

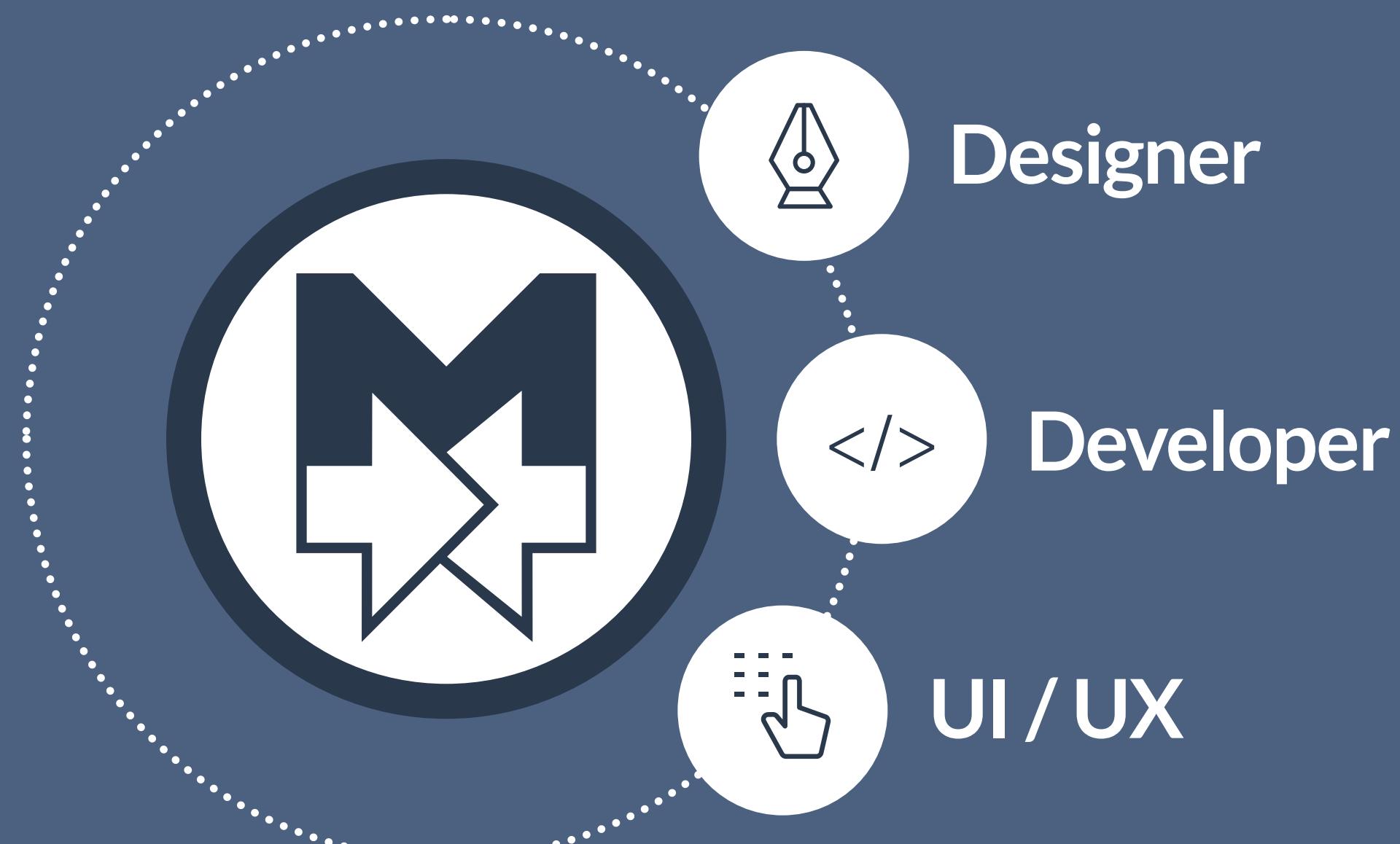


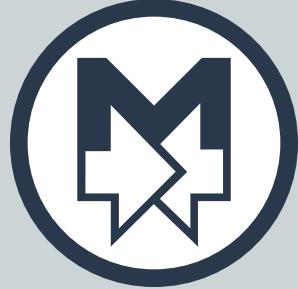
Lying with Data

Designing Honest Dashboards

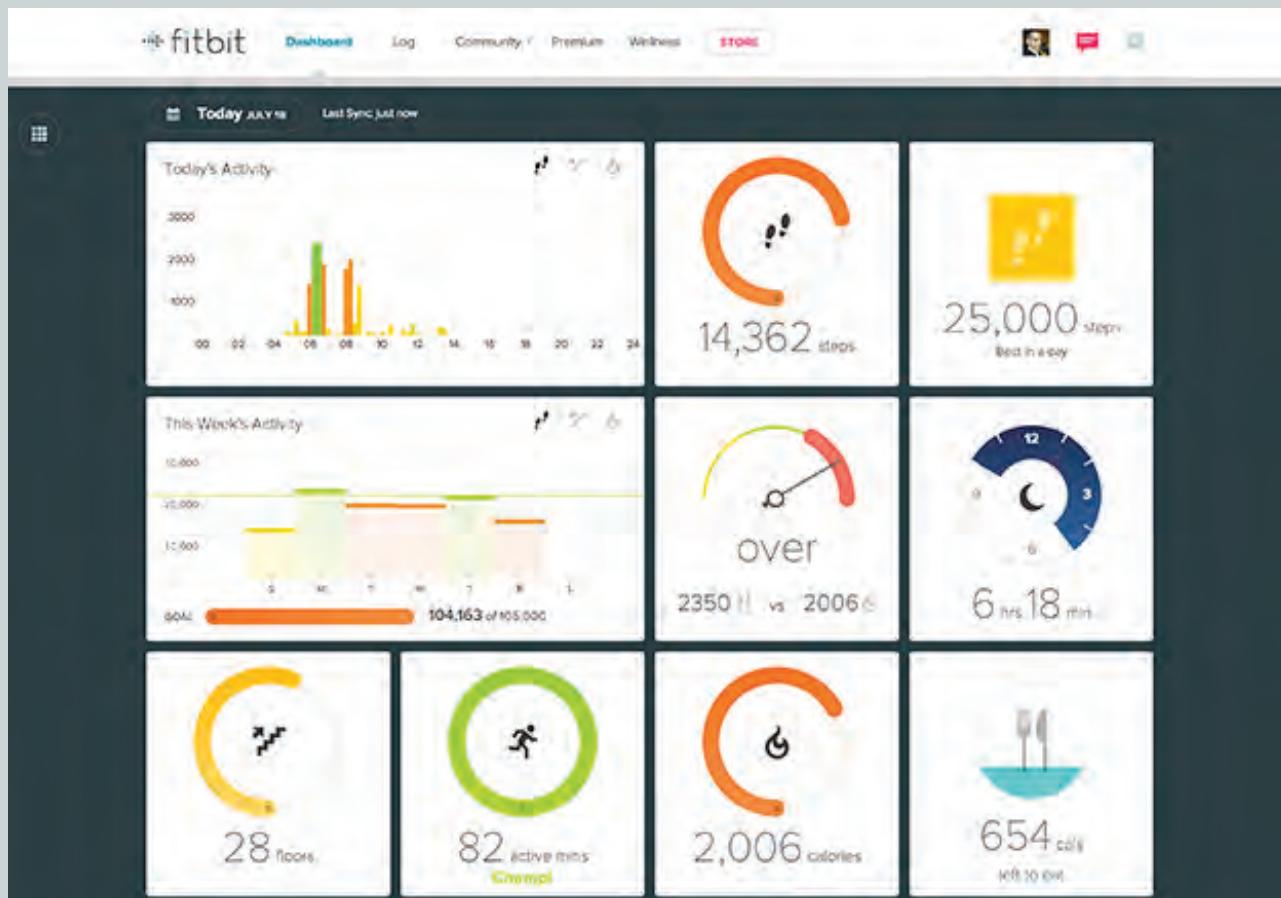


Jeremy Jones

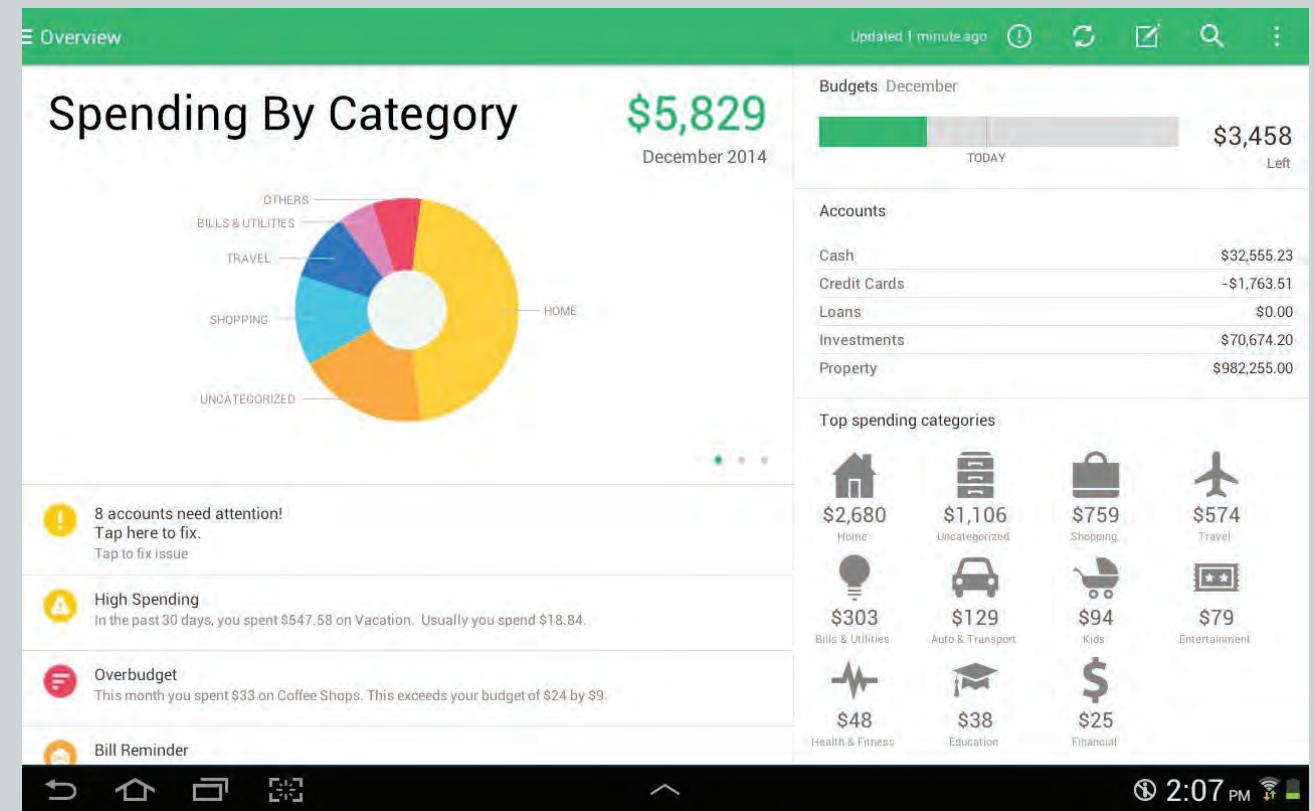




A Dashboard



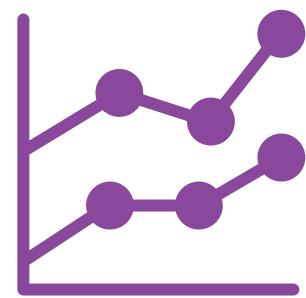
Fitbit



Mint



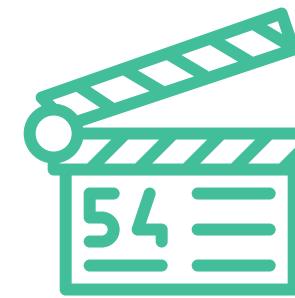
Visualizing Data



Data



Insight



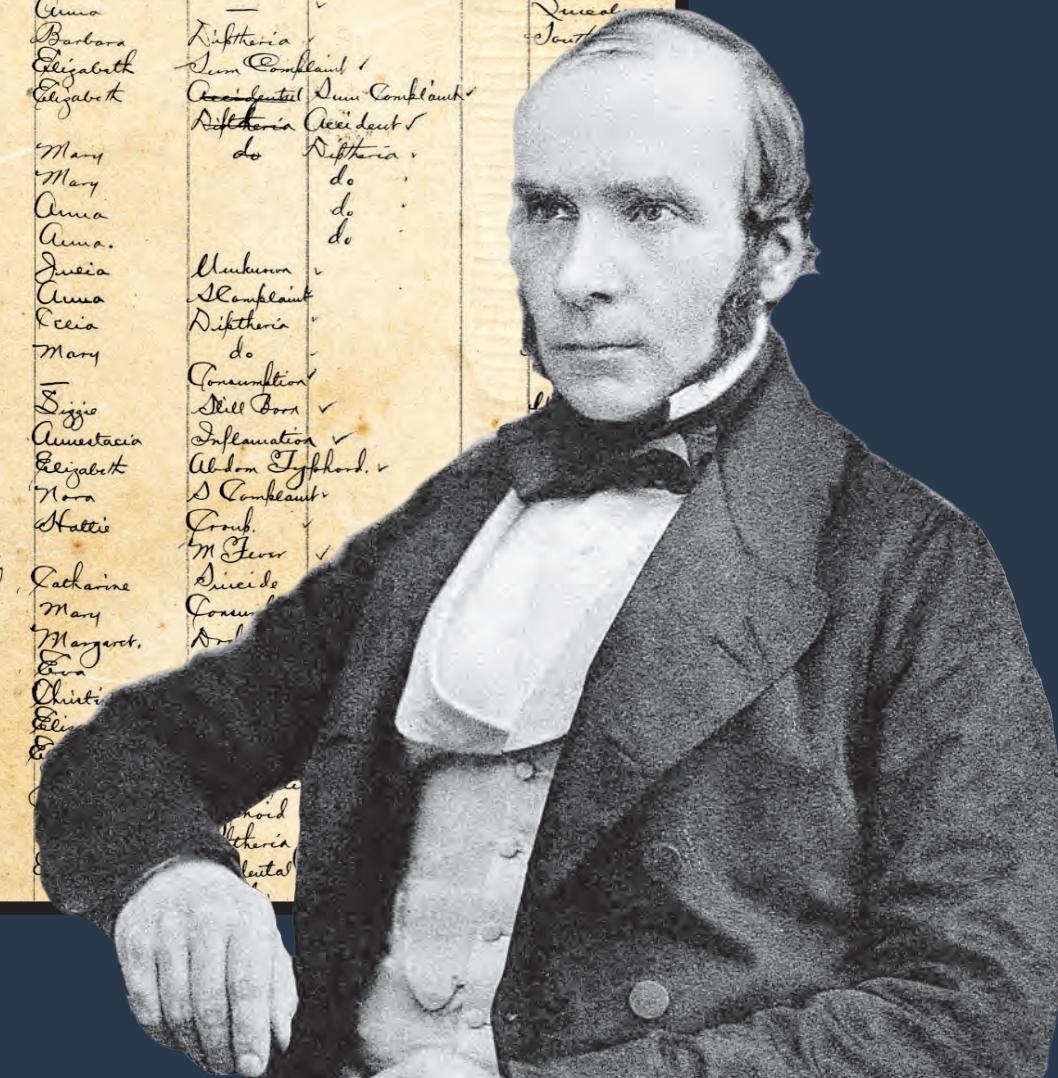
Action



The Data

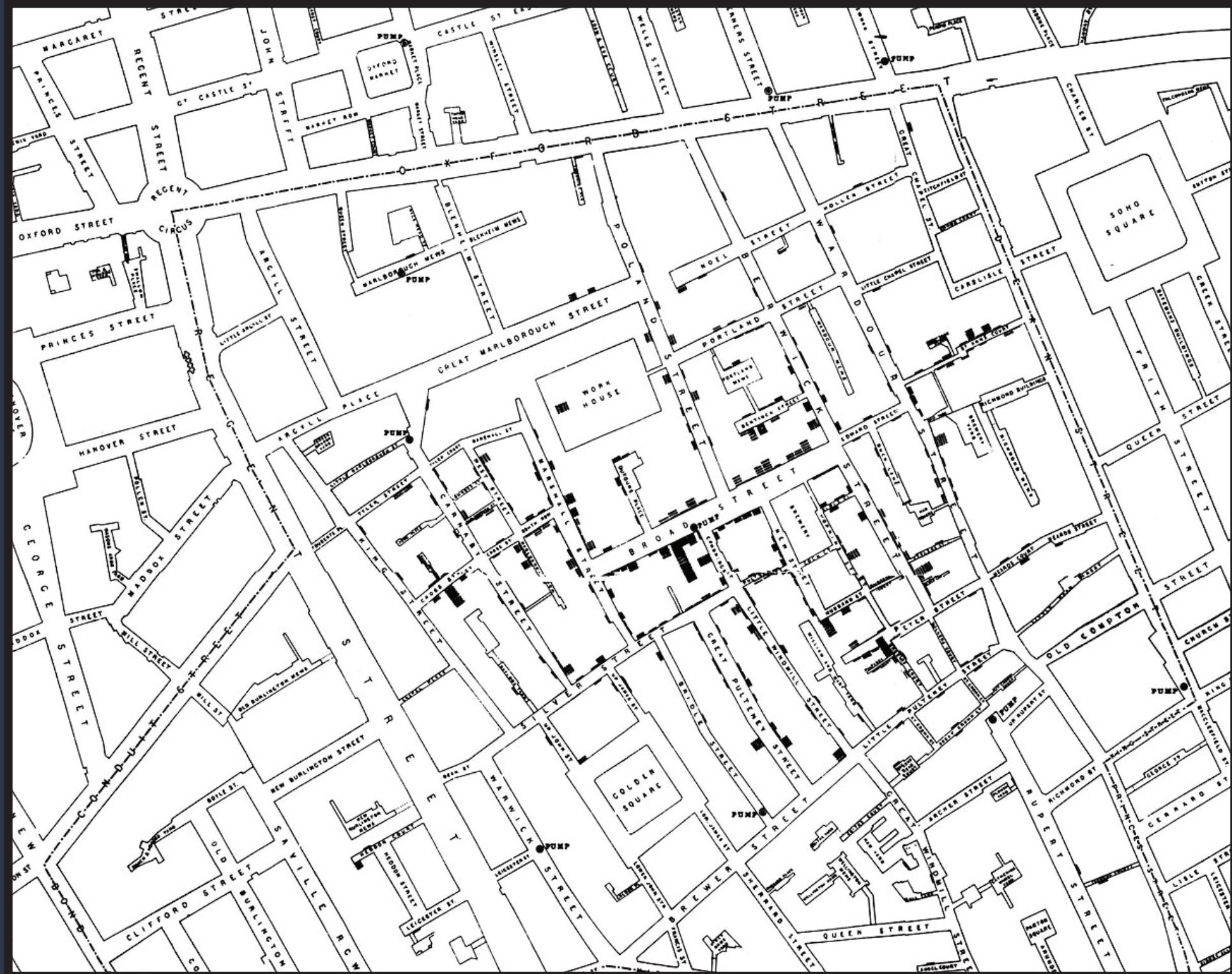
RECORD OF DEATHS.

NAME IN FULL.	DATE OF DEATH.			PLACE OF DEATH.	AGE.	PLACE OF BIRTH.			OCCUPATION.	NAMES OF PARENTS.		DISEASE.	DIRECT OR INDIRECT CAUSE OF DEATH.	COLOR.	LAST PLACE OF RESIDENCE.		
	Month.	Day.	Year.			Years.	Mos.	Days.		Father.	Mother.						
6 Sodrich Shebe	Augt	16	82	Cleveland	59	Cleveland	Guyahoga	Ohio		Joseph	Jucia	C Infarctum	v	W	Blatt 37		
7 Michael Arthur	May	3	82		9	"	"			Adolf	Sera	Head Disease			" 47		
7 Michael Adolph	Augt	17	"		do	Germany				Maider	Maider, Ch.	Consumption	v		" 47		
3 Stuter Maggie	June	26	"		do	Irishland				Nursekeeper	Weidmier, Jacob	do			" 136		
7 Murphy James	Oct	19	"		Single	11	11			School	Nicholas	Diphtheria			Cleveland 4		
5 Tolson Martha	Mich	26	83		Wild	82	3			Frank Makers	Abraham	Ed C.,			Gibbes 88		
6 Flynn E. M.	Afri	32	82		do	60	6			Kanes Makers	Anna	Consumption			" 62		
7 Daubert Meka	"	23	"		Single	1	6			James	Souine	Inflammation of Lungs			Ocean 4		
8 Ray Warren	McL	18	83		do	25	6			Devilor	John M.	Conj.			Gibbes 20		
9 Blomar Albert	Sept	30	83		Married	10	Hessen			Farmer	Philip	Barbara			" 13		
10 De Forest Jacob	June	28	"		do	36	Clarksville	Penn		Housekeeper	Strooper	Sarah			Scovill 19		
11 Kephart Sarah	Augt	9	"		Single	3	9	Cleveland		School	James G.	Margart.	Pneumonia			Madison 105	
12 Hall Walter	"	10	"		"	16	12	Guyahoga	Ohio	Thomas	Thomas	Susan	Consumption			Edwards 36	
13 Coffey Alida	Sept	13	"		"	16	12	Saunderston	Tafield		Charles	Anna	Diphtheria			Linnal 10	
14 Prochaska Charles	Nov	26	"		"	16	12	Cleveland	Guyahoga		George	Barbara	—			South 1	
15 Frechffer May	Jany	10	83		Married	76	State of	Maine		Real Estate	Thomas	Elizabeth	Diphtheria			Scovill 187	
