



# Effective Data Storytelling:

How to Turn Insights into Action

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[Effectivedatastorytelling.com](http://Effectivedatastorytelling.com)







# Introduction to Data Storytelling



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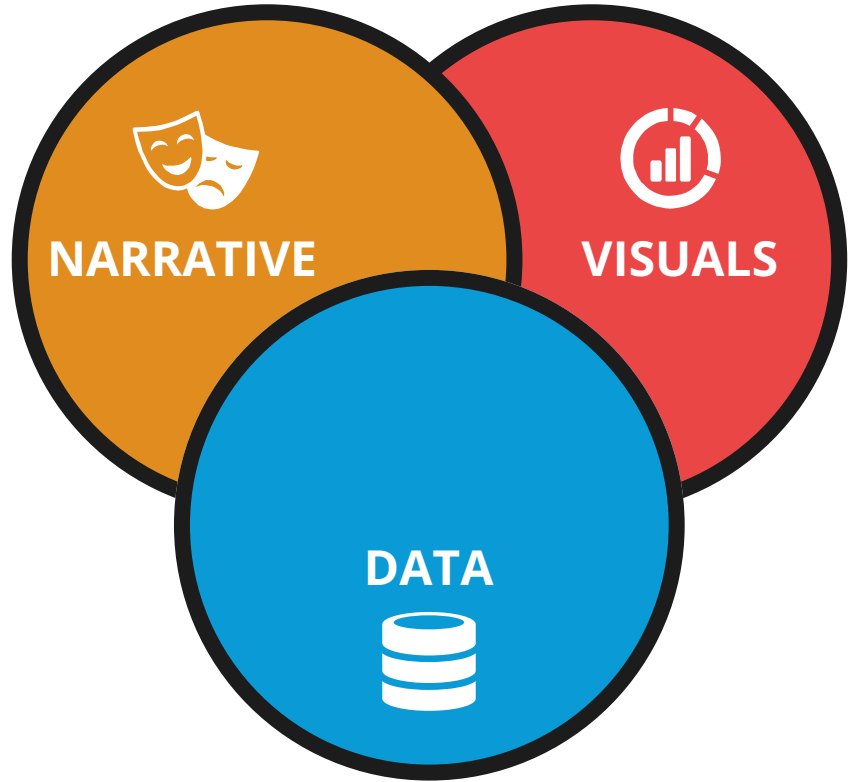


# What is Data Storytelling?

**Data storytelling** is a structured approach for communicating data insights using narrative elements and explanatory visuals.

# 3

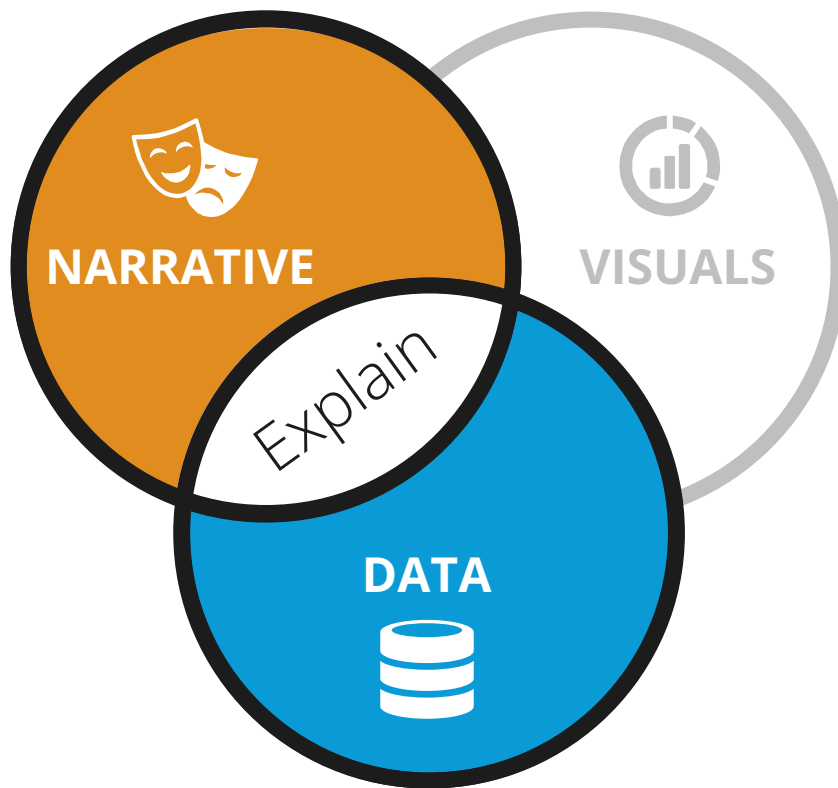
## Key Elements of Data Storytelling





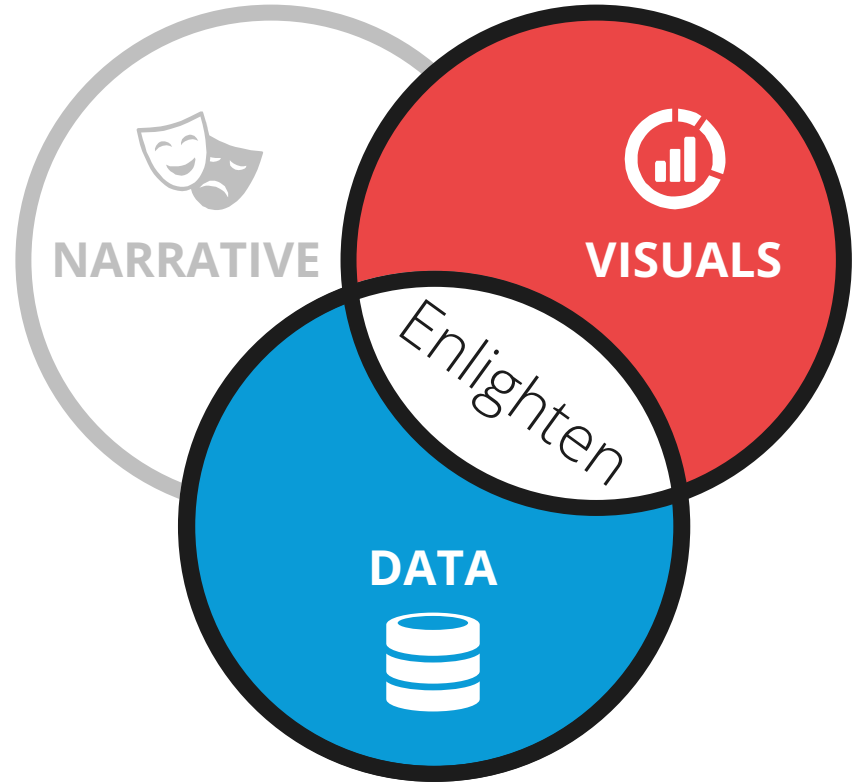
# EXPLAIN:

Narrative +  
Data



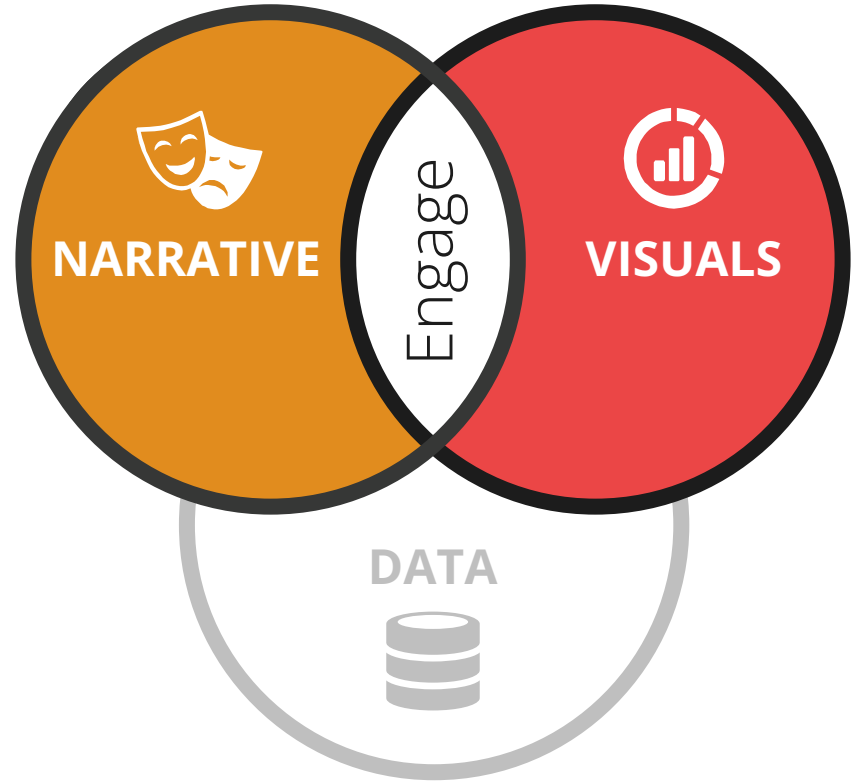
# ENLIGHTEN:

Data +  
Visuals

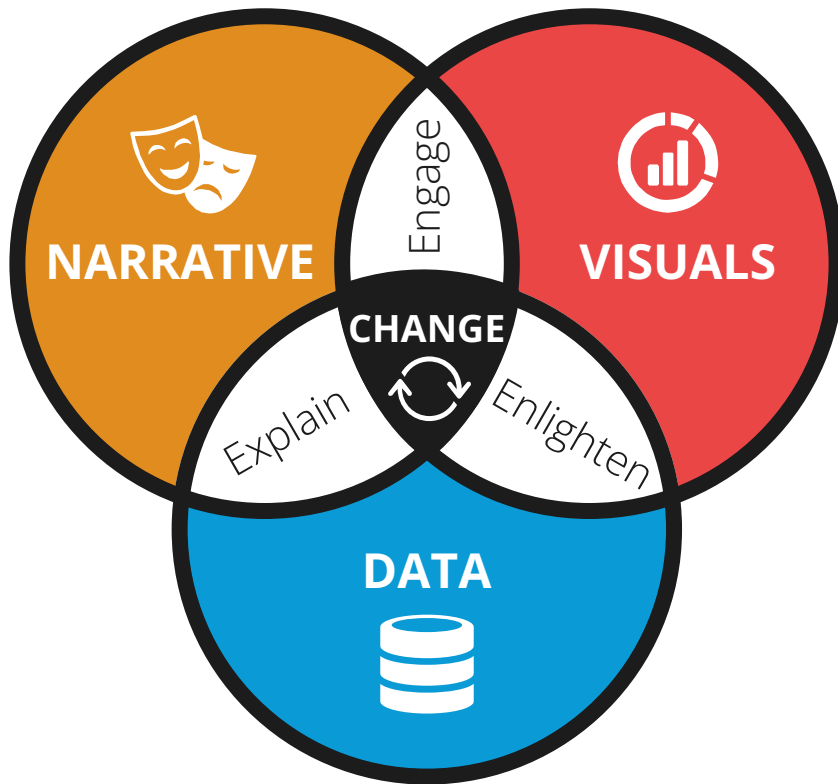


# ENGAGE:

Narrative +  
Visuals



# Influence **change** with data stories



# Every Data Story Begins with an Insight

“An **unexpected shift** in the way we understand things.”

**Gary Klein**

Psychologist and author

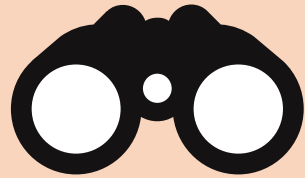


# Observations vs. Insights

WHAT

WHY

The share of visitation from **Dallas / Fort Worth** is up **5%!**



**Observation**

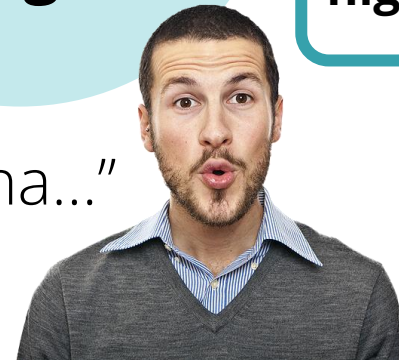


**Insight**

Visitors are taking advantage of our airport's **new direct flight service.**

"Hmm..."

"Aha..."



A close-up photograph of a person's hand pointing at a computer monitor. The hand is wearing a silver watch. A blue starburst graphic is overlaid on the screen where the finger is pointing. A speech bubble with a black outline and white background contains the word "Aha!" in bold black text. The background is blurred, showing a wooden desk and other people's hands.

**Aha!**



~~“The numbers  
speak for  
themselves”~~





# Introduction to Data Storytelling



# Why do you need data storytelling skills?



A man in a grey shirt is shown in profile, looking towards the right. In the background, there are other people and laptops, suggesting a meeting or office environment. The lighting is bright and natural.

## Find insights

"The ability to take data—to be able to **understand** it, to **process** it, to **extract value** from it, to visualize it, to communicate it—that's going to be a **hugely important skill in the next decades.**"



*Hal Varian, Google Chief Economist*

A man in a grey shirt is shown in profile, looking towards the right. In the background, another person is gesturing with their hand while sitting at a desk with a laptop. The scene is a professional meeting or office environment.

## Explain insights

"The ability to take data—to be able to understand it, to process it, to extract value from it, to **visualize** it, to **communicate** it—that's going to be a **hugely important skill in the next decades.**"



*Hal Varian, Google Chief Economist*

# Head-to-Head: Stories Beat Statistics

"Storytelling is the **most powerful way** to put ideas into the world today."

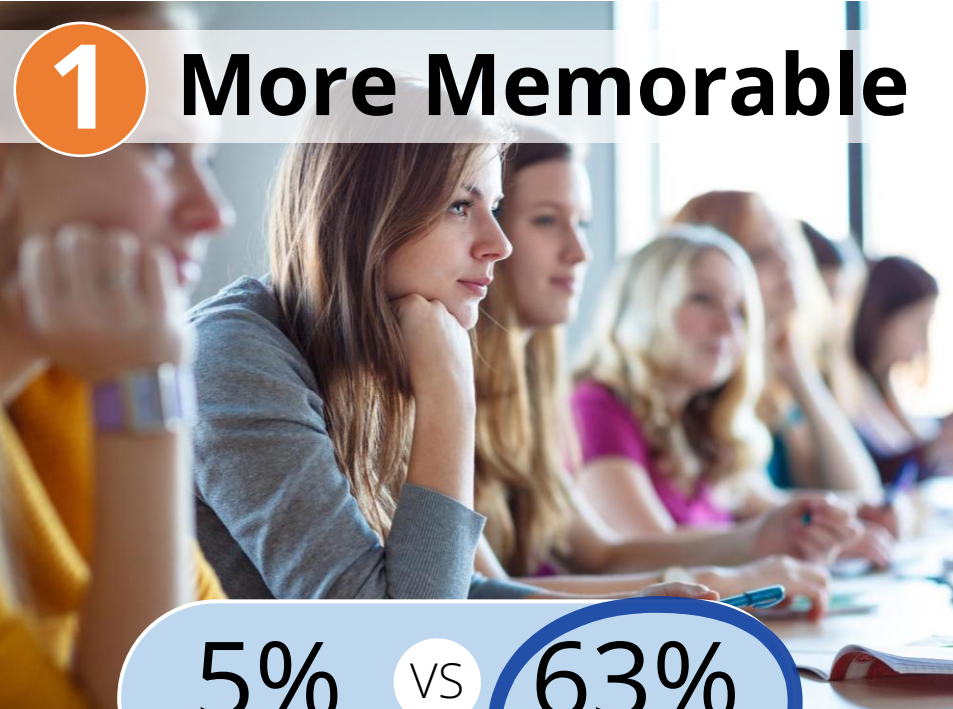


**Robert McKee**  
Screenwriting  
guru & professor



# Two Ways Stories Beat Statistics

## 1 More Memorable



5%  
statistics

VS

63%  
stories

## 2 More Persuasive



\$1.14  
statistics

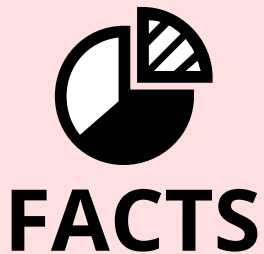
VS

\$2.38  
story

A person with their back to the camera, wearing a black and white geometric patterned sweater, is speaking to a group of people in a meeting. The group consists of several individuals, including a man in a blue shirt and a woman with long blonde hair, who are smiling and listening. The background is a bright, modern office space with large windows.

