



THIS IS YOUR BRAIN ON

VISUAL DATA

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#visualdata

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What is

VISUAL ANALYTICS?

“Visual analytics is the representation and presentation of data
that EXPLOITS OUR VISUAL PERCEPTION
ABILITIES in order to AMPLIFY COGNITION.”

- Andy Kirk, author of “Data Visualization:
a successful design process”

#visualdata

Human perception and cognition



#visualdata

Humans are slow at math

$$\begin{array}{r} 34 \\ \times 72 \\ \hline \end{array}$$

We're Faster When We Use the World

$$\begin{array}{r} 34 \\ \times 72 \\ \hline 68 \\ 23180 \\ \hline 2448 \end{array}$$

We're faster when we can

SEE DATA

Category	Sub-Category (group)	Customer Segment			
		Consumer	Corporate	Home Office	Small Business
Furniture	Bookcases	-63.02	-9,305.76	-16,610.95	-7,602.40
	Chairs & Chairmats	42,942.97	39,370.10	41,686.28	25,650.38
	Office Furnishings	12,099.80	27,374.47	42,196.25	18,757.40
	Tables	-12,251.51	-35,430.73	-43,292.40	-8,087.89
Office Supplies	Appliances	15,501.48	50,095.94	25,343.06	6,217.58
	Binders and Binder Ac..	48,035.27	125,811.27	71,674.19	61,892.69
	Envelopes, Labels, Pa..	16,907.52	31,230.67	25,508.13	33,476.65
	Pens & Art Supplies	2,621.68	1,670.40	1,580.82	1,691.88
	Rubber Bands	271.85	-353.54	-93.12	72.14
	Scissors, Rulers and ..	-558.10	-3,330.62	-2,844.06	-1,066.47
	Storage & Organization	5,752.65	-2,086.83	-23.24	3,021.57
Technology	Computer Peripherals	14,152.79	45,092.93	17,771.05	17,270.71
	Copiers and Fax	41,310.35	28,654.48	29,283.14	68,113.50
	Office Machines	51,454.78	180,356.22	39,386.23	36,515.70
	Telephones and Com..	49,781.48	120,596.92	86,788.72	59,784.52

