

Data Visualization 101: Grids, Charts and Dashboards



Presenter: **Joni Girardi**, DataSelf Founder & CEO

Agenda

Design principles

Easily understood viz types

Colors

Number and date formatting

Layout

Chart types: bars, lines, colors, grids

Role-focused dashboards

Color blindness

Rendering dashboards

Visualizations to avoid

Q&A

2	5	8	4	4	4	8	5	6	6	4	2	7	6	2	5	8	4	7	4	4	2	6	8	1	6
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Visual perception

Attentive processing

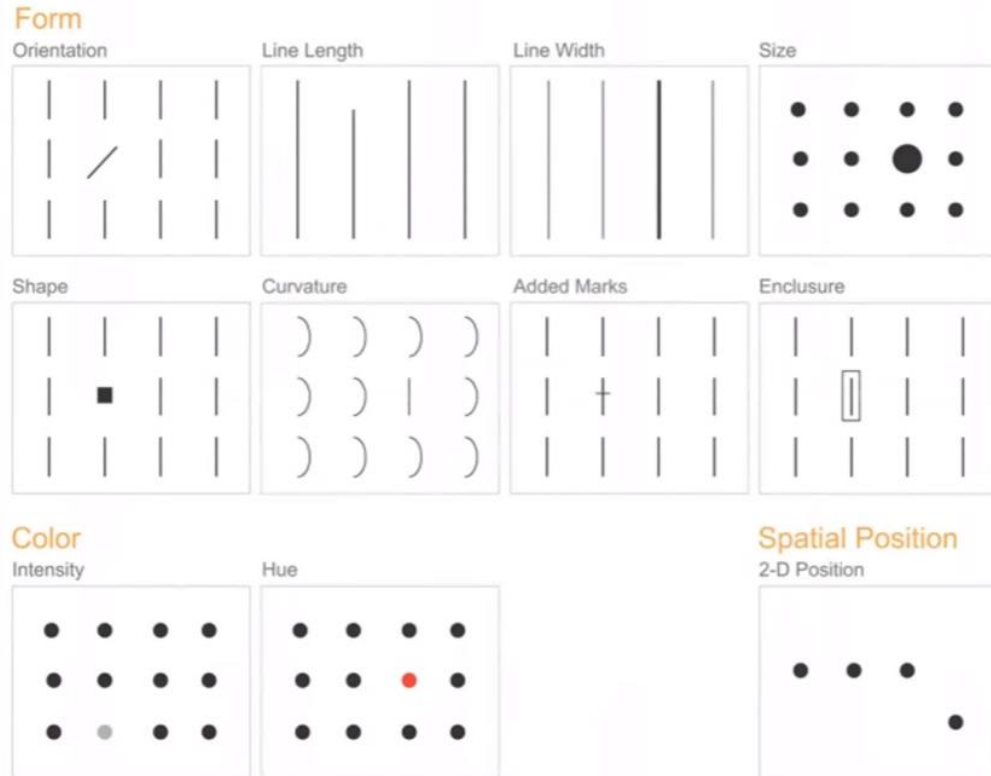
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Brain speed:

Pre-attentive
processing

(vs attentive processing)

Pre-Attentive Visual Attributes



Source: Stephen Few, Tapping the Power of Visual Perception
https://www.perceptualedge.com/articles/ie/visual_perception.pdf

THE USE OF COLOR IN DATA VISUALIZATION

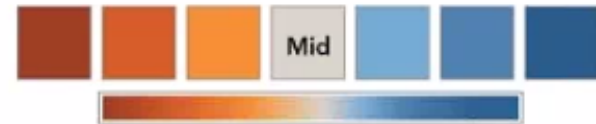
SEQUENTIAL

color is ordered from low to high



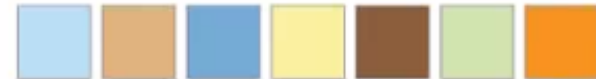
DIVERGING

two sequential colors with a neutral midpoint



CATEGORICAL

contrasting colors for individual comparison



HIGHLIGHT

color used to highlight something



ALERT

color used to get reader's attention



Design Principles / Guidelines

Goals of visualization

Who's your audience

Exposure frequency

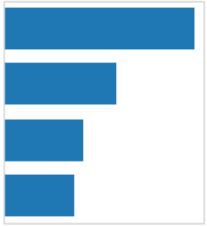
Exposure length

Screen real estate

Experiment, get feedback, refine

Easily Understood Visualization Types

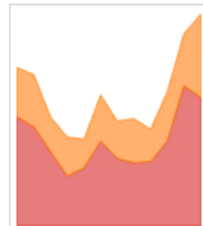
Will you have time to teach users how to read a scattered plot?



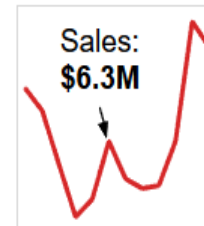
Bars



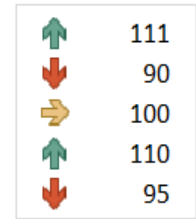
Lines



Areas



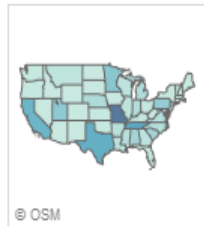
Labels



State indicators

January 2016	\$8,091K
February 2016	\$7,341K
March 2016	\$5,509K
April 2016	\$3,707K
May 2016	\$4,308K
June 2016	\$6,295K

Tables

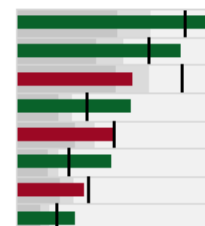


Maps



Pie charts

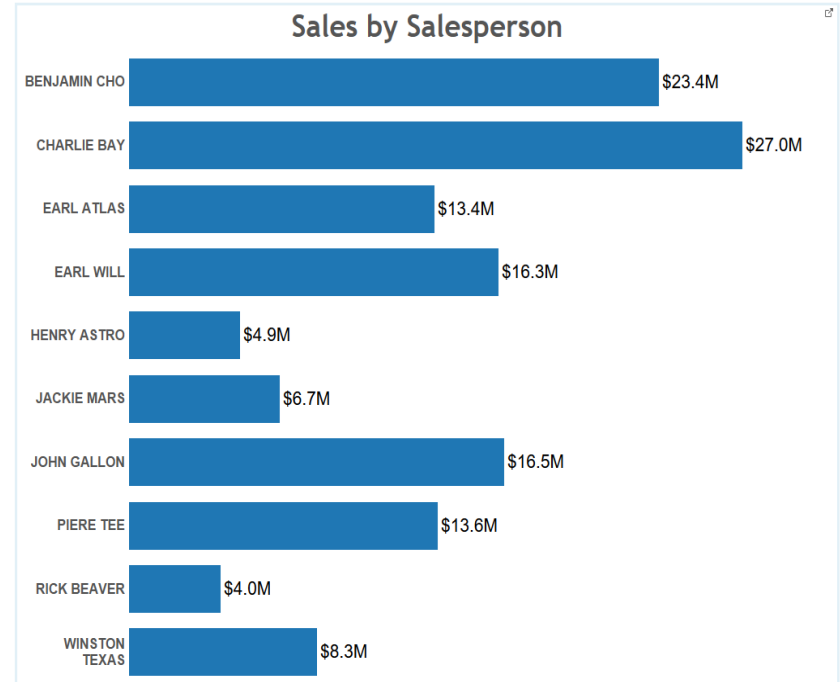
Up to a few different data points



Bullet charts

Radio gauges take a lot of space

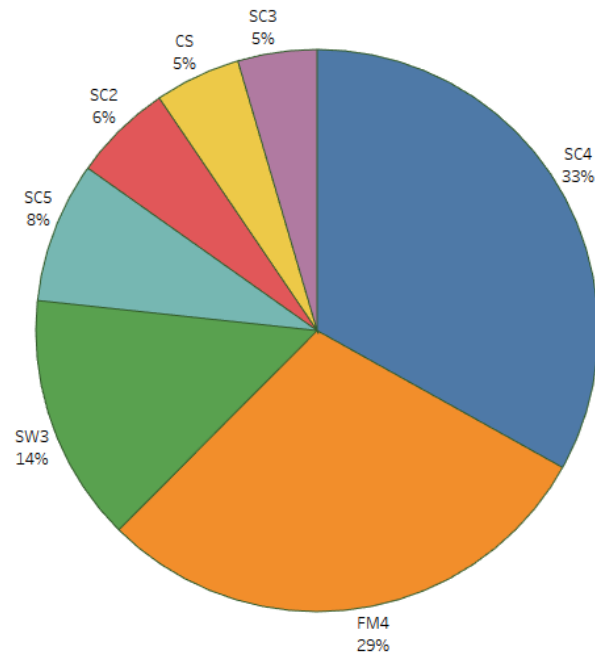
Color: Data-Ink Ratio



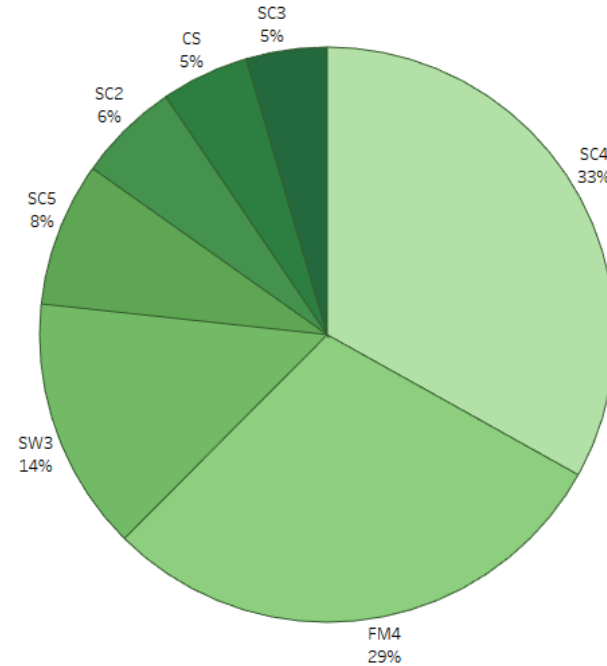
Edward Tufte: "Data-ink ratio" argues against using excessive decoration in visual displays of quantitative information

