


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 visual system.”

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





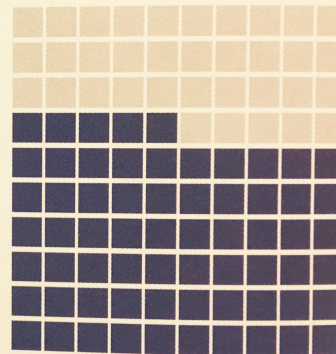
On average, we are exposed to the information equivalent of 174 newspapers every day (assuming an 85-page issue)

Picture Superiority Effect

Memory retention after 3 days



10%
Text or Audio Only



65%
Text + Picture

73.4 %
of speechwriters
fantasize about killing their
speakers during the writing &
rehearsing process

Not Good

73.4 %
of speechwriters
fantasize about
killing their speakers
during the writing &
rehearsing process



Better



73.4 %
of speechwriters
fantasize about
killing their speakers
during the writing &
rehearsing process

Even Better

Three Main Types of Memory

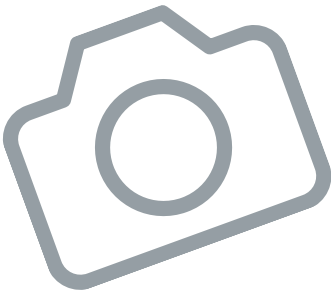
related to viewing images

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



Infographics: The Power of Visual Storytelling, p. 50-51

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



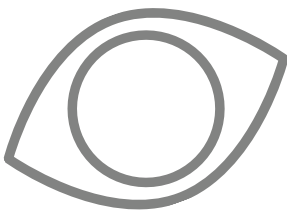
- Stores information from our experiences that we will retain for a long time
- Draw upon this type of memory to process new information

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

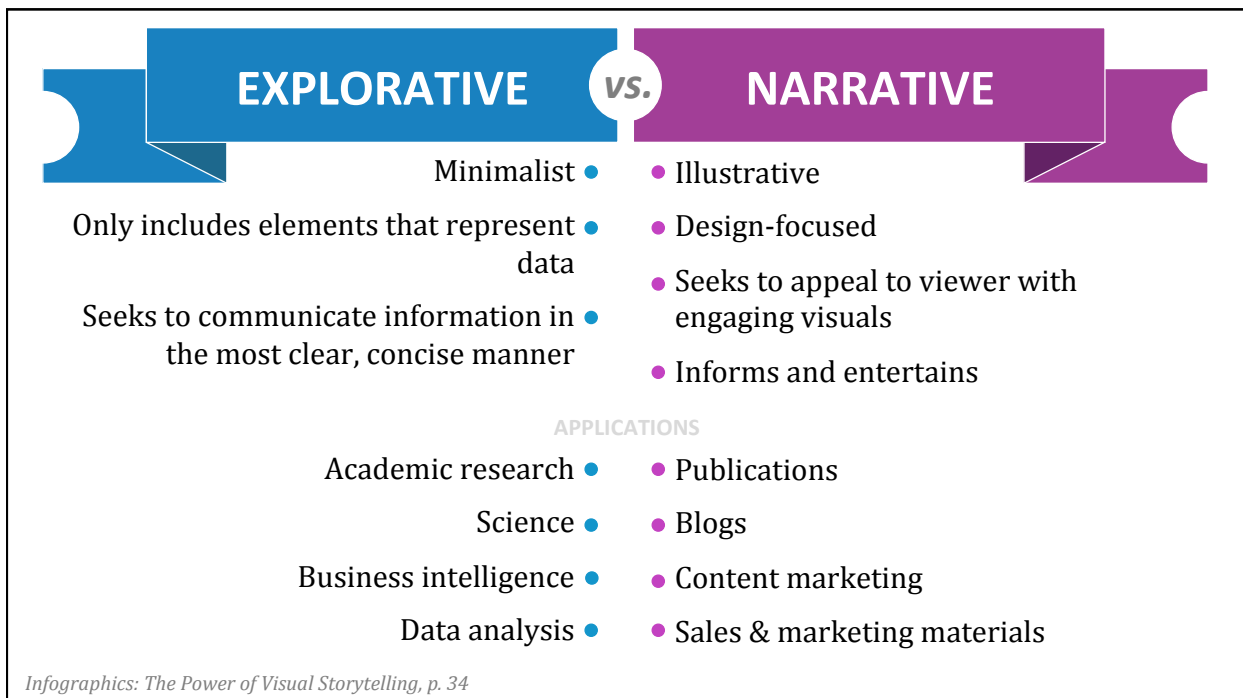


- Lies between iconic and long-term memory
- When we see object requiring further attention, we move it from iconic to visual working memory which then calls upon semantic memory to understand meaning (approximately 100 milliseconds)

3 Provisions of Effective Communications

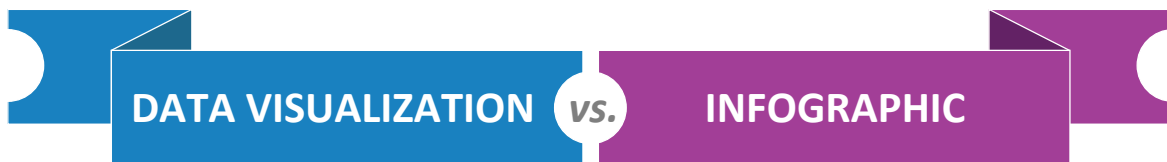
- **Appeal:** Should engage a voluntary audience
- **Comprehension:** Should effectively provide knowledge that enables clear understanding of the information
- **Retention:** Should impart memorable knowledge

Infographics: The Power of Visual Storytelling, p. 30



Infographics: The Power of Visual Storytelling, p. 34

- Typically part of a larger whole (speech, publication, web page)
- Often a whole in and of itself
- Stripped down/spare so that no extraneous visual element is included
- Uses decorative/illustrative elements to attract and hold viewer attention



Edward Tufte (*Explorative*)



Image:
https://thatsthespir.it/uploads/greyscale_edward-tufte.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

Infographics: The Power of Visual Storytelling, p. 35

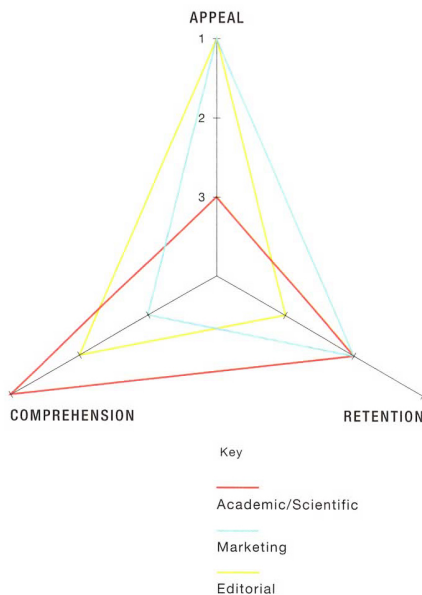
Nigel Holmes (*Narrative*)

