

Infographics & Data Visualizations Effective Storytelling through Data

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Why Infographics?

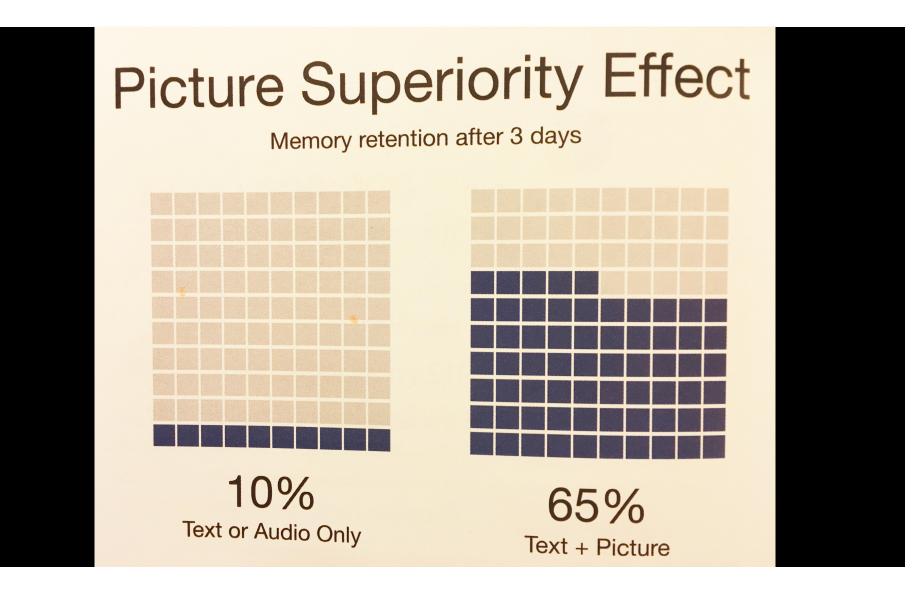
"The visualization of information is enabling us to gain insight and understanding quickly and efficiently, utilizing the incredible processing power of the human virtual system."

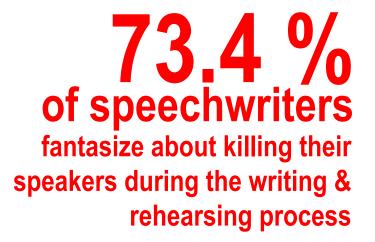
> Jason Lankow, Josh Ritchie & Ross Crooks Infographics: The Power of Visual Storytelling

Vision is our most dominant sense

Humans are pattern-recognition machines

On average, we are exposed to the information equivalent of 174 newspapers every day (assuming an 85-page issue)





Not Good







73.4 % of speechwriters fantasize about killing their speakers

during the writing & rehearsing process

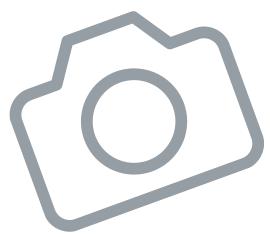
Even Better

Three Main Types of Memory related to viewing images

- Iconic Memory
- Visual Working Memory
- Long-Term Memory



Iconic Memory



- Snapshot of scene you retain for a brief instant after looking at something
- Stored less than a second unless analyzed & connected to something stored in brain

Long-Term Memory



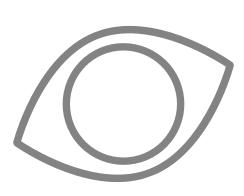
- Stores information from our experiences that we will retain for a long time
- Draw upon this type of memory to process new information

Long-Term Memory (cont.)



- Divided into three areas:
 - » Episodic Memory: Recall of scenes experienced and feelings associated with them
 - » Semantic Memory: Recall of knowledge that has no specific context or experience associated ("common knowledge)
 - » Procedural Memory: Recall of processes of doing that are accessed involuntarily without conscious thought (for example, typing)

Visual Working Memory



- Lies between iconic and long-term memory
- When we see object requiring further attention, we move it from iconic to visual working memory which then calls upon semantic memory to understand meaning (approximately 100 milliseconds)

3 Provisions of Effective Communications

- **Appeal:** Should engage a voluntary audience
- **Comprehension:** Should effectively provide knowledge that enables clear understanding of the information
- **Retention:** Should impart memorable knowledge

EXPLORATIVE

- Minimalist •
- Only includes elements that represent data
- Seeks to communicate information in the most clear, concise manner

- Illustrative
- Design-focused
- Seeks to appeal to viewer with engaging visuals

NARRATIVE

Informs and entertains

APPLICATIONS

VS.

