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COMMUNICATION

Visualizing Data

Objectives

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Communication of Visual Data

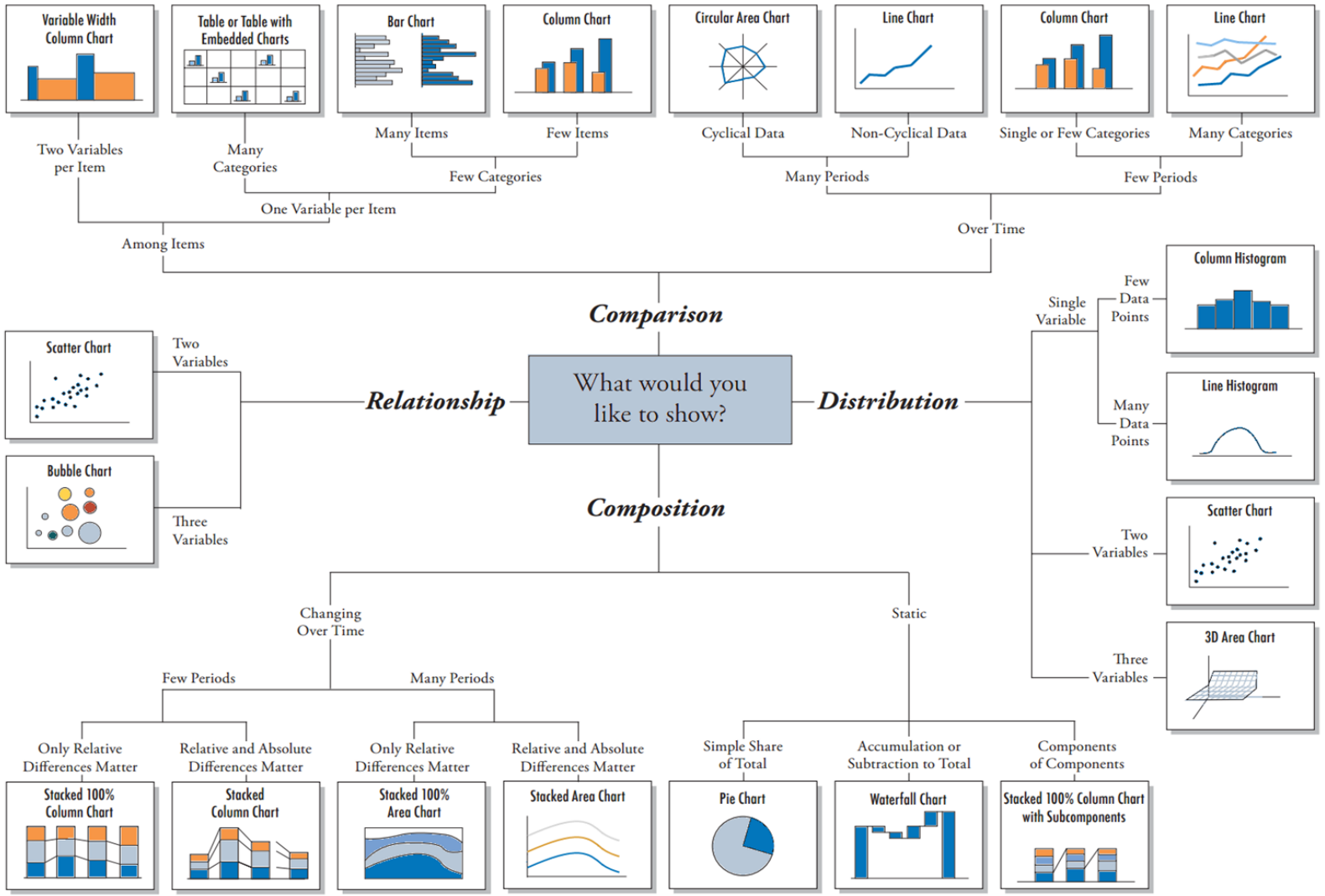
- Chart Type Selection & Math Connection
- Color, Psychology & Branding
- Visual Analysis Thought Leaders
- Timeless Design Principles & Pitfalls
- Designing an Effective Dashboard
- Practice: Interpret an Interactive Dashboard

Data Visualization

Selections & Critieria

Chart type reflects variable Relationships

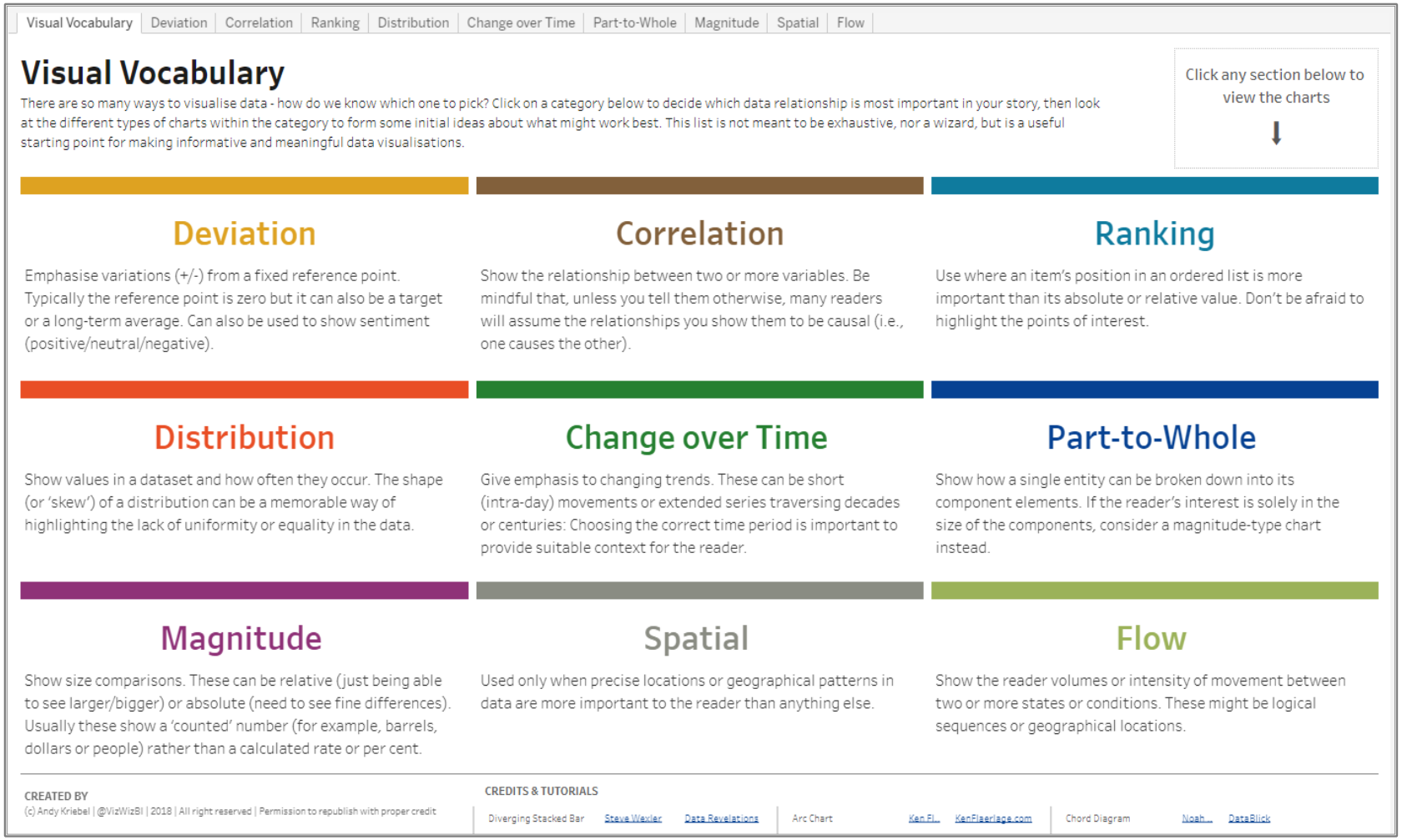
- Comparison?
- Distribution?
- Composition?
- Relationship?