Color: Distractions

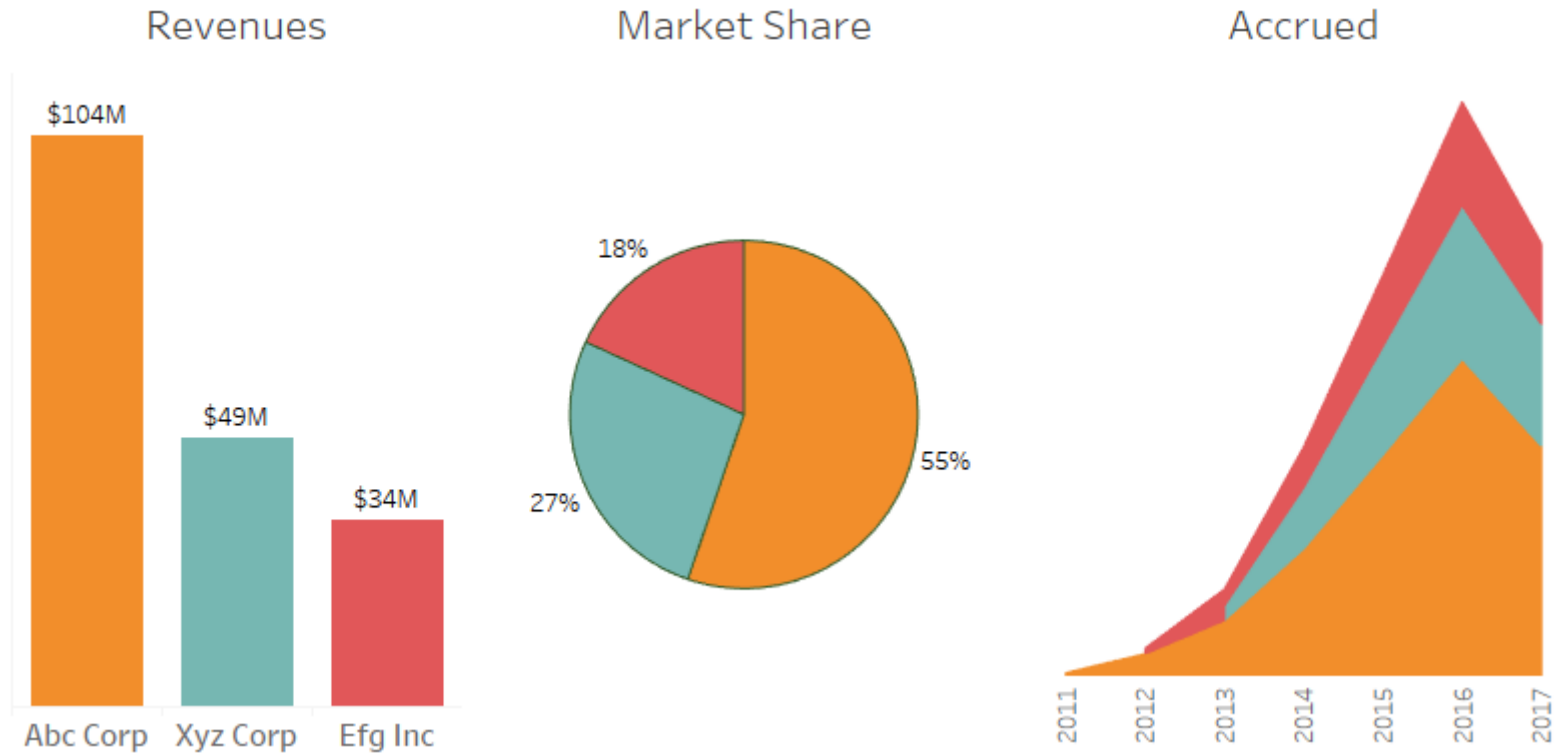
Top market share?