- Academic research
 - Science •
- Business intelligence
 - Data analysis •

- Publications
- Blogs
- Content marketing
- Sales & marketing materials

Typically part of a larger whole • (speech, publication, web page)

Stripped down/spare so that no • extraneous visual element is included

- Often a whole in and of itself
- Uses decorative/illustrative elements to attract and hold viewer attention



Edward Tufte (Explorative)

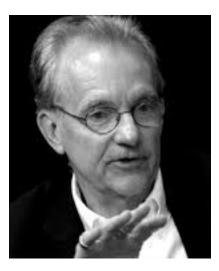


Image: https://thatsthespir.it/ uploads/ greyscale_edwardtufte.png

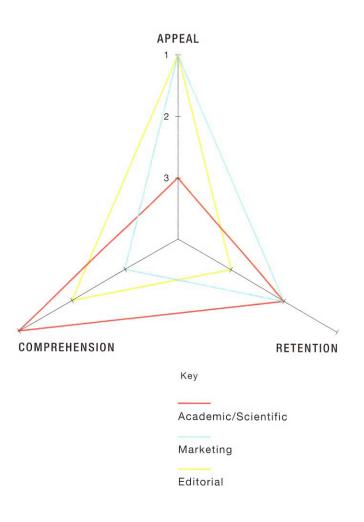
- Data-Ink Ratio: A measurement of the amount of information communicated in a graphic as it relates to the total number of visual elements in it
- Chart Junk: Unnecessary graphic elements that do not communicate information

Nigel Holmes (Narrative)

- Supports notion that using illustration and visual metaphor to support and reinforce the topic makes the graphic appealing to viewers
- Studies show these decorative elements can aid in retention of information



Image: http://moabpaper.com/ moab-masters/michaelsoluri/7635518

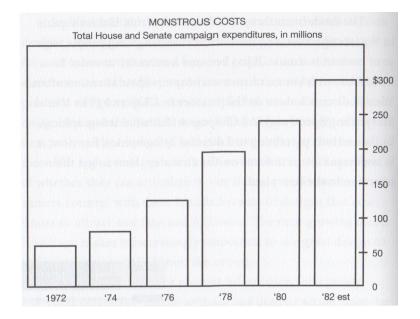


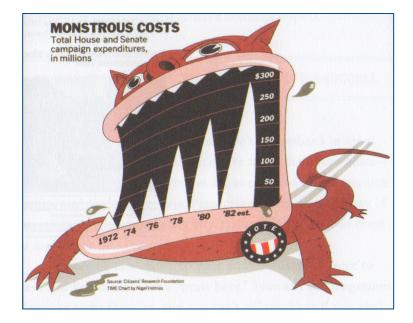
Understanding the Objectives of Your Visualization

Rank purpose in order (1, 2, 3):

- Appeal: Attracting/keeping the viewer's attention
- Comprehension: Communicating info in most clear & unbiased manner possible
- **Retention:** Enabling viewers to retain the information

Are Decorative & Illustrative Elements Appropriate?



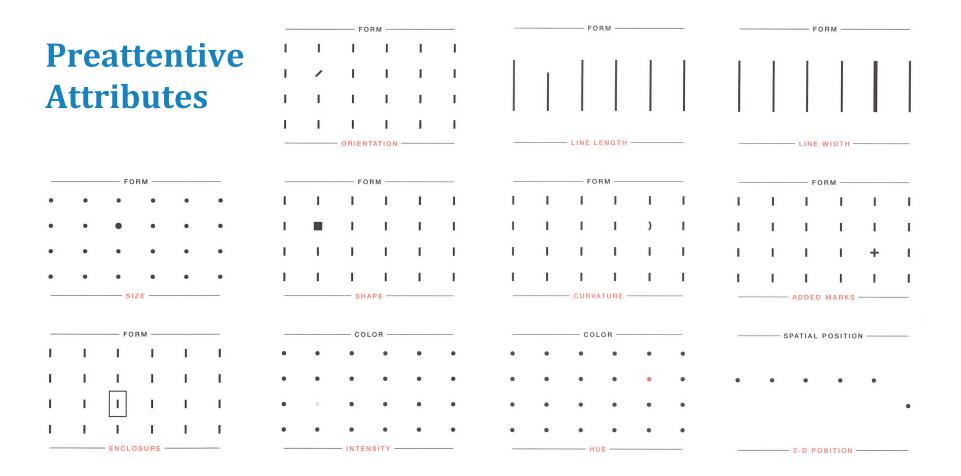


Infographics: The Power of Visual Storytelling, p. 42

2	1	4	3	9	5	6	7	8	2	3	6	5	9	4	0	1
6	7	9	3	4	9	0	5	6	2	5	8	4	0	5	2	6
9	8	2	6	3	5	9	3	2	9	3	7	2	6	3	4	8
8	1	6	2	3	8	7	9	5	0	2	3	9	2	8	4	3
0	9	1	8	5	4	2	9	4	7	4	6	8	4	0	2	9
3	9	2	7	3	6	6	5	2	9	4	0	4	9	4	8	6
5	2	4	3	6	4	8	1	0	3	9	4	8	4	7	3	2
8	6	2	3	0	8	7	3	6	2	5	4	4	8	3	5	0