Connect the Math & the Chart type!

Visual Vocabulary by Andy Kriebel.

Match the statistical measure and the chart type to best reflect the insights!



Visual Vocabulary | Deviation | Correlation | Ranking | Distribution | Change over Time | Part-to-Whole | Magnitude | Spatial | Flow

Visual Vocabulary

There are so many ways to visualise data - how do we know which one to pick? Click on a category below to decide which data relationship is most important in your story, then look at the different types of charts within the category to form some initial ideas about what might work best. This list is not meant to be exhaustive, nor a wizard, but is a useful starting point for making informative and meaningful data visualisations.

Click any section below to view the charts

Deviation

Emphasise variations (+/-) from a fixed reference point. Typically the reference point is zero but it can also be a target or a long-term average. Can also be used to show sentiment (positive/neutral/negative).

Correlation

Show the relationship between two or more variables. Be mindful that, unless you tell them otherwise, many readers will assume the relationships you show them to be causal (i.e., one causes the other).

Ranking

Use where an item's position in an ordered list is more important than its absolute or relative value. Don't be afraid to highlight the points of interest.

Distribution

Show values in a dataset and how often they occur. The shape (or 'skew') of a distribution can be a memorable way of highlighting the lack of uniformity or equality in the data.

Change over Time

Give emphasis to changing trends. These can be short (intra-day) movements or extended series traversing decades or centuries: Choosing the correct time period is important to provide suitable context for the reader.

Part-to-Whole

Show how a single entity can be broken down into its component elements. If the reader's interest is solely in the size of the components, consider a magnitude-type chart instead.

Magnitude

Show size comparisons. These can be relative (just being able to see larger/bigger) or absolute (need to see fine differences). Usually these show a 'counted' number (for example, barrels, dollars or people) rather than a calculated rate or per cent.

Spatial

Used only when precise locations or geographical patterns in data are more important to the reader than anything else.

Flow

Show the reader volumes or intensity of movement between two or more states or conditions. These might be logical sequences or geographical locations.

CREATED BY

CREDITS & TUTORIALS
Diverging Stacked Bar Steve Wexler Data Revelations | Arc Chart Ken Fl... KenFlerlage.com | Chord Diagram Noah... DataBlick

https://public.tableau.com/en-us/gallery/visual-vocabulary

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Color's Psychology & Branding

DEPENDABLE
INTELLIGENT, STABLE

HEALTHY
NATURE, FRESHNESS

OPTIMISTIC
ENERGETIC, FRIENDLY

CHEERFUL
ENERGIZING, LIGHT-HEARTED

DARING
DRAMATIC, SEXY

CREATIVE
MYSTERIOUS, LUXURIOUS

TRANQUIL
CORPORATE, MODEST

https://seventablets.com/blog/color-psychology/

Data Visualization

Timeless Principles & Pitfalls

Data Visualization: Industry Leaders

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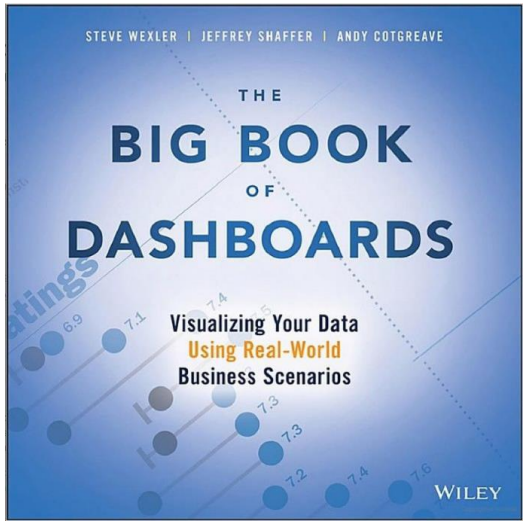
The Big Book of Dashboards

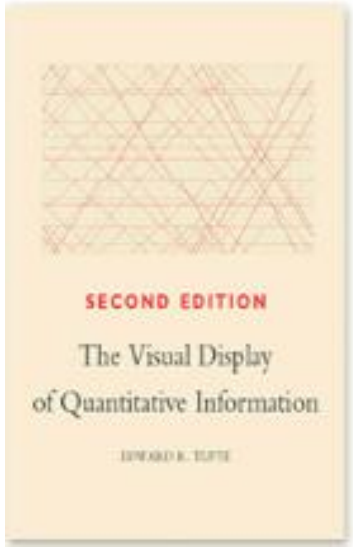
Visualizing Your Data Using Real-World Business Scenarios by Dr. Jeffrey Shaffer, Steve Wexler, and Andy Cotgreave.

