

Business Analytics and Data Driven Decision Making

Introduction to Visual Analytics – Design Considerations

Abid Hussain,
Associate Professor
Center for Business Data Analytics
Department of Digitalization, Copenhagen Business School, Copenhagen, Denmark.

Contact: ah.digi@cbs.dk

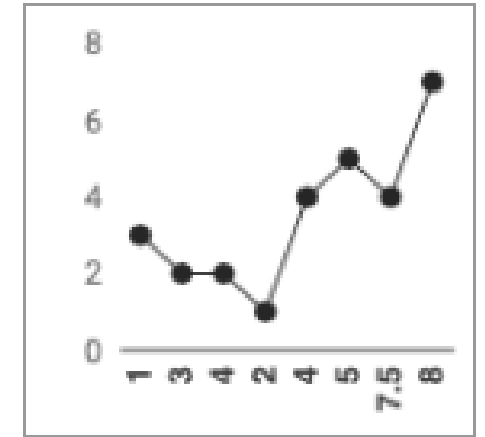
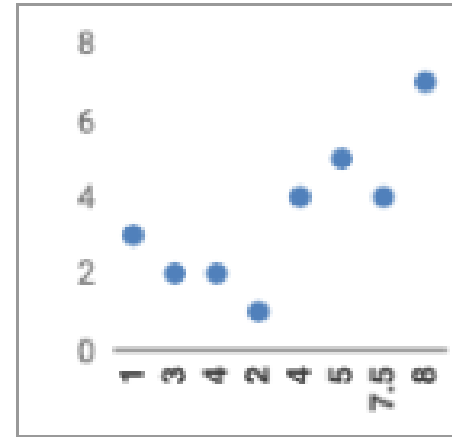
AGENDA

Agenda

- Clutter handling
- Drawing attention
- Common mistakes building Dashboard

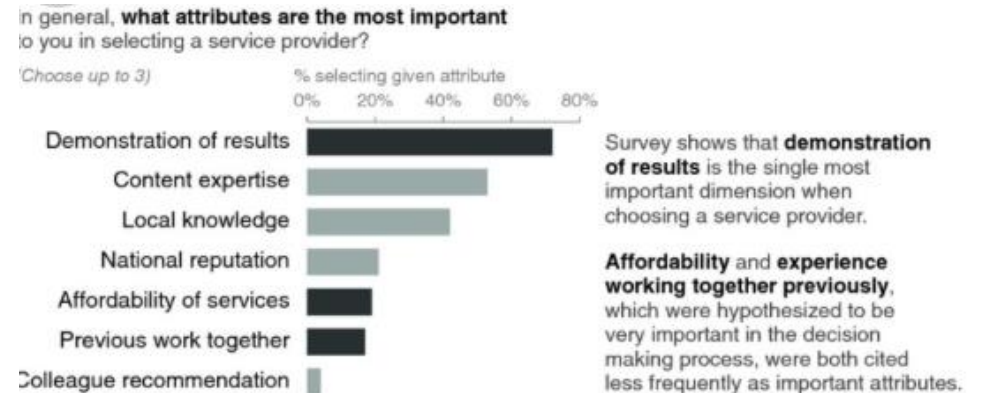
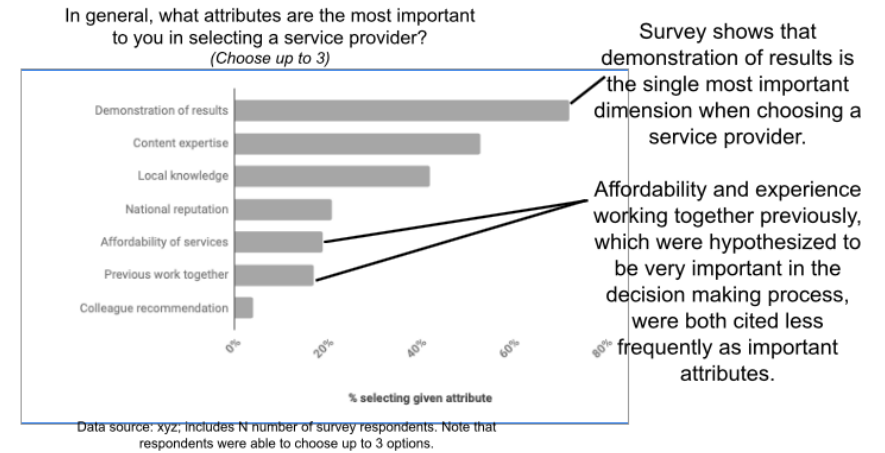
Differentiating between Signal and Noise

- Gestalt Principles of visual Perception
 - Proximity
 - Similarity
 - Enclosure
 - Closure
 - Continuity
 - Connection



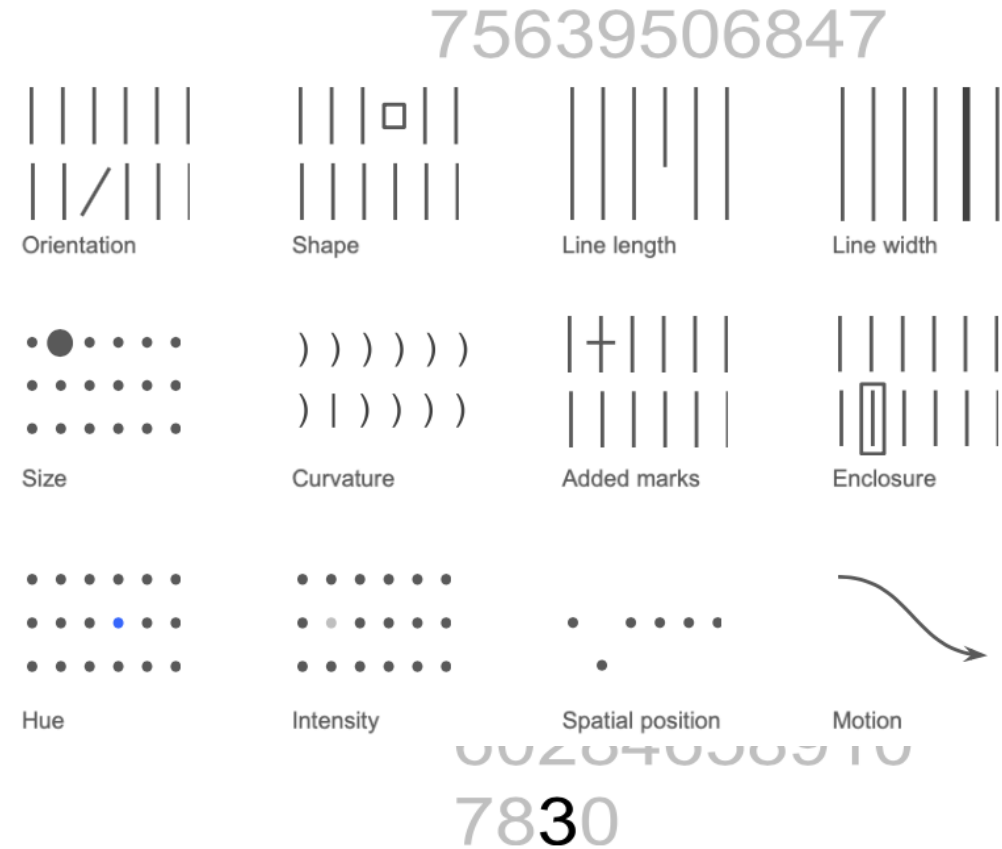
Thoughtful Design

- A good design is probably not noticed but bad design make audience "suffer"
- Basic Principles
 - Alingnment
 - Proper use of white space
 - Use contrast smartly to seek attention