- 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/michael-soluri/7635518>

Infographics: The Power of Visual Storytelling, p. 36



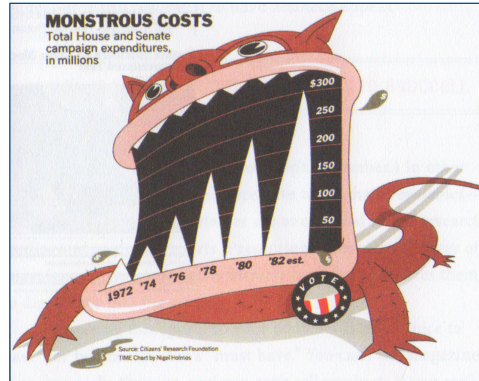
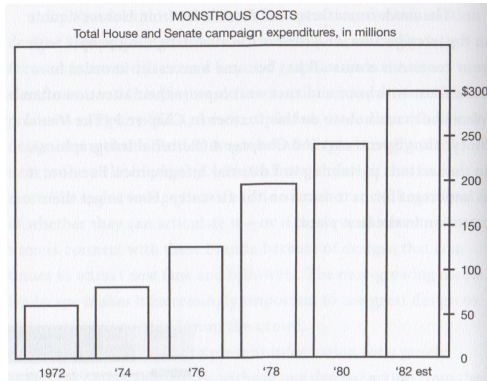
Understanding the Objectives of Your Visualization

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

Infographics: The Power of Visual Storytelling, p. 38

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
 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. 47

Preattentive Attributes

FORM ————

ORIENTATION ————

LINE LENGTH ————

LINE WIDTH ————

SIZE ————

SHAPE ————

CURVATURE ————

ADDED MARKS ————

ENCLOSURE ————

COLOR ————

INTENSITY ————

HUE ————

SPATIAL POSITION ————

2-D POSITION ————

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

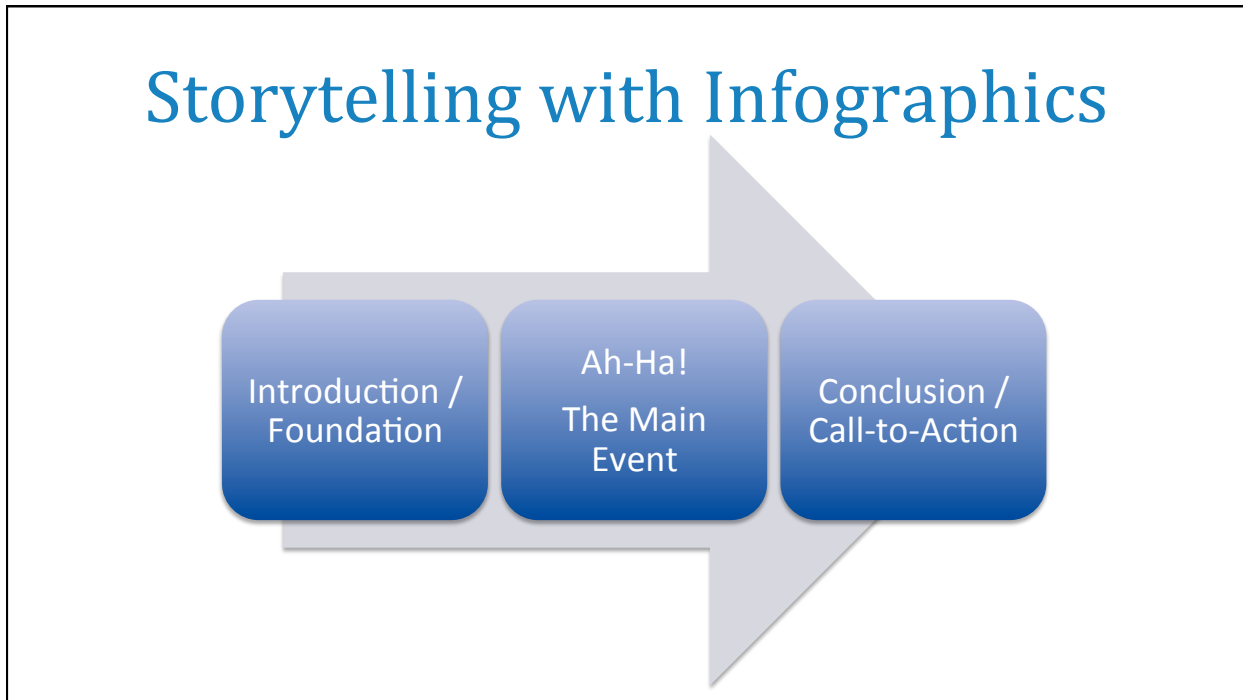
Illustrative Design Devices

- **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

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> • Static <ul style="list-style-type: none"> » Typically fixed information. » User interaction consists of viewing and reading. » Display output is still image. » Best as narrative, but can be explorative | <ul style="list-style-type: none"> • Motion <ul style="list-style-type: none"> » Typically fixed information. » User interaction consists of viewing, listening & reading. » Display output is still image. » Best as narrative | <ul style="list-style-type: none"> • Interactive <ul style="list-style-type: none"> » Fixed or dynamic info » User interaction consists of clicking, searching, actively shaping data display » Narrative, explorative or both |
|---|--|--|

Infographics: The Power of Visual Storytelling, p. 59



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

Infographics: The Power of Visual Storytelling, p. 129

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?

Infographics: The Power of Visual Storytelling, p. 128

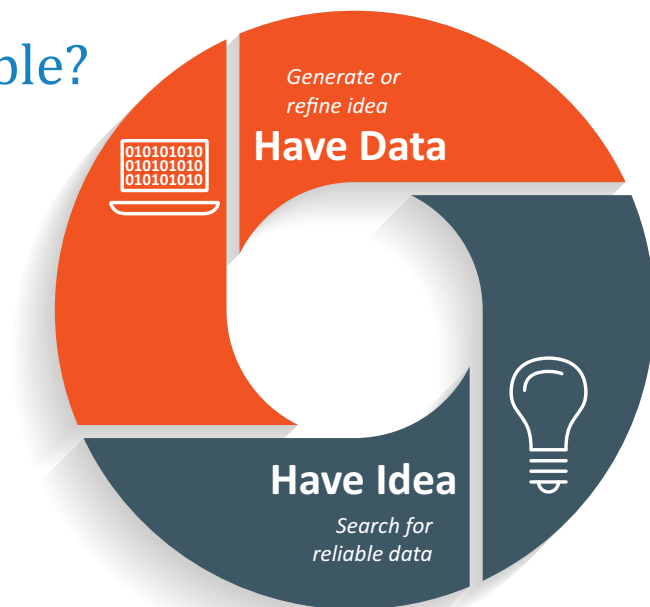
What makes a good idea?

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?

Infographics: The Power of Visual Storytelling, p. 129

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

Infographics: The Power of Visual Storytelling, p. 132



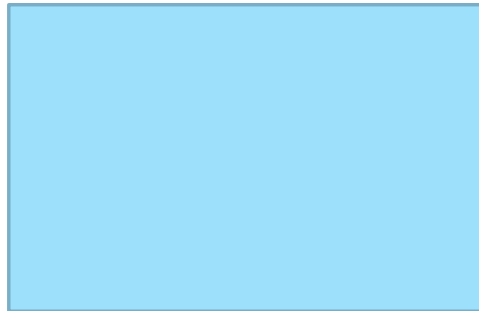
Planning Your Infographic

- 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



WHAT MAKES A LEVEL 1 TRAUMA CENTER?