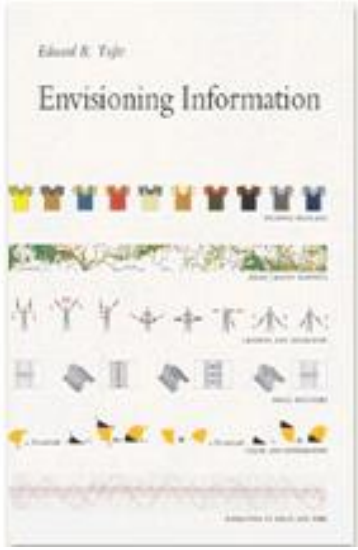


4C's of Design

Edward Tufte

Visual Display of Quantitative Information, and Envisioning Information.





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The Big Book of Dashboards' 4 C's:

Clear

Who is the **audience**? What is the **call to action**?
Clarity is more important than aesthetics.

Clean

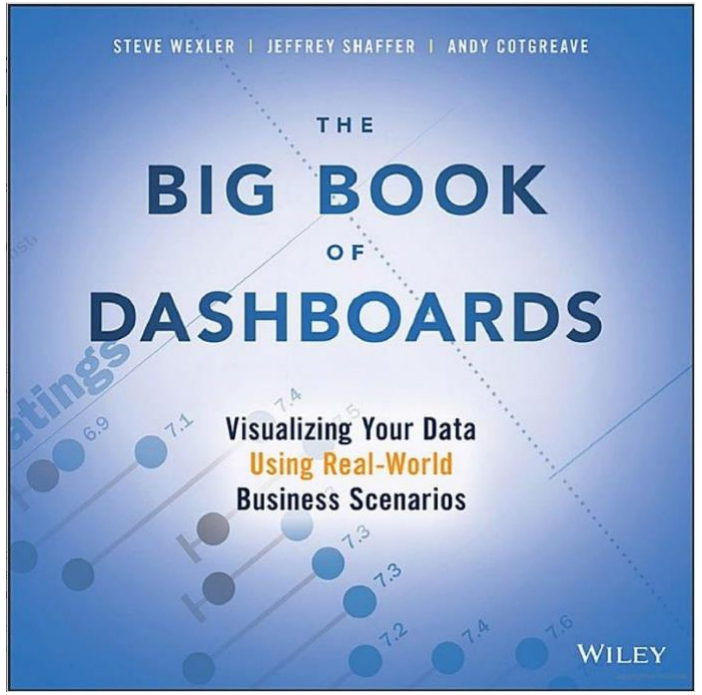
Labels, axes, gridlines, formats,
Color choice and chart type.

Concise

Balance of elements across the viz.
Be brief and to the point.

Captivating

Does it capture attention? Does it tell a story?



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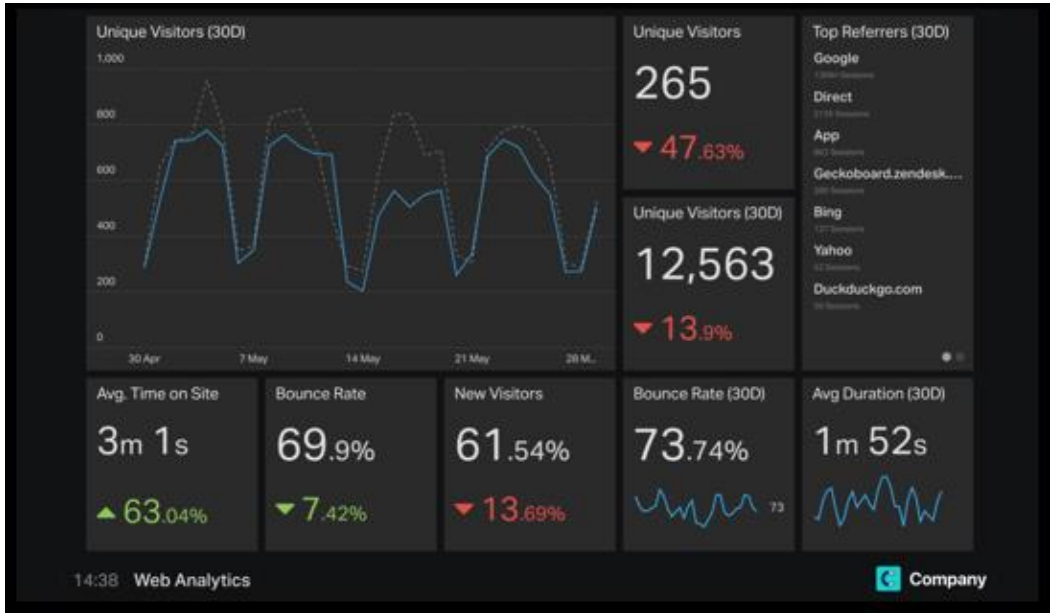
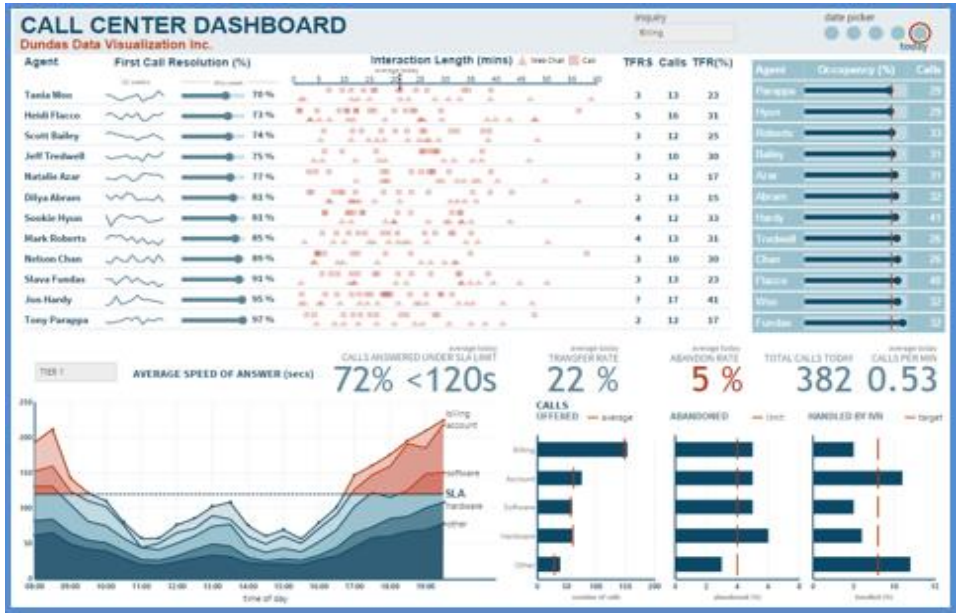
Clarity on Audience & Call to Action

- Who is your target audience? Consider level of detail.
- What's its purpose? Is it reporting on KPI's or Operational Tool?