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We're faster when we can

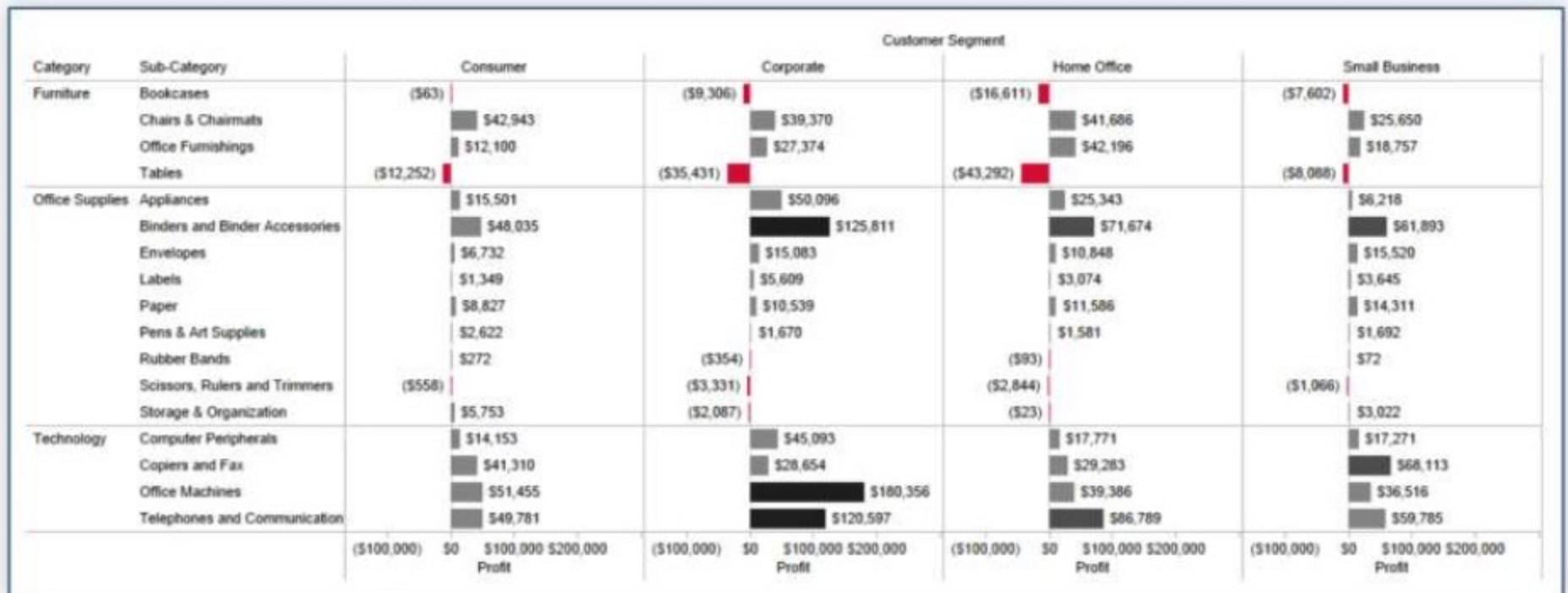
SEE DATA

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We're faster when we can

SEE DATA



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Pre-attentive visual attributes

Length



Width



Orientation



Size



Shape



Curvature



Enclosure



2-D Position



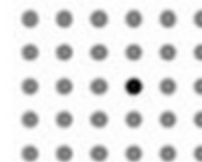
Spatial Grouping



Color (Hue)



Color (Intensity)



bit.ly/preattentive

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Visualization best practices



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Types of data

■ Qualitative (categorical)

Arizona, New York, Texas

Sarah, John, Maria

Coors, Bud Light, Stella Artois

■ Qualitative (ordinal)

Gold, silver, bronze

Excellent health, good health, poor health

Love it, like it, hate it

■ Quantitative

Weight (10 lbs, 20 lbs, 5000 lbs)

Cost (\$50, \$100, \$0.05)

Discount (5%, 10%, 12.8%)

How do humans like their data?

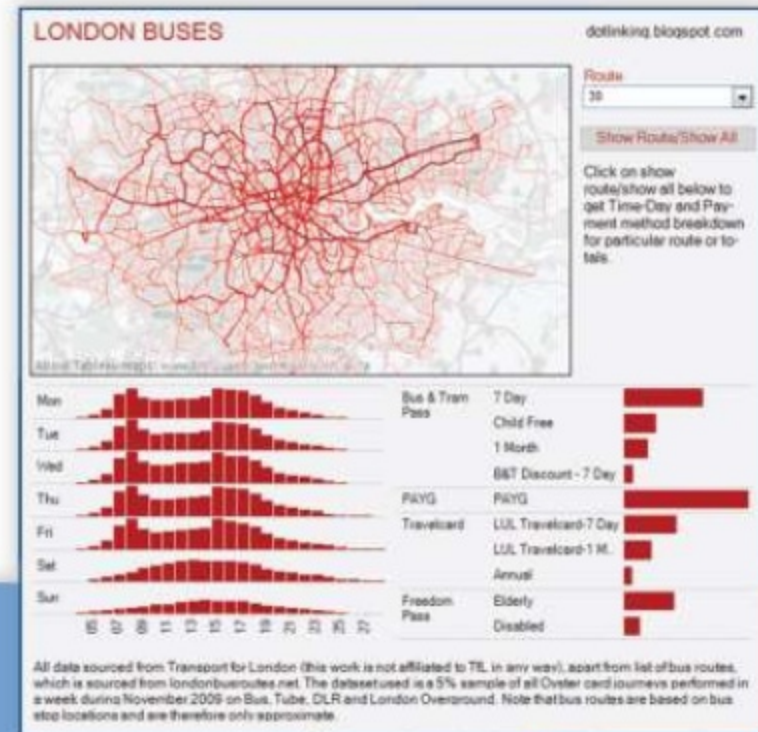
QUANTITATIVE	ORDINAL	CATEGORICAL
Position Length Size Color Intensity	Position Size Color Intensity Different Colors Shape	Position Shape Different Colors

How do humans like their data?



How do humans like their data?

