10 Steps to Data Vizardry

Zach Gemignani
CEO + founder
Juice Inc.
zach@juiceanalytics.com

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analytics

Stages of Data Vizardry

beginner   intermediate   advanced

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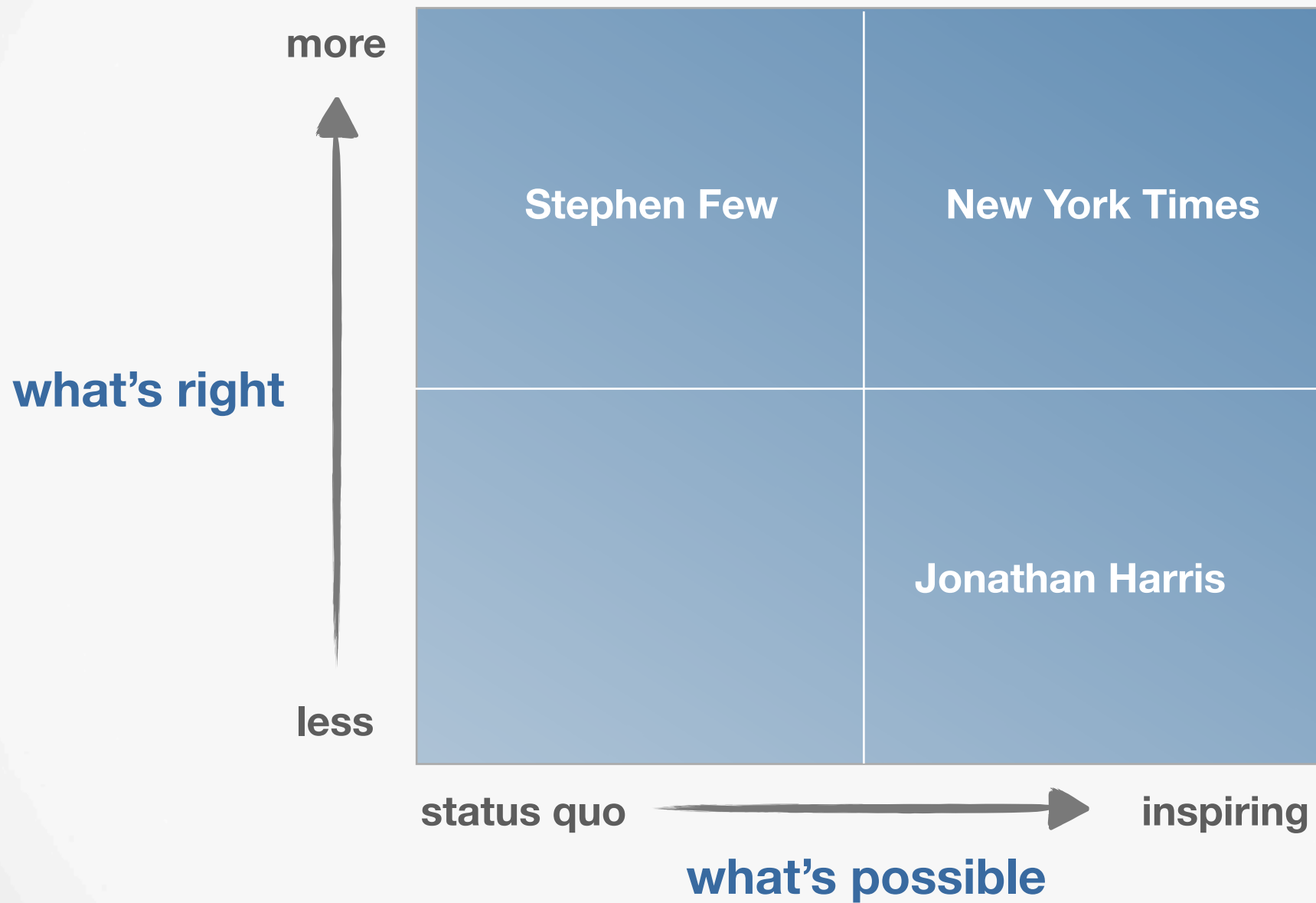
ACHIEVE SIMPLICITY
GO BEYOND THE BASICS
CHOOSE THE RIGHT CHART
BE A DATA GOURMET
MESSAGE AND AUDIENCE

DATA VIZARDS...

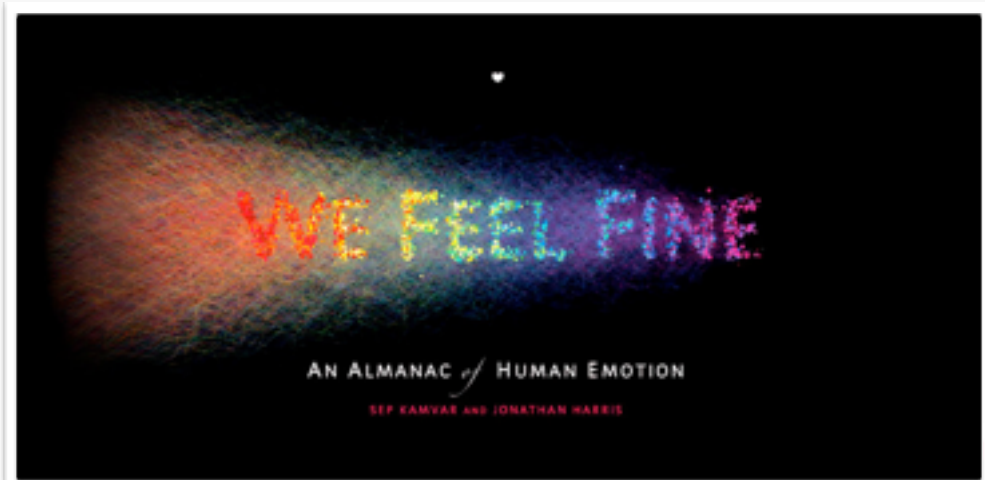## LEARN FROM THE BEST

"eloquence through simplicity"

" ██████ ██████ is a leading business intelligence vendor (based on sales), but its products consistently demonstrate that they don't understand analytics and haven't a clue about data visualization. A vendor that claims to be the best, which ██████ ██████ unabashedly claims (just like every other major BI vendor), should be ashamed of selling such moronic products. Don't reward them for irresponsible work—products that assume their customers are halfwits... "

Stephen Few
www.perceptualedge.com/blog

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Monday, June 13, 2011

data visualization as art

Jonathan Harris
www.wefeelfine.org

New York Times

New York Times

New York Times

The Ebb and Flow of Movies: Box Office Receipts 1986 - 2007
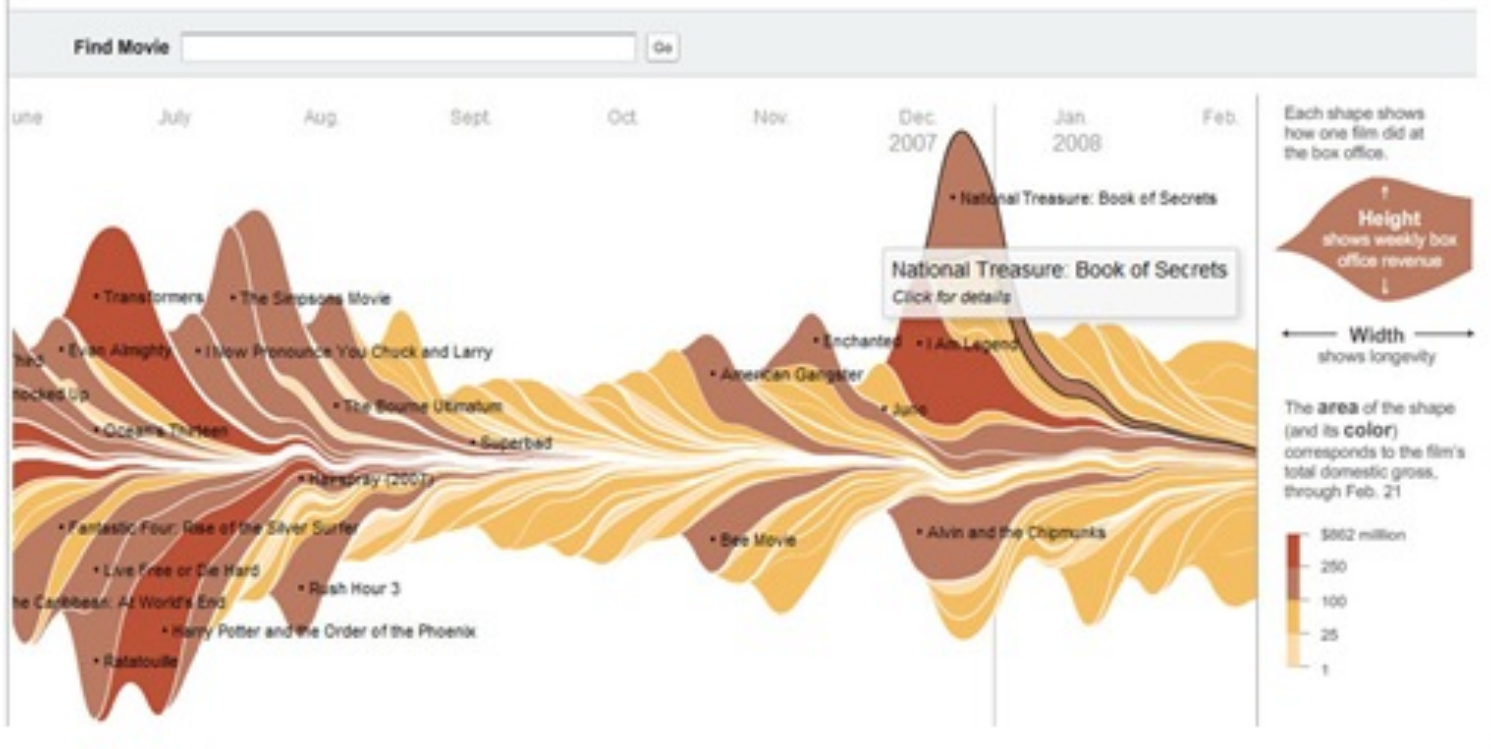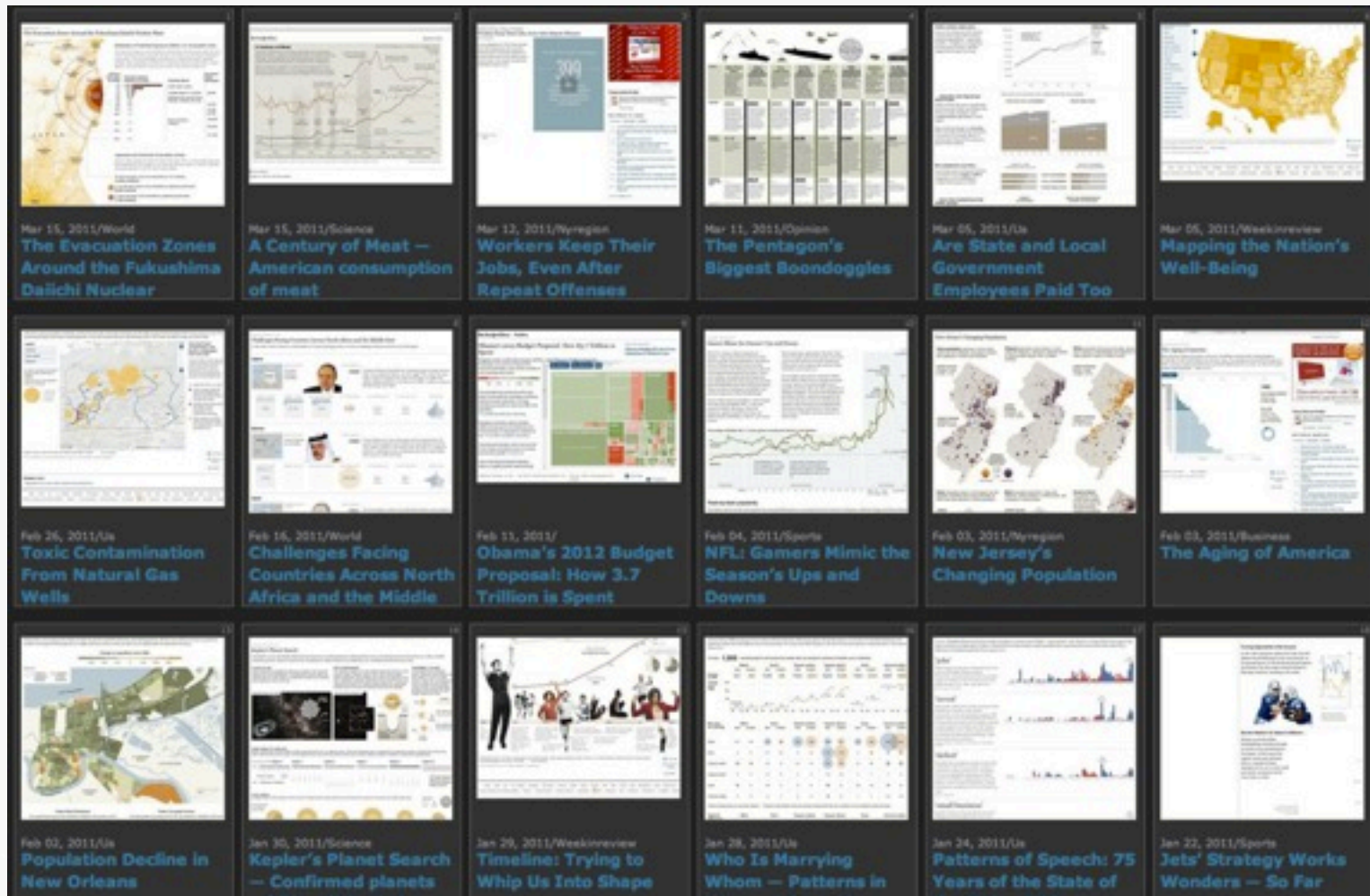
New York Times