Exec Management



Operational Management



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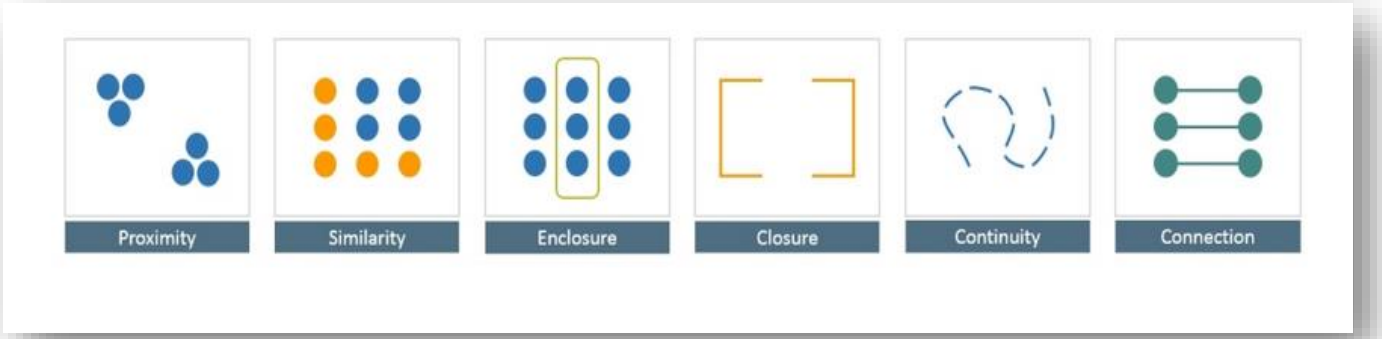
Preattentive Attributes and Gestalt's Design Principles

- **Proximity** – Elements nearby tend to be grouped in our minds.
- **Similarity** – Our minds associate similar elements.
- **Enclosure** – If a border surrounds an object, its perceived as a group.
- **Closure** – If something is incomplete (partial border or just axis), it is still perceived as a closed structure.
- **Continuity** – If several objects are aligned, we consider them as continuum.
- **Connection** – If a set of objects are connected, we also see them as a group.



Data Visualization Challenge

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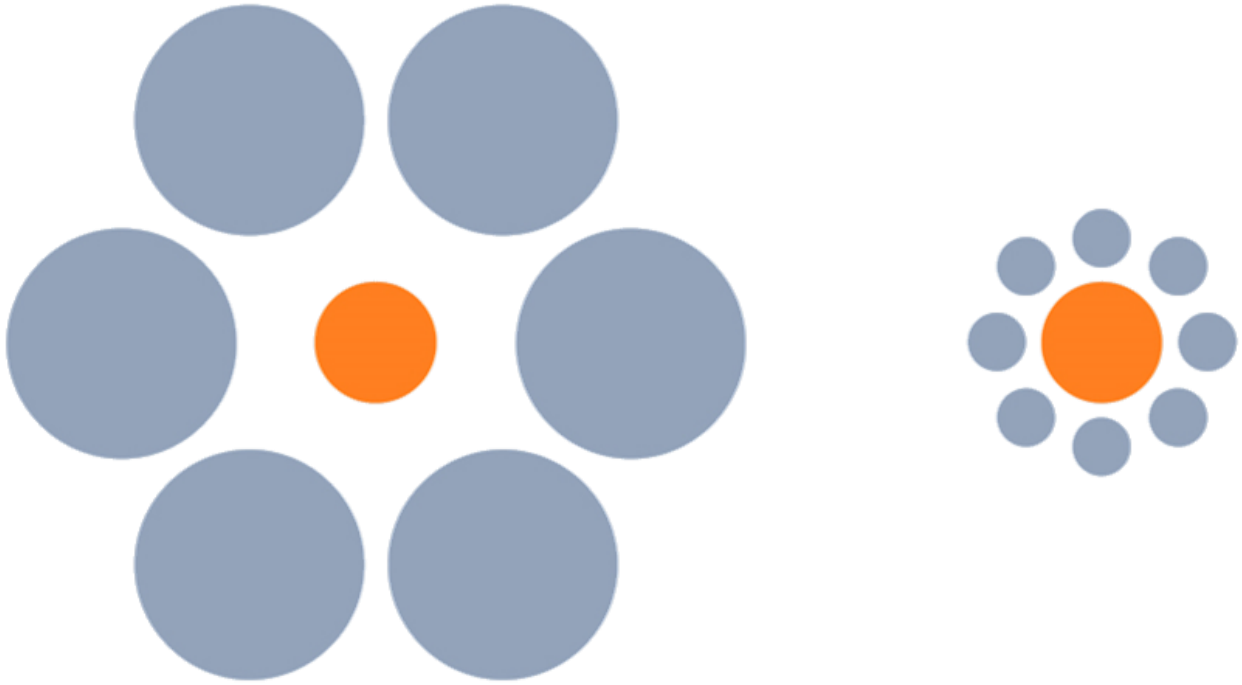
Which Orange Circle is Larger?



Source: https://goo.gl/b1f2G6

Data Visualization Challenge

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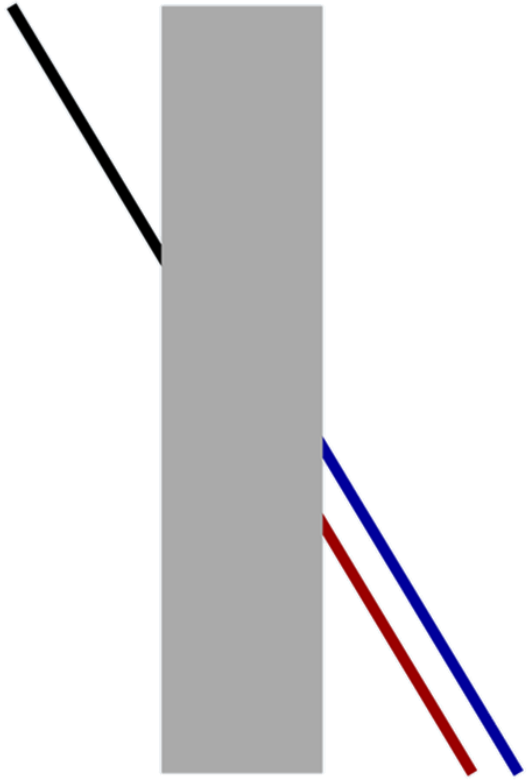
Look at the black line. Does it line up with the red or blue line?



