CCI
CENTER FOR CARE INNOVATIONS

Design Thinking for Data Visualization

July 27, 2017

Voices on the Webinar

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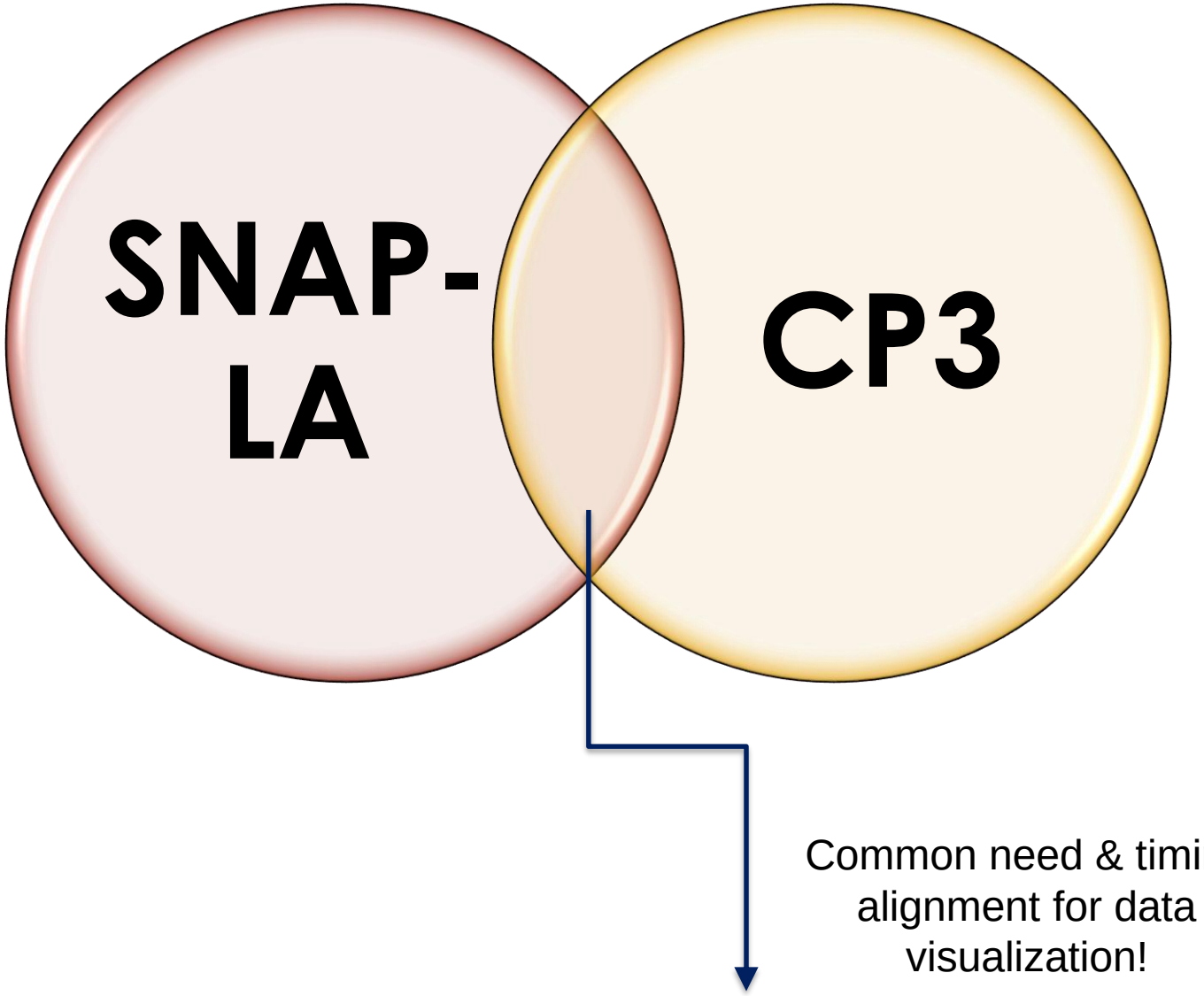
Webinar Reminders

1. Everyone is **MUTED.**

2. Remember to chat in questions!

3. Webinar is being recorded and will be posted and sent out via email



Common need & timing alignment for data visualization!

Webinar Participants

SNAP-LA

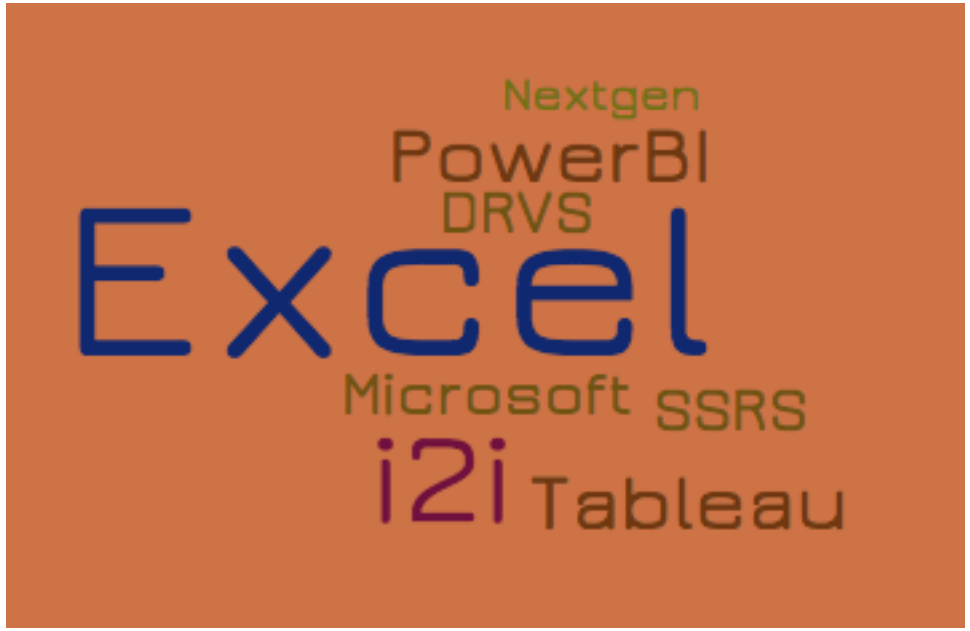
1. Eisner Pediatric & Family Medical Center
2. JWCH Institute, Inc.
3. KHEIR Center
4. Los Angeles LGBT Center
5. South Central Family Health Center
6. The Achievable Foundation
7. UMMA Community Clinic
8. Westside Family Health Center

CP3

1. Asian Health Services
2. Community Health Partnership
3. Gardner Family HealthCare
4. La Clinica de La Raza, Inc.
5. LifeLong Medical Care
6. Monterey County Clinics
7. Northeast Valley Health Corporation
8. Operation Samahan
9. Ravenswood Family Health Center
10. San Joaquin General Hospital
11. Venice Family Clinic
12. Vista Community Clinic

Setting the Context

What data visualization tools or techniques does your organization use?



What challenges has your organization encountered when displaying or presenting data?

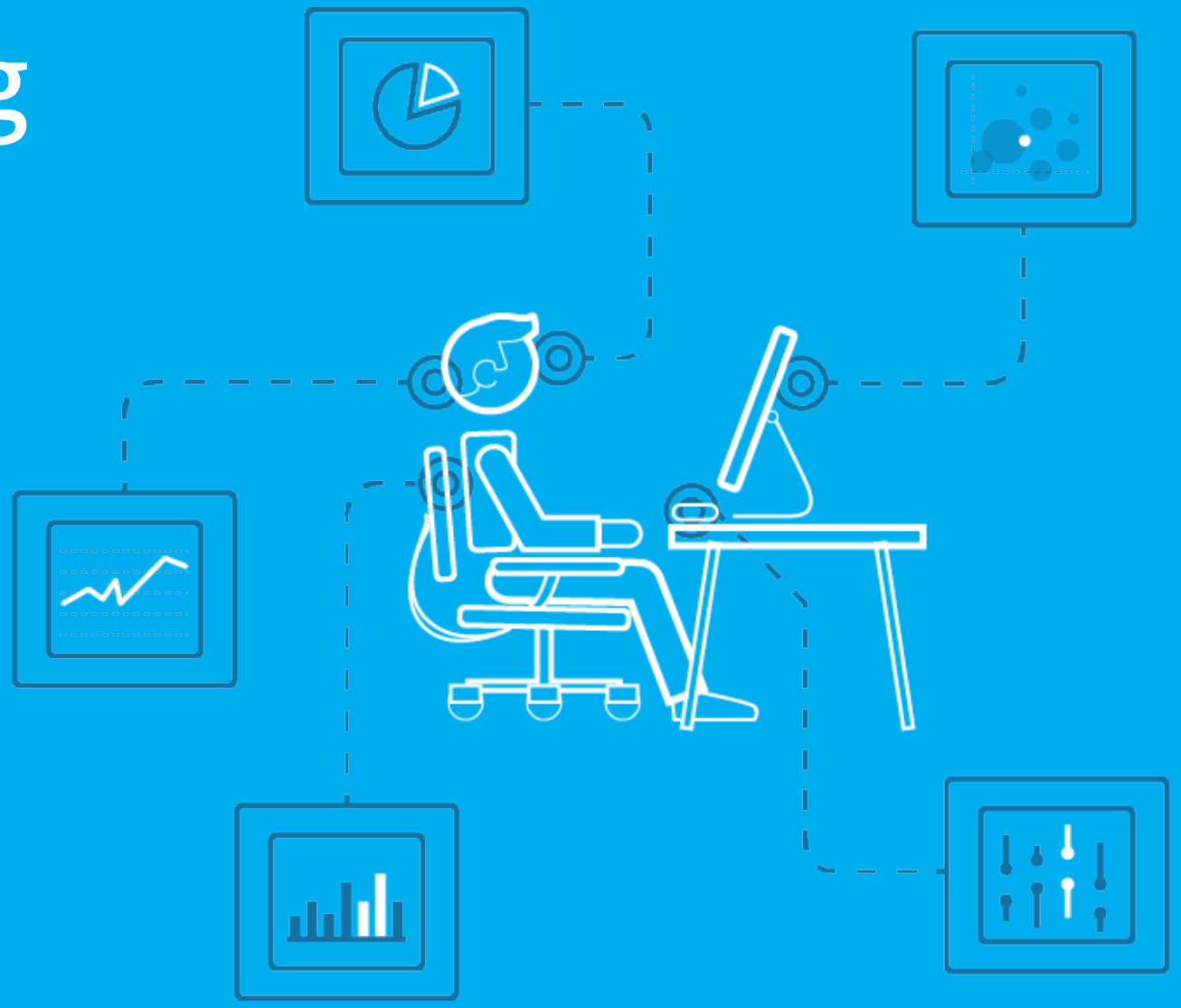
"Our stakeholders want more data and at different levels. Finding the right tool to handle such requests is our current priority."

"Ability for staff to manipulate and drill down to explore the data further."

"Keeping it simple enough to understand for everyone."

Design Thinking for Data Visualization

Andrew Frueh
Director of User Experience



HealthCatalyst
ignite outcomes improvement

New Language & Necessary Craft

HealthCatalyst
ignite outcomes improvement

It’s Everywhere

Data visualization has seeped into every aspect of our daily lives

News Infographics

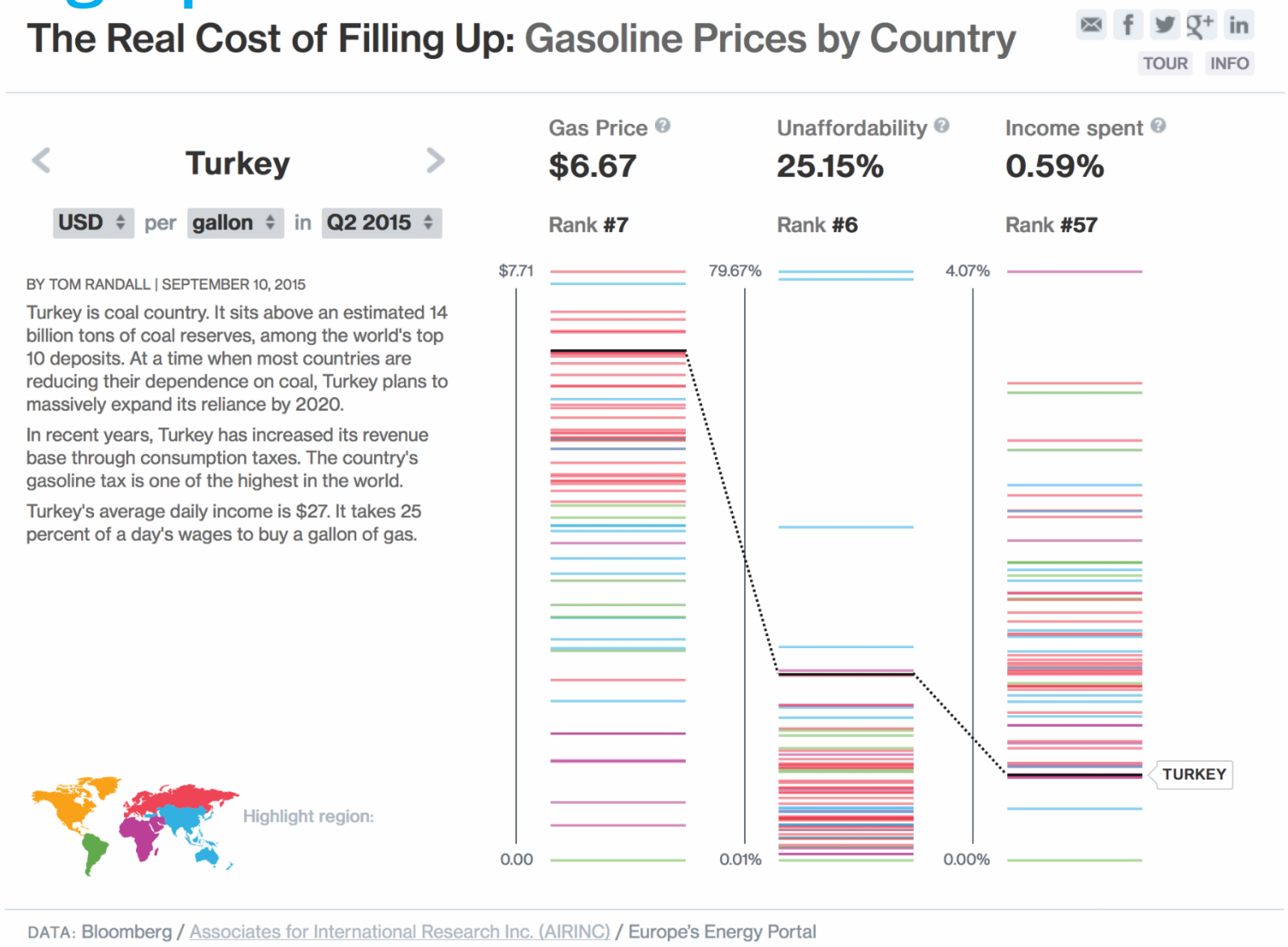
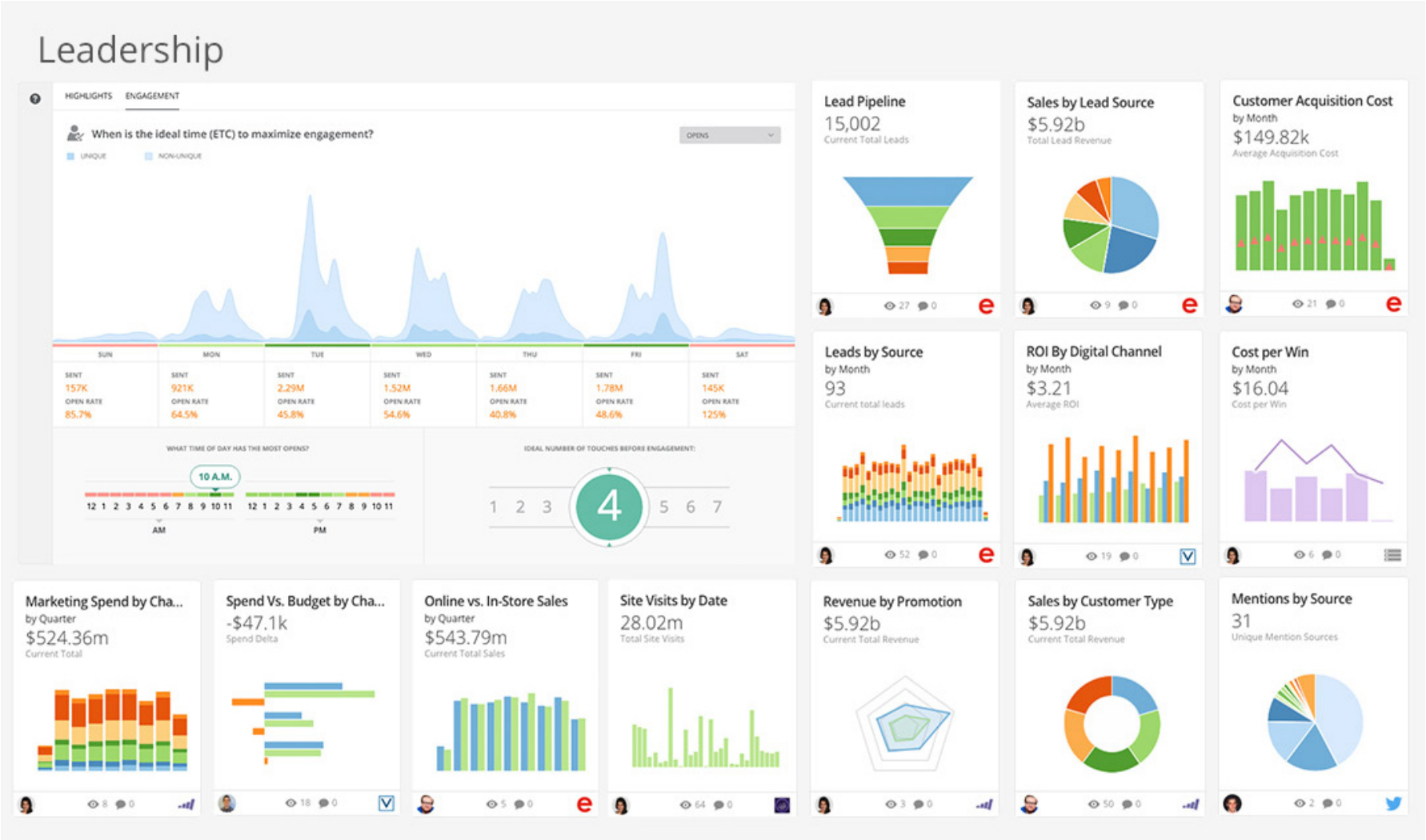


Figure 1. Gasoline Prices by Country. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 3), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