16 Gray Harry R.	McL	3	"		do	8	Cleveland	Guyahoga	Ohio		Jacob	Elizabeth	Sum Complaint				
17 Fries Adolph	Augt	22	82		Single	3	3	"			Frank	Elizabeth	Occidental Diphtheria				
18 Porter S. W.	Dec	17	"		"	9	10	"			Frank	Mary	Diphtheria				
19 Smeach John	Augt	"	"		"	9	9	"			Frank	Mary	Occidental Diphtheria				
20 Smeach Sammie	Sept	18	"		"	9	9	"			Frank	Anna	Diphtheria				
21 Kahout Anna	Feby	20	83		"	11	3	"			Frank	Anna	do				
22 Kahout Mary	"	10	"		"	9	9	"			Frank	Anna	do				
23 Kuthera Edward	"	6	"		"	9	9	"			Frank	Anna	do				
24 Peck Charles	June	17	83		"	1	15	"			Frank	Anna	Unknown				
25 Gaffney Francis	Nov	15	"		8	11	East..	"		Frank	Anna	Unknown					
26 Hawkins Violencia	April	6	"		Wild	19	"	Columbus	" Mass		Frank	Anna	Unknown				
27 Tieden Helen F	Mar	9	"			69		Cleveland	Guyahoga			Frank	Anna	Unknown			
28 Botel Baby	McL	7	83		Married	40	—	Worford	Do		Frank	Anna	Unknown				
29 Kauz Catherine	"	3	"		do	33	11	Heina	Germany		Frank	Anna	Unknown				
30 Seehman Anna	Sept	22	82		"	9	17	Cleveland	Guyahoga		Frank	Anna	Unknown				
31 Roberts James	Augt	"	"		"	11	21	"			Frank	Anna	Unknown				
32 Rock Clara	Janry	22	83		Married	35					Frank	Anna	Unknown				
33 Jamieson Sophia	April	11	83		"	22		Baden	Germany		Frank	Anna	Unknown				
34 Schiecke Rica	Dec	3	"		"	40		Lithray	Do		Frank	Anna	Unknown				
35 Slattery William	May	31	"		"	49	21	Bulin	Cleveland		Frank	Anna	Unknown				
36 Ronch Patrick	Nov	12	"		"	2		Cleveland	Guyahoga		Frank	Anna	Unknown				
37 Fox Monica	Jany	15	83		"	15		Glasgo	Scotland		Frank	Anna	Unknown				
38 Trull Sophia	Oct	3	82		Single	23	6	Cleveland	Guyahoga		Frank	Anna	Unknown				
39 Hart Annie	June	27	"		"	14		Kirkville	Do & Mann		Frank	Anna	Unknown				
40 Temple Ellen M.	Sept	11	"		Married	38		Cleveland	Guyahoga		Frank	Anna	Unknown				
41 Quayle John	McL	25	83		Single	45	21	Kirkville	Cleveland		Frank	Anna	Unknown				
42 Hunt Johnell	Jany	8	"		do	32		Cleveland	Guyahoga		Frank	Anna	Unknown				
43 Hawks Charles	April	10	83		"	11		"			Frank	Anna	Unknown				
44 Beuler Henry	Sept	3	"		"	6		"			Frank	Anna	Unknown				