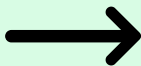
We **hear** statistics,  
but we **feel** stories

# Audiences Are More Receptive to Stories



**Shields Up**

Audience is critical  
& skeptical.



**Shields Down**

Audience drops its  
analytical guard.

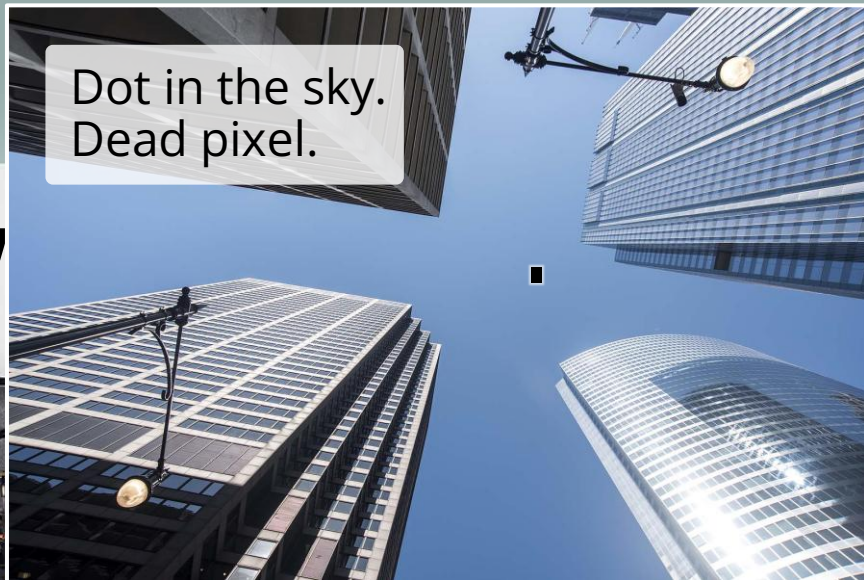


# The Innate Power of Stories

Our bedroom.  
Two voices.  
I knock.



Dot in the sky.  
Dead pixel.



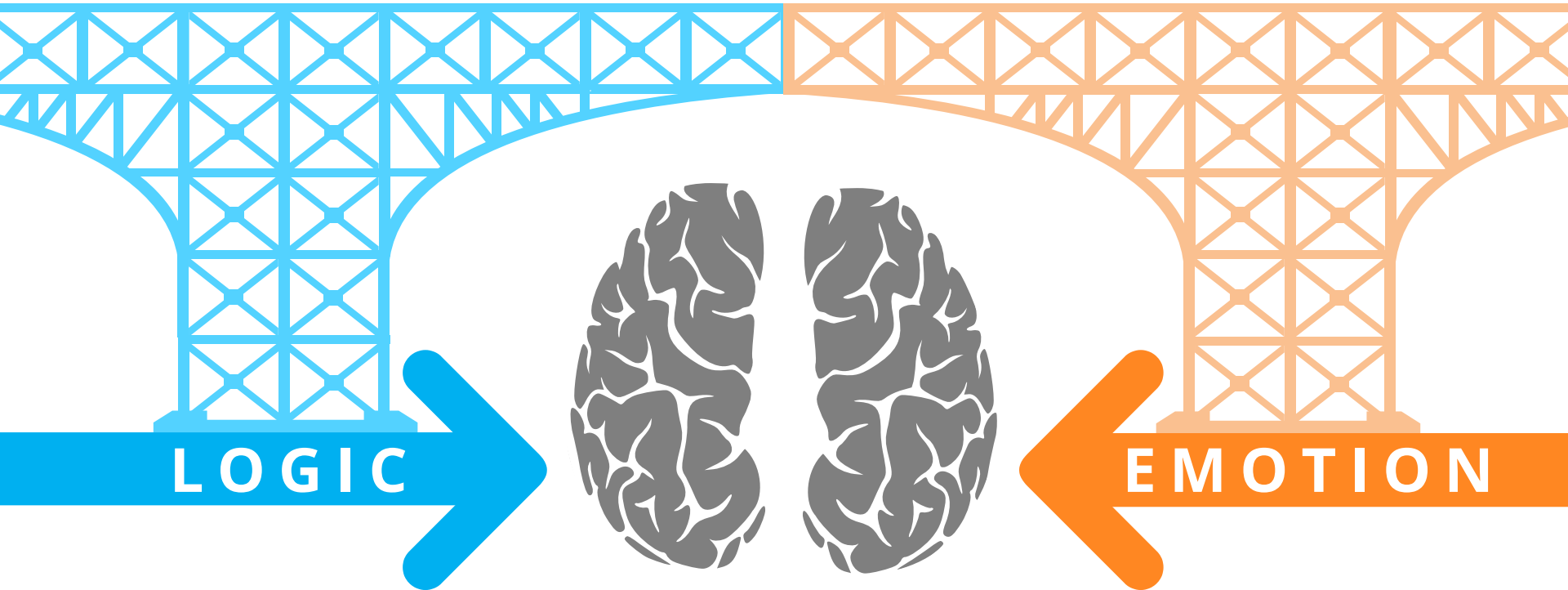
“The human mind is a **story processor**, not a logic processor.”

**Jonathan Haidt**  
American social psychologist



# Why Merge Data with Stories?

Data Story

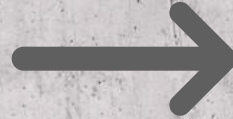


# Introduction to Data Storytelling

**Why?**



**What?**



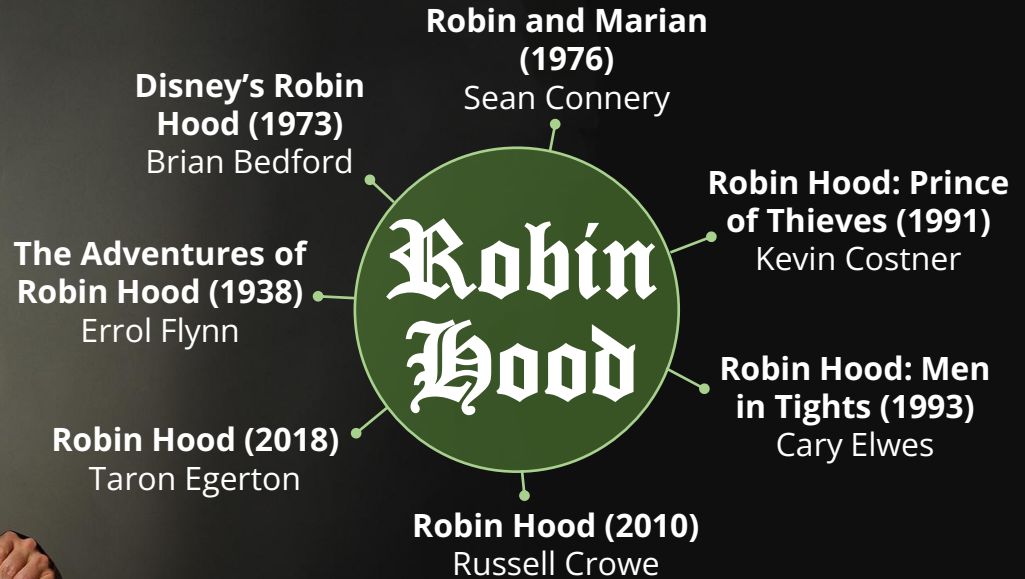
**How?**



# Narrative: The Structure of Your Data Story



# Match the Narrative to the Audience



Who is the **right audience** for my data story?

How do I **adjust my data story** to my audience?

# Message and Audience Alignment

“If the statistics are boring, you’ve got the **wrong numbers.**”

Edward Tufte  
Data viz expert



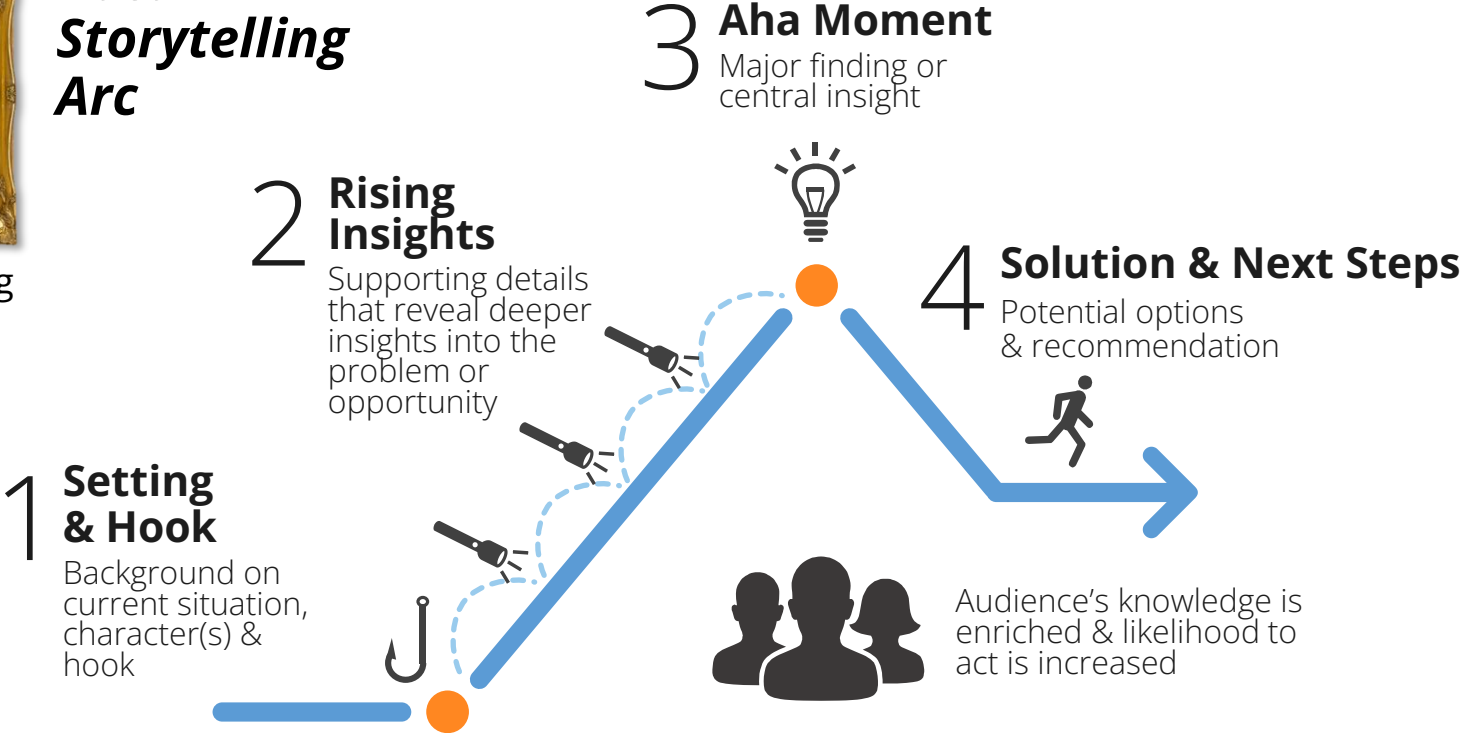
...or maybe the **wrong audience!**

# Turning Your Findings into a Story



Gustav Freytag  
(1816-1895)

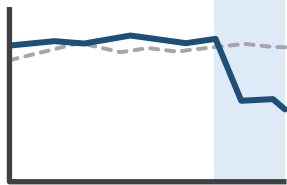
## Data Storytelling Arc



# Data Storytelling Arc in Action



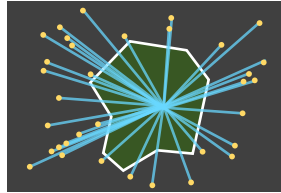
Setting & Hook



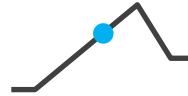
What is status quo? What unexpectedly changed?



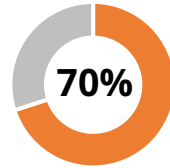
Rising Insight #1



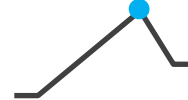
What influenced or contributed to the change?



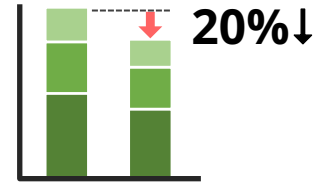
Rising Insight #2



What other supporting evidence is needed or helpful?



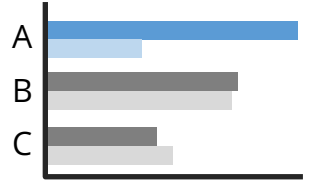
Aha Moment



What is the impact if nothing changes?



Solution & Next Steps



What are the options? What is the best course of action?



# Visuals: The Scenes of Your Data Story



# What Patterns Do You See?

1		2		3		4	
x1	y1	x2	y2	x3	y3	x4	y4
10	8.04	10	9.14	10	7.46	8	6.58
8	6.95	8	8.14	8	6.77	8	5.76
13	7.58	13	8.74	13	12.74	8	7.71
9	8.81	9	8.77	9	7.11	8	8.84
11	8.33	11	9.26	11	7.81	8	8.47
14	9.96	14	8.1	14	8.84	8	7.04
6	7.24	6	6.13	6	6.08	8	5.25
4	4.26	4	3.1	4	5.39	19	12.5
12	10.84	12	9.13	12	8.15	8	5.56
7	4.82	7	7.26	7	6.42	8	7.91
5	5.68	5	4.74	5	5.73	8	6.89

## Summary statistics

X mean = 9.0  
Y mean = 7.5

X variance = 11  
Y variance = 4.125

R = 0.816  
R<sup>2</sup> = 0.67



# Patterns You May Have Spotted

## Observation #1

1		2		3		4	
x1	y1	x2	y2	x3	y3	x4	y4
10	8.04	10	9.14	10	7.46	8	6.58
8	6.95	8	8.14	8	6.77	8	5.76
13	7.58	13	8.74	13	12.74	8	7.71
9	8.81	9	8.77	9	7.11	8	8.84
11	8.33	11	9.26	11	7.81	8	8.47
14	9.96	14	8.1	14	8.84	8	7.04
6	7.24	6	6.13	6	6.08	8	5.25
4	4.26	4	3.1	4	5.39	19	12.5
12	10.84	12	9.13	12	8.15	8	5.56
7	4.82	7	7.26	7	6.42	8	7.91
5	5.68	5	4.74	5	5.73	8	6.89

A lot of 8's in this column

## Observation #2

1		2		3		4	
x1	y1	x2	y2	x3	y3	x4	y4
10	8.04	10	9.14	10	7.46	8	6.58
8	6.95	8	8.14	8	6.77	8	5.76
13	7.58	13	8.74	13	12.74	8	7.71
9	8.81	9	8.77	9	7.11	8	8.84
11	8.33	11	9.26	11	7.81	8	8.47
14	9.96	14	8.1	14	8.84	8	7.04
6	7.24	6	6.13	6	6.08	8	5.25
4	4.26	4	3.1	4	5.39	19	12.5
12	10.84	12	9.13	12	8.15	8	5.56
7	4.82	7	7.26	7	6.42	8	7.91
5	5.68	5	4.74	5	5.73	8	6.89

First three X columns have the same numbers

## Observation #3

1		2		3		4	
x1	y1	x2	y2	x3	y3	x4	y4
10	8.04	10	9.14	10	7.46	8	6.58
8	6.95	8	8.14	8	6.77	8	5.76
13	7.58	13	8.74	13	12.74	8	7.71
9	8.81	9	8.77	9	7.11	8	8.84
11	8.33	11	9.26	11	7.81	8	8.47
14	9.96	14	8.1	14	8.84	8	7.04
6	7.24	6	6.13	6	6.08	8	5.25
4	4.26	4	3.1	4	5.39	19	12.5
12	10.84	12	9.13	12	8.15	8	5.56
7	4.82	7	7.26	7	6.42	8	7.91
5	5.68	5	4.74	5	5.73	8	6.89

X columns contain whole numbers, and Y columns have decimals.



