Do Your Data Visualizations Need a Makeover?

Meagan Longoria

My Data Viz Journey

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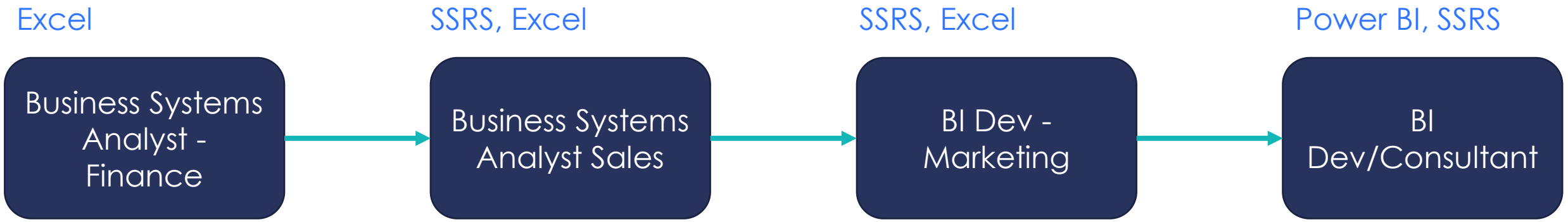


You are interviewing candidates for an open business analyst position and this guy shows up.

What are you thinking?

His outfit might be distracting from his message.

What Not To Wear: Data Viz Edition

Participants begin worried they will look boring, but recognize deeper issues and leave knowing how to convey the right message.

My goal for your data viz

Photo by Phil Plait CC-By-SA

Two Types of Analysis Facilitated By Data Visualization

Exploratory (sense-making)

Explanatory (communication)

This is what you do when you share a Power BI report

Miscommunication is human. It happens a lot
Data visualization is communication.

Data visualization is a skill.
Most practitioners aren't trained.
Neither are our users.

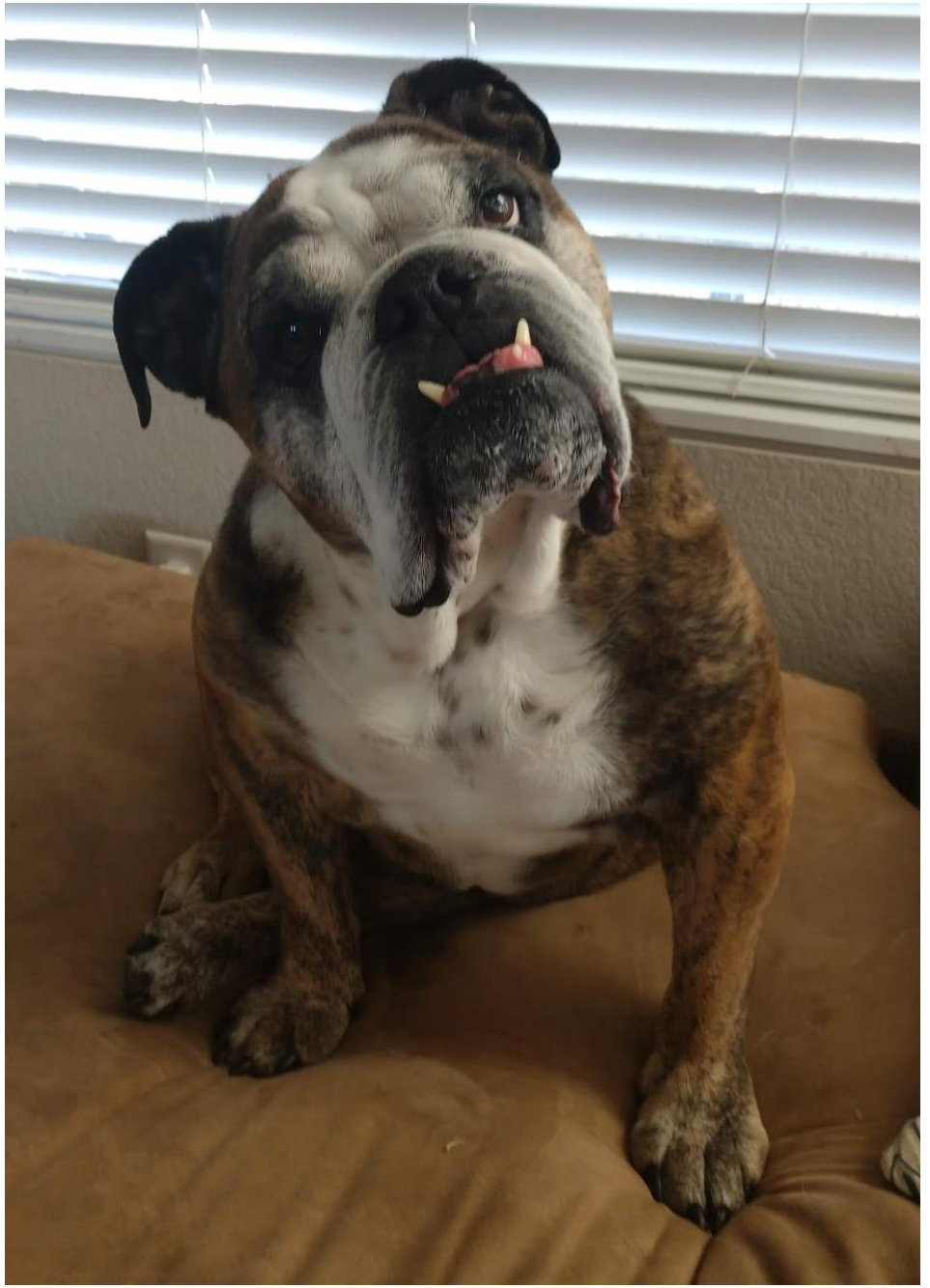
Bad data visualization is like a joke that falls flat.

You get one of three reactions:

Boredom
Confusion
Disgust

The Reaction We Want

Is Interest
Or
Positive Engagement



Why Do We Fail?

1. Our definition of success is wrong

Why Do We Fail?

2. We don't structure and order our information purposefully

Why Do We Fail?

3. We fail to consider how we interpret visual design

Defining Success In Data Visualization

Data Visualization

Any effort to help people understand the significance of data by placing it in a visual context