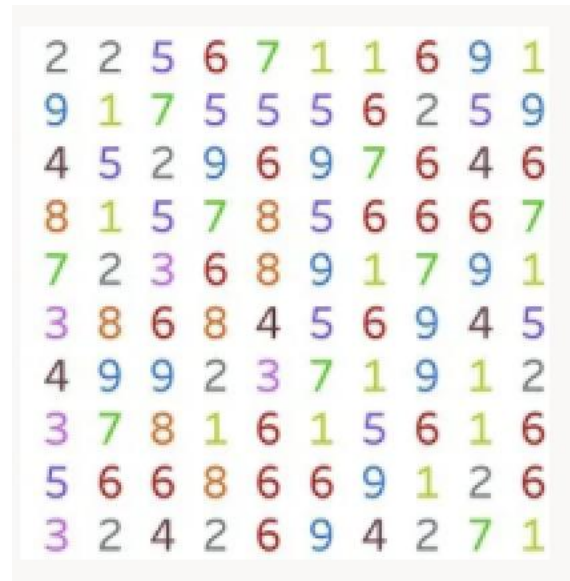
Drawing Audience Attention – Pre-Attentive Attributes for Text

- Bold/Italics/Color
- Size
- Underline
- Shape



Drawing Audience Attention – Pre-Attentive Attributes for Graph

- Size (Relative size denote relative importance)
- Color
 - Don't use color for adding beauty
 - Boring grey can be more useful !
 - Use color sparingly
 - Use color consistently
 - Brand Colors?
 - Design with color blind in mind



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

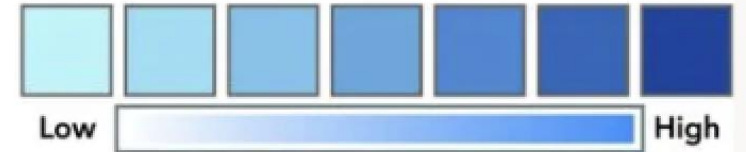
COUNTRY	RANK				
	1	2	3	4	5+
Australia	1	2	3	6	7
Brazil	1	3	4	5	6
Canada	2	3	6	12	8
China	1	2	8	4	7
France	3	2	4	8	10
Germany	3	1	6	5	4
India	4	1	8	10	5
Italy	2	4	10	9	8
Mexico	1	5	4	6	3
Russia	4	3	7	9	12
Spain	2	3	4	5	11
Turkey	7	2	3	4	8
United Kingdom	1	2	3	6	7
United States	1	2	4	3	5

