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Create Powerful Data Visualizations

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Topic Outline

- Introduction
- Learning objectives
- Powerful data visualizations:
  - Understand visualizations
  - Create visualizations
  - Refine visualizations
  - Practice and present visualizations
- Recommendations & actions

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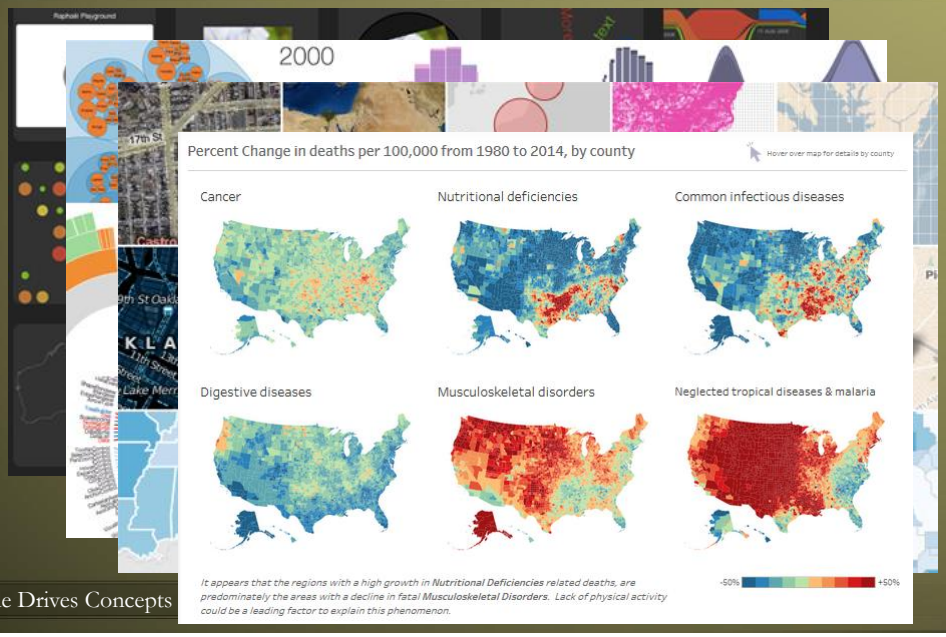
Vast Data Visualization Choice



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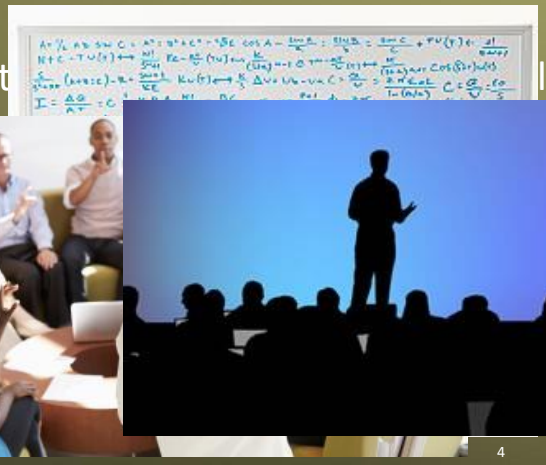
Learning Objectives

- Understand design considerations that lead to powerful data visualizations
- Understand effective t lizations
- Understand best pr tips for presenting data visualizations



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Understand Visualizations

A Brief History of Data Visualization

When a Chart hits our Eyes

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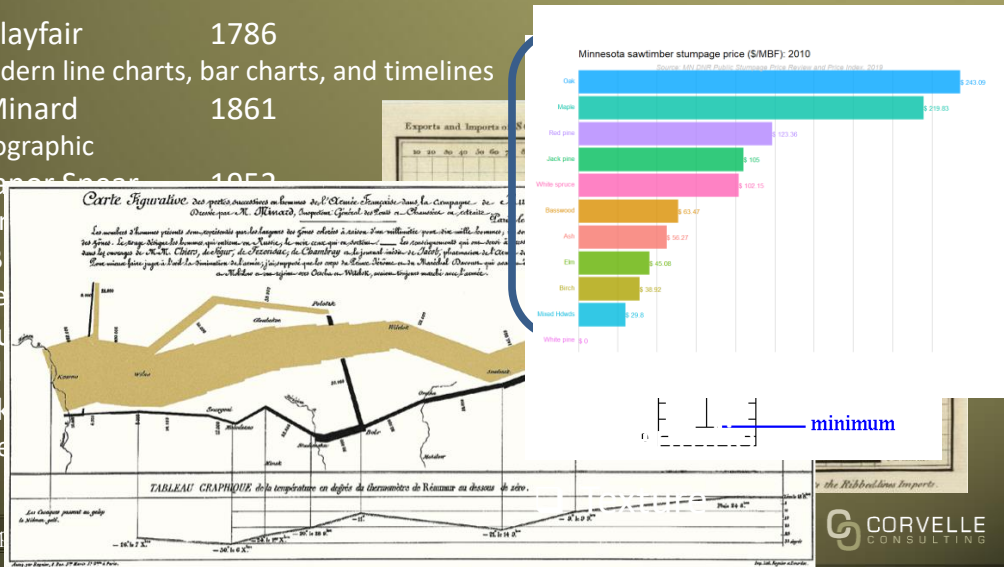
A Brief History of Data Visualization

- William Playfair 1786
  - First modern line charts, bar charts, and timelines
- Charles Minard 1861
  - First infographic
- Mary Elea
  - Commo
- Jacques B
  - Principle
- Edward Tu
  - Minimal
- Jock Mack
  - Software