# Anscombe's Quartet In Action

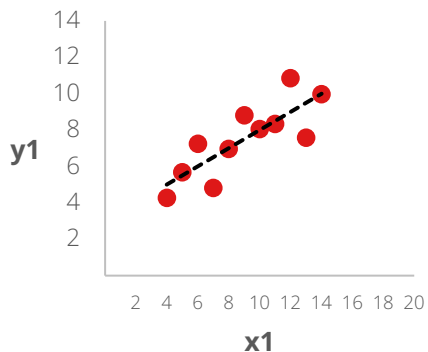
**Francis Anscombe**  
Statistician  
(1918-2001)



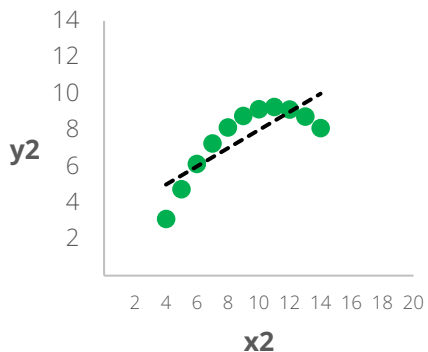
“Numerical calculations are exact, but graphs are rough.”



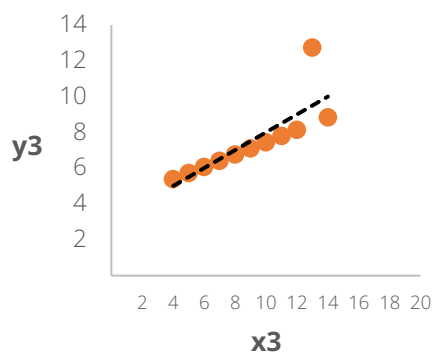
1



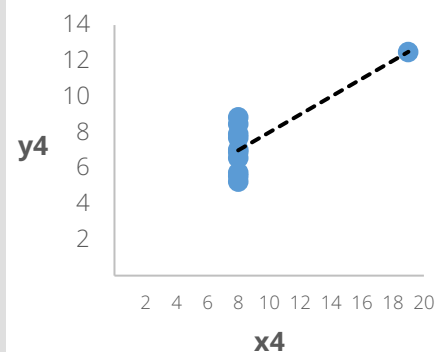
2



3



4



# Enabling Smart Comparisons

*“We’re always trying to answer the question ‘Compared with what?’ . . . **It always comes down to making and showing smart comparisons.**”*



**Edward Tufte**  
Data Visualization Expert



# Visual Comparison: Color

**GREEN**



**RED**



# Visual Comparison: Size

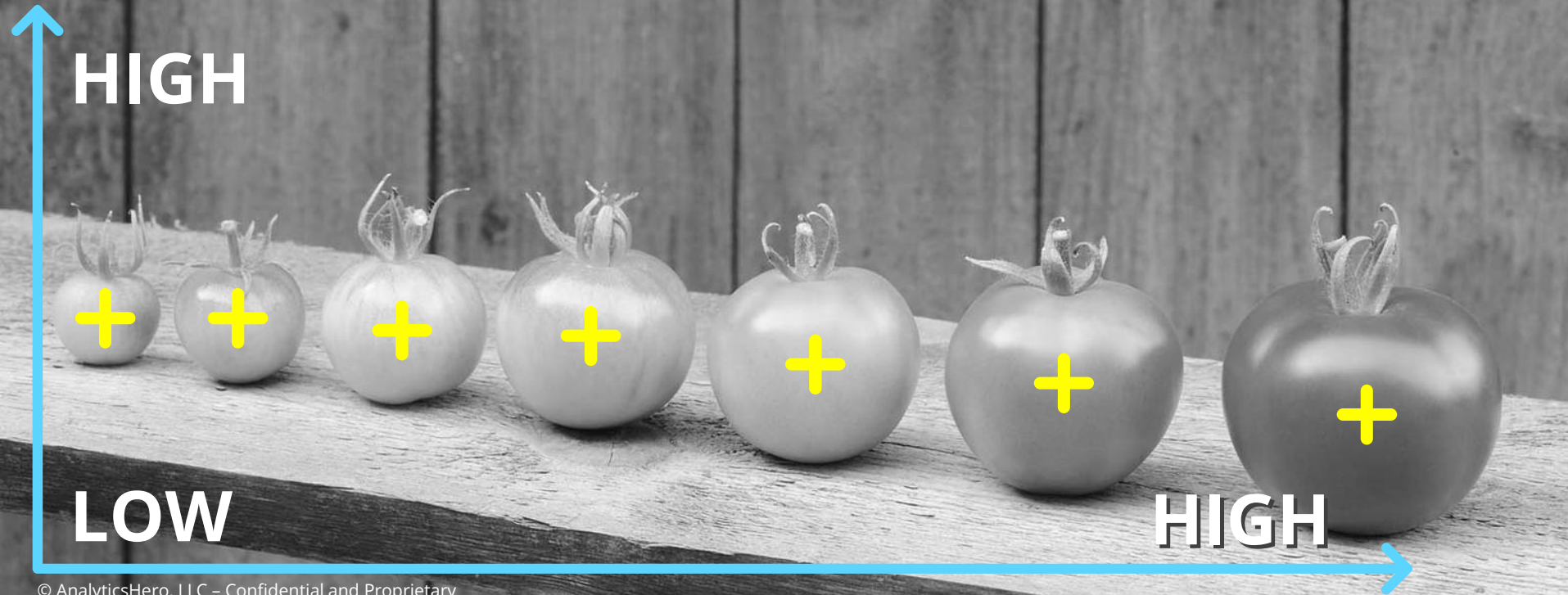
**SMALL**



**LARGE**



# Visual Comparison: Position



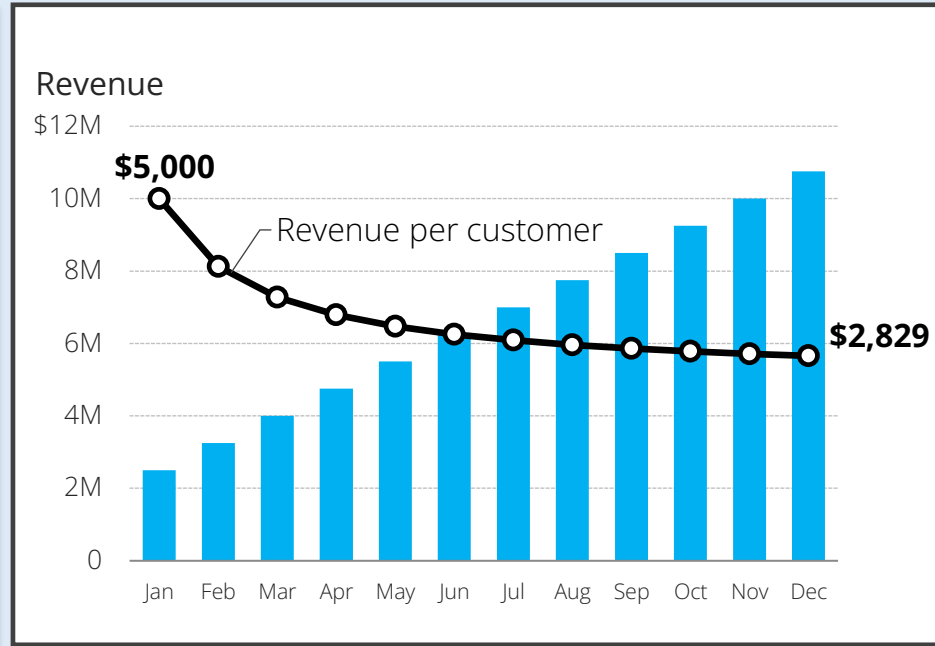
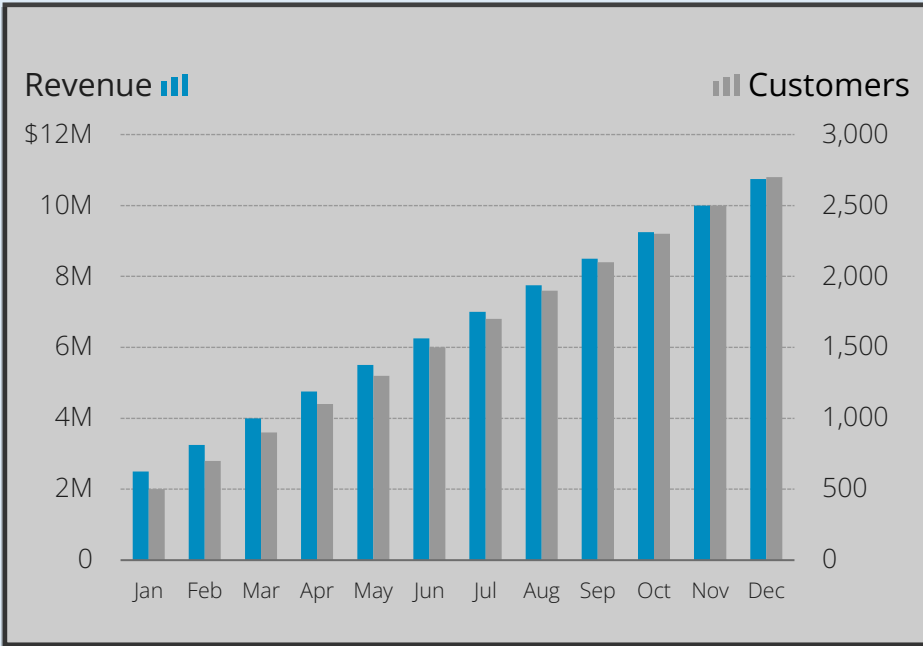


# 5 Steps for Better Visual Storytelling

1 Identify the right data

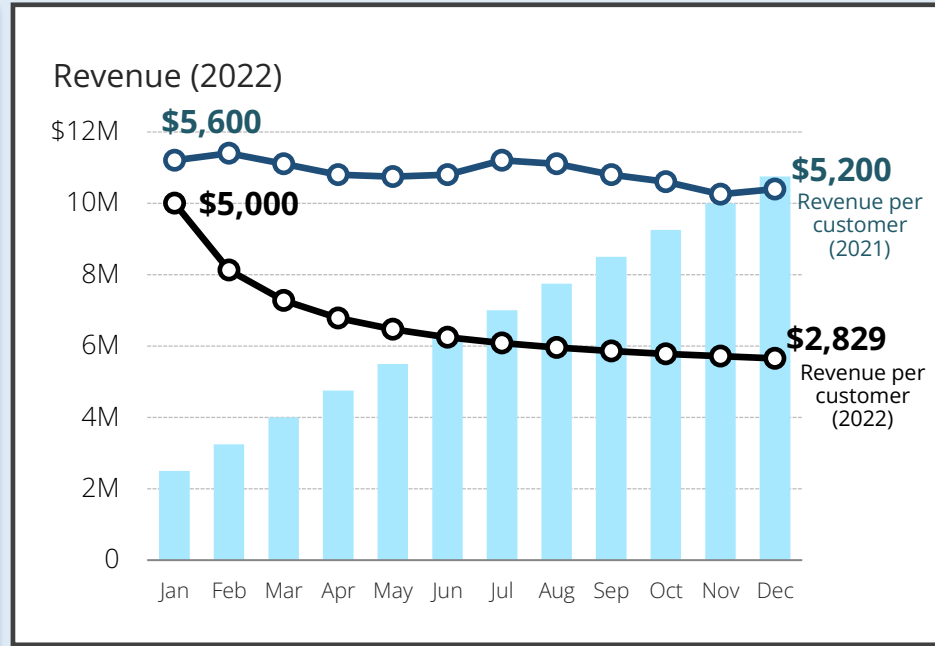
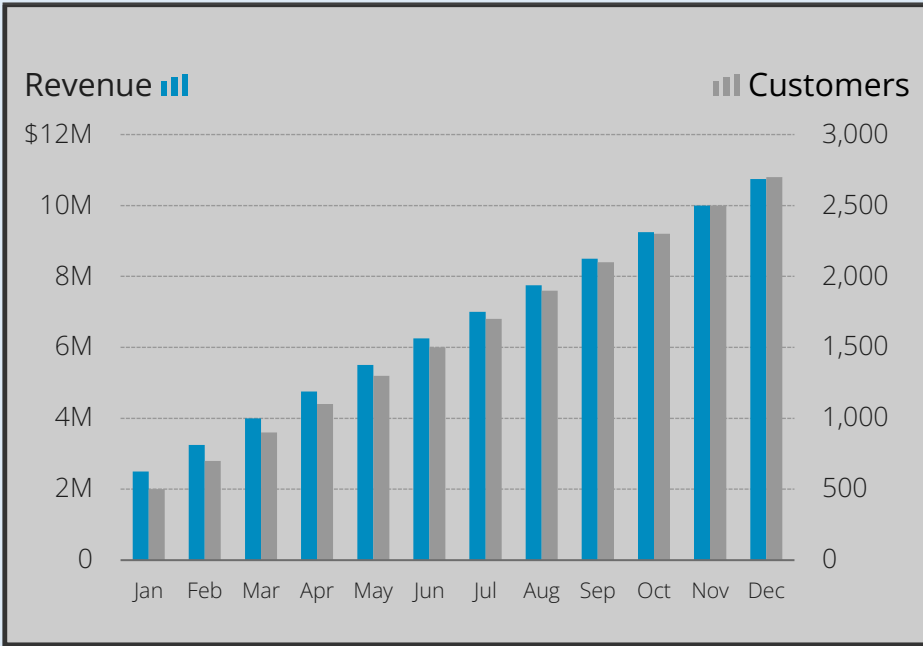
# Identify Right Data for Your Data Story

**Calculated metrics** may be more insightful than total values.



# Identify Right Data for Your Data Story

**Contextual data** may make your visual more insightful.

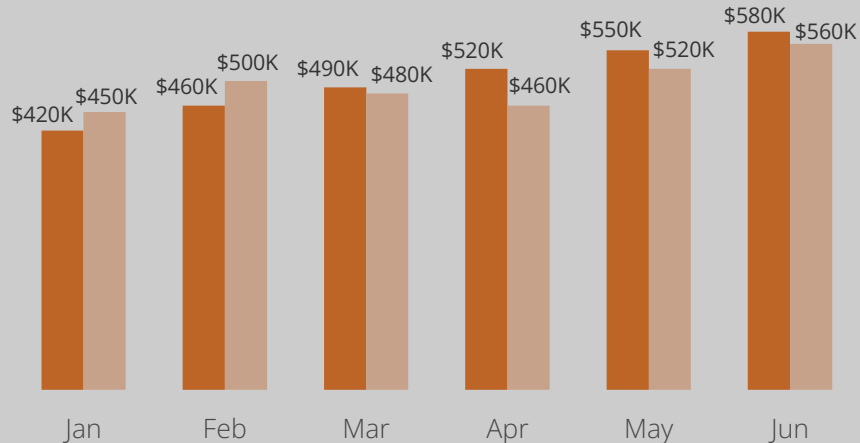


# Identify Right Data for Your Data Story

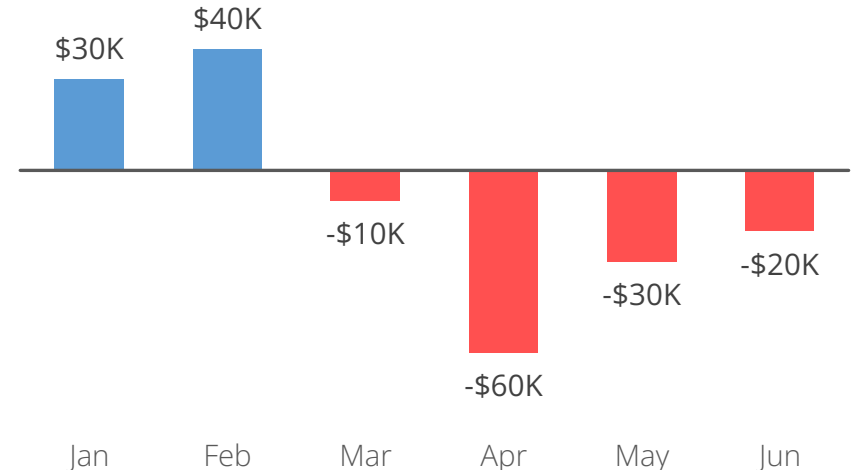
**Showing the difference** may make your data easier for the audience to process.