Infographics: The Power of Visual Storytelling, p. 46

2	1	4	3	9	5	6	7	8	2	3	6	5	9	4	0	1	
6	7	9	3	4	9	0	5	6	2	5	8	4	0	5	2	6	
9	8	2	6	3	5	9	3	2	9	3	7	2	6	3	4	8	
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5	2	4	3	6	4	8	1	0	3	9	4	8	4	7	3	2	
8	6	2	3	0	8	7	3	6	2	5	4	4	8	3	5	0	



Infographics: The Power of Visual Storytelling, p. 48-49

Illustrative Design Devices

- Visual metaphor
- Symbols & Iconography
 - » Success depends on cultural context

• Decorative framing

 » Use of design elements that appeal to target audience • Warning:

- » Illustrative design can have a negative effect
 - Accidental or intentional distortion of data display
- » Illustration should
 complement
 visualization but not
 mislead viewer

Infographic Formats

• Static

- » Typically fixed information.
- » User interaction consists of viewing and reading.
- » Display output is still image.
- » Best as narrative, but can be explorative

Motion

- » Typically fixed information.
- » User interaction consists of viewing, listening & reading.
- » Display output is still image.
- » Best as narrative

• Interactive

- » Fixed or dynamic info
- » User interaction consists of clicking, searching, actively shaping data display
- Narrative, explorative or both

Storytelling with Infographics





CAUTION:

IDENTIFY MOST IMPORTANT INFO AT EARLY STAGE

STAKEHOLDERS MUST AGREE ON POINTS TO HIGHLIGHT





Qualities of Good Editorial Infographics

- Entice readers to engage with content
- Get message across quickly
- Easily shared via various social channels online
- Extremely easy to reuse, recycle, repost or republish

Editorial Infographic Production Process



Infographics: The Power of Visual Storytelling, p. 128

Keep Your Goal In Mind

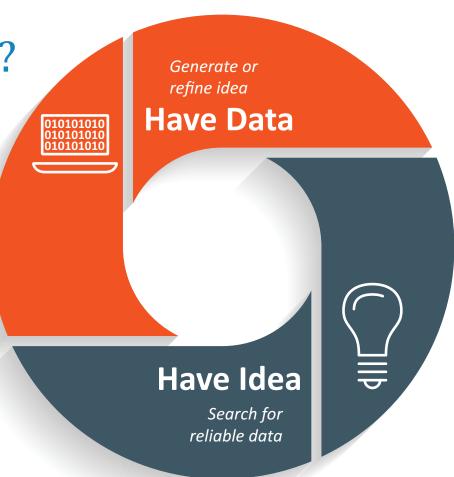
- Choose information to include in infographic based on your intended goal
- Key questions
 - » Who is the intended audience?
 - » What do we want to say?

What makes a good idea?

- 1. Is it relevant to your audience?
- 2. How does it help you achieve your communication objectives?
- 3. Is it meaningful?
- 4. Will other people find it interesting?
- 5. How is it original?

Is Your Idea Actionable?

- Do you have good, reputable sources?
- Is this topic interesting/relevant?
- Is this a new take on the data or infographic?



Rules for Research

- 1. Make sure the sources tell a story
- 2. Make sure your sources are reliable
- 3. Make sure your sources are relevant
- 4. Limit your sources for consistency



CAUTION:

ALL DATA VISUALIZATION IS BIASED!



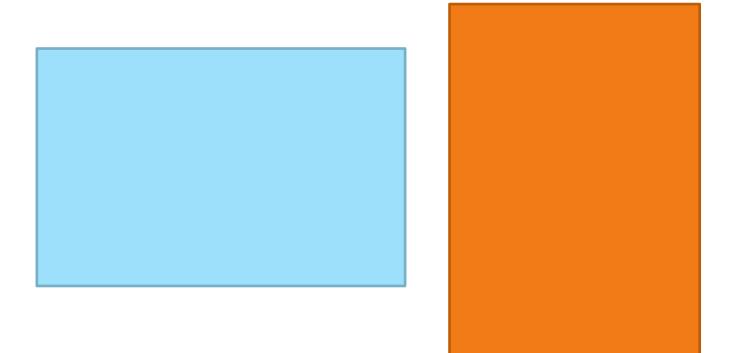
Planning Your Infographic

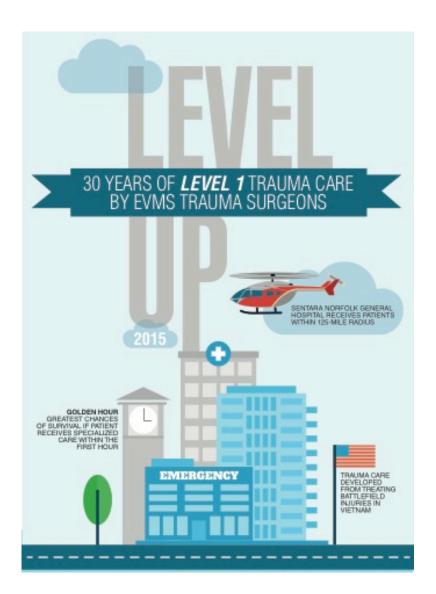
- Collaborate to concept a design based on objectives and the content
- Establish the hierarchy importance to ensure most significant information receives the most space
- Some design element (subtle or obvious) should allow reader to comprehend subject matter without having to read all the text