New York Times

www.smallmeans.com/new-york-times-infographics/
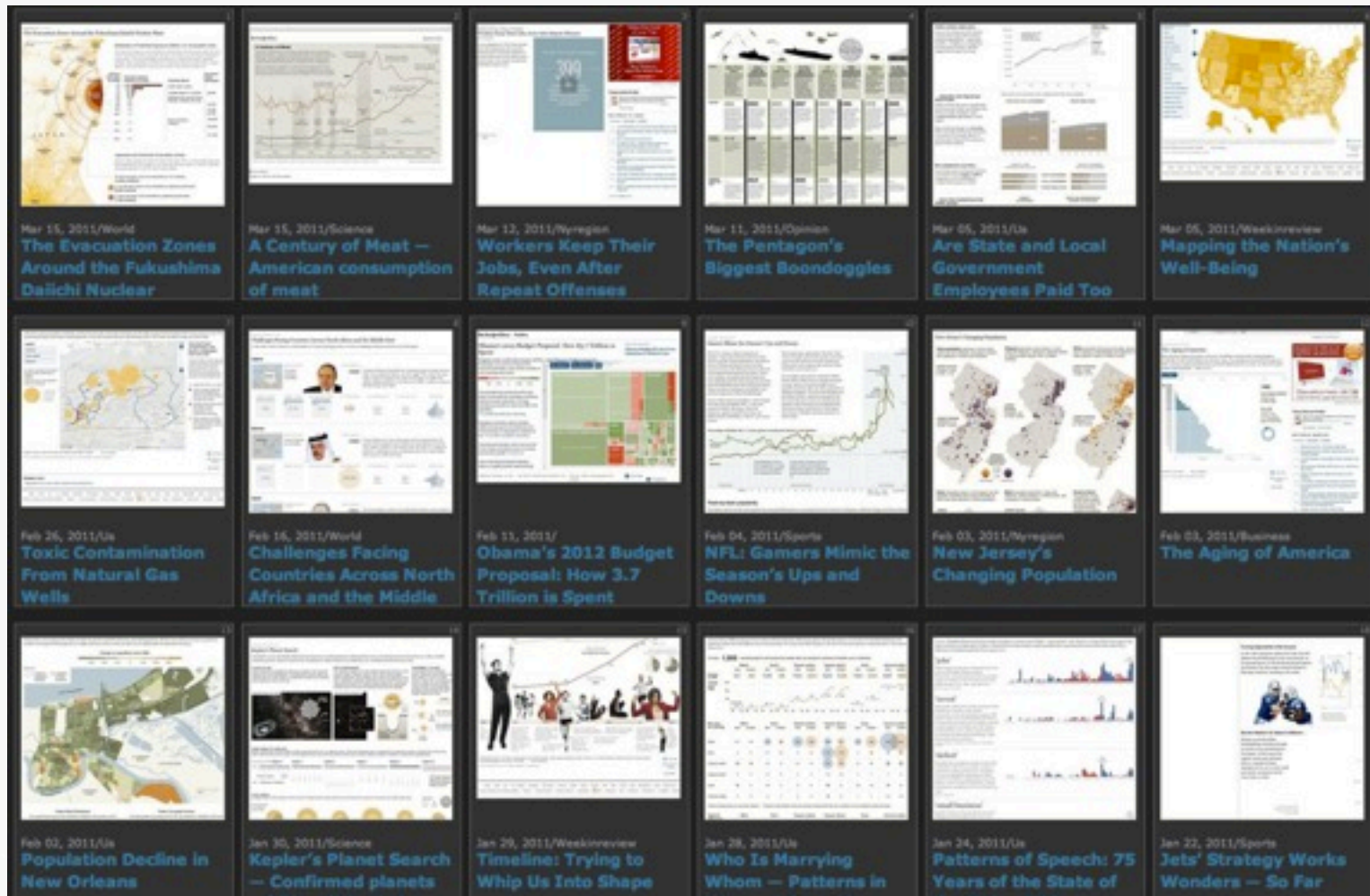
PROVIDE CONTEXT
KEEP IT SIMPLE
GO BEYOND THE BASICS
CHOOSE THE RIGHT CHART
AUDIENCE AND MESSAGE

DATA
VIZARDS...
BE A DATA GOURMET

Data Gourmet

Data Gourmand

"Data isn't like your kids. You don't have to pretend to love them equally."

» Amanda Cox, New York Times

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The right data

Interesting < Useful < Actionable

A frozen car-sicle!
A New York City resident was astonished to find his car encased in ice. Watch Video

National Forecast
The snow says goodbye to the Northeast, for now. A clipper in the Great Lakes could bring a quick shot of snow today. More

- East radar
- Midwest temperatures
- Precipitation forecast

Next 36 Hours

Tonight	Tomorrow	Tomorrow Night
Mostly Cloudy	AM Snow Showers	Partly Cloudy
26°	**39°**	**23°**
Low	High	Low
Chance of Precip: 10%	Chance of Snow: 40%	Chance of Snow: 10%

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TELL A STORY
PROVIDE CONTEXT
KEEP IT SIMPLE
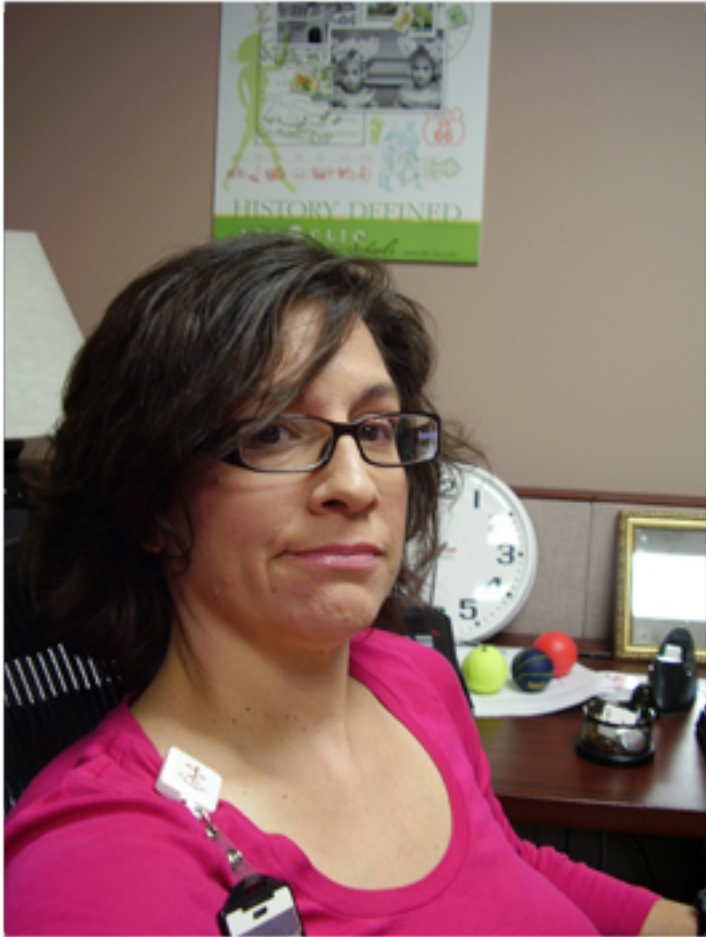GO BEYOND THE BASICS
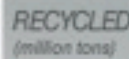CHOOSE THE RIGHT CHART

DATA VIZARDS...
AUDIENCE AND MESSAGE

Know your audience

Management

Analyst

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INTERNET BUZZ NOW (compare two things)

EAST COAST WEST COAST

COST OF LIVING NOW
(100 = U.S. city average)

250
200
150
100
50
0

Kodiak, AK
New York, NY
Baton Rouge, LA

The New York Times
U.S. Consumer Spending Rose Modestly in February. The 0.3 percent rise in consumer spending in February was considered a respectable showing. Read more...

TEXTS ON SPRINT PHONES
4701122

boingboing
Highlights from steampunk bazaar at White Mischief. The steampunk maker bazaar at this weekend's White Mischief Read more...

TRAFFIC NOW
Los Angeles
405

GO STOP

SELF DESTRUCTING NOW CARD
I miss you Now.
I miss you Now.

CURRENT NATIONAL DEBT   YOUR SHARE
35116.33

PEOPLE FLIRTING ON THE NOW NETWORK™
3686

NEW CASES OF MALARIA
1009

COFFEE CUPS BEING PRODUCE
9K
8K
6K
5K
3K
2K
0

int
ow.

SPRINT GPS USERS
74480

TIME IN TANZANIA
7:26

W N E S

WORLD MOOD
Add yours!

FORESTS CUT NOW (in acres)
172

Widget   Screen saver

DAYS UNTIL FRIDAY
4

CALLS ON SPRINT PHONES
32678

Google™:
s all

YOU'VE BEEN HERE FOR
00:02:27

BOSTON AQUARIUM
Receiving Now
LIVE 12:26 AM

TWEETS NOW
tweet

LISTEN NOW
LET'S STAT FRIENDS
LES SAVT FAV
1. POTS & PANS
2. THE EQUESTRIAN
3. THE YEAR BEFORE...
4. PATTY LEE
5. WHAT WOULD WOLVES DO
6. BRACE YOURSELF

PLAY NOW

BUY ALBUM @ FRENCHKISS   VIEW BAND @ MYSPACE

PUSH NOW

NEXTEL DIRECT CONNECT® CHIRPS NOW
3556347

FOX Sports
Duke ed
Duke dr
Read m

WO
so
(SC
1. D
Sor

NEX
New

The Now Clock

HOUSES BEING BUILT
37.4

BICYCLES BEING PRODUCED WORLDWIDE
2526

CARS BEING PRODUCED WORLDWIDE
985

TEMP NOW
100
80
60
40
20

ON SALE NOW
uncrate
Nissan Juke
Go buy it →

VIDEOS UPLOADED ON SPRINT PHONES

PLANES IN THE AIR

U.S. MOON

TRASH (million tons)

RECYCLED (million tons)

Do
Co

no

it will be **partly cloudy** with a high of **96°f** today in **atlanta, ga**

goingtorain.com

TELL A STORY
ACT LIKE A DESIGNER
PROVIDE CONTEXT
KEEP IT SIMPLE
GO BEYOND THE BASICS

DATA VIZARDS...