- 24-HOUR CARE**
IN-HOSPITAL CARE COVERAGE BY GENERAL SURGEONS AND SPECIALISTS
- TEACHING & RESEARCH**
HELP DIRECT INNOVATIONS IN TRAUMA CARE
- ANNUAL VOLUME**
MEETS MINIMUM REQUIREMENT FOR ANNUAL VOLUME OF SEVERELY INJURED PATIENTS
- REFERRAL RESOURCE**
FOR COMMUNITIES IN NEARBY REGIONS
- SUBSTANCE ABUSE PROGRAM**
PROVIDES SCREENING AND PATIENT INTERVENTION
- CONTINUING EDUCATION**
FOR TRAUMA TEAM MEMBERS

THE REGION'S ONLY LEVEL 1 TRAUMA CENTER IS A PARTNERSHIP BETWEEN EVMS & SENTARA

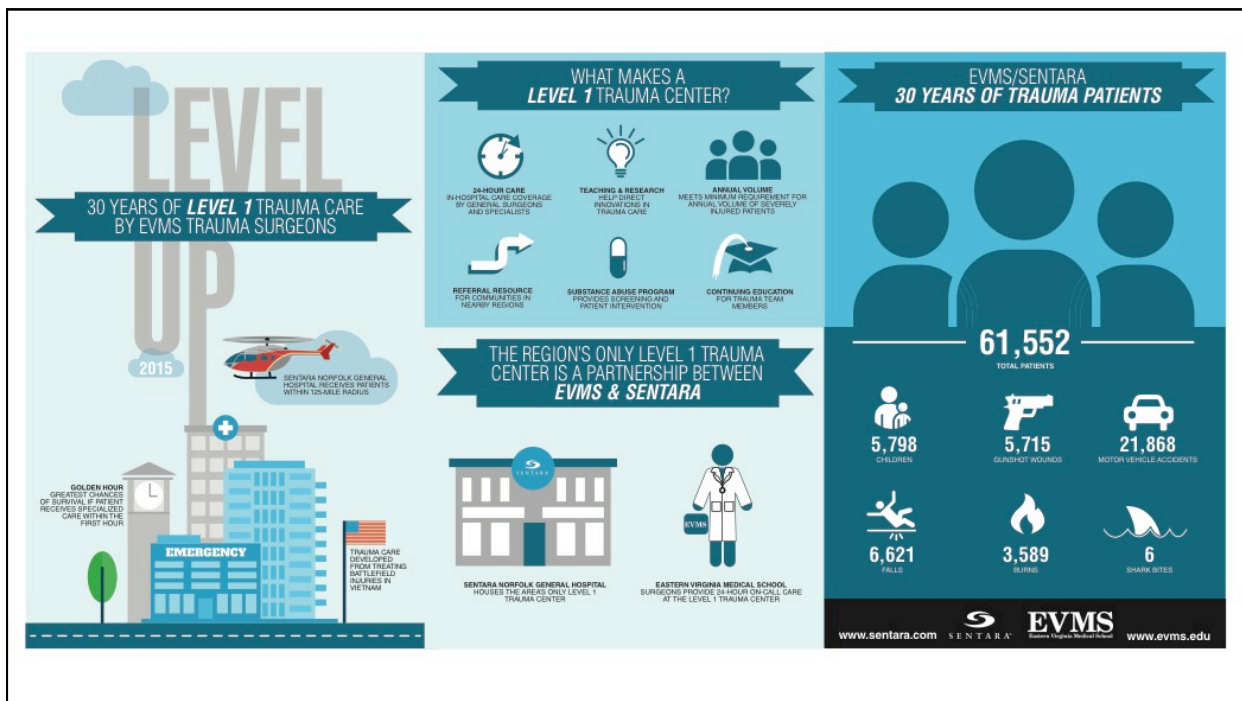
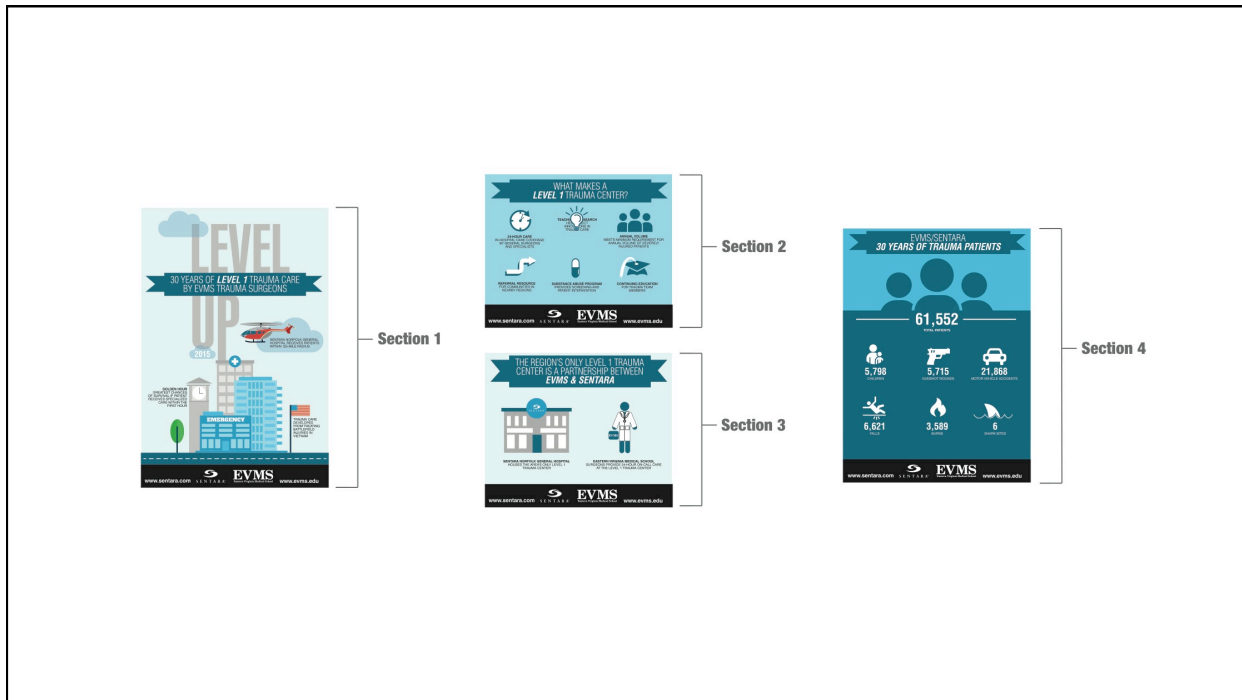
- SENTARA NORFOLK GENERAL HOSPITAL**
HOUSES THE AREA'S ONLY LEVEL 1 TRAUMA CENTER
- EASTERN VIRGINIA MEDICAL SCHOOL**
SURGEONS PROVIDE 24-HOUR ON-CALL CARE AT THE LEVEL 1 TRAUMA CENTER

EVMS/SENTARA 30 YEARS OF TRAUMA PATIENTS

61,552
TOTAL PATIENTS

- 5,798** CHILDREN
- 5,715** GUNSHOT WOUNDS
- 21,868** MOTOR VEHICLE ACCIDENTS
- 6,621** FALLS
- 3,589** BURNS
- 6** SHARK BITES

www.sentara.com SENTARA EVMS Eastern Virginia Medical School www.evms.edu



Cognitive Load

- The mental effort required to learn new information
- **Perceived cognitive** load matters most 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

DL943 SEA ▸ ANC
67°

Operated by Delta Air Lines
Data from The Weather Channel

DEPARTED

11:15 am

ESTIMATED ARRIVAL

1:49 pm

ON TIME

IN FLIGHT

1h 21m

REMAINING

1h 43m

BOOK A HOTEL

RENT A CAR

MANAGE YOUR TRIP

Content Distribution

- **Web Site**

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

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

 - » Connect with bloggers
 - » Connect with other organizations

Online Lifespan

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

The Image Problem (SEO)

Search engine spiders can't "read" your image

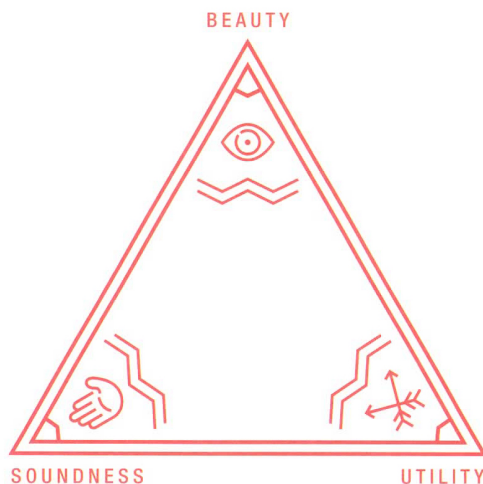
- Keywords
- Landing page URL
- Title tag
- Page title
- Description text
- Infographic image filename
- Alt text description

Brand-Centric Infographics

Where else can you your infographics?