Source: https://goo.gl/b1f2G6

Data Visualization Challenge

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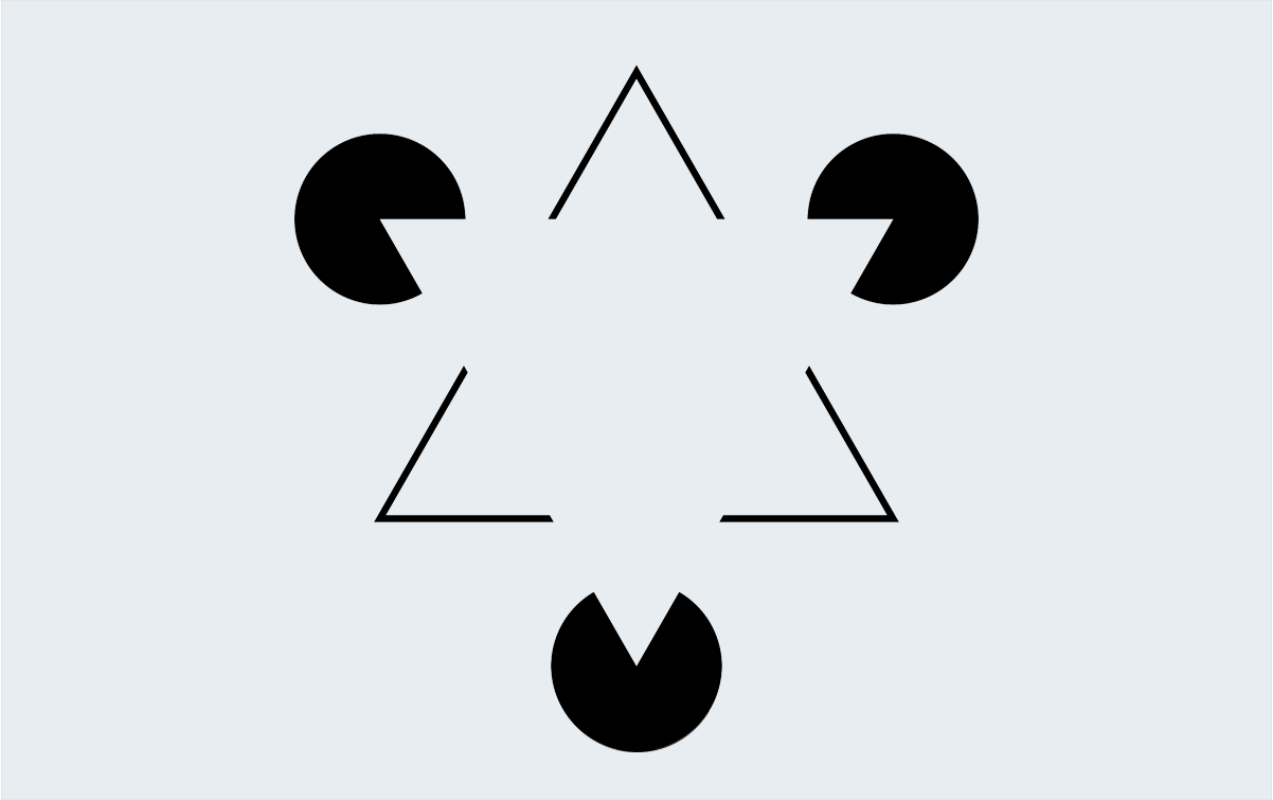
Is the inverted triangle in the center brighter than the gray background? Kanizsa's Triangle, Gestalt Effect)



Source: https://goo.gl/b1f2G6

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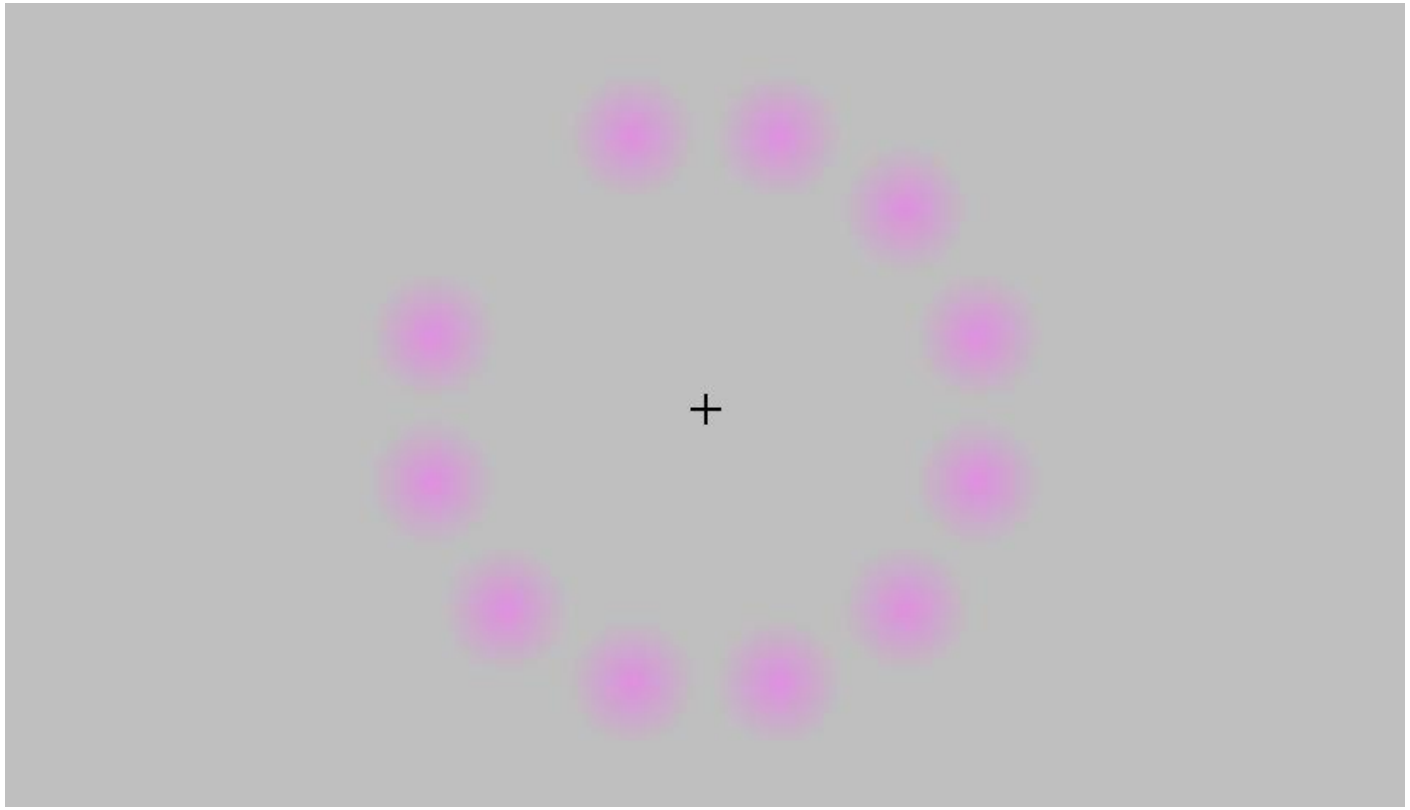
Stare at this animation for 10 seconds. Do you see a green dot appear? (Lilac Chaser, “Pac-Man Illusion)



