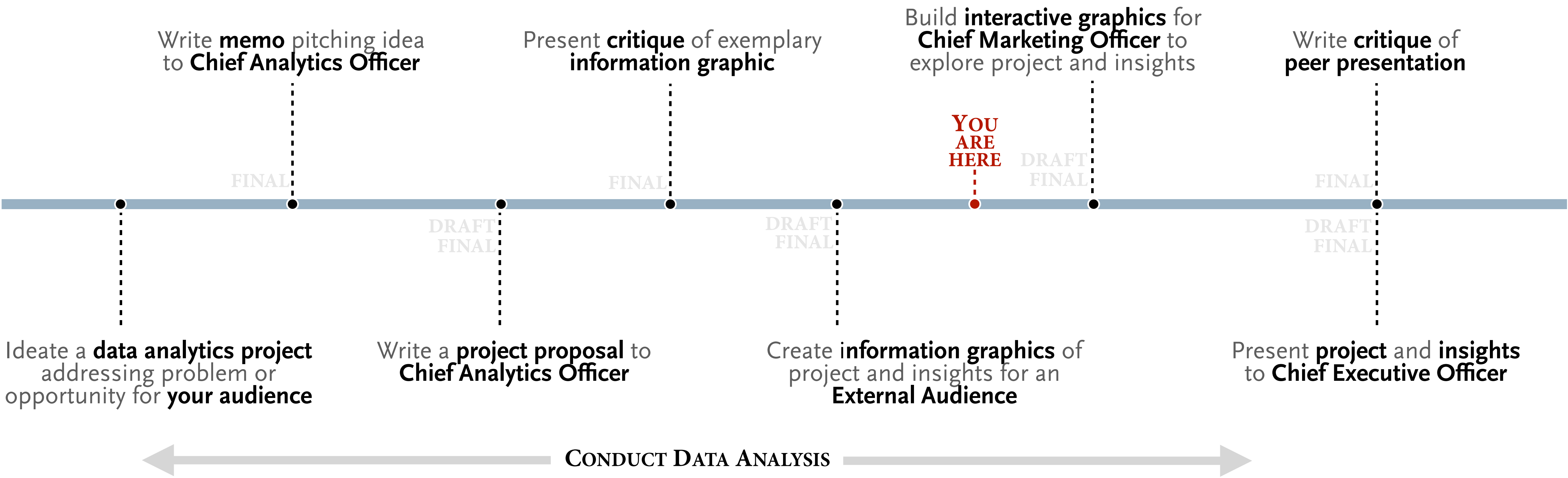


Storytelling with data

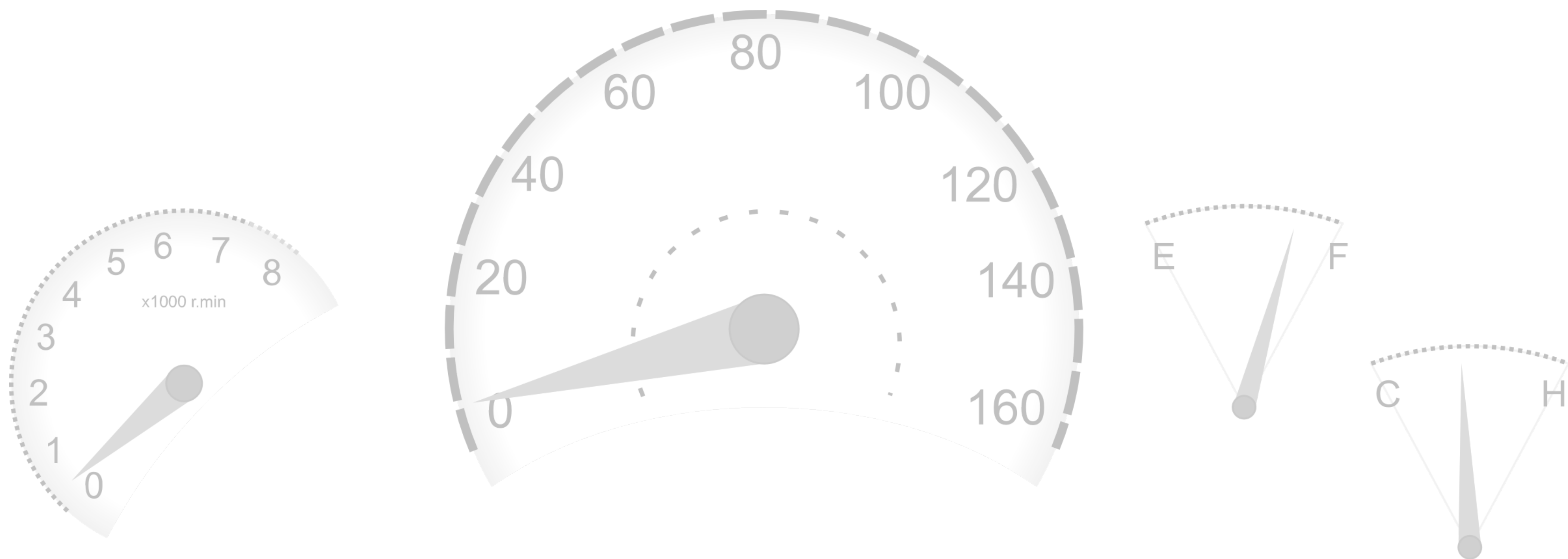
11 | Interactivity, broadened from data-driven graphics to whole communications

course overview, main course deliverables



visual narrative flow

visual narrative flow, “what do we talk about when we talk about *dashboards*?” — Sarikaya et al. 2019