Design Considerations

- Layout + Hierarchy
 - » Example, top to bottom, right to left
- Illustration + Design Aesthetic
 - » Ensure appropriateness for content & audience
- Branding Opportunities
 - » Ensure people know infographic belongs to your brand when they see it

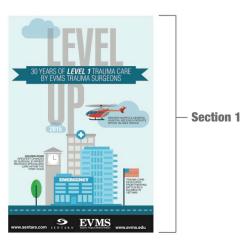
Vertical vs. Horizontal Layout

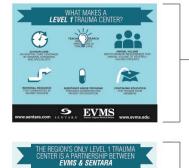










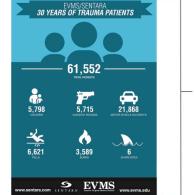


EASTERN VIRGINA MEDICAL SCHOOL SURBEONS PROVIDE 2NHOUR ON-CALL G AT THE LEVEL 1 TRALMA CENTER

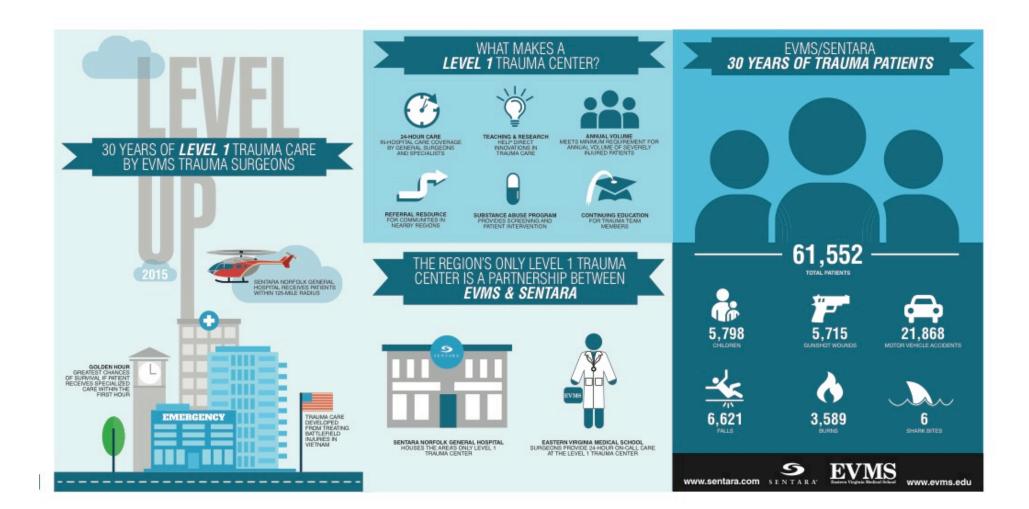
HOUSES THE AREAS ONLY LEVEL 1 TRAINA CENTER

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- Section 2
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– Section 3



– Section 4



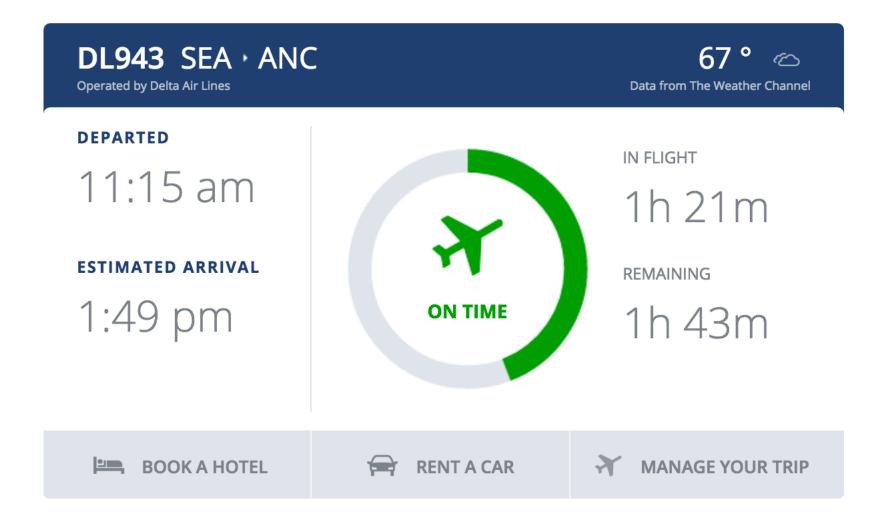
Cognitive Load

- The mental effort required to learn new information
- Perceived cognitive load matters mots to audience. How hard do they *think* they will have to work to learn
- Strip away unnecessary elements to avoid extra cognitive load

Stripping Out the "Chart Junk"

See example in Storytelling with data: A data visualization guide for business professionals

Pages 91-97



Content Distribution

Web Site

- » Include intro paragraph
- » Size for blogs (550-600 pixels)
- » Social media quick-share
- » Embed code

Social Media · Others

- » Post frequently to your accounts
- » Repeat throughout day
- » Encourage interaction

- » Connect with bloggers
- » Connect with other
 - organizations

Online Lifespan

Online Lifespan is the amount of time that an infogrpahic remains relevant to audiences. Topic and data selection here are crucial.