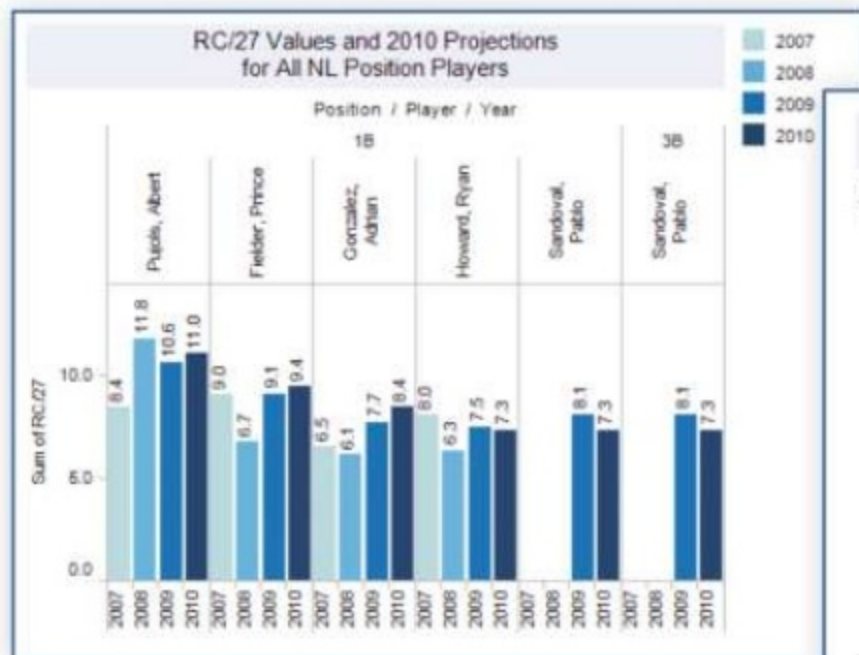
- Time: on an x-axis
- Location: on a map
- Comparing values:
bar chart
- Exploring relationships:
scatter plot
- Relative proportions:
treemap



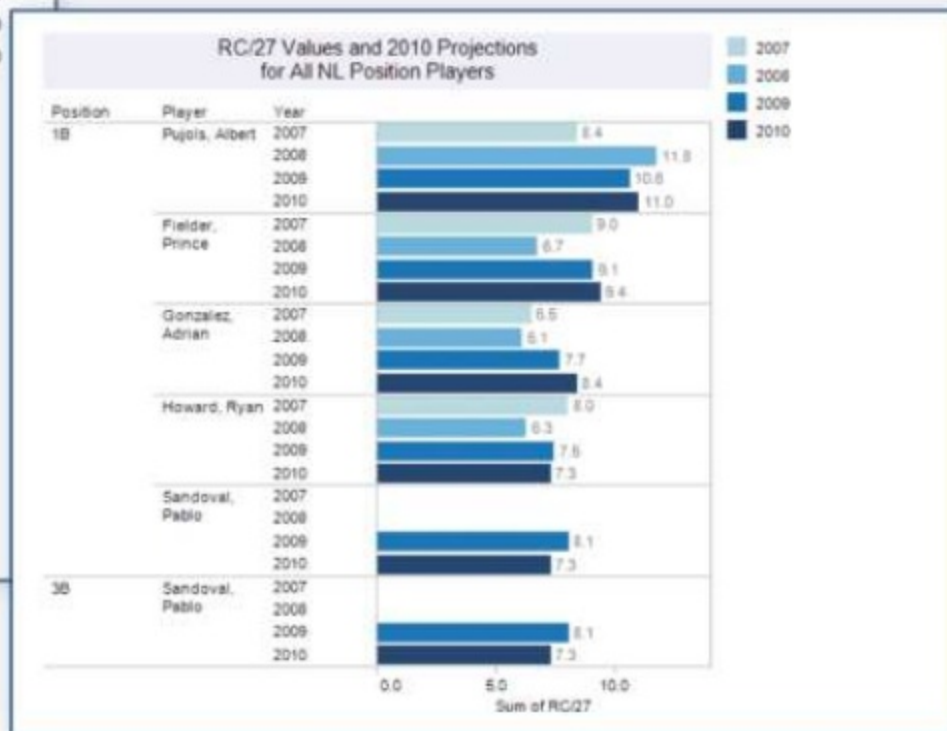
How do humans like their data?