Success Means

Not just understanding the data, but understanding its significance

In Other Words

Tell your intended audience what they need to know efficiently and effectively

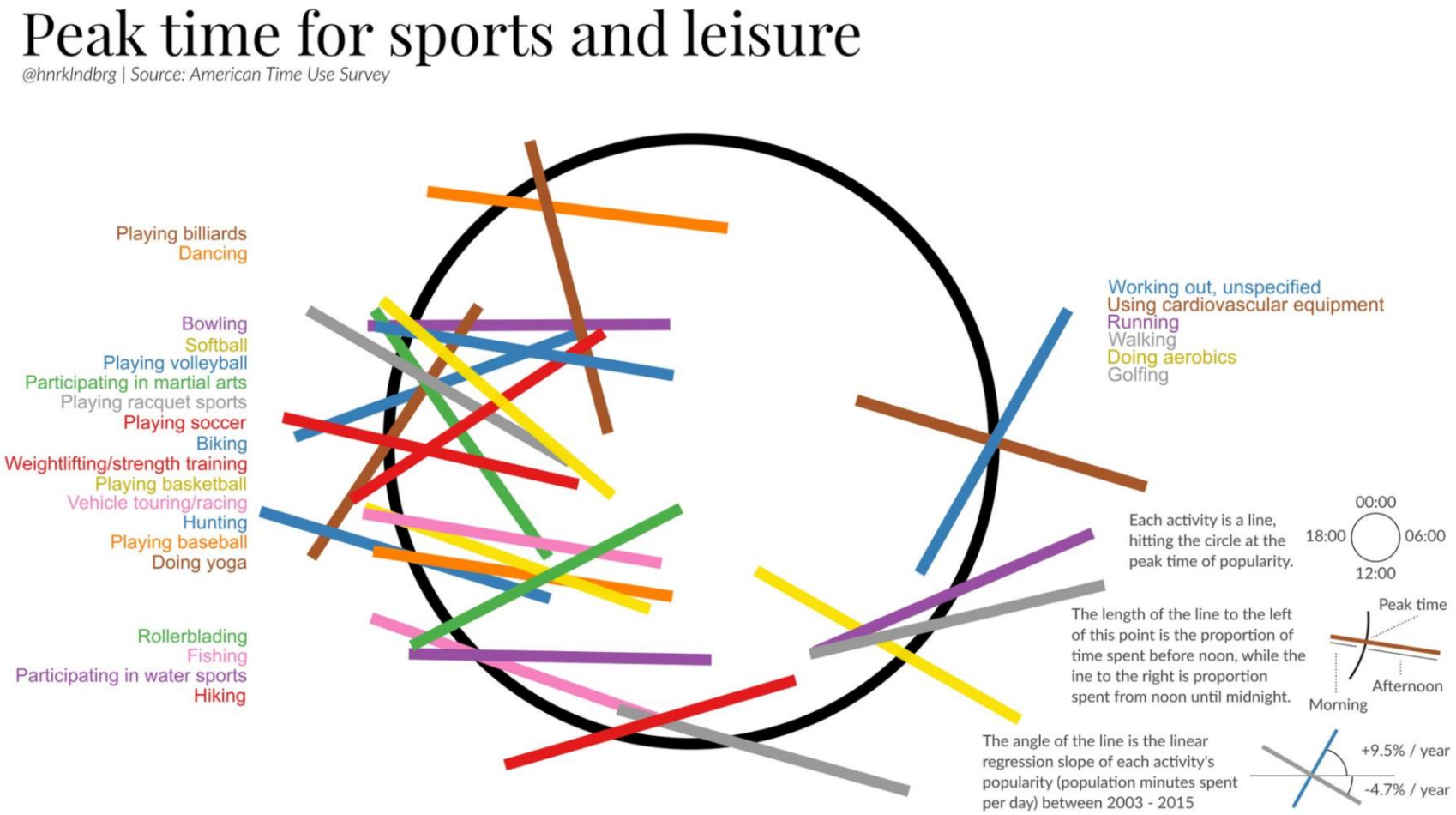
Ultimately

Help your audience make a decision or take action

Not Your Goal #1

Show how many different chart types you can use

Novelty Over Clarity



https://twitter.com/hnrklndbrg/status/886181647003119616

Not Your Goal #2

Show off how many reporting features you can use

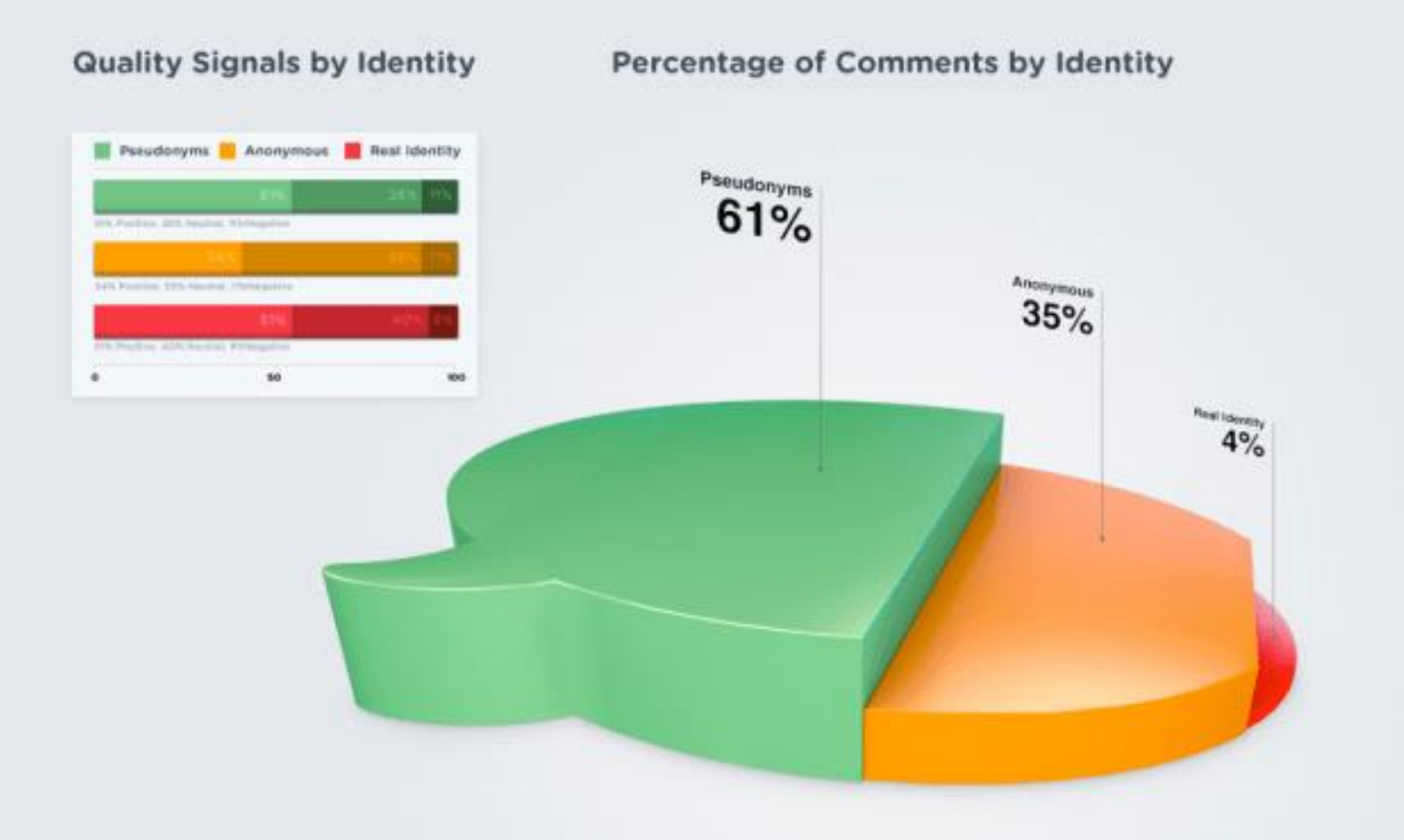
Look What I Can Do!

https://www.idashboards.com/dashboard-examples/healthcare-dashboards-doctors-scorecard/

Not Your Goal #3

Make shiny things

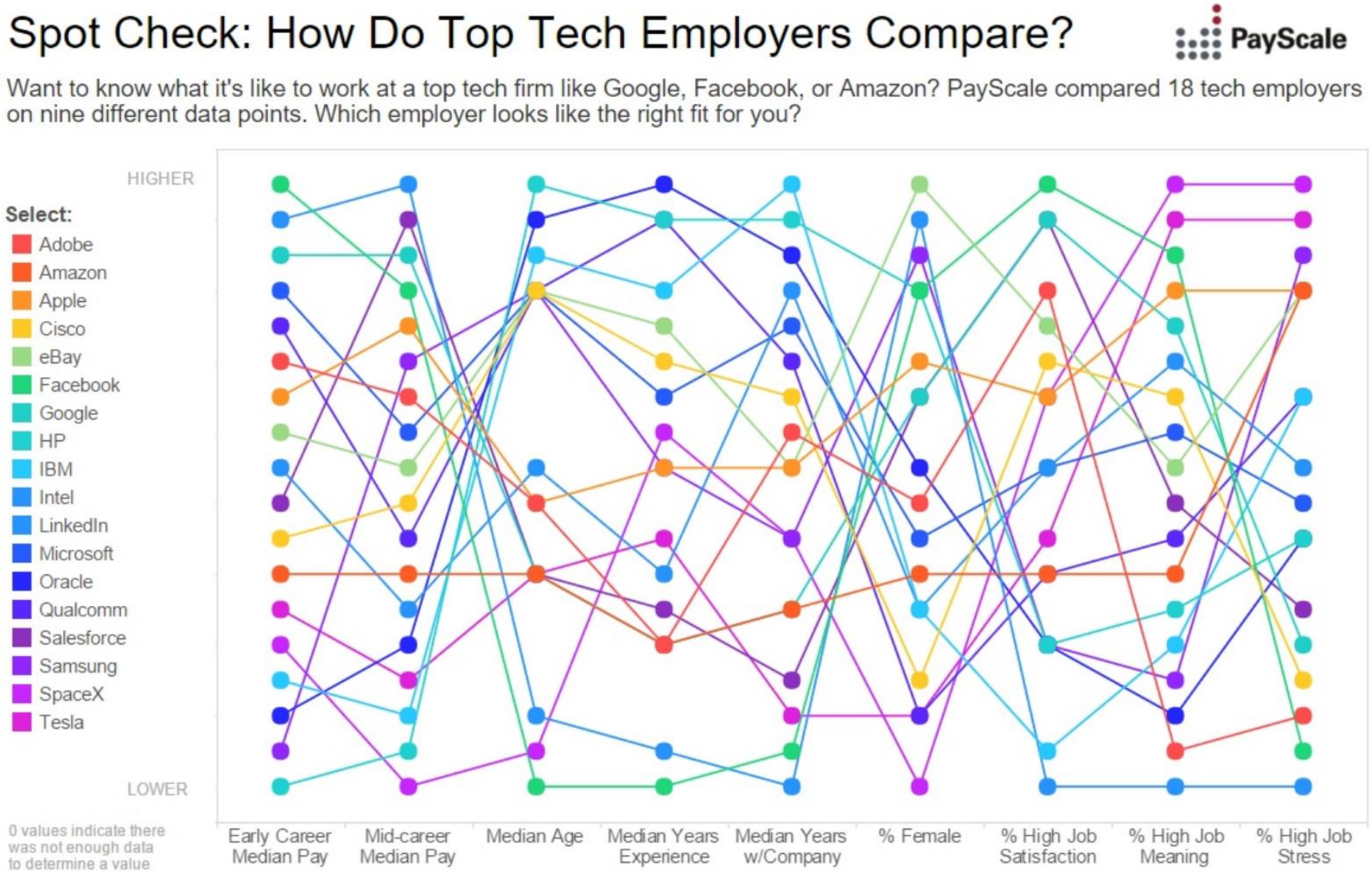
Pretty, Useless Shapes



https://flowingdata.com/2012/01/10/pie-step-comment-bubble-3d-thing/


Not Your Goal #4
Display ALL of the data

No Data Point Left Behind



https://www.geekwire.com/2016/payscale-ratings-rank-spacex-tesla-low-salary-high-meaningfulness/