Use of colors

USE OF COLOR IN DATA VISUALIZATION

SEQUENTIAL

color is ordered from low to high



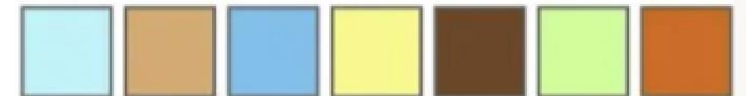
DIVERGING

two sequential colors with a neutral midpoint



CATEGORICAL

contrasting colors for individual comparison



HIGHLIGHT

color used to highlight something



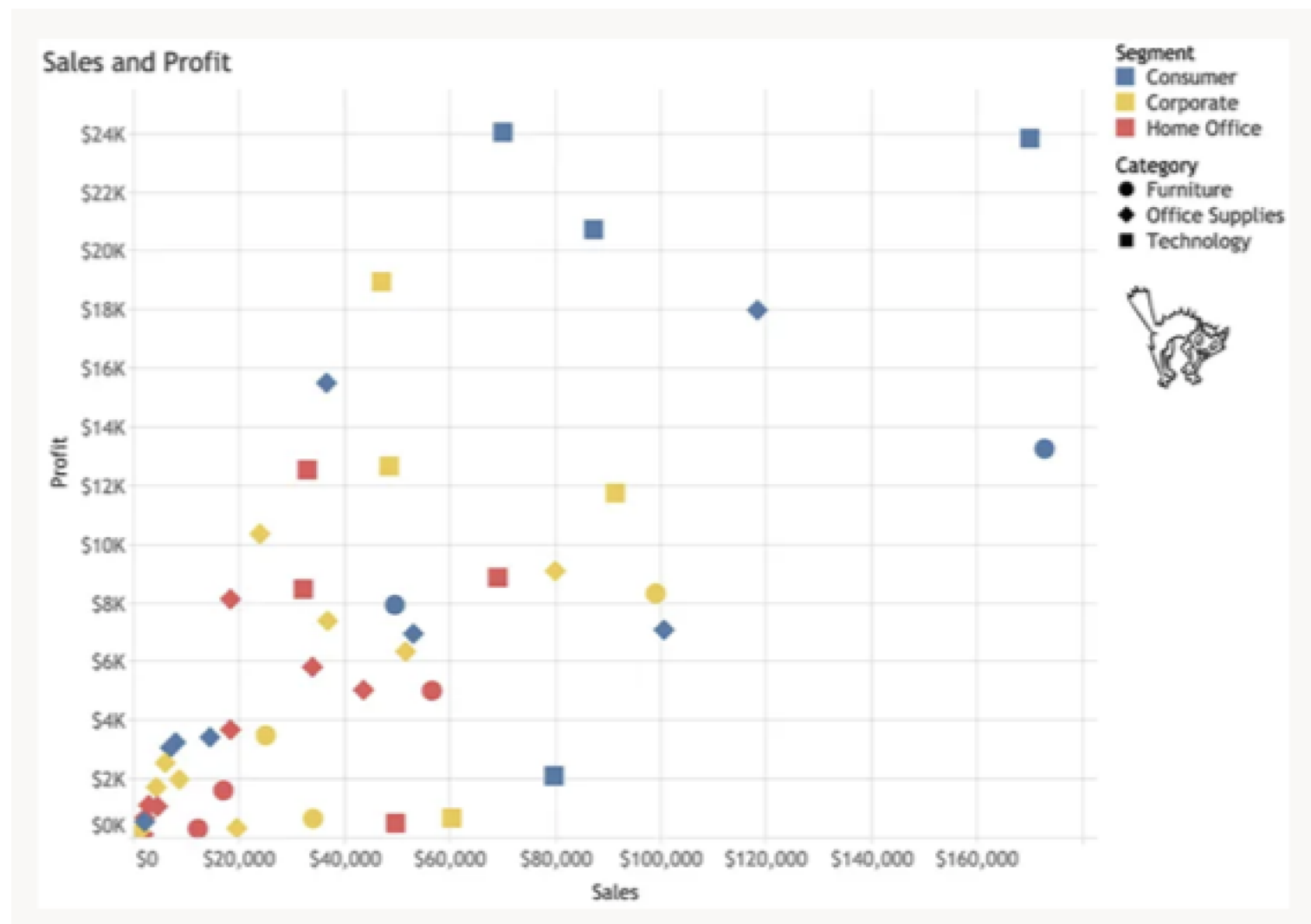
ALERT

color used to alert or warn reader



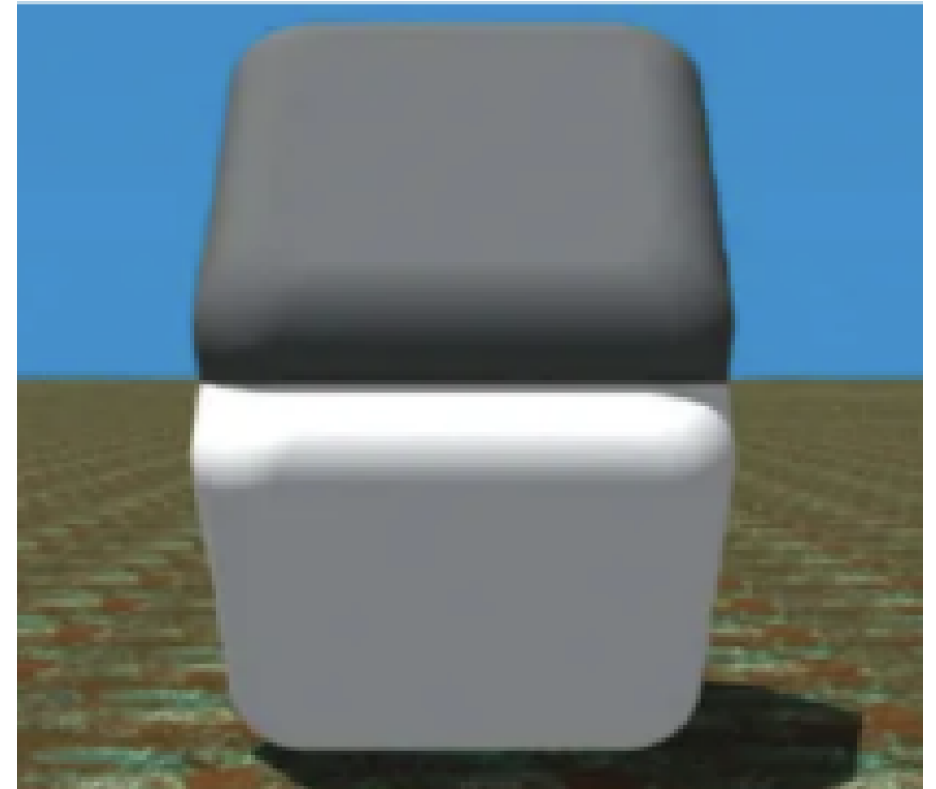
Drawing Audience Attention – Pre-Attentive Attributes for Graph

- Too many pre-attentive attributes together !



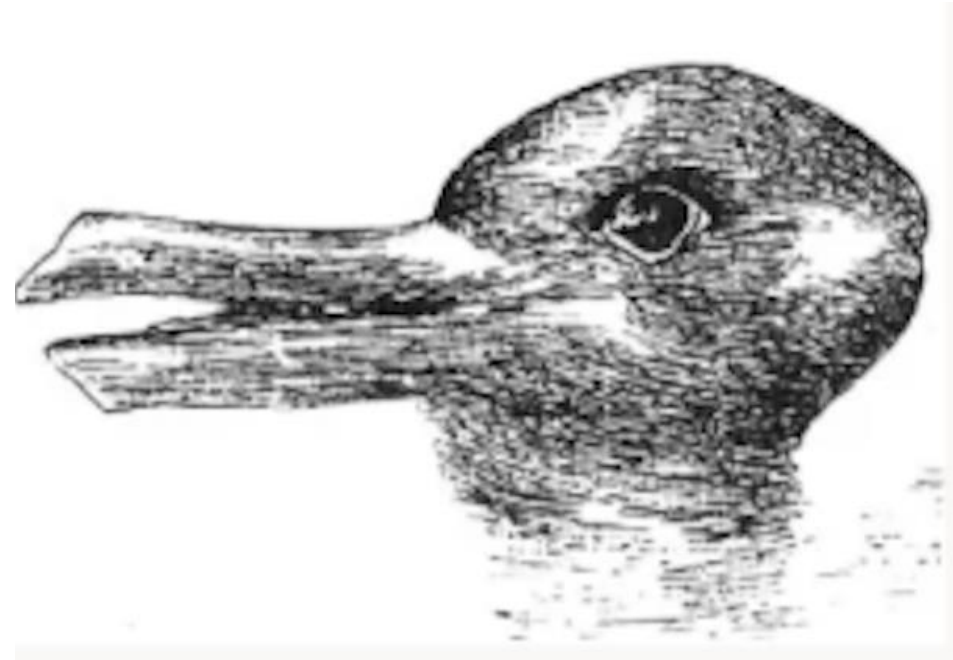
Visual traps – illusions - perceptions

- Does the top color seem darker than the bottom one?
- Cover the center white line, give it a second and try again !