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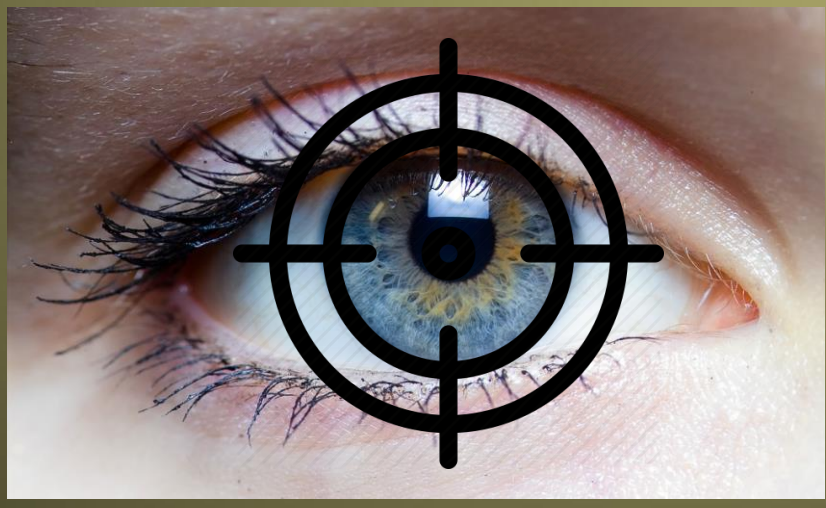
When a Chart hits our Eyes



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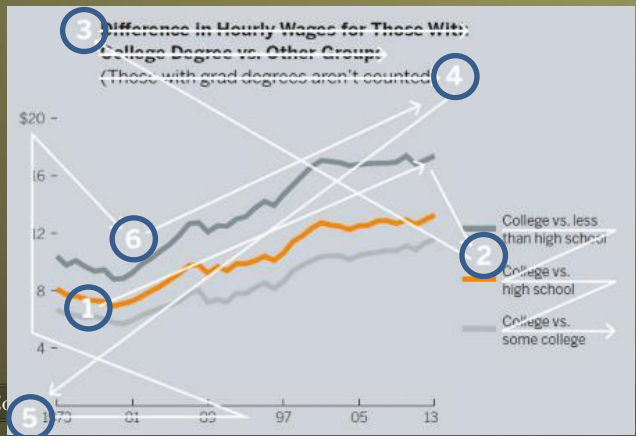
When a Chart hits our Eyes

- Visuals aren't read in a predictable, linear way
  - Create charts spatially, from the visual outward



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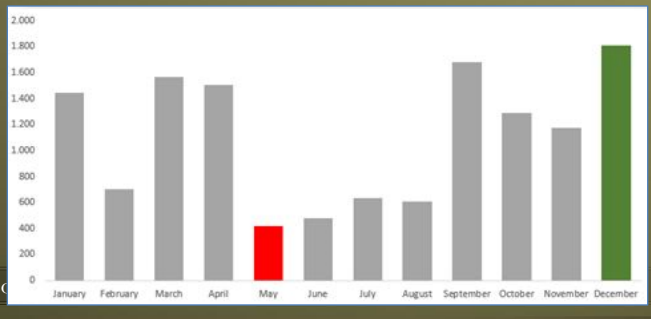
When a Chart hits our Eyes

- Visuals aren't read in a predictable, linear way
  - Create charts spatially, from the visual outward
- We see first what stands out
  - Whatever stands out should support idea



When a Chart hits our Eyes

- Visuals aren't read in a predictable, linear way
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- We see only a few visuals at once
  - Plot as few visual elements as possible

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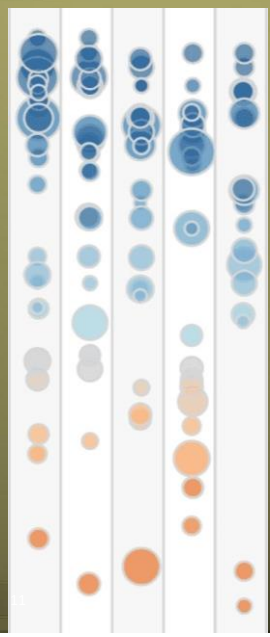
- We seek meaning and make connection
  - Relate visual elements in a meaningful way



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When a Chart hits our Eyes

- Visuals aren't read in a predictable, linear way
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- We see only a few visuals at once
  - Plot as few visual elements as possible
- We seek meaning and make connection
  - Relate visual elements in a meaningful way
- We rely on conventions and metaphors
  - Embrace deeply ingrained conventions