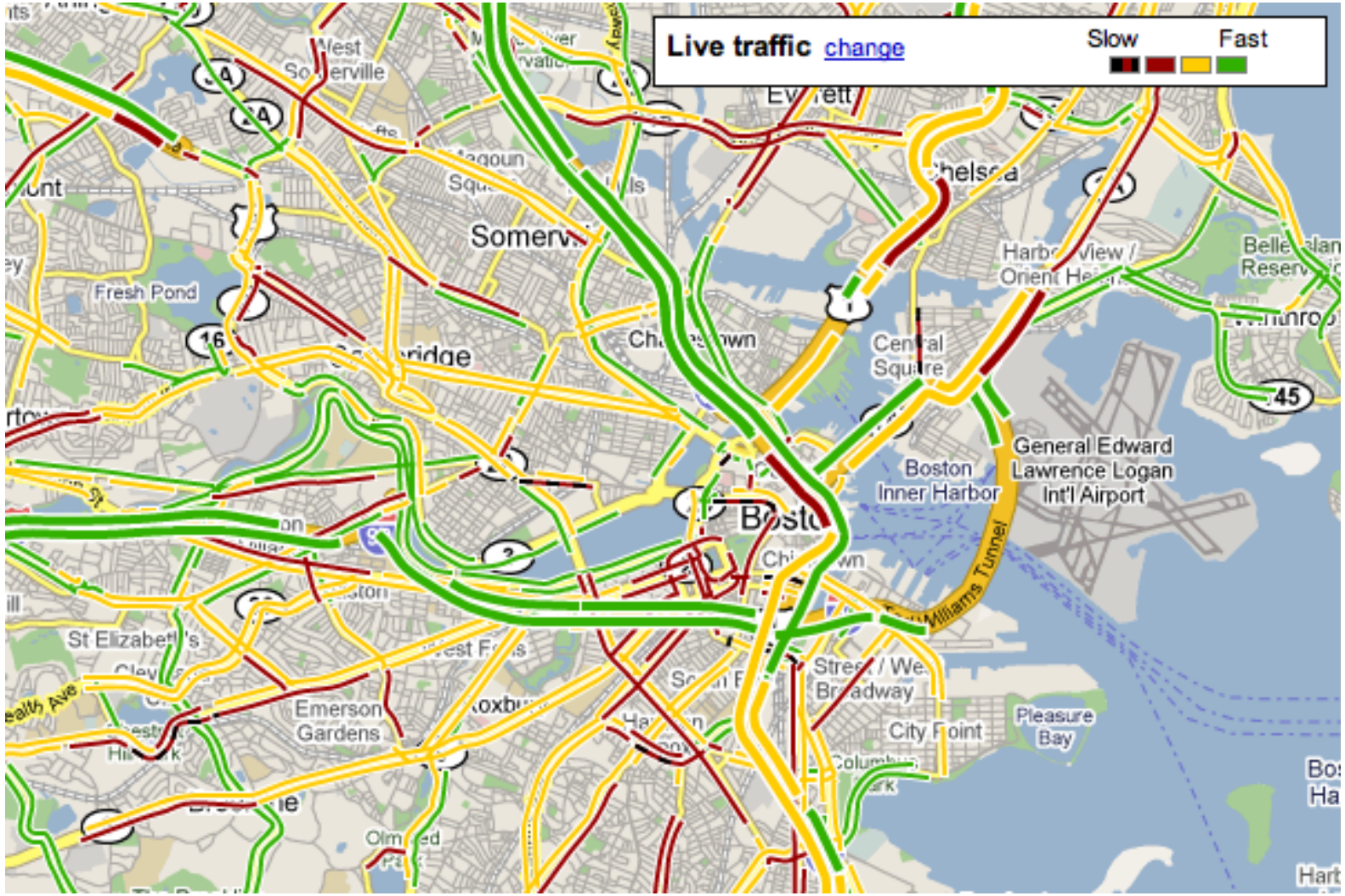
Executive Dashboards



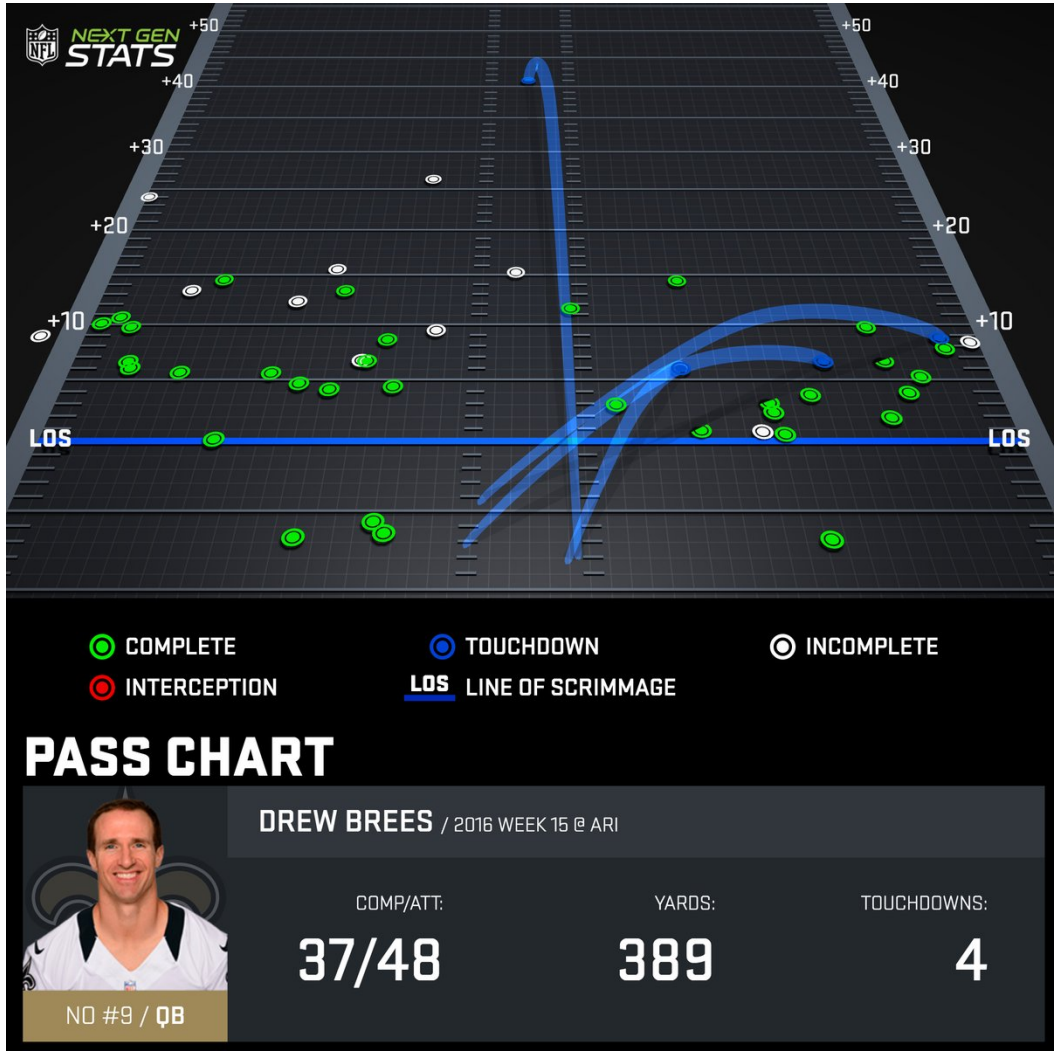
Fitness Apps

Figure 2. Fitness App Visualizations. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 3), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

Traffic Maps



Sports


NEXT GEN STATS
+50
+40
+30
+20
+10
LOS
COMPLETE
TOUCHDOWN
INCOMPLETE
INTERCEPTION
LOS LINE OF SCRIMMAGE
PASS CHART
DREW BREES / 2016 WEEK 15 @ ARI
COMP/ATT:
37/48
YARDS:
389
TOUCHDOWNS:
4
NO #9 / QB

So what?

So What?

First: Dataviz is everywhere and comes in a wide spectrum of sophistication and quality.

Why Visualization?

Big Data:

- The sheer volume and velocity of data coming at us is staggering
- Demands a new way of communicating that abstracts, simplifies, and helps us cope

Boeing Osprey

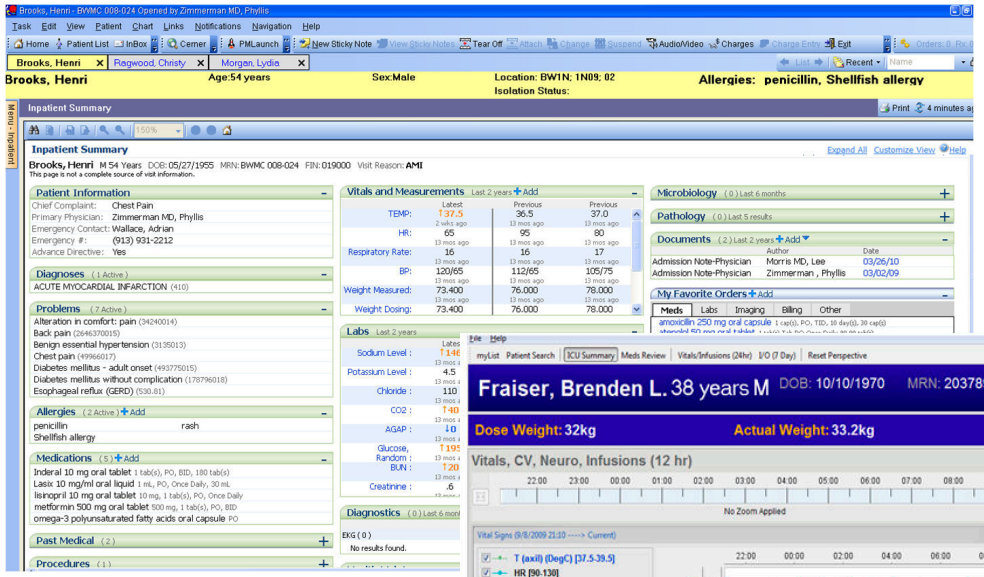
- Takes off an lands like a helicopter
- Sensors produce a terabyte of data on each takeoff and landing
- Ten flights produce as much data as the entire print collection of Library of Congress
- Scouring that data in any raw format would be absurd

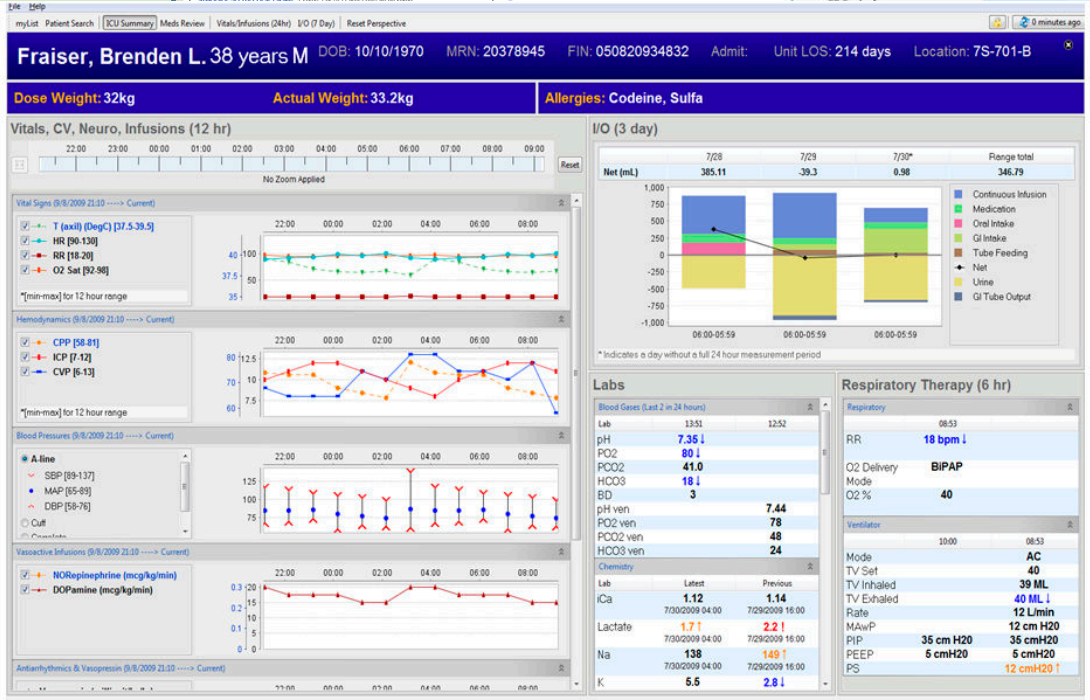
So What?

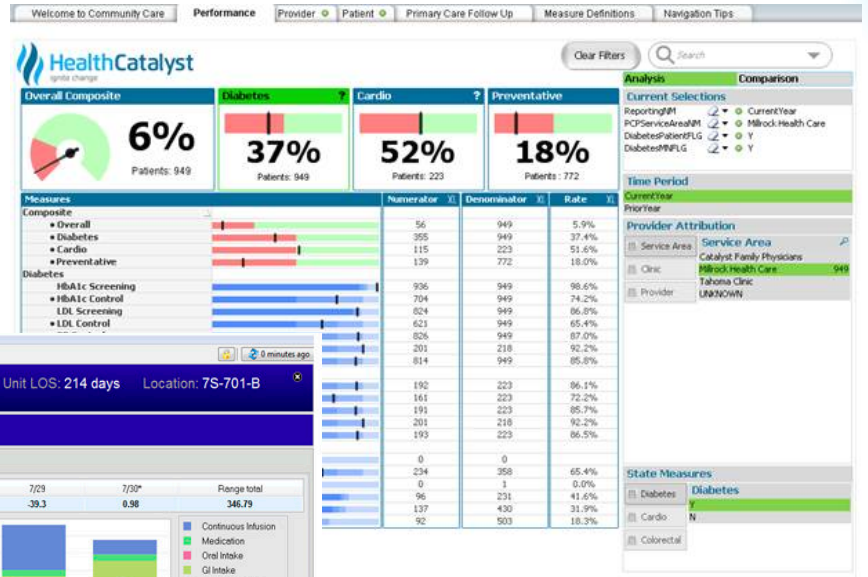
First: Dataviz is everywhere and comes in a wide spectrum of sophistication and quality.

Second: The volume of data available to us is greater now than at any time in human history, we *need* visualization to help us cope

How High is the Bar?







This High


Zite
Pretentious Beer Glasses
Mashed Potato, Cheddar and Waffles
CREATE AGREEMENT
Freelance / Hire
Keep Confidential
Buy / Sell
AROUNDME
AUTOMATIC
Run Detection
3.46 mi
Distance
0:33:34
Active Time
MOTION TRACKING
Now supporting
iPhone 5S with M7
192.1lb
68 BPM
THURSDAY
SEP 12
81°F
2272
8330
DISTANCE
3.46 mi
RUNNING
OPHIUCHUS
SCORPIUS
Antares
Cancel
Edit
Done
Vibrant
Sunkiss'd
Purple Haze
So Emo
Cyanotype
Magic Hour
Redscale
Black & White
Sepia

So What?

First: Dataviz is everywhere and comes in a wide spectrum of sophistication and quality.

Second: The volume of data available to us is greater now than at any time in human history, we *need* visualization to help us cope.

Third: The exposure to dataviz has an effect on the expectations of our clients and the consumers of our viz.

Learning Objectives

You will be able to turn your data into effective visualizations that convey actionable stories.

- Understand how our brains perceive and **consume** data visualizations.
- Understand and apply **design** guidelines for well-executed, beautiful charts.
- Understand how to establish context and how to use context to **design** and **create** the most effective dataviz for your audience.
- **Create** effective dataviz for a real-world scenario within healthcare analytics.
- Explain your design decisions to others.

When a Chart Hits our Eyes

HealthCatalyst
ignite outcomes improvement

Chart Perception

CONSUMER

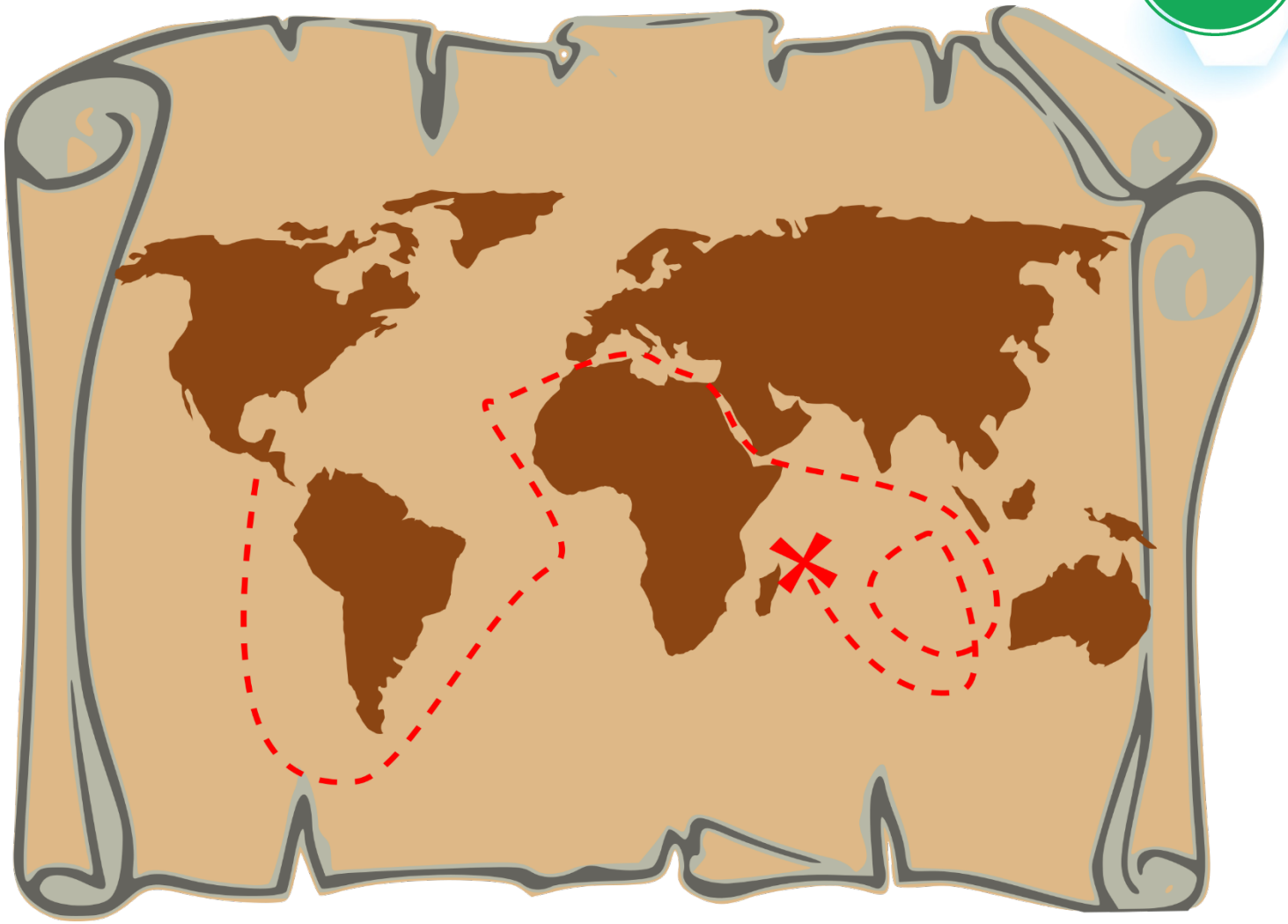
> If something is hard to perceive, people not only struggle to find the right meaning, but judge it less favorably. It's not the chart that they'll judge harshly if the meaning is hard to find; it's the *information* itself. They'll consider it less credible.