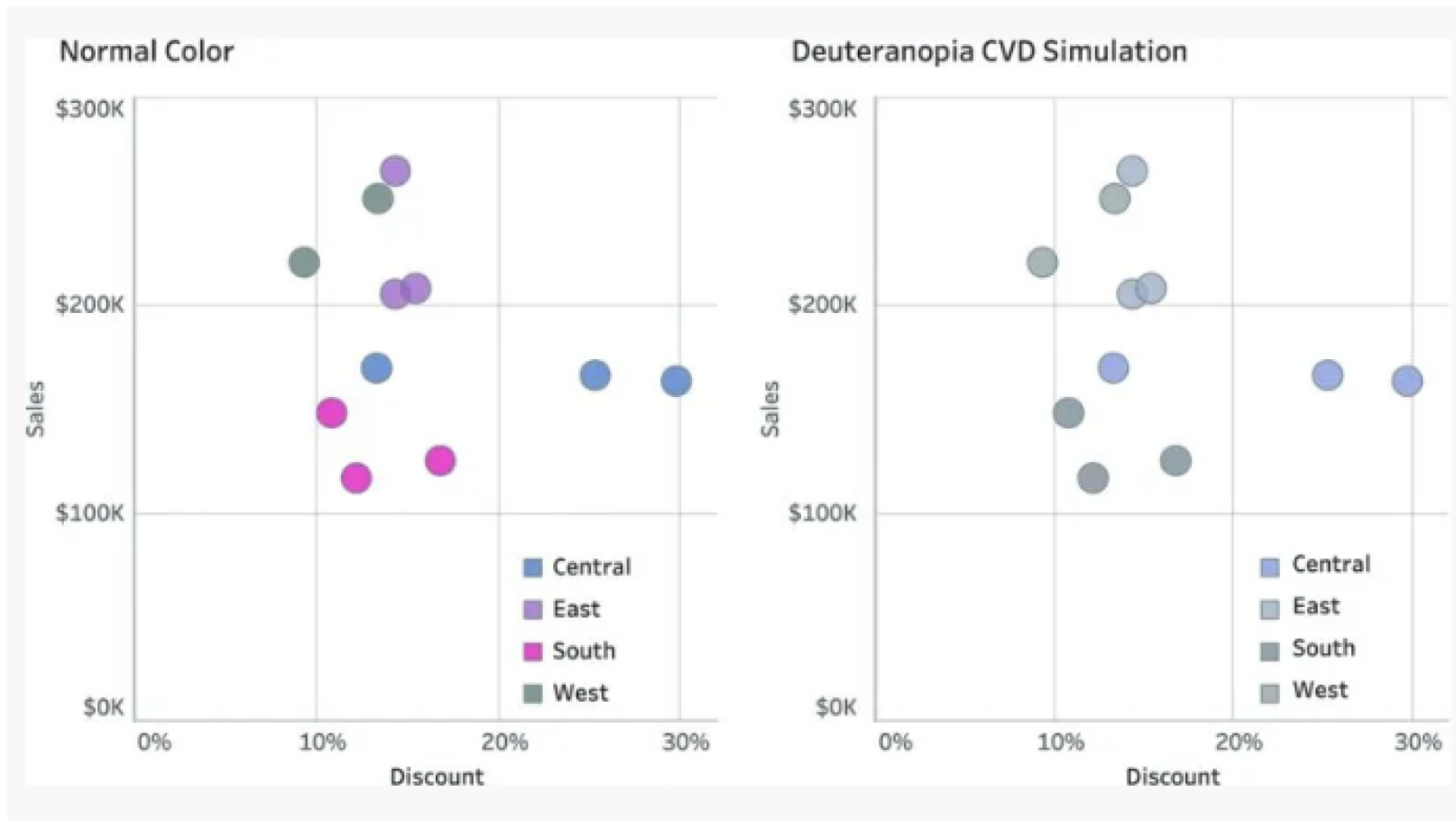


Visual traps – illusions - perceptions

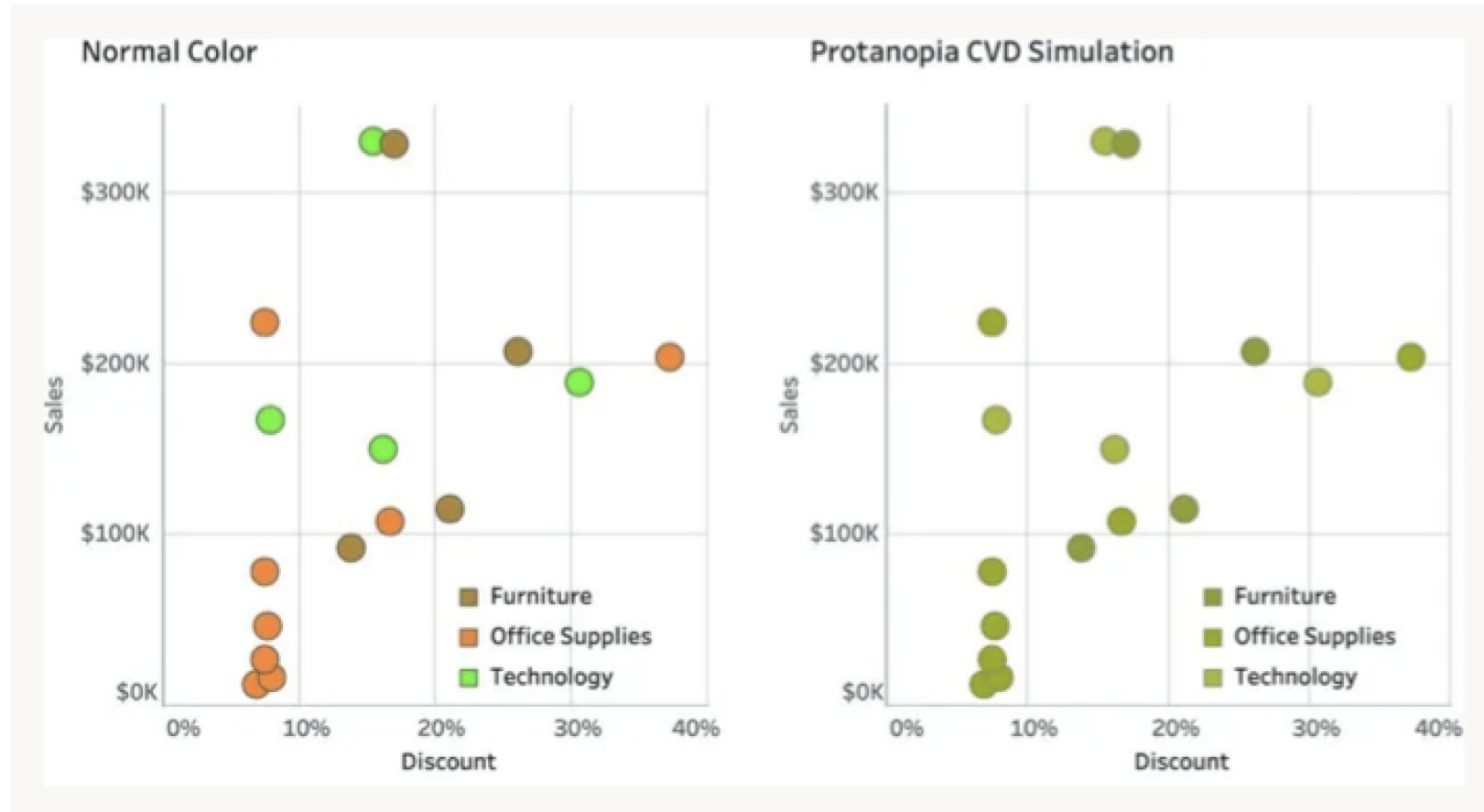
- Is it duck or a rabbit ?