Purposeful Structure and Order

My Mom

Lovely, kind… horrible storyteller

Gets stuck on unimportant details

Starts a story and then doesn't finish it

Don't let your data viz be like my mom

Storytelling

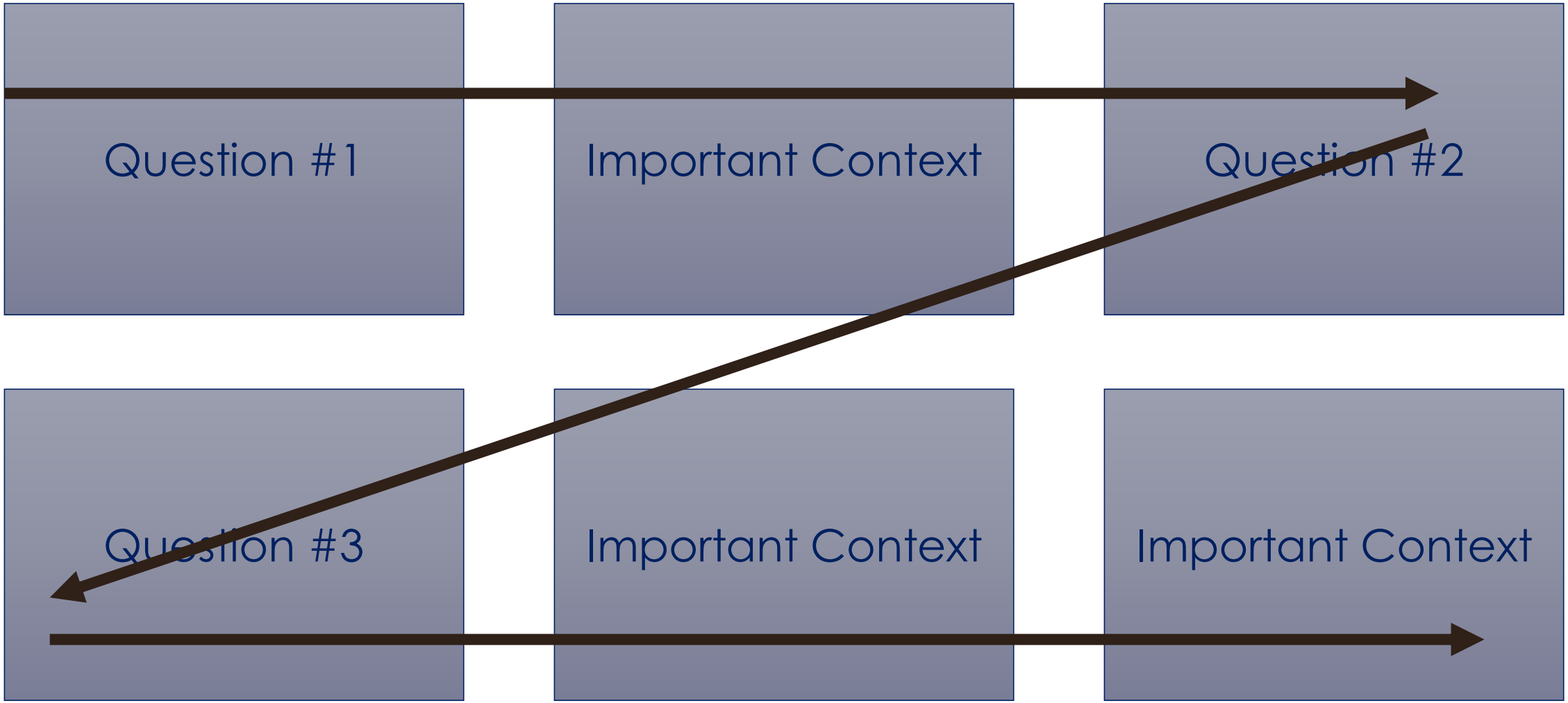
~~"Massage" data to make it more interesting~~

~~Show visuals one at a time~~

Purposeful structure and order on the page

Helpful navigation paths

Purposeful Order – Possible Option



Data Visualization Requires Empathy

Everyone is busy.

People want to go home, or they want to accomplish more at work.

Help them do that by giving them what they need.

Challenge

How do I tell a story that keeps my users engaged?

Sometimes you can't delight, but you can still be efficient.

Tip

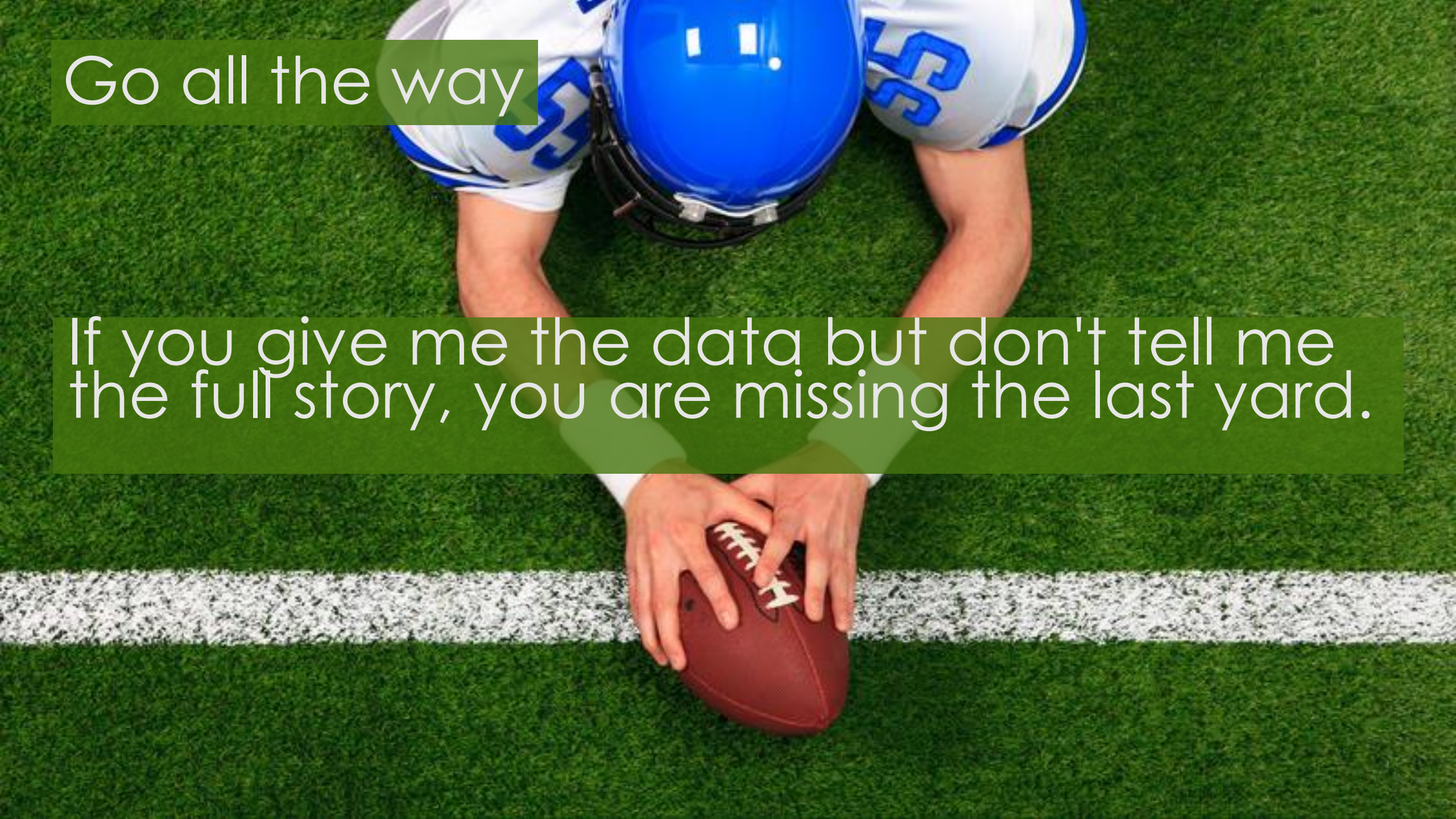
Whiteboarding and WYSIWYG editors help get a good flow.