## Cost Performance

Actuals Budget



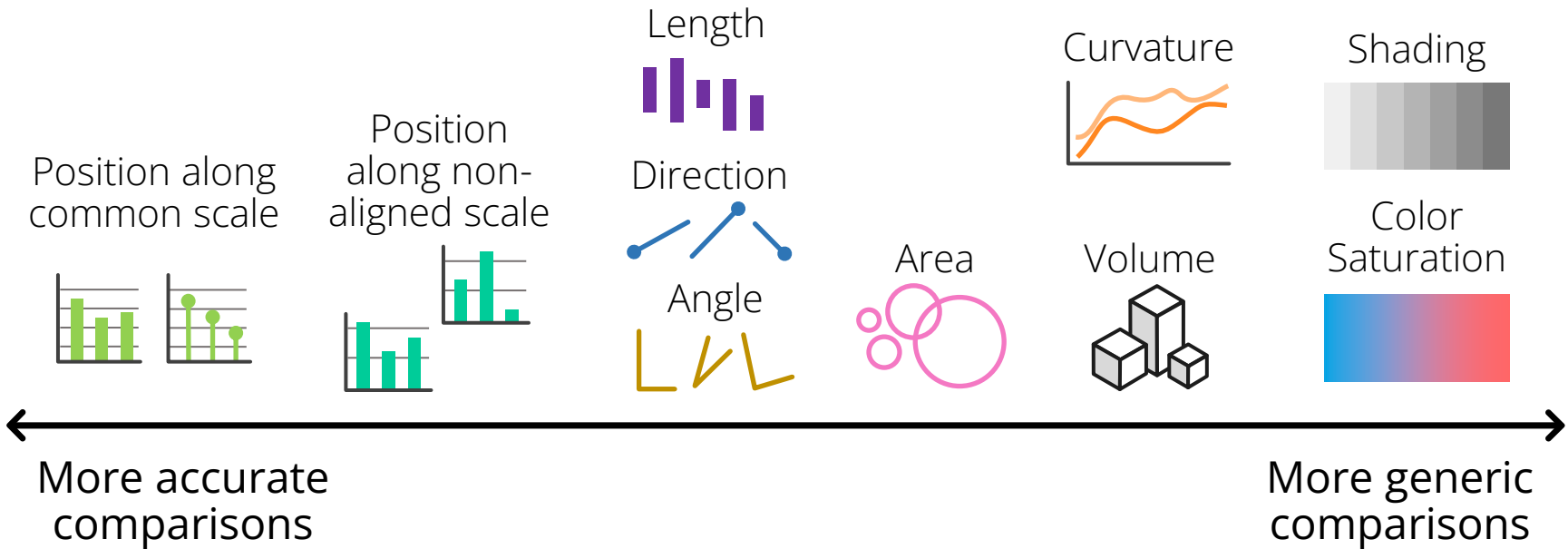
## Cost Actuals to Budget Difference



# 5 Steps for Better Visual Storytelling

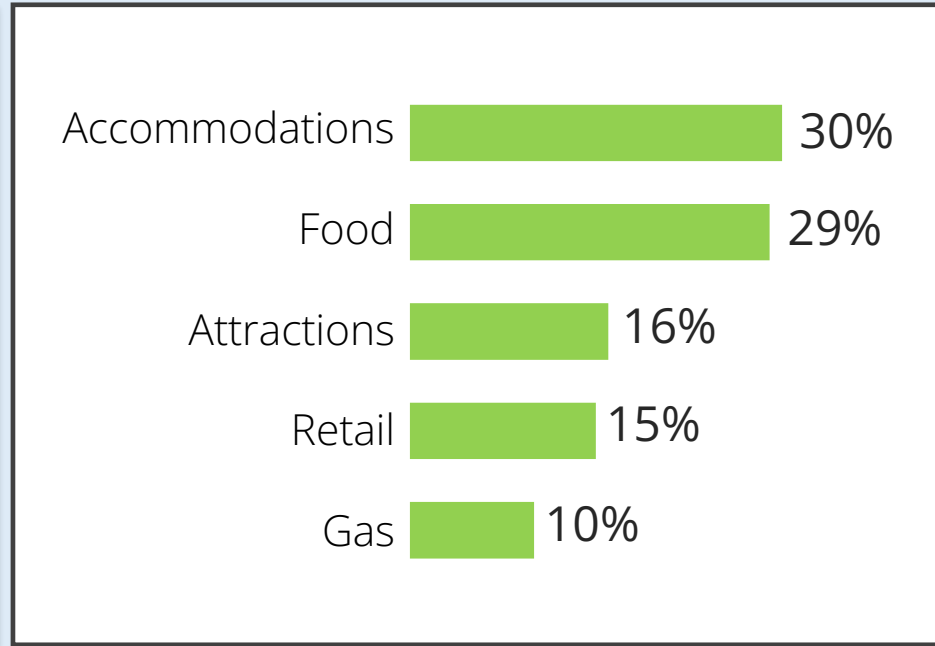
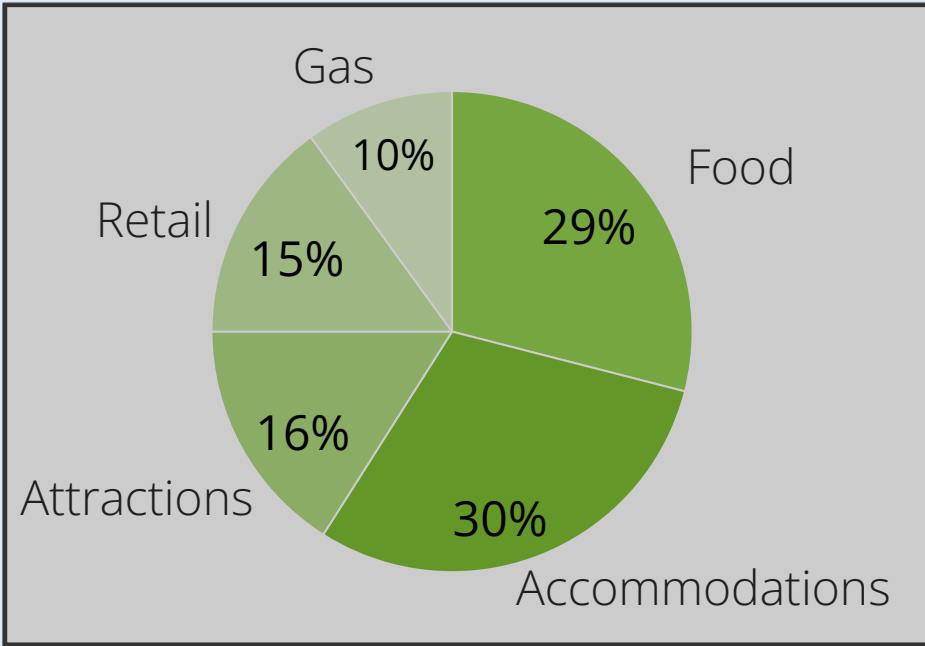
- 1 Identify the right data
- 2 Choose the right visualizations

# Graphical Methods Vary in Effectiveness



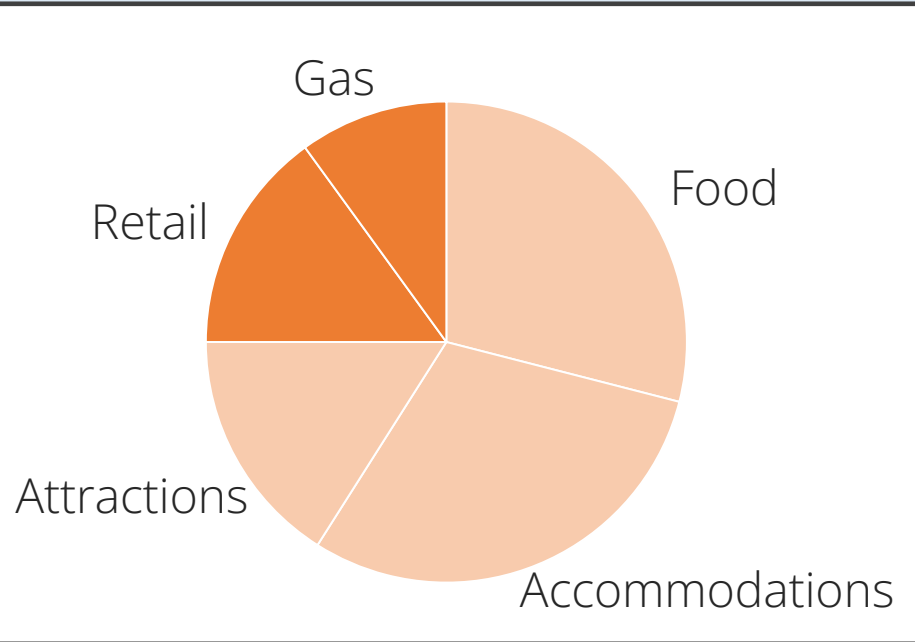
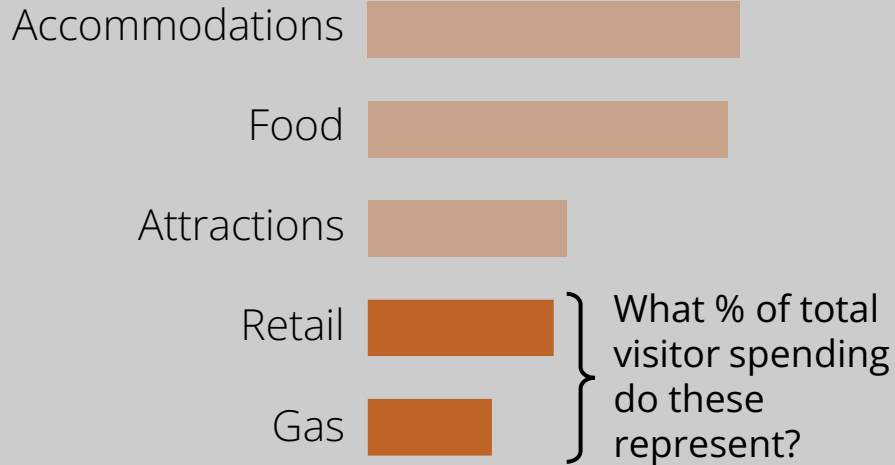
# All Charts Are Not Created Equal

**Bar charts** don't necessarily need value labels to convey differences.



# Charts Can Fit Different Purposes

**Pie charts** can be used to convey certain percentages very clearly.



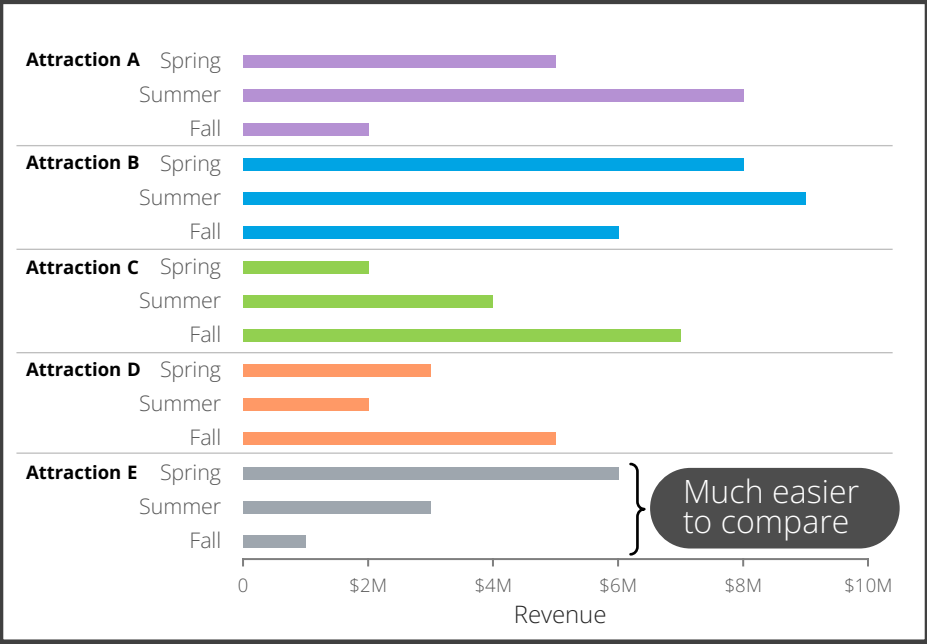
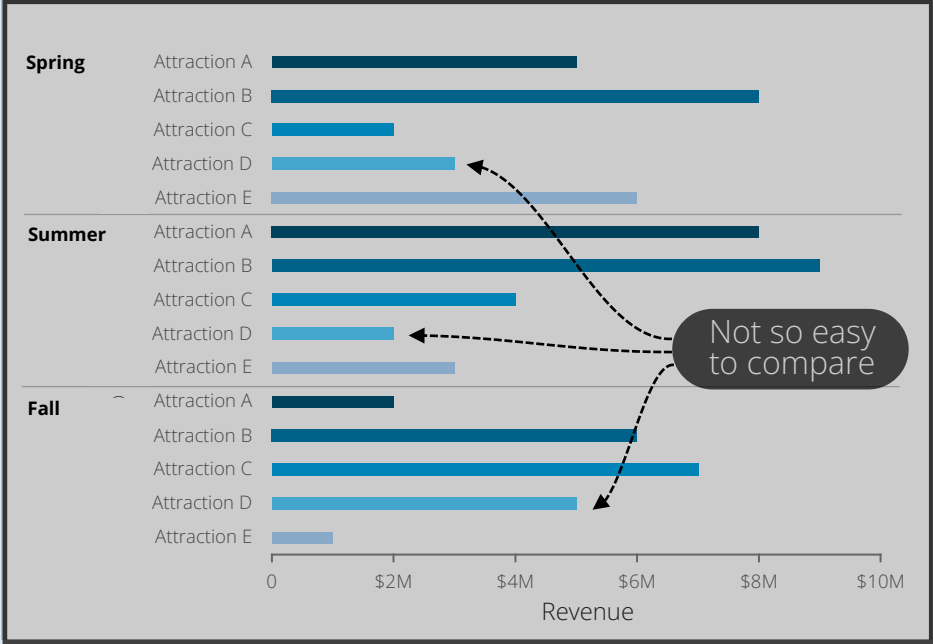


# 5 Steps for Better Visual Storytelling

- 1 Identify the right data
- 2 Choose the right visualizations
- 3 Calibrate visuals to your message

# Anticipate Your Audience's Comparison Needs

Changing the orientation of a chart can make it easier to compare key values.