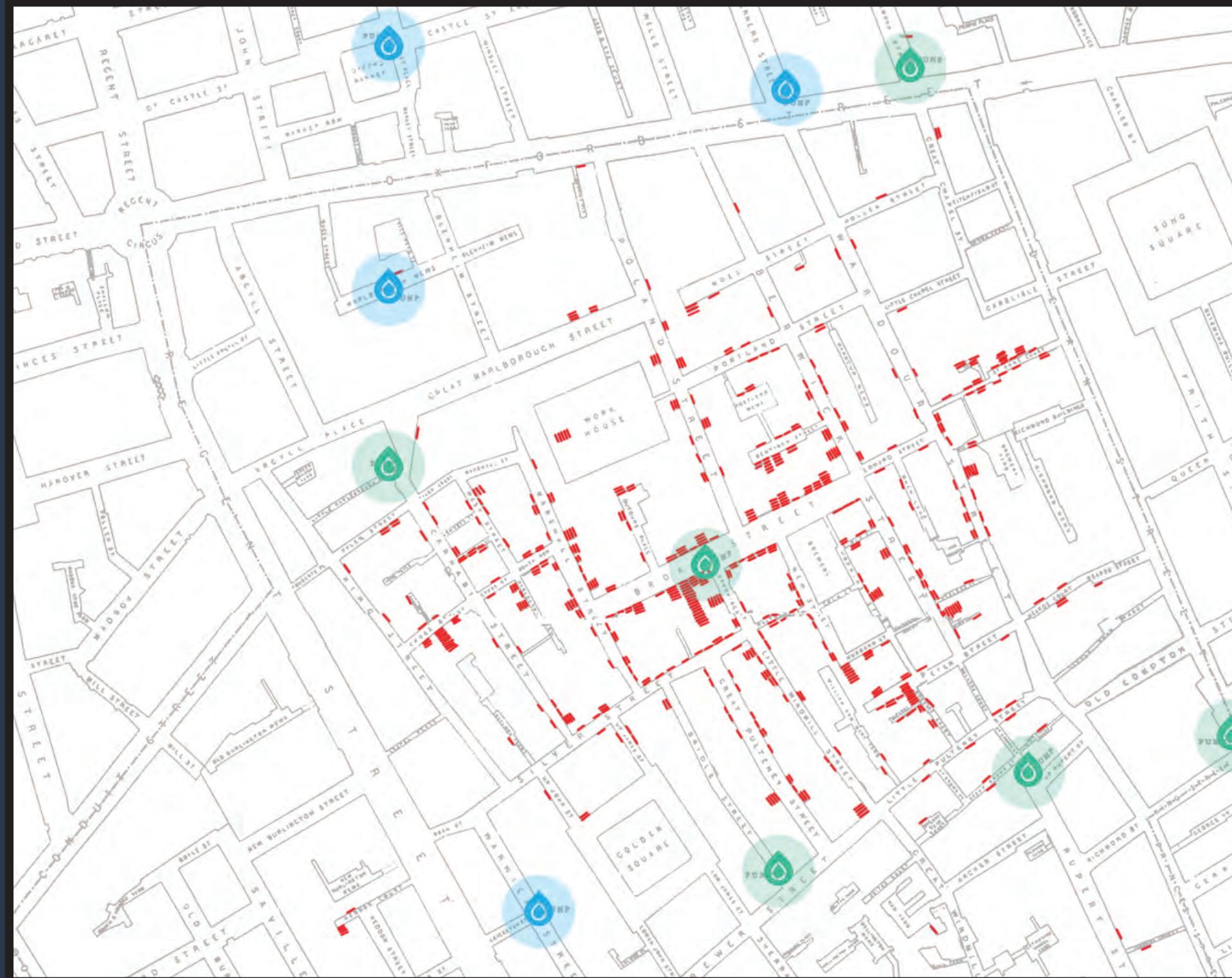


The Insight





The Insight



Death



Lambeth Pump



Southwark Pump



The Action



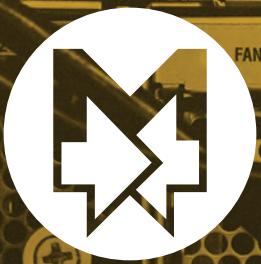


Lying





Lies of Intent



THE DATA
DOESN'T LIE



Forms of Data



Raw

“Scrub”

Secondary



I KNOW THE
AUDIENCE



The Audience



Influencer



Stakeholder



User



The Usual Audience



Influencer



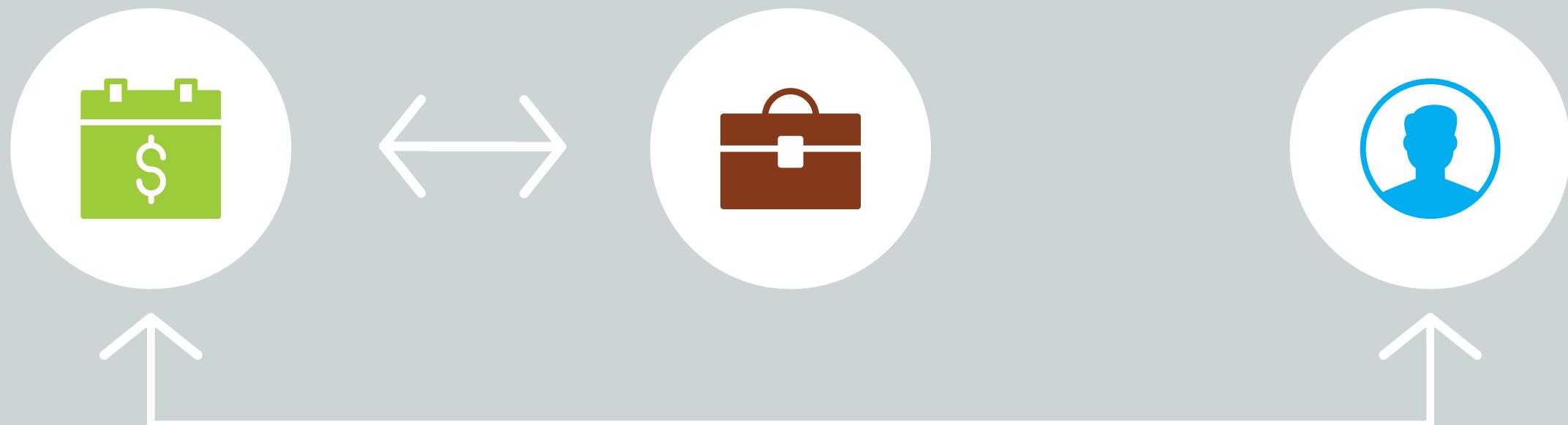
Stakeholder



User



The Better Audience



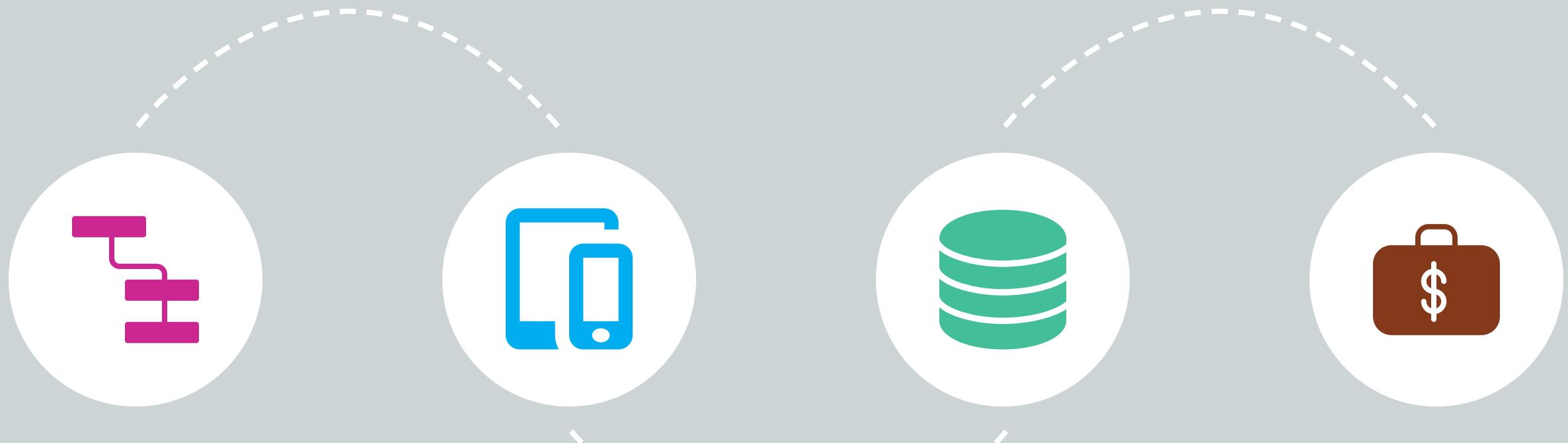
Influencer

Stakeholder

User



The User Variables



Role

Work Flow

Data Skills

Expertise



EVERYTHING IS
CRITICAL





Info Discrimination



**What would you do
If you knew this info?**

Interesting

Actionable

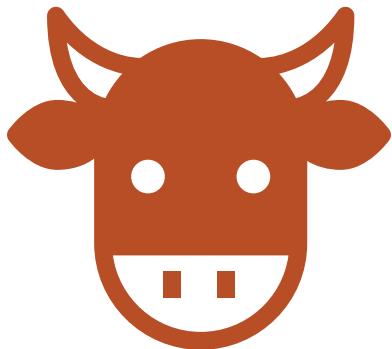


THE DASHBOARD DOES EVERYTHING





Info Analysis



Reporting

Measure and monitor the
known / predictable

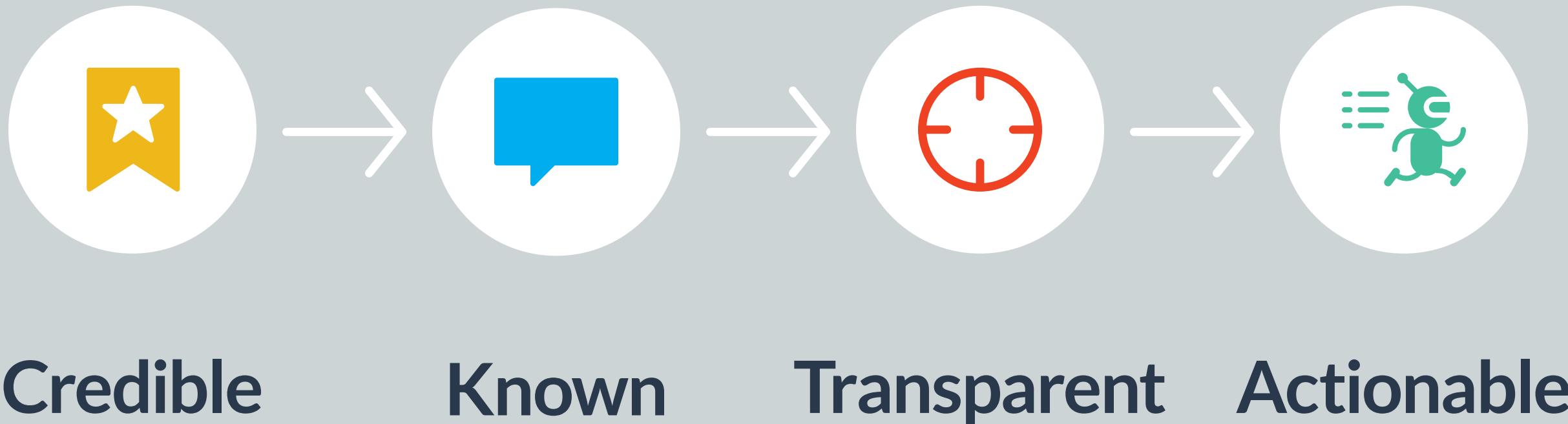


Exploration

Develop understanding of
new / erratic behaviors

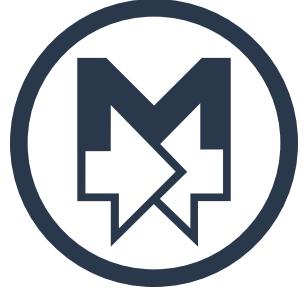


Choosing Metrics



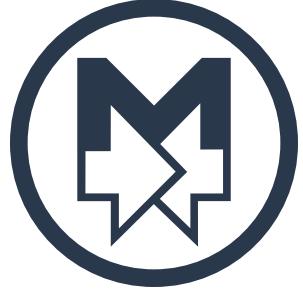


Lies by **Design**



How Many...