Source: https://goo.gl/b1f2G6

Data Visualization Challenge

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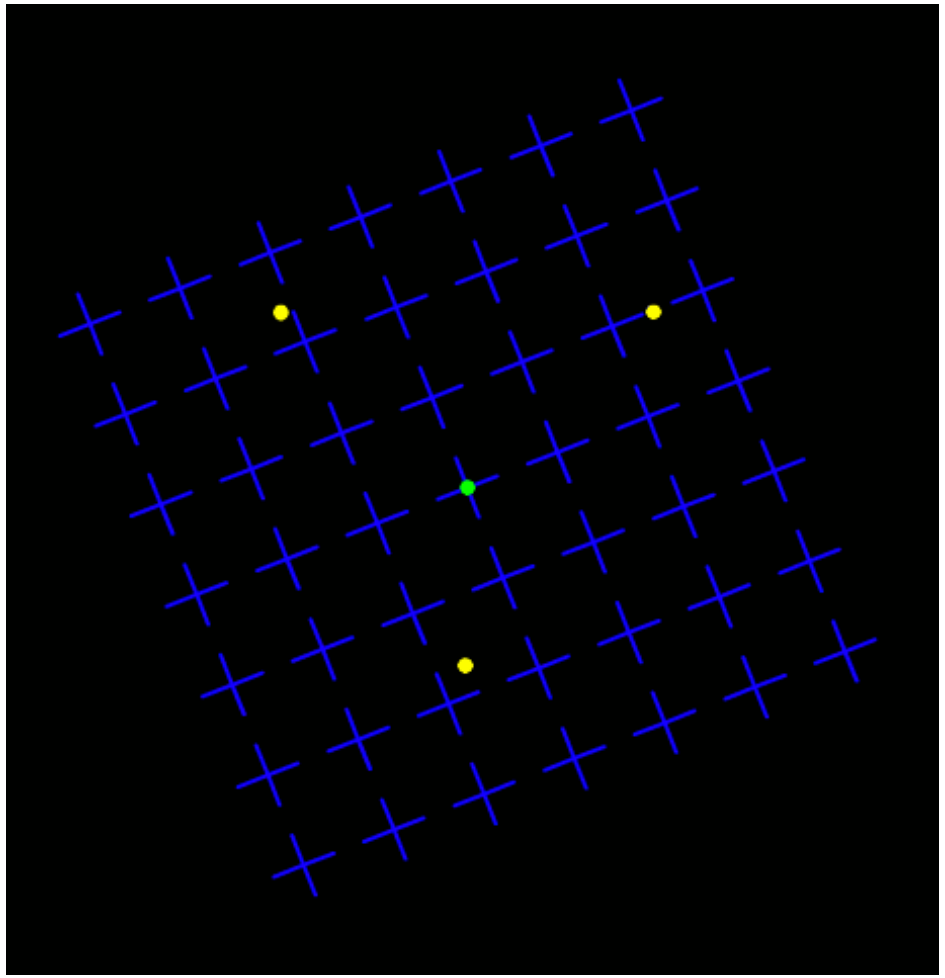
Stare at the center of this without blinking.

Do notice anything happening to the 3 yellow dots? (MIB Illusion)



Source: https://goo.gl/BvBzRT

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Common Charting Pitfalls to Avoid!

- Consistent scaling: charts of order and progression (Time Series).
- Stacked bar or area charts need clear labeling. Clearly show if they are additive or if each begins at zero?
- Dual Axis are great for layering closely related items. Watch scaling.
- Pie charts are best to compare 2 or 3 items (max!).

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Common Color Pitfalls to Avoid!

- Use Corporate ID Branding colors when available.
- Be purposeful and consistent with color application.
- Connect to expected “norms” – green (positive), red (alert)
- Consider the psychology behind the colors to add meaning.
- Be Inclusive. Do you have stakeholders with color blindness?

Data Visualization

Building Dashboards

Data Visualization

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Good Design Summary

- Eliminate Chart Junk. Simple and clear is best.
- 2-3 Colors is enough. Use gradient hues to extend.
- Consistently apply meaning of colors & devices.
- Complimentary selections are across the Color wheel.
- Alert with contrasting colors or shapes.

Use the 4 C's to evaluate your visualization!