Color distraction

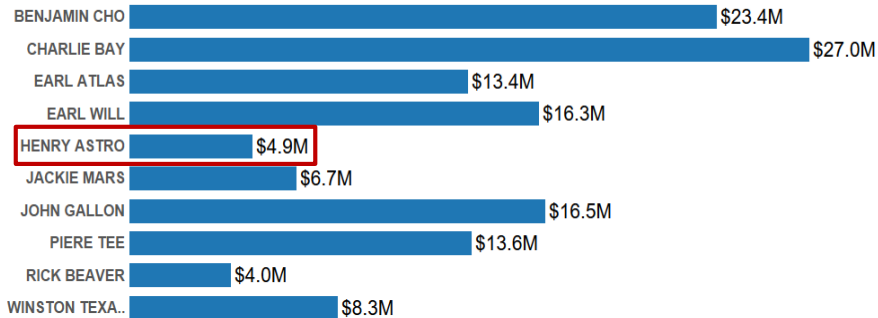


Color: Legend and Consistency

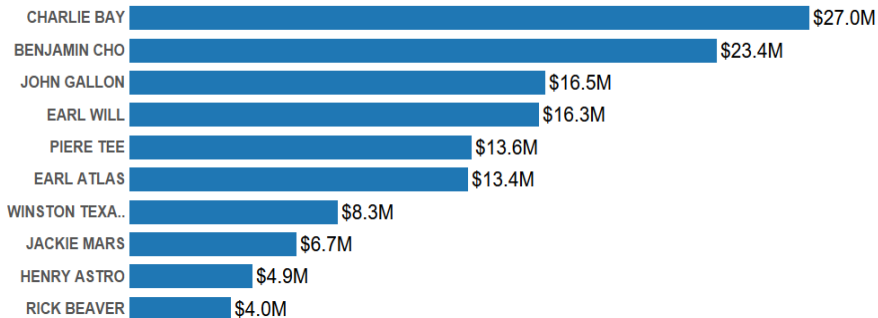


Color: Legend and Consistency

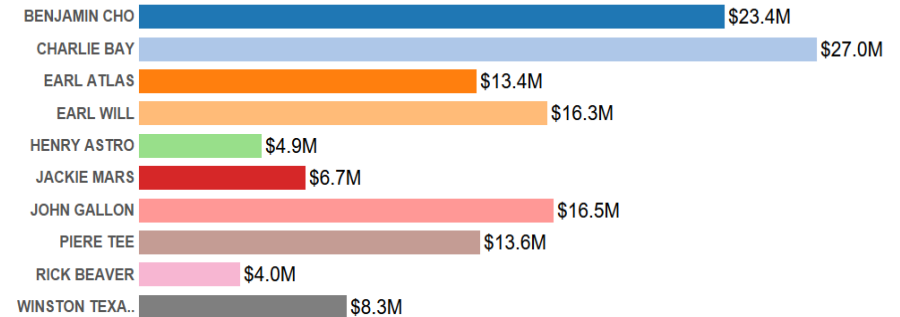
Alphabetical Order



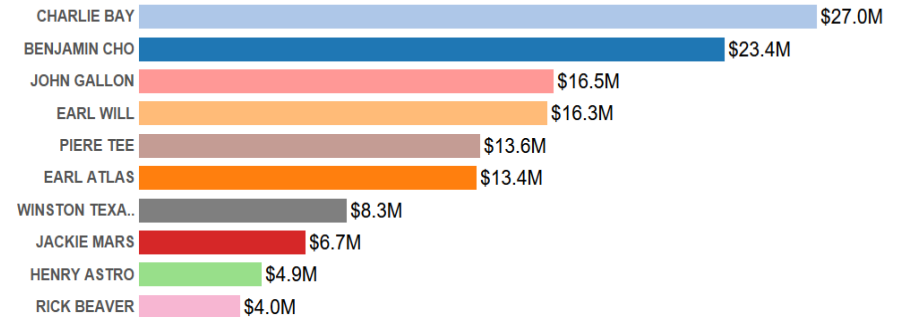
Descending Order



Alphabetical Order

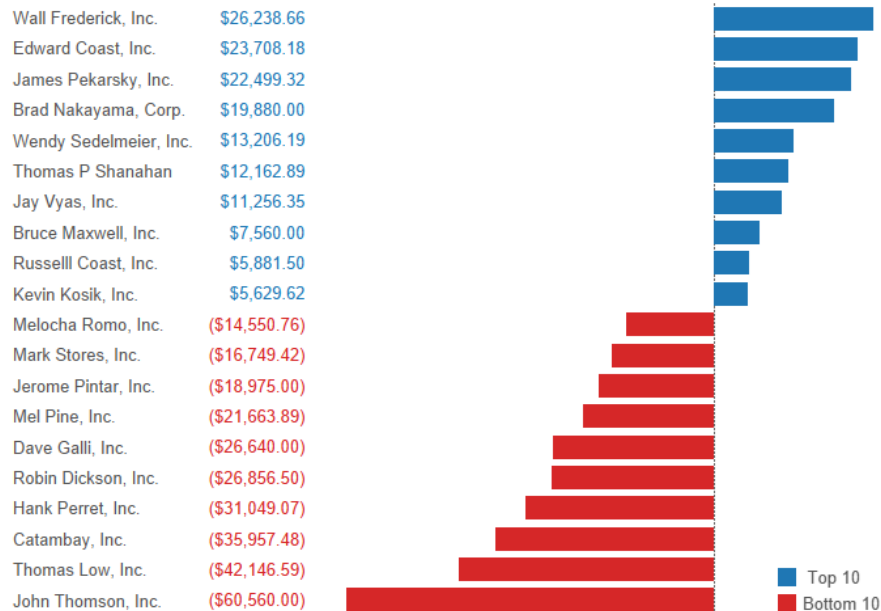


Descending Order

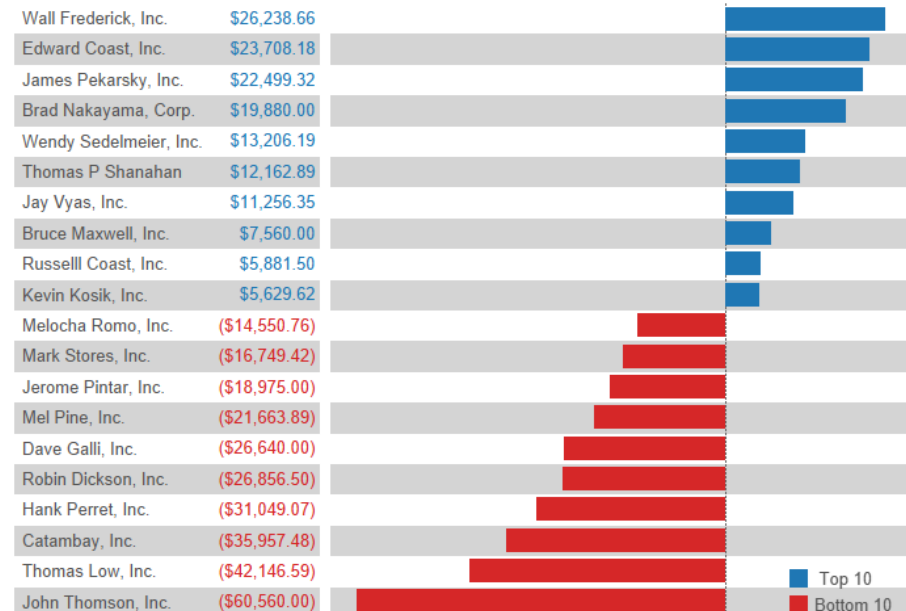


Color: Bands and Lines

Top customers by sales change since last YTD

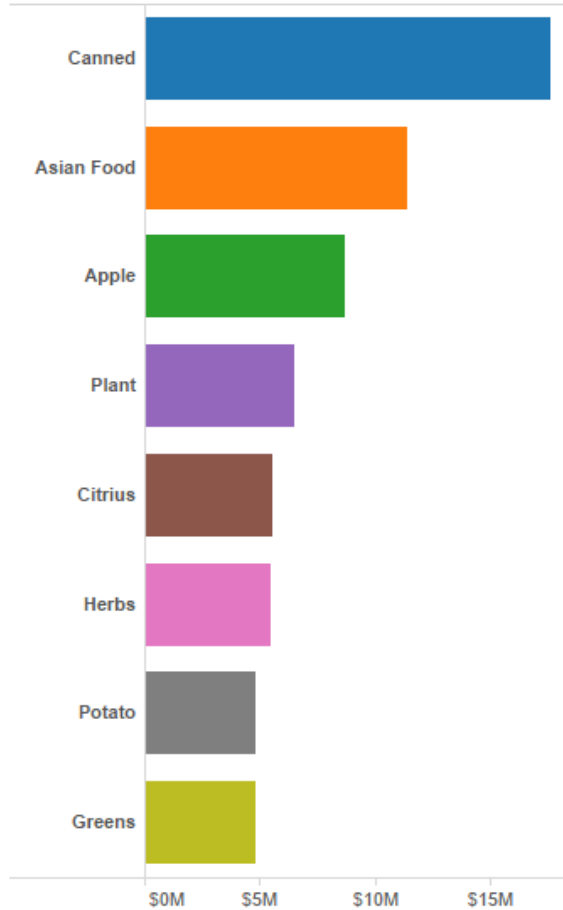


Top customers by sales change since last YTD

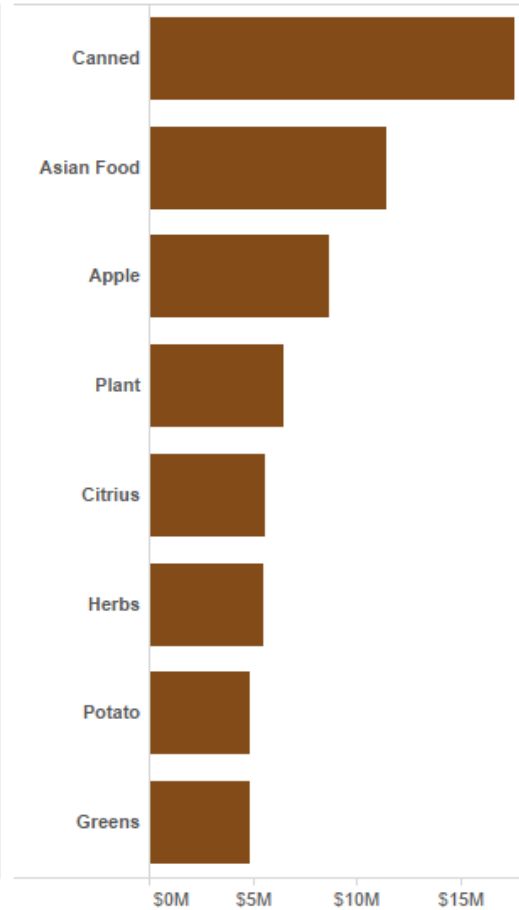


Color: Actionable

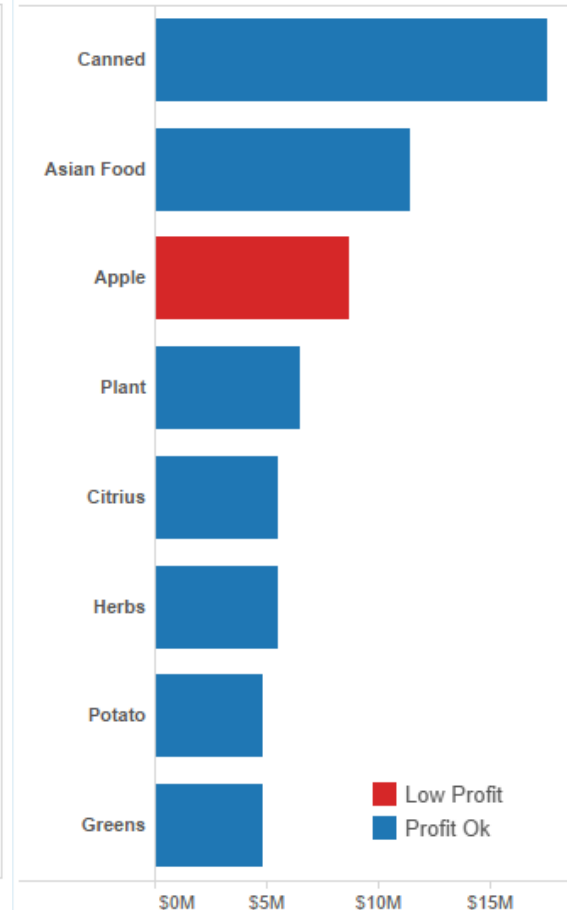
Poor



Good



Best practices. Actionable!