You don't feel as committed to keeping a visual when it's easy to make and change.

Power BI is good for this!

Have The Right Inputs

If you don’t give me the right data, I’m not going to care.


Go all the way
If you give me the data but don't tell me the full story, you are missing the last yard.

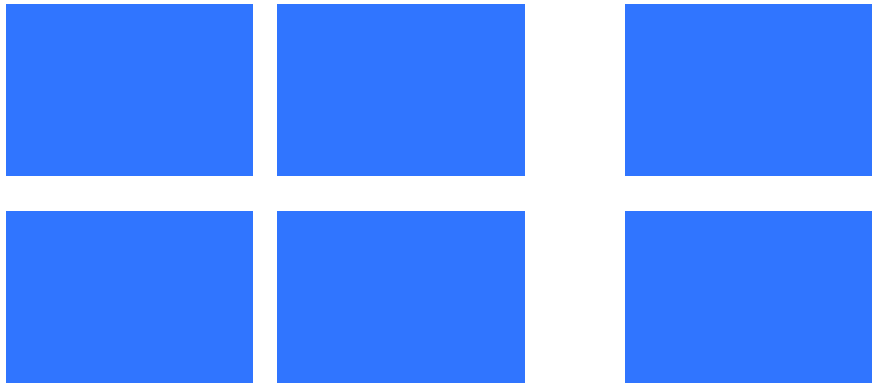
Understanding How We Interpret Visual Design

Visual Design

Color

Shape

Layout



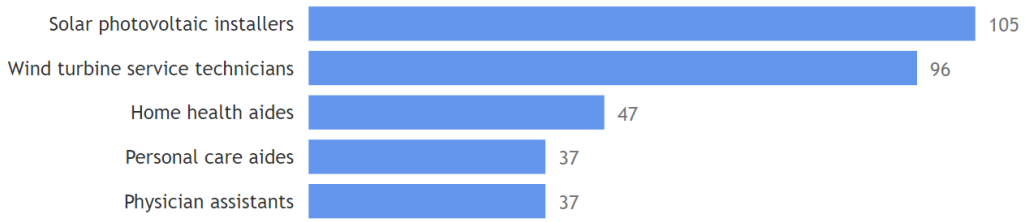
Common and Fixable

Issue #1: Lack of Alignment

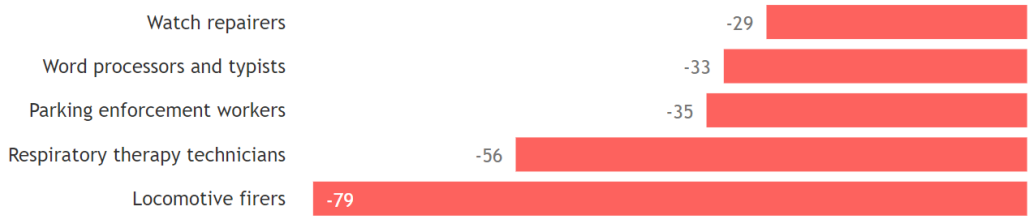
Projected Employment Changes By Occupation 2016 - 2026

Data retrieved from the Bureau of Labor and Statistics: https://data.bls.gov/projections/occupationProj

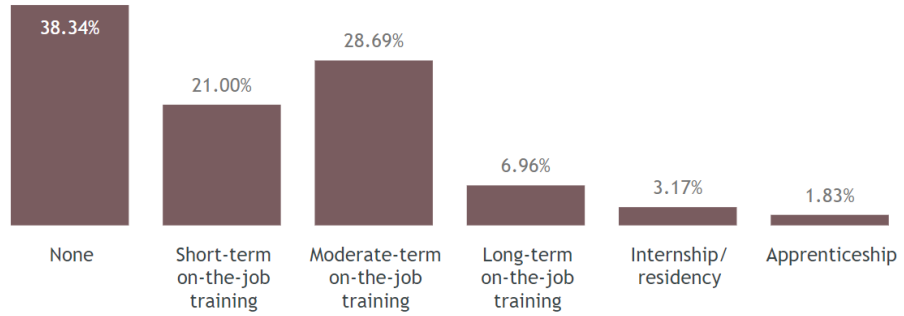
Highest Growth Occupations By Percent Change



Lowest Growth Occupations By Percent Change



Percent of Occupations By On-The-Job Training Required To Achieve Competency



Top Paying Occupations - High School Dipoma or Less

Occupation	2016 Median Annual Wage	Employment Change, 2016-2026
Nuclear power reactor operators	$91,170	-700
Transportation, storage, and distribution managers	$89,190	7,700
First-line supervisors of police and detectives	$84,840	6,900

Top Paying Occupations - Associate's Degree

Occupation	2016 Median Annual Wage	Employment Change, 2016-2026
Air traffic controllers	$122,410	900
Radiation therapists	$80,160	2,300
Nuclear technicians	$79,140	0

Top Paying Occupations - Bachelor's Degree

Occupation	2016 Median Annual Wage	Employment Change, 2016-2026
Chief executives	$181,210	-10,700
Computer and information systems managers	$135,800	43,800
Architectural and engineering managers	$134,730	9,900

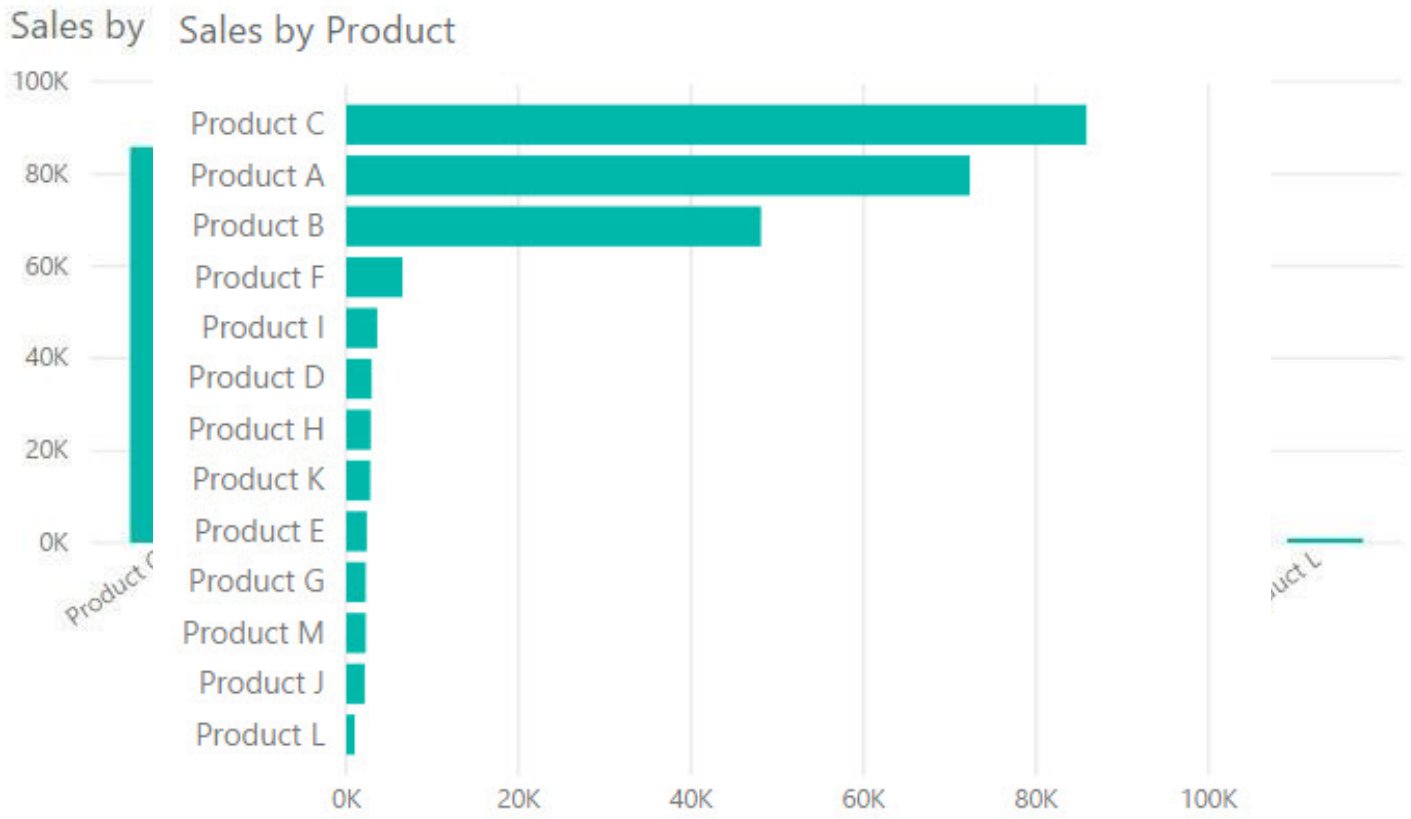
Top Paying Occupations - Master's Degree