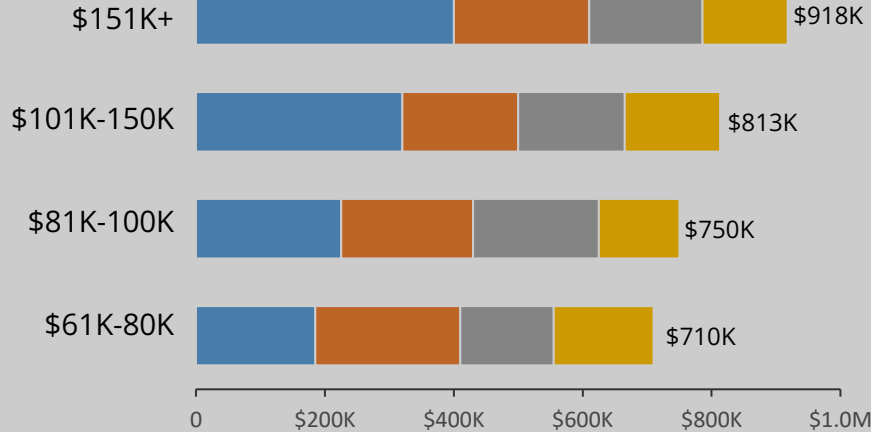


# Anticipate Your Audience's Comparison Needs

**Panel bar charts** offer each category its own baseline for easier visual inspection.

**HHI**

Accommodations Attractions Food Retail



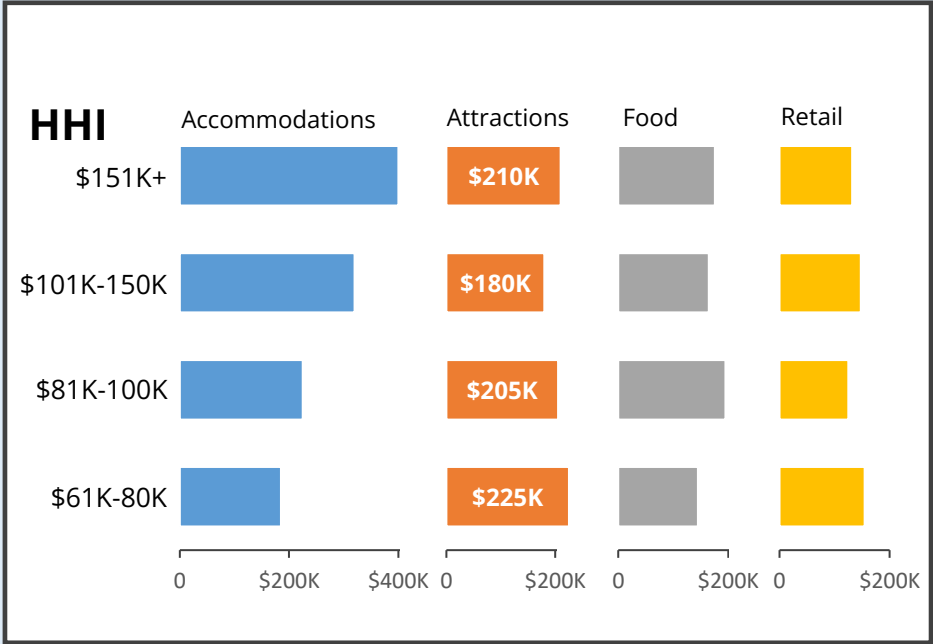
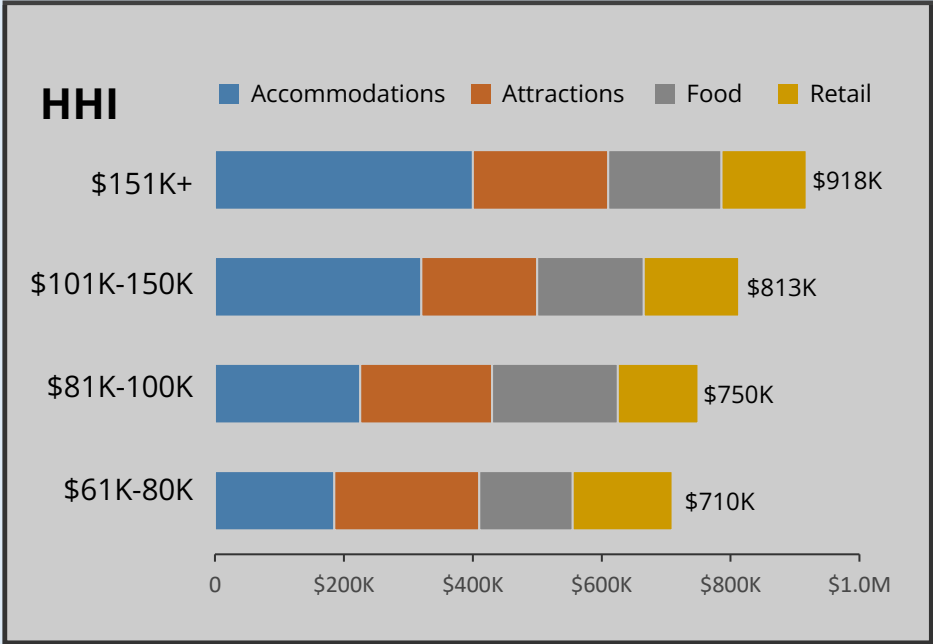
**HHI**

Accommodations Attractions Food Retail



# Anticipate Your Audience's Comparison Needs

**Panel bar charts** offer each category its own baseline for easier visual inspection.

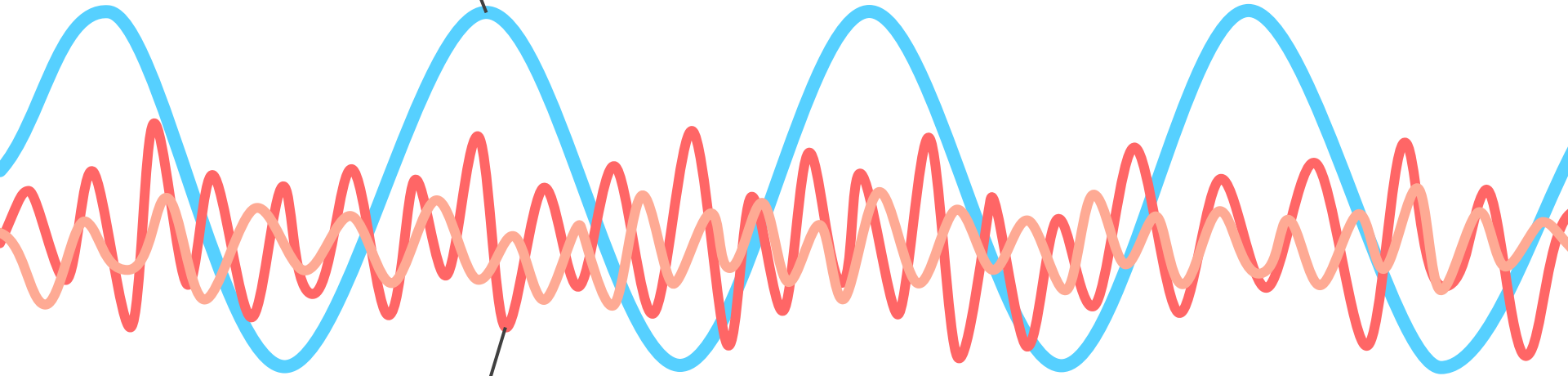


# 5 Steps for Better Visual Storytelling

- 1 Identify the right data
- 2 Choose the right visualizations
- 3 Calibrate visuals to your message
- 4 Remove unnecessary noise

# Strengthen Signal by Removing Noise

**Signal**



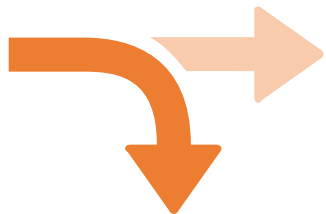
**Noise**



# 4 Ways to Reduce the Noise in Your Visuals

1

Remove  
Surplus Data



2

Aggregate Less  
Important Data



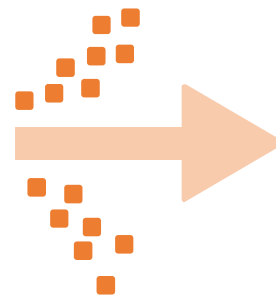
3

Separate Data  
Layers



4

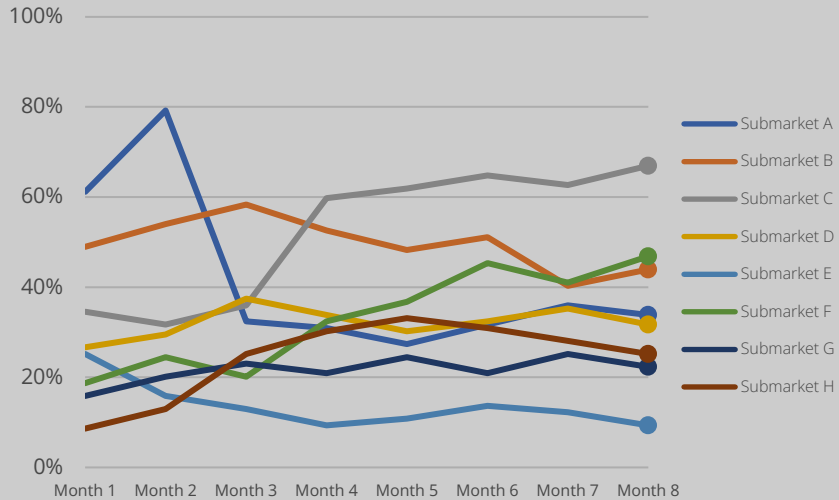
Remove  
Chartjunk



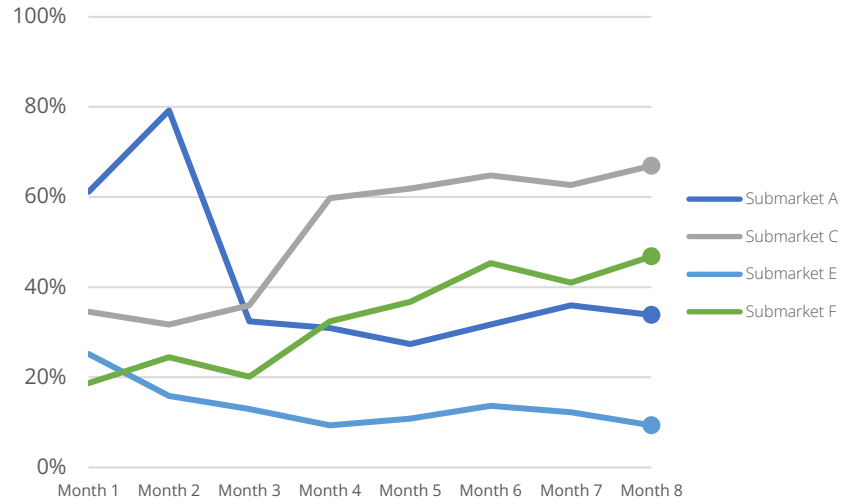
# Remove Surplus Data that Isn't Needed

Ask yourself **what is essential** to making your point. Remove what's unnecessary.

## Hotel Occupancy by Submarkets



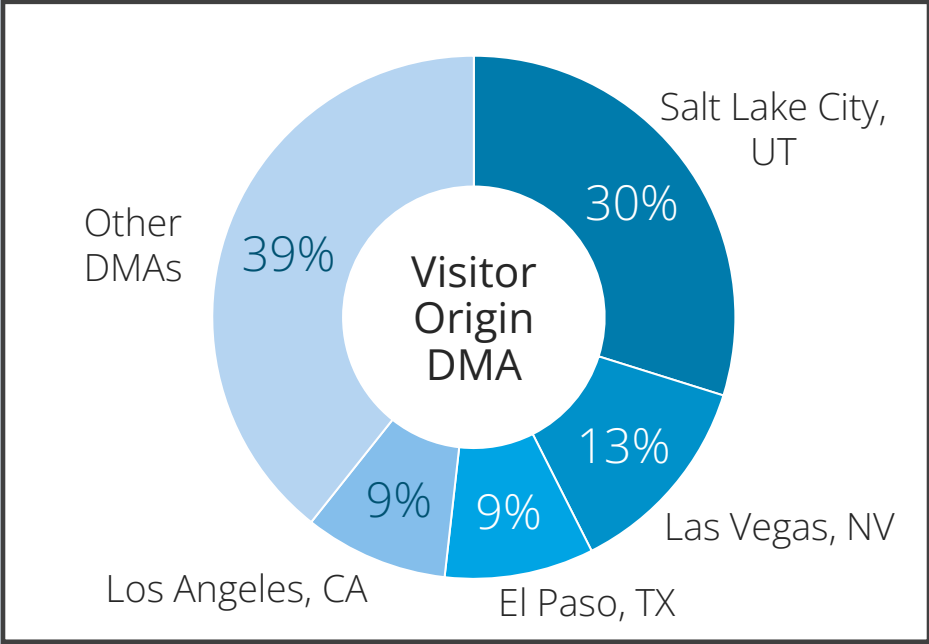
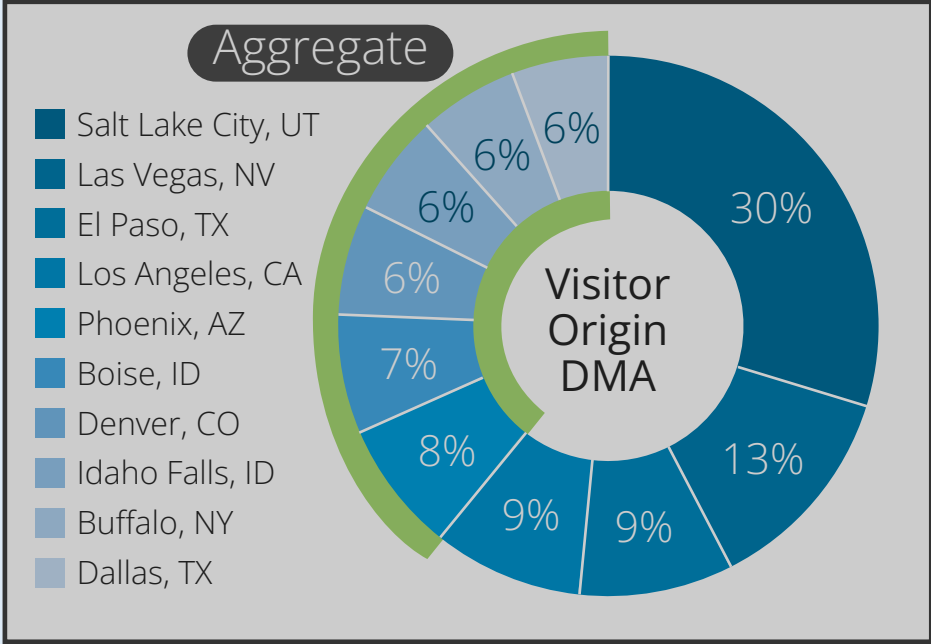
## Hotel Occupancy by Submarkets





# Aggregate Less Important Information

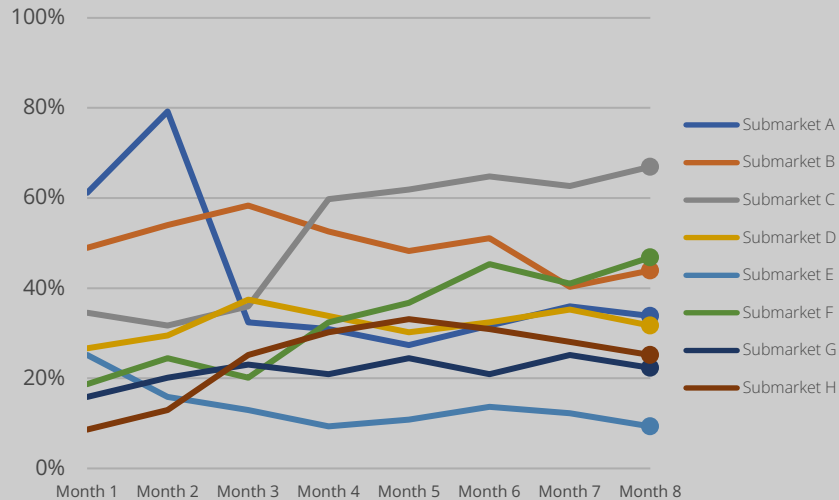
To simplify charts, you can **aggregate less critical data** to reduce the cognitive load.



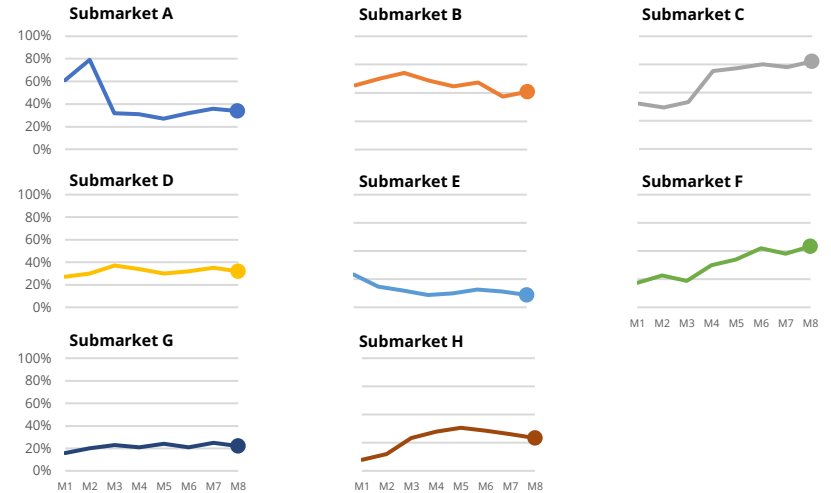
# Separate Data Layers

To reduce noise, you can **break apart data series** into separate charts.