Orient data so people can read it easily

Good



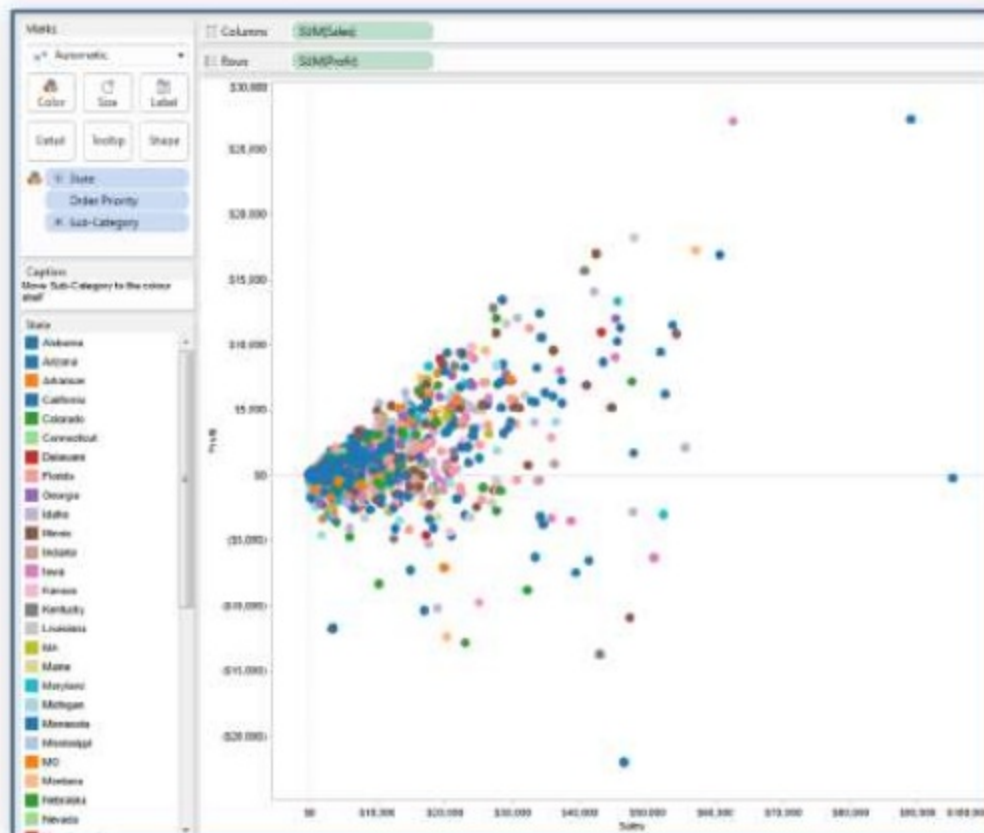
Better



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Color me impressed

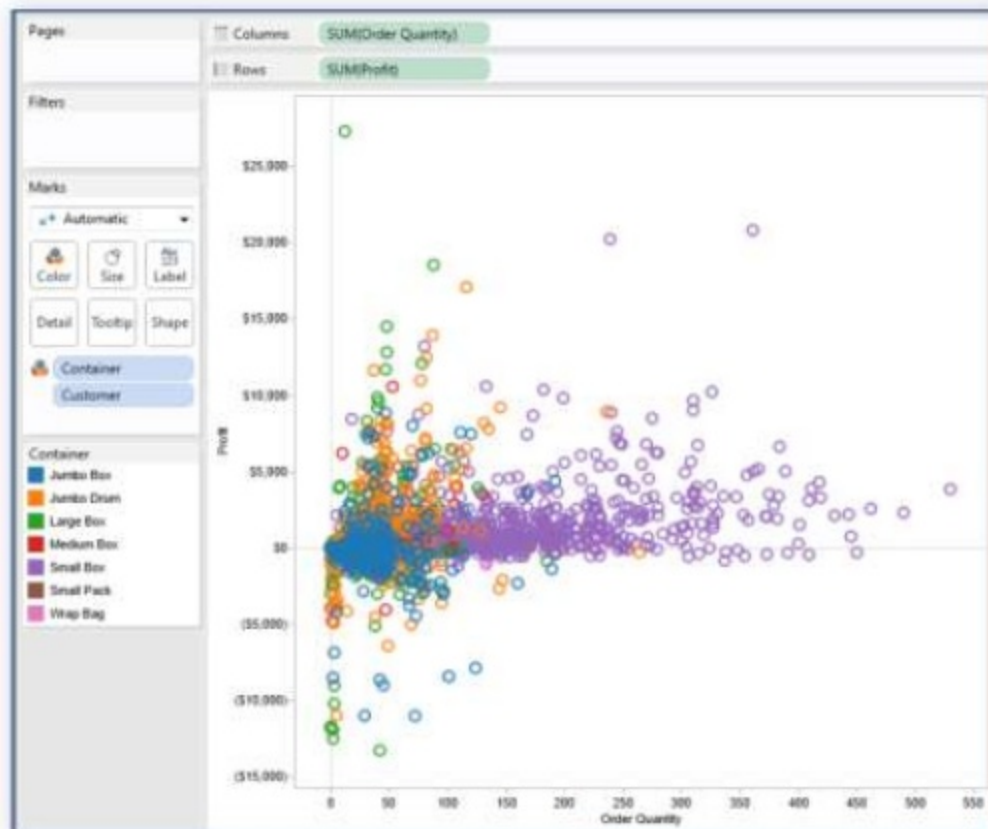
Humans can only distinguish ~8 colors



This is not helpful.

Color me impressed

Humans can only distinguish ~8 colors



This is helpful.

#visualdata