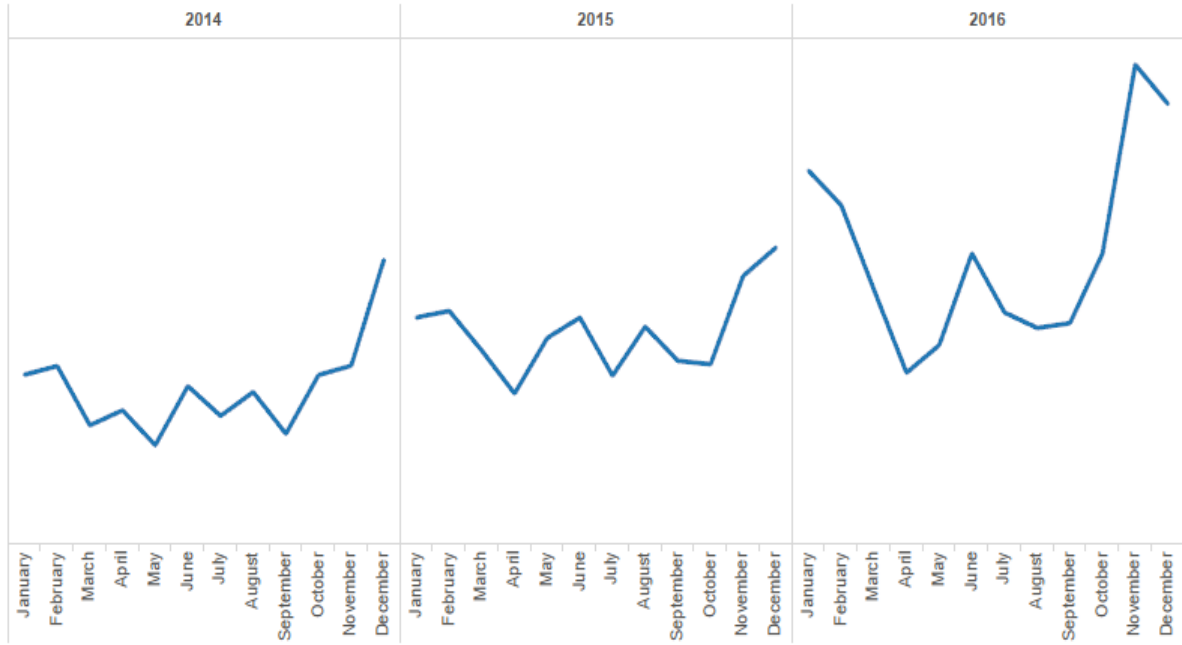
Number Formatting

Types: Currency, Number, Percentage

	Qty Sold	Sales	Pct GP
Abc Corp	1497019.00	86509343.13	0.54
Intl Ops	11440509.00	51235507.73	0.09
West Co	4198314.00	36319928.23	0.51
Xyz Inc	5828632.00	31876796.84	0.57

	Qty Sold	Sales	Pct GP
Abc Corp	1,497K	\$86.5M	54.3%
Intl Ops	11,441K	\$51.2M	9.1%
West Co	4,198K	\$36.3M	51.0%
Xyz Inc	5,829K	\$31.9M	57.4%

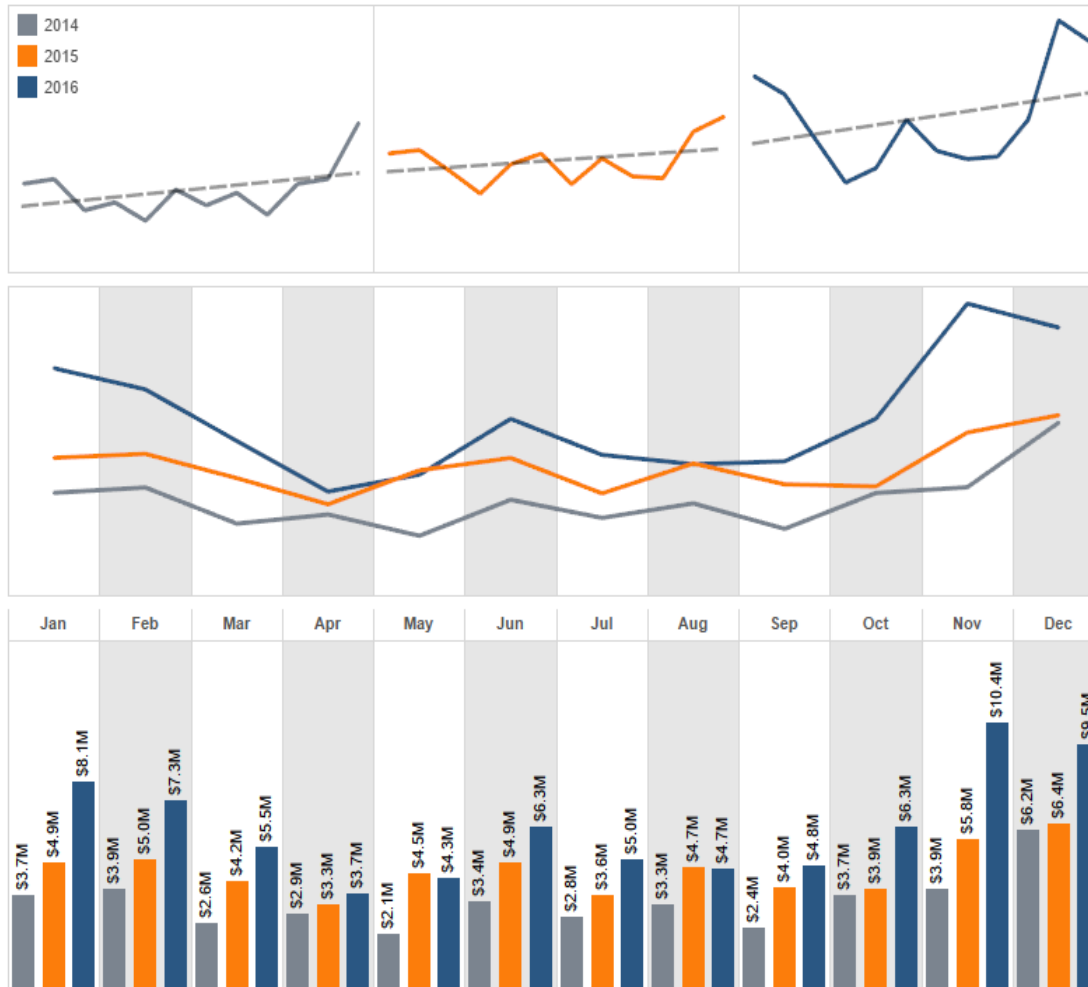
Date Formatting



Trend over time?
YoY growth?

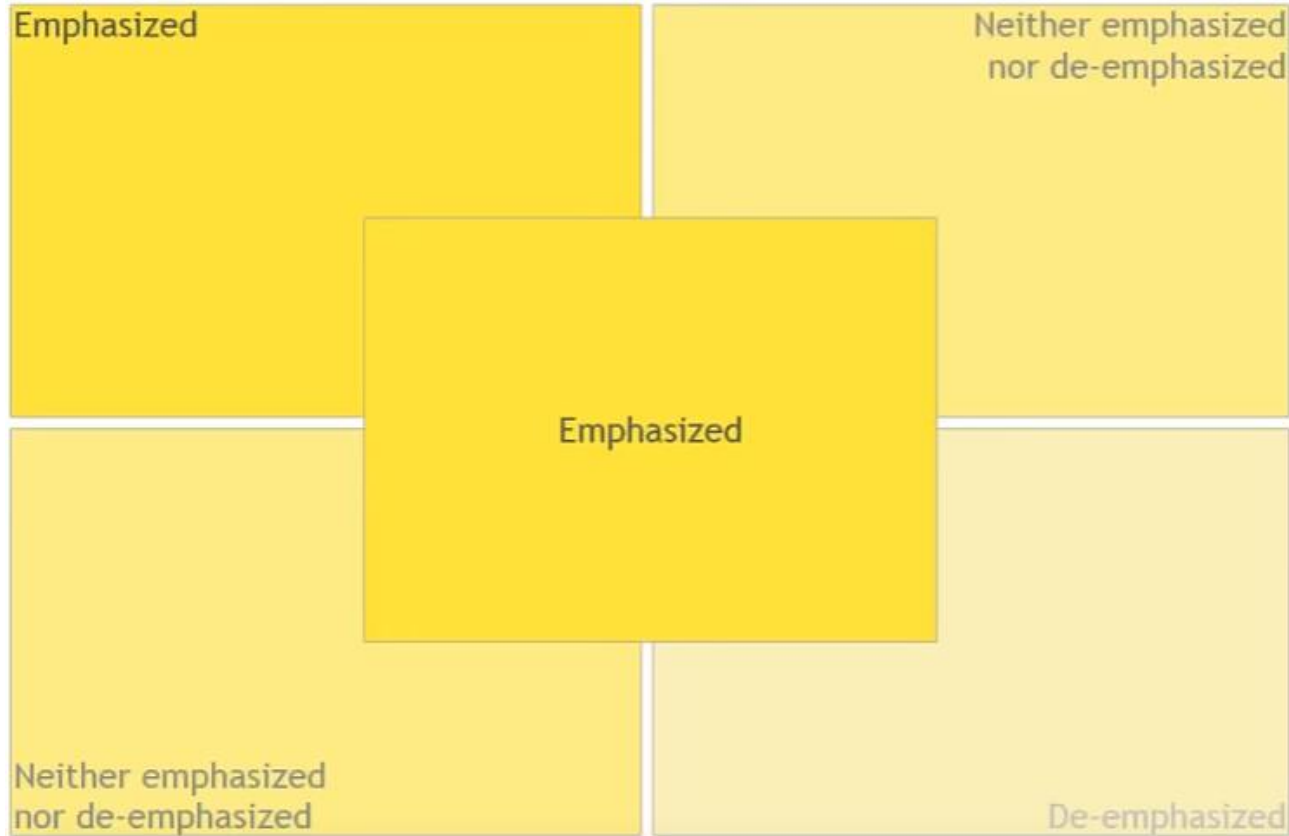
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J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
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Date and Color Choices



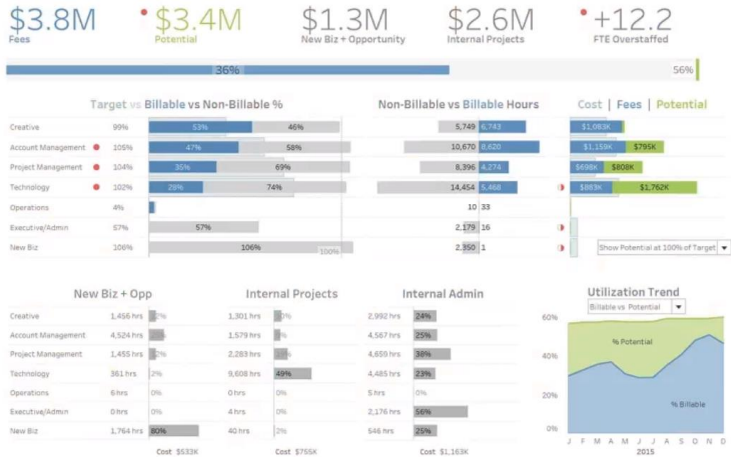
Trend over time?
YoY growth?