## Hotel Occupancy by Submarkets



## Hotel Occupancy by Submarkets

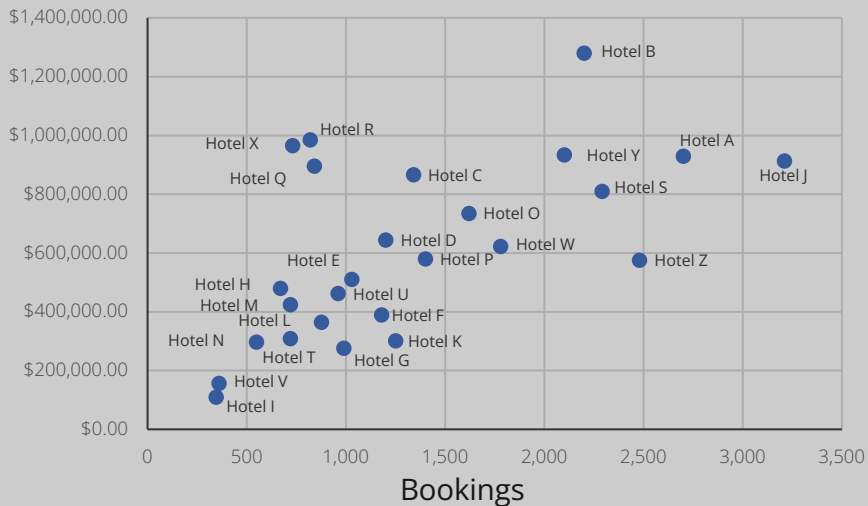


# Remove the Chartjunk

**Remove non-essential chart elements** to help the data communicate more clearly.

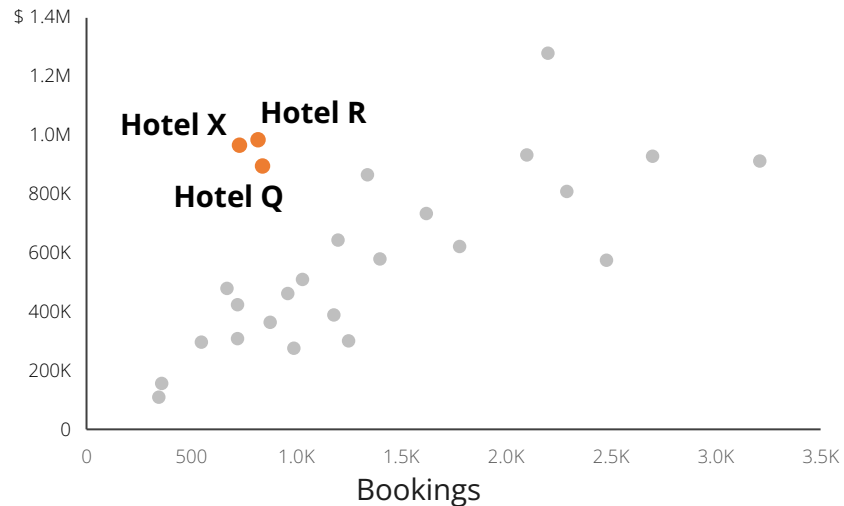
## Hotel Bookings in April

Revenue



## Hotel Bookings in April

Revenue



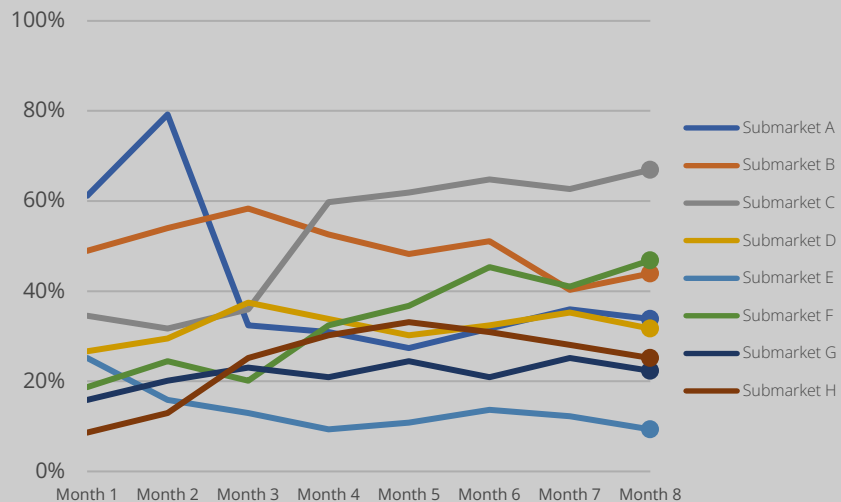
# 5 Steps for Better Visual Storytelling

- 1 Identify the right data
- 2 Choose the right visualizations
- 3 Calibrate visuals to your message
- 4 Remove unnecessary noise
- 5 Focus attention on what's important

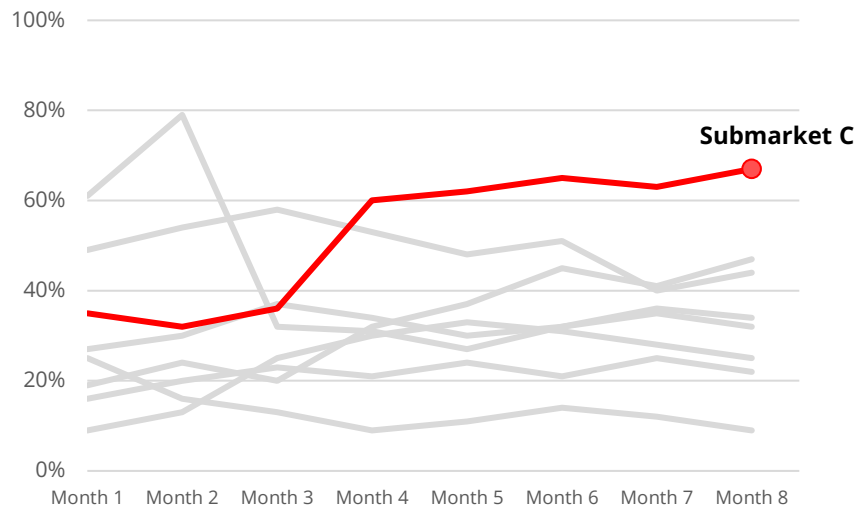
# Highlight What Matters with Color

Use **color and grayscale** to draw attention while still providing context.

Hotel Occupancy by Submarkets



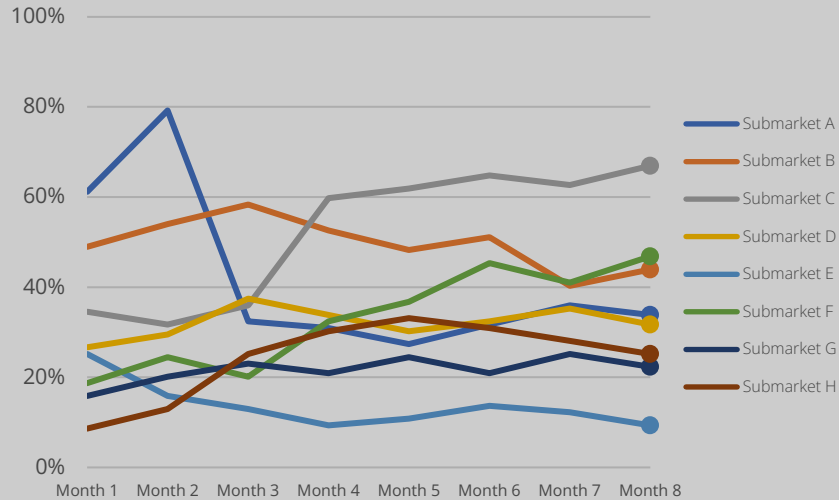
Hotel Occupancy by Submarkets



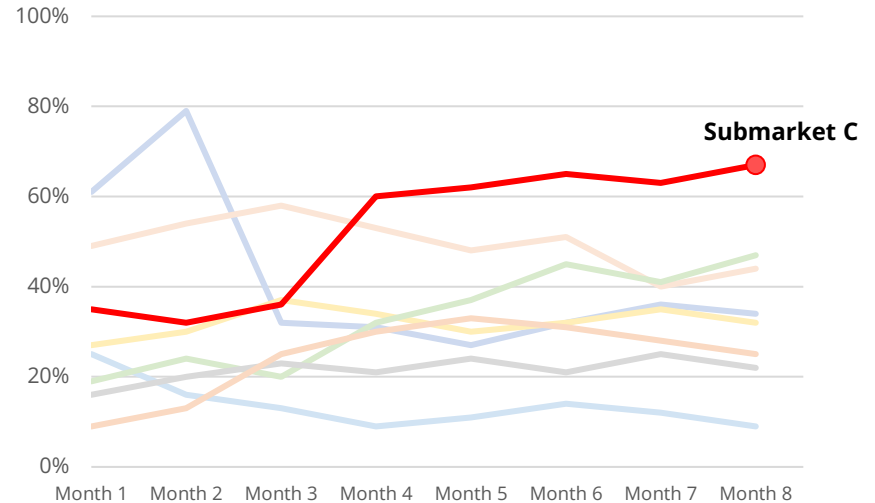
# Highlight What Matters with Color

Use a **bold color with light colors** to draw attention while still providing context.

Hotel Occupancy by Submarkets



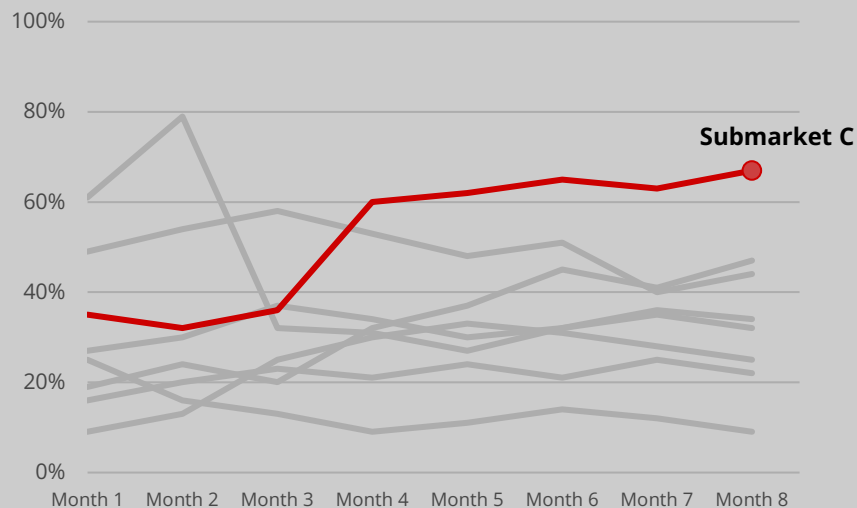
Hotel Occupancy by Submarkets



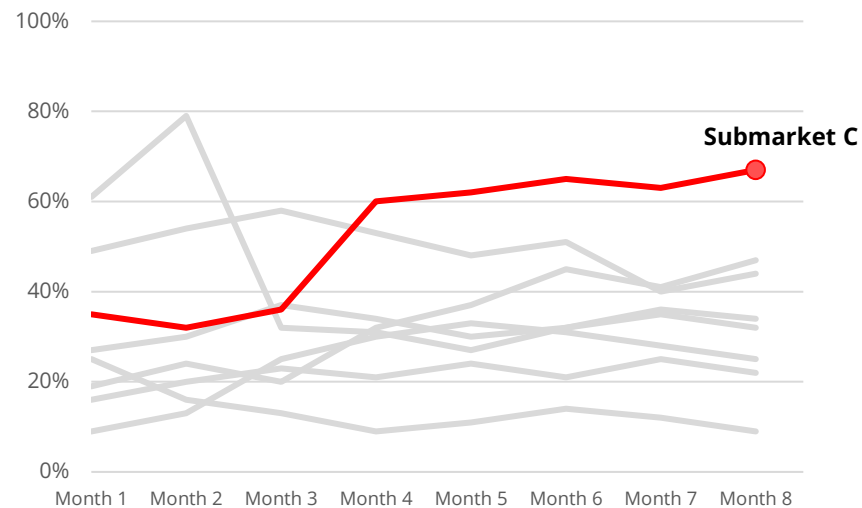
# Highlight What Matters with Text

Text can be used to **steer attention** to what's most important in a chart.

Hotel Occupancy by Submarkets



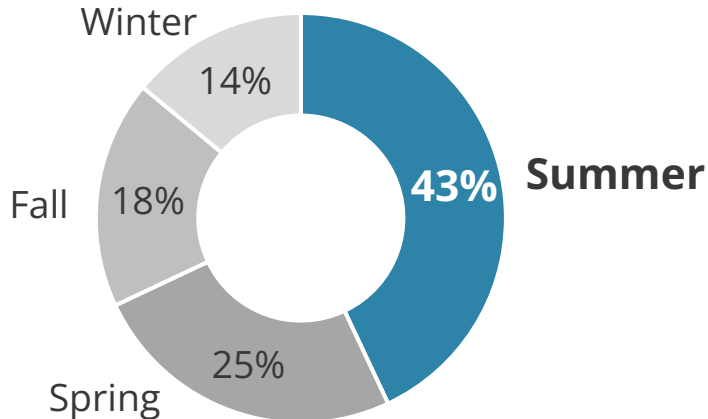
Submarket C: Occupancy increased 94% over the past 8 months



# Highlight What Matters with Images

Use **quality stock photos** to humanize your numbers and engage the audience.

**Charlotte visitors: 43%** visited during the Summer months



**43%**  
of visitors  
from Charlotte  
visit in the  
summer

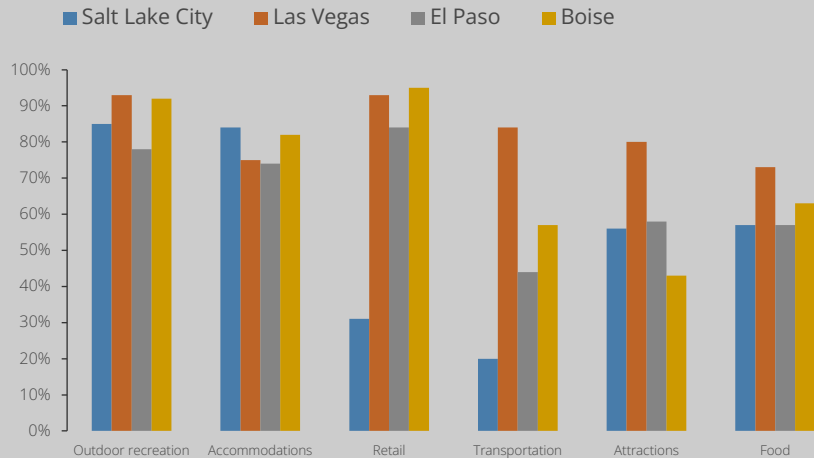




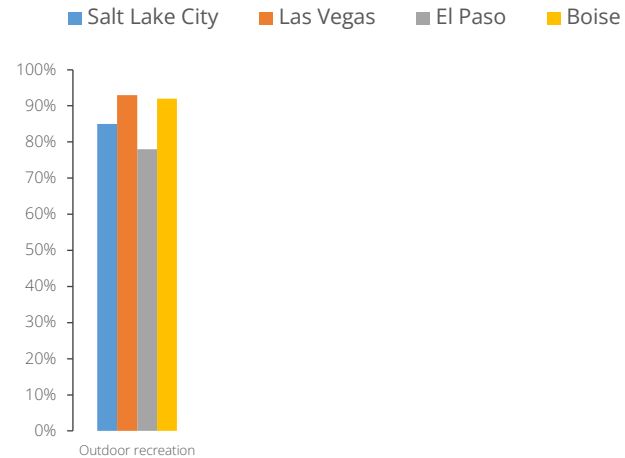
# Use Content Staging to Reveal Insights

**Break up complex charts** into digestible chunks that are easier to process.

**% of Visitors Observed at POI Category by Origin Market**  
Opportunity to promote transportation packages to SLC visitors



**% of Visitors Observed at POI Category by Origin Market**  
Opportunity to promote transportation packages to SLC visitors

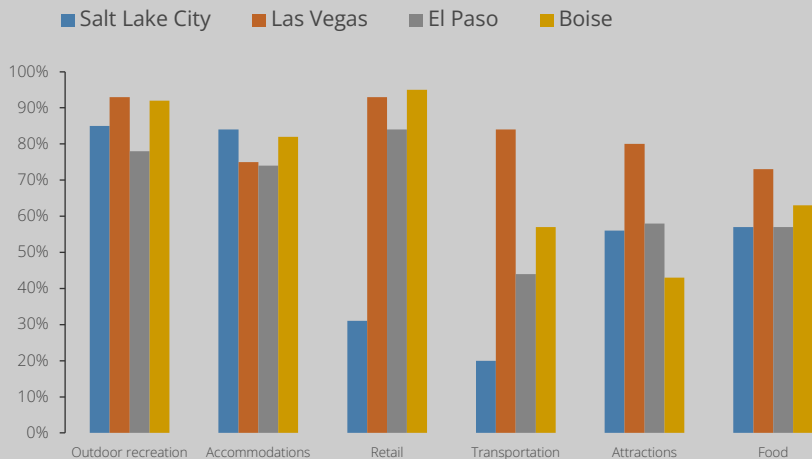


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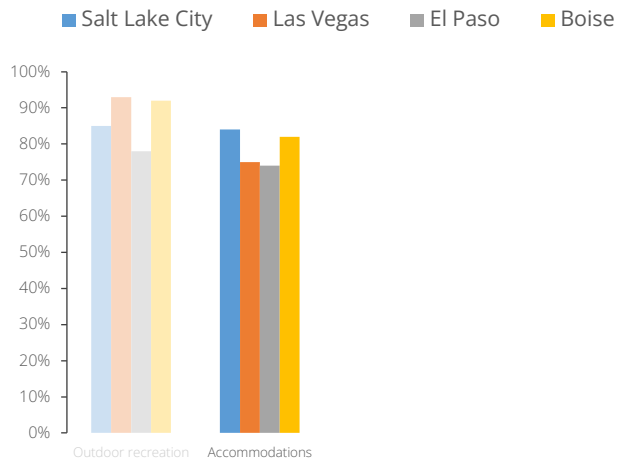
## % of Visitors Observed at POI Category by Origin Market