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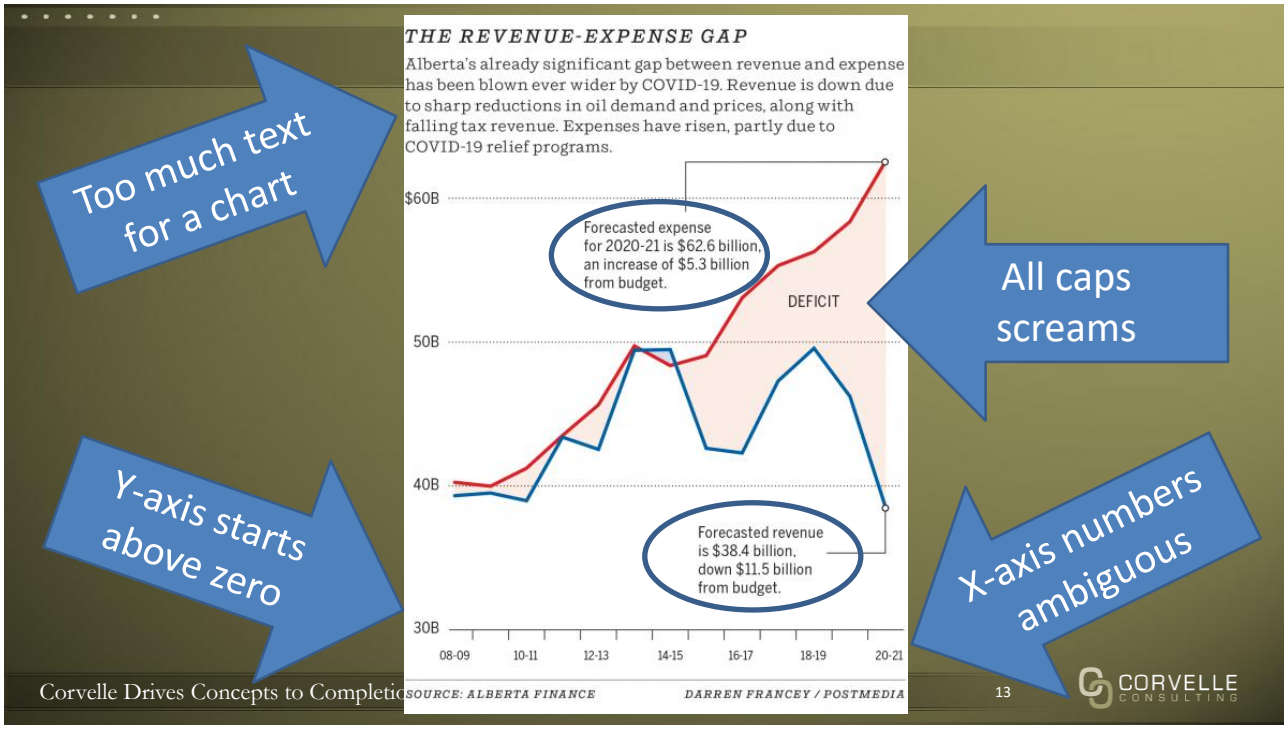
Too much text for a chart
THE REVENUE-EXPENSE GAP
Alberta's already significant gap between revenue and expense has been blown ever wider by COVID-19. Revenue is down due to sharp reductions in oil demand and prices, along with falling tax revenue. Expenses have risen, partly due to COVID-19 relief programs.
$60B
50B
40B
30B
Forecasted expense for 2020-21 is $62.6 billion, an increase of $5.3 billion from budget.
DEFICIT
Forecasted revenue is $38.4 billion, down $11.5 billion from budget.
08-09
10-11
12-13
14-15
16-17
18-19
20-21
SOURCE: ALBERTA FINANCE
DARREN FRANCEY / POSTMEDIA
All caps screams
Y-axis starts above zero
X-axis numbers ambiguous
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DO YOU WANT ME TO PUT THE CHART ON ONE PAGE, WHICH WOULD MAKE THE TEXT TOO SMALL FOR YOUR AUDIENCE TO SEE?
OR DO YOU PREFER A MULTIPLE-PAGE APPROACH THAT IS CONFUSING AND UNPERSUASIVE?
Alternative Charts
IT'S PROBABLY BETTER IF NO ONE CAN READ IT.
I WON'T BOTHER USING REAL WORDS.
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Create Visualizations

What kind of visual communication do you want to create?
Better Visualizations in an Hour

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What kind of visual communication do you want to create?

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What kind of visual communication do you want to create?

1. Is my information conceptual or data-driven?
   - Conceptual information is qualitative
   - Data-driven information is quantitative

2. Are my visuals meant to be declarative or exploratory?
   - A declarative purpose is to make a statement
   - An exploratory purpose is to look for new ideas

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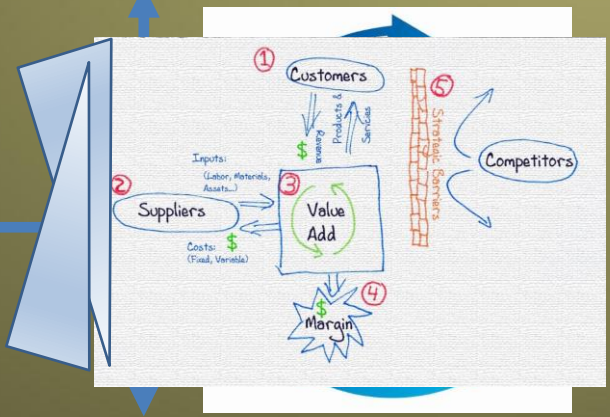
Four Types of Data Visualizations

Declarative

Idea illustration

Conceptual



Idea generation

Exploratory

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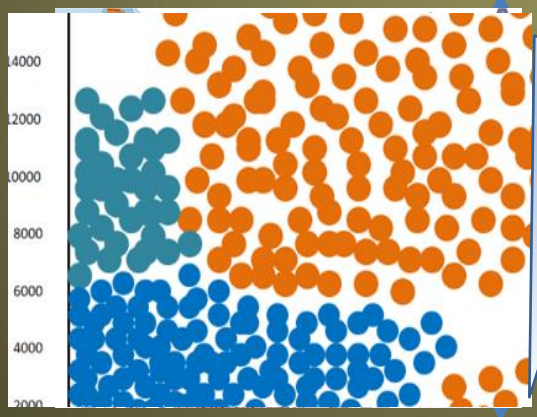
Four Types of Data Visualizations

Declarative



Data visualization

Data-Driven

Visual discovery

Exploratory

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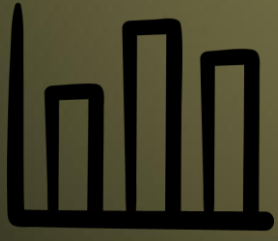
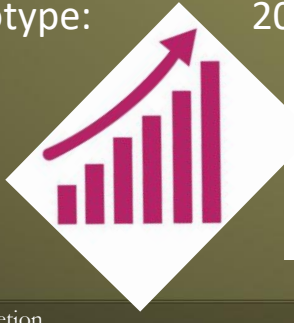
Better Visualizations in an Hour

Step 1.	Preparation:	5 minutes
Step 2.	Talk and listen:	15
Step 3.	Sketch:	20
Step 4.	Prototype:	20





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1. Preparation: 5 minutes

- ❑ Create a workspace
- ❑ Put aside your data
- ❑ Write down basics as constant reminders:
  - – Who is in my audience?
  - – What is the setting?