Occupation	2016 Median Annual Wage	Employment Change, 2016-2026
Nurse anesthetists	$160,270	6,700
Political scientists	$114,290	200
Computer and information research scientists	$111,840	5,400

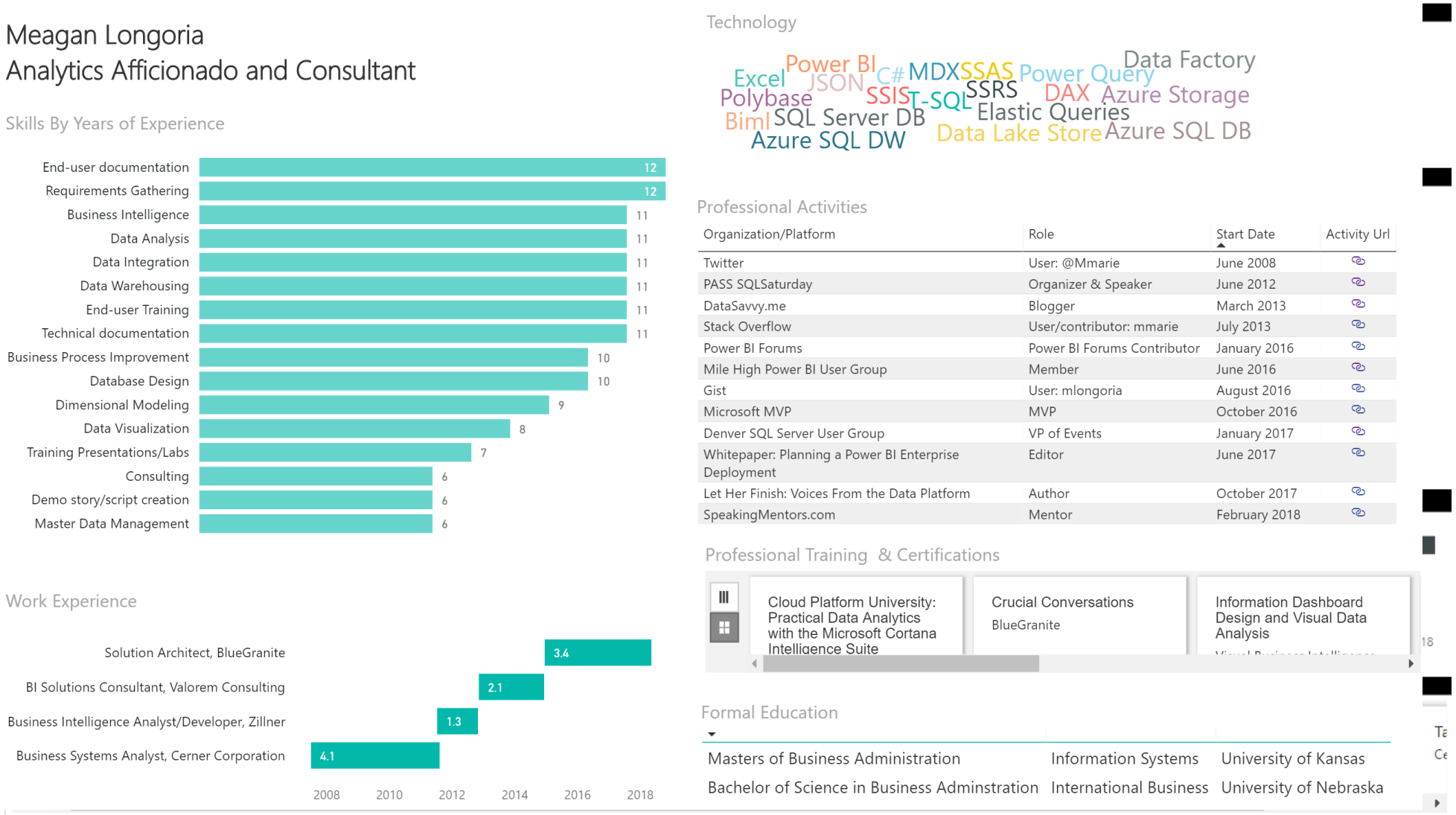
Top Paying Occupations - Doctoral or Professional Degree

Occupation	2016 Median Annual Wage	Employment Change, 2016-2026
Anesthesiologists	$208,000	5,900
Obstetricians and gynecologists	$208,000	3,900
Oral and maxillofacial surgeons	$208,000	1,200
Orthodontists	$208,000	1,100
Surgeons	$208,000	7,600