CHOOSE THE RIGHT CHART

2012 PRESIDENTIAL RUN
GOP CANDIDATES

BACK PALIN 70%
BACK HUCKABEE 63%
BACK ROMNEY 60%

FOX 47°

SOURCE:OPINIONS DYNAMIC

Back Palin	70%
Back Huckabee	63%
Back Romney	60%

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1 **What question do you need to answer?**

↓

2 **What elements of the data do you want to emphasize?**

↓

3 **How do you most effectively map the data to the chart elements?**

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Chart categories

Distribution

Comparison

Composition

Relationship

Trend

www.extremepresentation.com/design/charts/

www.chartchooser.com

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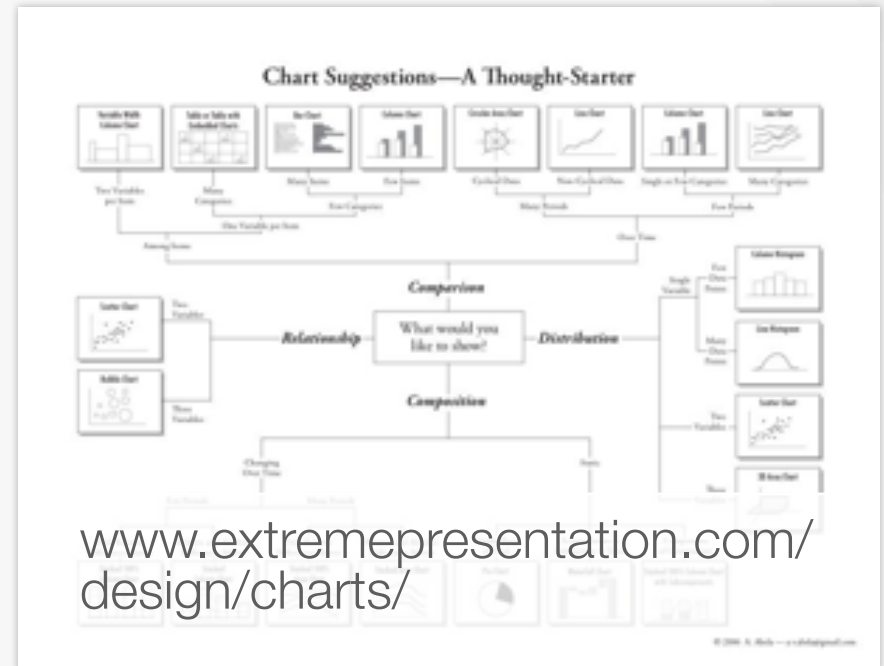
People perceive...

Accurately	**Length of a line**
	Position in 2D space
Semi-accurately	**Area**
	Color intensity
	Radial distance
	Position in 3D space
Not accurately at all	**Odds of winning in Vegas**

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FORM FOLLOWS FUNCTION
TELL A STORY
ACT LIKE A DESIGNER
PROVIDE CONTEXT
KEEP IT SIMPLE
DATA
VIZARDS...
GO BEYOND THE BASICS
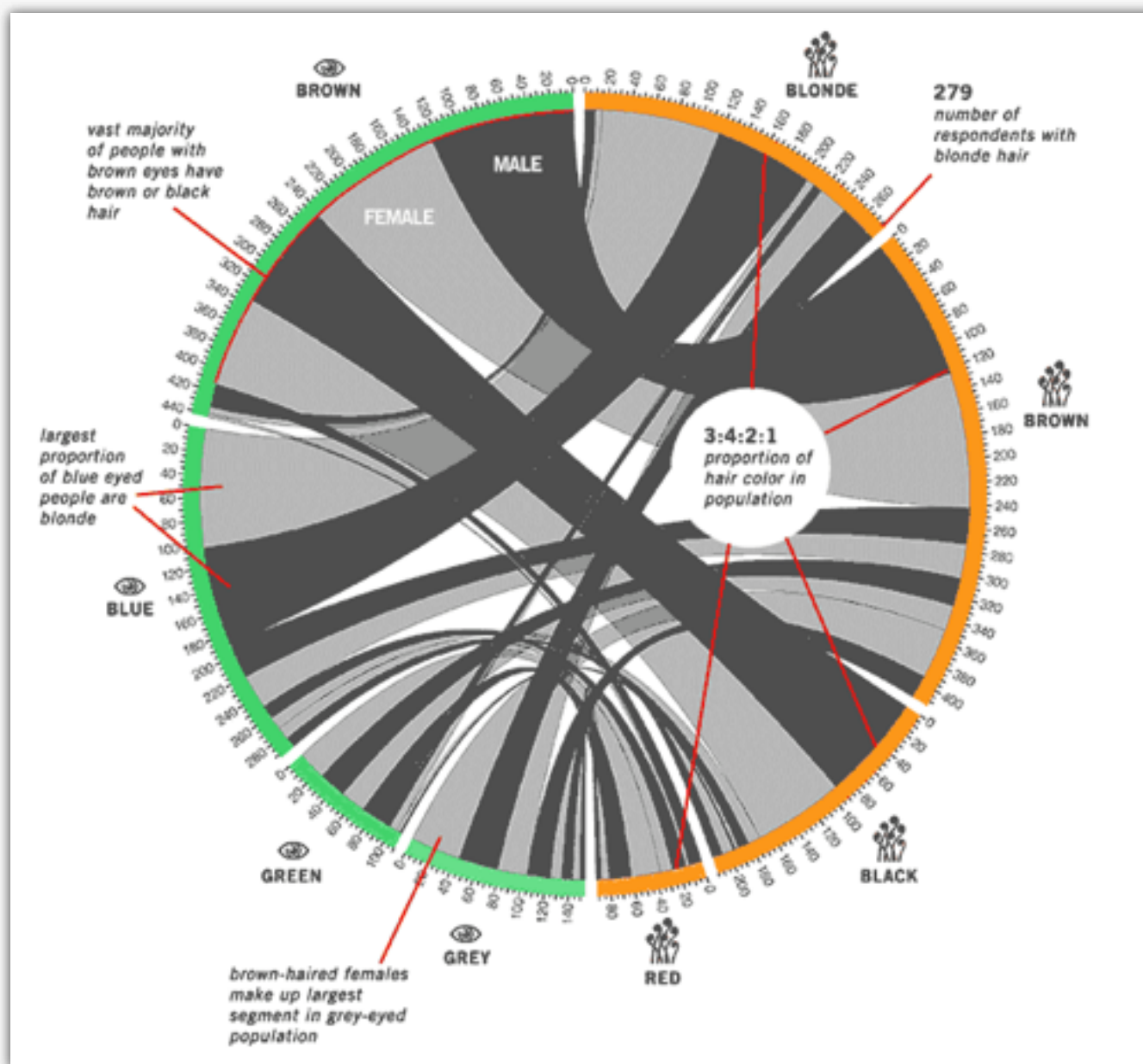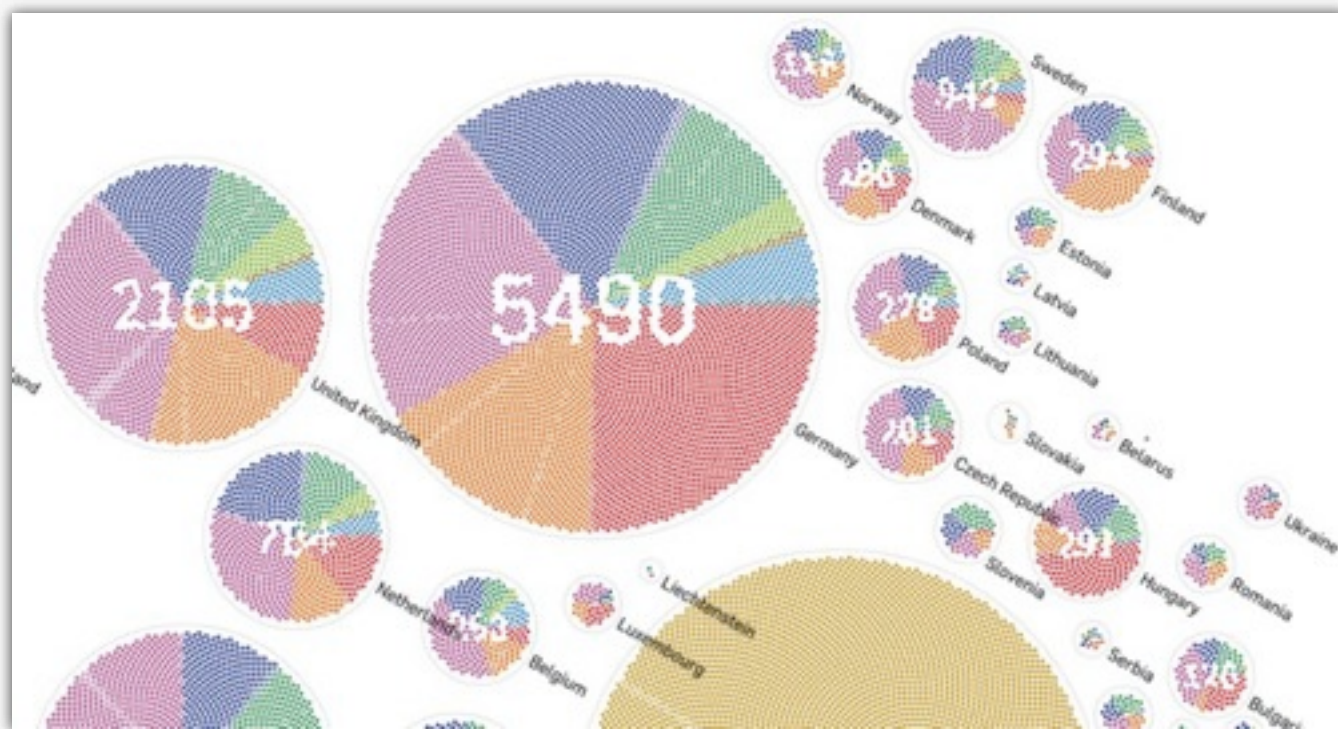
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THE
CONVERSATION
PRISM
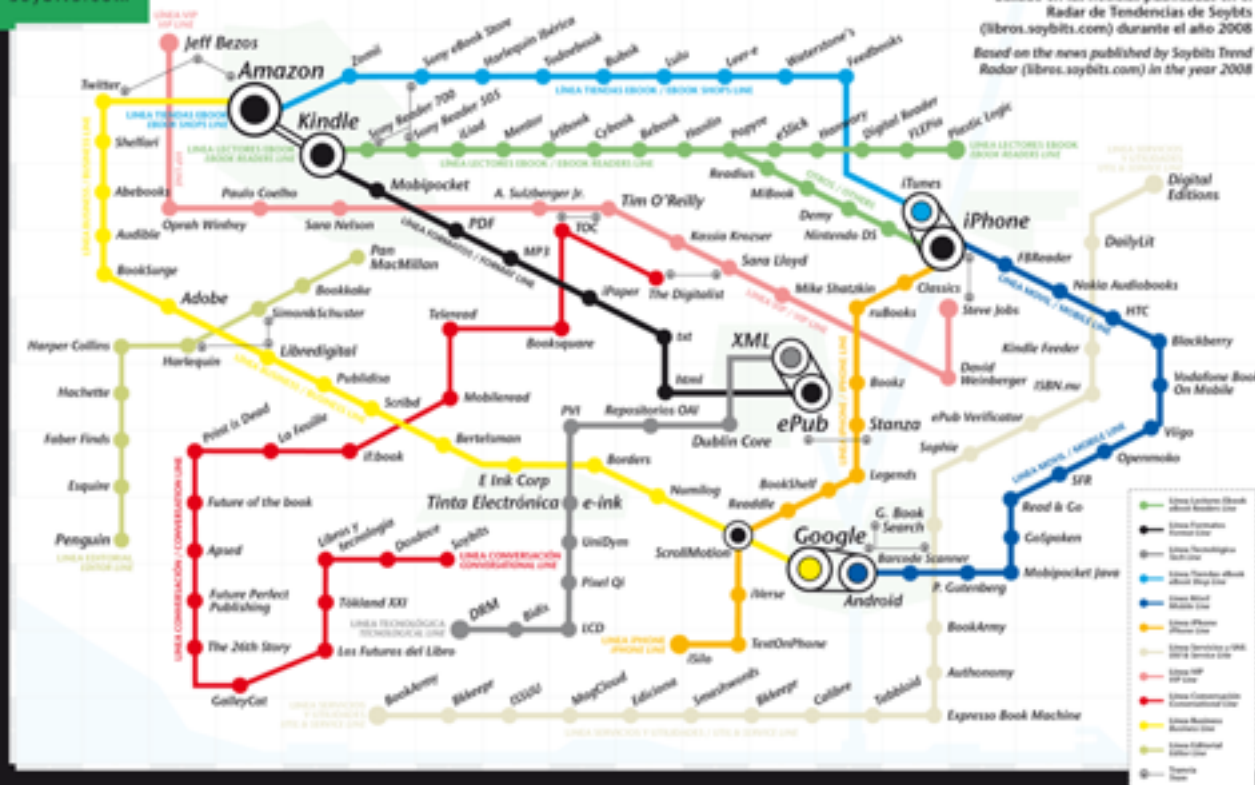
Brought to you by
Brian Solis & JESS3