The Image Problem (SEO) Search engine spiders can't "read" your image

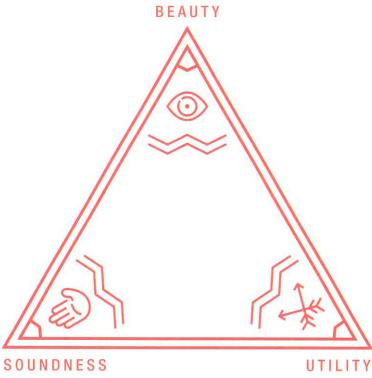
- Keywords
- Landing page URL
- Title tag
- Page title

- Description text
- Infographic image filename
- Alt text description

Brand-Centric Infograhics Where else can you your infographics?

- "About Us" web page
 - » Make purpose & value proposition stand out
- Product instructions
- Visual press release

- Proprietary data with value to outsiders
- Presentations
- Annual reports



Vitruvius' Principles of Good Design

- Utility
 - » Employ objectives-based approach
- Soundness
 - » Communicate something meaningful
 - Beauty
 - » Utilize appropriate format & high-quality design

Infographics: The Power of Visual Storytelling, p. 198



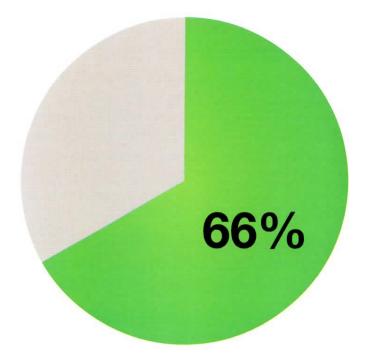
CAUTION:

ILLUSTRATION CAN DISTRACT FROM DATA

ILLUSTRATION MUST NOT MISLEAD VIEWERS



Consumer Interviews



4 out of 6 people interviewed would buy the product

Consumer Interviews

4 out of 6 people interviewed would buy the product

7 Most Commonly Graphed Relationships

- Nominal comparison
- Time series
- Ranking
- Part-to-whole

- Deviation
- Distribution
- Correlation

Infographics: The Power of Visual Storytelling, p. 208 Quoting Stephen Few, Show Me the Numbers: Designing Tables and Graphs to Enligthen, p. 66