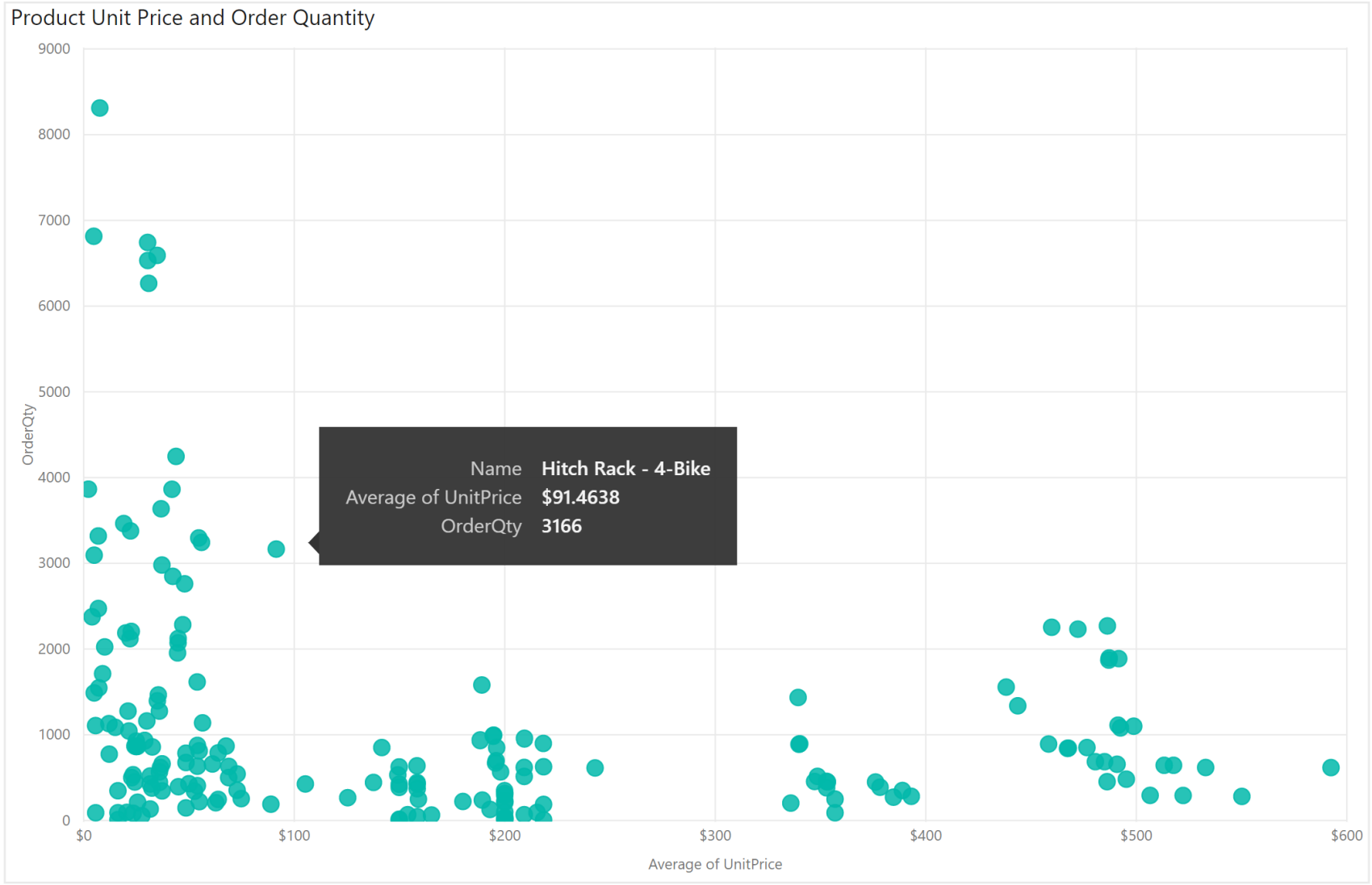
Issue #2: Diagonal Chart Labels



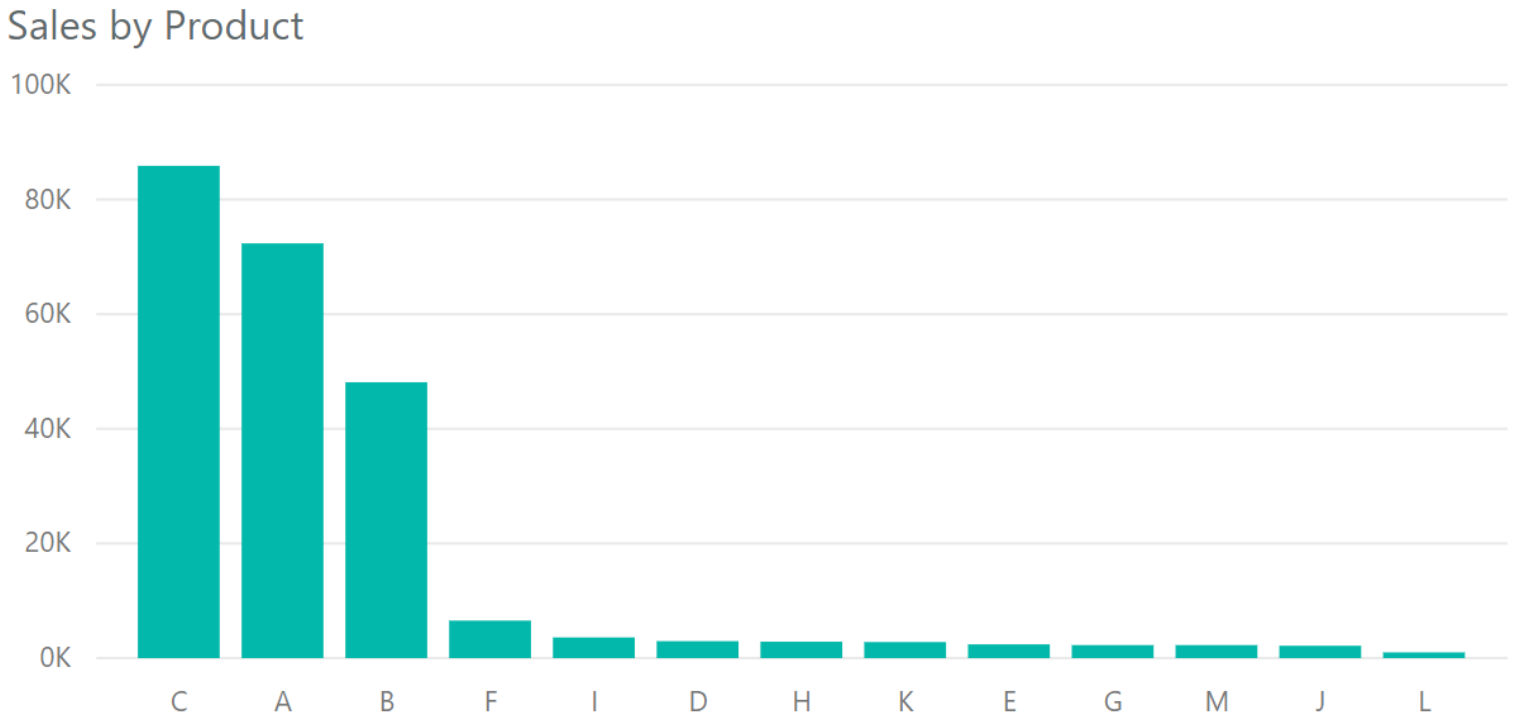
Issue #3: Bold chart title background with low-intensity chart colors



Issue #4: Too many data labels



Issue #5: Non-strategic Use of Color Contrast



Issue #6: Overuse of Chart Borders

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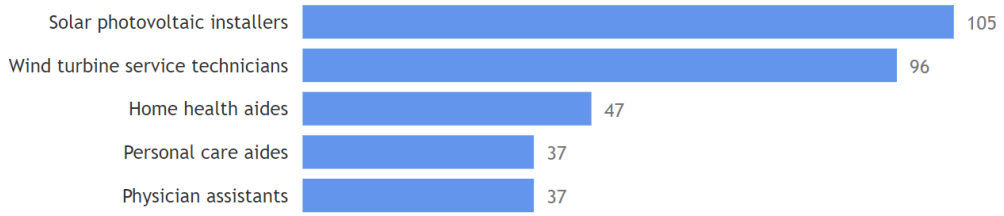

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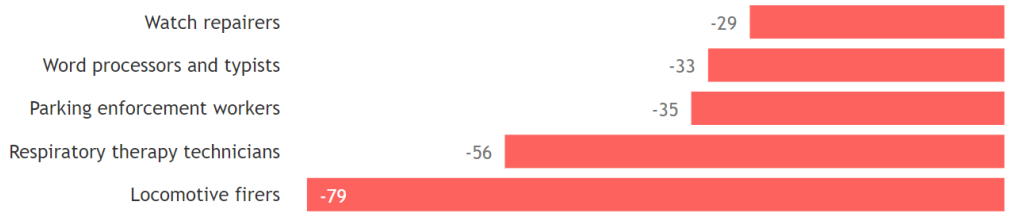

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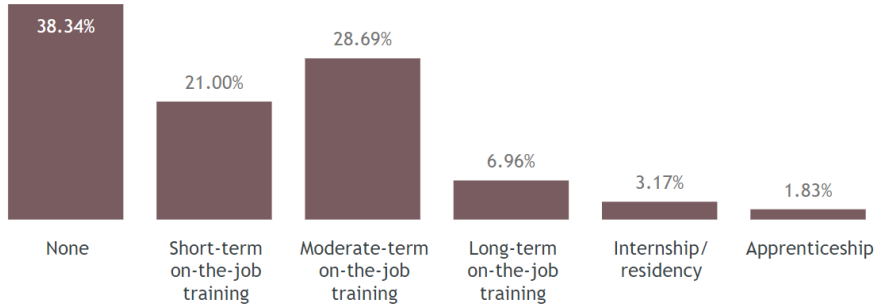