Opportunity to promote transportation packages to SLC visitors



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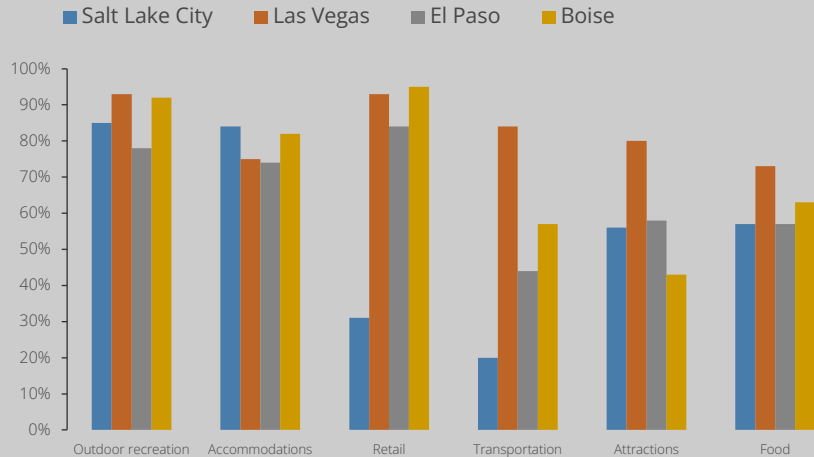
Opportunity to promote transportation packages to SLC visitors



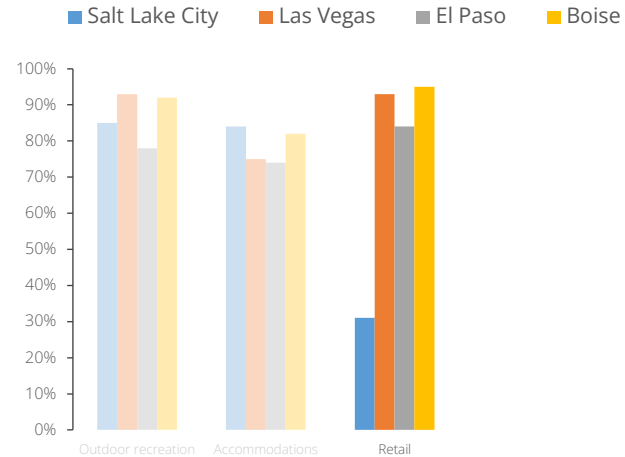
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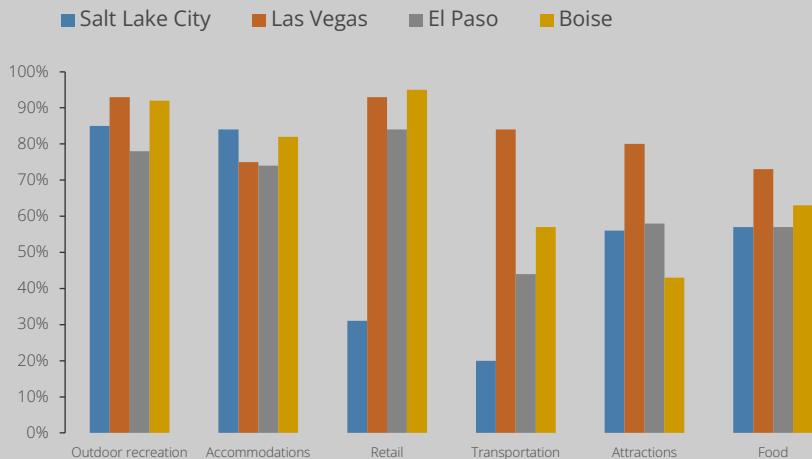


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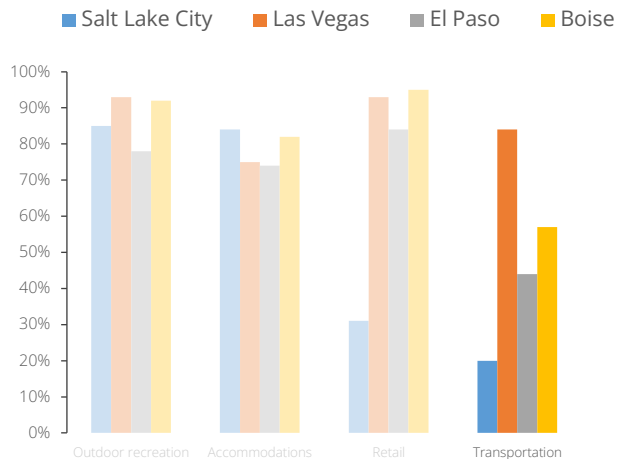
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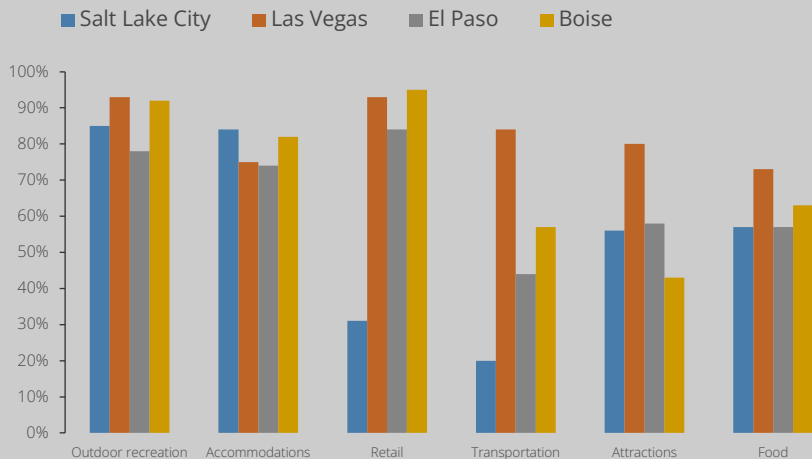


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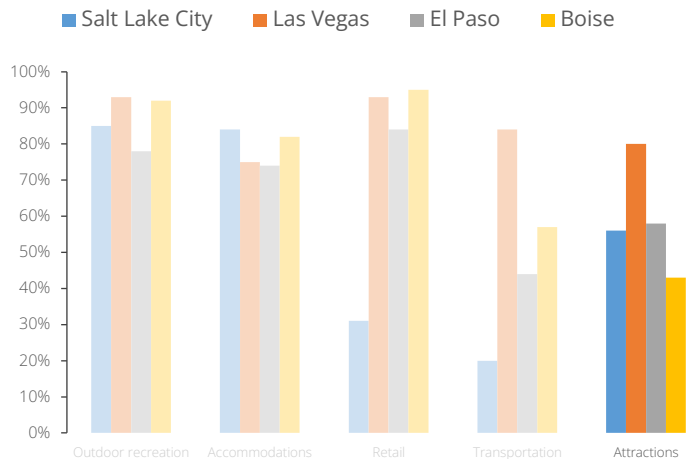
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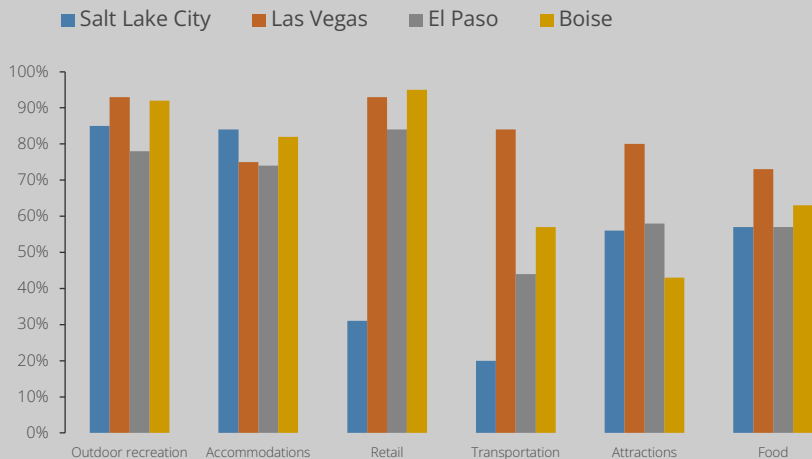


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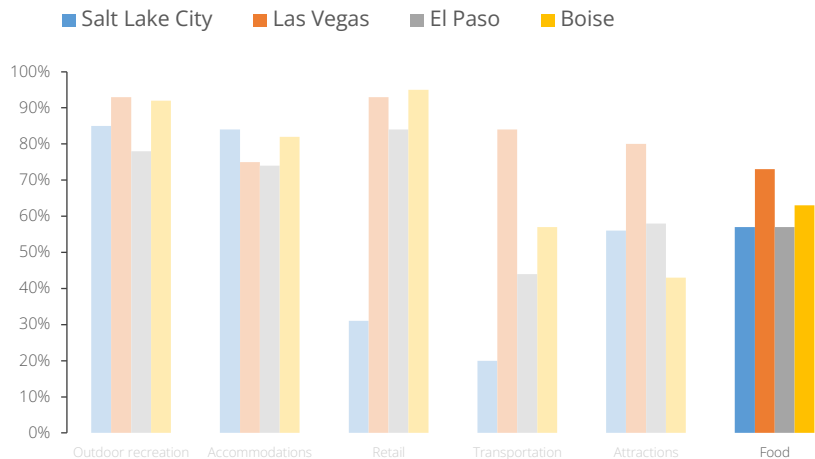
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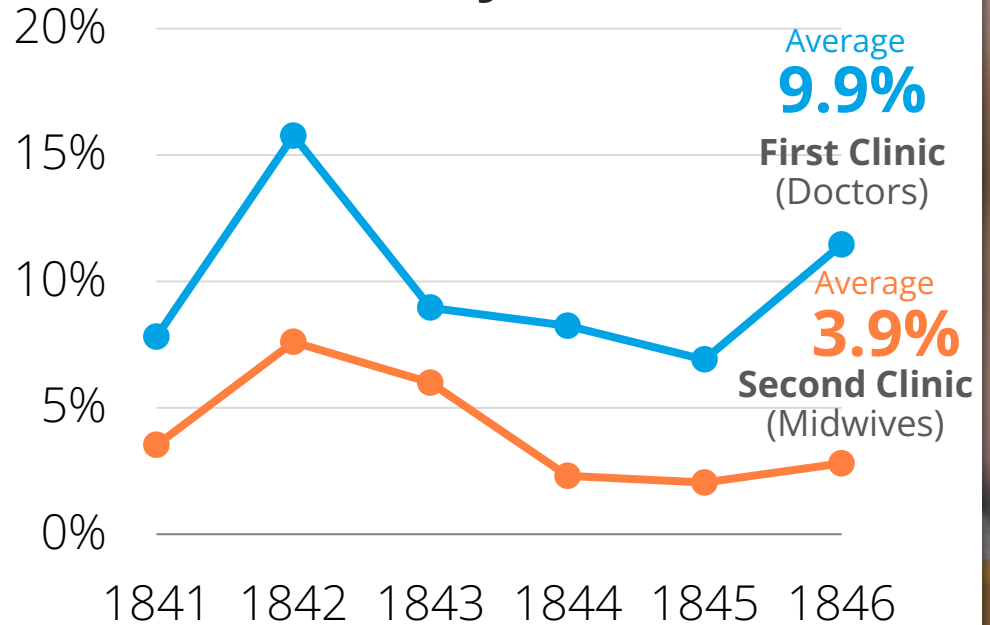
Opportunity to promote transportation packages to SLC visitors





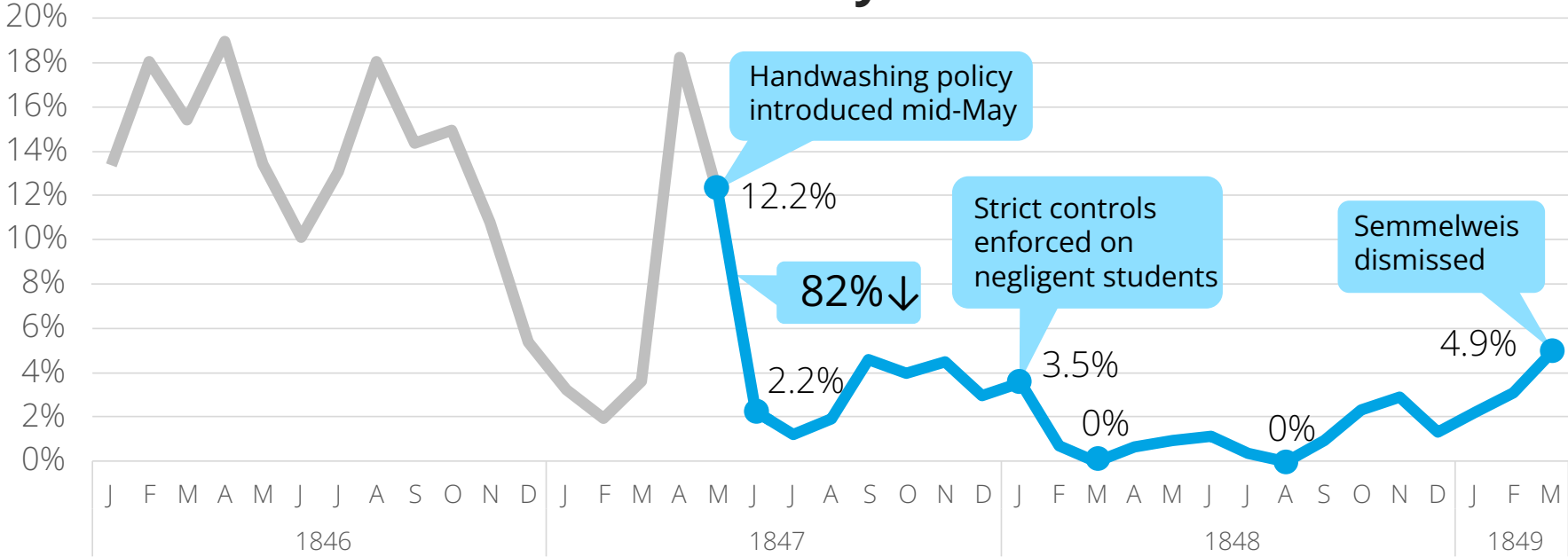
**Ignaz Semmelweis**  
"Savior of Mothers"  
1818-1865