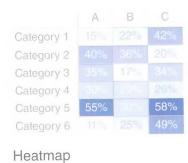
91%

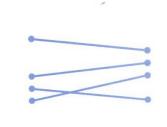
Scatterplot



Table

Simple text



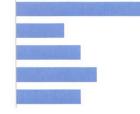


Slopegraph

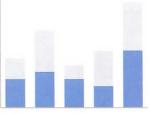


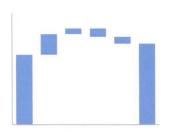
Line





Horizontal bar





Waterfall



Stacked horizontal bar

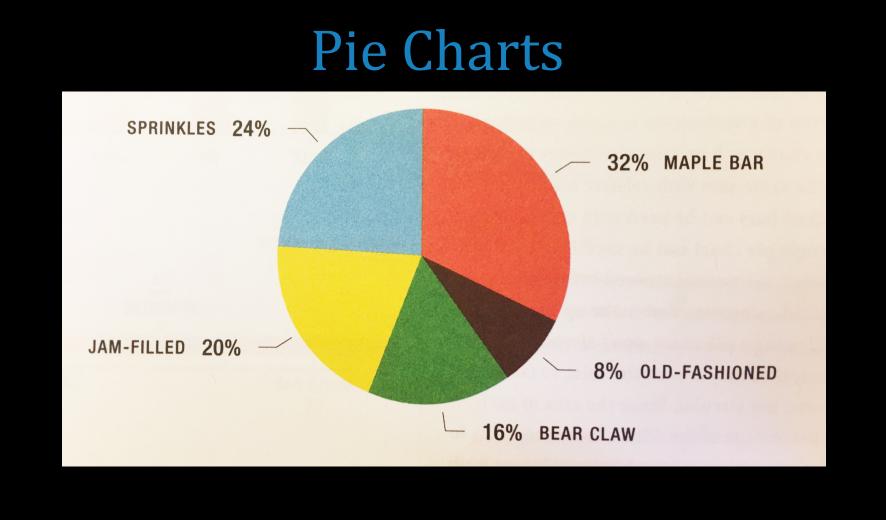


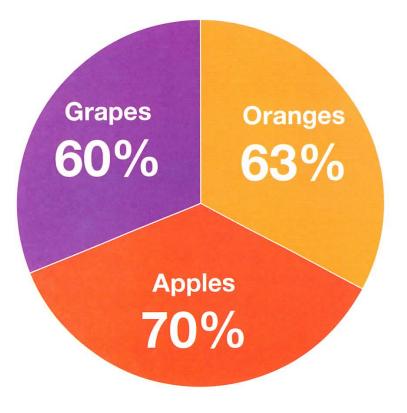
Square area

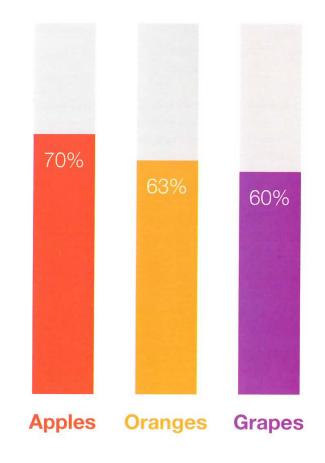


Stacked vertical bar

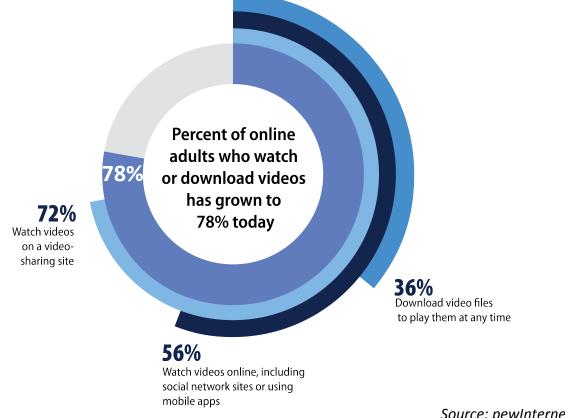
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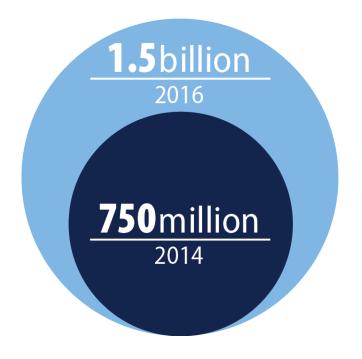


Adult consumption of online video increasing (2013)

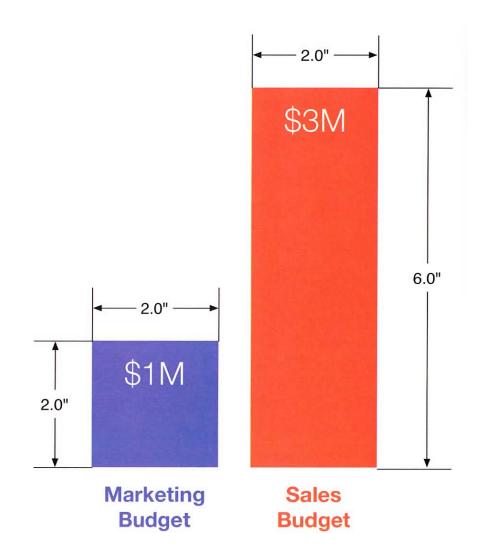


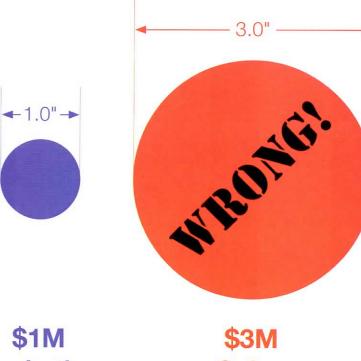
Source: pewInternet.org (Online Video 2013)

The number of adults viewing online video will double by 2016



Source: comScore Video Metrix, December 2012





\$1M Marketing Budget Area = 0.79 in² \$3M Sales Budget Area = 7.07 in²

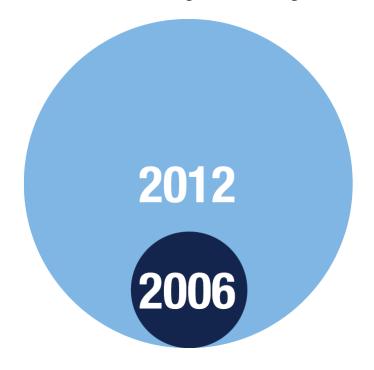


Area = 0.79 in^2



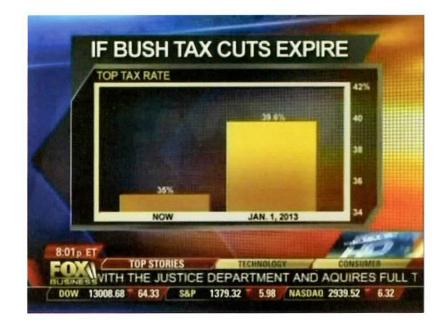
\$3M Sales Budget Area = 2.36 in²

800% increase in number of online videos watched in just 6 years



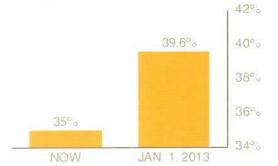
Source: comScore Video Metrix, December 2012

