dist)
THERMAL CONDUCTIVITY OF COPPER

THERMAL CONDUCTIVITY, W cm\(^{-1}\) K\(^{-1}\)

TEMPERATURE, K
<table>
<thead>
<tr>
<th>Cancer site</th>
<th>Relative survival rate, % (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 years</td>
</tr>
<tr>
<td>Oral cavity and pharynx</td>
<td>56.7 (1.3)</td>
</tr>
<tr>
<td>Oesophagus</td>
<td>14.2 (1.4)</td>
</tr>
<tr>
<td>Stomach</td>
<td>23.8 (1.3)</td>
</tr>
<tr>
<td>Colon</td>
<td>61.7 (0.8)</td>
</tr>
<tr>
<td>Rectum</td>
<td>62.6 (1.2)</td>
</tr>
<tr>
<td>Liver and intrahepatic bile duct</td>
<td>7.5 (1.1)</td>
</tr>
<tr>
<td>Pancreas</td>
<td>4.0 (0.5)</td>
</tr>
<tr>
<td>Larynx</td>
<td>68.8 (2.1)</td>
</tr>
<tr>
<td>Lung and bronchus</td>
<td>15.0 (0.4)</td>
</tr>
<tr>
<td>Melanomas</td>
<td>89.0 (0.8)</td>
</tr>
<tr>
<td>Breast</td>
<td>86.4 (0.4)</td>
</tr>
<tr>
<td>Cervix uteri</td>
<td>70.5 (1.6)</td>
</tr>
<tr>
<td>Corpus uteri and uterus, NOS</td>
<td>84.3 (1.0)</td>
</tr>
<tr>
<td>Ovary</td>
<td>55.0 (1.3)</td>
</tr>
<tr>
<td>Prostate</td>
<td>98.8 (0.4)</td>
</tr>
<tr>
<td>Testis</td>
<td>94.7 (1.1)</td>
</tr>
<tr>
<td>Urinary bladder</td>
<td>82.1 (1.0)</td>
</tr>
<tr>
<td>Kidney and renal pelvis</td>
<td>61.8 (1.3)</td>
</tr>
<tr>
<td>Brain and other nervous system</td>
<td>32.0 (1.4)</td>
</tr>
<tr>
<td>Thyroid</td>
<td>96.0 (0.8)</td>
</tr>
<tr>
<td>Hodgkin’s disease</td>
<td>85.1 (1.7)</td>
</tr>
<tr>
<td>Non-Hodgkin lymphomas</td>
<td>57.8 (1.0)</td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>29.5 (1.6)</td>
</tr>
<tr>
<td>Leukaemias</td>
<td>42.5 (1.2)</td>
</tr>
</tbody>
</table>

Rates derived from SEER 1973–98 database (both sexes, all ethnic groups). NOS=not otherwise specified.

Table 4: **Most recent period estimates of relative survival rates, by cancer site**
A redesign

Maximizing the data:ink ratio
Monthly outgoing mail workload, millions of units.
Relationship of Actual Rates of Registration to Predicted Rates
(104 cities 1960).
Self promoting graphics: the Duck
Sunspider benchmark - lower is better

- Chrome 2: 1600.4
- Safari: 1863.8
- Firefox 3.1: 1872.4
- Chrome 1: 2023.8
- Firefox 3.0.6: 4863.2
Chartjunk
“Chartjunk generates no information, no sense of discovery, no wonder, no substance.”

Tufte
Graphical Excellence

- Tells the truth about the data
- Appeals to the eye
- Typically multivariate
- Maximizes data/ink ratio
- Shows the data; hides the design
Figure 3: DSI Comparison
Elemental rate, % h⁻¹

Stack axes when the same

Open circle for control, baseline, simplest

Stack axes when the same
Op art
<table>
<thead>
<tr>
<th>Topic</th>
<th>Number of articles</th>
<th>Percent of articles with negative criticism of specific person or policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watergate: defendants and prosecutors, Ford’s pardon of Nixon</td>
<td>537</td>
<td>49%</td>
</tr>
<tr>
<td>Inflation, high cost of living</td>
<td>415</td>
<td>28%</td>
</tr>
<tr>
<td>Government competence: costs, quality, salaries of public employees</td>
<td>322</td>
<td>30%</td>
</tr>
<tr>
<td>Confidence in government: power of special interests, trust in political leaders, dishonesty in politics</td>
<td>266</td>
<td>52%</td>
</tr>
<tr>
<td>Government power: regulation of business, secrecy, control of CIA and FBI</td>
<td>154</td>
<td>42%</td>
</tr>
<tr>
<td>Crime</td>
<td>123</td>
<td>30%</td>
</tr>
<tr>
<td>Race</td>
<td>103</td>
<td>25%</td>
</tr>
<tr>
<td>Unemployment</td>
<td>100</td>
<td>13%</td>
</tr>
<tr>
<td>Shortages: energy, food</td>
<td>68</td>
<td>16%</td>
</tr>
</tbody>
</table>
DESIGNING

- Symbols and numbers easy to see.
- Space used effectively.
- Helpful annotation.
- Avoid advertisements (no branding!).