## Childbed Fever Mortality Rates



# Semmelweis's Impact on Mortality Rates

## Childbed Fever Mortality Rates in Clinic #1





# Why Wasn't Semmelweis Successful?



**Ignaz Semmelweis**  
"Savior of Mothers"  
1818-1865



**Accurate**



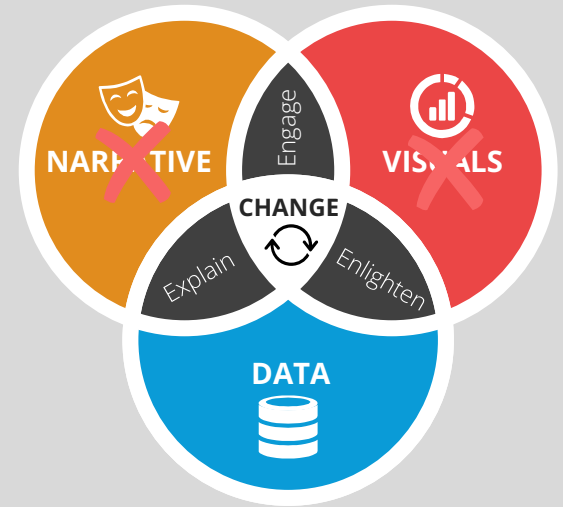
**Valuable**



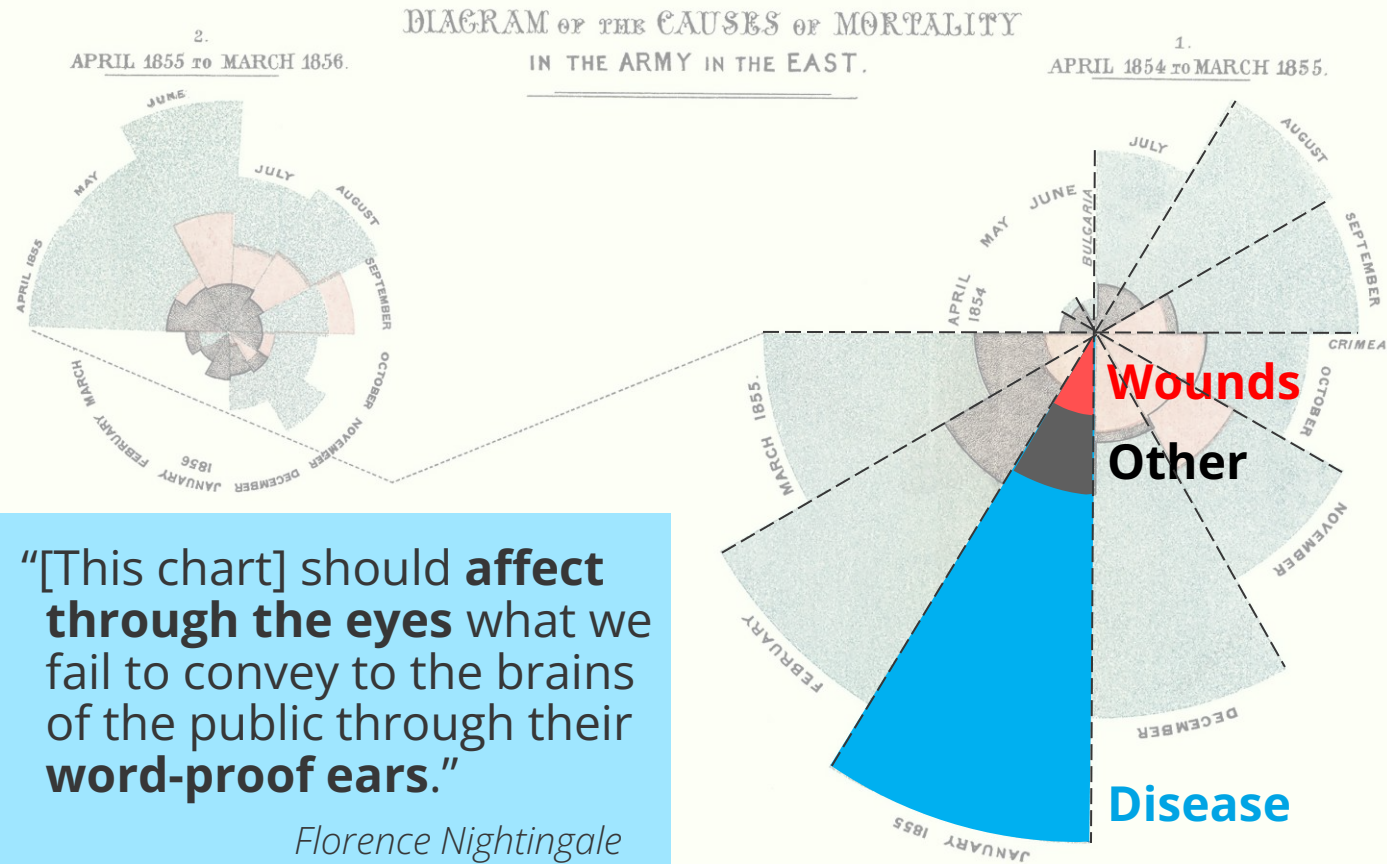
**Actionable**



**Adopted**



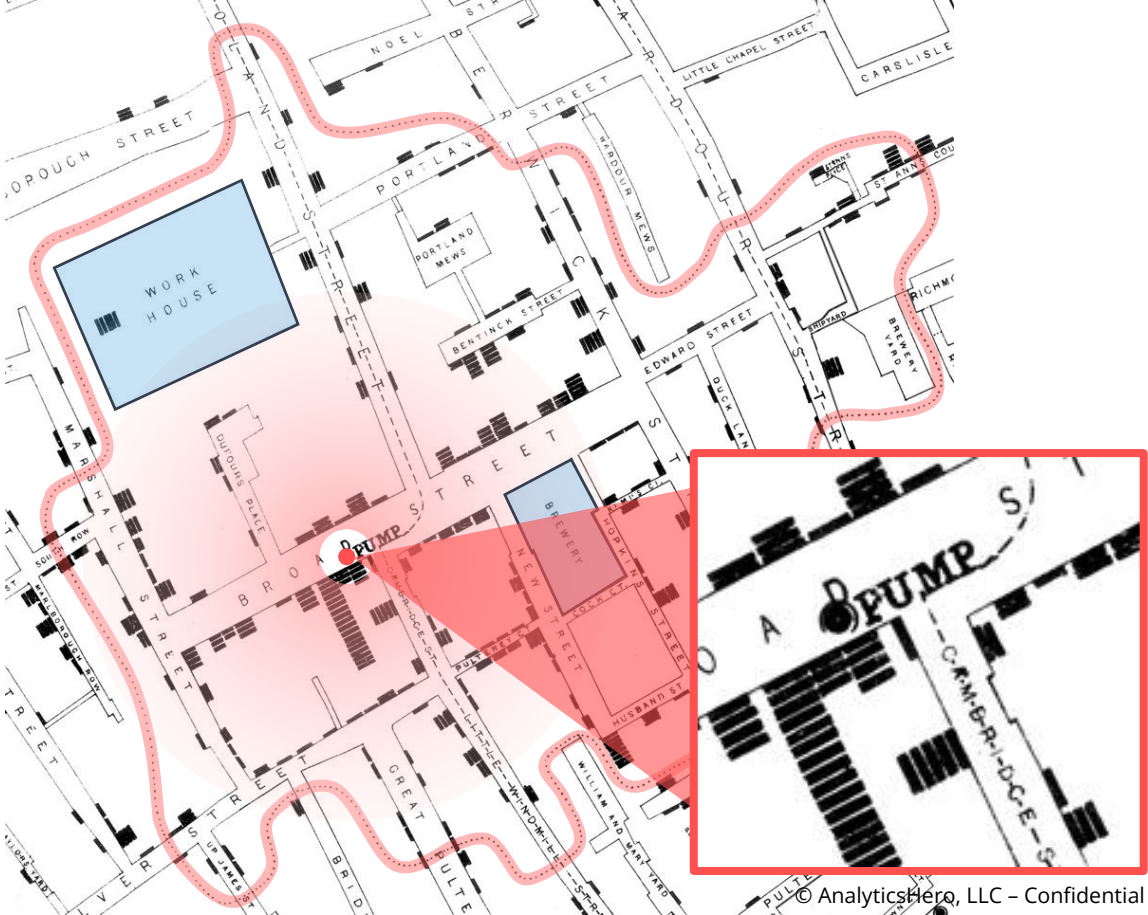
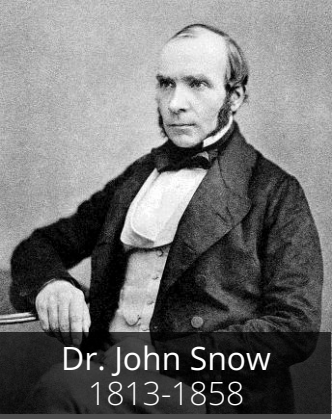
# Nightingale: Reducing Army Mortality Rates



"[This chart] should **affect through the eyes** what we fail to convey to the brains of the public through their **word-proof ears.**"

*Florence Nightingale*

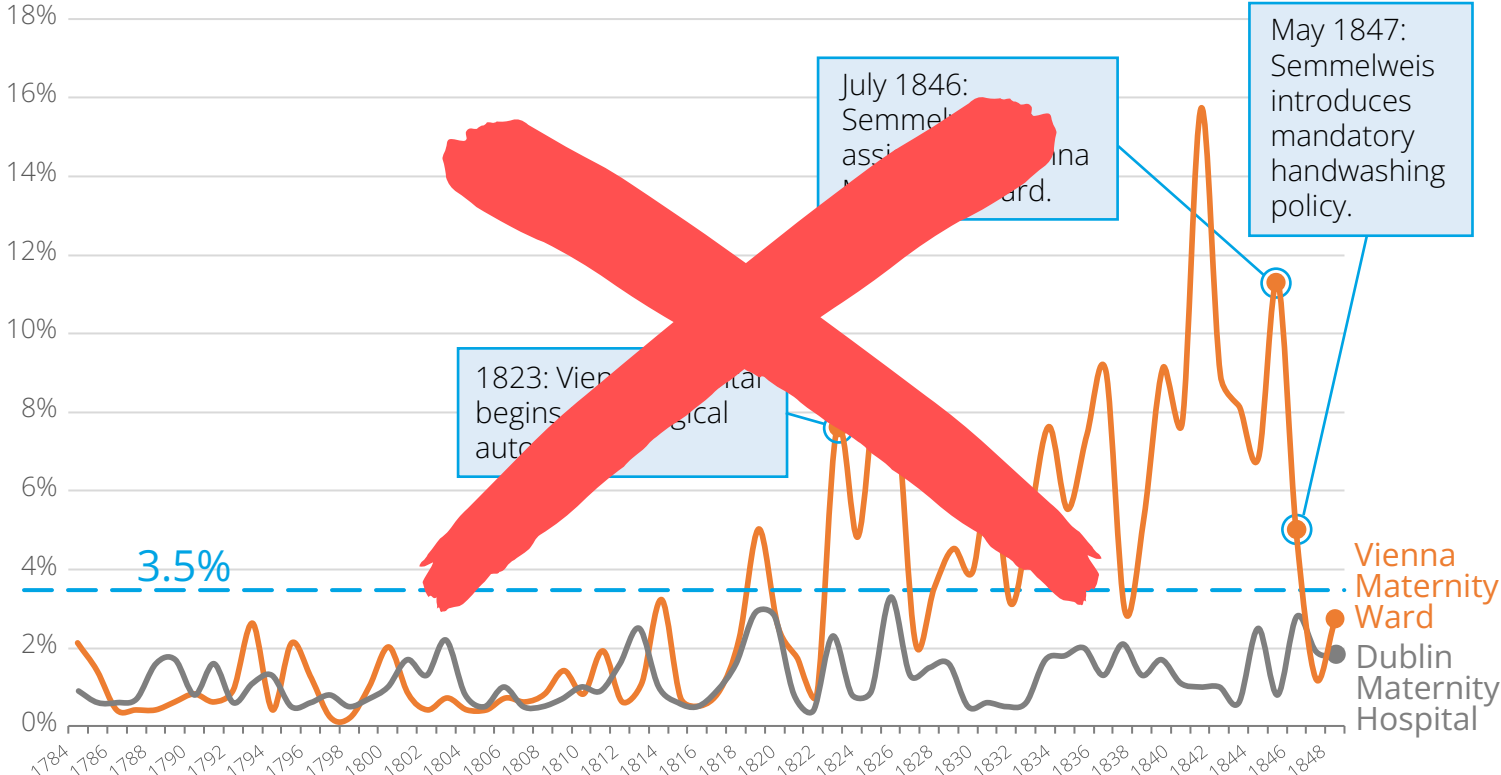
# Snow: Cholera As Waterborne Disease



# Semmelweis: Where He Went Wrong



Childbed Fever Mortality Rates: Vienna vs. Dublin



# Semmelweis: Where He Went Wrong



Dublin Maternity Hospital				Viennese Maternity Hospital			Dublin Maternity Hospital				Viennese Maternity Hospital				
Births	Deaths	Rate		Births	Deaths	Rate	Births	Deaths	Rate	Births	Deaths	Rate			
<b>BEFORE SEPARATION OF CLINICS</b>															
<b>Before Pathological Anatomy</b>															
1784	1,261	11	0.87	284	6	2.11	1823	2,584	59	2.28	2,872	214	7.45		
1785	1,292	8	0.61	899	13	1.44	1824	2,446	20	0.81	2,911	144	4.94		
1786	1,351	8	0.59	1,151	5	0.43	1825	2,740	26	0.94	2,594	229	8.82		
1787	1,347	10	0.74	1,407	5	0.35	1826	2,440	81	3.31	2,359	192	8.13		
1788	1,469	23	1.56	1,425	5	0.35	1827	2,550	33	1.29	2,367	51	2.15		
1789	1,435	25	1.74	1,246	7	0.56	1828	2,856	43	1.50	2,833	101	3.56		
1790	1,546	12	0.77	1,326	10	0.75	1829	2,141	34	1.58	3,012	140	4.64		
1791	1,602	25	1.56	1,395	8	0.57	1830	2,288	12	0.52	2,797	111	3.96		
1792	1,631	10	0.61	1,579	14	0.88	1831	2,176	12	0.55	3,353	222	6.62		
1793	1,747	19	1.08	1,684	14	2.61	1832	2,242	12	0.53	3,331	105	3.15		
1794	1,543	20	1.29	1,755	14	0.79	<div style="background-color: #444; color: white; border-radius: 50%; padding: 20px; display: inline-block;">                     500+ pages 60+ tables                 </div>						<b>AFTER SEPARATION OF CLINICS</b>		
1795	1,503	7	0.46	1,755	28	2.11							<b>Males and Females in Both</b>		
1796	1,621	10	0.61	1,904	22	1.15							3,737	197	5.27
1797	1,712	13	0.75	2,012	22	0.72							2,657	205	7.71
1798	1,604	8	0.49	2,046	5	0.24							2,573	143	5.55
1799	1,537	10	0.65	2,067	20	0.96							2,677	200	7.47
1800	1,837	18	0.97	2,070	41	1.98							2,765	251	9.07
1801	1,725	30	1.73	2,106	17	0.80							2,987	91	3.04
1802	1,985	26	1.30	2,346	9	0.38							2,781	151	5.42
1803	2,028	44	2.16	2,215	16	0.72							2,889	267	9.24
1804	1,915	16	0.83	2,022	8	0.39							<b>Males in First Clinic Only</b>		
1805	2,220	12	0.54	2,112	9	0.42							3,036	237	7.80
1806	2,406	23	0.95	1,875	13	0.69							3,287	518	15.75
1807	2,511	12	0.47	925	6	0.64							3,060	274	8.95
1808	2,665	13	0.48	855	7	0.81	3,157	260	8.23						
1809	2,889	21	0.72	912	13	1.42	3,492	241	6.90						
1810	2,854	29	1.01	744	6	0.80	4,010	459	11.44						
<b>Chlorine Washings Used</b>															

# Important Insights Require Data Storytellers

Nightingale



Insight



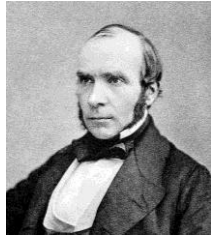
Data Story



Change



Snow



Insight



Data Story



Change



Semmelweis



Insight



No Data Story



Nothing





“Numbers have an **important story** to tell. They rely on you to give them a **clear and convincing voice.**”

**Stephen Few**  
Data Viz Expert





# Questions?



@analyticshero



Linkedin.com/in/brentdykes



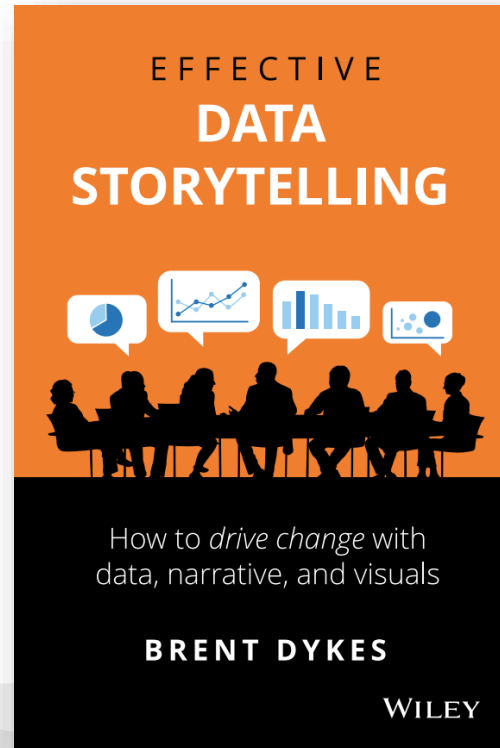
brent@analyticshero.com



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