Layout: Location, Location, Location

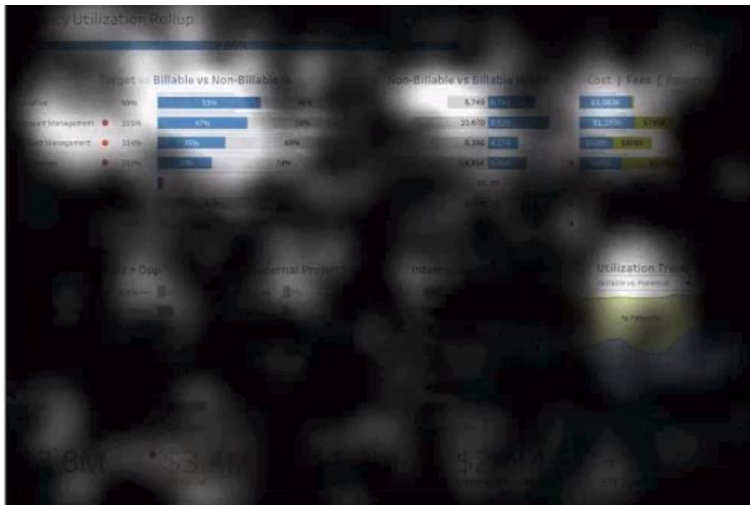


Layout: Big Numbers, Eye-tracking

Agency Utilization Rollup



Agency Utilization Rollup



10s eye-tracking

Layout: Tips

- Avoid scrollbars
- Date/time stamp

Chart Types: Bars and Lines

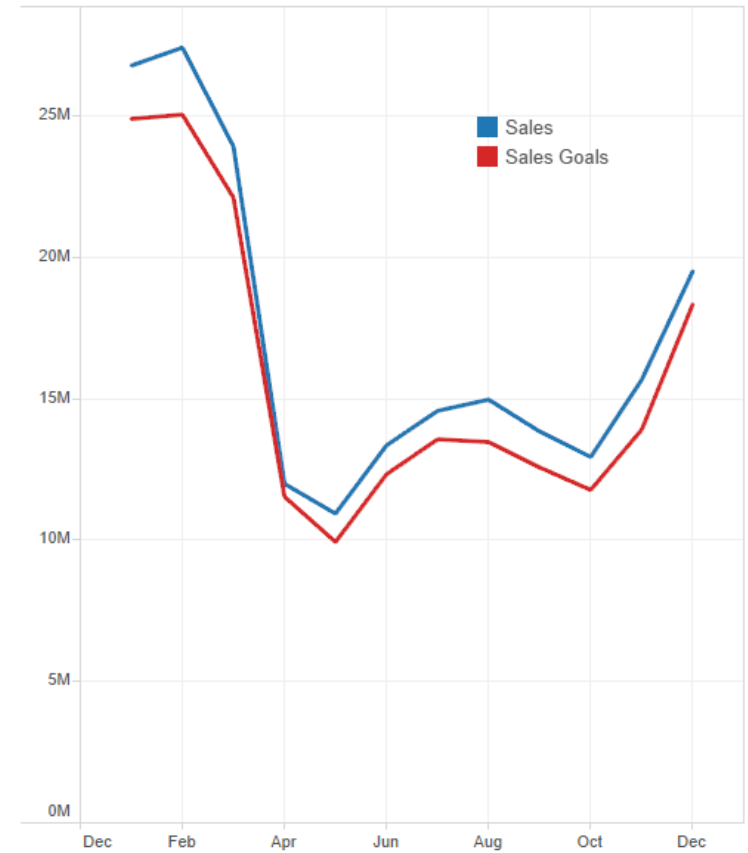
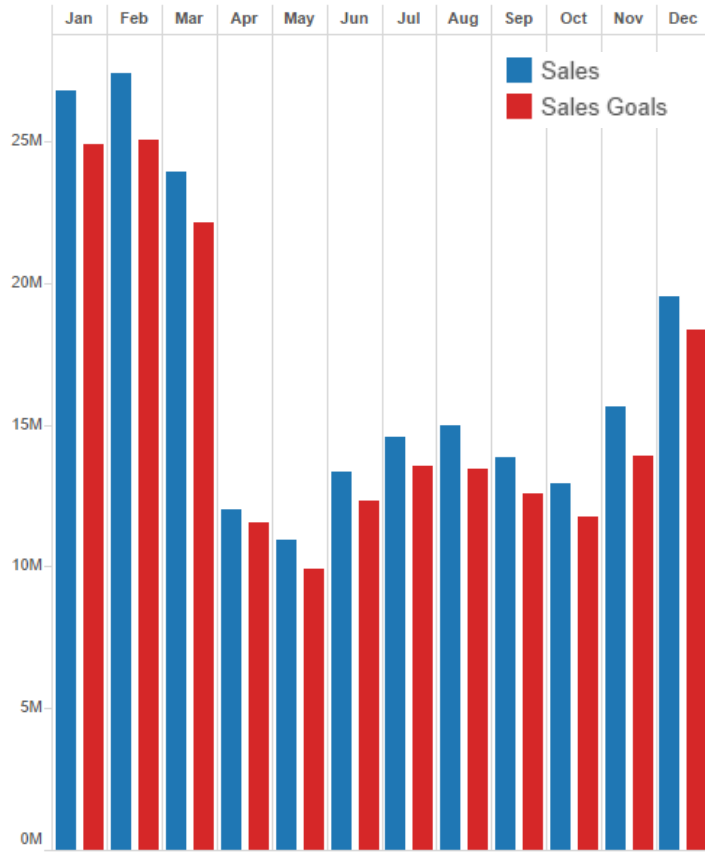
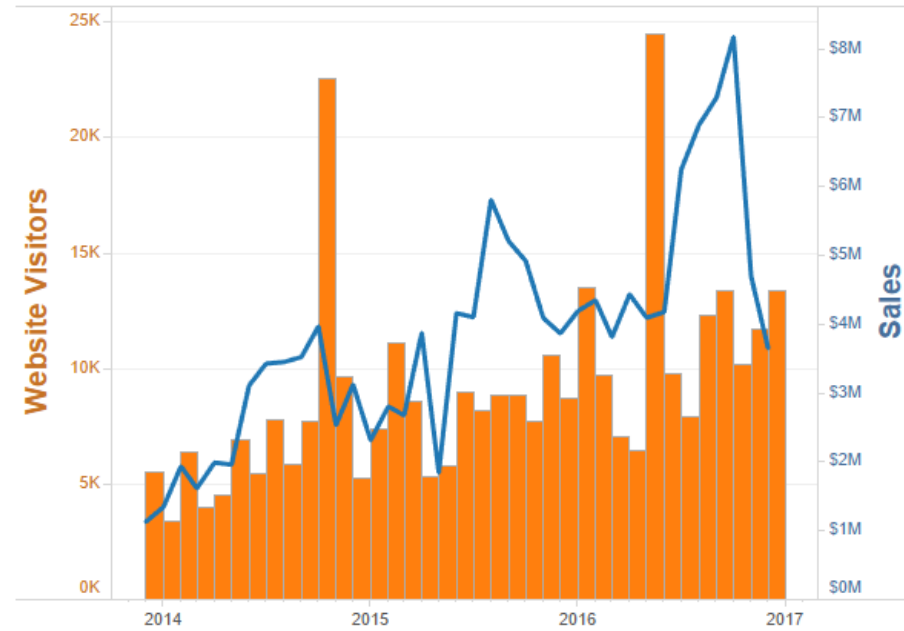
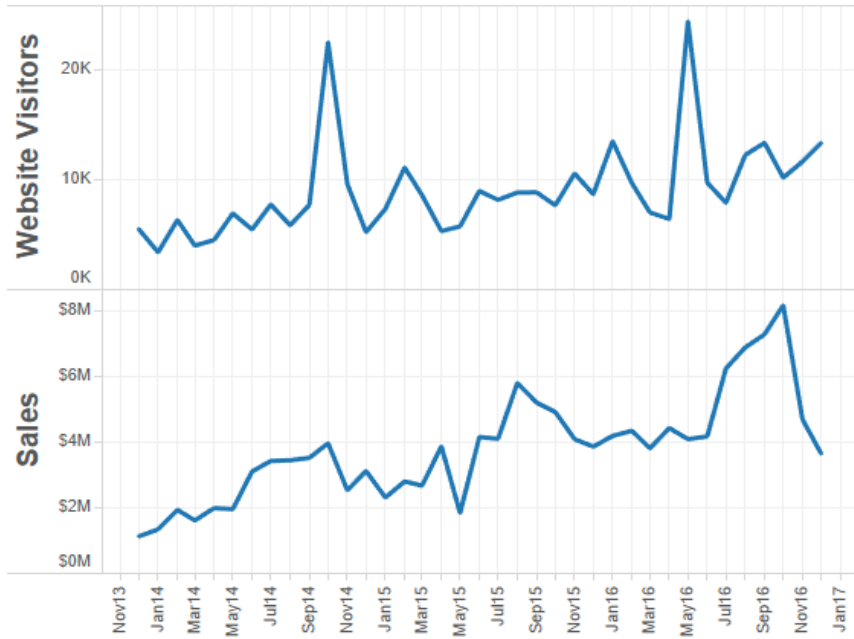
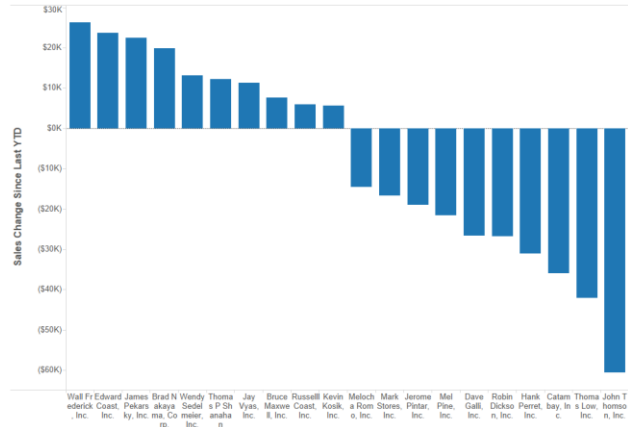