Activity
Eye Map

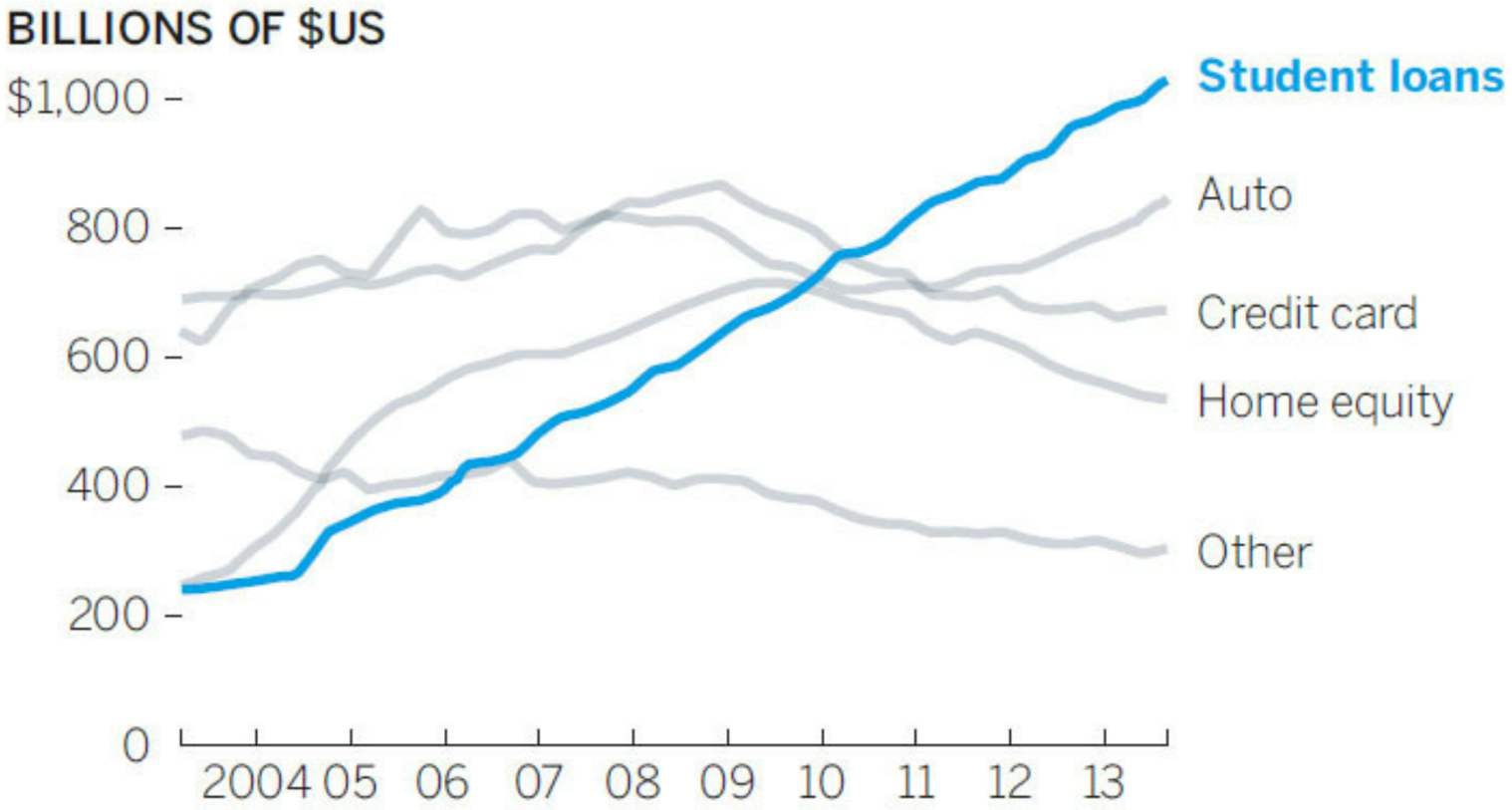
Instructions:

Look visualization on next slide:

- Map how your eyes travel across the visualization.
- Number each “stop” your eyes make.



NON-MORTGAGE DEBT OUTSTANDING

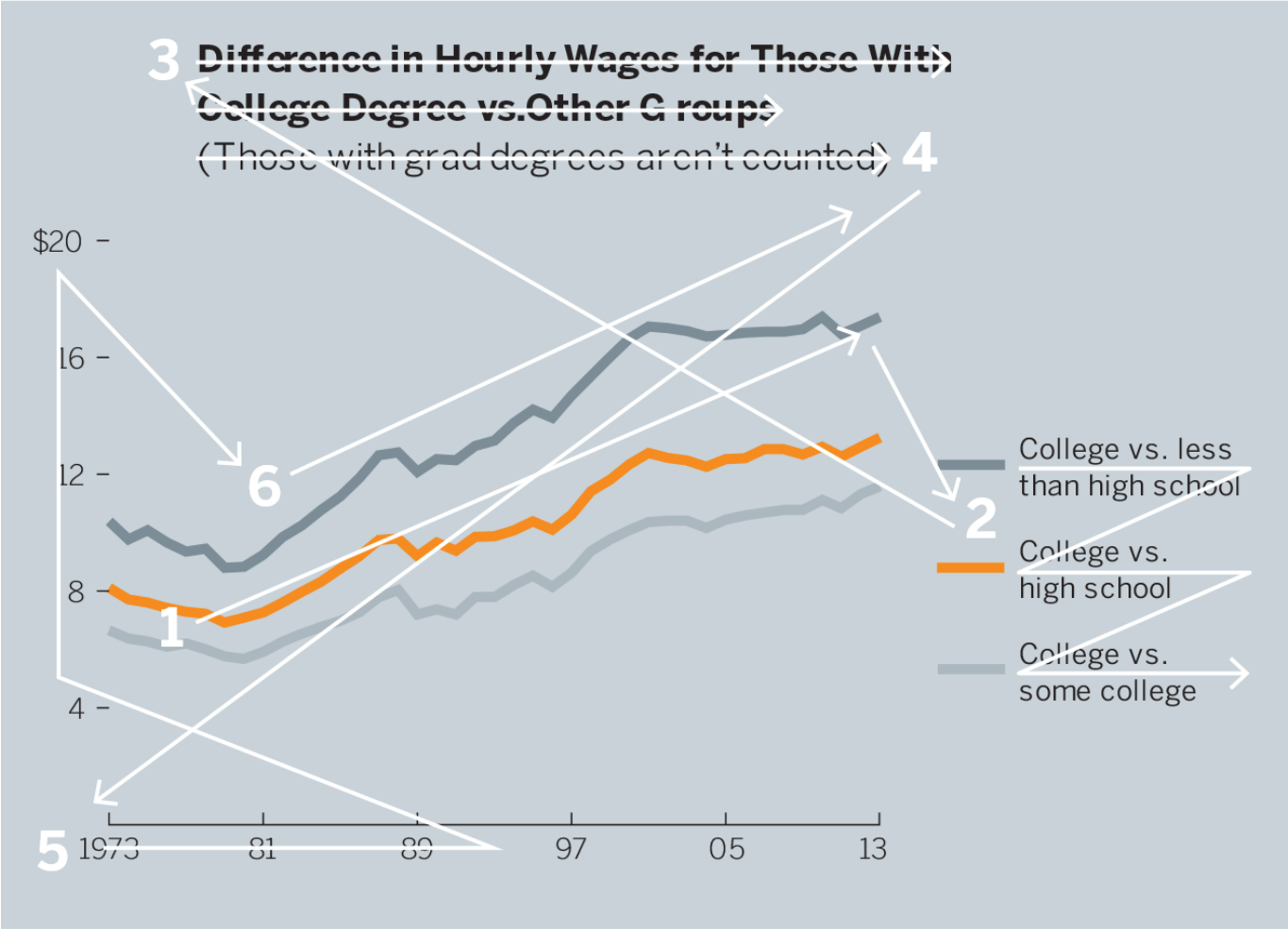


SOURCE: FEDERAL RESERVE BANK OF NEW YORK

How Do We Read Text?

Figure 6. Reading Order. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 34), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

How Do We Read Charts?

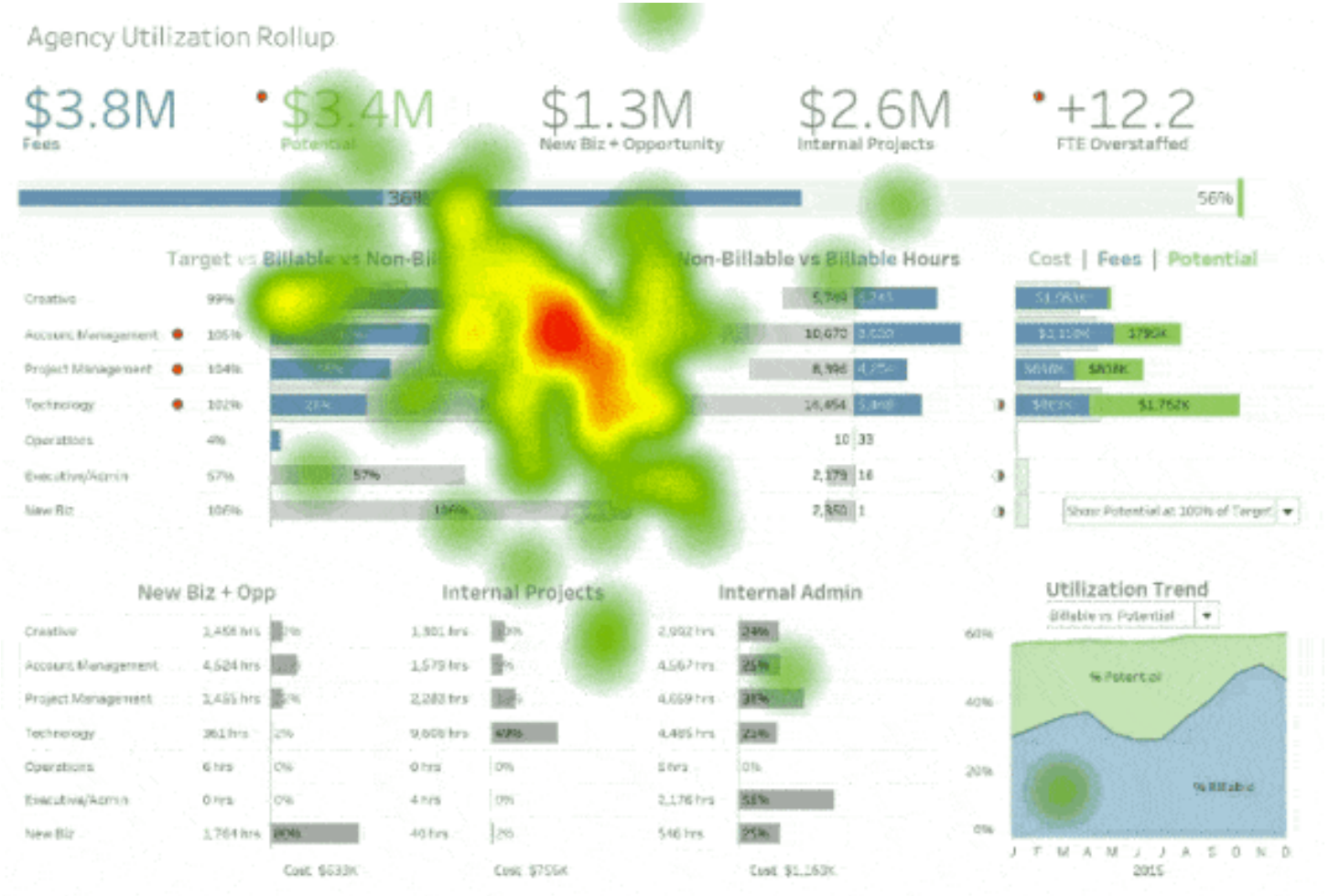


How Do We Read Charts?

1. We don’t go in order

Activity
Heat Map

Instructions: Review your eye tracking to see where your eyes went *first* on the chart.



[Image: courtesy Tableau]

CONSUMER

What Stands Out?

- High Contrast (colors or brightness)
- Distinct Colors
- Story or Trend in the Data (an intersection between lines, etc)
- Big Numbers
- Human Faces

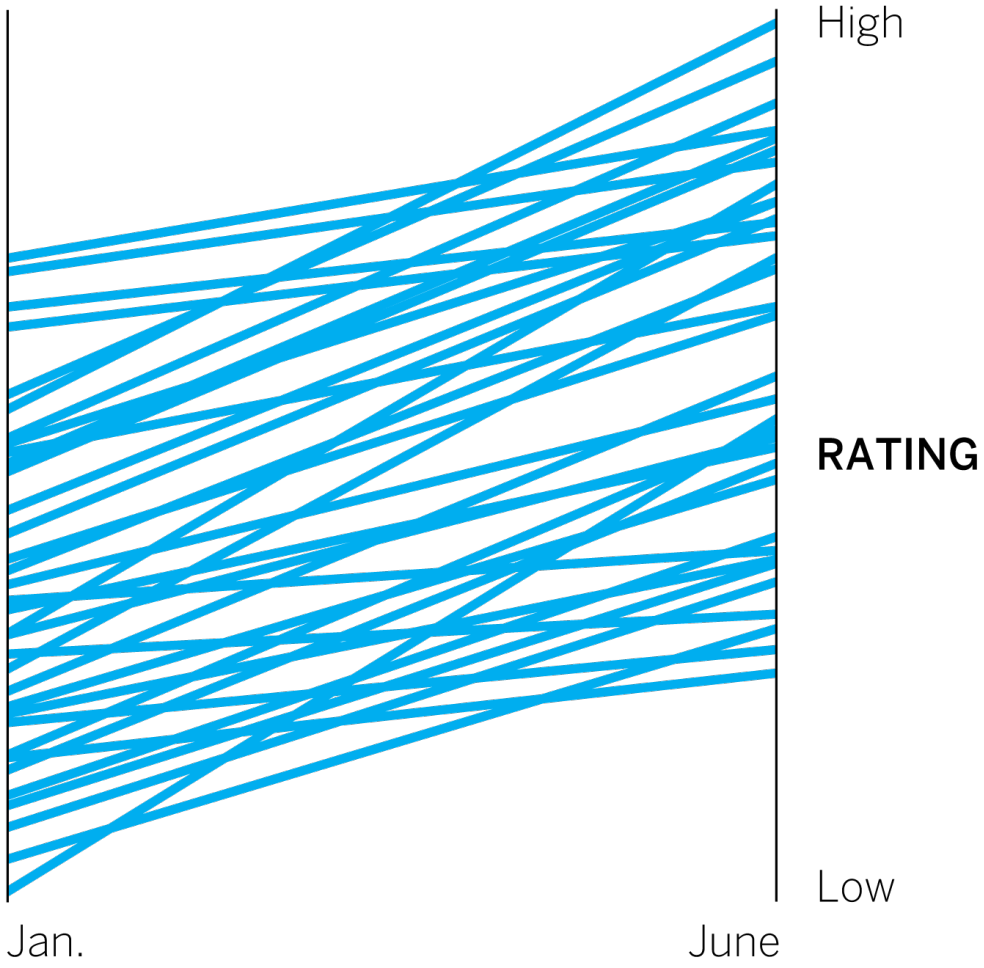
HAS 17

How We Read Charts

1. We don’t go in order
2. We see first what stands out

TEAM PERFORMANCE

BLUE TEAM PERFORMANCE

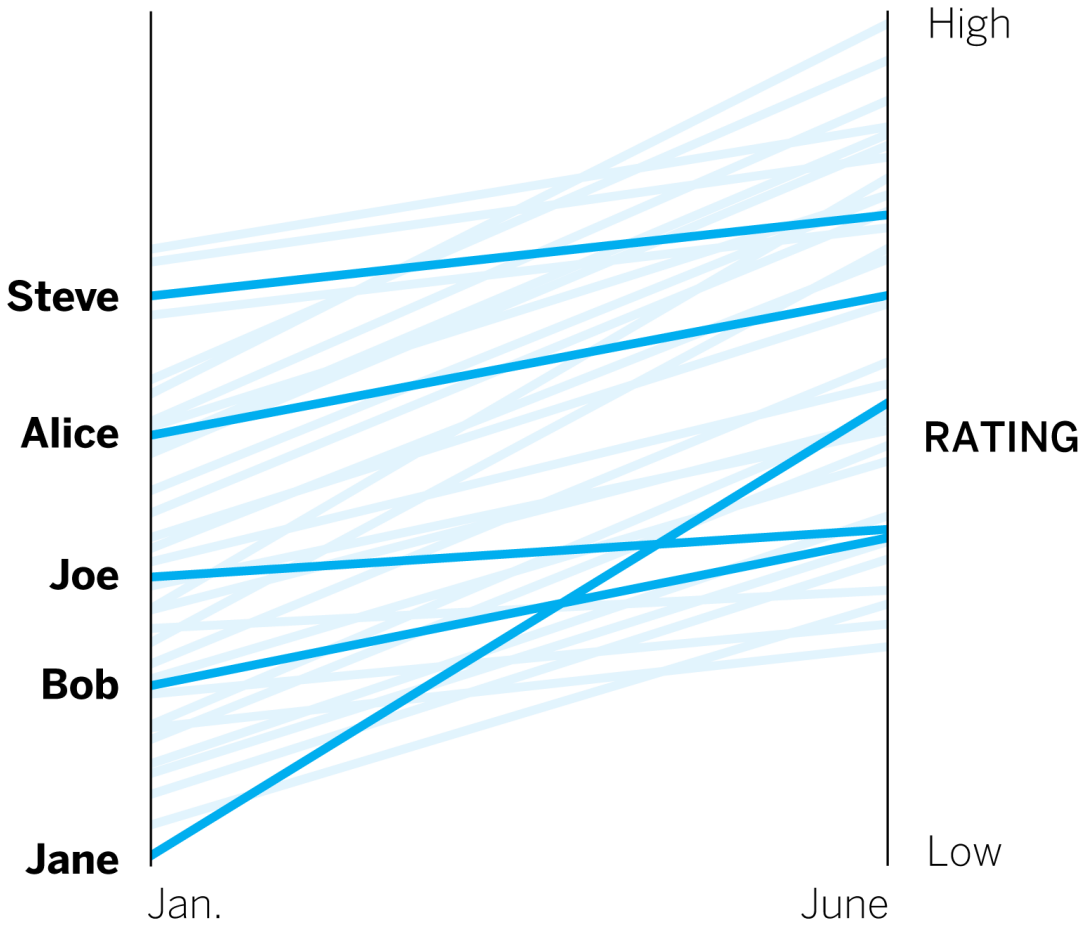


SOURCE: COMPANY RESEARCH

Figure 11. Gasoline Prices by Country. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 37), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