theconversationprism.com
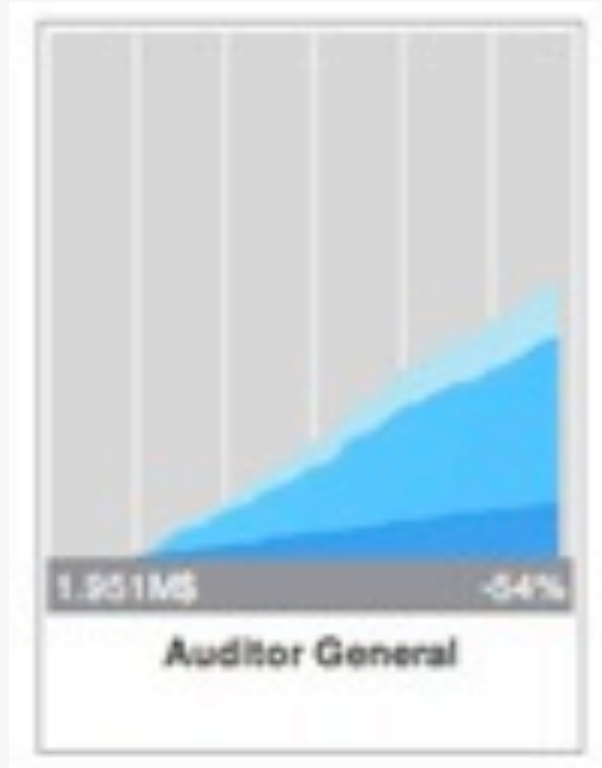
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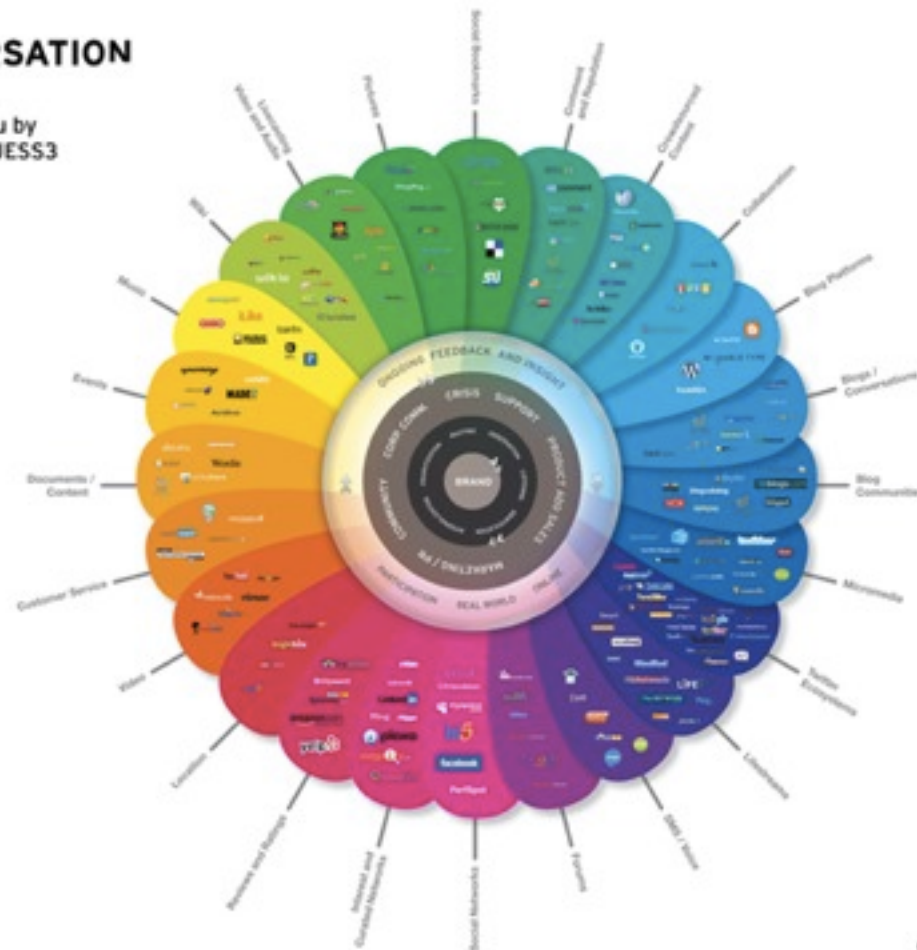
Good visualization techniques...