2	5	6	7	1	1	6	5	1	2	2	5	6	7
6	1	7	5	5	5	6	2	5	7	3	1	7	5
4	5	2	3	6	5	7	6	4	6	4	5	2	4
8	1	5	7	8	5	6	6	6	7	8	1	5	7
7	2	3	6	8	2	1	7	3	1	7	2	3	6
3	8	6	4	4	5	6	6	4	5	3	8	6	4
4	9	5	2	3	7	1	7	1	2	4	5	8	2
3	7	8	1	6	1	5	6	1	6	3	9	8	1
5	6	6	8	6	6	8	1	2	6	5	6	6	8
3	2	4	2	6	5	4	2	7	1	3	2	4	2



How About Now

2	5	6	7	1	1	6	5	1	2	2	5	6	7
6	1	7	5	5	5	6	2	5	7	3	1	7	5
4	5	2	3	6	5	7	6	4	6	4	5	2	4
8	1	5	7	8	5	6	6	6	7	8	1	5	7
7	2	3	6	8	2	1	7	3	1	7	2	3	6
3	8	6	4	4	5	6	6	4	5	3	8	6	4
4	9	5	2	3	7	1	7	1	2	4	5	8	2
3	7	8	1	6	1	5	6	1	6	3	9	8	1
5	6	6	8	6	6	8	1	2	6	5	6	6	8
3	2	4	2	6	5	4	2	7	1	3	2	4	2

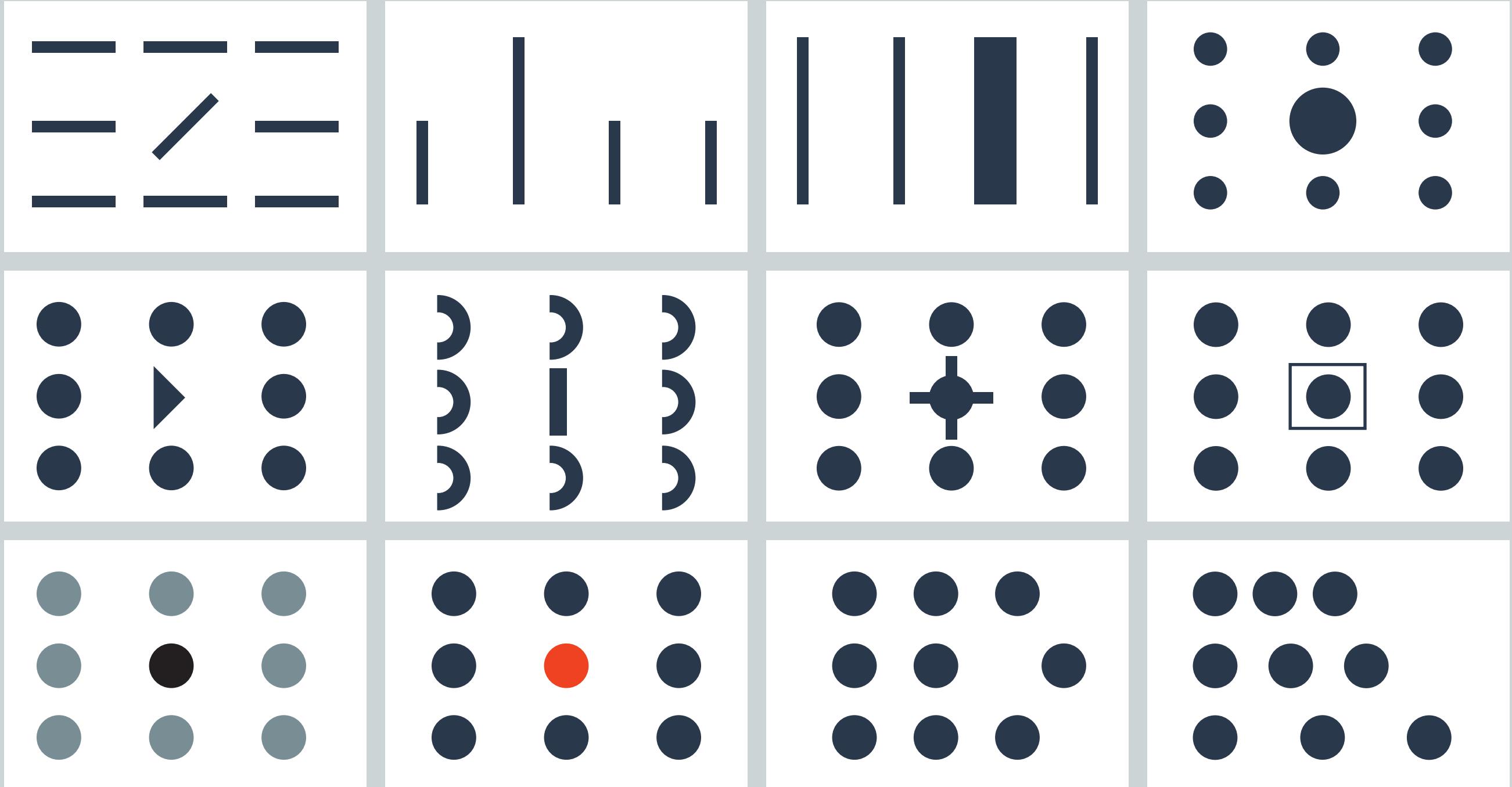


How About Now

2	5	6	7	1	1	6	5	1	2	2	5	6	7
6	1	7	5	5	5	6	2	5	7	3	1	7	5
4	5	2	3	6	5	7	6	4	6	4	5	2	4
8	1	5	7	8	5	6	6	6	7	8	1	5	7
7	2	3	6	8	2	1	7	3	1	7	2	3	6
3	8	6	4	4	5	6	6	4	5	3	8	6	4
4	9	5	2	3	7	1	7	1	2	4	5	8	2
3	7	8	1	6	1	5	6	1	6	3	9	8	1
5	6	6	8	6	6	8	1	2	6	5	6	6	8
3	2	4	2	6	5	4	2	7	1	3	2	4	2