TEAM PERFORMANCE

HIGHLIGHTING INDIVIDUALS



SOURCE: COMPANY RESEARCH

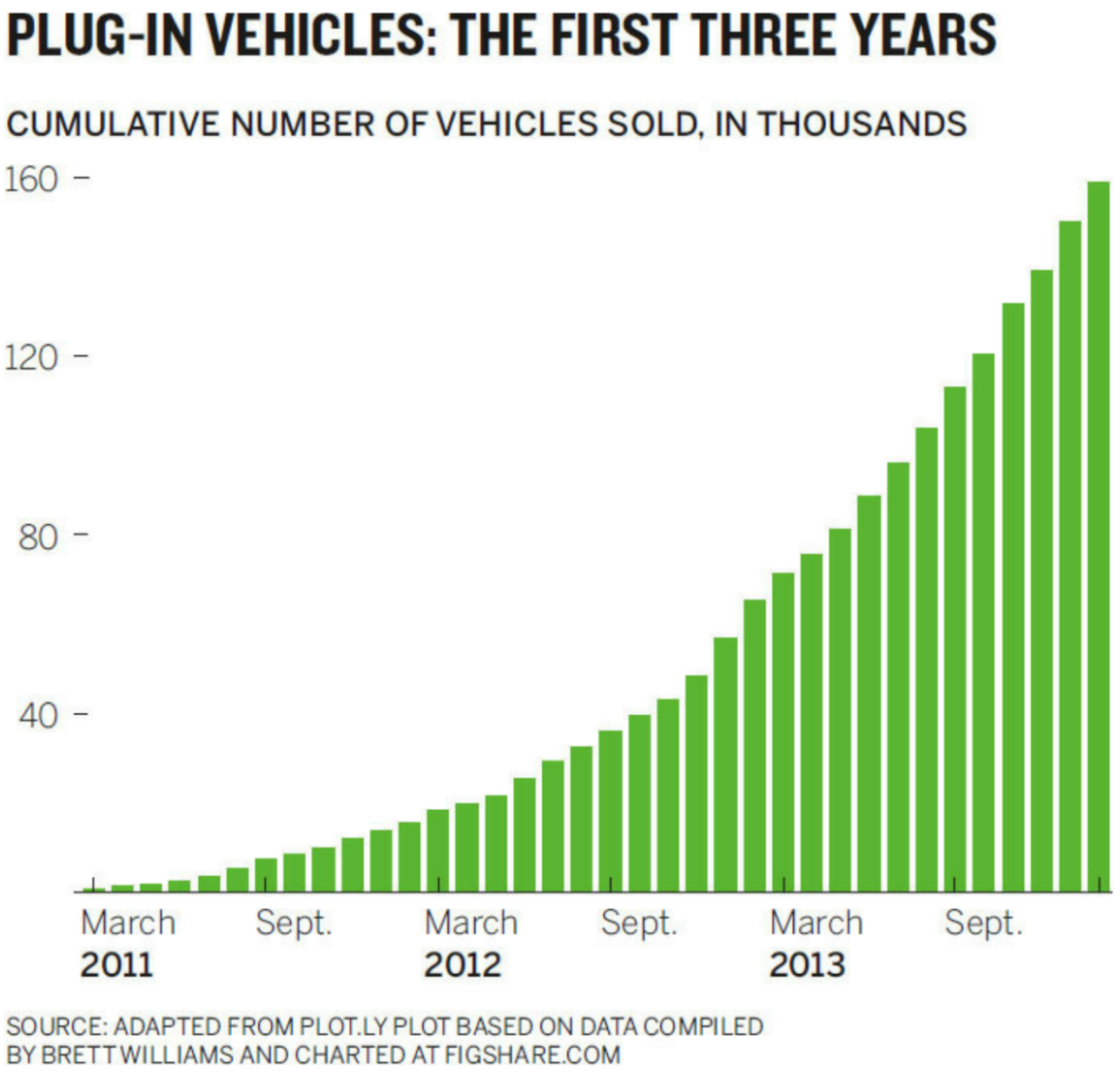


Figure 13. Plug-in Vehicles. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 38), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

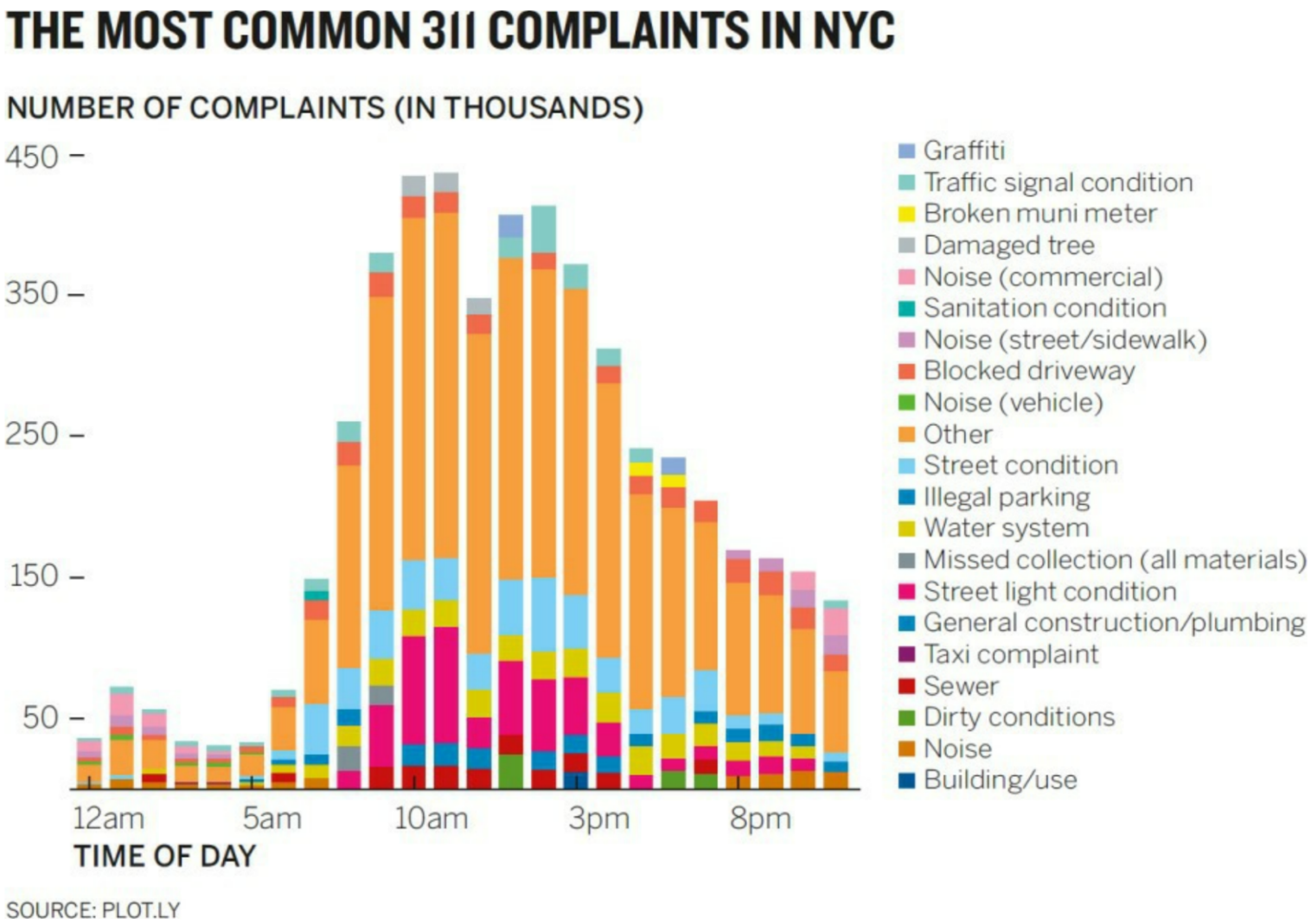


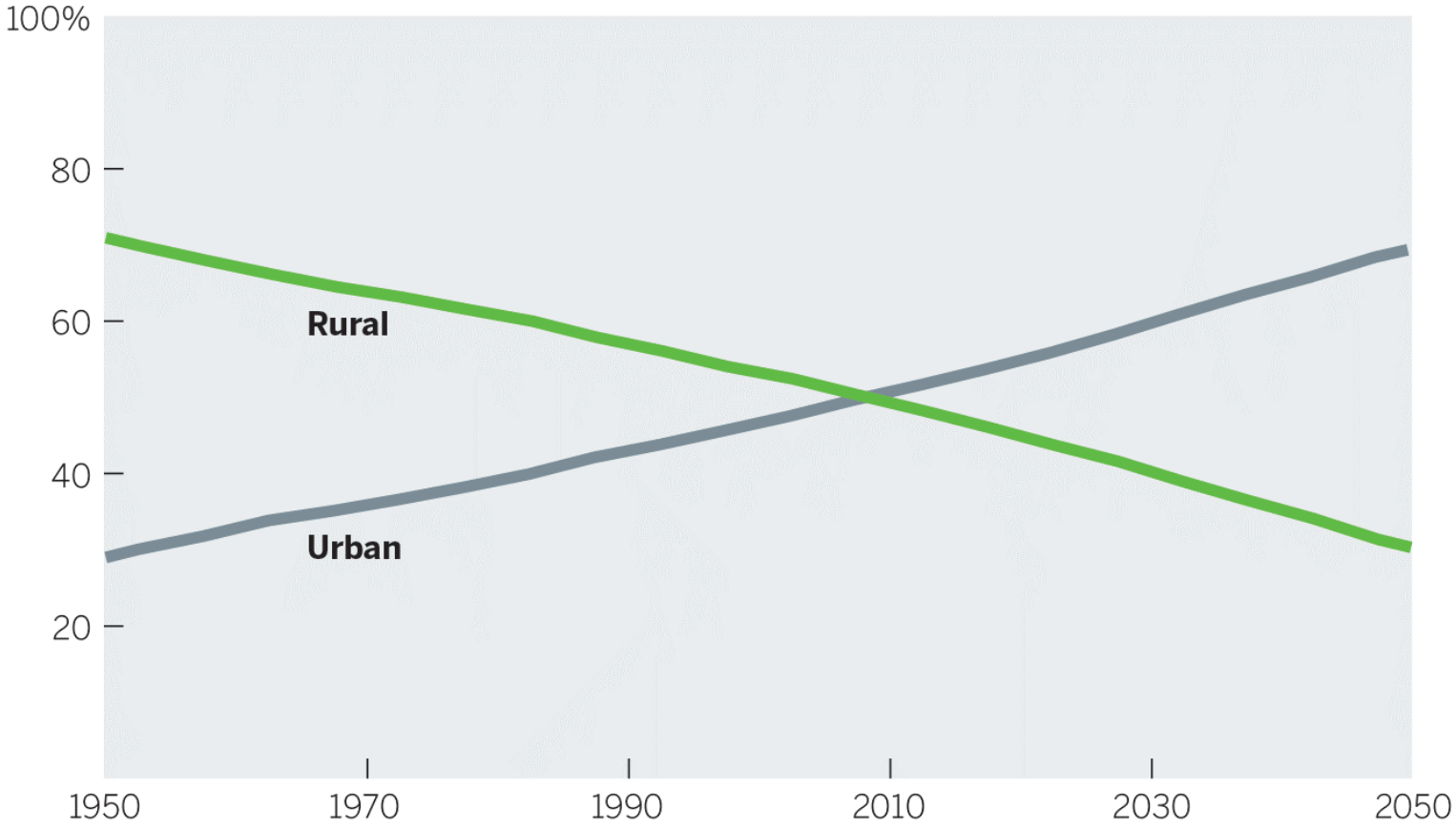
Figure 14. Complaints in NYC. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 38), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

How We Read Charts

1. We don’t go in order
2. We see first what stands out
3. We see only a few things at once

WHERE PEOPLE LIVE

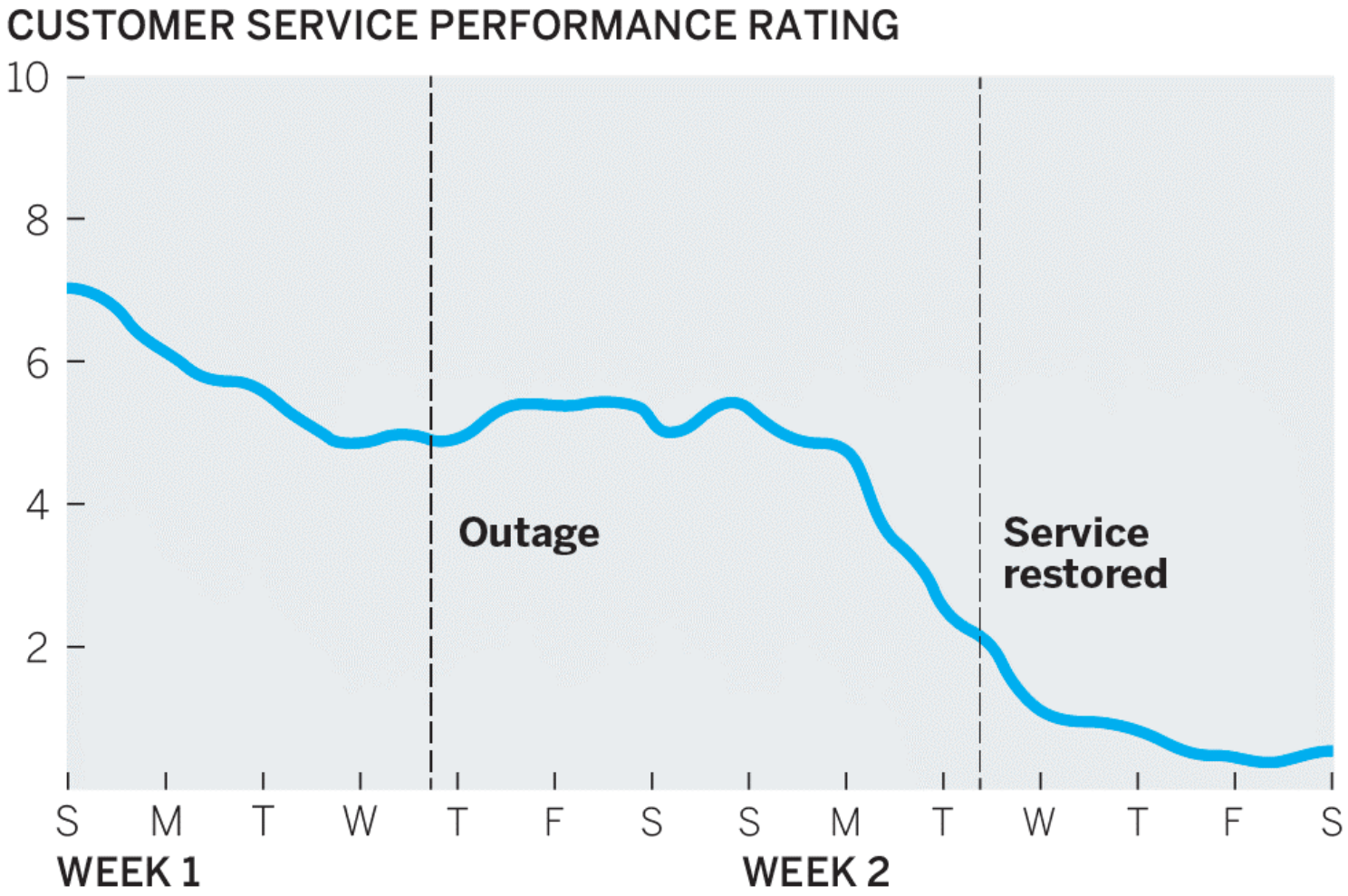
PERCENTAGE OF WORLD POPULATION LIVING IN URBAN AND RURAL AREAS



SOURCE: UNITED NATIONS, DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS, POPULATION DIVISION (2014)