2. Talk and listen: 15 minutes

- ❑ Enlist a colleague
- ❑ Write down words, phrases, and statements

3. Sketch: 20 minutes

- ❑ Match keywords to chart types
- ❑ Start sketching, try out multiple visuals

Major Data Visualizations Types

Visualizations Type	Purpose
Comparison	To compare the magnitude of measures
Change over time	To display the changing trend of measures
Part-to-whole	To identify the parts making up a measure total
Flow	To display a flow or dynamic relations
Ranking	To rank measures in an order
Spatial	To display measures over spatial maps
Distribution	To display the distribution of values
Correlation	To show correlations between measures
Single	To present single values
Narrative	To tell a story with data
Filter	To control report filters

Great articles to read:

Microsoft

[Visualization types in Power BI]

FusionCharts
An Idera, Inc. Company

[How To Choose The Right Chart Type For Your Data]

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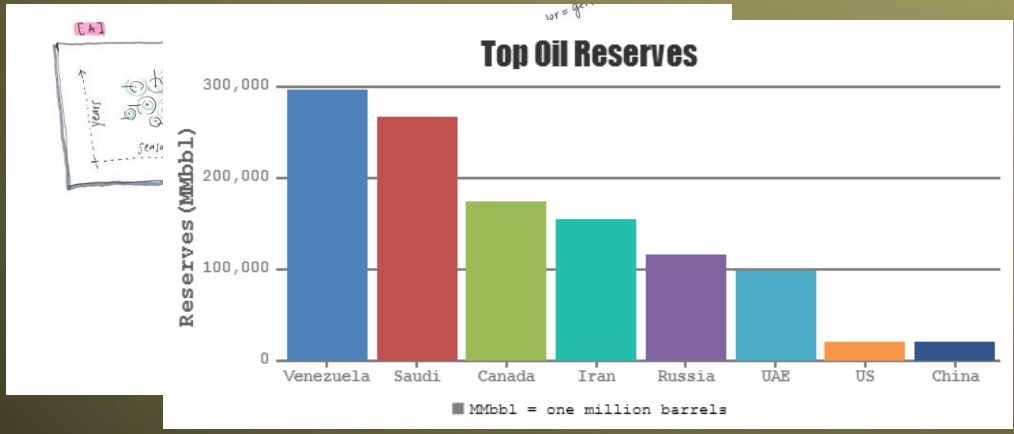
4. Prototype: 20 minutes