Preattentive Attributes



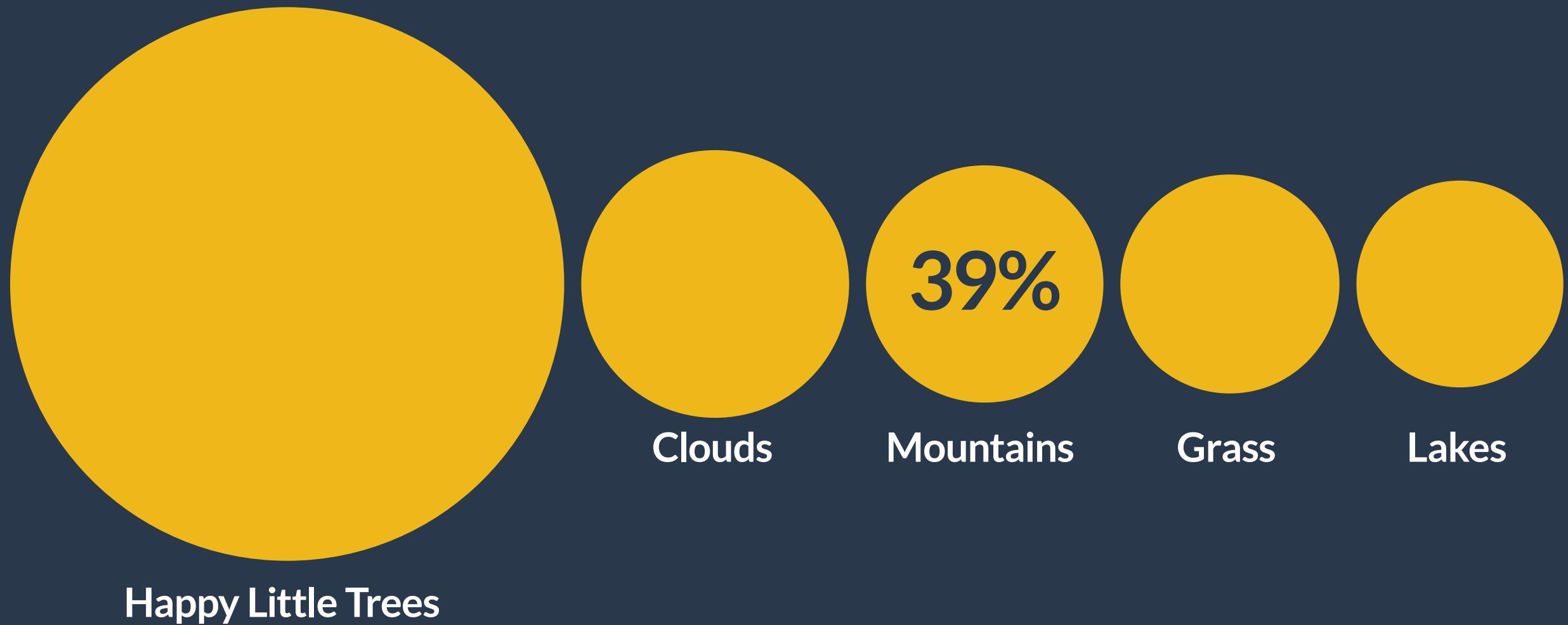


CHARTS DON'T LIE





Top 5 Objects in Bob Ross Paintings by %



Happy Little Trees

Clouds

Mountains

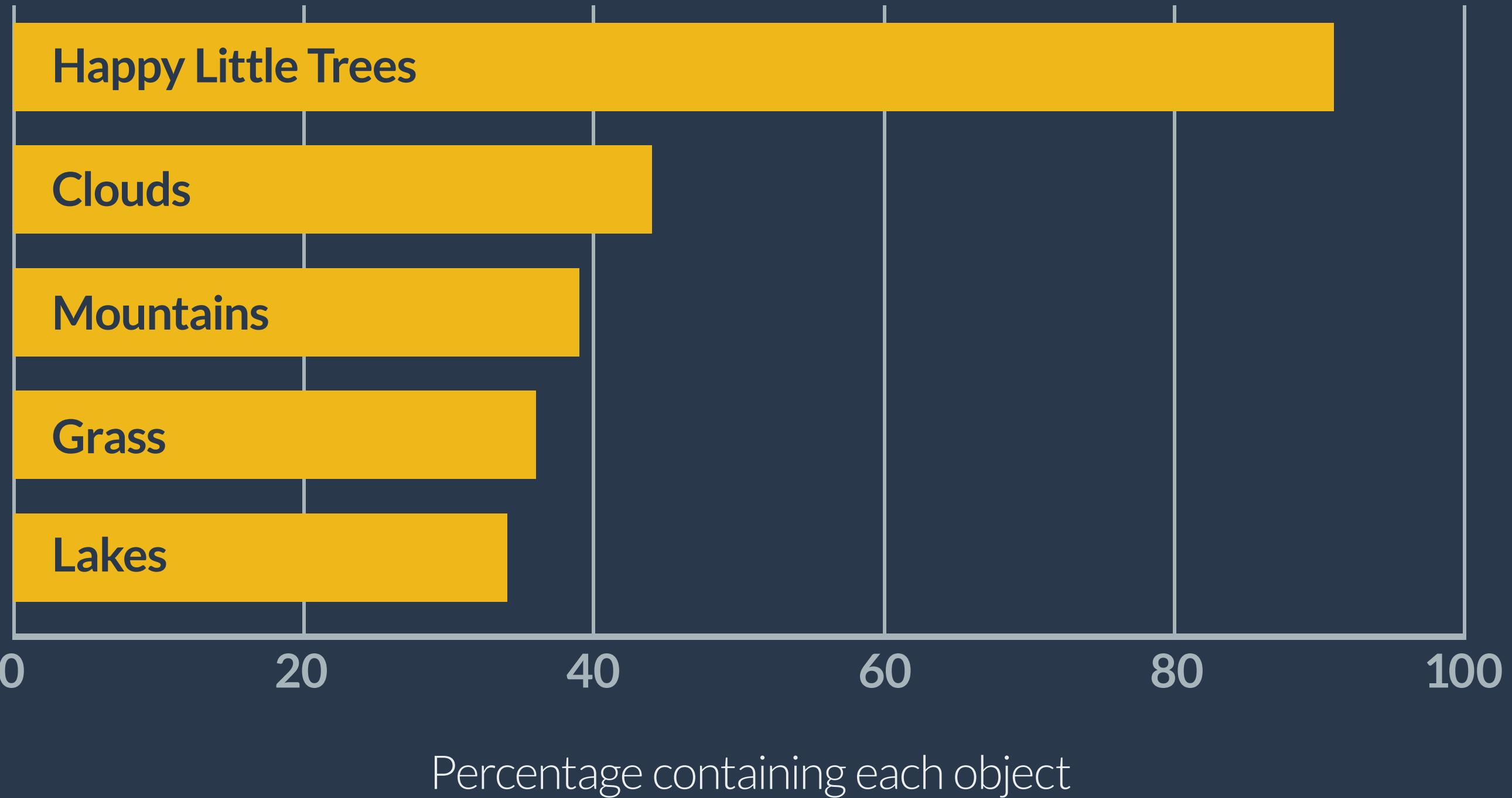
Grass

Lakes

Percentage containing each object

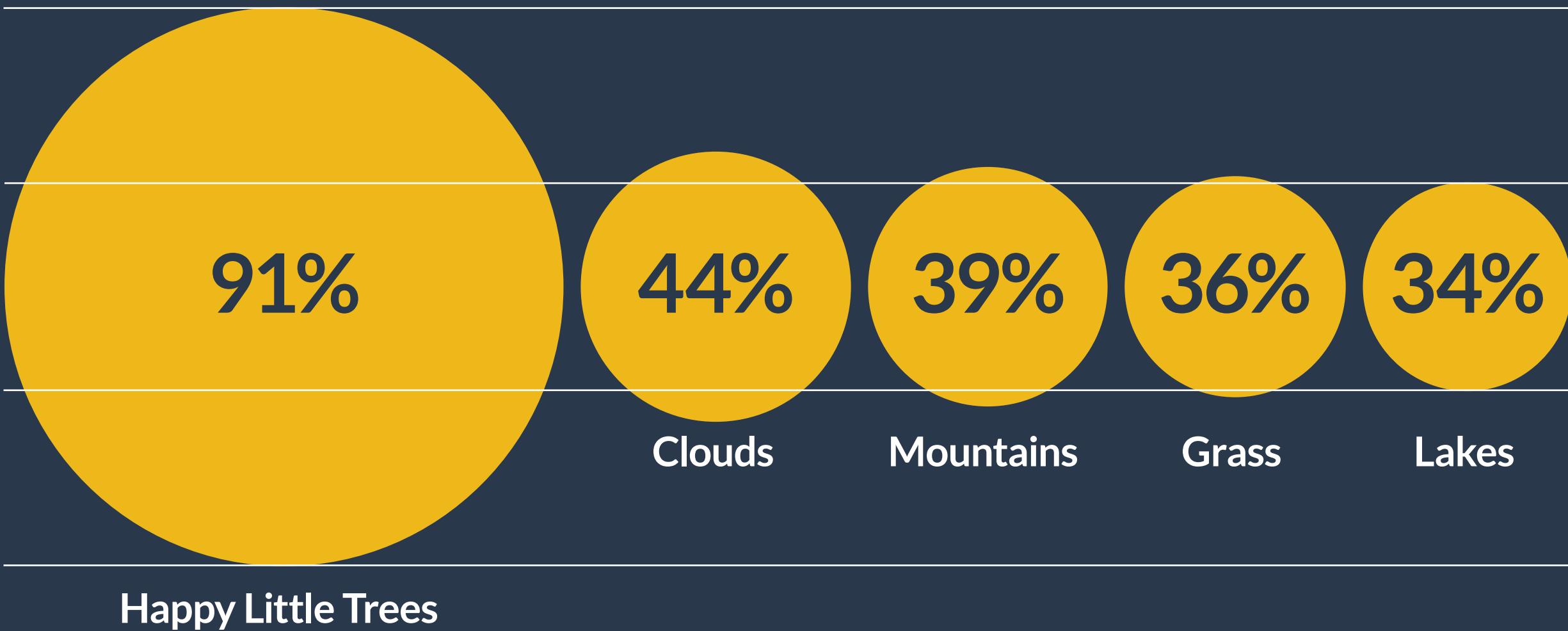


Top 5 Objects in Bob Ross Paintings by %

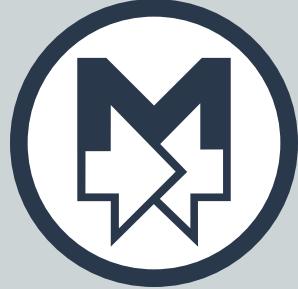




Top 5 Objects in Bob Ross Paintings by %



Percentage containing each object



Questioning Graphs



=



=



What is the
QUESTION?

What does the
DATA SAY?

What does the
VISUAL SHOW?



Chart Junk



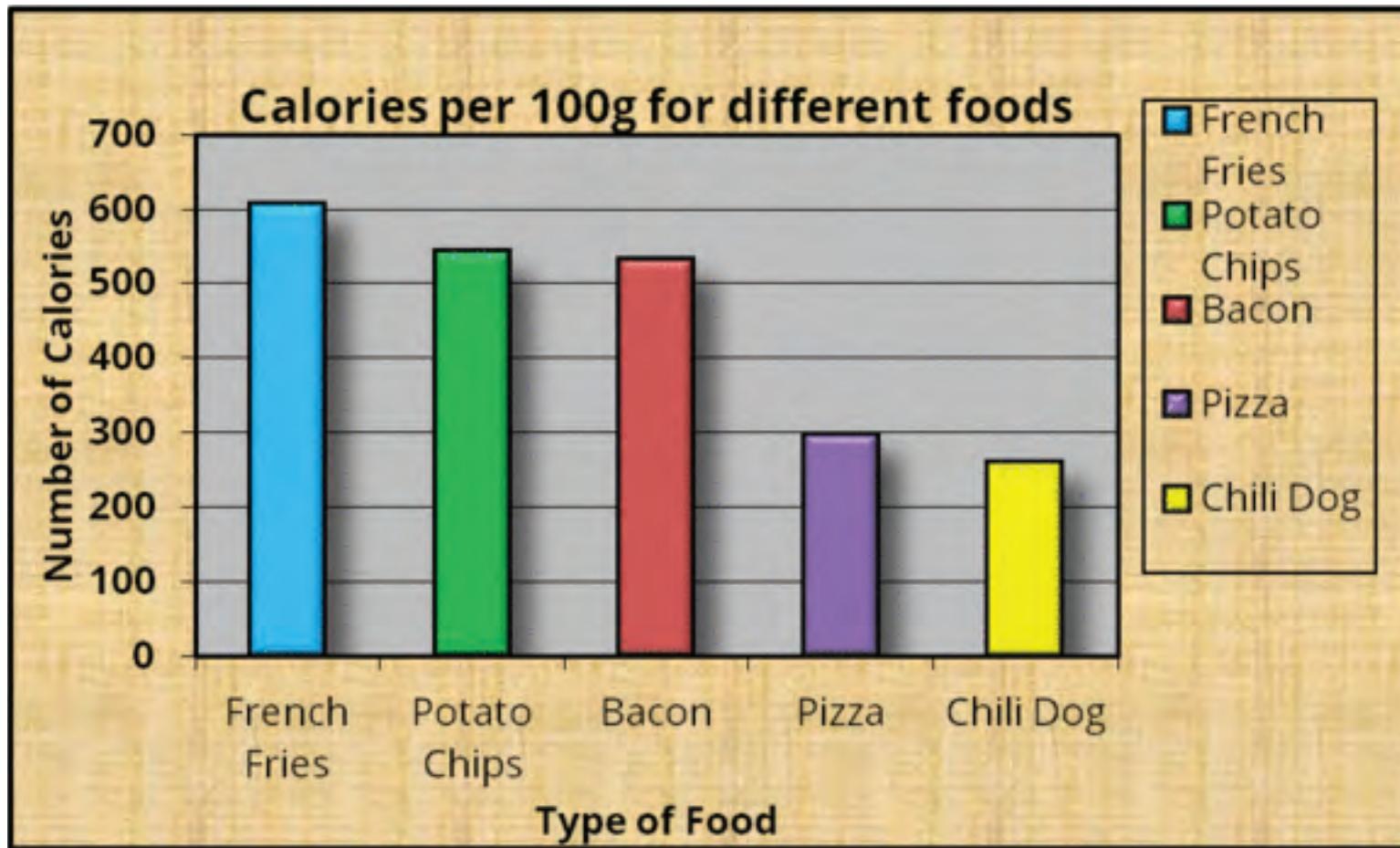
Decrease Chart Junk



Increase Data Ink



Decrease Chart Junk

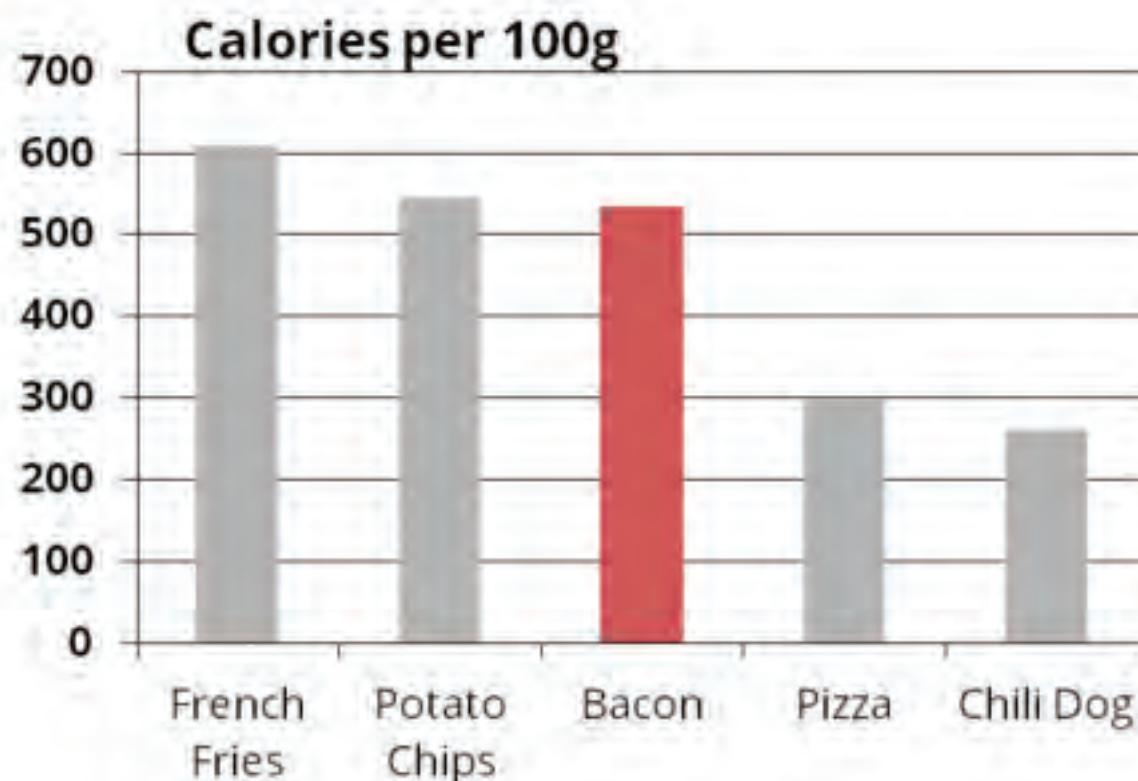


REMOVE

- Backgrounds
- Redundant Labels
- Borders
- Unnecessary Colors
- Special Effects