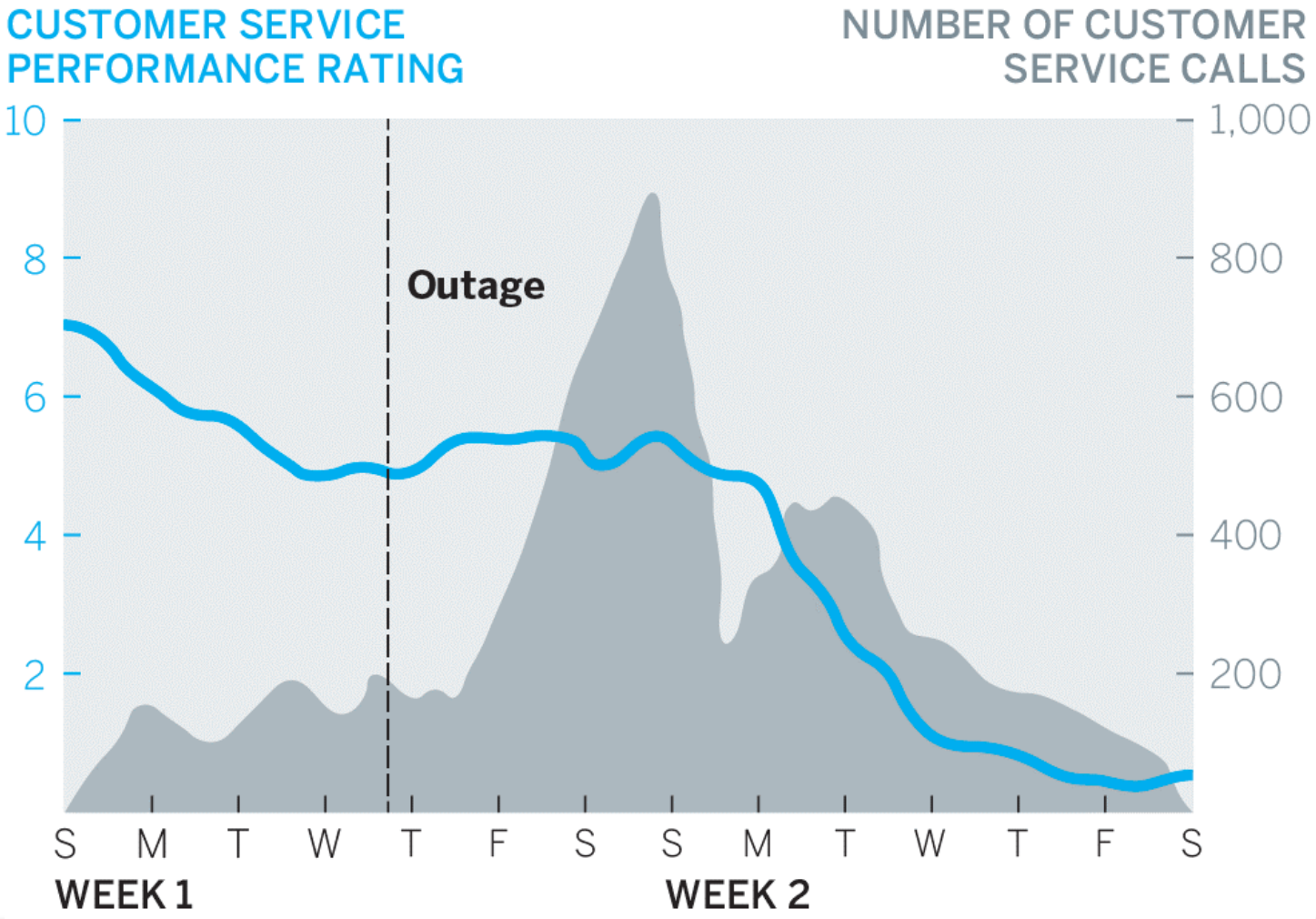
CONSUMER

DECLINING CALL CENTER PERFORMANCE

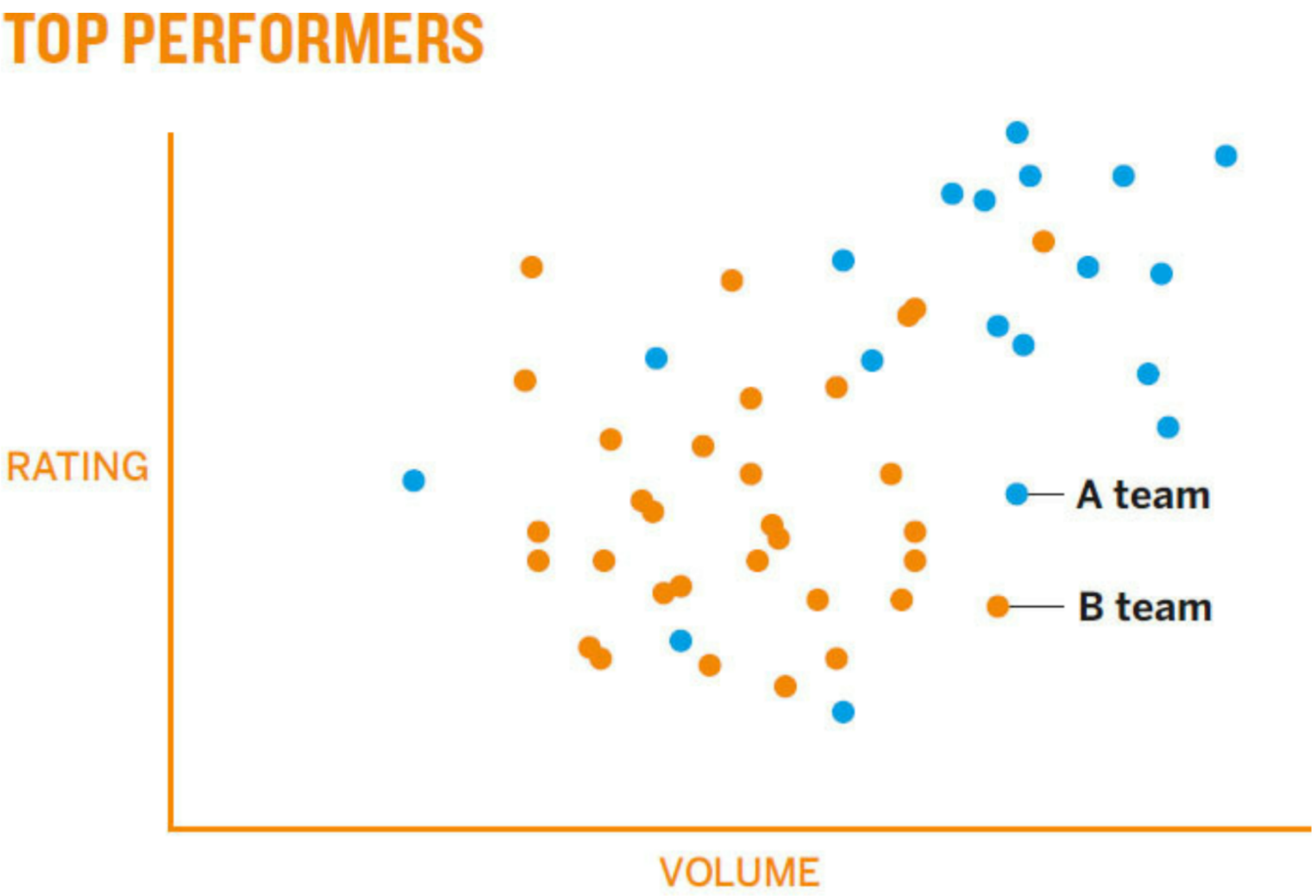


SOURCE: COMPANY RESEARCH

CUSTOMER SERVICE CALLS VS. PERFORMANCE



SOURCE: COMPANY RESEARCH



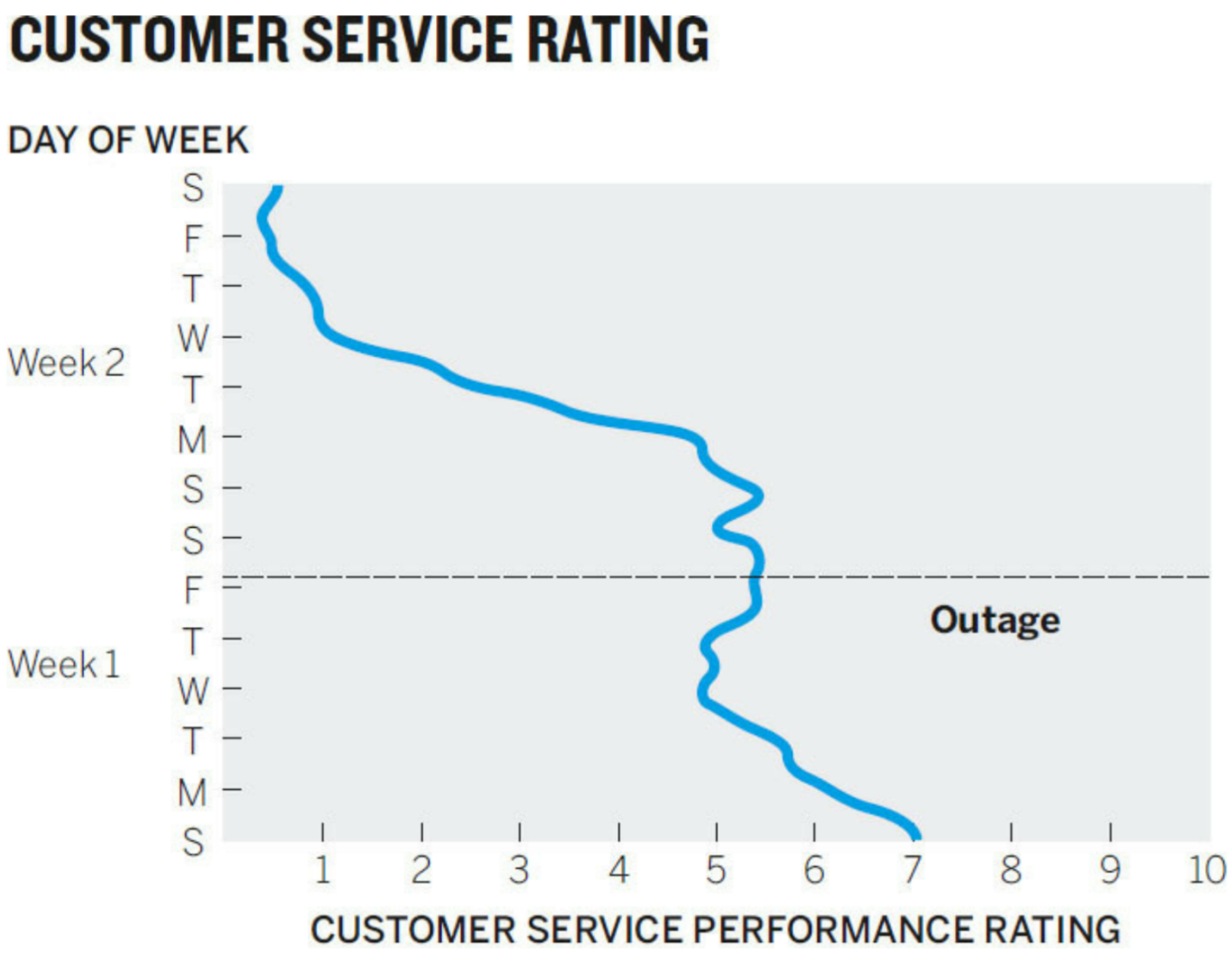
SOURCE: COMPANY RESEARCH

Figure 15. Top Performers. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 42), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

How We Read Charts

1. We don’t go in order
2. We see first what stands out
3. We see only a few things at once
4. We seek meaning and make connections


INTERSTATE
1
DO NOT
ENTER
INTERSTATE
95
SOUTH
NEWPORT
EXIT ONLY
6
STOP



SOURCE: COMPANY RESEARCH

Figure 16. Customer Service Rating. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 42), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

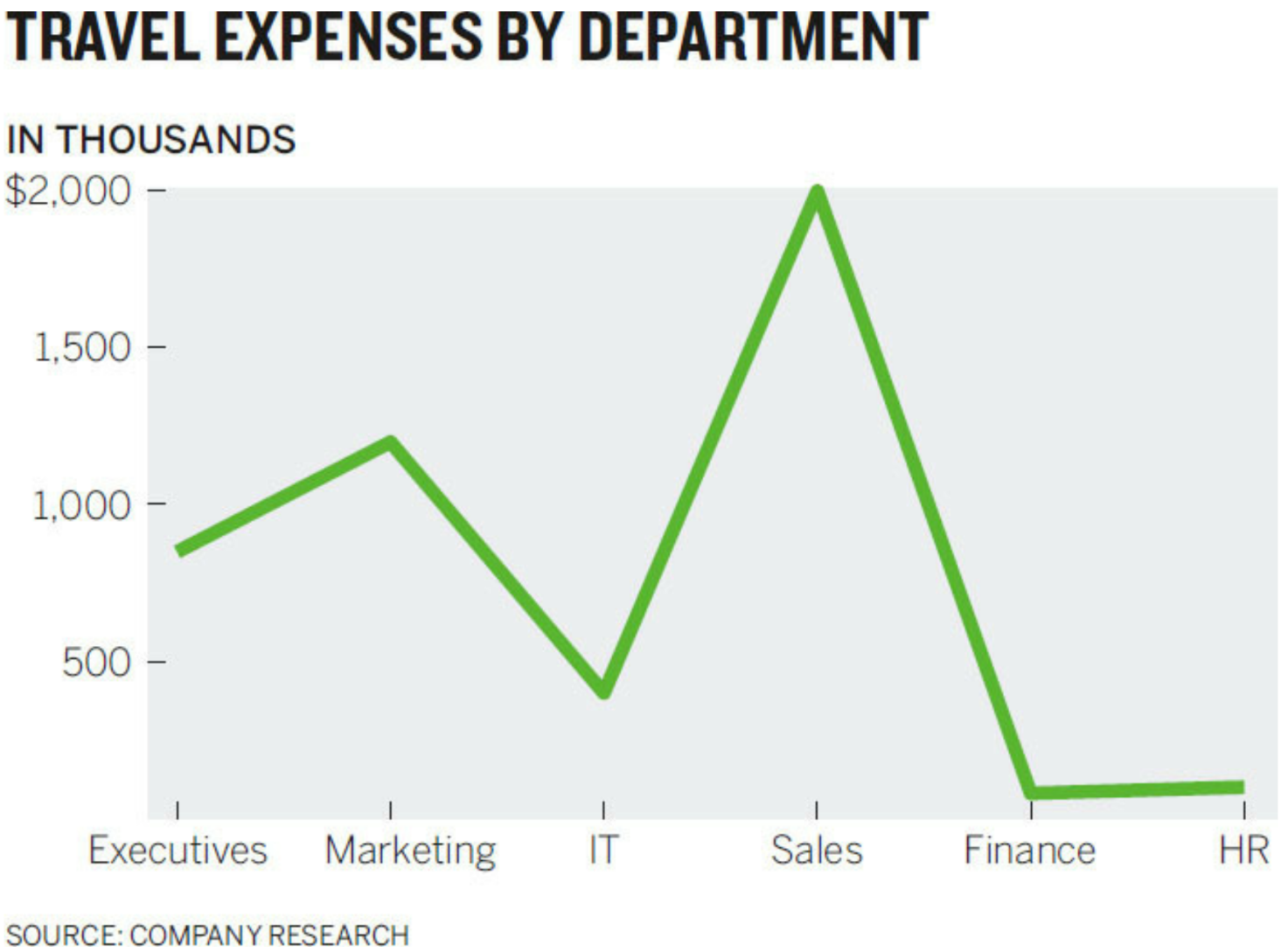
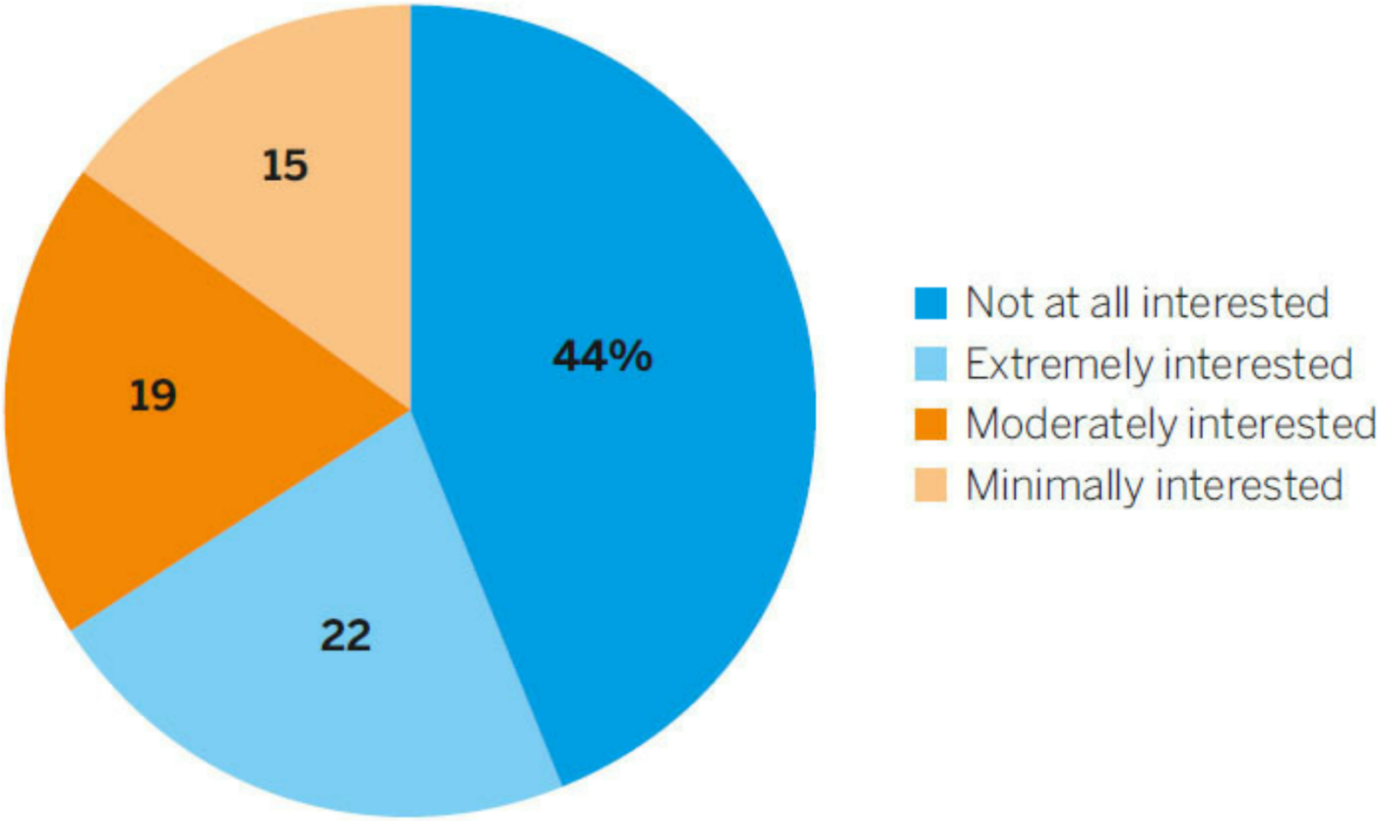


Figure 17. Travel Expenses by Department. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 43), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

HOW INTERESTED ARE YOU IN THIS PRODUCT?