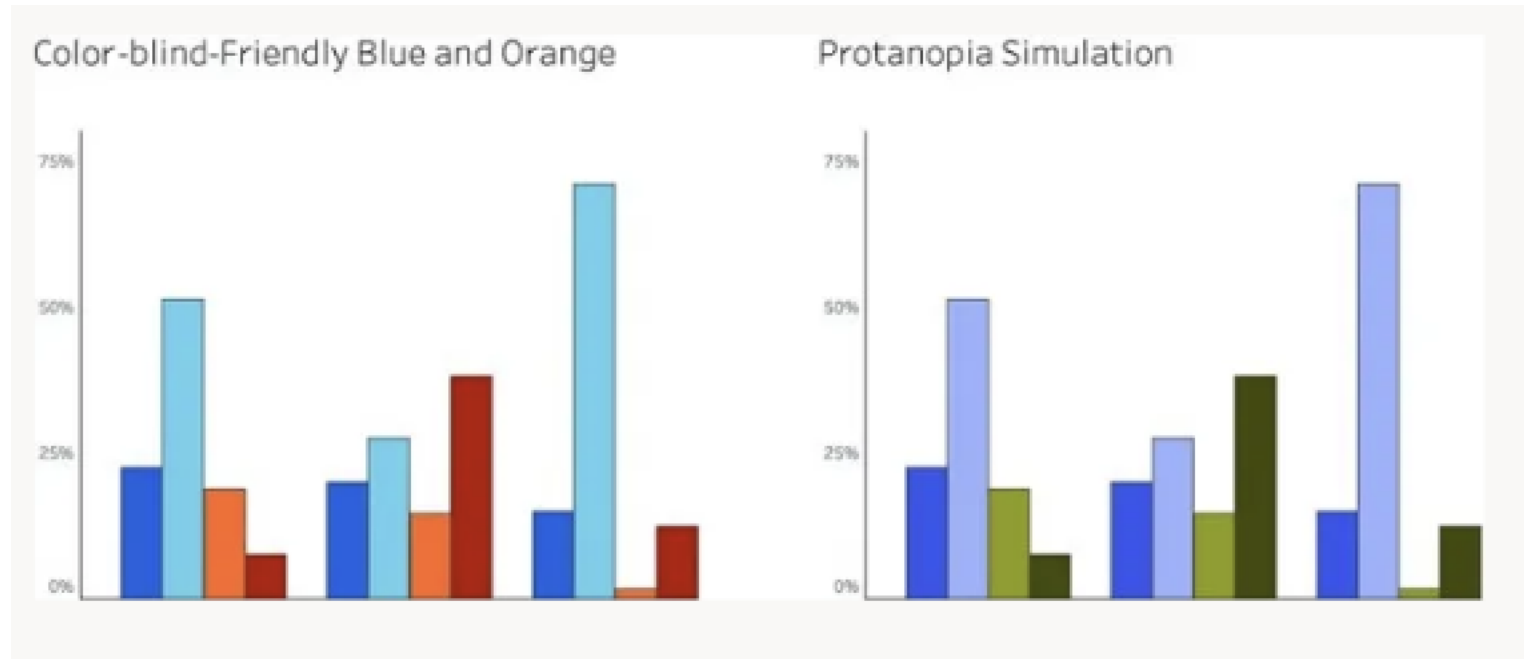
Caring for color blindness



Caring for color blindness



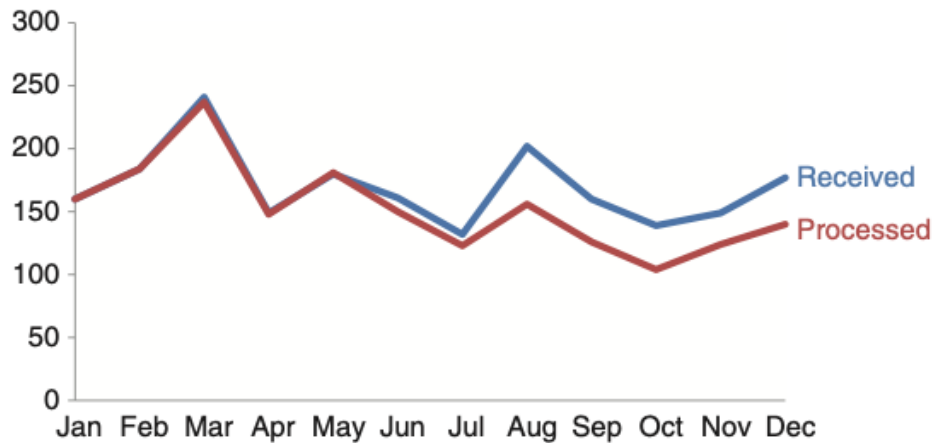
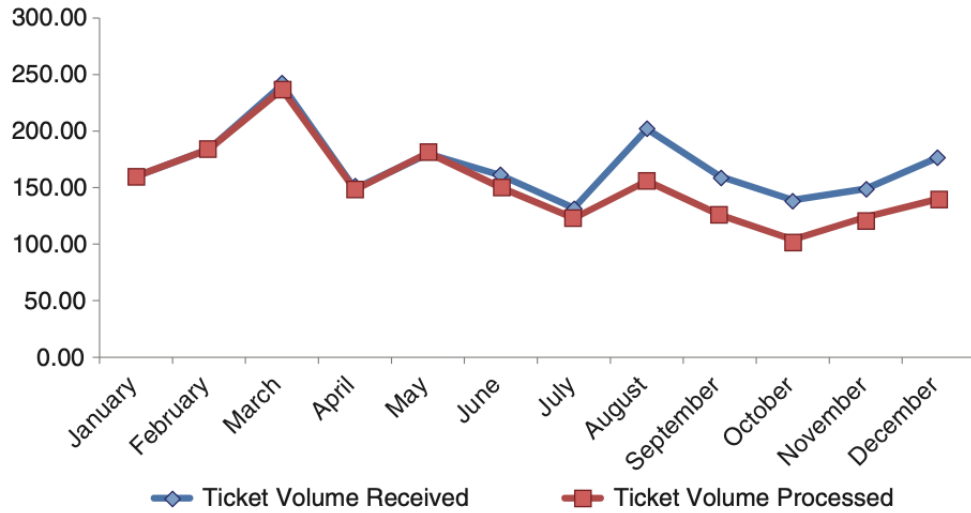
Caring for color blindness



Use Sorting when relevant



A good example



Please approve the hire of 2 FTEs

to backfill those who quit in the past year

Ticket volume over time



Data source: XYZ Dashboard, as of 12/31/2014 | A detailed analysis on tickets processed per person and time to resolve issues was undertaken to inform this request and can be provided if needed.