easy to understand

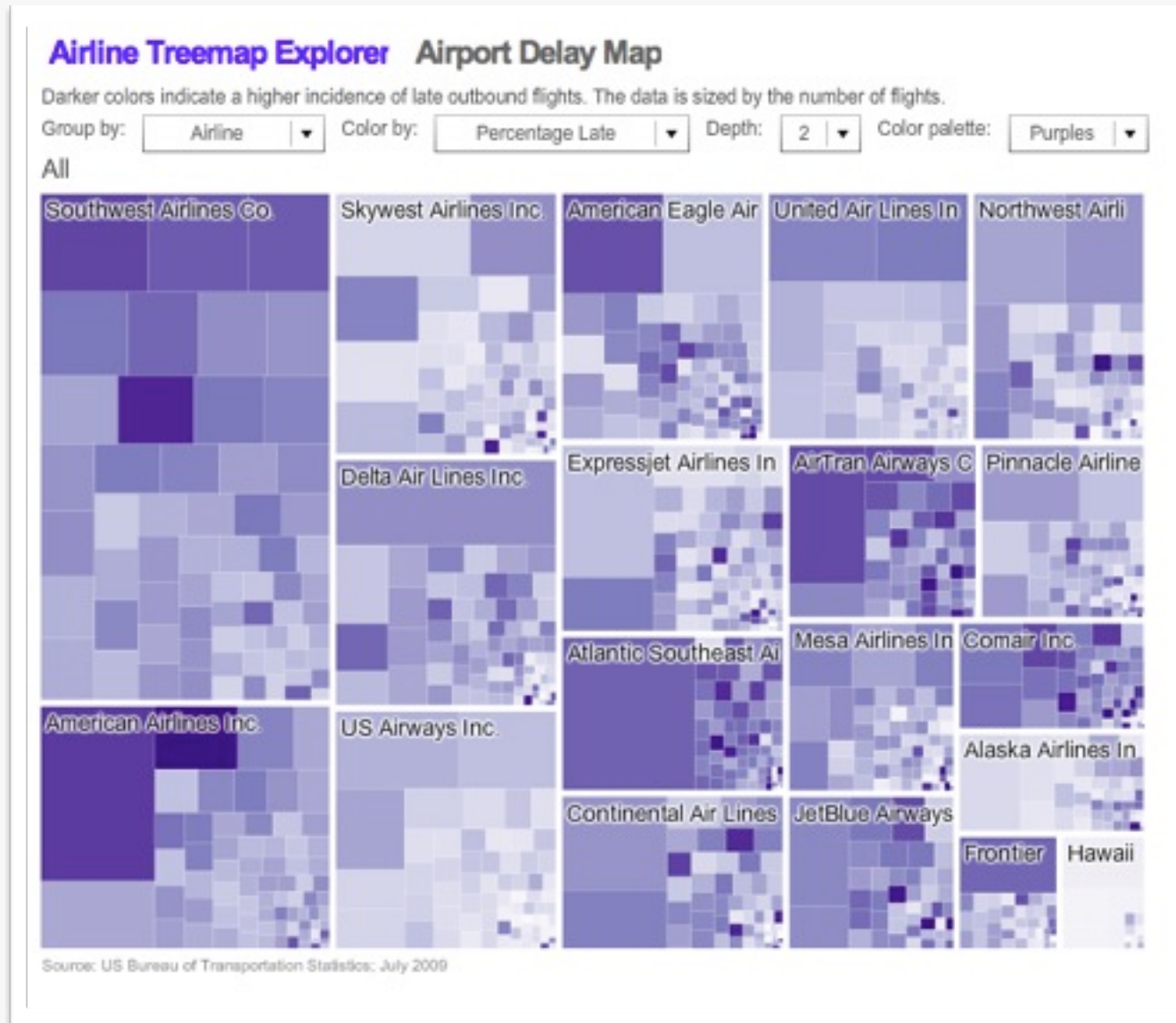solve common problems

reproducable

small multiples

small multiples
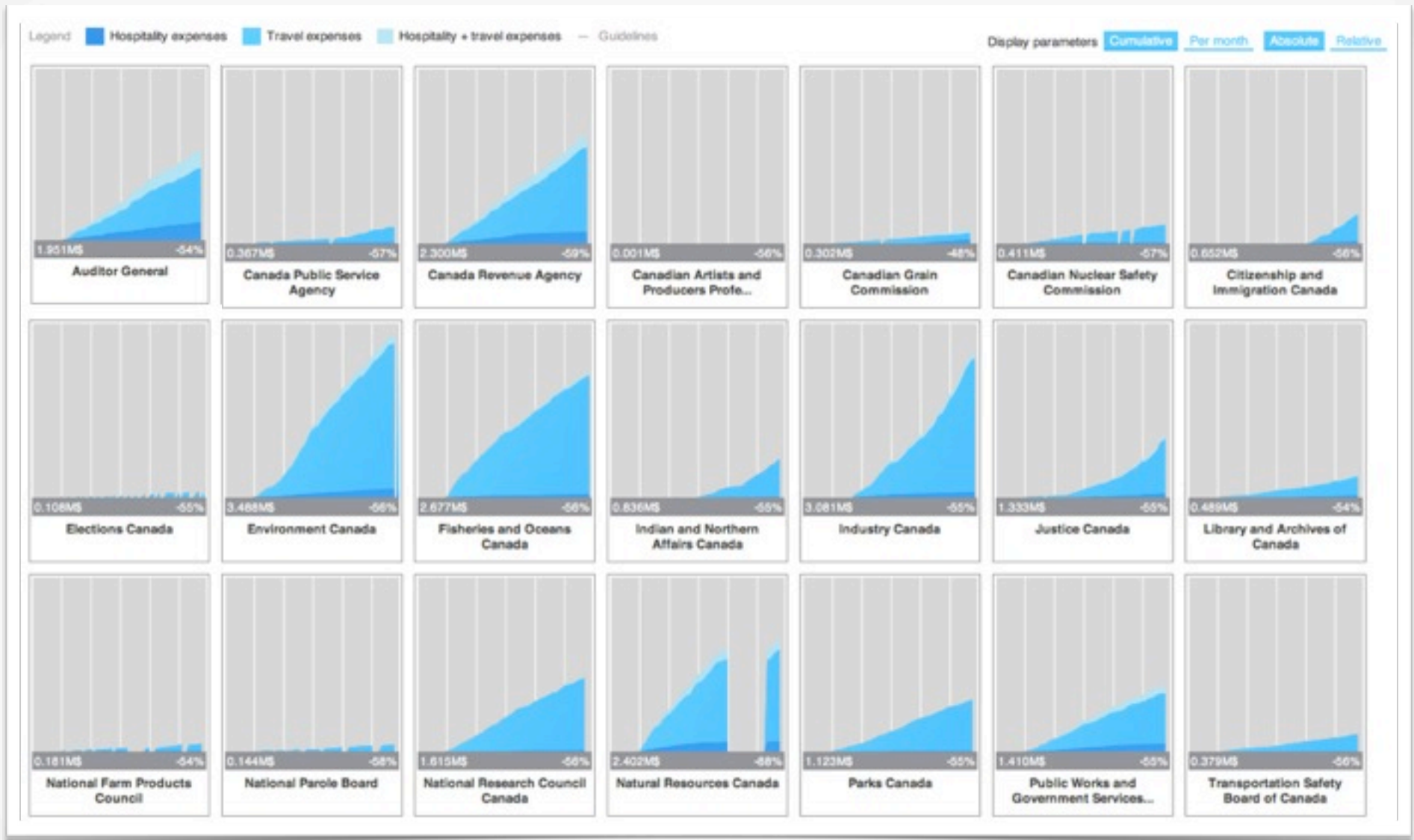
ffctn.com/a/expensevisualizer/

treemap

www.juiceanalytics.com/demos/airline/

unit chart

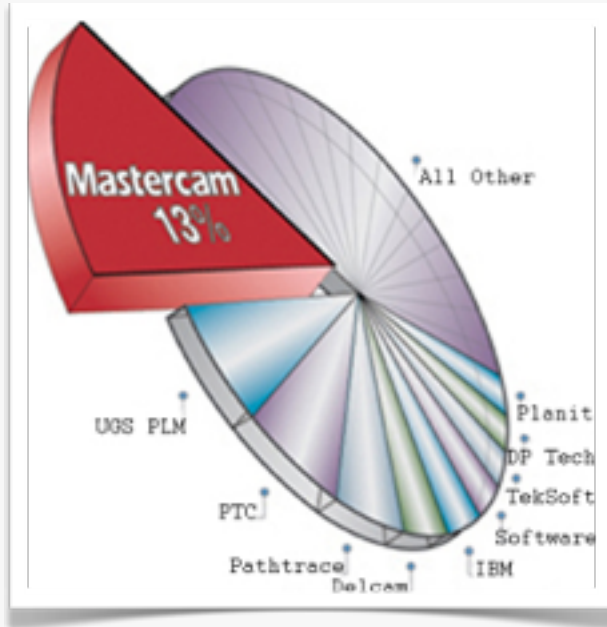visualization.geblogs.com/visualization/health_visualizer/

animated bubble chart

www.gapminder.org/world

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FORM FOLLOWS FUNCTION
TELL A STORY
ACT LIKE A DESIGNER
PROVIDE CONTEXT
DATA
VIZARDS...
KEEP IT SIMPLE

Distracting graphical elements
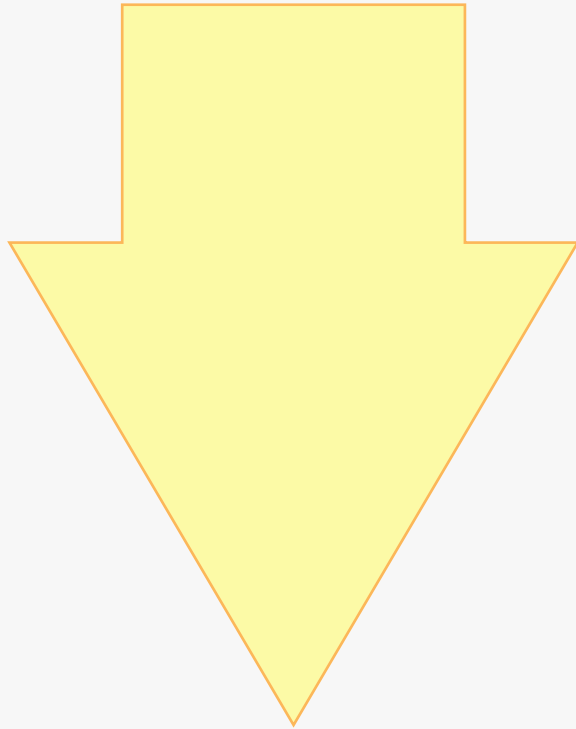
Jargon-y language

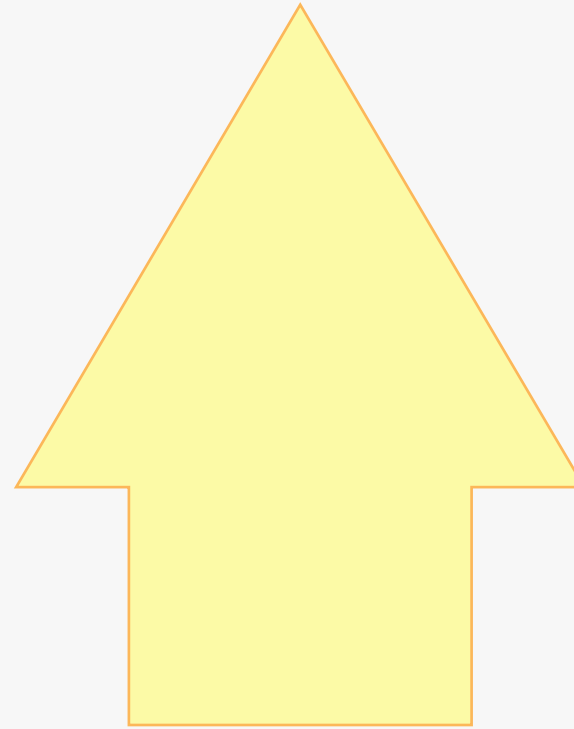# Overly-ambitious charts

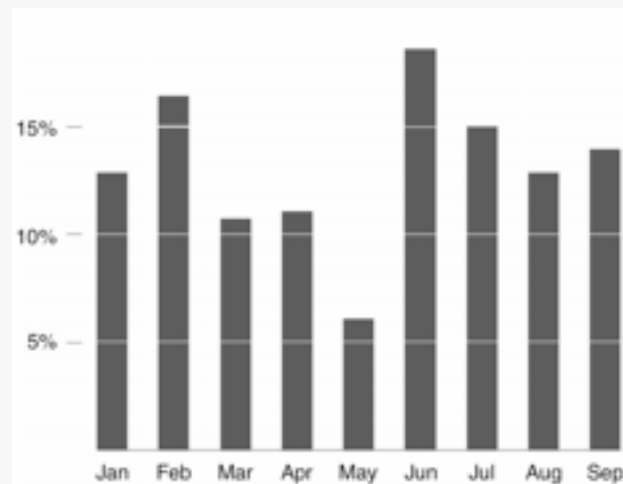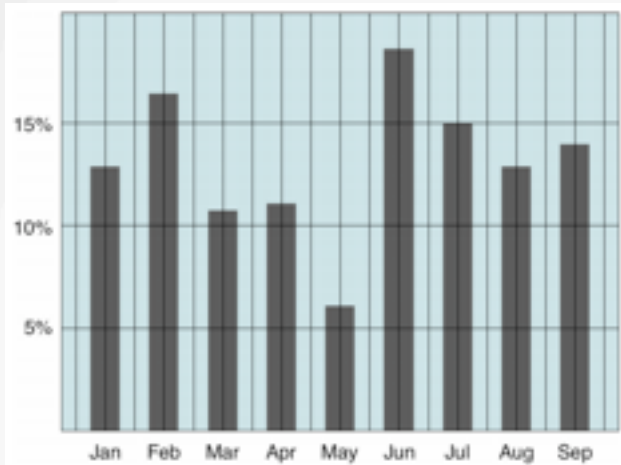Juice, Inc.©2010
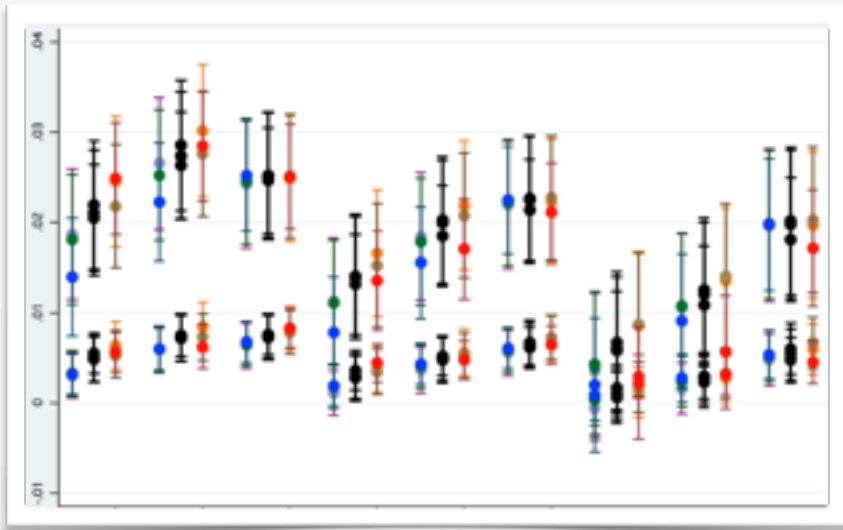
Fundamental rules of chart design

Reduce *chartjunk*

(remove chart elements that are decorative or ornamental)

Increase *data-ink ratio*

(make every pixel tell a story about your data)

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Images courtesy of Tim Bray: http://www.tbray.org/ongoing/When/200x/2003/03/13/Data-Ink