SOURCE: COMPANY RESEARCH

Figure 18. Interest in Product. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 45), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

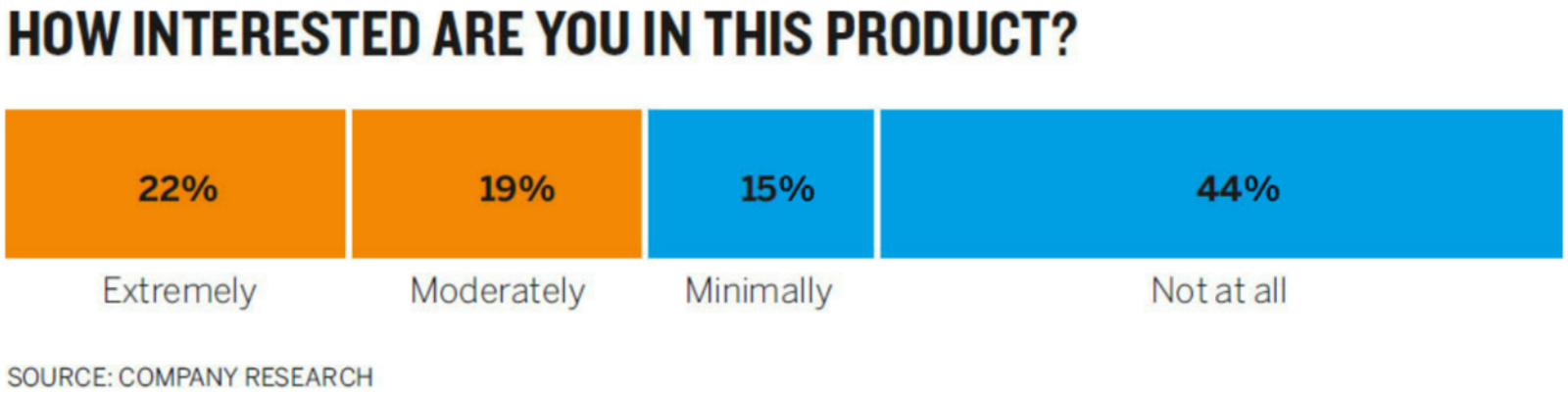


Figure 19. Interest in Product (bar). Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 47), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

How We Read Charts

1. We don’t go in order
2. We see first what stands out
3. We see only a few things at once
4. We seek meaning and make connections
5. We rely on conventions and metaphors

The Feeling Behind our Eyes

HealthCatalyst
ignite outcomes improvement

Design Principles

1. Structure & Hierarchy

Consistent Structure

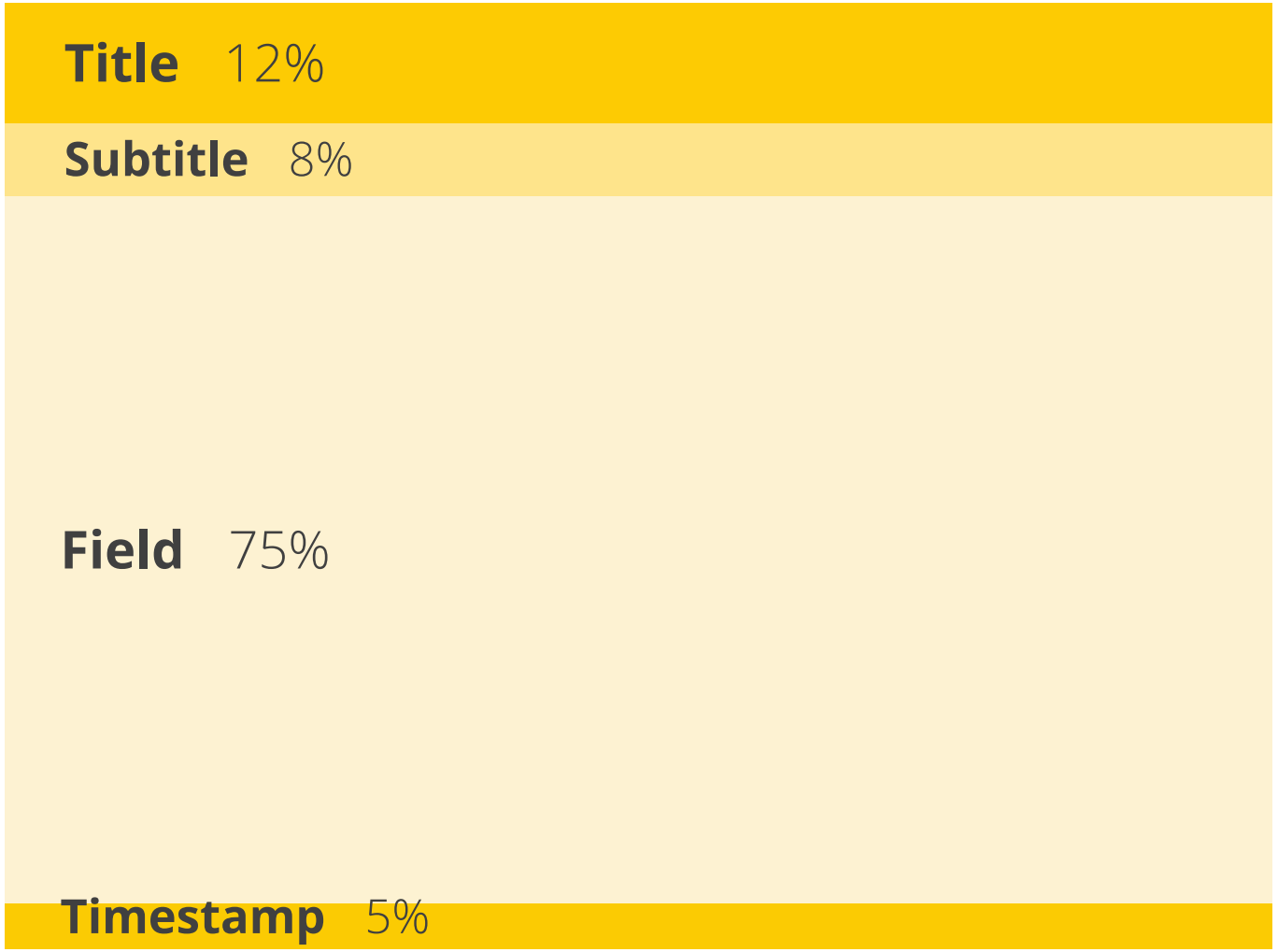
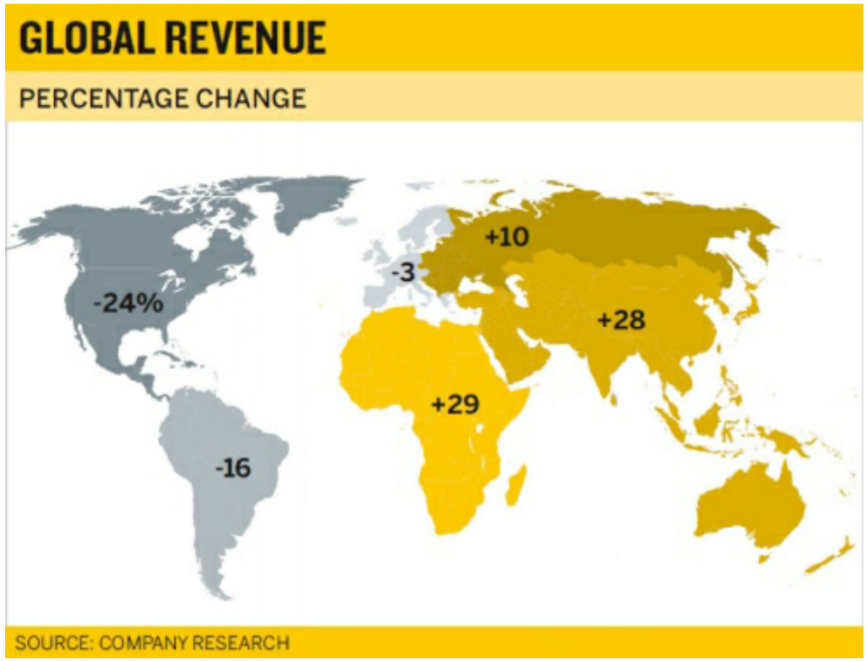
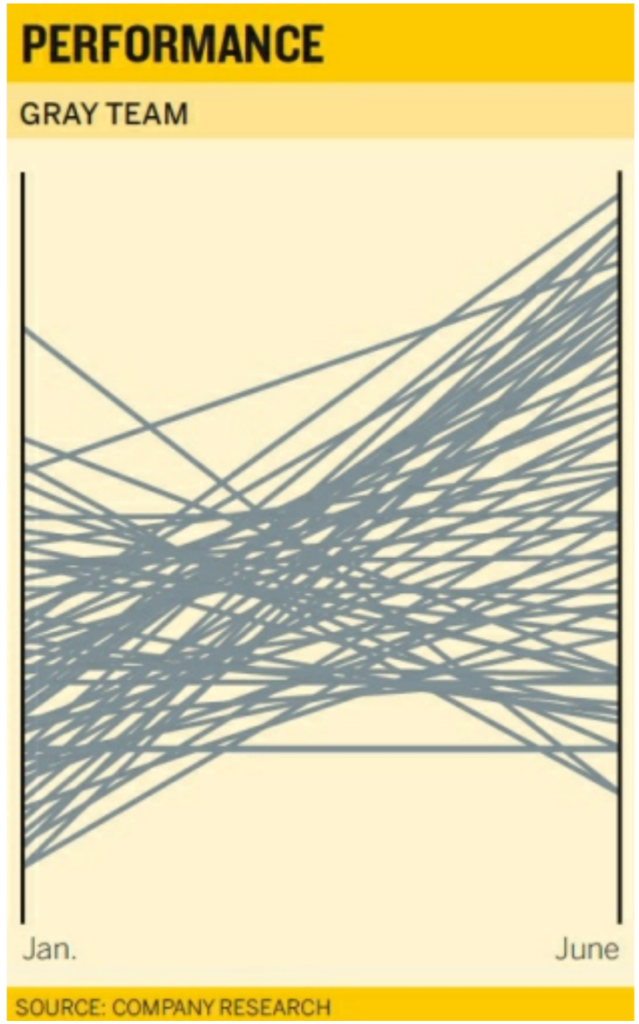


Figure 20. Consistent Structure. Adapted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 113), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.





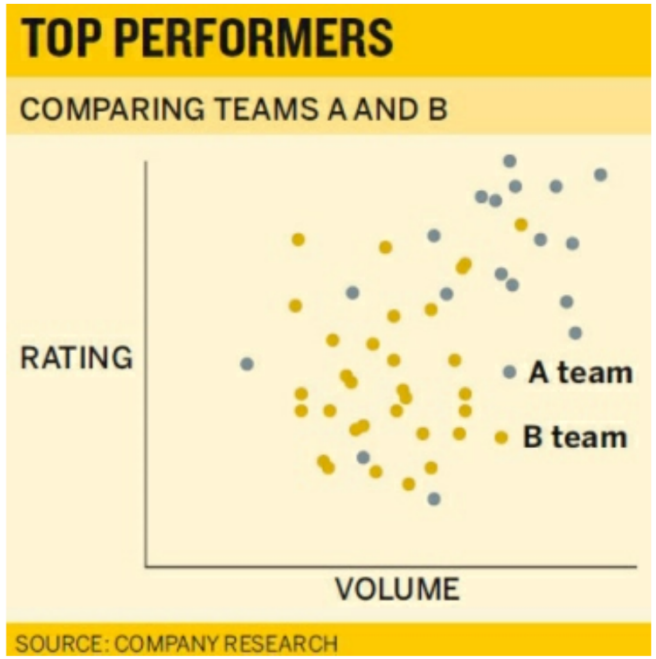
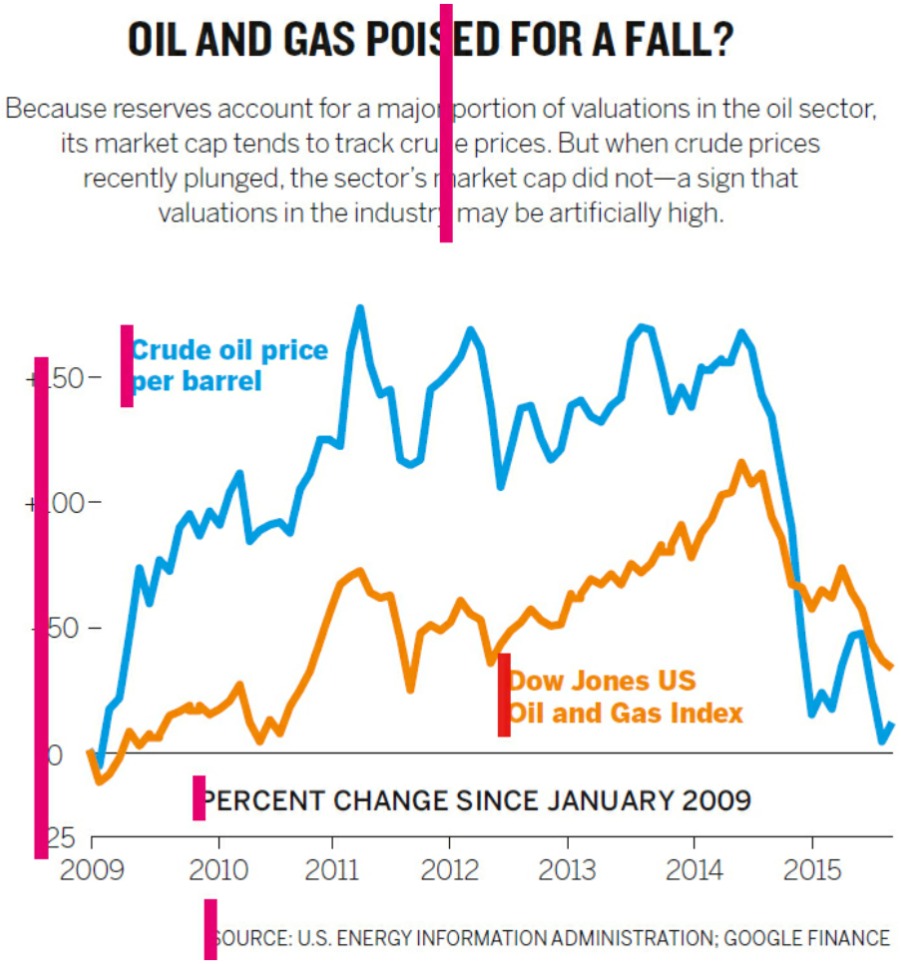


Figure 21. Consistent Structure (examples). Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 114), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

Consistent Alignment



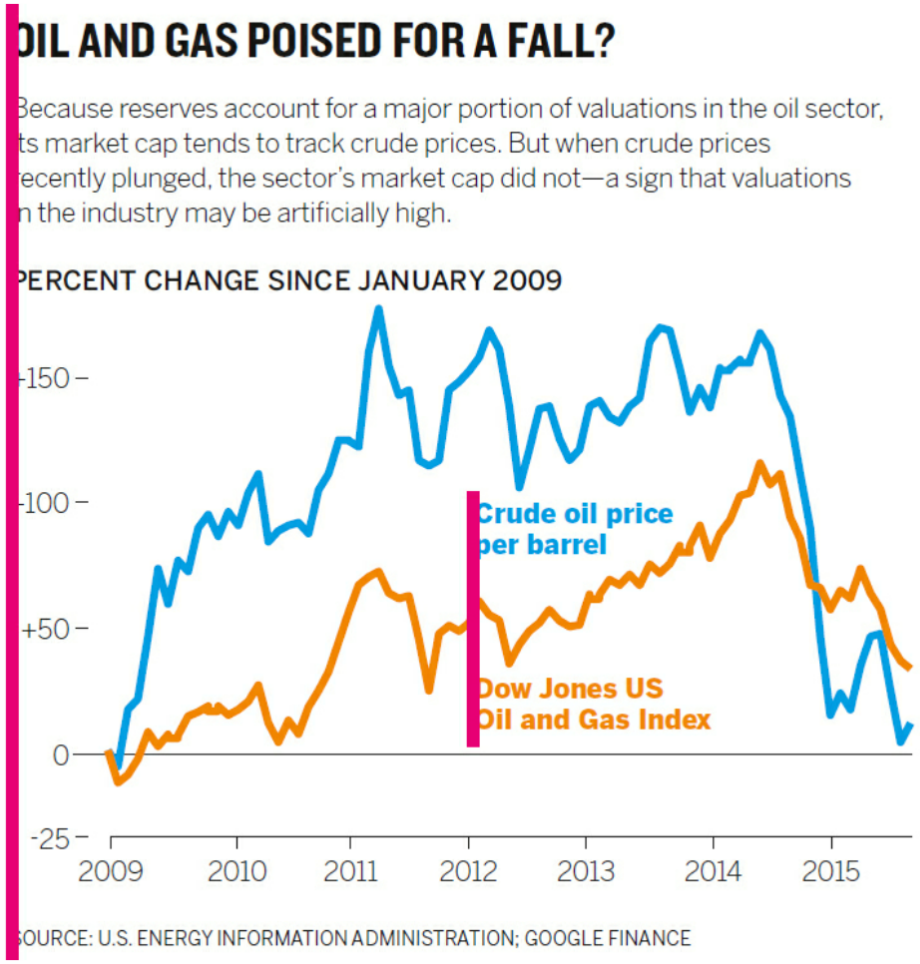
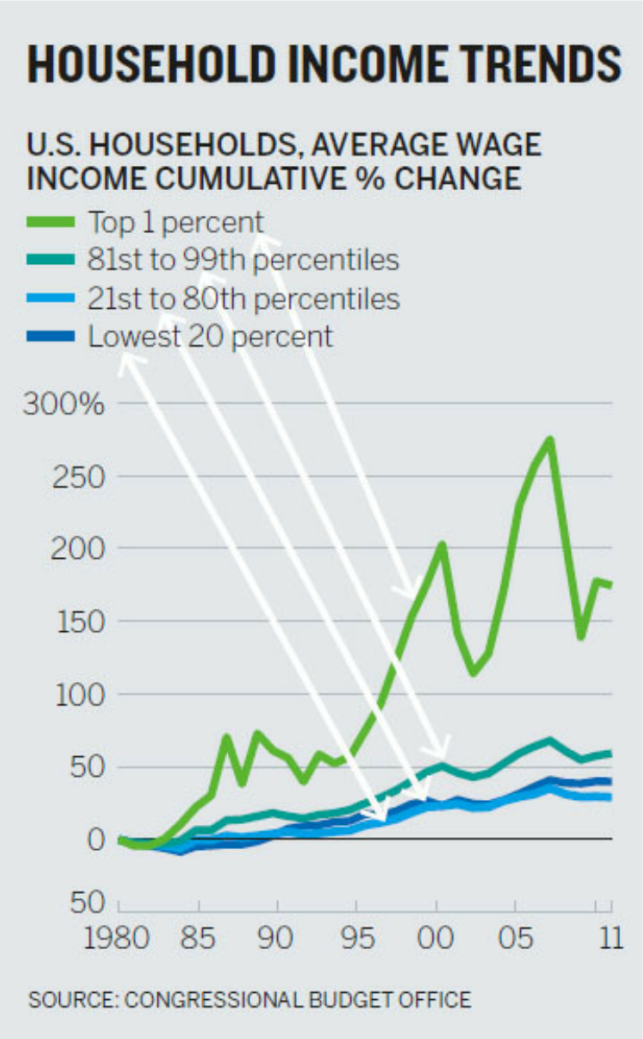


Figure 22. Consistent Alignment. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 115), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