Increase Data Ink



REMOVE

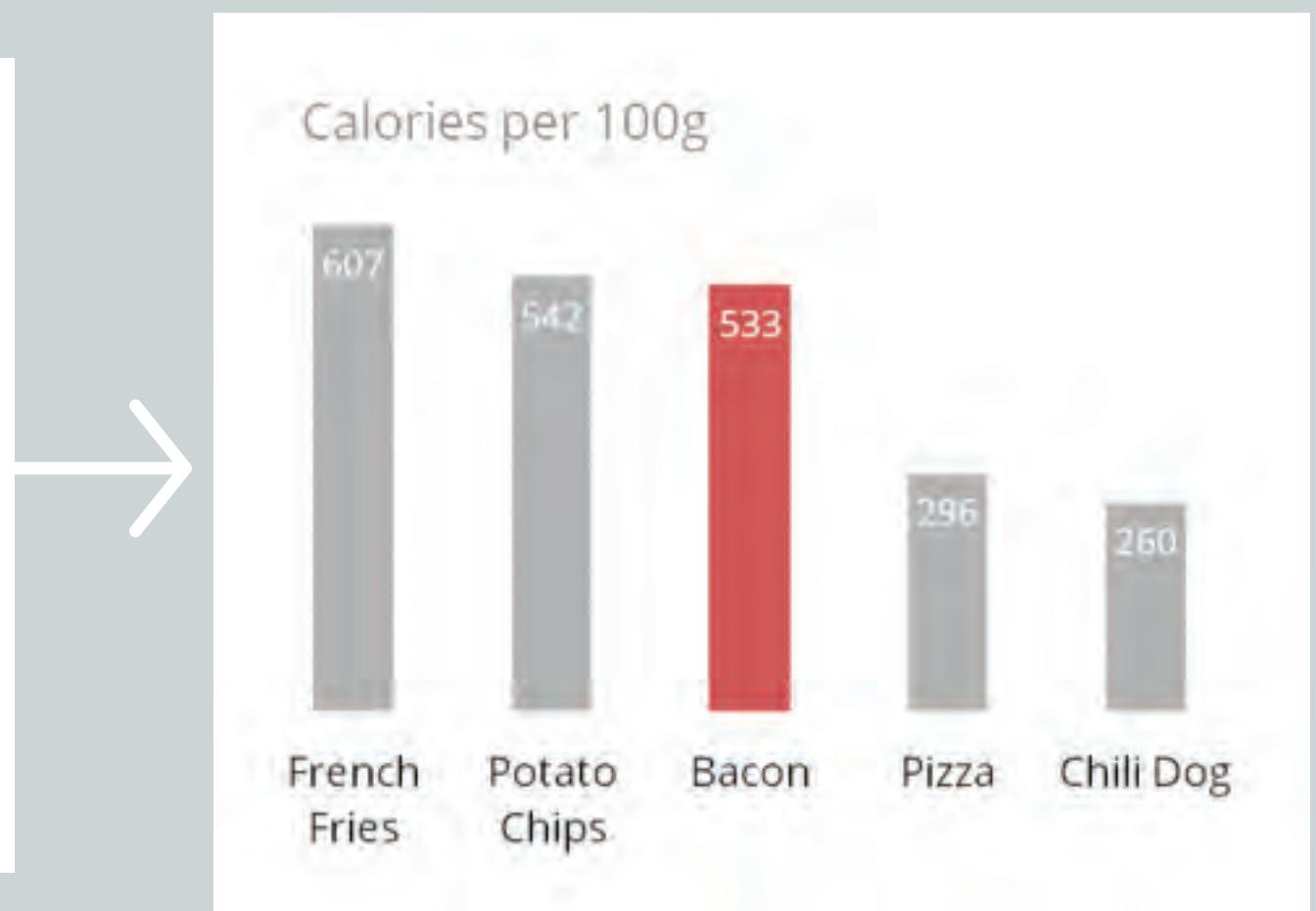
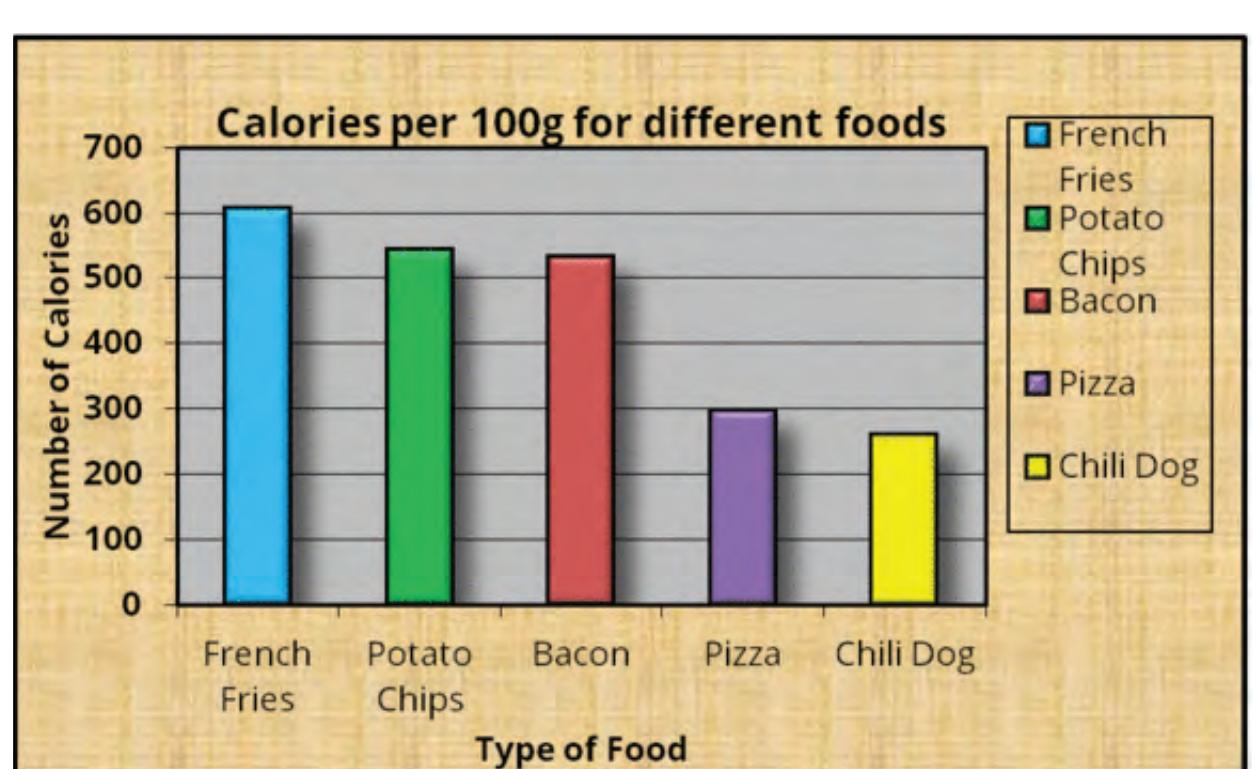
- Bolding
- Axis Lines