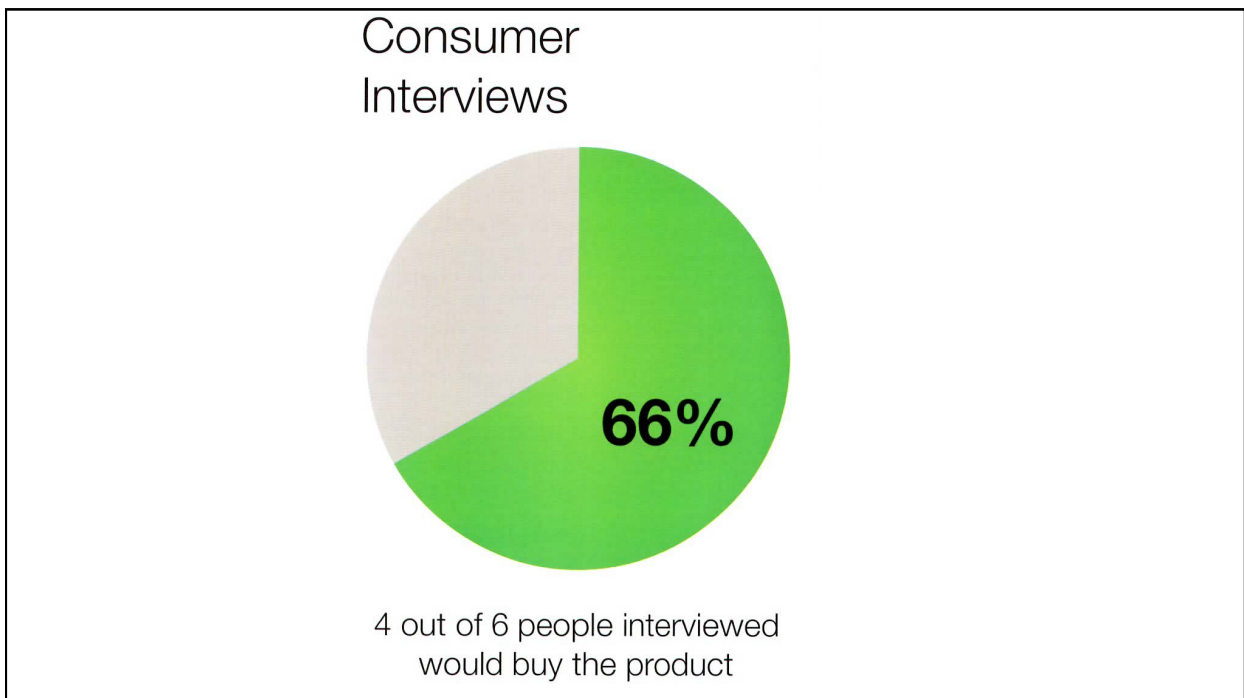
- “About Us” web page
 - » Make purpose & value proposition stand out
- Product instructions
- Visual press release
- Proprietary data with value to outsiders
- Presentations
- Annual reports