Limit Eye Travel



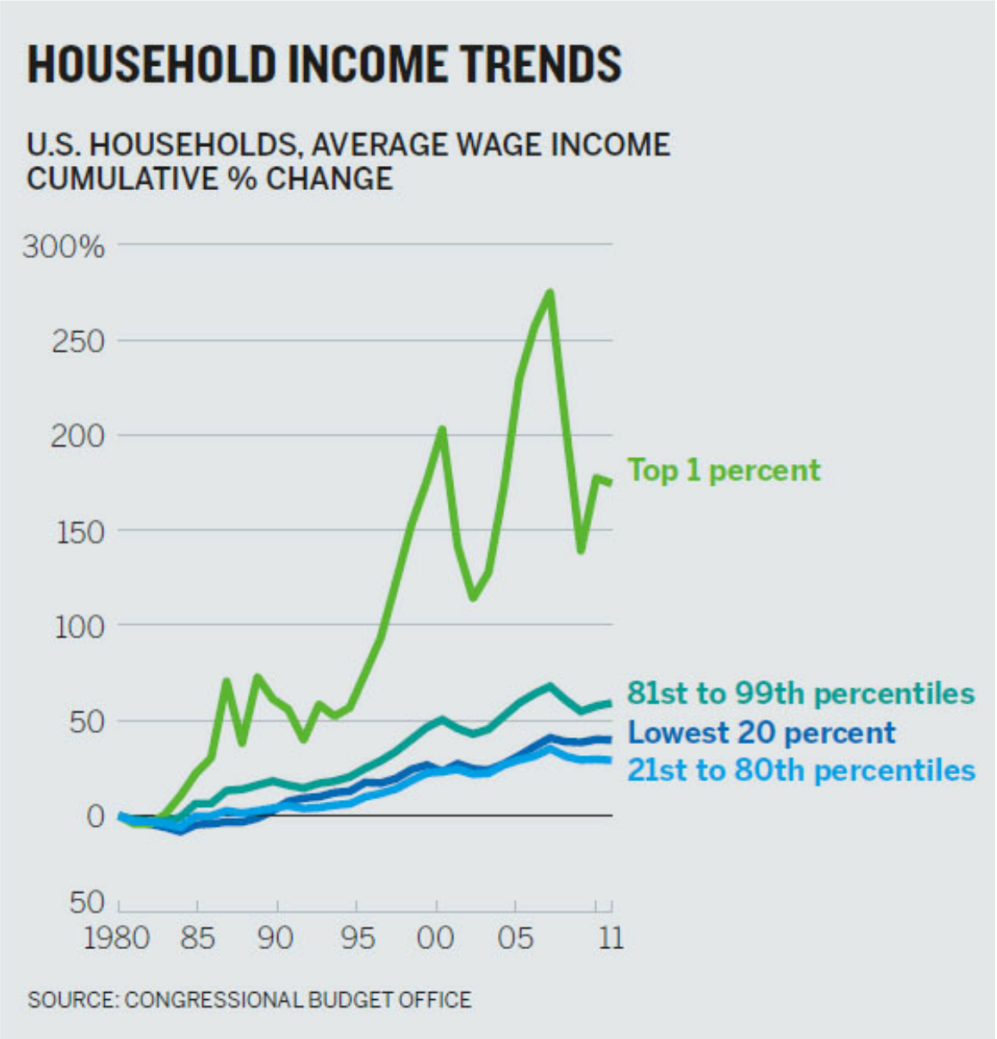
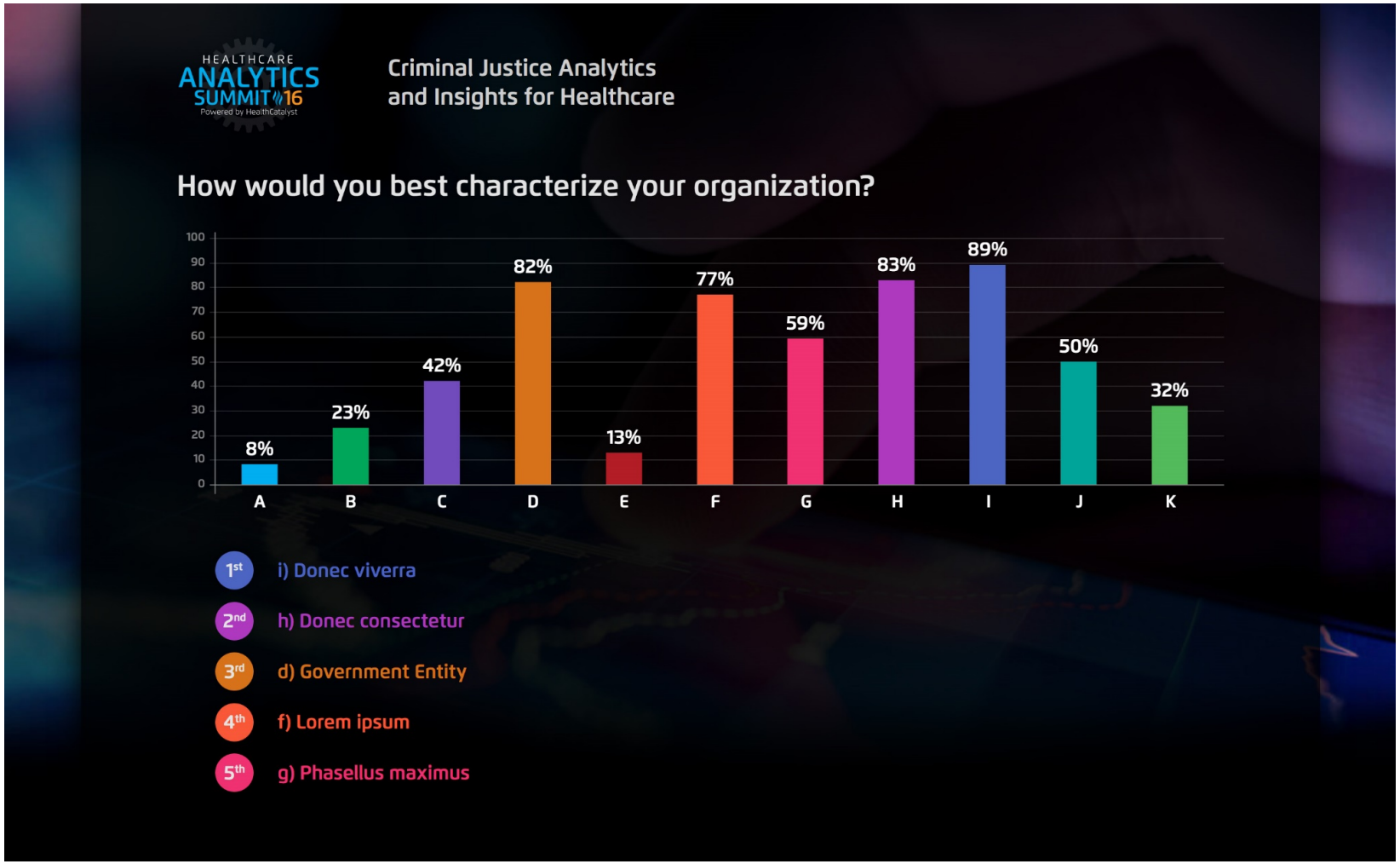


Figure 23. Limit Eye Travel (examples). Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 116), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

HAS16 Example



HAS17 Update

Design Principles

1. Structure & Hierarchy
2. Clarity

Confusion

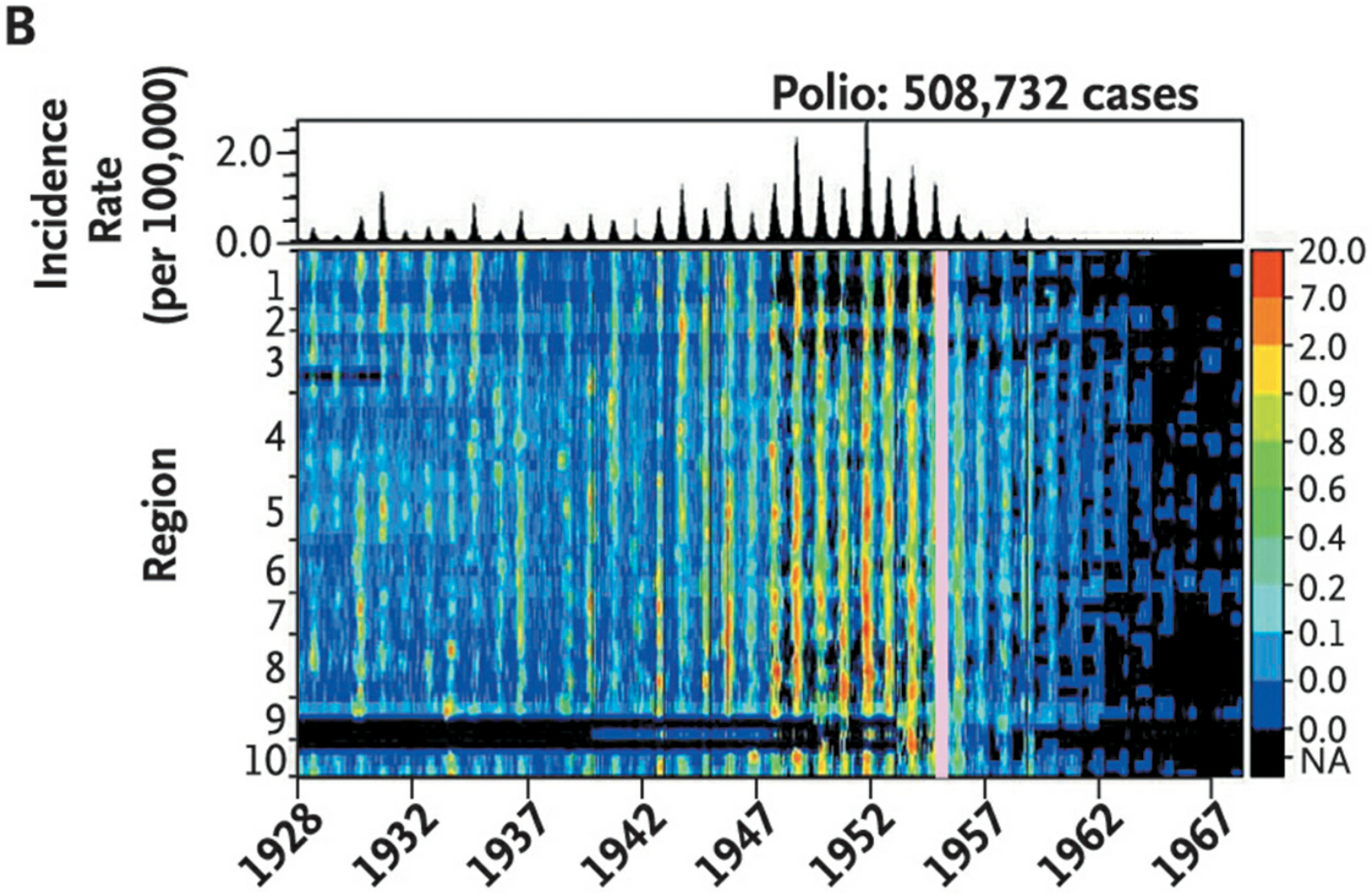


Figure 24. Polio. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 117), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

Clarity

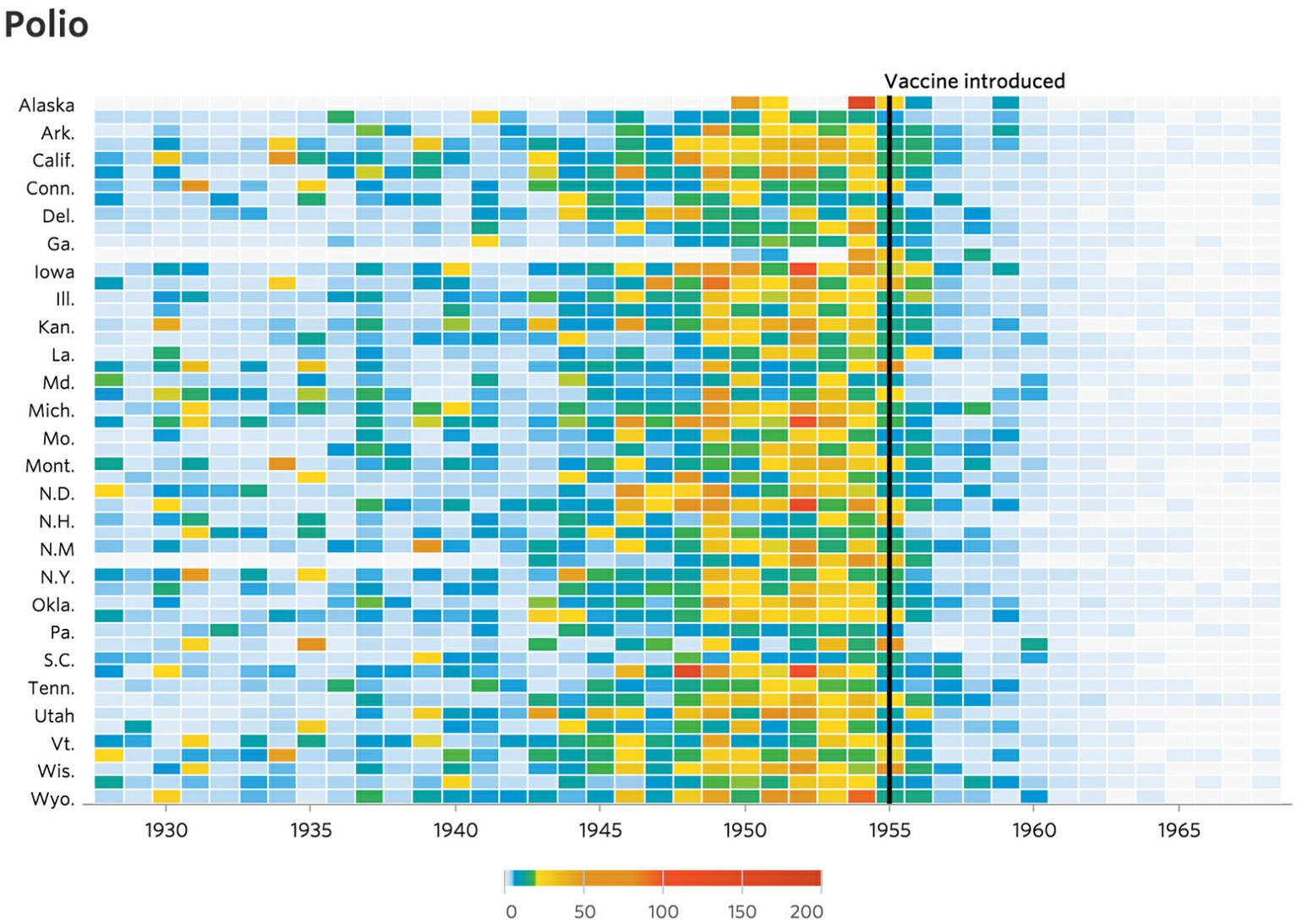


Figure 25. Polio (clarity). Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 117), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

Seriously?

Figure 26. Boston Street Sign. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 119), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

Design Principles

1. Structure & Hierarchy
2. Clarity
3. Simplicity

> The ability to simplify means to eliminate the unnecessary so the necessary can speak.

Hans Hofman

A REP'S PAST PERFORMANCE DOESN'T PREDICT FUTURE PROFITS

By looking not just at the revenue reps have generated but at their future profitability, you may find that your top performers are even more valuable than you thought—and your low performers even more costly.

SOURCE: V. KUMAR, SARANG SUNDER, AND ROBERT P. LEONE

A REP'S PAST PERFORMANCE DOESN'T PREDICT FUTURE PROFITS

SALES REPS' AVERAGE ANNUAL REVENUE (IN THOUSANDS)

*CALCULATED USING A PROPRIETARY FORMULA.

SOURCE: RESULTS FROM A STUDY OF ONE B2B COMPANY BY V. KUMAR, SARANG SUNDER, AND ROBERT P. LEONE

Building Better Charts

HealthCatalyst
ignite outcomes improvement

Design Process

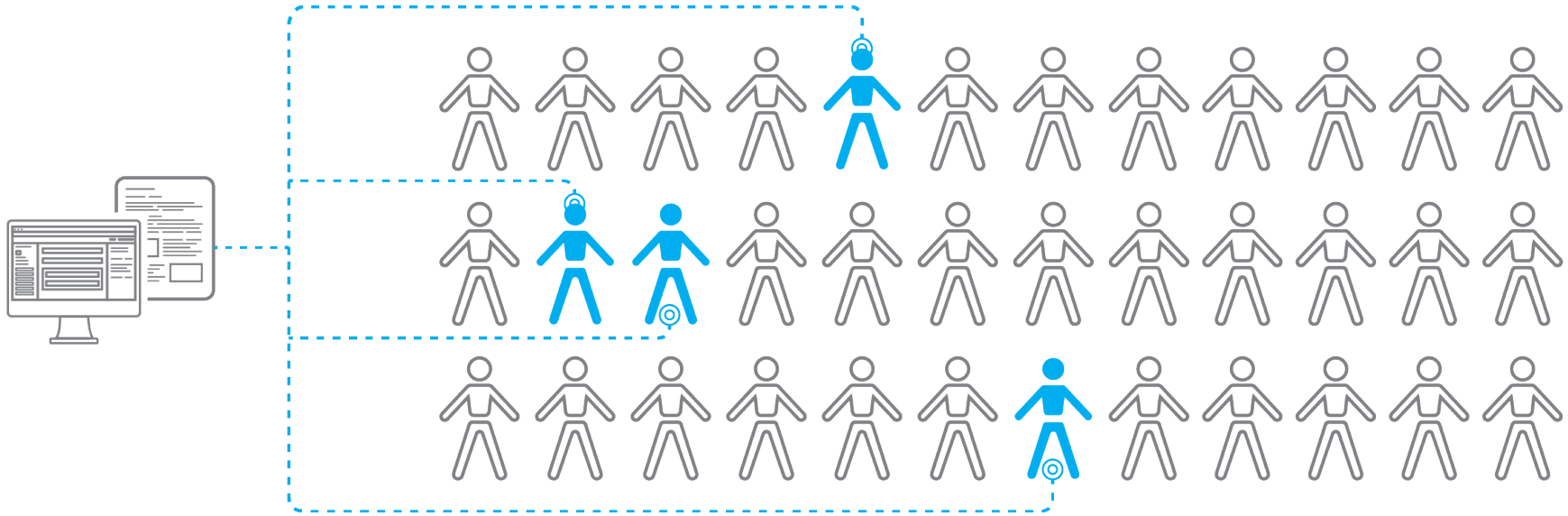
1. Listen to the Client

What is the Context?

DESIGNER

> In the absence of context, a chart is neither good nor bad. It's only well built or poorly built.