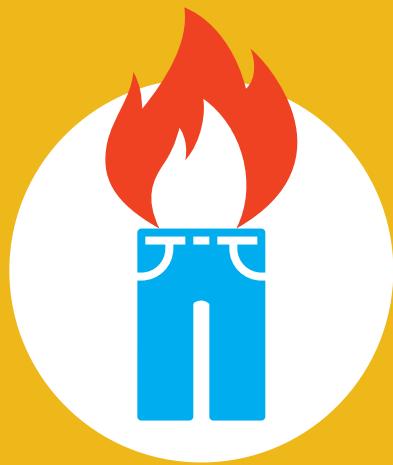
ADD

- Direct Labels

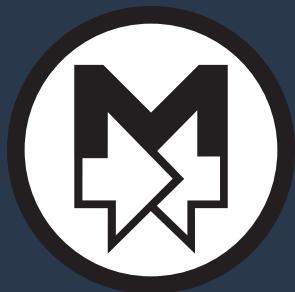


Chart Junk





**Do you know when you are
*lying or lied to with data?***



UNDER PRESIDENT OBAMA,
**MORE STUDENTS ARE EARNING THEIR HIGH
SCHOOL DIPLOMAS THAN EVER BEFORE**

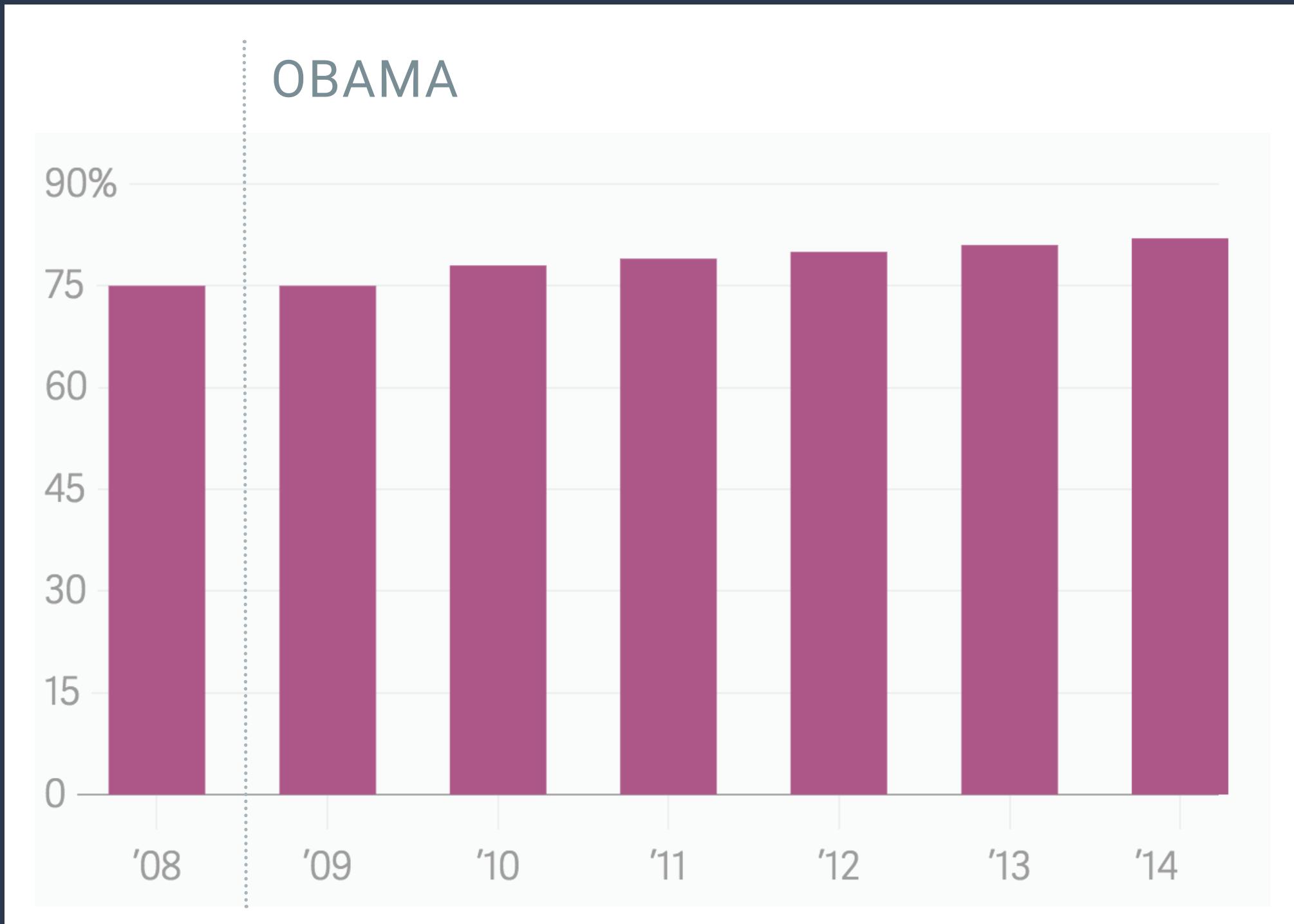


#LeadOnEducation

SOURCE: U.S. DEPARTMENT OF EDUCATION,
NATIONAL CENTER FOR EDUCATION STATISTICS

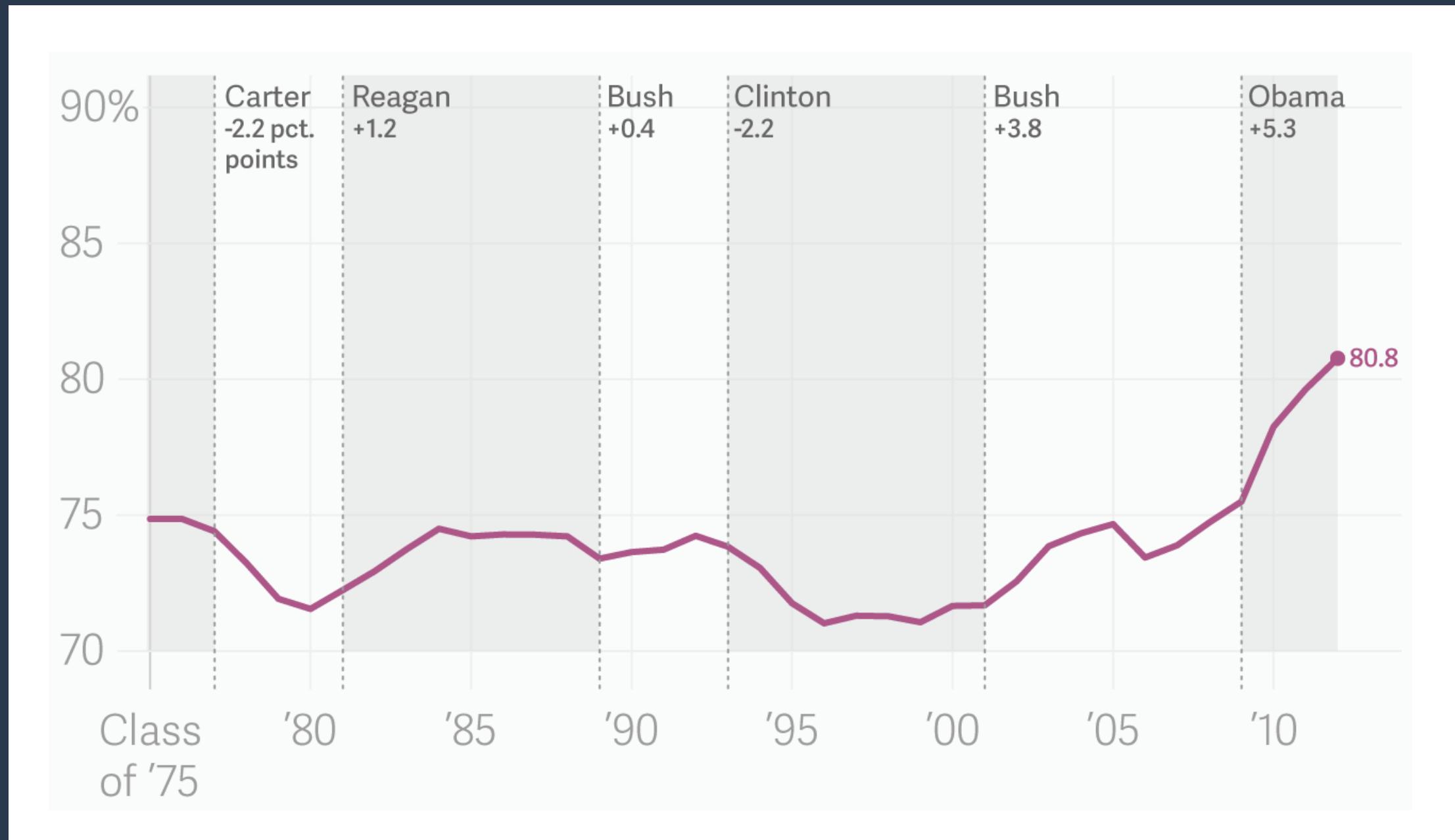


HIGH SCHOOL GRADUATIONS RATES





HIGH SCHOOL GRADUATIONS RATES



DATA: NATIONAL CENTER FOR EDUCATION STATISTICS

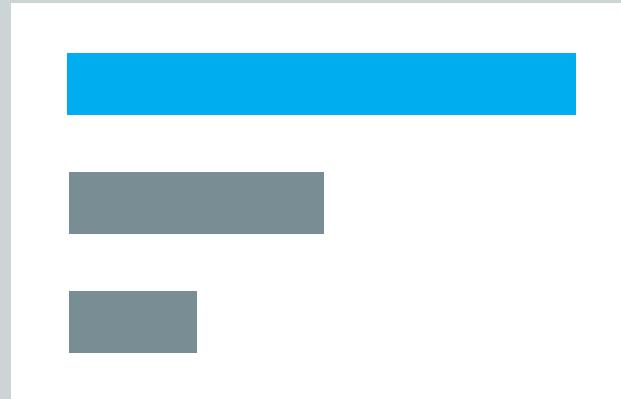


CHARTS ARE INTERCHANGEABLE





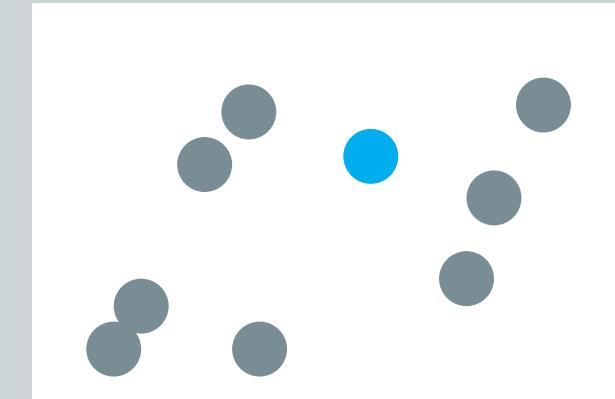
Types of Charts



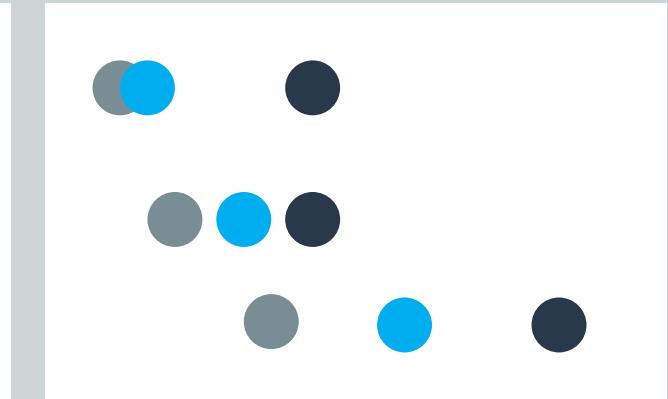
Bar



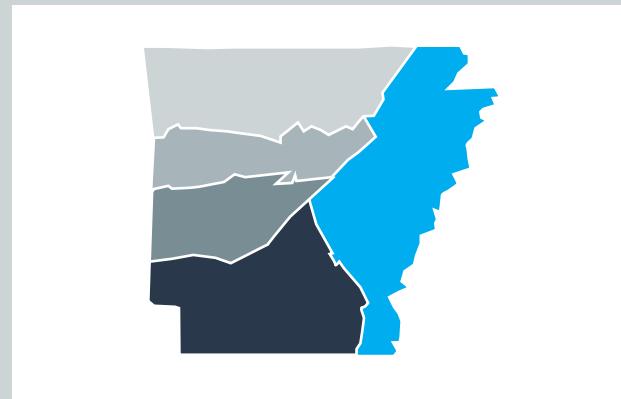
Line



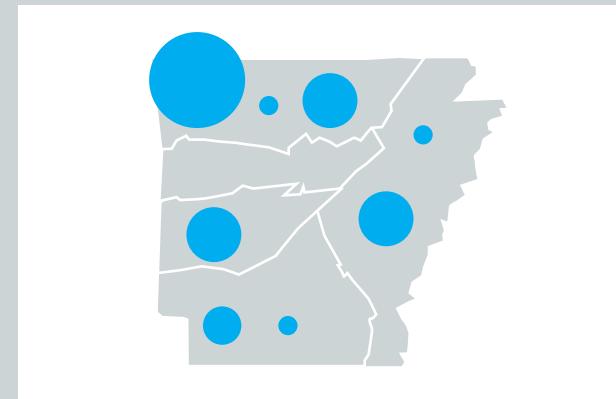
Scatter-plot



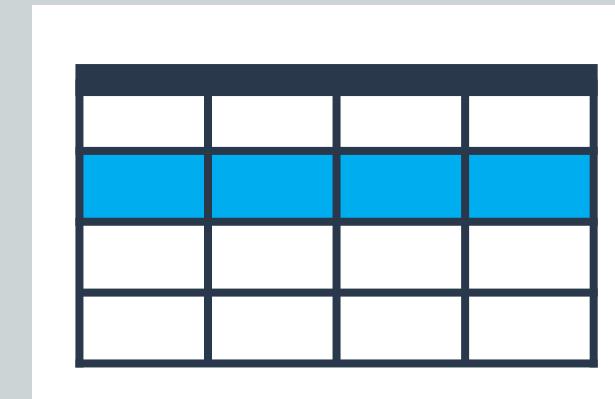
Dot Plot



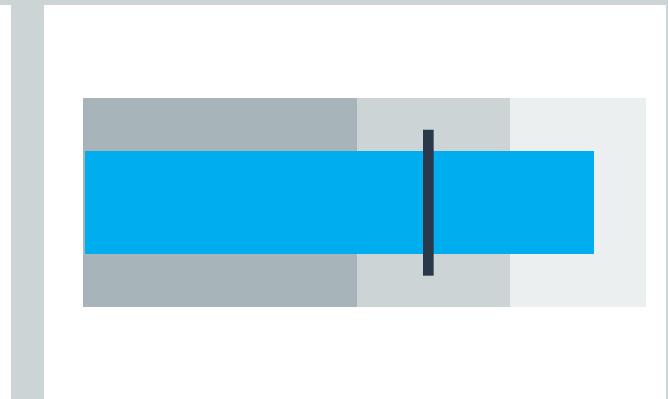
Filled Map



Symbol Map



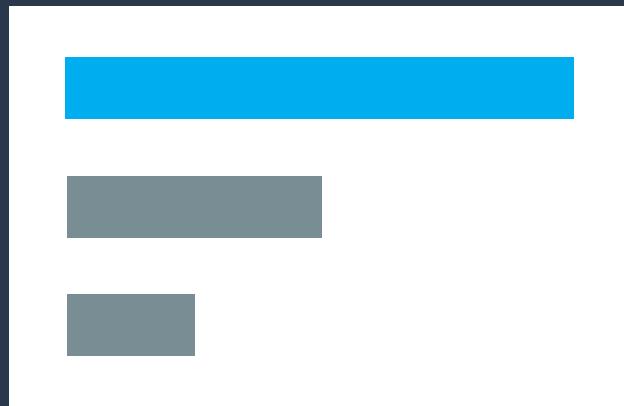
Table



Bullet Graph

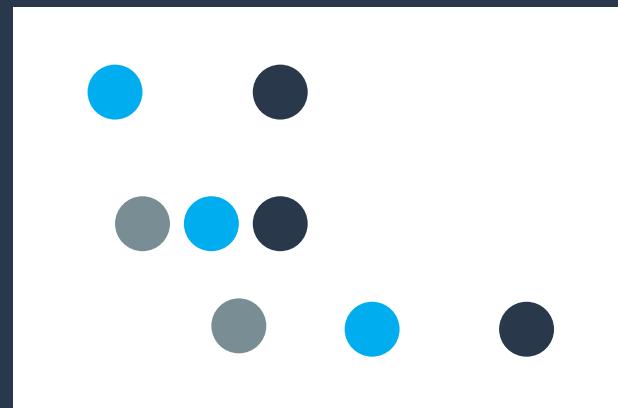


Comparison Charts



Bar

Compare highs
and lows of a
few categories



Dot Plot

Compare many
categories over
many variables



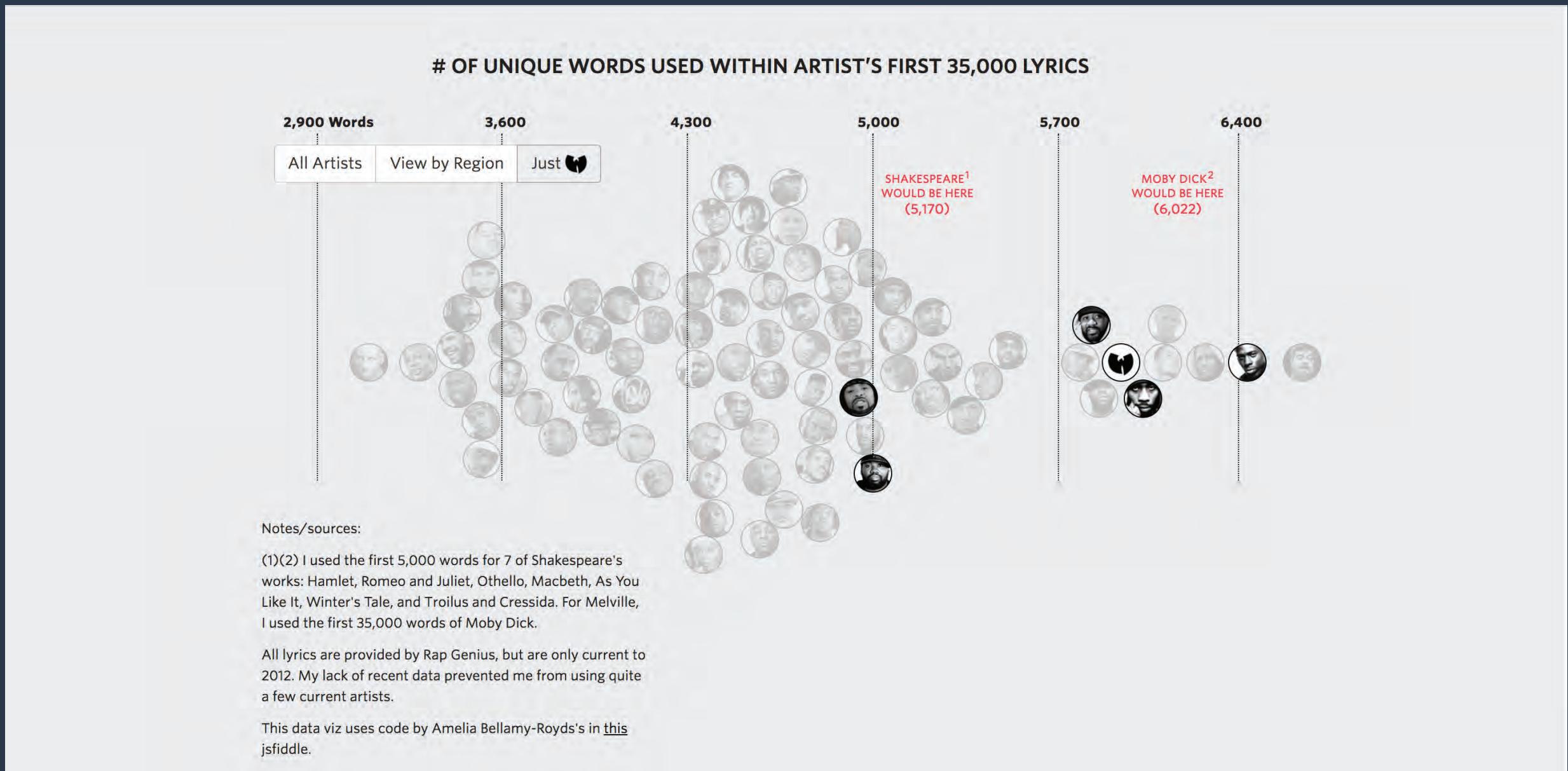
Line

Compare
trends of many
categories over
time



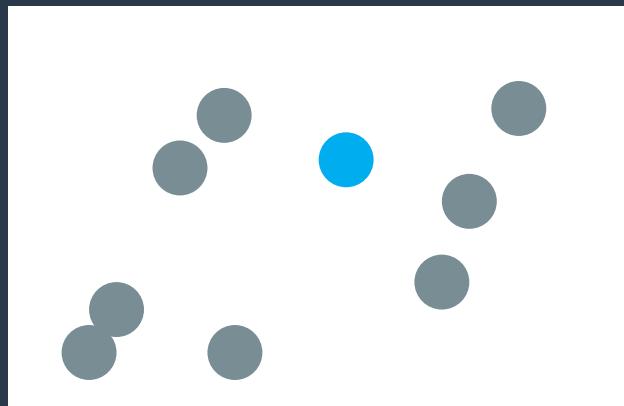