4 C's Evaluation

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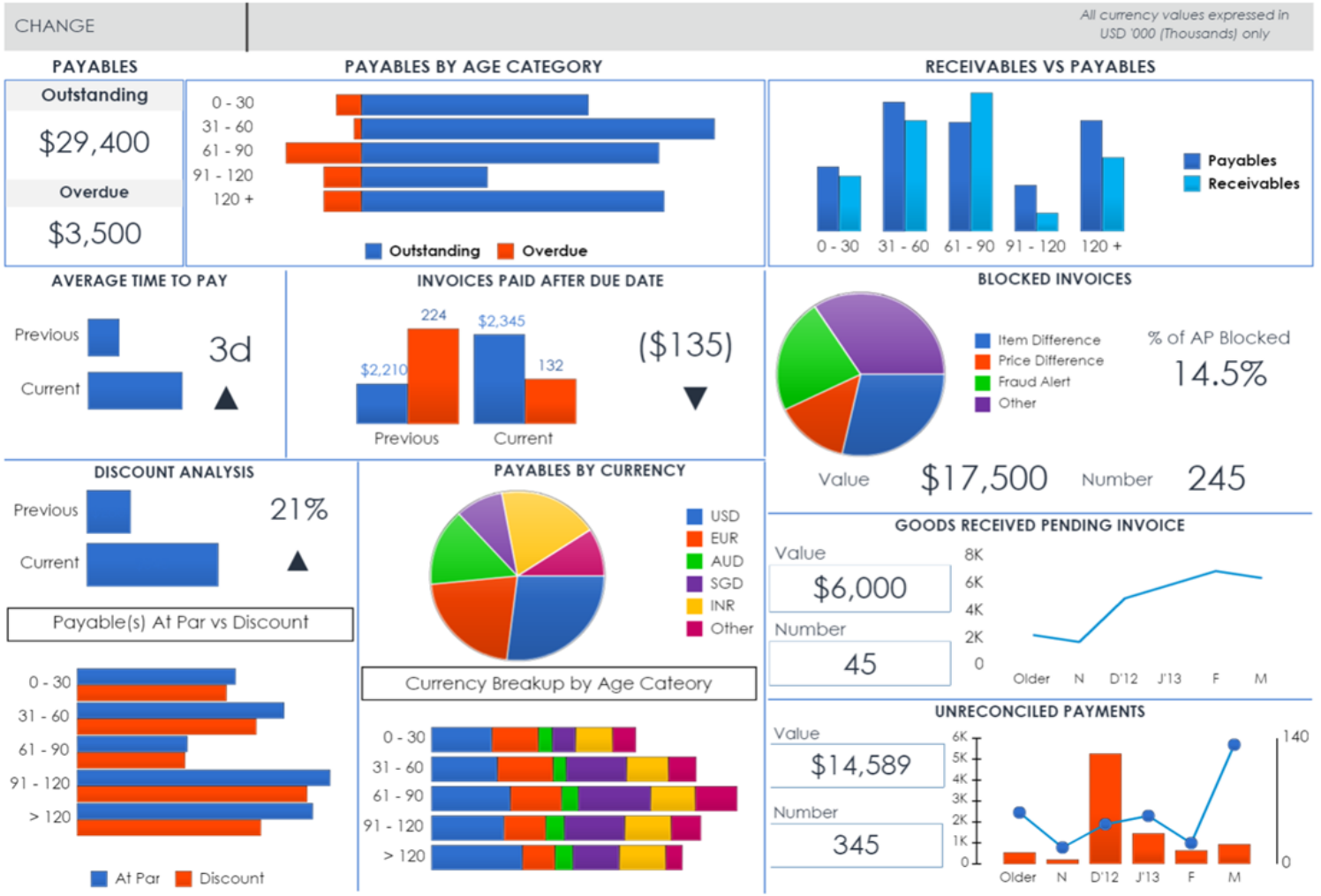
Clear, clean, concise and captivating?



Feedback:

- Unfocused.
- Too many chart types.
- Too many colors.
- Overly broad messaging.
- Inconsistent assignment of color.

4 C's Evaluation

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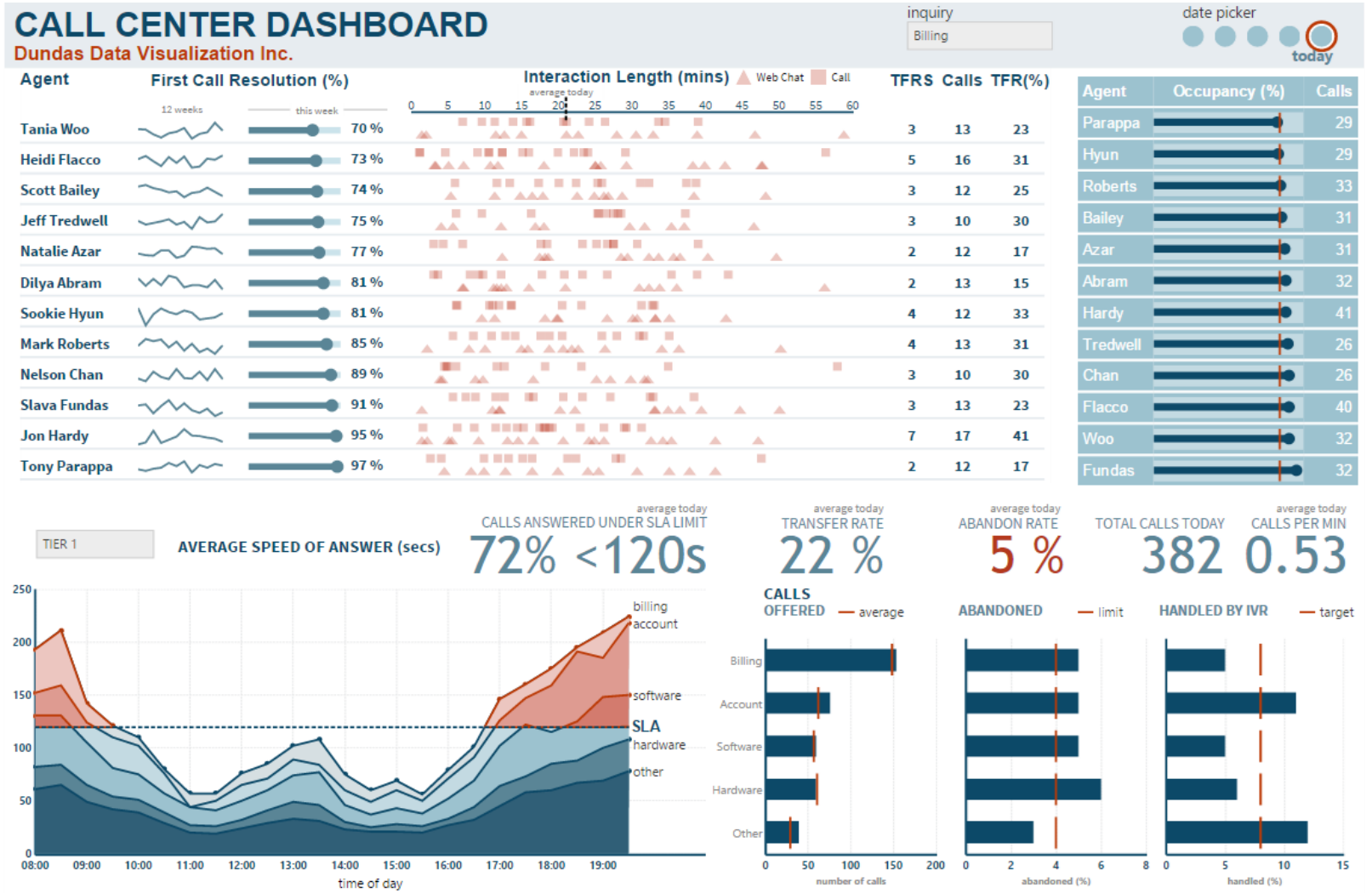
Clear, clean, concise and captivating?