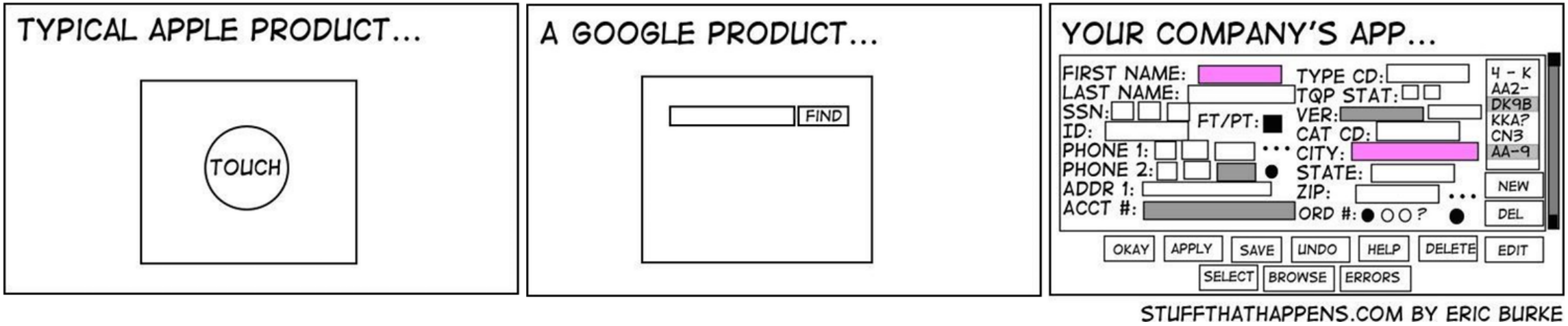
What is the Context?



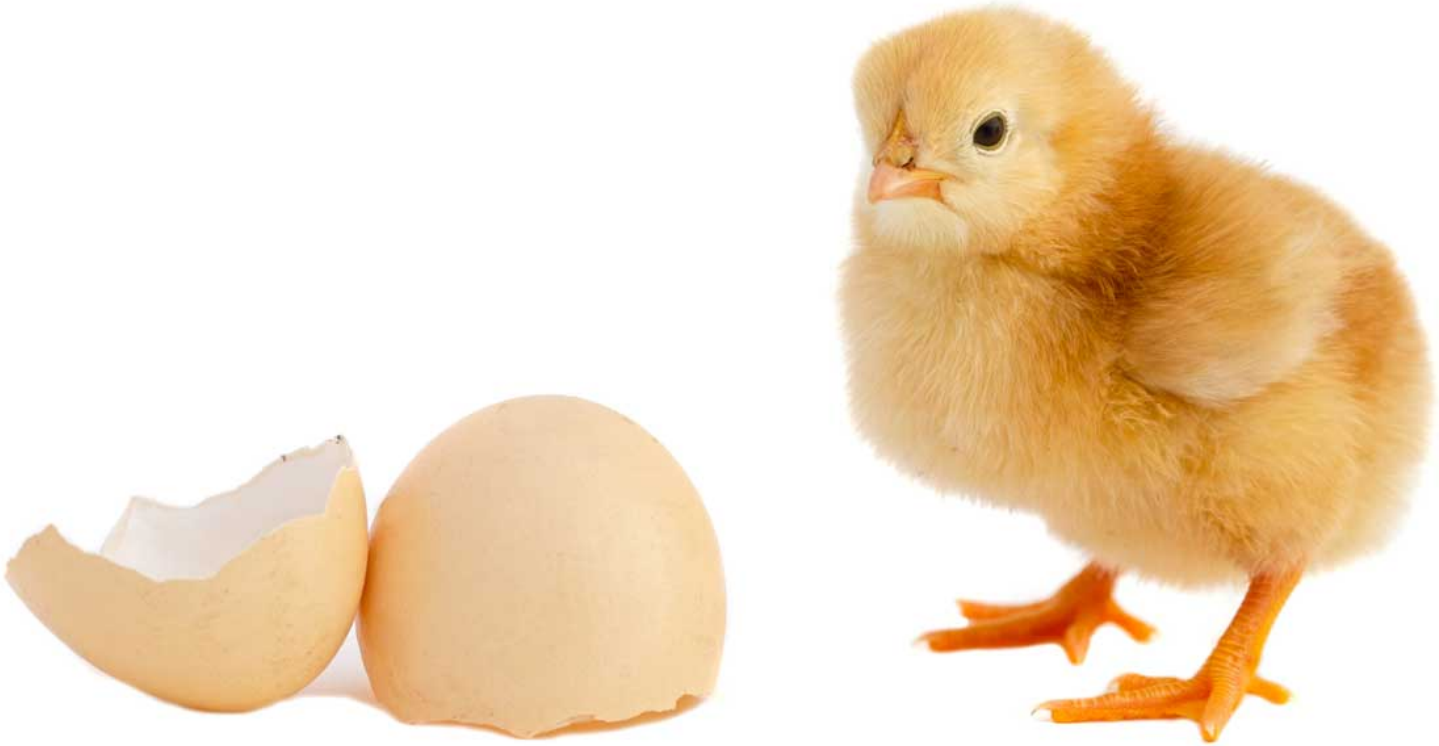
- Who will see this?
- What do they want?
- What do they need?

- What idea do I want to convey?
- What could I show?
- What am I trying to prove/learn?

Customer is Always Right?



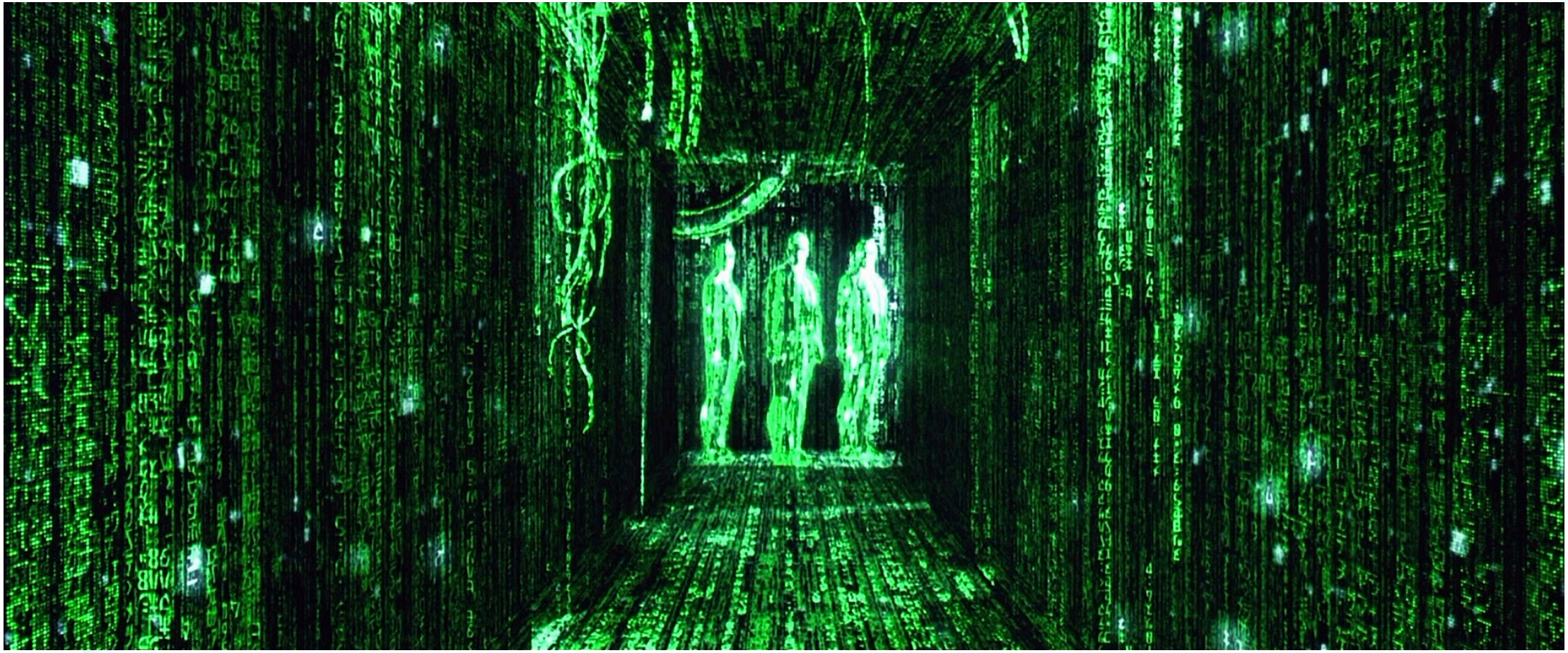
Chicken or the Egg?



Design Process

1. Listen to the Client
2. Listen to the Data

The Story in the Data



Berman, B. et al (Producers), & Wachowski, La., Wachowski, Li. (Directors). (1999). *The Matrix* [Motion picture]. USA: Warner Bros.

Listen to the Client and the Data

What story does the client want me to tell?

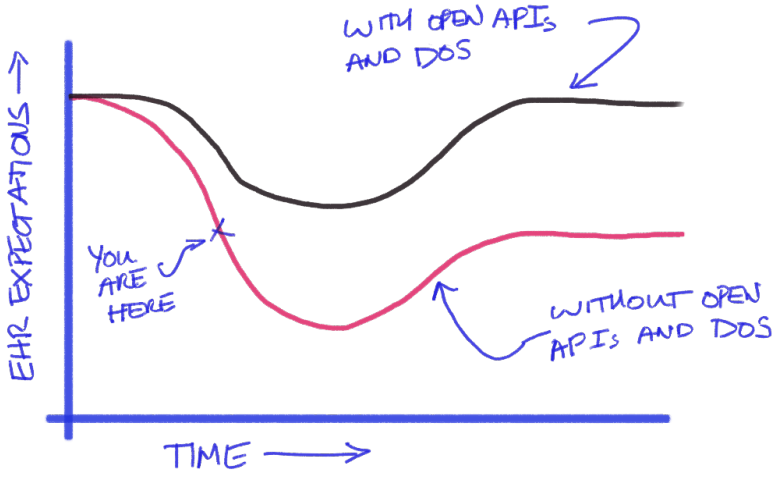
What story can the data tell?

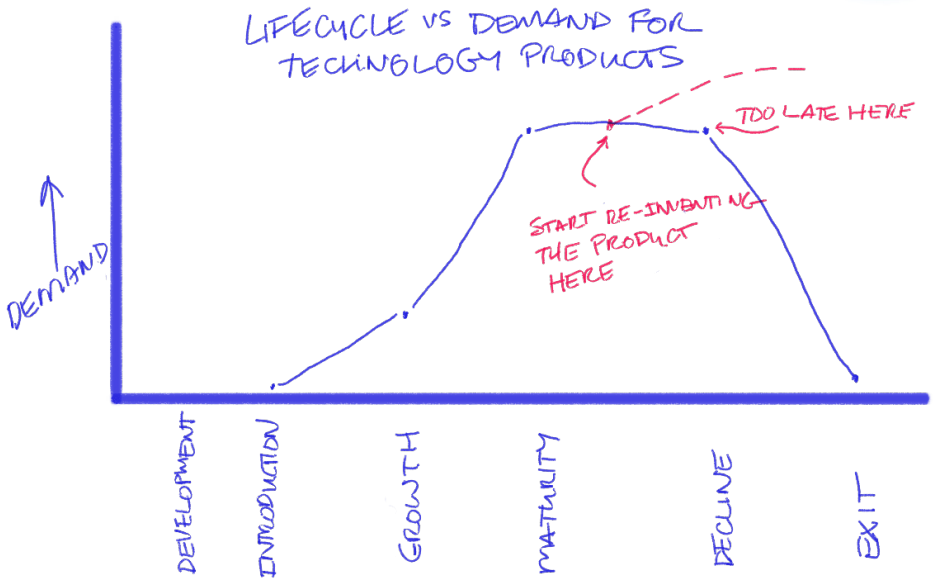
What story is the data telling?

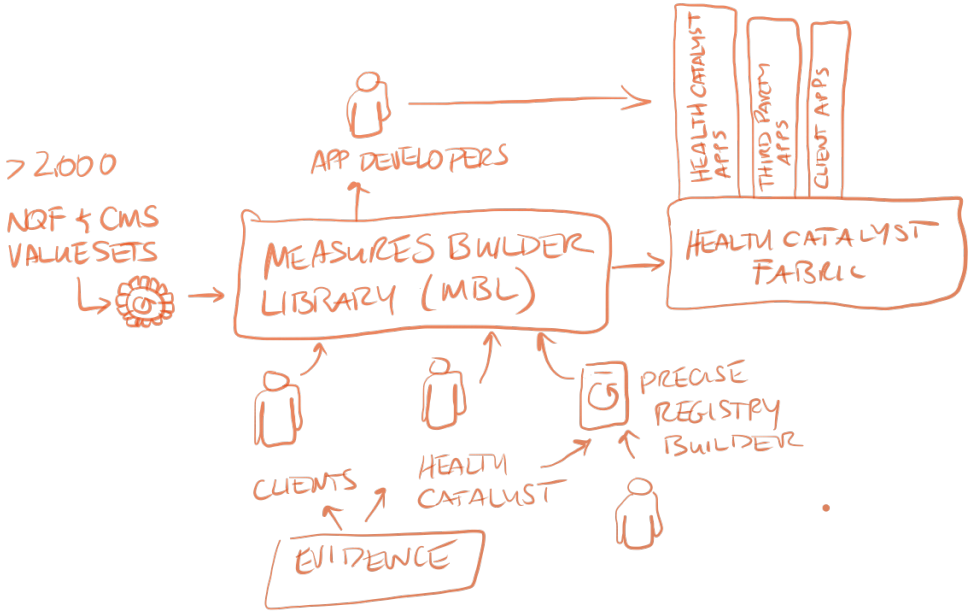
Design Process

1. Listen to the Client
2. Listen to the Data
3. Sketch

Sketch Examples







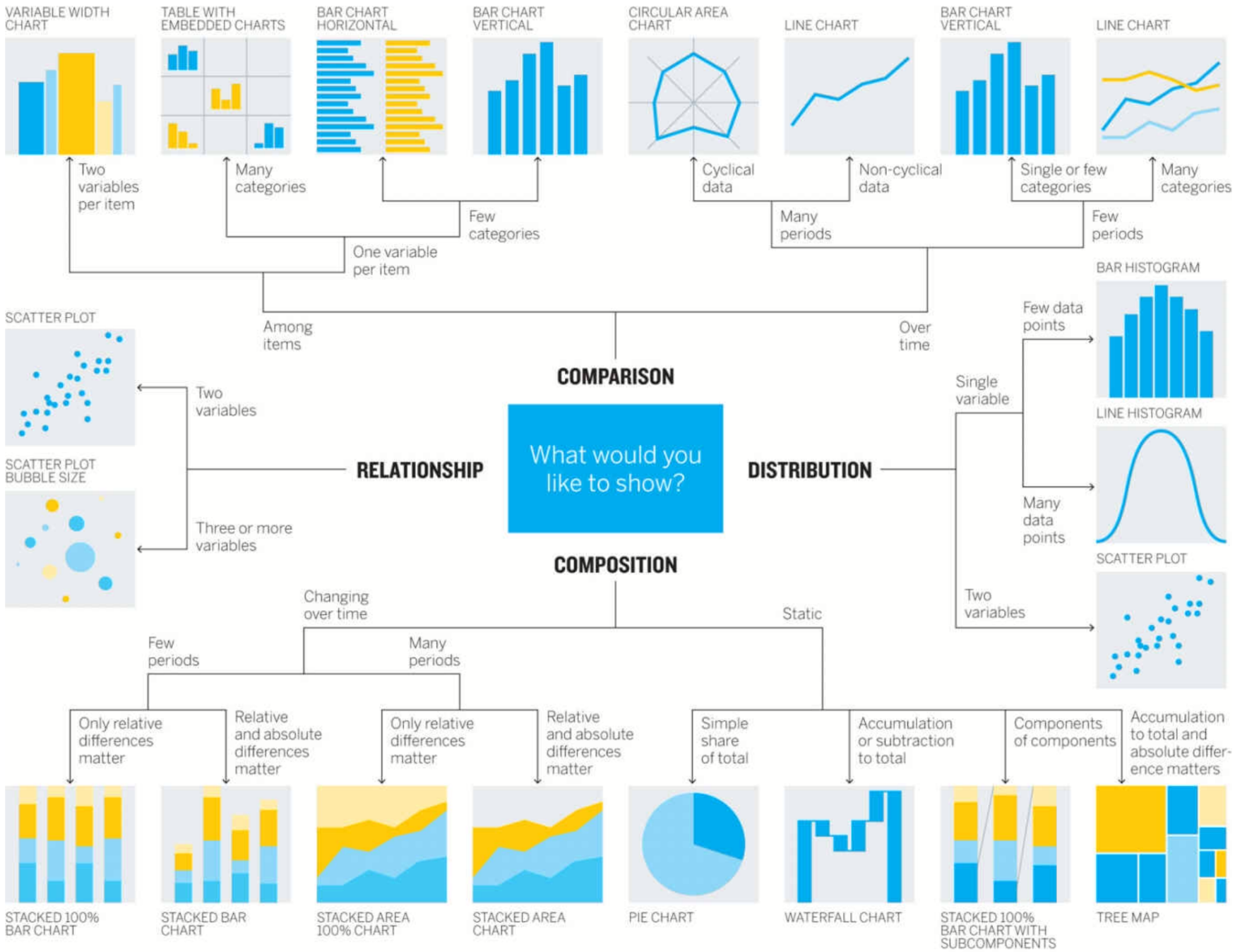


Figure 29. Chart Hierarchy. Reprinted from Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations (p. 83), by S. Berinato, 2016, Boston, MA: Harvard Business Review Press. Copyright 2016 by Harvard Business School Publishing Corporation.

Design Process

1. Listen to the Client
2. Listen to the Data
3. Sketch
4. Prototype

Thank You!

SNAP-LA To Do's Summary

- ❑ **Webinars:** Attend upcoming webinar on August 10: Tableau in Action.

- ❑ **Coach Check-in:** Attend coach check-in between July 15-31.

- ❑ **Consultation Support:** Email Megan (mobrien@careinnovations.org) if you have requests for Jerry, Boris, or Loretta.

CP3 Low-Intensity Track:
4 Part Data for Pop. Health Series

Part 1: Building a Data-Driven Culture for Pop. Health Management

- July 19, 2017 @12-1pm
- *Faculty:* SA Kushinka, CCI & Jerry Lassa, Data Matt3rs

Part 2: Design Thinking for Data Visualization

- **July 27, 2017 @ 12-1pm**
- *Faculty:* Andrew Frueh, Health Catalyst

Part 3: Tableau in Action

- **August 10, 2017 @ 2-3pm**
- *Faculty:* Dr. Jason Cunningham, West County Health Centers

Part 4: From Data to Action: Key Steps and Strategies for Using Data to Improve Care

- **August 17, 2017 @ 12-1pm**
- *Faculty*: Boris Kalikstein, Pivotal Moment Consulting

tableau

DATA VISUALIZATION

Thank You!

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CEDARS-SINAI

For questions, please contact:

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