FIGURE 0.3 Example 1 (after): storytelling with data

COMMON MISTAKES IN VISUAL DASHBOARD DESIGN



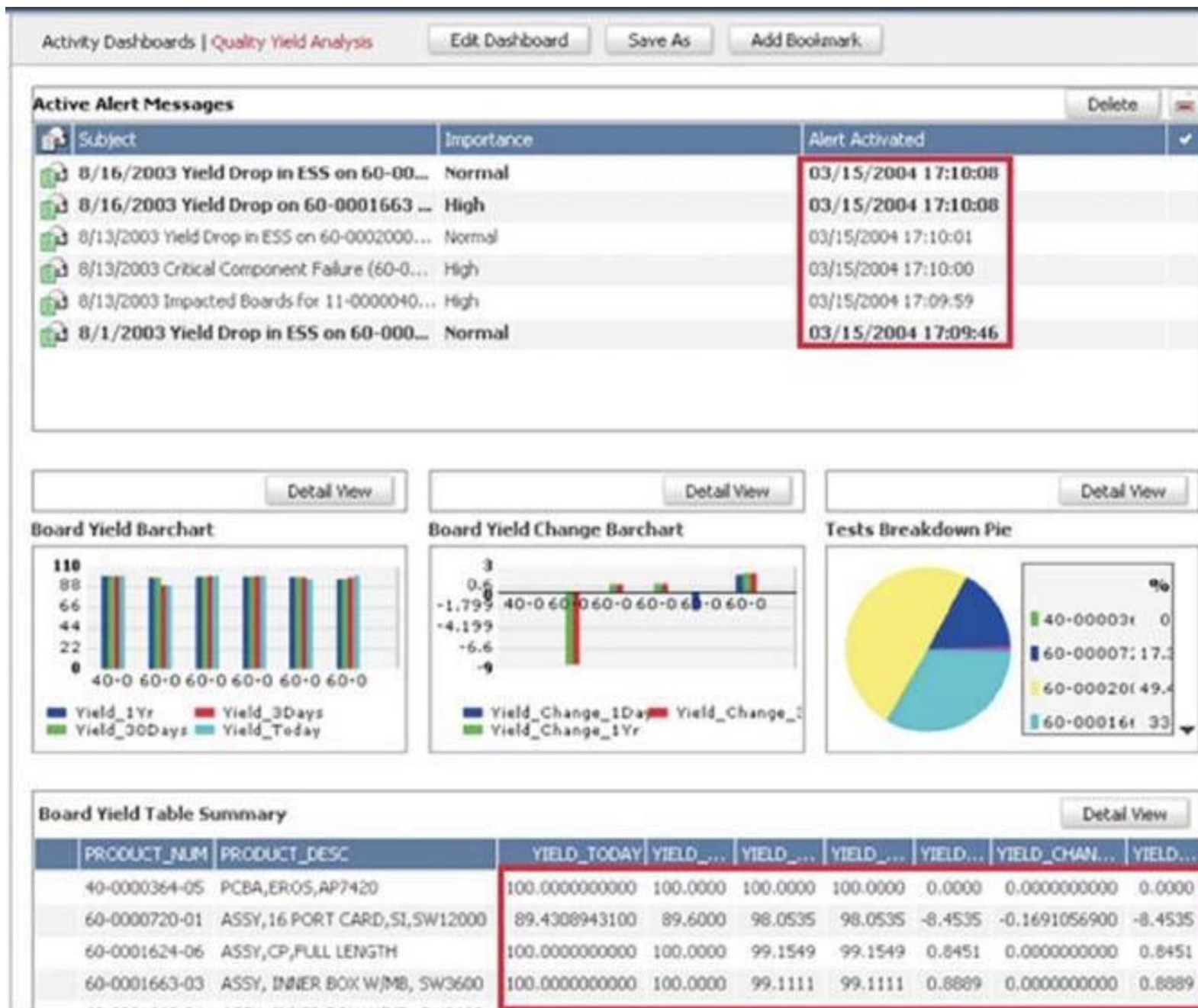


1. Exceeding Boundaries of Single Screen



2. Supplying Inadequate Context

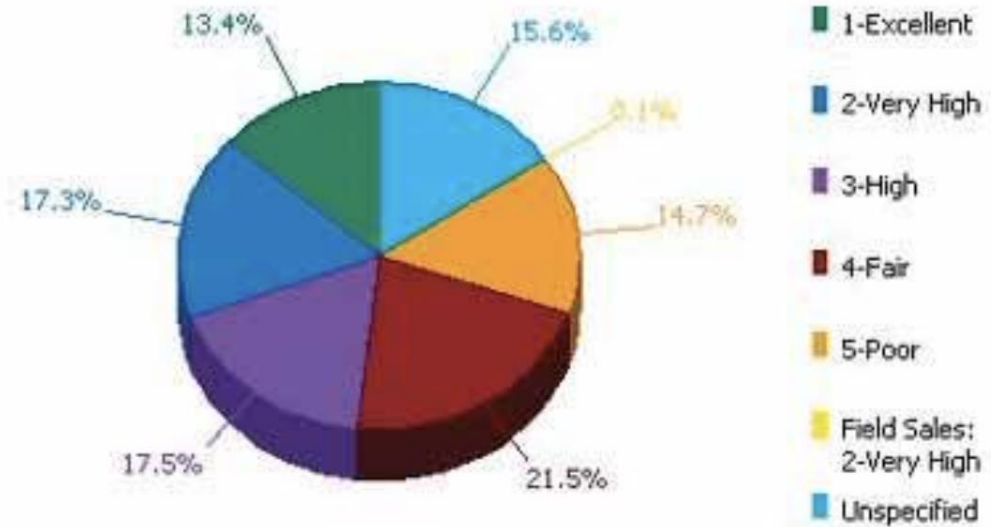
3. Displaying Excessive Details



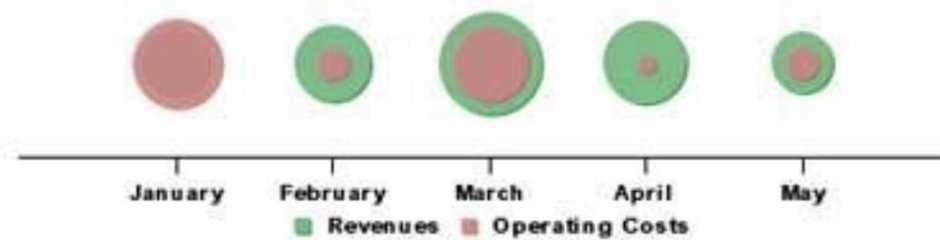
4. Choosing inappropriate Graph Type



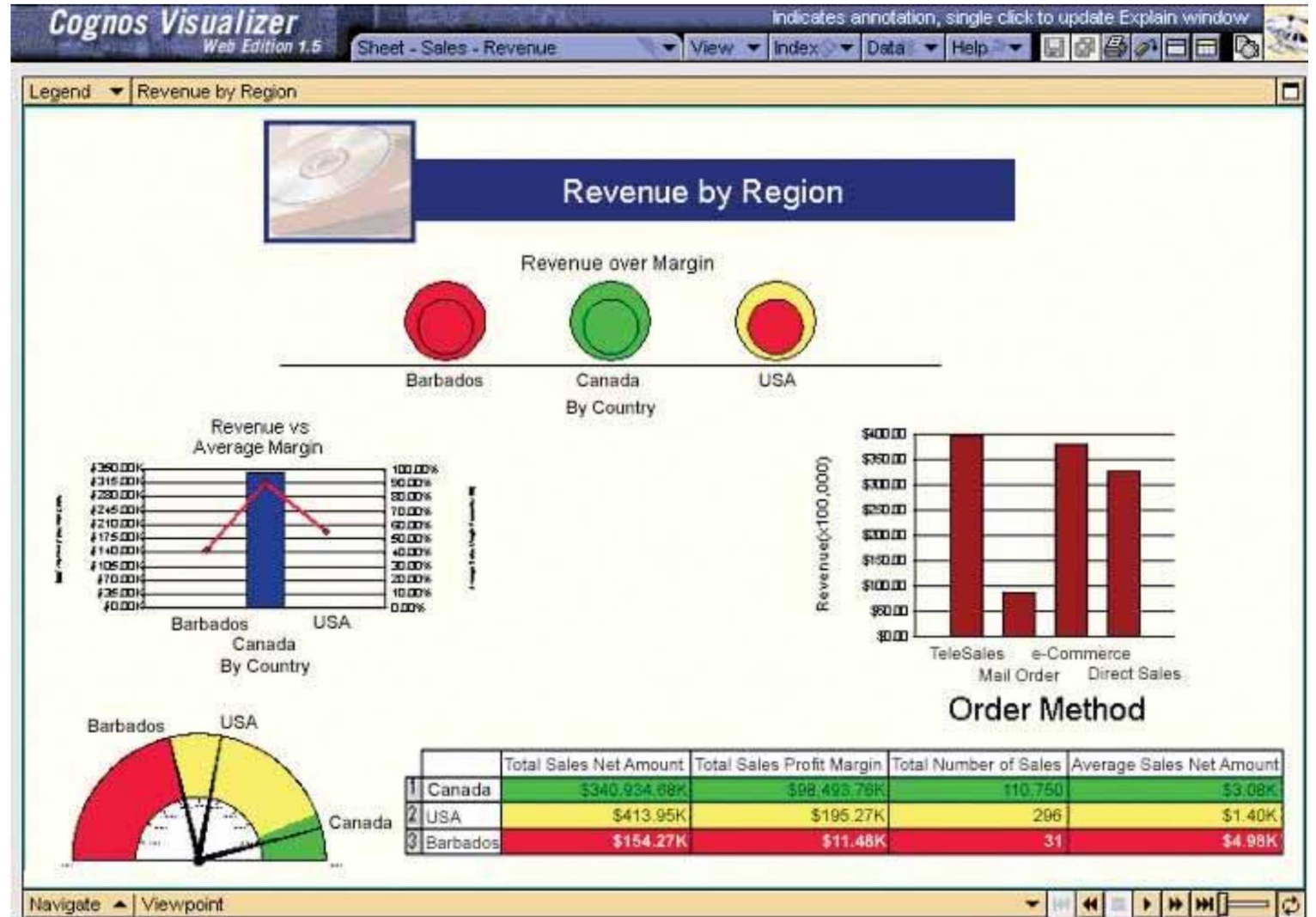
Number of New Opportunities by Lead Quality



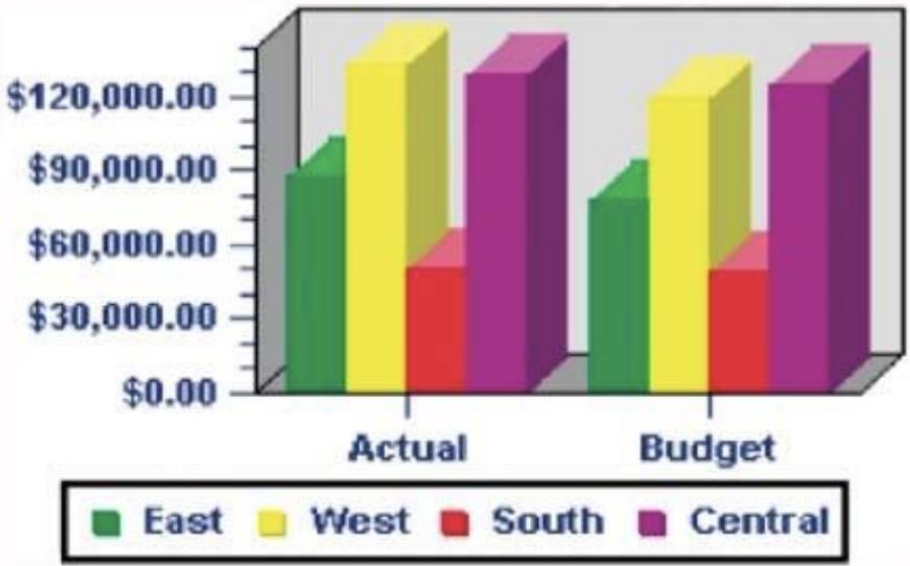
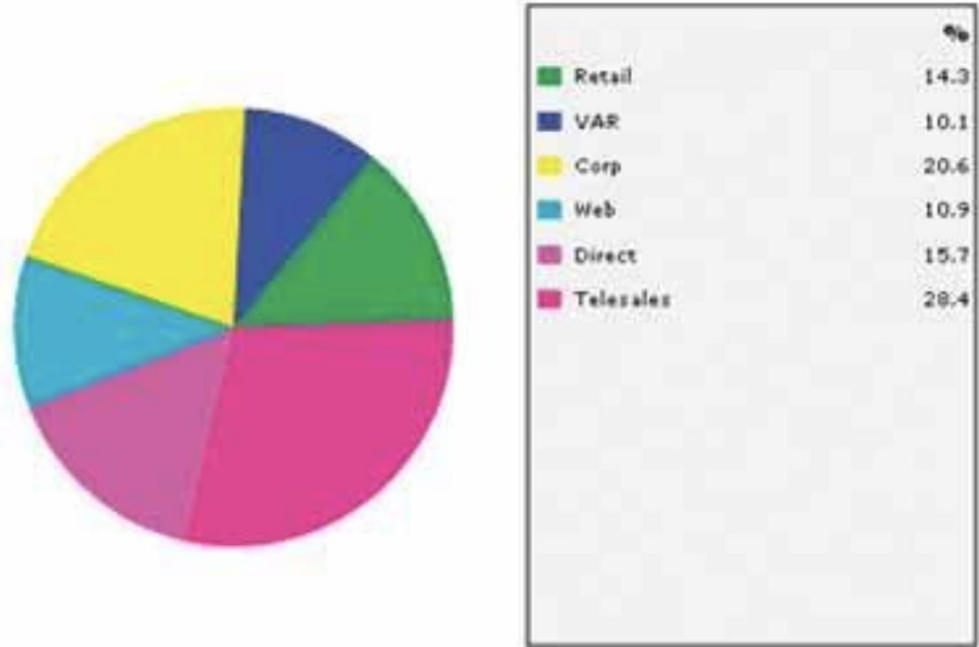
Costs vs. Revenue