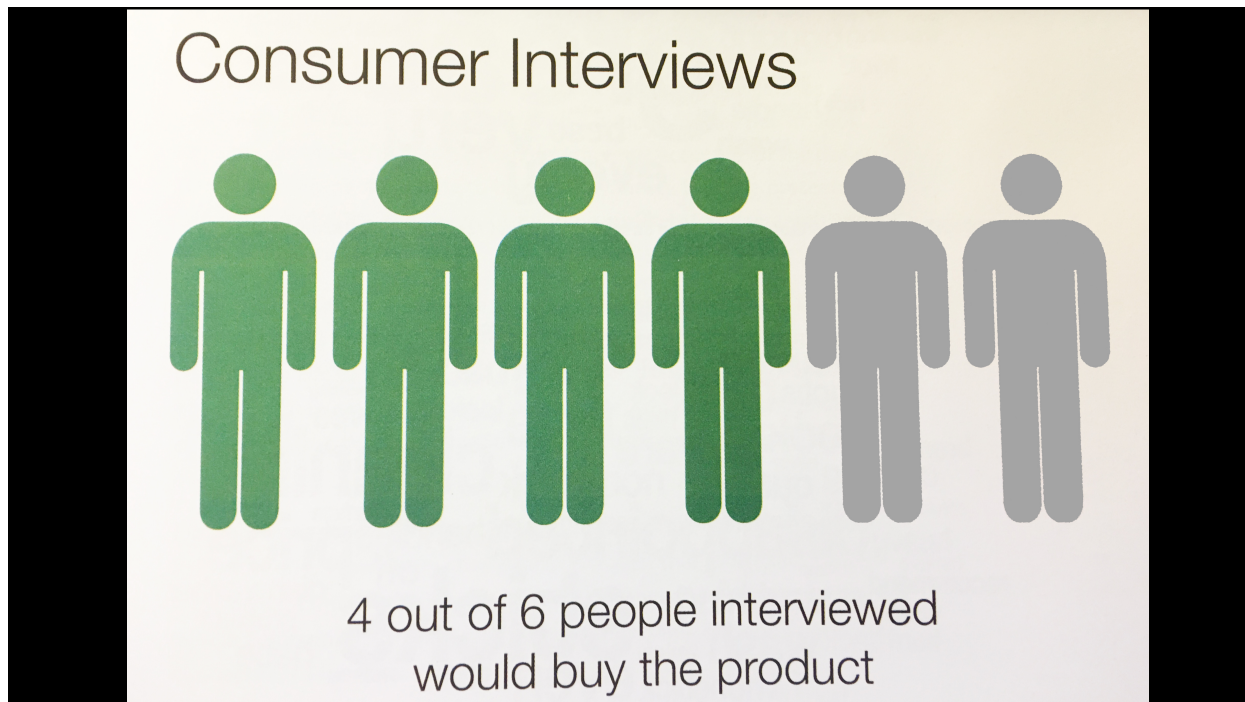
Vitruvius’ Principles of Good Design



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

Infographics: The Power of Visual Storytelling, p. 198

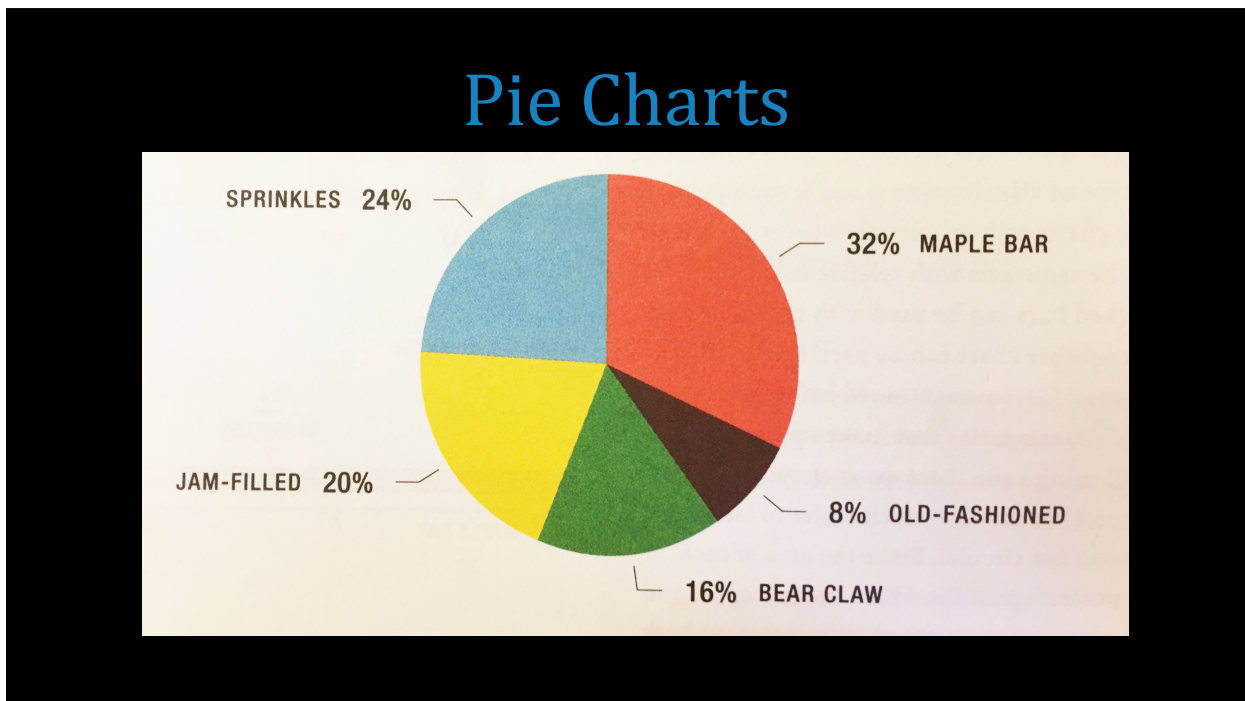


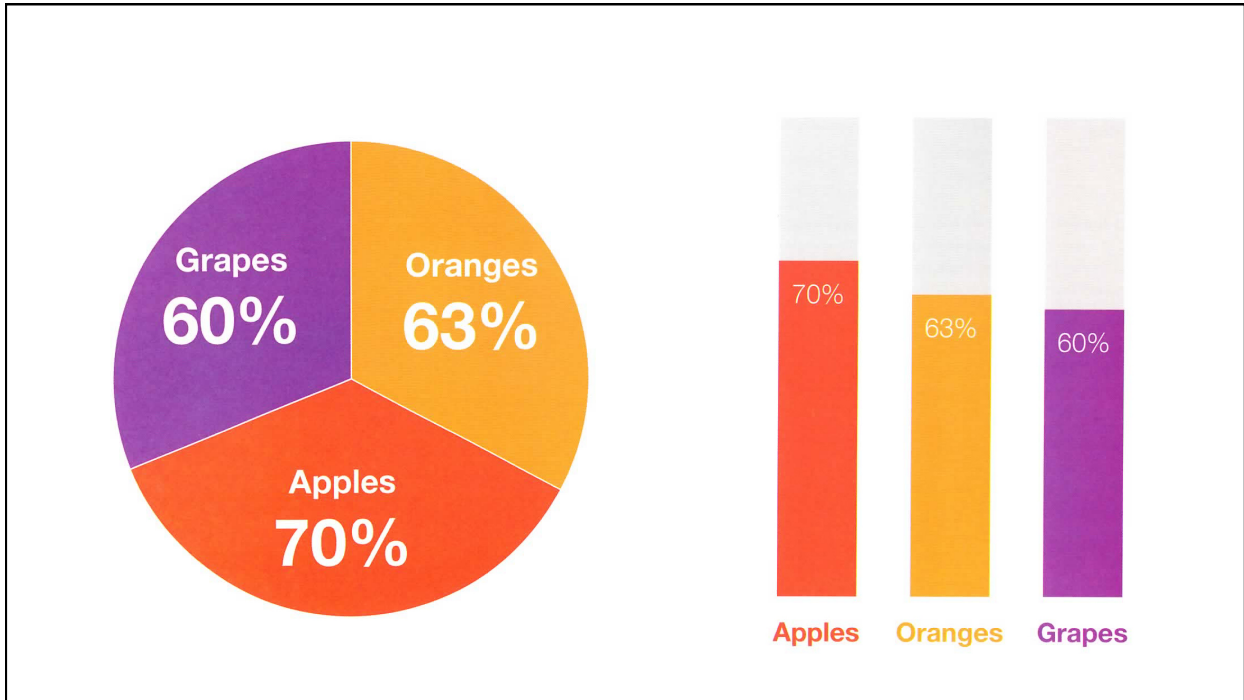


7 Most Commonly Graphed Relationships

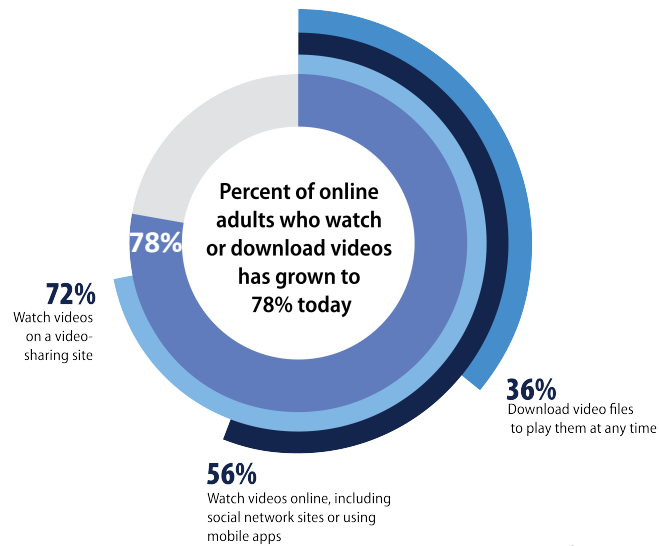
- Nominal comparison
- Time series
- Ranking
- Part-to-whole
- Deviation
- Distribution
- Correlation

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



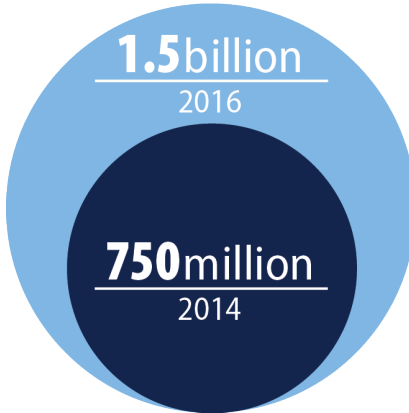


Adult consumption of online video increasing (2013)