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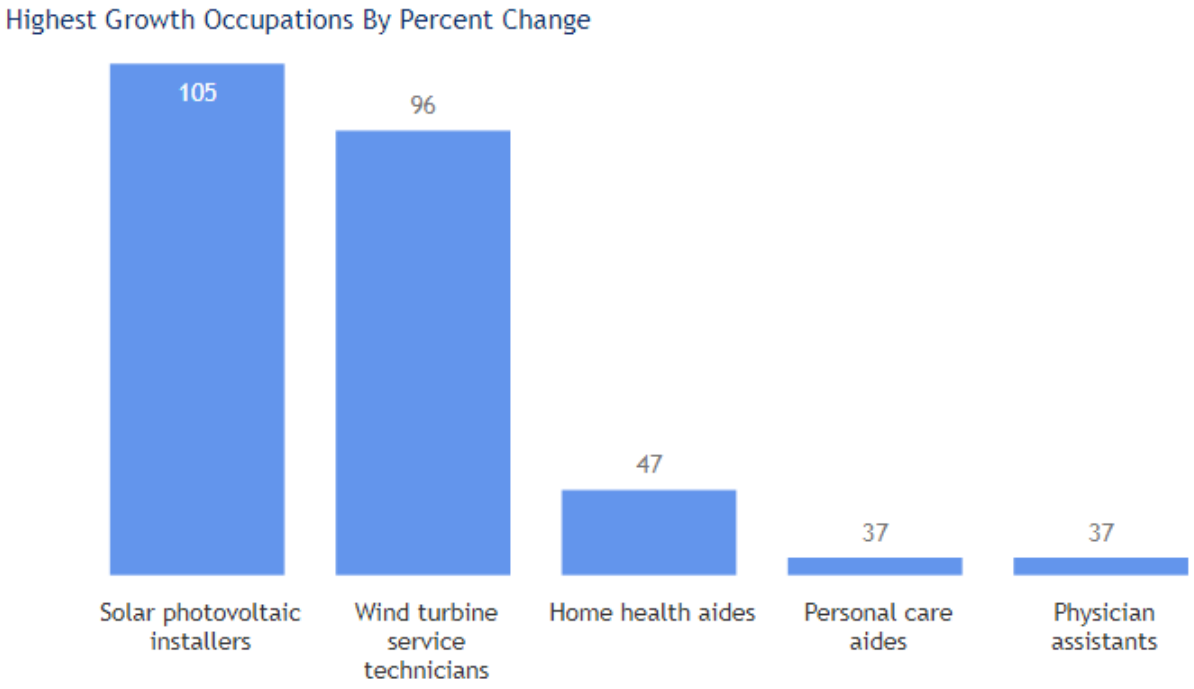
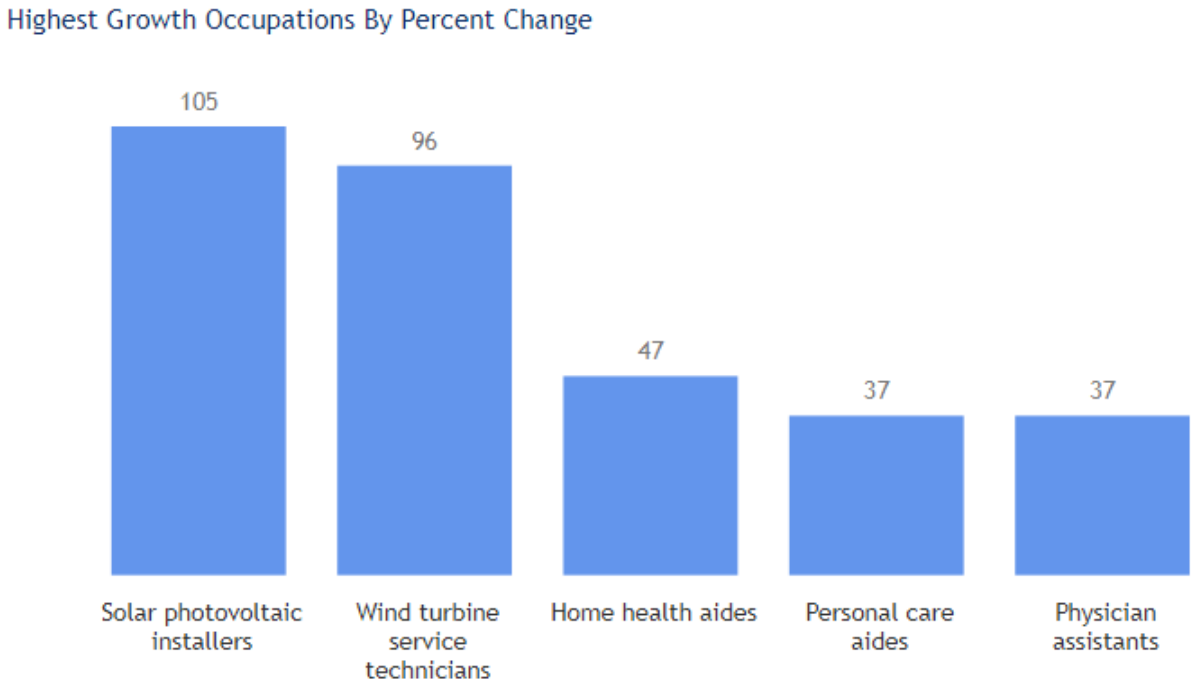
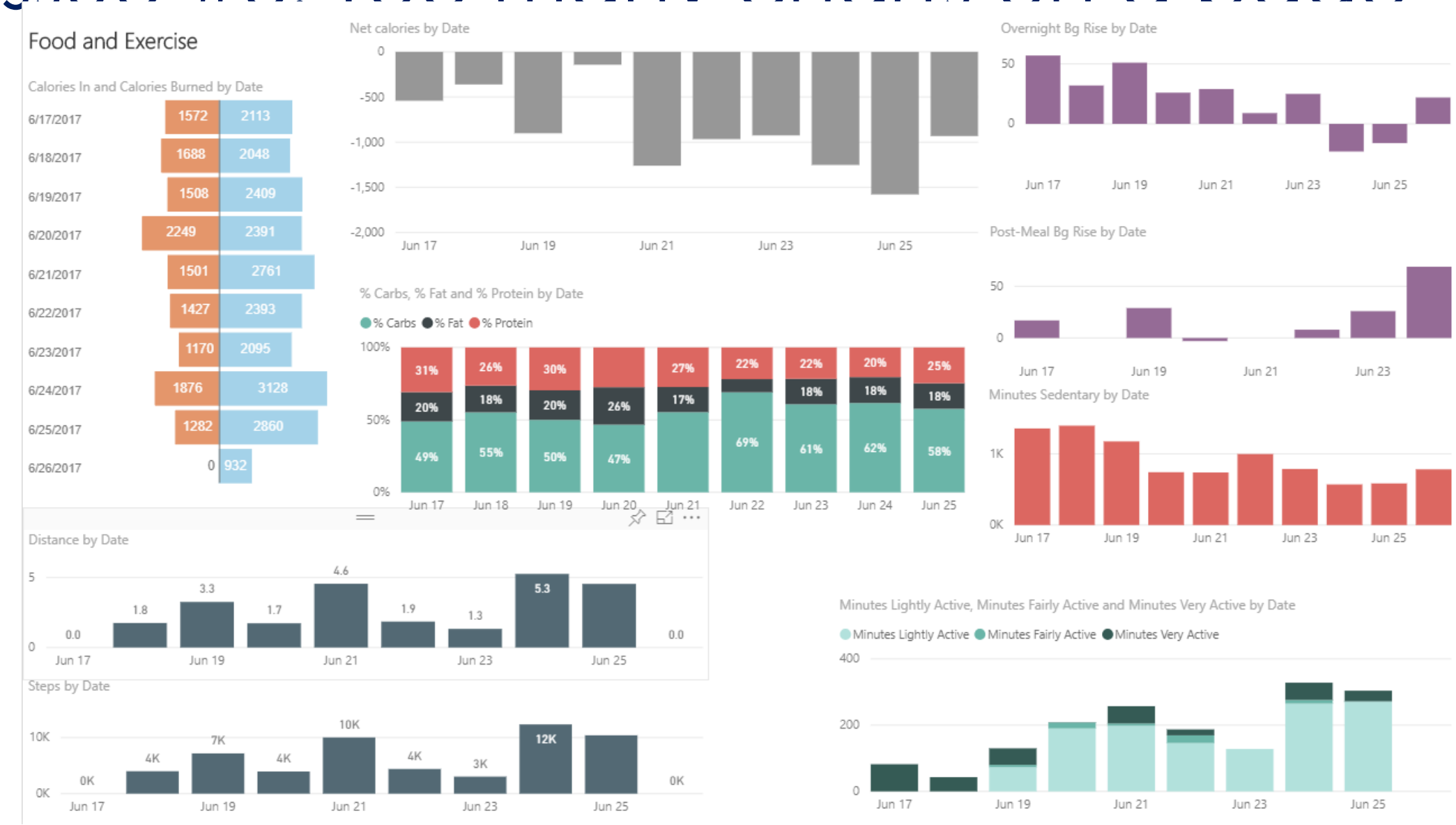
Issue #7: Bar charts with axis that doesn't start at 0





Issue #8: Too many charts on a page



Your Turn

What would you add to the list of common mistakes?