Chart Types: Colors and Dual Axis

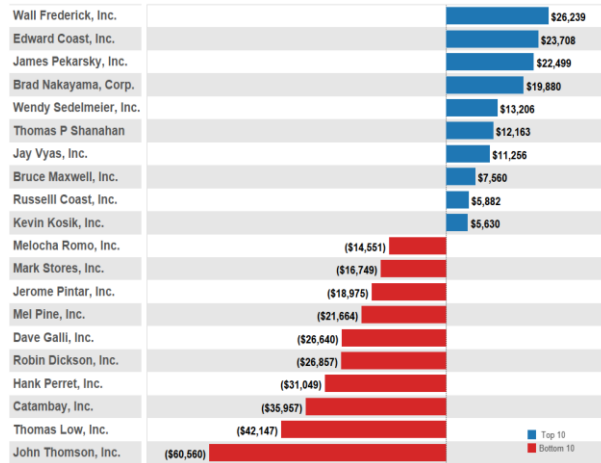


Charts and Grids

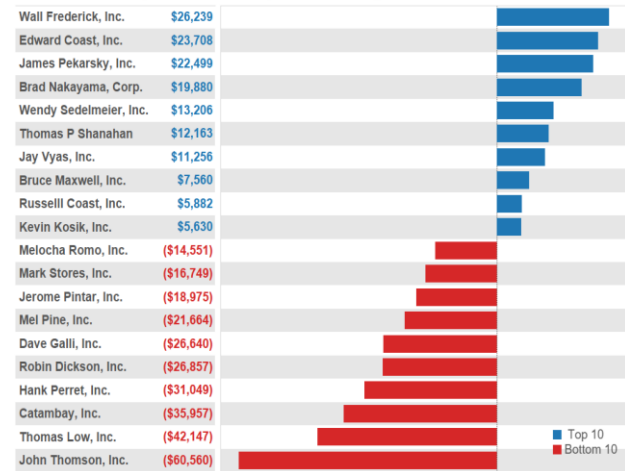
Top customers by sales growth and decline since last YTD



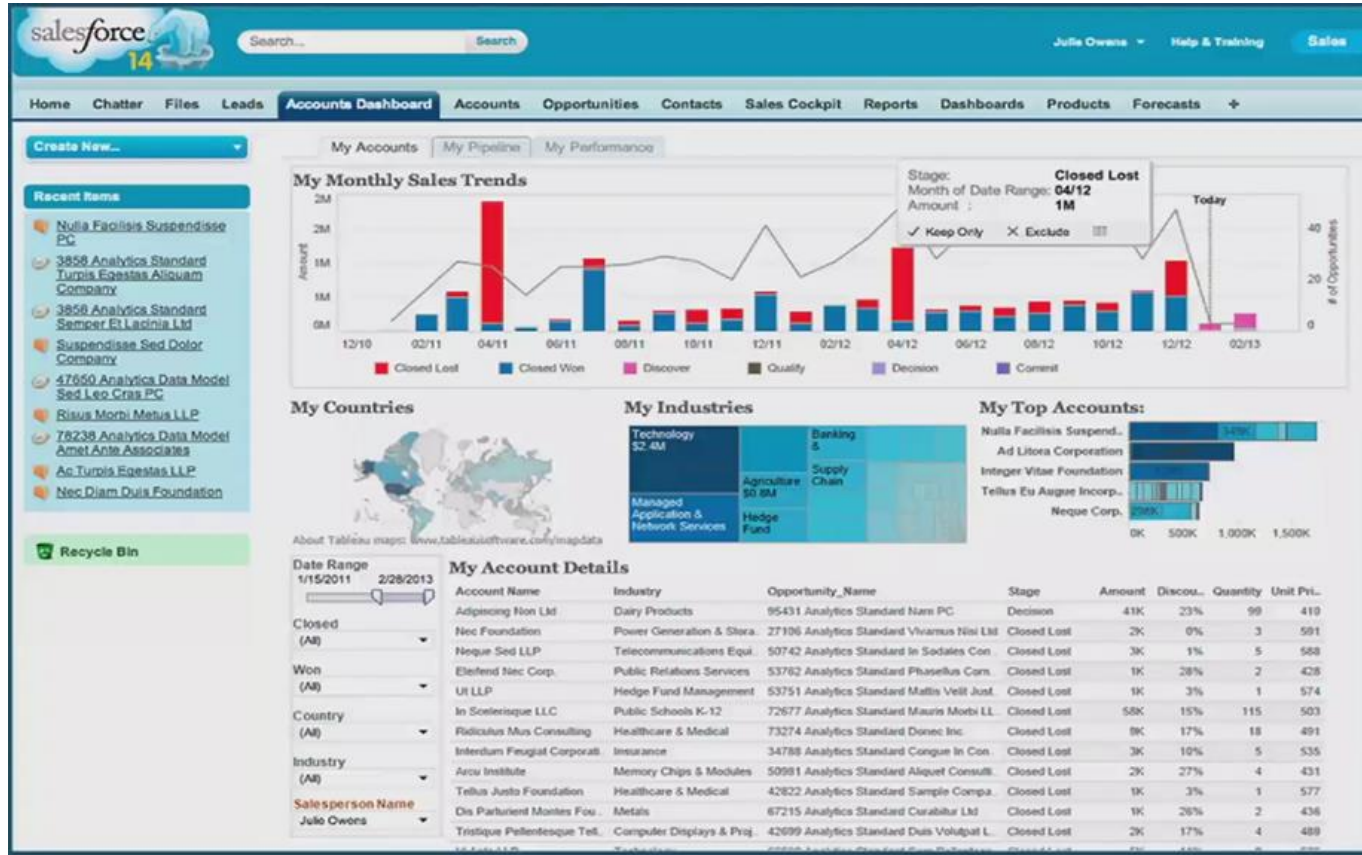
Top customers by sales change since last YTD



Top customers by sales change since last YTD

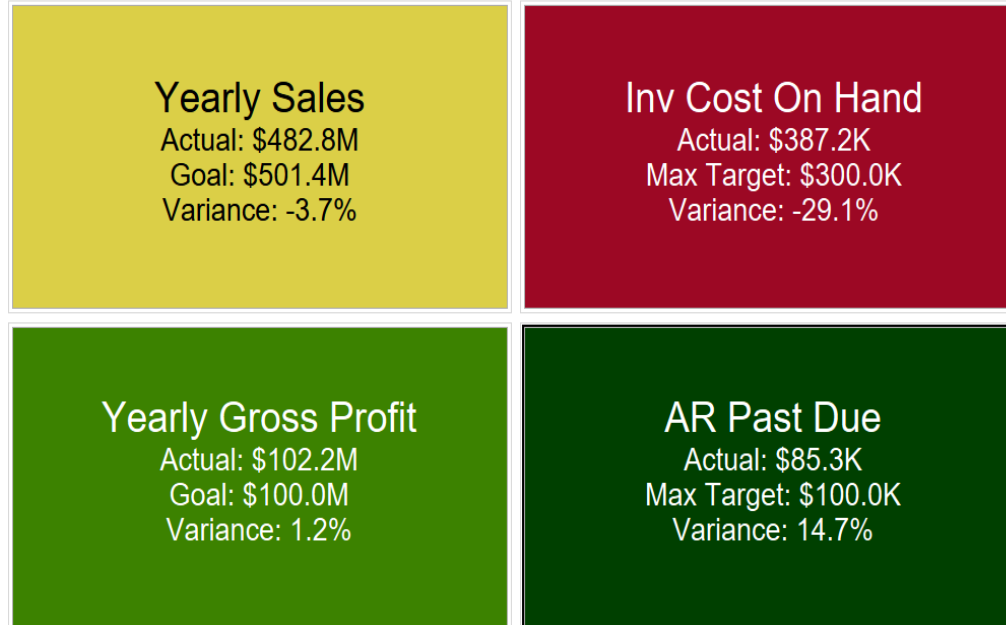


Role Focused Dashboards: In the work flow



Role Focused Dashboards

CEO Snapshot



Color Blindness

10% of males, 1% of females

Source: <http://schoolworkhelper.net/color-blindness-causes-types/>



Colors as seen with normal vision

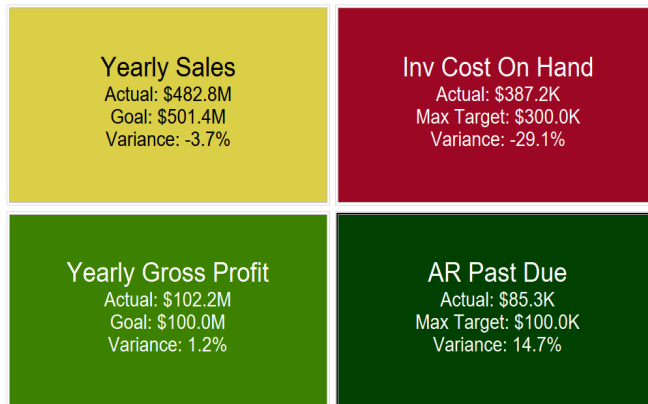
Same colors as seen with red-green color deficiency