Bar Charts Must ALWAYS Have Zero Baseline



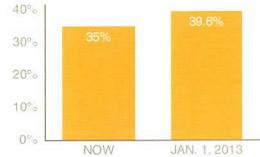
Non-zero baseline: as originally graphed

IF BUSH TAX CUTS EXPIRE TOP TAX RATE



Zero baseline: as it should be graphed





Other Tips for Bar Charts

- Perfect distance between two bars in a graph is half the width of one of the bars
- Typically each graph in a bar should be the same color
- Avoid intense patterns if it distracts from understanding the visualization

Other Tips for Bar Charts (cont.)

- With vertical or horizontal bars, ordering is important — establish a hierarchy (highest to lowest or vice versa)
- Alpha order also is acceptable for ranking
- Don't use leftward horizontal bars unless you mean it to have a negative value

Limit Colors (Especially on Heat Maps)

Country Level Sales Rank Top 5 Drugs

Rainbow distribution in color indicates sales rank in given country from #1 (red) to #10 or higher (dark purple)

	1.1	N		· ·	
Country	А	В	С	D	E
AUS	1	2	3	6	7
BRA	1	3	4	5	6
CAN	2	3	6	12	8
CHI	1	2	8	4	7
FRA	3	2	4	8	10
GER	3	1	6	5	4
IND	4	1	8	10	5
ITA	2	4	10	9	8
MEX	1	5	4	6	3
RUS	4	3	7	9	12
SPA	2	3	4	5	11
TUR	7	2	3	4	8
UK	1	2	3	6	7
US	1	2	4	3	5

Top 5 drugs: country-level sales rank

RANK	1	2	3	4					
COUNTRY DRUG									
	A	В	С	D	E				
Australia	1	2	3						
Brazil	1	3	- 4						
Canada	2								
China	1	2		4					
France		2	4						
Germany		1			-4				
India	4	1							
Italy		4							
Mexico	1	5	- 4	6					
Russia	4								
Spain	2	3	4						
Turkey	7	2		4					
United Kingdom	1	2	3	15					
United States	1	2	4	3					

Limit Colors

Survey results

Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree Percent of total 0% 20% 40% 60% 80% 100% Survey item B Survey item C Survey item D Survey item E

Limit Colors (Use for emphasis)



Limit Colors (Use for emphasis)

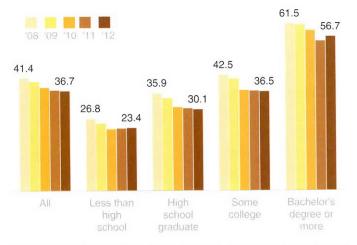
Performance overview



Limit Colors (Use for emphasis)

New Marriage Rate by Education

Number of newly married adults per 1.000 marriage eligible adults



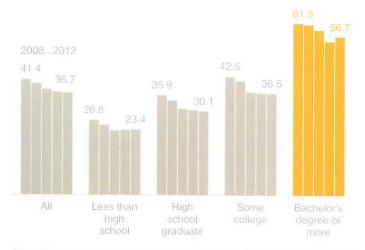
Note: Marriage eligible includes the newly married plus those widowed, divorced, or never married at interview

Source: U.S. Census

Adapted from PEW RESEARCH CENTER

New Marriage Rate by Education

Number of newly married adults per 1.000 marriage eligible adults

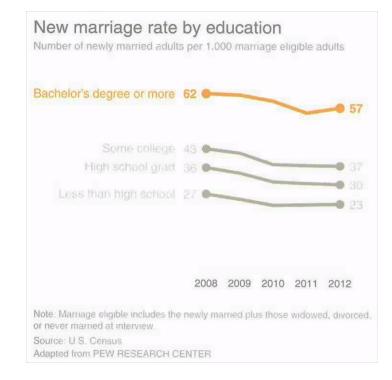


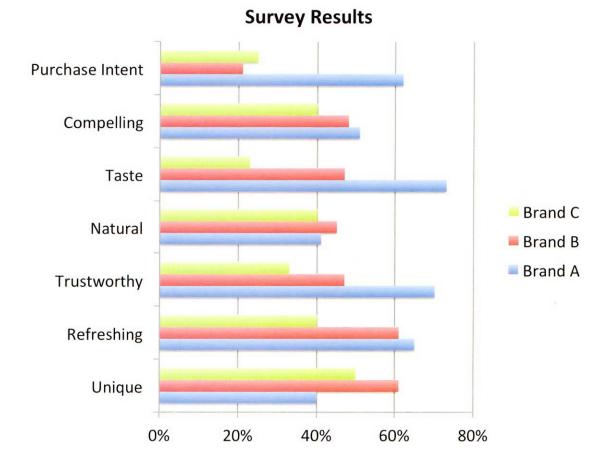
Note: Marriage eligible includes the newly married plus those widowed, divorced, or never married at interview.