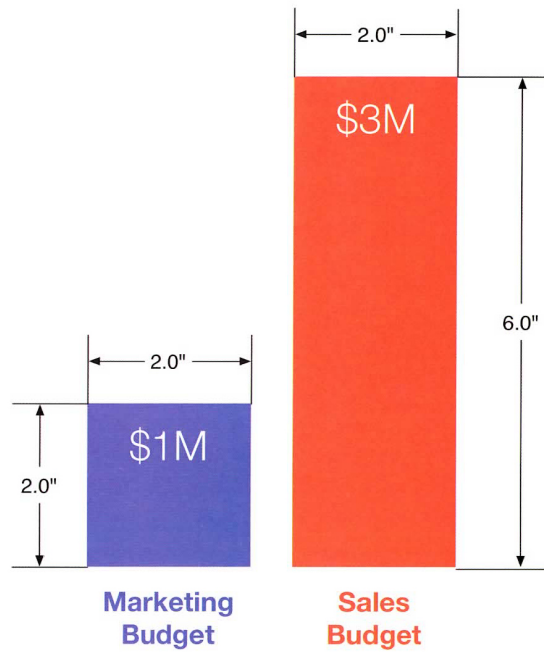


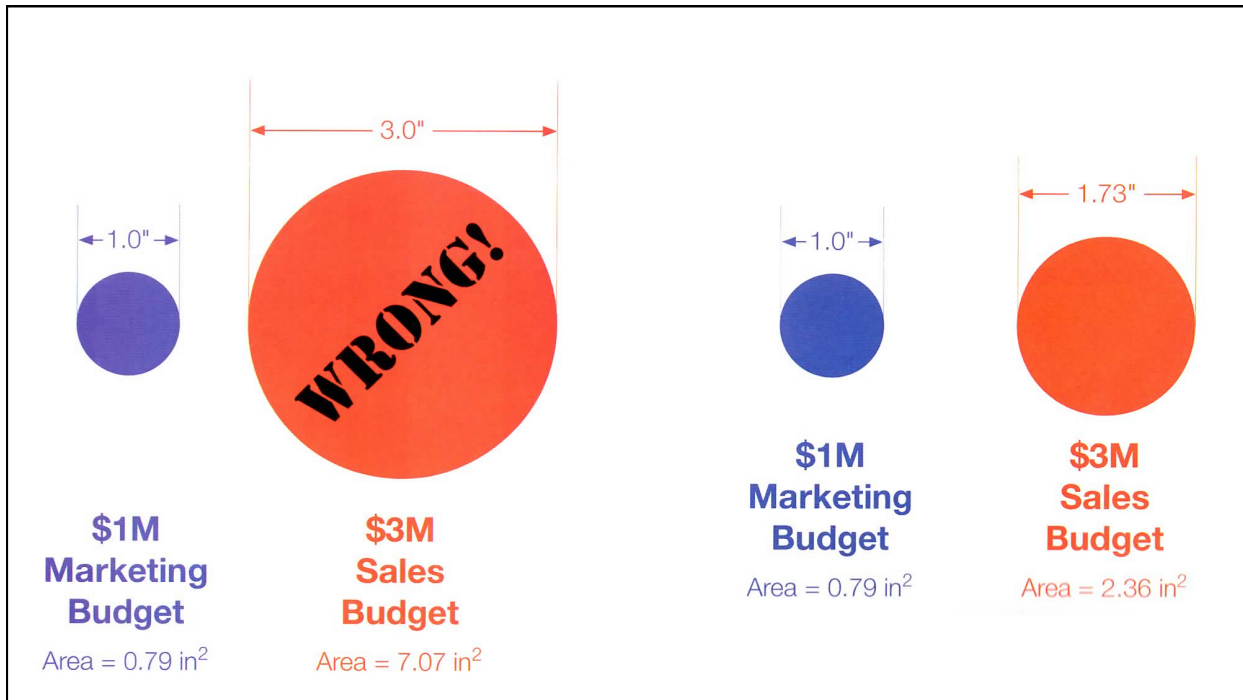
Source: *pewInternet.org (Online Video 2013)*

The number of adults viewing online video will double by 2016



Source: comScore Video Metrix, December 2012



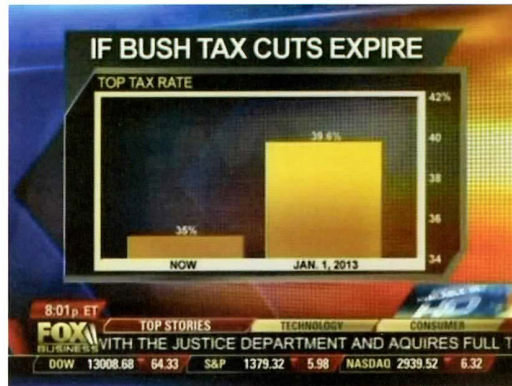


800% increase in number of online videos watched in just 6 years

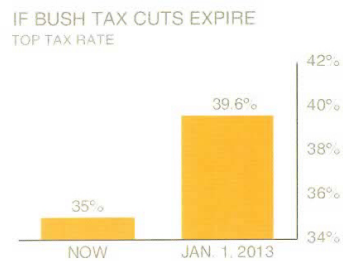


Source: comScore Video Metrix, December 2012

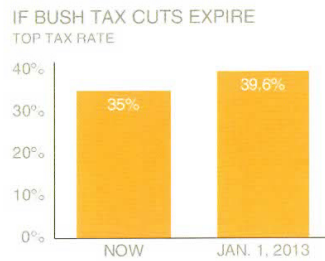
Bar Charts Must ALWAYS Have Zero Baseline



Non-zero baseline: as originally graphed



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)

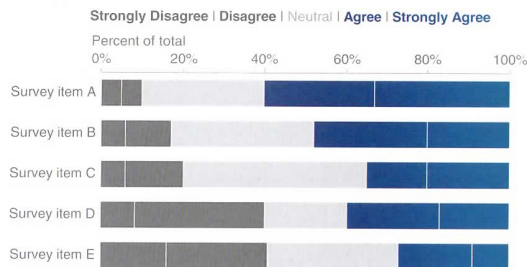
Country	A	B	C	D	E
AUS	1	2	3	6	7
BRA	1	3	4	5	6
CAN	2	3	6	12	8
CHI	1	2	8	4	7
FRA	3	2	4	8	10
GER	3	1	6	5	4
IND	4	1	8	10	5
ITA	2	4	10	9	8
MEX	1	5	4	6	3
RUS	4	3	7	9	12
SPA	2	3	4	5	11
TUR	7	2	3	4	8
UK	1	2	3	6	7
US	1	2	4	3	5

Top 5 drugs: country-level sales rank

COUNTRY DRUG	RANK				
	1	2	3	4	5+
Australia	1	2	3	5	7
Brazil	1	3	4	5	8
Canada	2	3	6	12	8
China	1	2	8	4	7
France	3	2	4	8	10
Germany	3	1	6	5	4
India	4	1	8	10	5
Italy	2	4	10	9	8
Mexico	1	5	4	6	3
Russia	4	3	7	9	12
Spain	2	3	4	5	11
Turkey	7	2	3	4	8
United Kingdom	1	2	3	6	7
United States	1	2	4	3	5

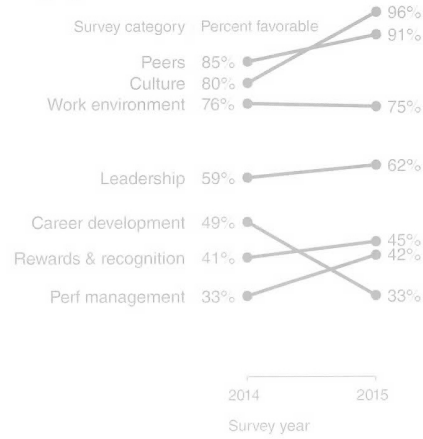
Limit Colors

Survey results

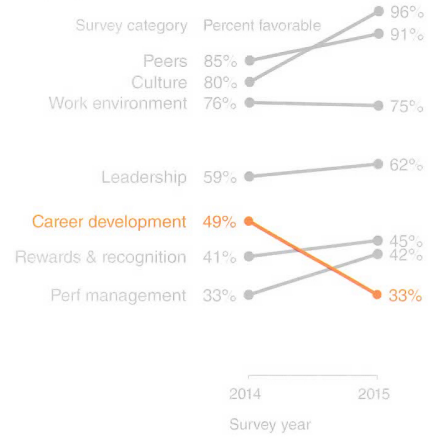


Limit Colors (Use for emphasis)