- Prototype approach



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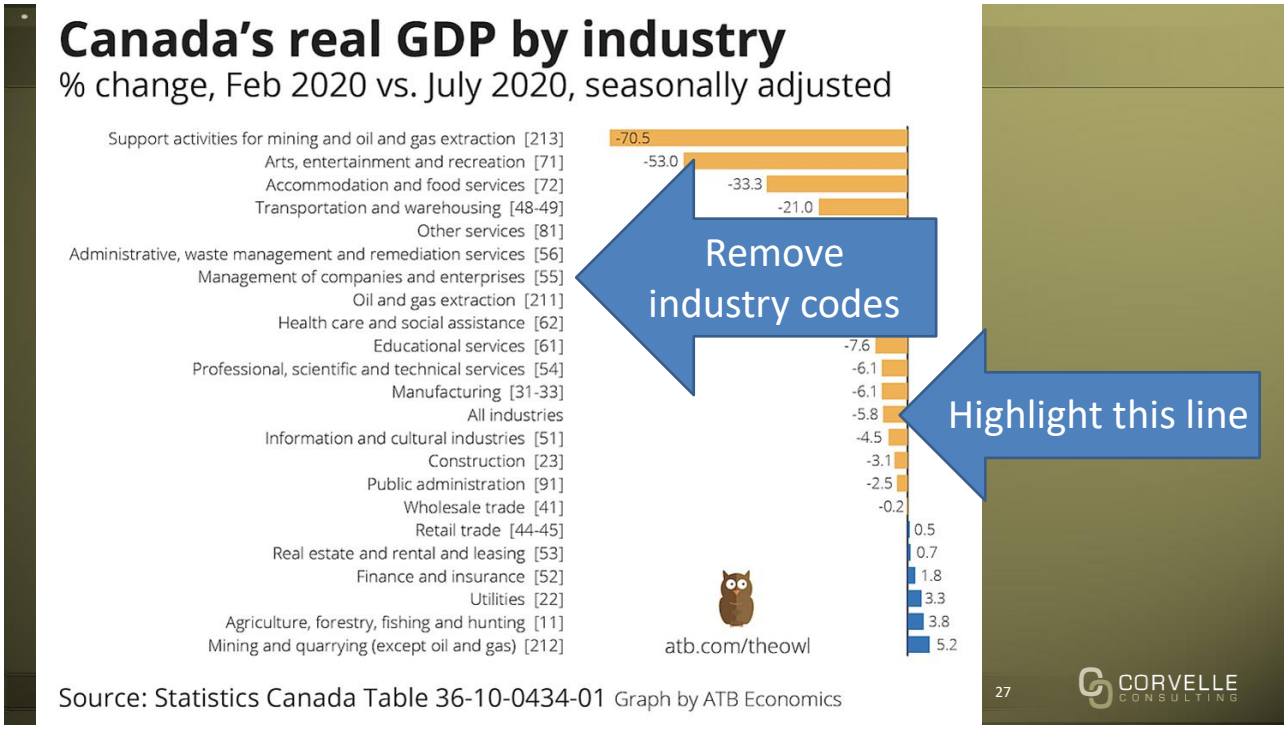
Canada's real GDP by industry
% change, Feb 2020 vs. July 2020, seasonally adjusted
Support activities for mining and oil and gas extraction [213] -70.5
Arts, entertainment and recreation [71] -53.0
Accommodation and food services [72] -33.3
Transportation and warehousing [48-49] -21.0
Other services [81]
Administrative, waste management and remediation services [56]
Management of companies and enterprises [55]
Oil and gas extraction [211]
Health care and social assistance [62]
Educational services [61] -7.6
Professional, scientific and technical services [54] -6.1
Manufacturing [31-33] -6.1
All industries -5.8
Information and cultural industries [51] -4.5
Construction [23] -3.1
Public administration [91] -2.5
Wholesale trade [41] -0.2
Retail trade [44-45] 0.5
Real estate and rental and leasing [53] 0.7
Finance and insurance [52] 1.8
Utilities [22] 3.3
Agriculture, forestry, fishing and hunting [11] 3.8
Mining and quarrying (except oil and gas) [212] 5.2
Remove industry codes
Highlight this line
atb.com/theowl
Source: Statistics Canada Table 36-10-0434-01 Graph by ATB Economics
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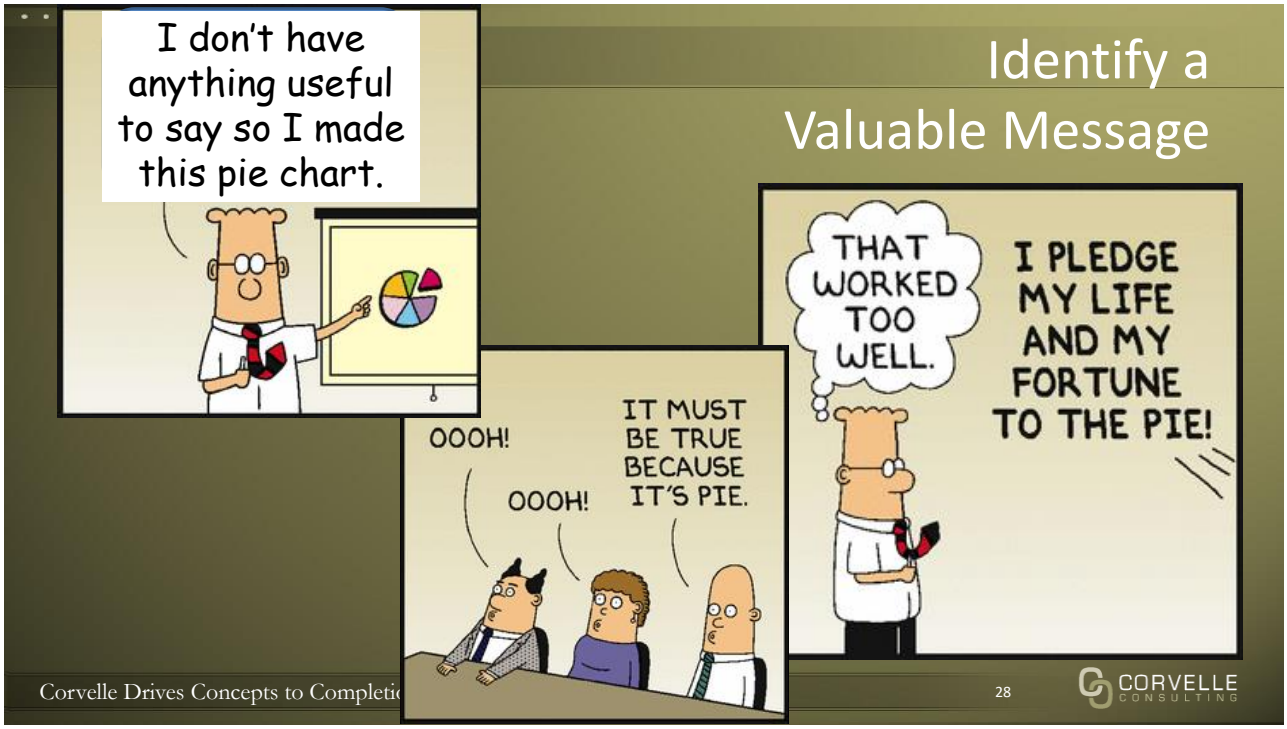
I don't have anything useful to say so I made this pie chart.
Identify a Valuable Message
THAT WORKED TOO WELL.
I PLEDGE MY LIFE AND MY FORTUNE TO THE PIE!
OOOH!
OOOH!
IT MUST BE TRUE BECAUSE IT'S PIE.
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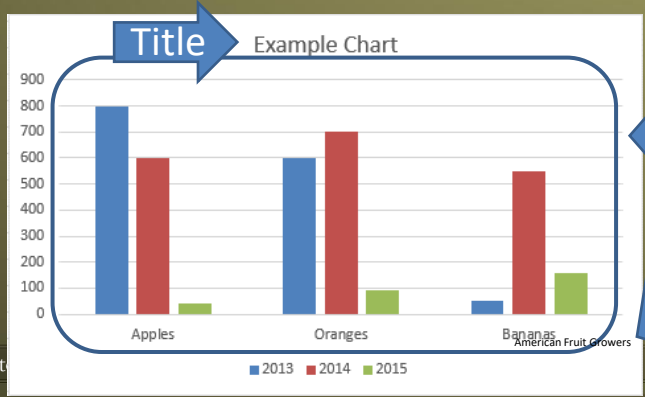
Refine Visualizations

Refine to Impress
Refine to Persuade
Persuasion or Manipulation?

Refine to Impress

Creating that sense of good design

1. Focus on design structure and hierarchy:
   – Include: title, subtitle, visual field, source line
   – Align elements



Refine to Impress
Creating that sense of good design

1. Focus on design structure and hierarchy:
   - Include: title, subtitle, visual field, source line
   - Align elements
2. Focus on design clarity
   - Make all elements support visual
   - Remove ambiguity
   - Use conventions and metaphors

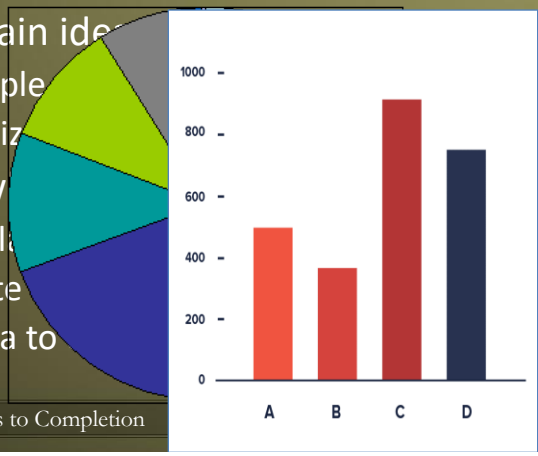
Refine to Impress
Creating that sense of good design