Reduce tablejunk

Team	1999	2000	2001	2002	2003	2004	2005	2006
Arizona Diamondbacks	$61,184,250	$72,346,275	$72,505,825	$77,893,950	$80,657,500	$60,521,550	$58,348,000	$56,943,475
Atlanta Braves	$68,134,250	$70,448,200	$74,073,950	$75,379,325	$96,872,425	$79,024,800	$85,148,575	$79,708,500
Baltimore Orioles	$73,057,675	$70,213,300	$62,436,500	$47,260,525	$59,872,650	$45,725,575	$66,580,850	$64,808,675
Boston Red Sox	$55,142,125	$64,950,275	$85,592,900	$90,305,050	$89,473,775	$104,340,450	$108,314,225	$111,204,200
Chicago White Sox	$22,740,725	$26,839,225	$57,743,525	$52,826,700	$49,048,075	$62,704,325	$69,655,550	$98,918,900
Chicago Cubs	$51,889,225	$50,449,450	$61,553,675	$67,581,100	$72,092,250	$78,535,925	$77,866,900	$84,679,625
Cincinnati Reds	$28,588,575	$43,395,550	$43,488,350	$37,542,000	$50,874,800	$38,453,450	$49,715,225	$53,115,200
Cleveland Indians	$60,769,300	$72,962,375	$76,645,825	$65,757,875	$39,382,925	$28,807,750	$36,060,700	$56,795,875
Colorado Rockies	$53,716,200	$54,563,575	$65,803,700	$52,639,850	$55,818,050	$57,670,000	$41,197,425	$34,277,500
Detroit Tigers	$30,450,600	$53,949,225	$44,492,125	$49,150,000	$47,272,125	$41,387,100	$61,605,525	$76,205,625
Florida Marlins	$17,477,775	$17,303,450	$29,586,800	$37,482,075	$43,185,975	$38,998,175	$55,903,675	$14,421,625
Houston Astros	$49,643,275	$47,489,925	$55,909,875	$58,748,525	$67,778,700	$74,666,300	$73,825,975	$88,991,825
Kansas City Royals	$22,794,225	$20,922,325	$30,726,725	$40,738,800	$38,959,125	$39,674,175	$34,149,075	$40,770,700
Los Angeles Dodgers	$70,773,175	$81,596,550	$93,949,100	$91,202,850	$101,824,625	$86,244,550	$67,524,575	$91,830,500
Anaheim/Los Angeles Angels	$39,265,275	$42,886,800	$37,554,975	$55,108,625	$73,177,475	$93,596,925	$81,911,925	$103,625,325
Milwaukee Brewers	$38,329,400	$28,519,800	$39,897,525	$43,351,575	$35,023,275	$27,518,500	$40,234,825	$56,790,000
Minnesota Twins	$18,502,400	$15,884,125	$22,548,800	$38,677,875	$53,466,350	$51,524,050	$52,421,300	$61,355,825
Montreal/Washington Nationals	$14,977,325	$30,006,750	$28,978,750	$34,527,225	$49,950,950	$35,997,925	$40,484,575	$52,722,925
New York Mets	$57,824,475	$79,509,775	$83,191,450	$90,993,850	$100,748,800	$96,758,950	$97,009,400	$97,020,275
New York Yankees	$75,923,825	$79,774,350	$88,541,850	$108,559,125	$133,670,525	$157,616,825	$198,017,725	$177,376,950
Oakland Athletics	$22,340,700	$29,603,075	$31,306,250	$36,740,500	$48,423,875	$55,393,675	$53,720,450	$62,322,050
Philadelphia Phillies	$26,118,525	$40,782,750	$40,061,700	$51,745,525	$61,017,250	$86,314,050	$91,671,075	$81,734,575
Pittsburgh Pirates	$18,498,050	$27,815,700	$42,498,650	$36,485,850	$48,698,300	$29,840,675	$34,047,325	$41,846,200
San Diego Padres	$42,703,875	$45,684,175	$35,493,625	$35,711,200	$37,858,325	$54,639,500	$56,150,175	$62,254,625
Seattle Mariners	$48,041,825	$56,649,050	$67,546,875	$80,282,675	$80,726,400	$72,807,000	$67,096,350	$84,927,400
San Francisco Giants	$44,943,550	$51,670,975	$58,641,350	$72,499,850	$79,184,775	$66,144,500	$86,045,600	$90,862,075
St. Louis Cardinals	$42,313,275	$56,901,725	$66,612,800	$71,248,325	$67,057,175	$75,633,525	$89,730,625	$85,039,625
Tampa Bay Rays	$29,269,400	$50,617,050	$50,881,125	$30,696,425	$19,630,000	$27,321,000	$26,690,675	$31,623,175
Texas Rangers	$71,956,675	$68,073,000	$71,374,525	$90,777,700	$87,105,400	$47,263,775	$46,089,375	$52,796,875
Toronto Blue Jays	$42,797,425	$44,459,925	$67,677,225	$66,262,350	$47,480,550	$48,093,275	$43,621,625	$66,587,975
Average	$43,338,913	$49,875,624	$56,243,878	$59,605,910	$63,877,748	$62,107,276	$66,361,310	$72,051,937

Increase data-ink ratio

Team	Average Salary ($ millions)							
	1999	2000	2001	2002	2003	2004	2005	2006
Arizona Diamondbacks	61.2	72.3	72.5	77.9	80.7	60.5	58.3	56.9
Atlanta Braves	68.1	70.4	74.1	75.4	96.9	79.0	85.1	79.7
Baltimore Orioles	73.1	70.2	62.4	47.3	59.9	45.7	66.6	64.8
Boston Red Sox	55.1	65.0	85.6	90.3	89.5	104.3	108.3	111.2
Chicago White Sox	22.7	26.8	57.7	52.8	49.0	62.7	69.7	98.9
Chicago Cubs	51.9	50.4	61.6	67.6	72.1	78.5	77.9	84.7
Cincinnati Reds	28.6	43.4	43.5	37.5	50.9	38.5	49.7	53.1
Cleveland Indians	60.8	73.0	76.6	65.8	39.4	28.8	36.1	56.8
Colorado Rockies	53.7	54.6	65.8	52.6	55.8	57.7	41.2	34.3
Detroit Tigers	30.5	53.9	44.5	49.2	47.3	41.4	61.6	76.2
Florida Marlins	17.5	17.3	29.6	37.5	43.2	39.0	55.9	14.4
Houston Astros	49.6	47.5	55.9	58.7	67.8	74.7	73.8	89.0
Kansas City Royals	22.8	20.9	30.7	40.7	39.0	39.7	34.1	40.8
Los Angeles Dodgers	70.8	81.6	93.9	91.2	101.8	86.2	67.5	91.8
Anaheim/Los Angeles Angels	39.3	42.9	37.6	55.1	73.2	93.6	81.9	103.6
Milwaukee Brewers	38.3	28.5	39.9	43.4	35.0	27.5	40.2	56.8
Minnesota Twins	18.5	15.9	22.5	38.7	53.5	51.5	52.4	61.4
Montreal/Washington Nationals	15.0	30.0	29.0	34.5	50.0	36.0	40.5	52.7
New York Mets	57.8	79.5	83.2	91.0	100.7	96.8	97.0	97.0
New York Yankees	75.9	79.8	88.5	108.6	133.7	157.6	198.0	177.4
Oakland Athletics	22.3	29.6	31.3	36.7	48.4	55.4	53.7	62.3
Philadelphia Phillies	26.1	40.8	40.1	51.7	61.0	86.3	91.7	81.7
Pittsburgh Pirates	18.5	27.8	42.5	36.5	48.7	29.8	34.0	41.8
San Diego Padres	42.7	45.7	35.5	35.7	37.9	54.6	56.2	62.3
Seattle Mariners	48.0	56.6	67.5	80.3	80.7	72.8	67.1	84.9
San Francisco Giants	44.9	51.7	58.6	72.5	79.2	66.1	86.0	90.9
St. Louis Cardinals	42.3	56.9	66.6	71.2	67.1	75.6	89.7	85.0
Tampa Bay Rays	29.3	50.6	50.9	30.7	19.6	27.3	26.7	31.6
Texas Rangers	72.0	68.1	71.4	90.8	87.1	47.3	46.1	52.8
Toronto Blue Jays	42.8	44.5	67.7	66.3	47.5	48.1	43.6	66.6
Average Salary	43.3	49.9	56.2	59.6	63.9	62.1	66.4	72.1

FORM FOLLOWS FUNCTION
TELL A STORY
ACT LIKE A DESIGNER
DATA
VIZARDS...
PROVIDE CONTEXT

762

762*

career home runs

BARRY LAMAR BONDS

HENRY "HANK" AARON*

Sports Illustrated

THE TRUTH
BARRY ... STEROIDS

762*

career home runs

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Types of data context

284
new leads
in Q3 2009

+4.5% v. last month
-2.8% v. goal

the new "Vortex" marketing campaign
drove new leads after a slow Q2

metric name

comparison to
previous time period
and goal

relevant scope

explanation of
mitigating factors

shown within broader
context of overall
trend and goals

— Goal   o Actual
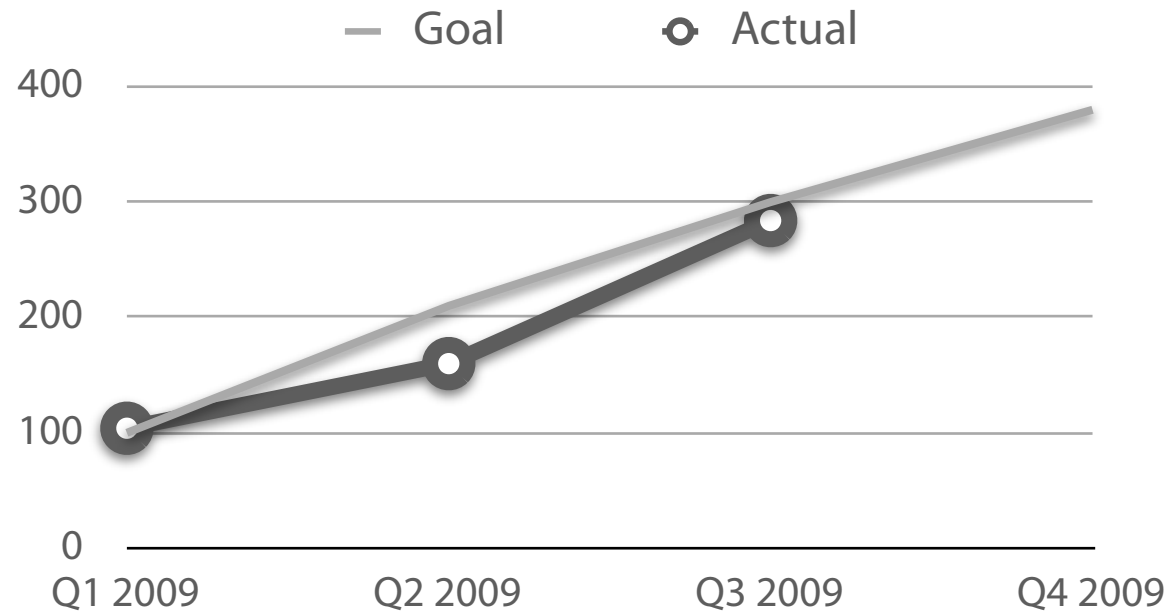
FORM FOLLOWS FUNCTION
TELL A STORY
DATA VIZARDS...
ACT LIKE A DESIGNER