Data Viz Concepts

Cognitive Load

Information requires brain power

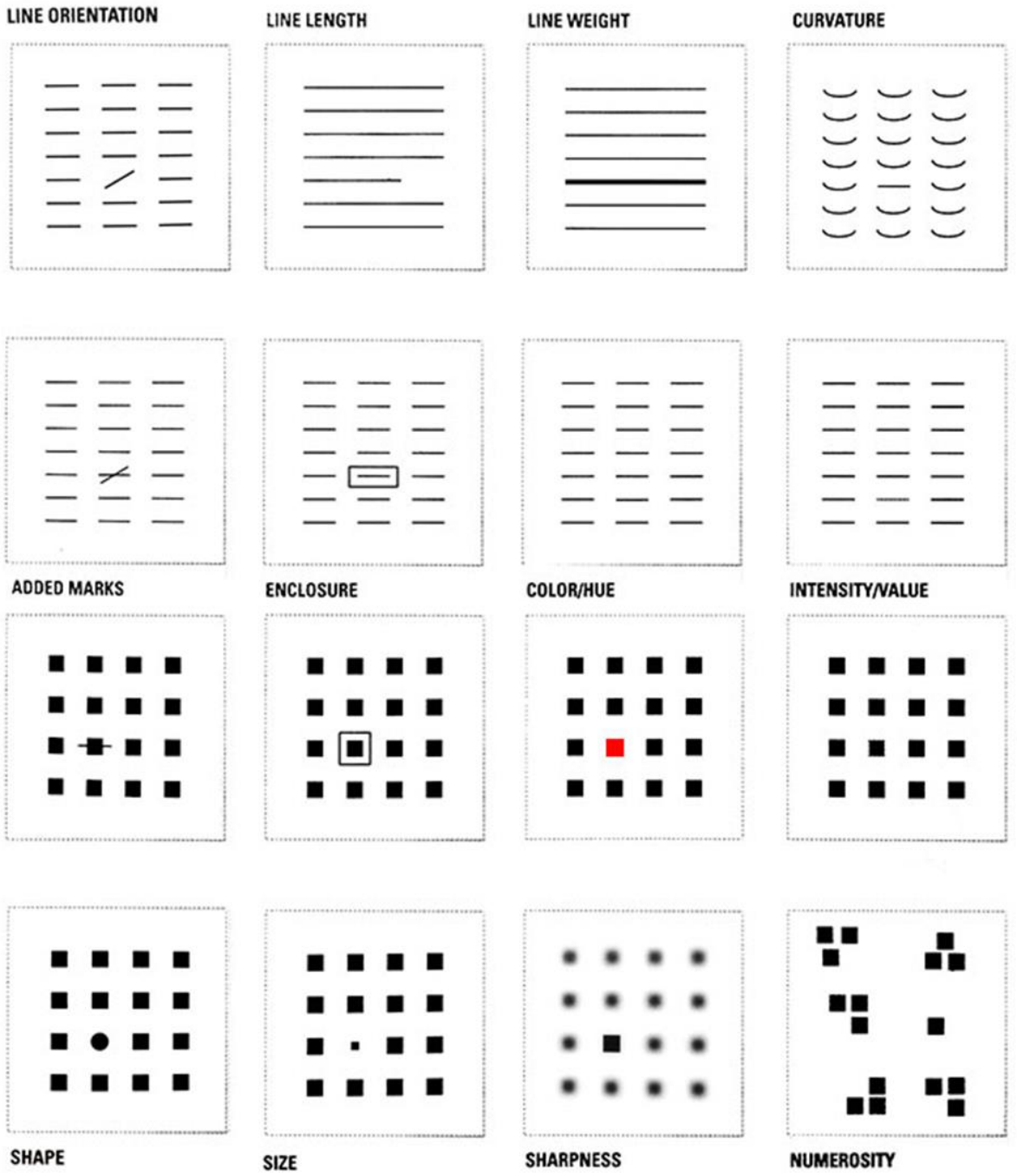
Brain power (aka working memory) is limited

Be intentional about the information you present

Preattentive Attributes

Visual properties we notice without conscious effort within ~200 ms of exposure

Color
Form
Spacial Positioning
Movement



Gestalt Principles

Our brains simplify objects so we see the whole or outline before we see all the components

We like things to be:

- Simple
- Symmetrical
- Orderly
- Regular

Your Data Viz Needs a Makeover If…

Cognitive Load

- ✓ Charts are off message
- ✓ My dog is really cute

Cognitive Load

- ✓ Too much jargon, lack of supplemental information to explain terminology or data gathering techniques

Cognitive Load

- ✓ Super intense colors everywhere

Cognitive Load

- ✓ Redundant information that is not central to the main message (gridlines + axis labels with data labels)

Cognitive Load

- ✓ Inconsistent design across report pages (slicer bank in different places, different use of bookmarks)

Preattentive Attributes

- ✓ Bright colors on information that doesn't require attention

Preattentive Attributes

- ✓ Using multiple colors without purpose

Preattentive Attributes

- ✓ Rotated axis labels

Preattentive Attributes

- ✓ Bar charts that don't start at 0

Preattentive Attributes

- ✓Misaligned **visuals on a page**

Preattentive Attributes

- ✓ **Dark titles** or title backgrounds that are more prominent than the rest of the chart

Preattentive Attributes

- ✓ Dark, intense borders

Gestalt Principles

- ✓ Proximity: Related bars are drawn near each other

Gestalt Principles

- ✓ Uneven spacing between charts on a page without purpose

Gestalt Principles

- ✓ Using multiple colors without purpose

Gestalt Principles

- ✓ Reusing multiple colors for different purposes

Gestalt Principles

- ✓ Background colors that stand out more than the chart elements

Squint Test

- ✓ Foreground elements not standing out against background

Squint Test

- ✓ Background or border elements that unintentionally draw more attention than more important data elements

Squint Test

- ✓ The most eye-catching element on your report page is not an important element

Squint Test

- ✓ Charts in appropriate order on the page

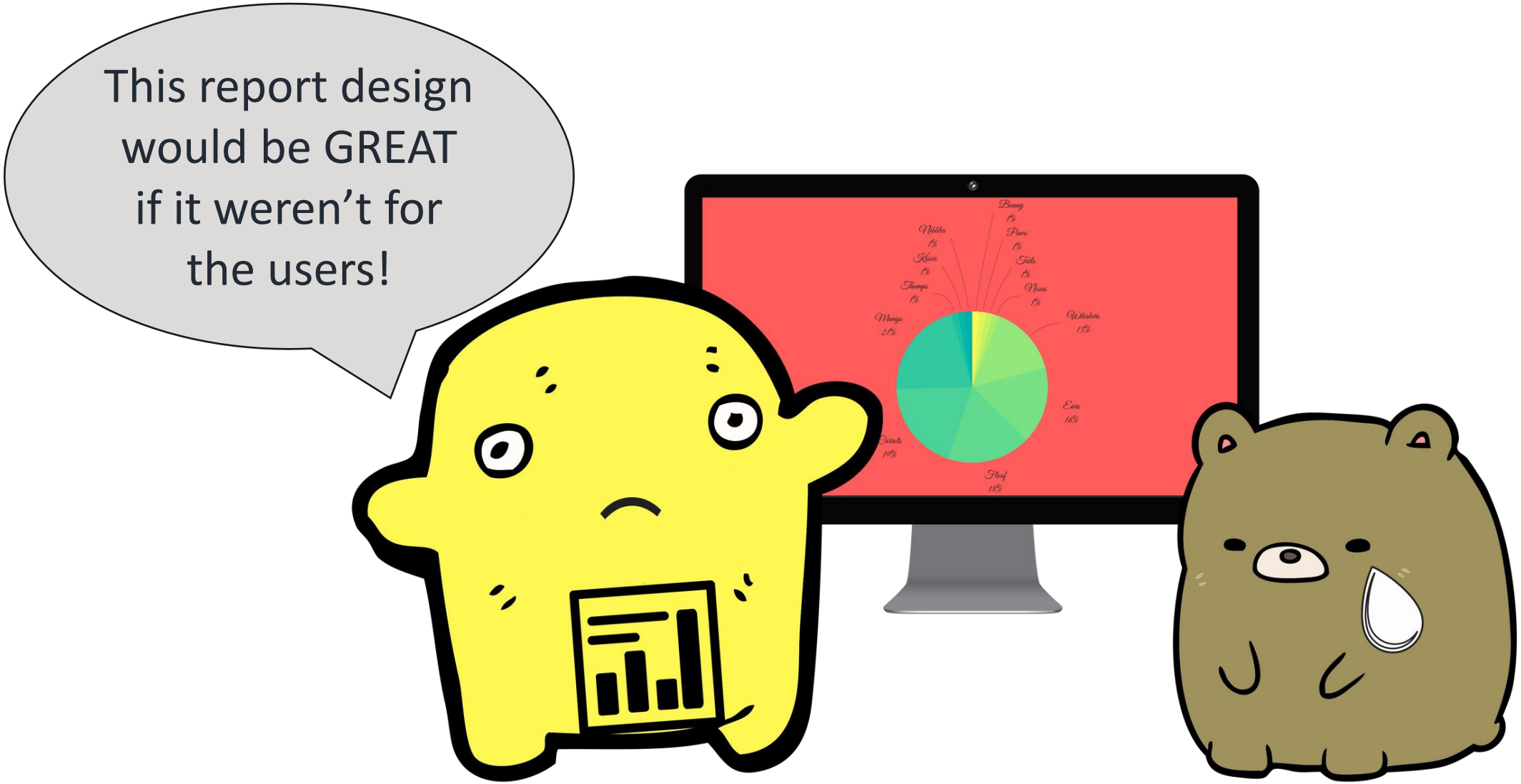
Squint Test

- ✓ Elements not spaced appropriately so that objects that are closer to each other have some type of relationship

Get the Power BI Visualization Usability Checklist:

https://datasavvy.me/pbi-data-viz-checklist/

Most data viz blunders are due to lack of focus on your intended audience



Art by [Kendra Little]