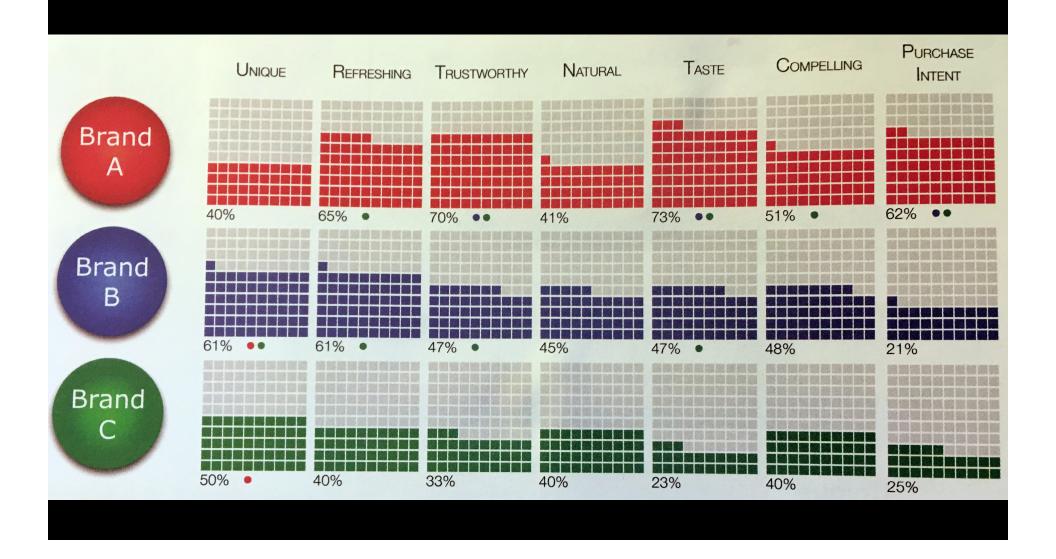
Source: U.S. Census

Adapted from PEW RESEARCH CENTER

Try Graphing in Multiple Formats



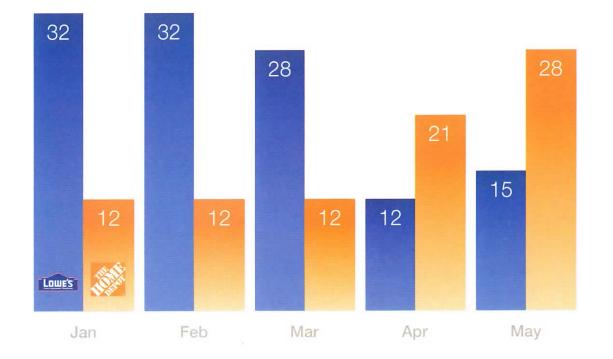




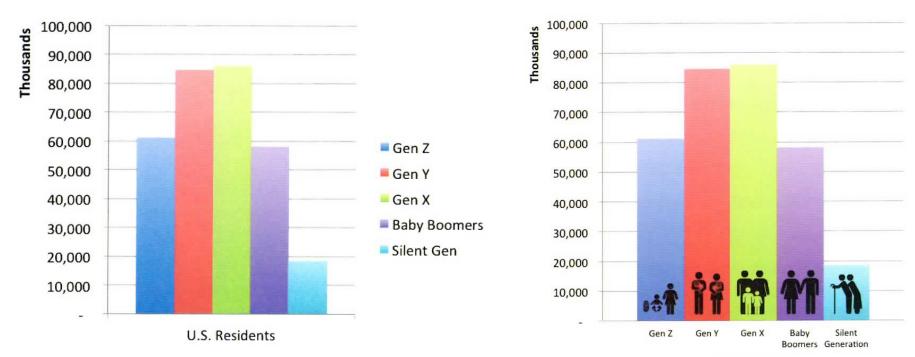
Easy Chart Fix-Up 1



2012 Store Openings



Easy Chart Fix-Up 2



U.S. Residents

Samples

- <u>https://www.facebook.com/businessinsider/videos/</u> <u>10153610307964071/</u>
- <u>http://www.evms.edu/about_evms/administrative_offices/</u> <u>marketing_communications/publications/issue_8_2/index.php</u>
- <u>http://www.evms.edu/about_evms/administrative_offices/</u> <u>marketing_communications/publications/issue8_1/index.php</u>
- <u>http://www.evms.edu/about_evms/administrative_offices/</u> <u>marketing_communications/publications/issue_8_4/index.php</u>
- <u>http://www.coolinfographics.com</u>

Other Resources

Periodic Table of Visualization Methods

<u>http://www.visual-literacy.org/periodic_table/</u> <u>periodic_table.html</u>

Other Resources

See recommendations in Cool Infographics: Effective communication with Data Visualization and Design

Pages 317-338

Other Resources

See list of sites in Storytelling with data: A data visualization guide for business professionals

Pages 247-248



Questions?





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