looks matter

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Data + Design

data junkies

designers

JUICE
analytics

Color

JUICE analytics

http://www.fusion41.com/visuals/
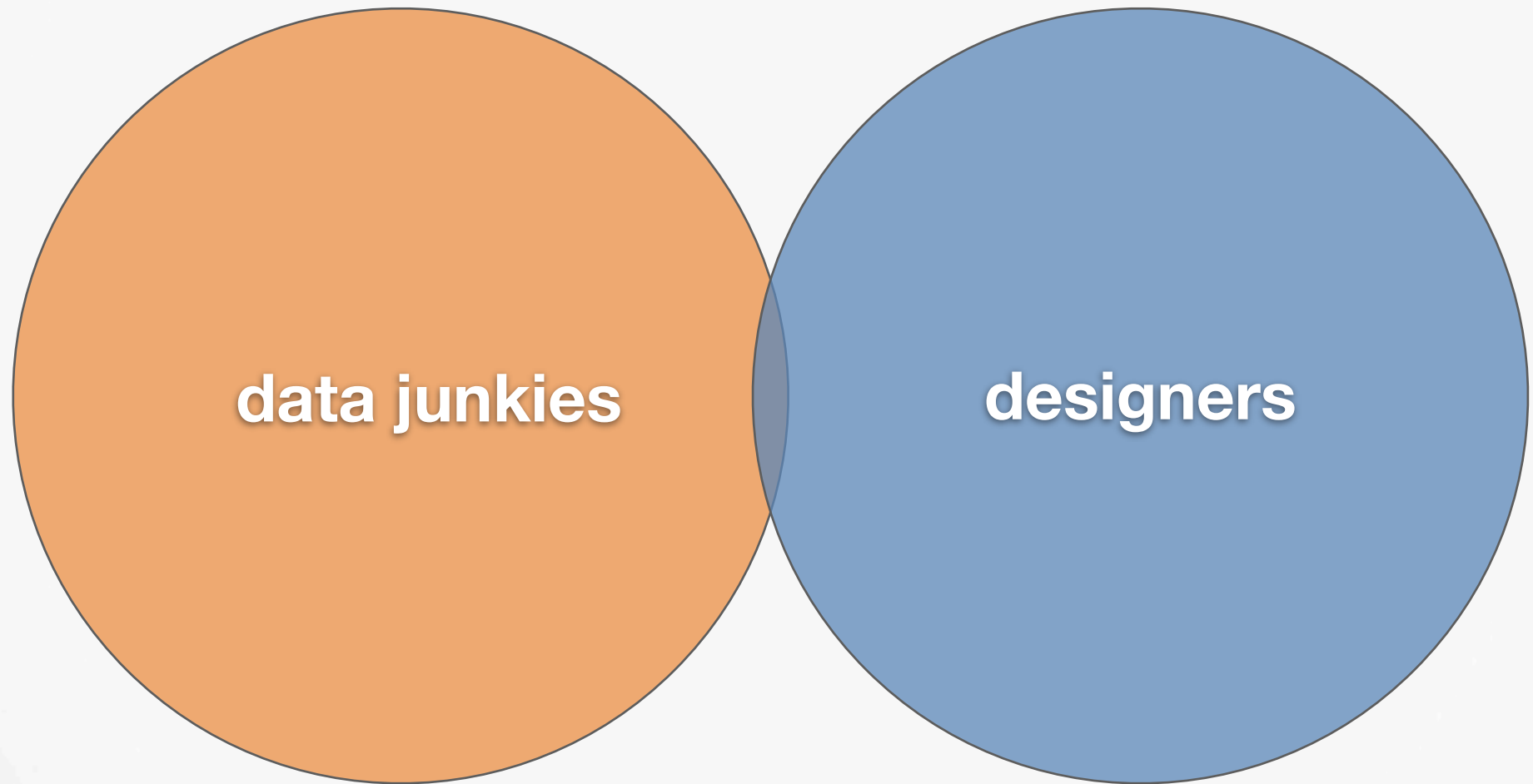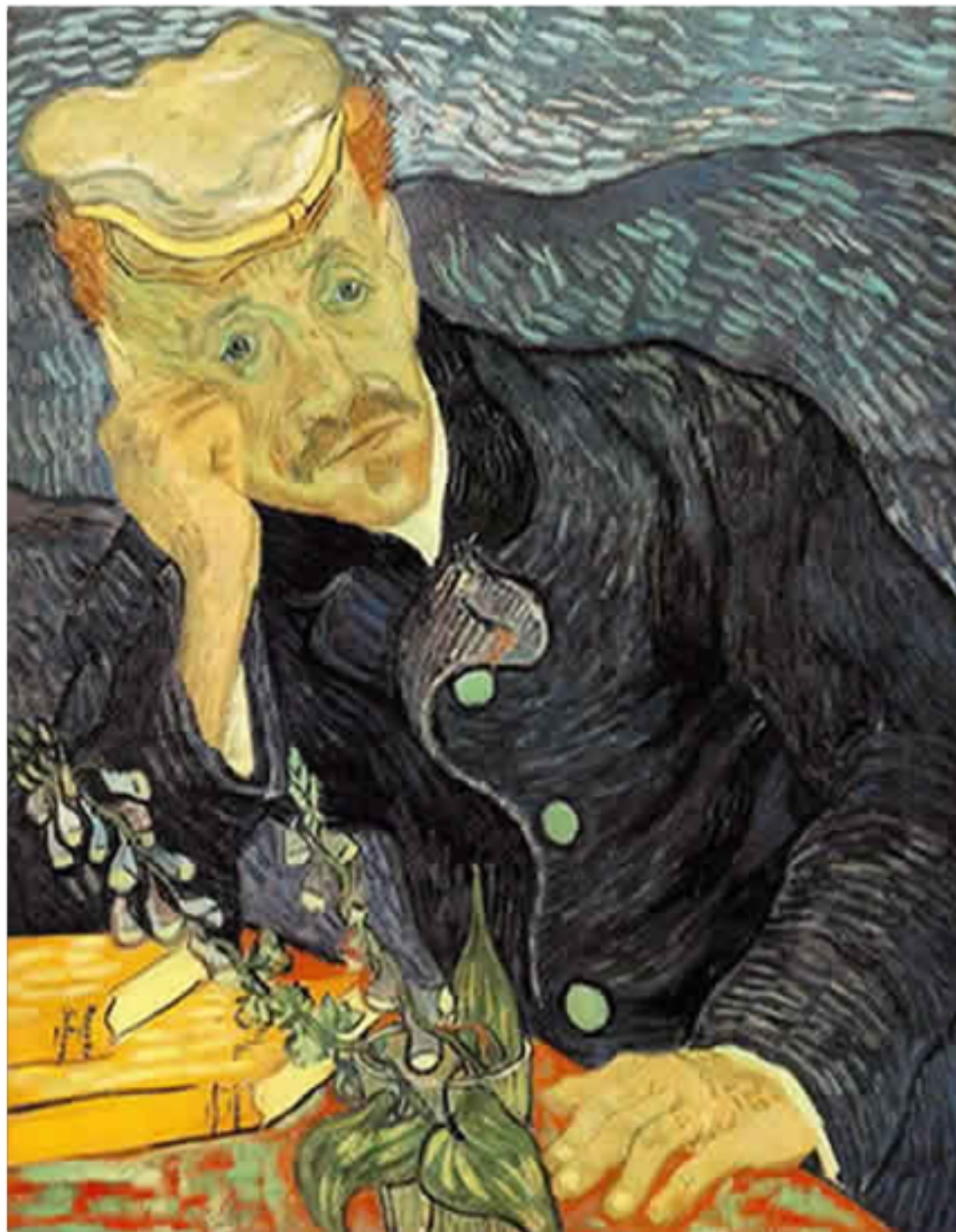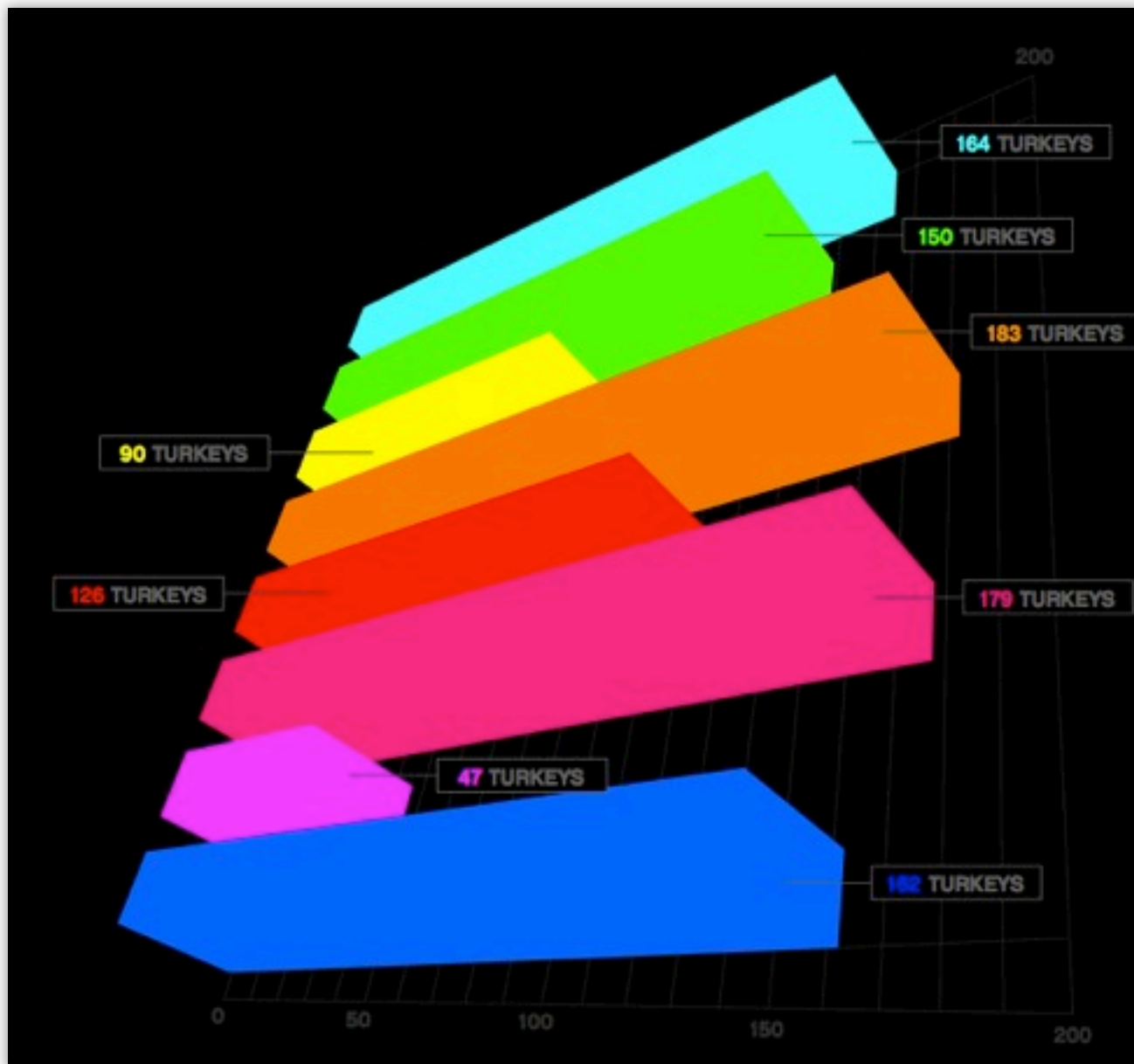
WebTrends 10

restraint

meaning

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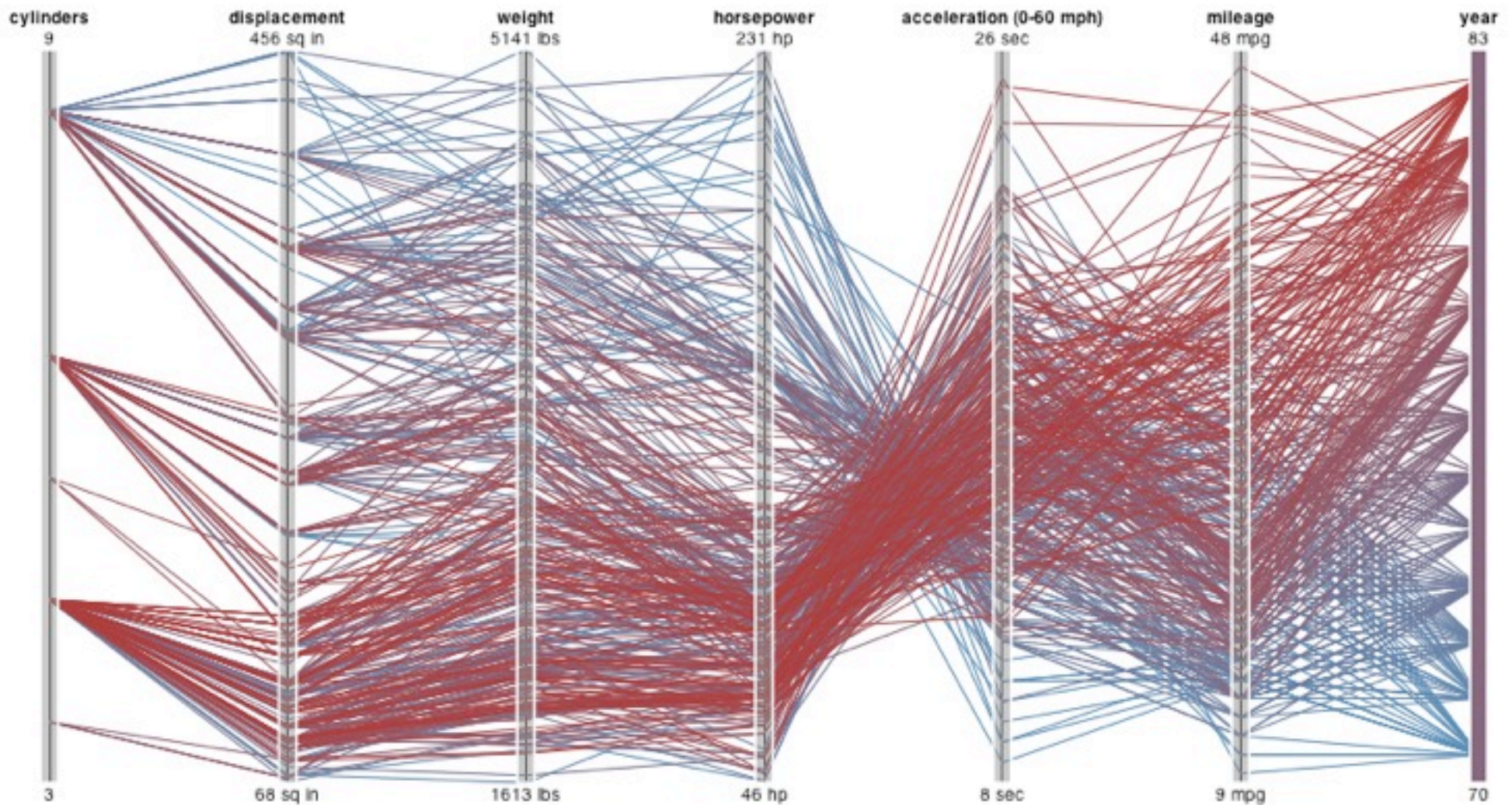
Contrast