Feedback:

- Logical layout.
- Correlated color hues.
- Concise representations.
- Visually cohesive.
- Clear call to action.



Data Visualization

Dashboard Activity

Power BI Dashboards

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Let's Explore and Interactively Answer Questions!

- ☑ **Answer questions for two pre-built dashboards linked:**
  - ☑ Estimate Electricity Usage (linked)
  - ☑ Seattle's Construction Climate (linked)

Power BI Dashboards

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Estimate Electricity Usage (linked)

A bachelor working from home in Hawaii is looking for ways that they can minimize their electricity usage. They have come across a tool via Power BI that will allow them to put together their strategy for reducing their cost/usage. He typically these devices x amount of minutes a day:

Game Console – 90
Internet - all day
phone charger – 60
Dryer – 15
coffee maker – 14
fridge - all day
television – 300
laptop – 480
printers – 4
light bulb -480
dish washer – 14
kitchen hood – 10
water heater - 20
monitor – 480
vacuum cleaner – 4
washing machine – 14
electric stove – 45
microwaves – 10

What would your first solution for this gentleman to decrease his power consumption? What was his power consumption? What section of the house is consuming the most electricity? What do you think about their use of a pie chart? What did they do to help it succeed?

Power BI Dashboards

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Seattle's Construction Climate (linked)

- ☑ In Seattle in 2013, construction with a permit issued, what was the amount listed at the peak of the in the line graph depicting the growing rate for single family homes?
- ☑ Which contractor won the highest sum of deals between 01/4/2012 and 03/15/2012?
- ☑ How many permits did they get over this period of time?
- ☑ Between 11/01/2016 and 09/01/2017, what was the smallest max permit value, who holds that permit, and what category does it fall into?

Competitive Landscape

		
★Industry leader for data visualization software, with VizQL IP for Interactive Data Inquiry.	Integrated with Microsoft tool suite, including MS database offerings.	Qlik Sense 2015 modeled after Tableau feature set to increase competition.
Logical & Physical Data Model with Hyper Database Engine for in memory columnar preparation. Extensive 80+ native data connectors.	User navigation uses familiar selection interface for Data Model and Chart Navigation.	★Automated Associative Indexing for table imports; dynamic Data Model with programmatic options.
Robust user-friendly interface designed to democratize access to visual data analysis.	★Consistent user experience reduces learning curve for those with Excel experience and greatly enhances visuals coming from Excel.	Smart Search with suggested KPI's and Charts recommendations. Learning curve with user interface.
Extensive specialization options: PyTab, Extension libraries, 3rd party add-on integration, etc.	DAX extends creation options.	Direct SQL integration for aggregation and customization. SET Expressions.

Questions?

Project Timeline

Budget Your Time Carefully!

Project 1 Timeline

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Project Checkpoints	Project Documents
2/24: Team-Work Begins	Team working agreement
2/25: Peer Share & Feedback	Multi-tab Excel Workbook
2/26: Project Plan Submission	PDF Plan; Snapshot of Data Dictionary
3/1: Team Mini-Presentation	Slide deck presented; PDF & xlsx submitted
3/2-4: Power BI Implementation	Peer review of initial pbix work
3/8: Project 1 Delivery	Slide deck presented; PDF, xlsx and pbix files submission

Practice Lab & Project Dev

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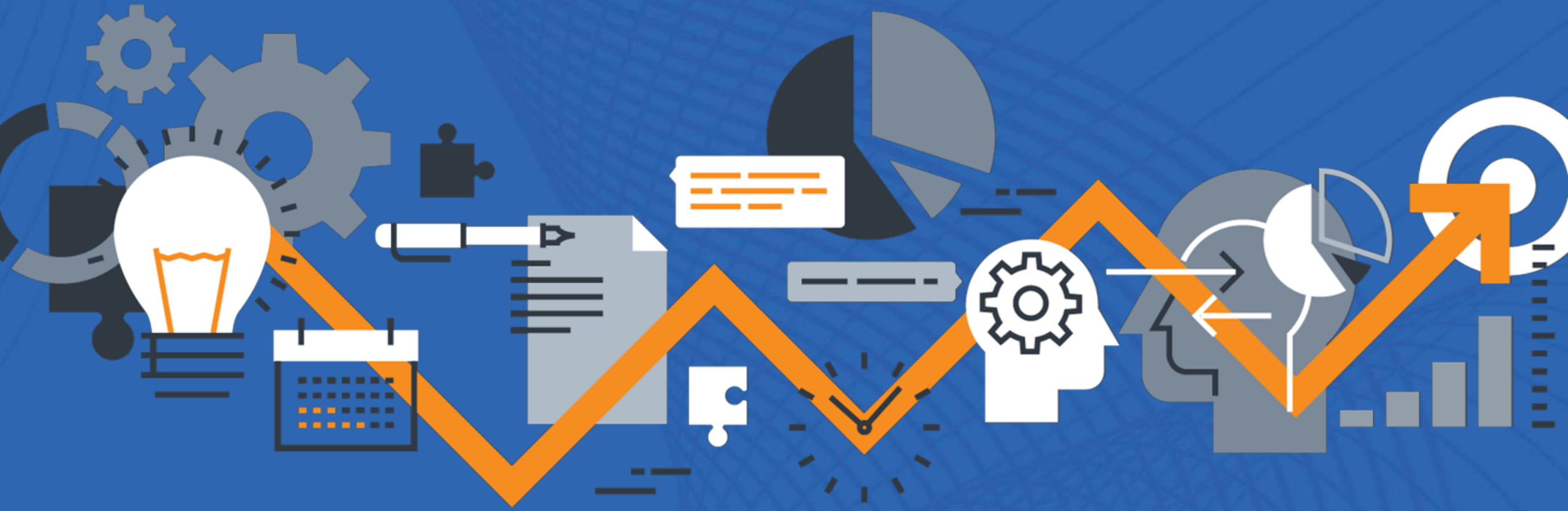
- ☑ Answer questions for two pre-built dashboards linked:
  - ☑ Estimate Electricity Usage (linked)
  - ☑ Seattle's Construction Climate (linked)
- ☑ Recreate Citibike Trip Dashboard (Review with Ray at 4pm)
- ☑ Begin Implementing Power BI into Airbnb Project data.
- ☑ Questions?

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