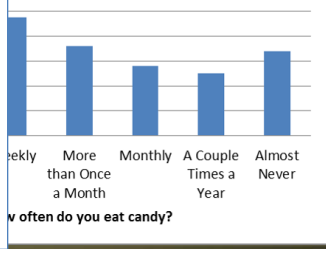
1. Focus on design structure and hierarchy:
   - Include: title, subtitle, visual field, source line
   - Align elements
2. Focus on design clarity
   - Make all elements support visual
   - Remove ambiguity
   - Use conventions and metaphors
3. Focus on design simplicity
   - Show only what's needed
   - Minimize the number of colors

Refine to Persuade

Making an accurate chart not enough

1. Hone main idea
   - Start by saying I need to convince the audience
2. Make main ide
   - Use simple
   - Emphasiz
3. Adjust w
   - Manipul
   - Eliminate
   - Add data to





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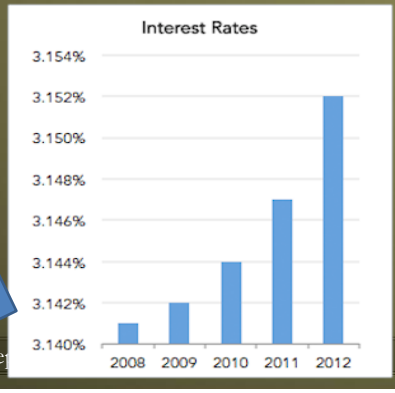
Persuasion or Manipulation?

- Truncated Y-axis
  - A chart removes valid value ranges from the y-axis, thereby removing data from the visual field



Y-axis starts above zero

No perceivable difference

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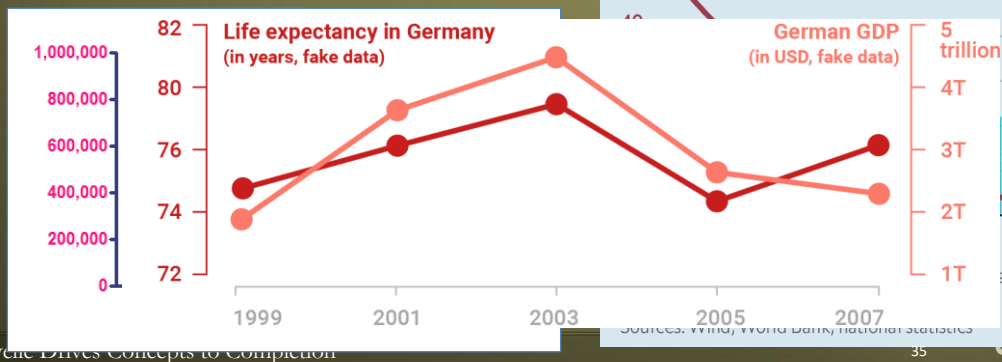
Persuasion or Manipulation?

- Double Y-axis
  - A chart includes two vertical scales for different data sets



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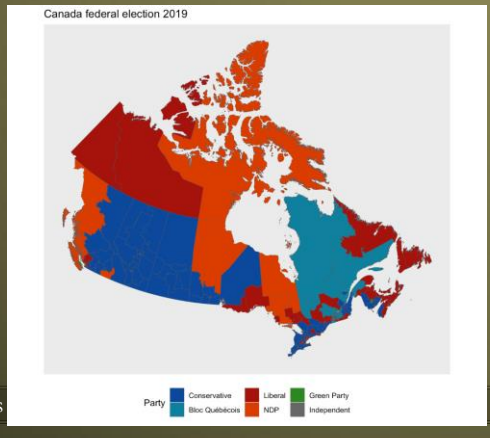
Persuasion or Manipulation?

- Map
  - uses geographical boundaries to present values



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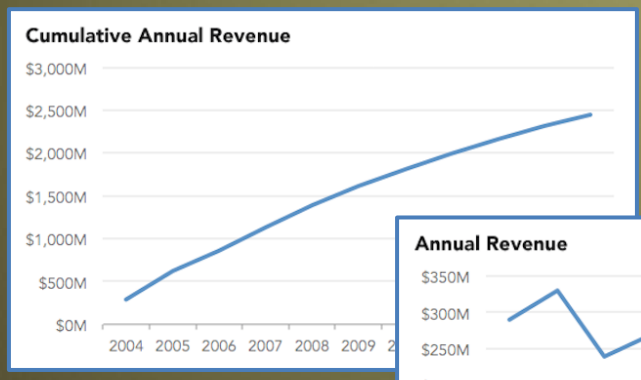
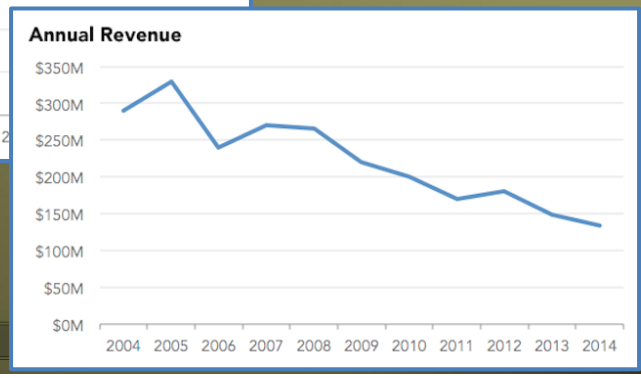
Example: Charting the Wrong Variable