Select Color Palette:

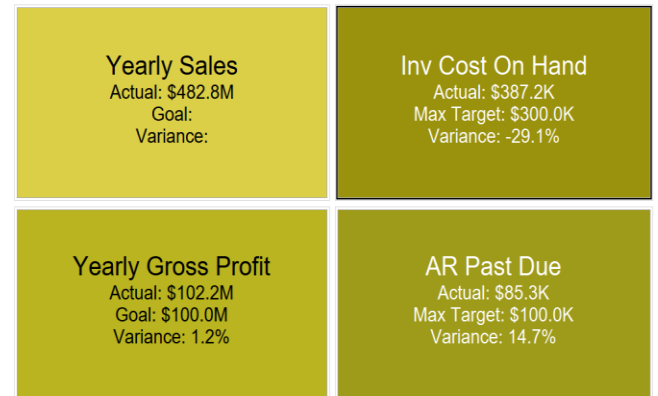
 Color Blind



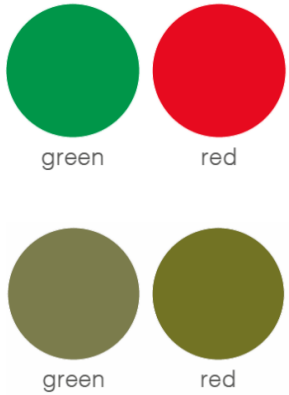
CEO Snapshot



CEO Snapshot



Color Blindness



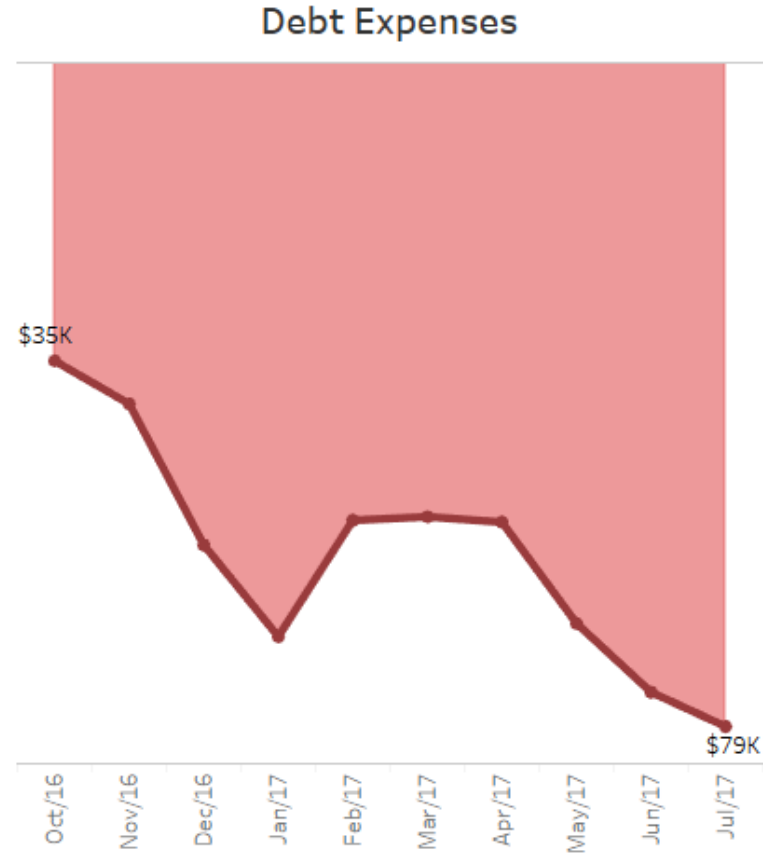
Rendering Dashboards

- Method:
Desktop, web, mobile, email
Push, self-service, alerts, in the work flow
- Security - with sensitive data, test it really well!
- Screen sizes

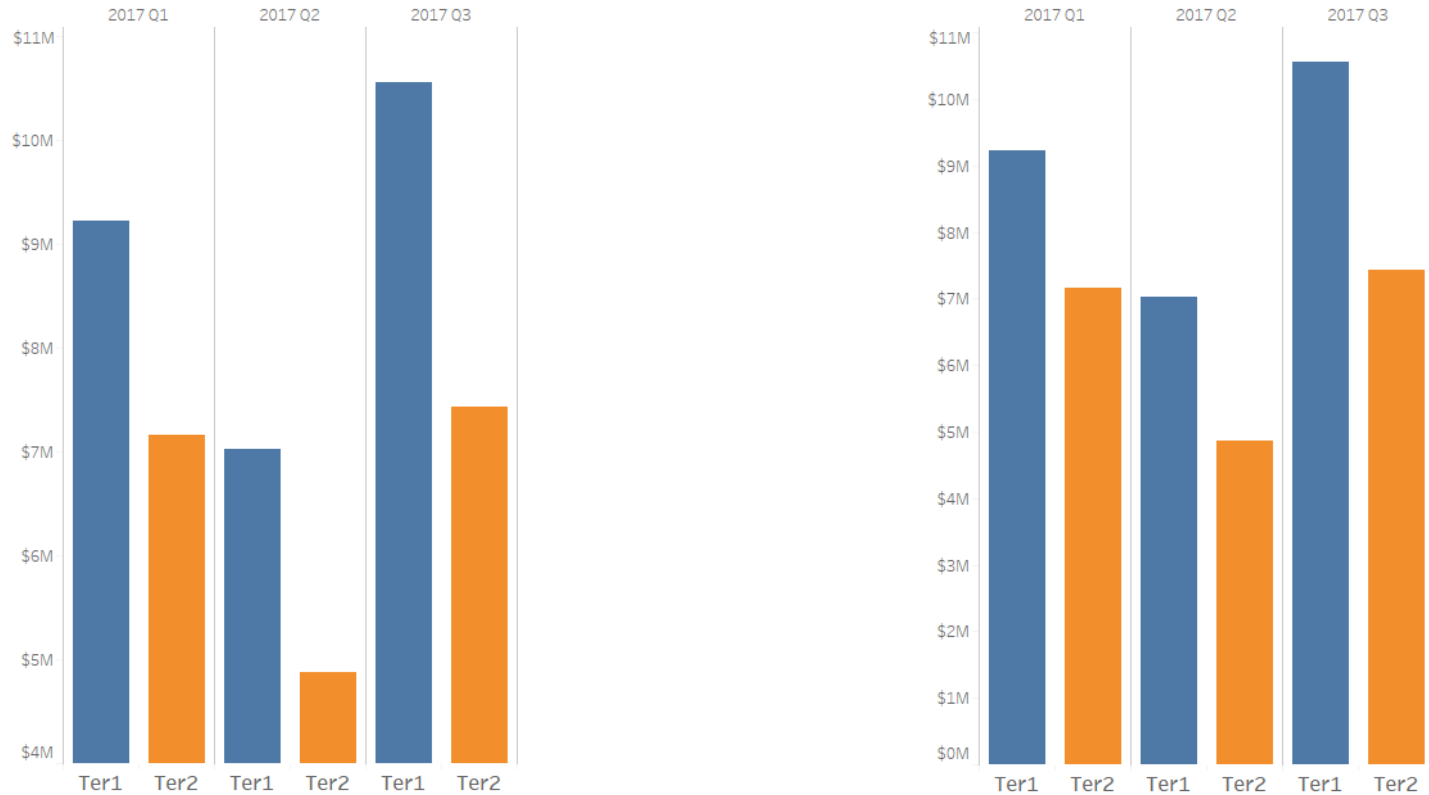
Interactivity

- Use it wisely:
 - Valuable for analysis and actionable dashboards
 - Potentially confusing for others
- Pop up windows - short-term memory, important data should be always visible
- Only set filters that are really required