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Contrast

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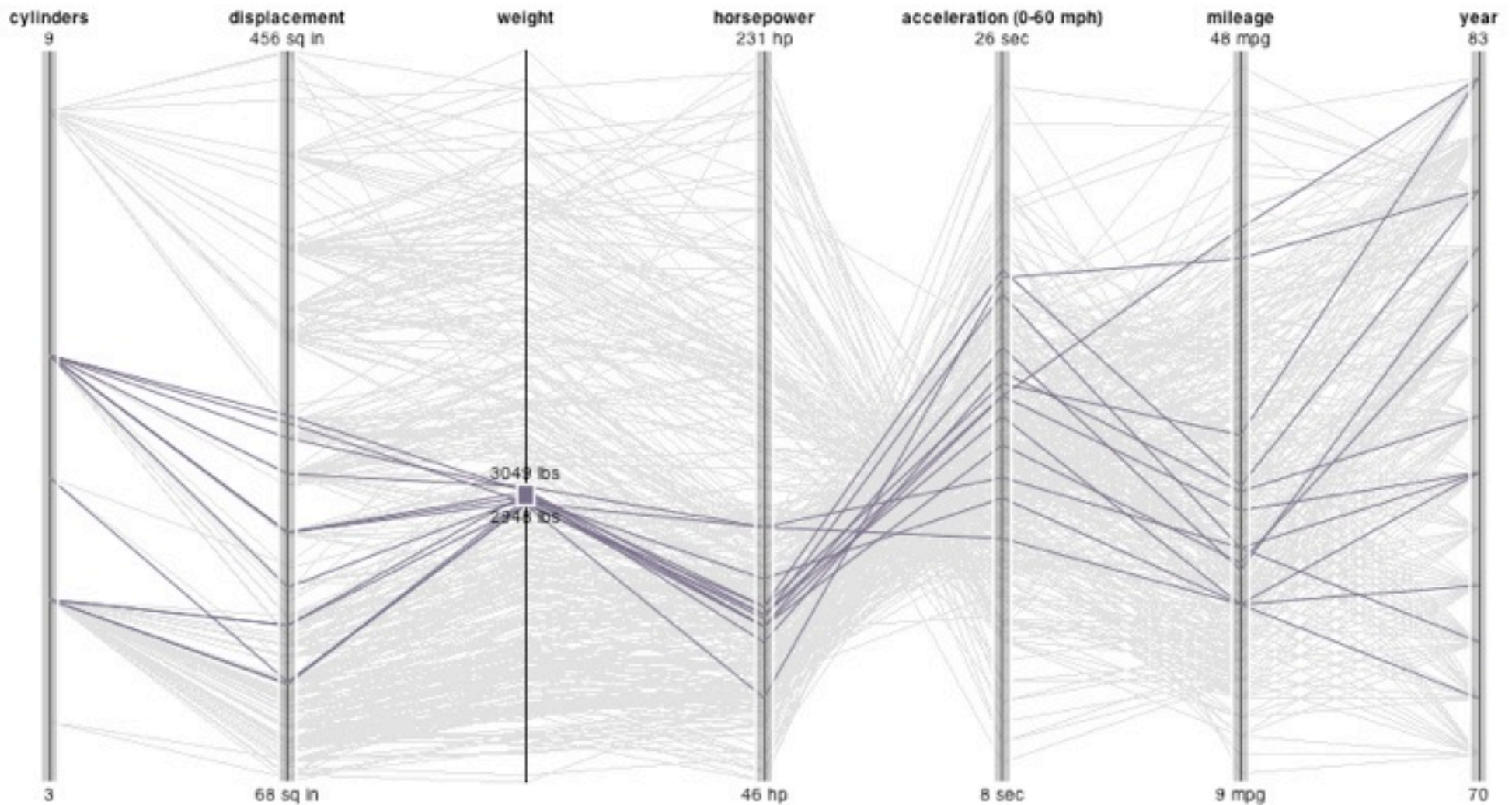
Contrast

Contrast

Contrast
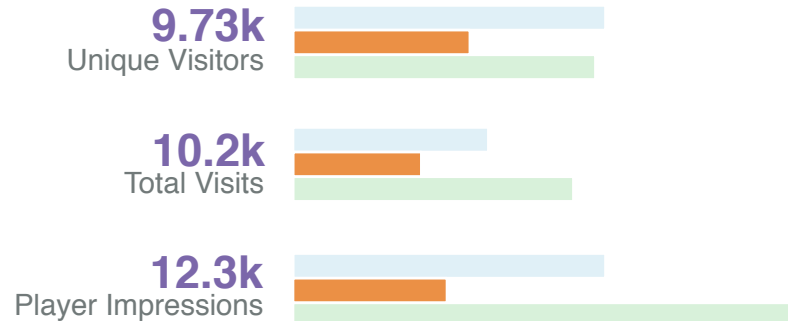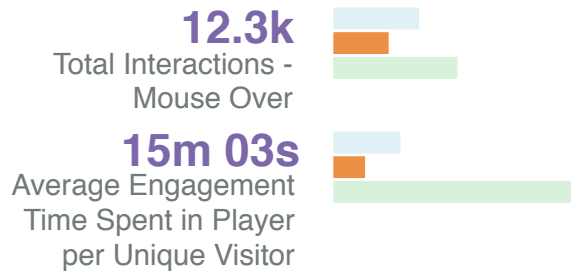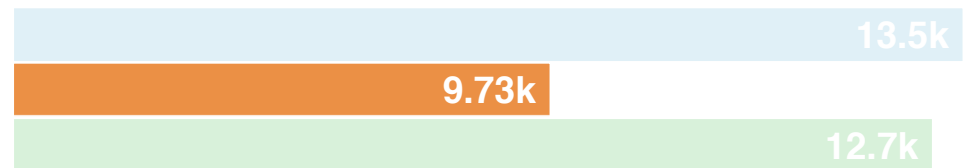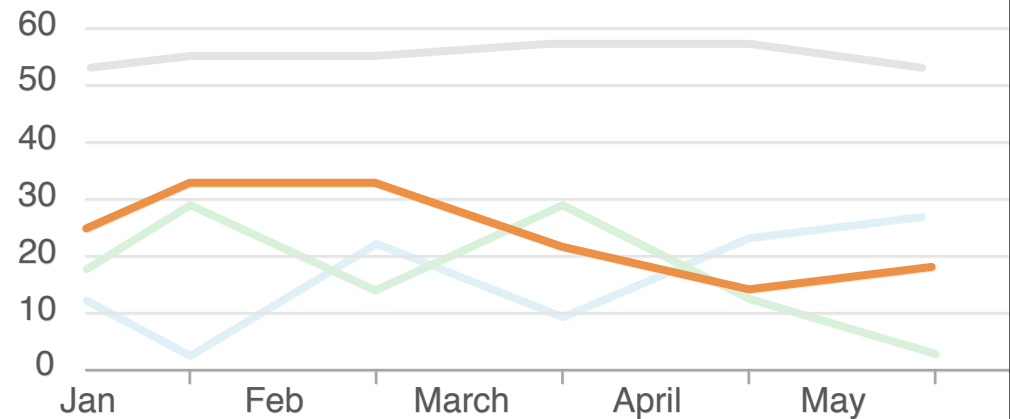
FORM FOLLOWS FUNCTION

DATA
VIZARDS...

TELL A STORY

FORM FOLLOWS FUNCTION

DATA
VIZARDS...
TELL A STORY

DATA VIZARDS…
FORM FOLLOWS FUNCTION

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Columns: paper, Excel, online app, e-mail, large screen

timeliness: paper ❌, Excel ✅, online app ✅, e-mail ✅, large screen ✅
aesthetic: paper ✅, Excel (empty), online app ✅, e-mail ❌, large screen ✅
mobility: paper ✅, Excel empty, online app empty, e-mail ✅, large screen ❌
connectivity: paper ❌, Excel empty, online app ✅, e-mail ✅, large screen ✅
data detail: paper ❌, Excel ✅, online app ✅, e-mail ❌, large screen empty
data density: paper ✅, Excel empty, online app empty, e-mail ❌, large screen empty
interactivity: paper ❌, Excel empty, online app ✅, e-mail ❌, large screen ❌
collaboration: paper empty, Excel empty, online app empty, e-mail ✅, large screen ❌

form function	paper	Excel	online app	e-mail	large screen
timeliness	❌	✅	✅	✅	✅
aesthetic	✅		✅	❌	✅
mobility	✅			✅	❌
connectivity	❌		✅	✅	✅
data detail	❌	✅	✅	❌	
data density	✅			❌	
interactivity	❌		✅	❌	❌
collaboration				✅	❌

form / *function*	paper	Excel	online app	e-mail	large screen
timeliness	❌	✅	✅	✅	✅
aesthetic	✅		✅	❌	✅
mobility	✅			✅	❌
connectivity	❌		✅	✅	✅
data detail	❌	✅	✅	❌	
data density	✅			❌	
interactivity	❌		✅	❌	❌
collaboration				✅	❌

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Monday, June 13, 2011

LEARN FROM THE BEST
BE A DATA GOURMET
AUDIENCE AND MESSAGE
CHOOSE THE RIGHT CHART
GO BEYOND THE BASICS
KEEP IT SIMPLE
PROVIDE CONTEXT
ACT LIKE A DESIGNER
TELL A STORY
FORM FOLLOWS FUNCTION

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List of resources

Skill	Resources
Learn from the best	www.smallmeans.com/new-york-times-infographics/ www.perceptualedge.com/blog infographics.alltop.com
Message and audience	
Be a data gourmet	www.juiceanalytics.com/writing/being-a-data-gourmet/
Choose the right chart	www.chartchooser.com www.extremepresentation.com/design/charts/ www.juiceanalytics.com/writing/chart-selection-art-and-science/
Go beyond the basics	A Tour of the Visualization Zoo (queue.acm.org/detail.cfm?id=1805128)
Keep it simple	Edward Tufte Q&A (www.edwardtufte.com/bboard/q-and-a?topic_id=1)
Provide context	
Act like a designer	colorbrewer2.org www.juiceanalytics.com/writing/simple-font-framework/
Tell a story	www.duarte.com/books/resonate/www/
Form follow function	

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Monday, June 13, 2011

we craft applications that make using
data enjoyable and rewarding