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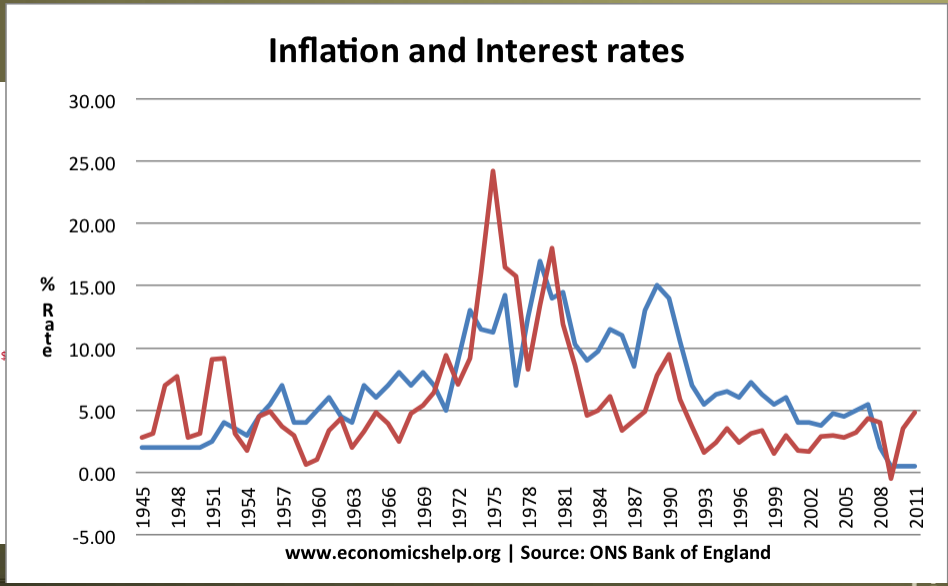
Coincidental correlation vs. Strong causation



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Not so Effective Design

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Present and Practice Visualizations

Present to Persuade
Visual Critique

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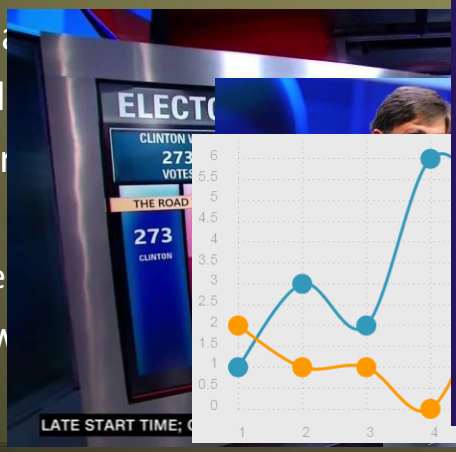
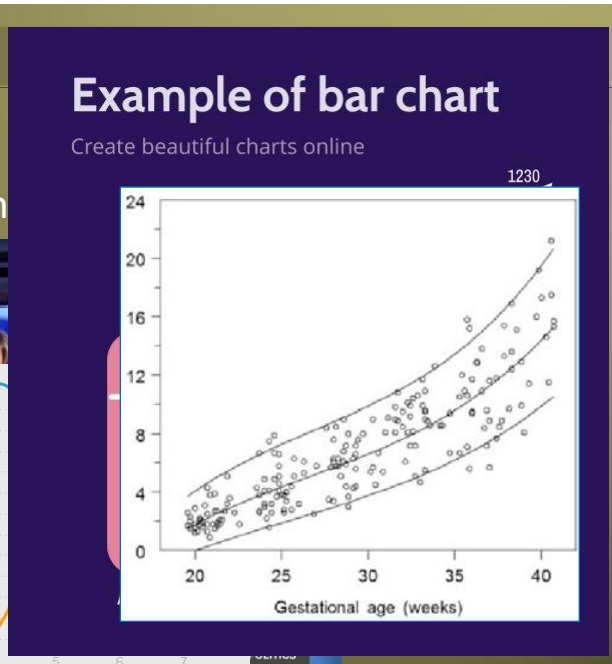
- Show the chart and stop talkin
- Talk
- Guid
- Use
- Turn
  - Pre
- Show





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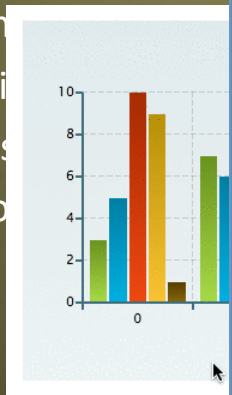
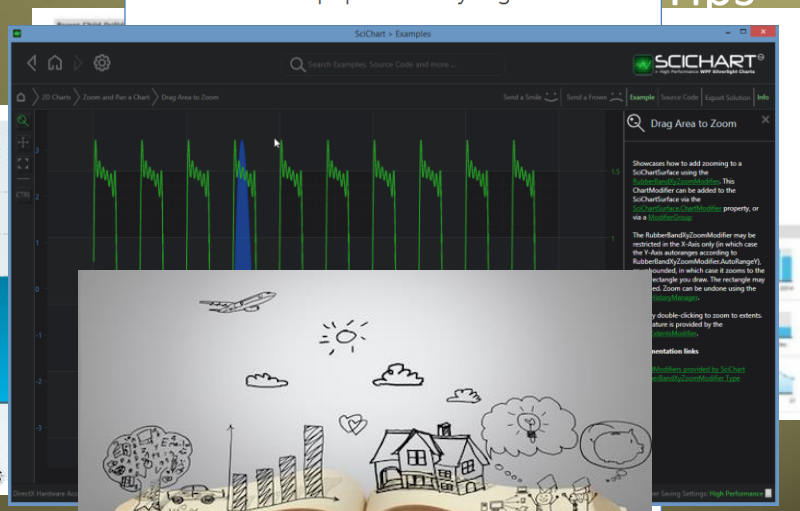
Present to Persuade