Employee feedback over time



Employee feedback over time



Limit Colors (Use for emphasis)

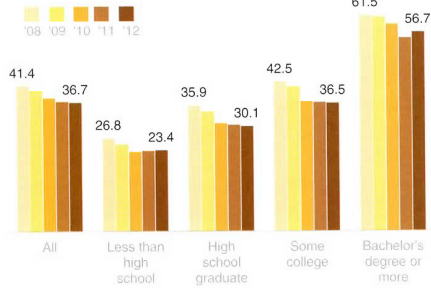
Performance overview



Limit Colors (Use for emphasis)

New Marriage Rate by Education

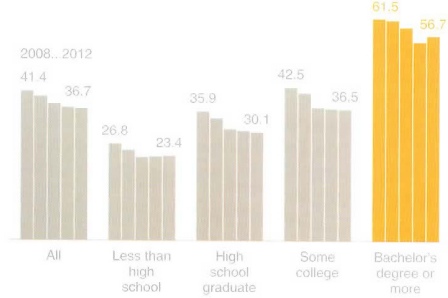
Number of newly married adults per 1,000 marriage eligible adults



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

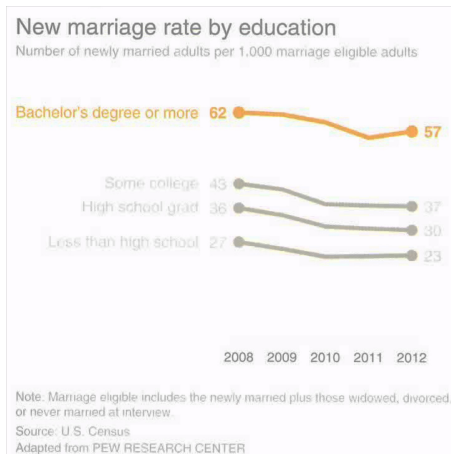
New Marriage Rate by Education

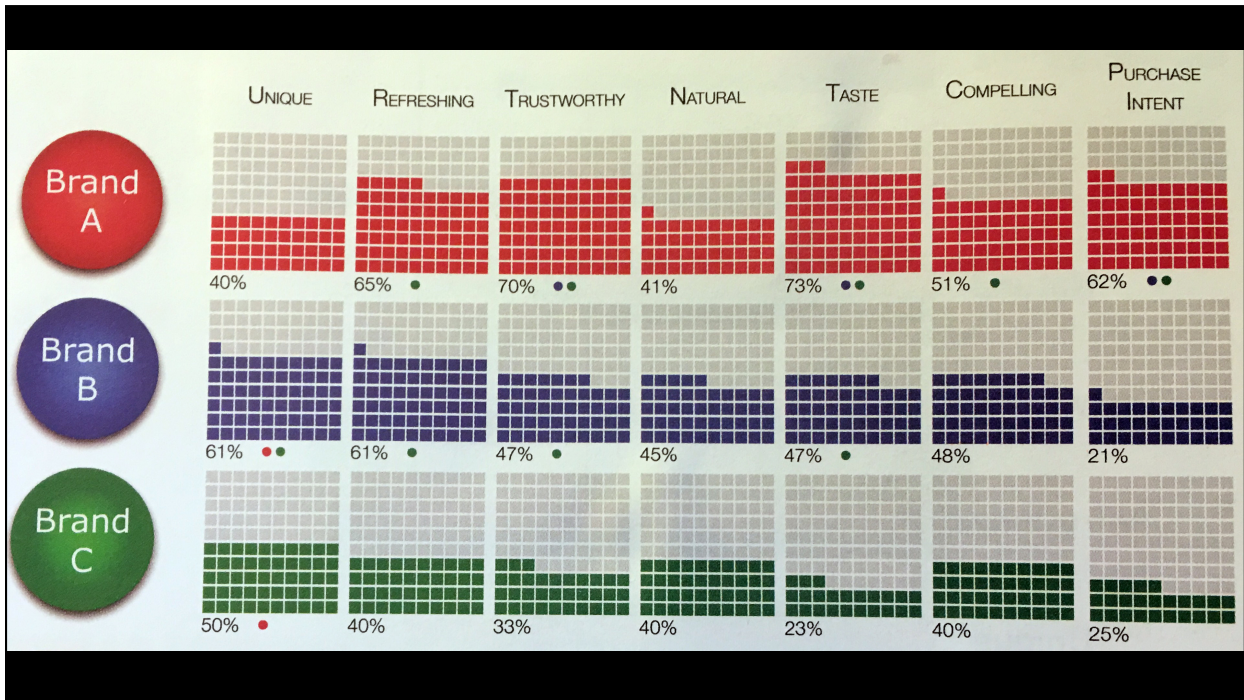
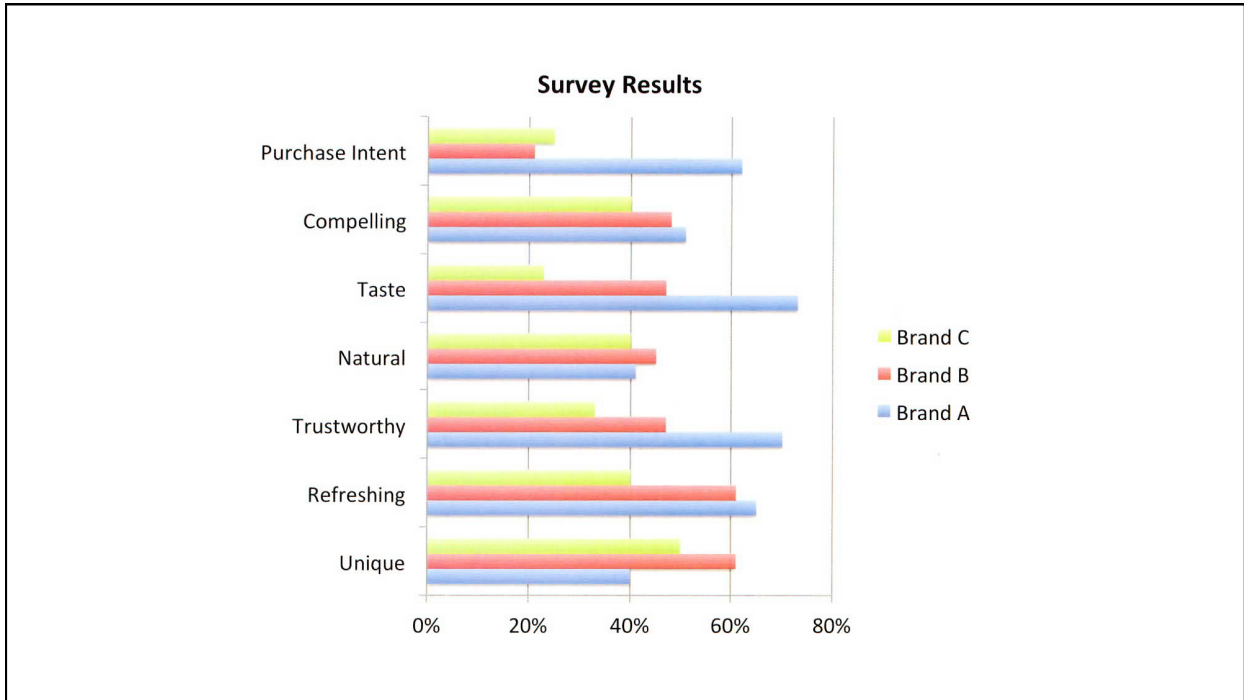
Number of newly married adults per 1,000 marriage eligible adults