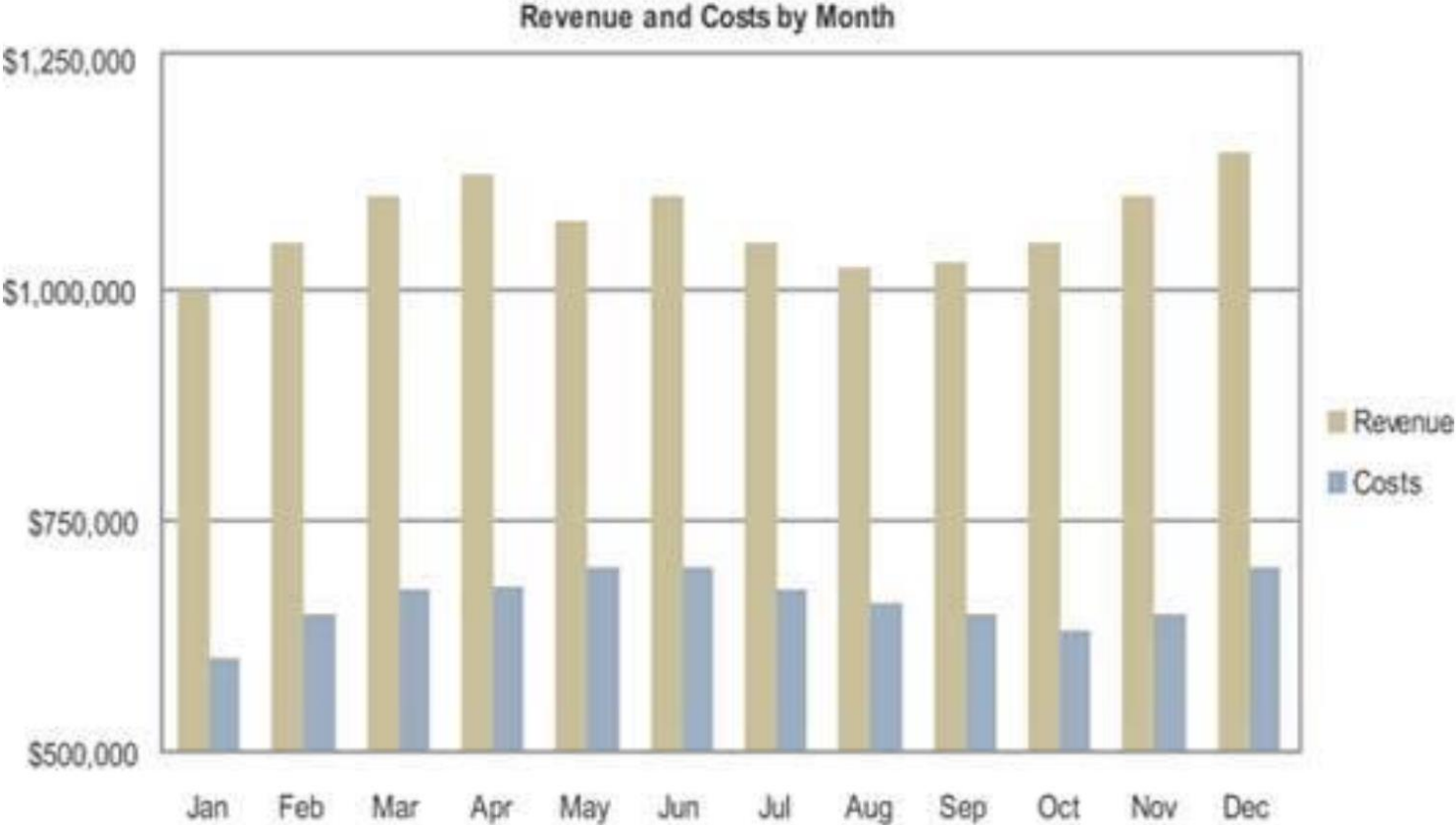
5. Choosing meaningless variety to avoid making boring dashboards