Visualizations to avoid: Visual Distortions

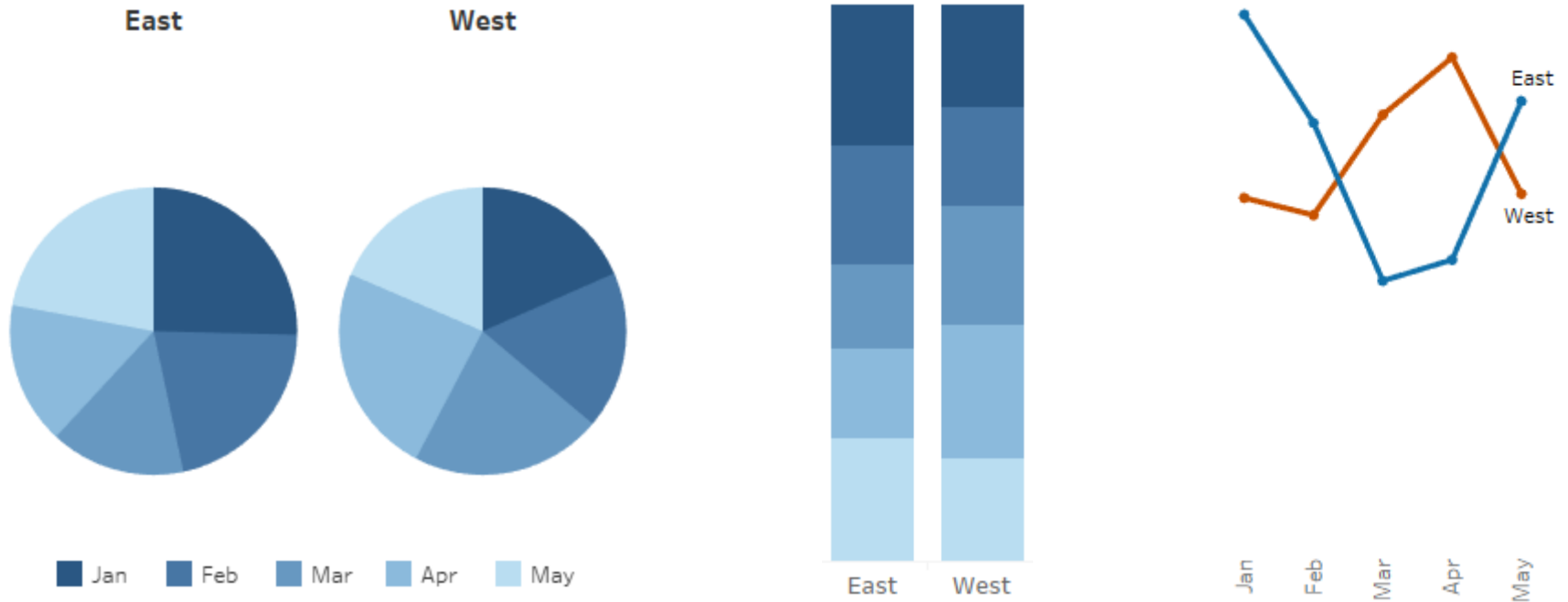


Visualizations to avoid: Visual Distortions

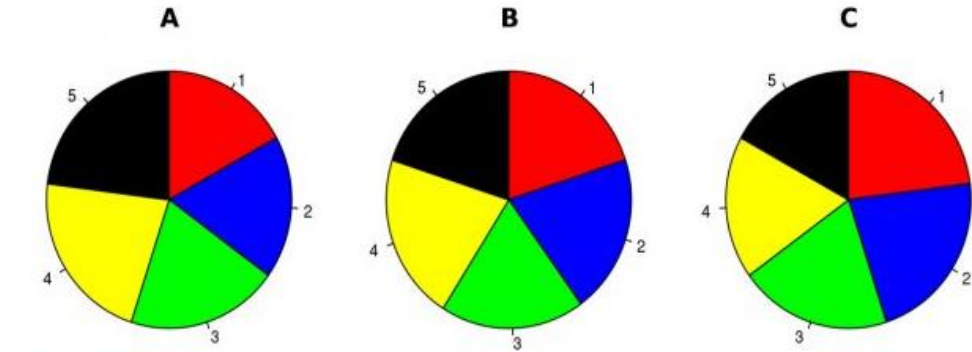


Visualizations to avoid: Visual math

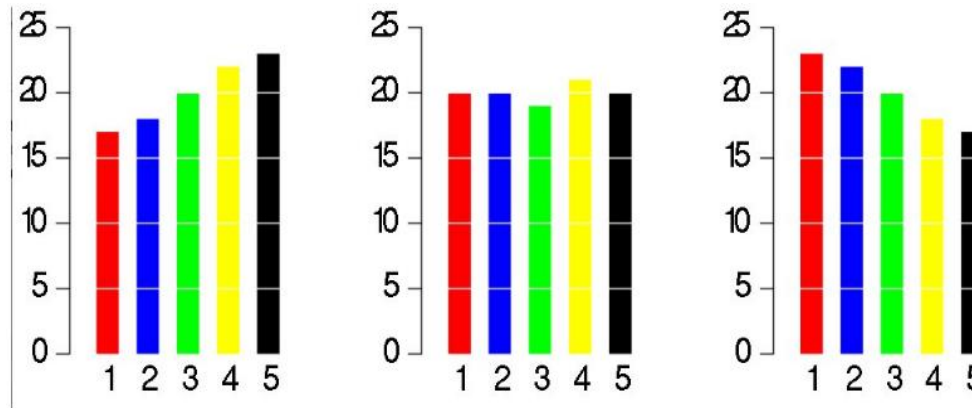
Market share change over time?



Visualizations to avoid: Pie Charts for comparing similar data points

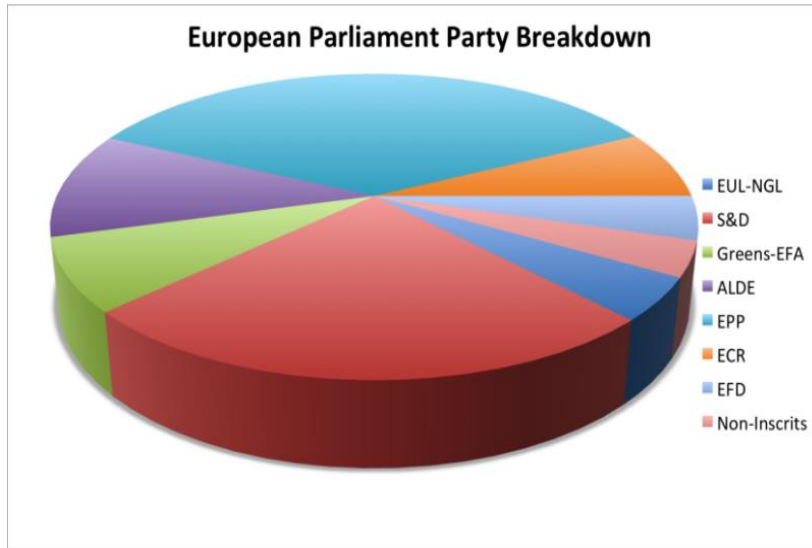


Public Domain/ Wikipedia



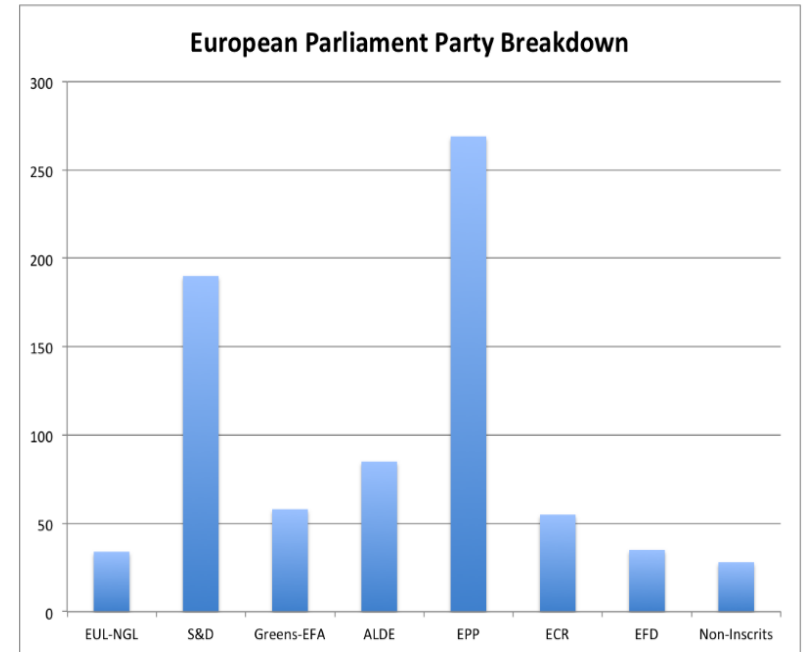
Public Domain/ Wikipedia

Visualizations to avoid: 3D Charts, especially Pie Charts



Walter Hickey / BI

Deceiving



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Source: Business Insider

Suggested References

Video: <https://www.tableau.com/learn/webinars/big-book-of-dashboards>

Video: <https://www.youtube.com/watch?v=GnMSjSWDQNK>

Beautiful Evidence (Edward Tufte)

Information Visualization (Colin Ware)

Information Dashboard Design (Stephen Few)

Storytelling with Data (Cole Nussbaumer Knaflic)

The 4 Disciplines of Execution (McChesney, Covey, Huling)

Q&A

Thank you!

Joni Girardi, DataSelf Corp. CEO & Founder
(408) 674.8003 jgirardi@dataself.com @jonigirardi
www.dataself.com

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