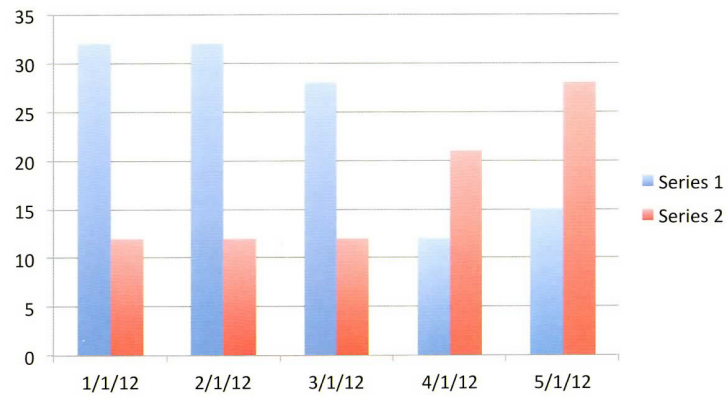
Note: Marriage eligible includes the newly married plus those widowed, divorced, or never married at interview.
Source: U.S. Census
Adapted from PEW RESEARCH CENTER

Try Graphing in Multiple Formats

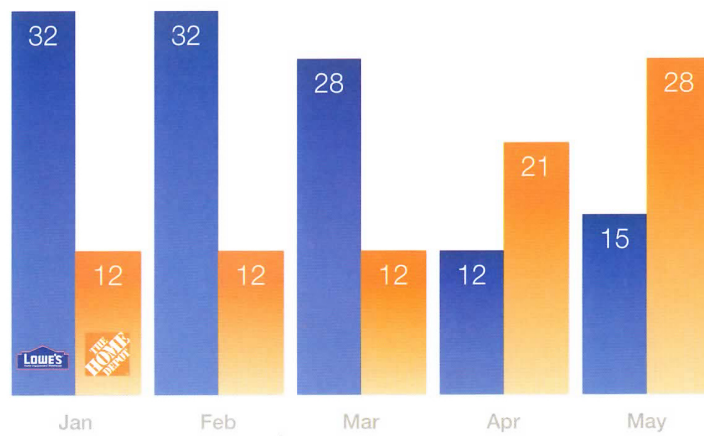




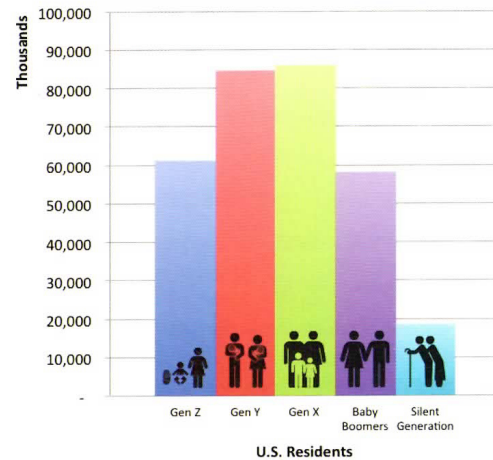
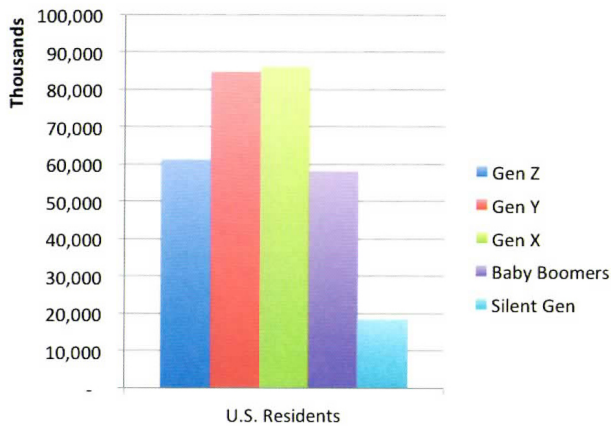
Easy Chart Fix-Up 1



2012 Store Openings



Easy Chart Fix-Up 2



Samples

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

Other Resources

Periodic Table of Visualization Methods

[http://www.visual-literacy.org/periodic_table/
periodic_table.html](http://www.visual-literacy.org/periodic_table/periodic_table.html)

Other Resources

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

Pages 317-338

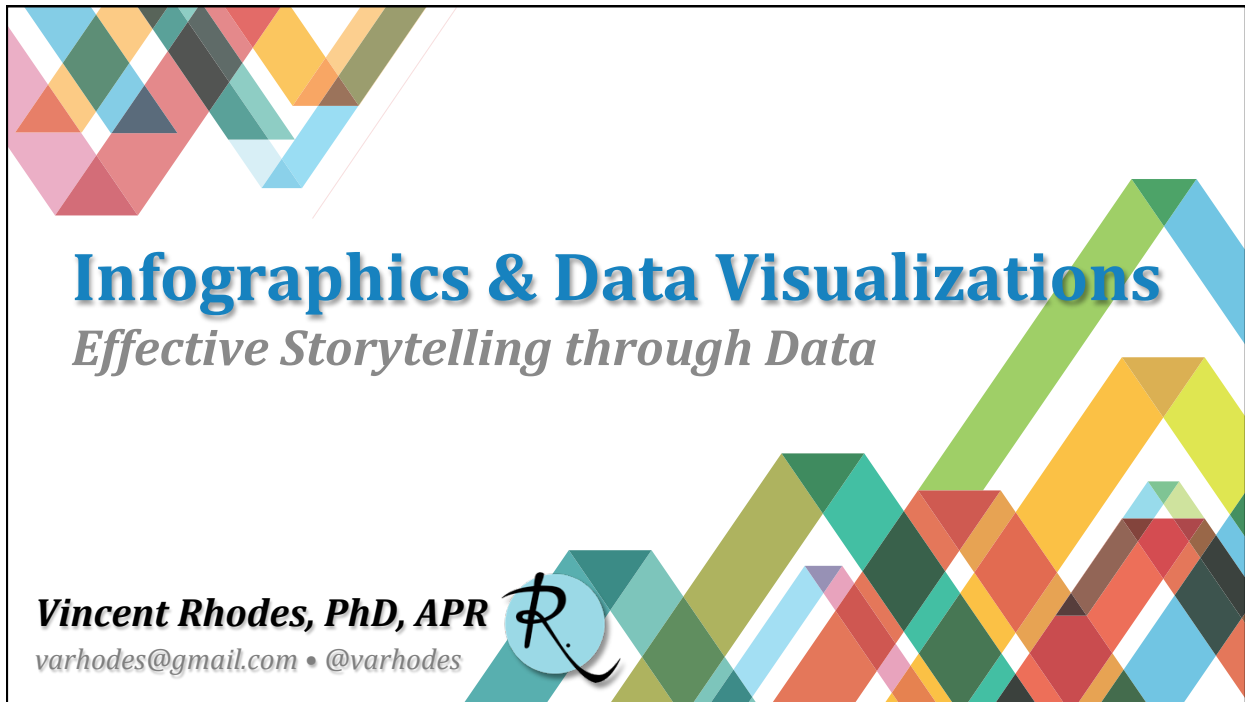
Other Resources

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

Pages 247-248



Questions?

The slide features a decorative background of colorful geometric shapes, including triangles and diamonds in shades of blue, green, orange, and red. A prominent bar chart with five bars of increasing height is overlaid on the right side, with the tallest bar in green. The text is centered and left-aligned within the design.

Infographics & Data Visualizations
Effective Storytelling through Data

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varhodes@gmail.com • @varhodes