Dot Plot

OF UNIQUE WORDS USED WITHIN ARTIST'S FIRST 35,000 LYRICS



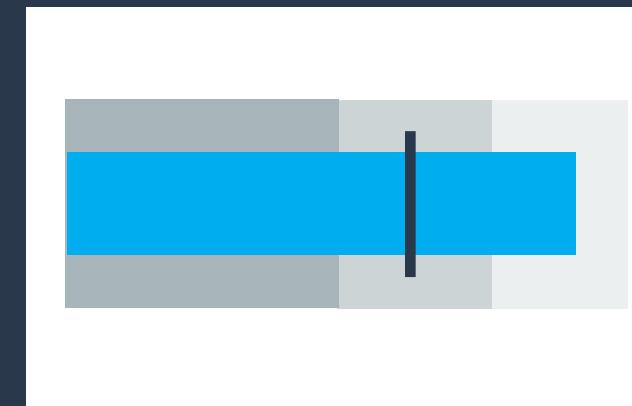


Relationship Charts



Scatter-plot

Relationship
between two
variables



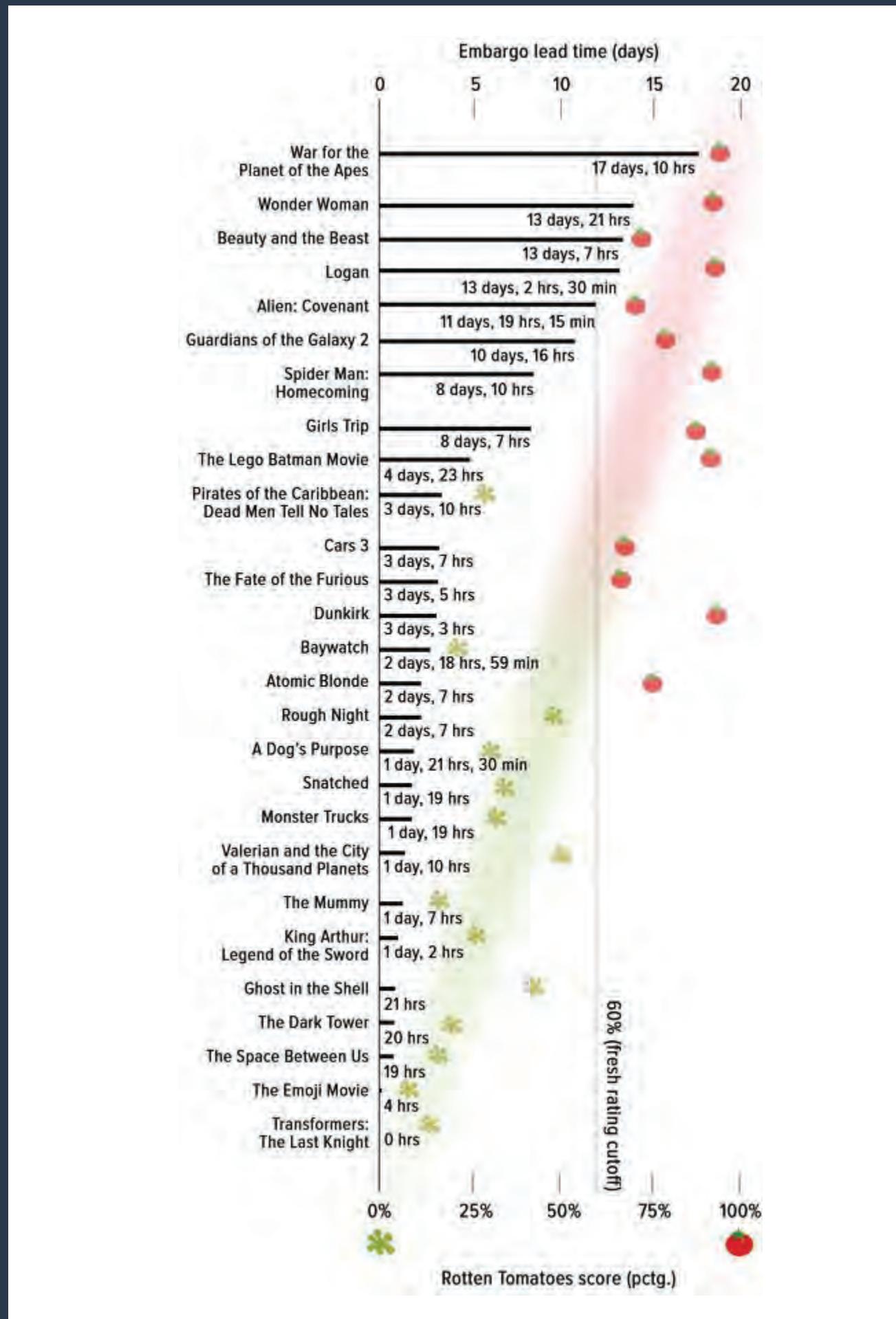
Bullet Graph

Show actual
versus target
against grades



Scatter-plot

ROTTEN TOMATOES
SCORE VERSUS CRITIC
REVIEW EMBARGO LIFT





Bullet Graph

M NIGHT SHYAMALAN DIRECTED MOVIES ROTTEN TOMATOE SCORES

The Sixth Sense 1999



Unbreakable 2000



Signs 2002



The Village 2004



Lady in the Water 2006



The Happening 2008



Afer Earth 2013





Value Charts



Filled Map

Show values of
different areas



Symbol Map

Show values of
exact locations



HONEST DASHBOARDS



Honest Data



Validate your Data source(s)

Refresh Data as needed or requested



Honest Audiences



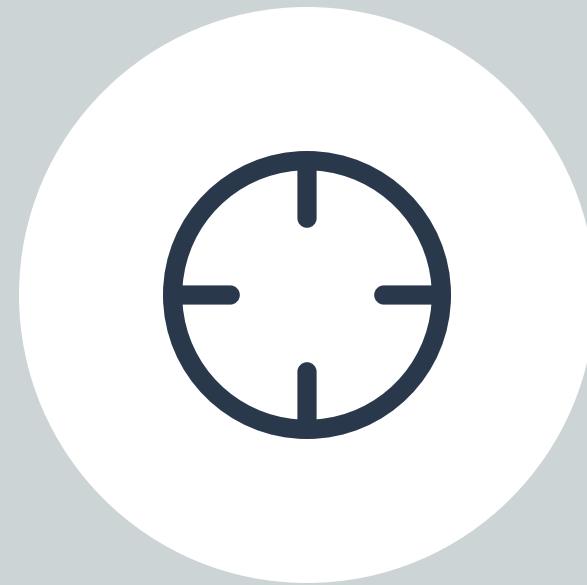
Establish who will be the user(s)

Design for roles or segments

Adjust for data skills



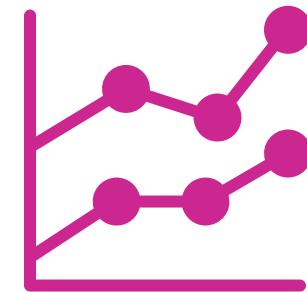
Honest Metrics



**Reporting or Exploration?
Is the metric actionable?**



Honest Charts



Answer the stated question

Reduce Chart Junk increase Data Ink

Design for clarity



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EXPERTS IN DATA



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QUESTIONS?

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