Tips

- Create tension
- Use tim
- Zoom i
- Decons
- Tell sto





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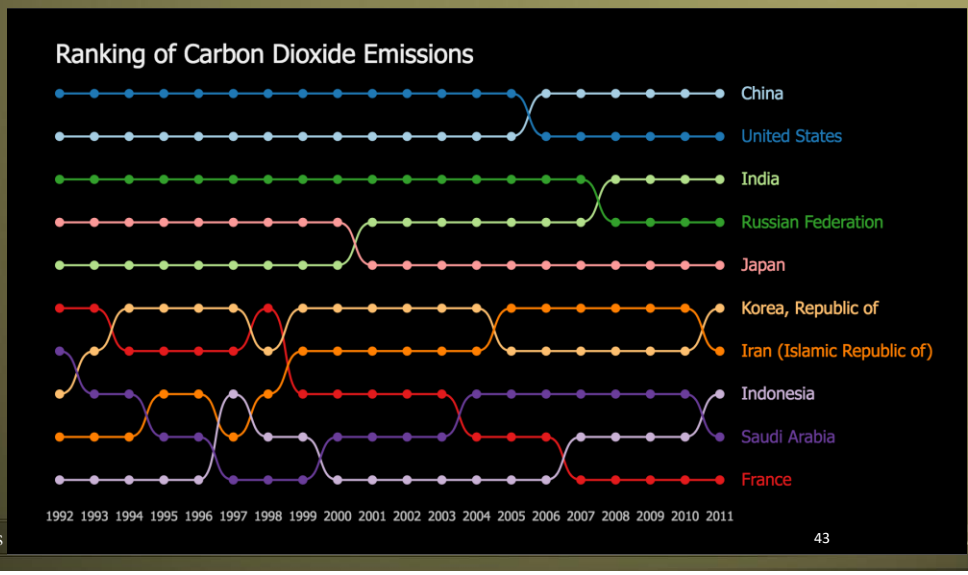
Example: Minimalist Approach Communicates Best



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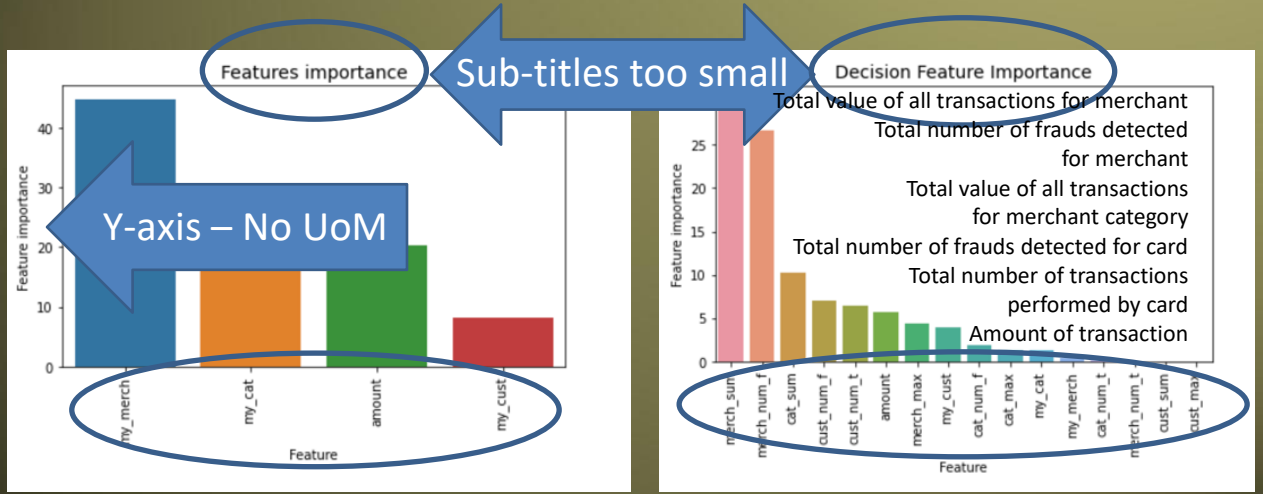
Added Value of Graph Databases in Credit Fraud Detection



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SOMEONE TOLD ME YOUR PRESENTATION WAS CONFUSING AND UNPERSUASIVE.
SOMETIMES ONE PERSON'S INABILITY TO UNDERSTAND LOOKS LIKE ANOTHER PERSON'S INABILITY TO EXPLAIN.
I DON'T UNDERSTAND WHAT YOU JUST SAID.
SEE?
Communication is never easy
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Understand visualizations
– Enhance
Create Vi
– Experim
Revenue for Top Channels Oct 2012
$250,000
$200,000
$150,000
$100,000
$50,000
$-
Email
Paid Search
Organic Search
Referral
Social
Banner
Affiliate
Barchart (b.2)
Scatterplot (dist vs speed)
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Reflection Questions

1. What is the most common kind of visual communication?
2. How elaborate should your data visualizations be?
3. What are some presentation tips?
4. Can you describe an opportunity to improve your data visualizations in your immediate area?
5. Can you describe an opportunity to improve your data visualizations somewhere in your organization?

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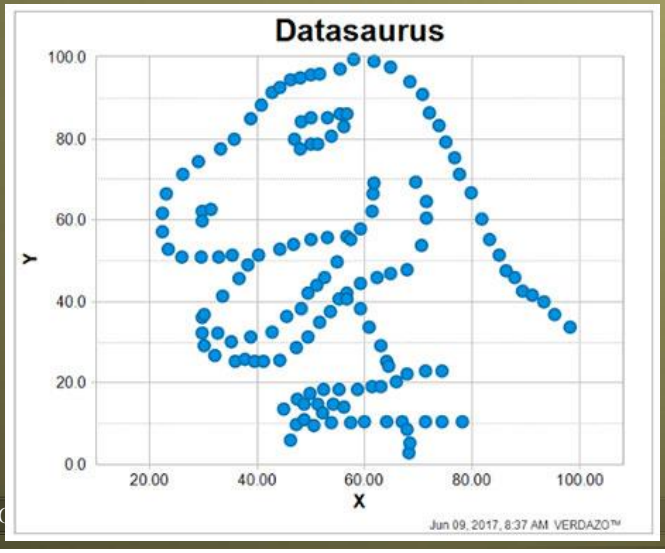
Never trust summary statistics alone
Always visualize your data



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