6. Poorly designed display media



7. Encoding quantitative data inaccurately



8. Highlighting Important Data ineffectively



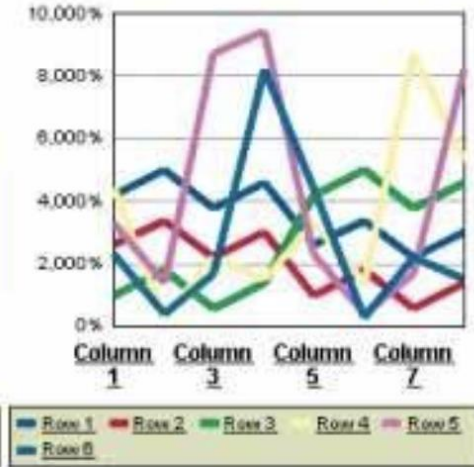
Sales vs. Percent Margin



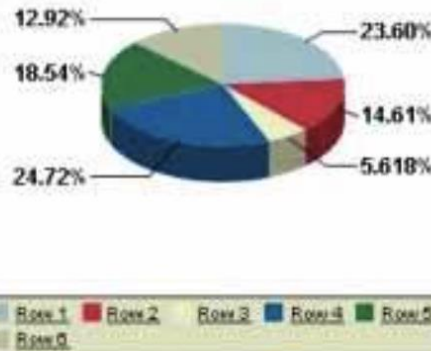
Sales vs. Cost of Sales



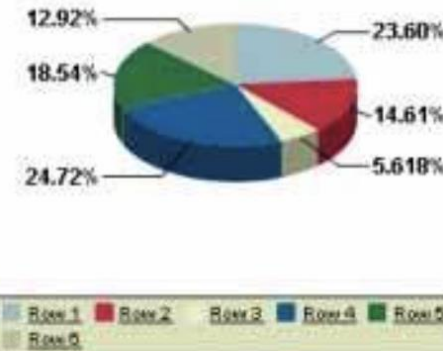
% Difference in Sales and Margin



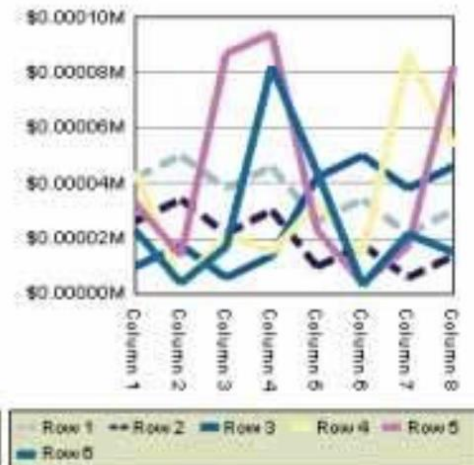
Contribution to 2001 Sales



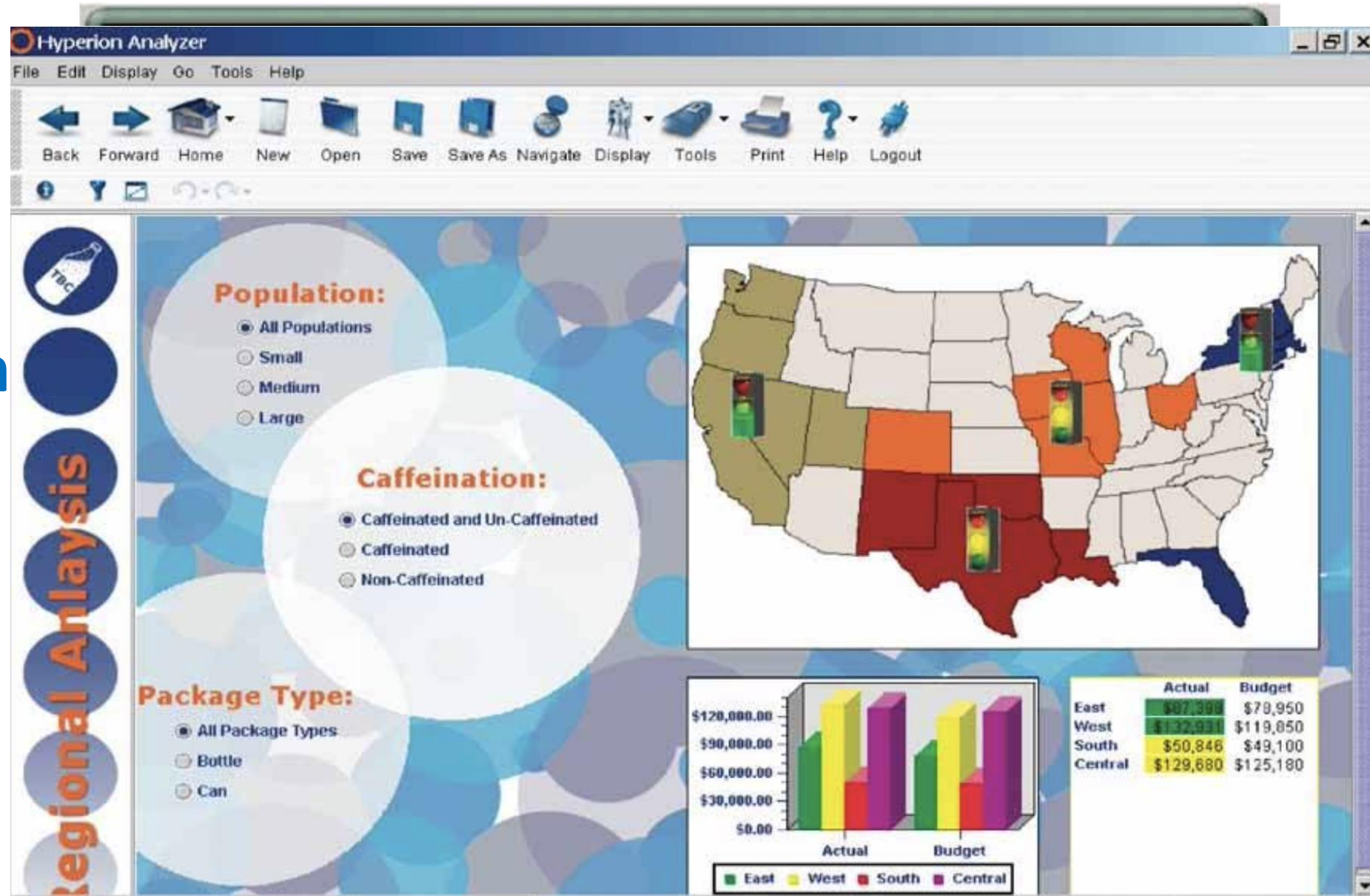
Contribution to 2001 Margin



Moving Averages for Sales

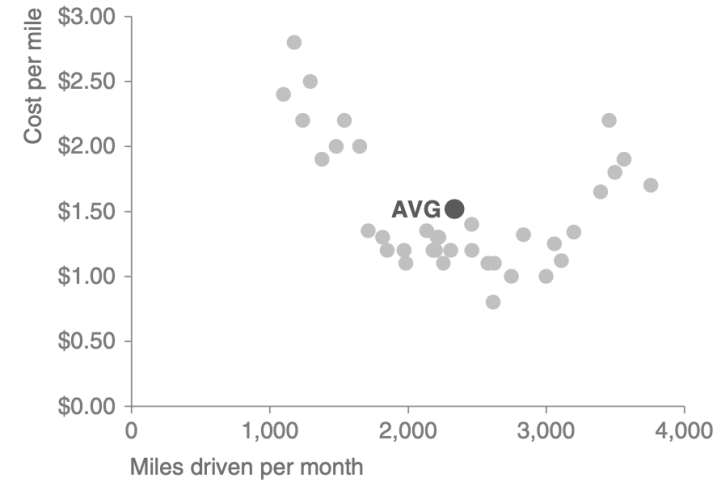


9. Cluttering the Display with Useless Decoration

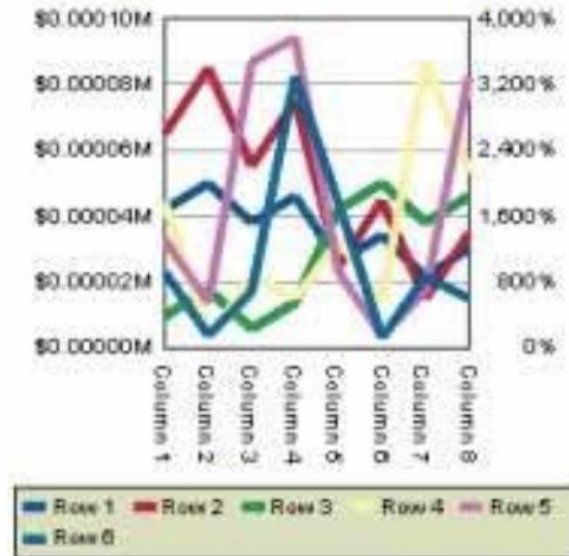


10. Missing or Over-Using Colors

Cost per mile by miles driven



Sales vs. Percent Margin



Conclusion

- There is no one solution Fits All approach in Visual Analytics.
- Personal, regional and cultural preferences are hard to deal with.
- Organizational branding colors and visuals preferences.
- Any Tool can be used as long as basic principle are followed.
- Keep it simple !

Conclusion

“..We maintain that a dashboard must first be truthful and functional, but there are reasons you should go the extra mile to make dashboards that are elegant as well”.

“Products [should] actually fulfill human needs while being understandable and usable. In the best of cases, the products should also be delightful and enjoyable”.

-The Design of Everyday Things by Donald A. Norman (Basic Books, 2013).

THANK YOU