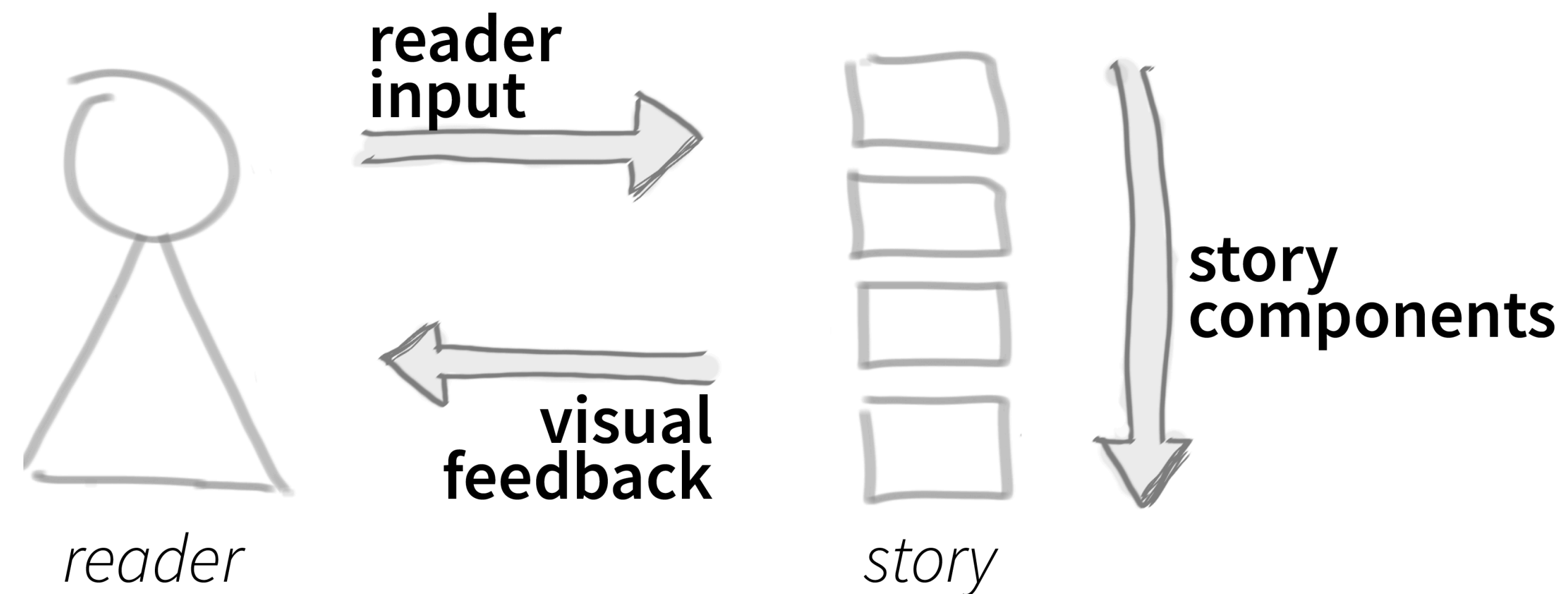


For a vehicle dashboard, who’s its audience? What’s its purpose? Needs words? — Audience and purpose drive design.

visual narrative flow, *if* a dashboard, the need for *guided* dashboards

An issue of communication is related to storytelling ability. Dashboards are increasingly used for decision making and communication across contexts: top-down, within departments, and across the organization. **Dashboards that capture only the data and not the semantics of the data, or what was done in response to the data, can be *insufficient* for communication purposes.** In BI, people often take screenshots of dashboards and put them into slide presentations in order to annotate them with contextual information, suggesting **a *need* for more powerful storytelling features.**

visual narrative flow, characteristics that affect experience

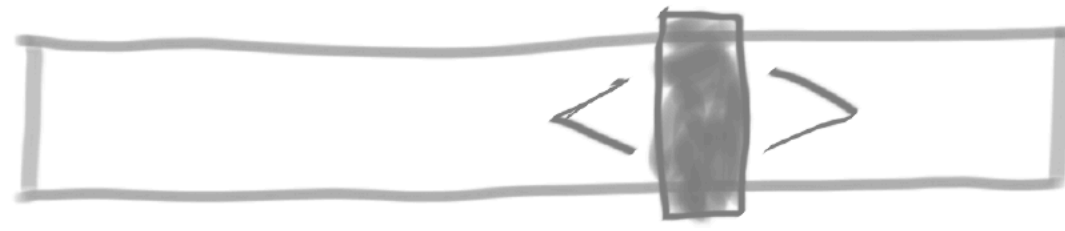


visual narrative flow | the congruence between *flow-factors*, i.e., 1) the way a reader navigates the story, 2) the visual components of the story, and 3) the type of visual feedback the reader receives; along with the nature of the data and facts that the author wants to communicate.

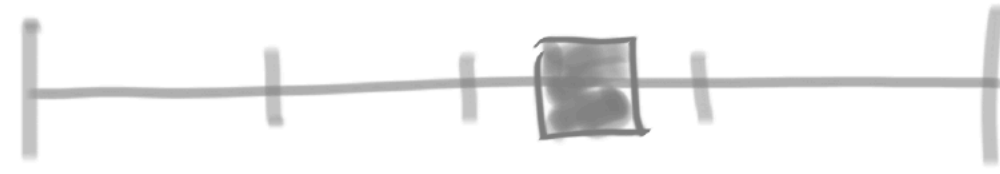
design space for *flow factors*, navigation input · level of control · navigation progress · story layout · role of visualization · story progression · navigation feedback



button



scroll



slider



text



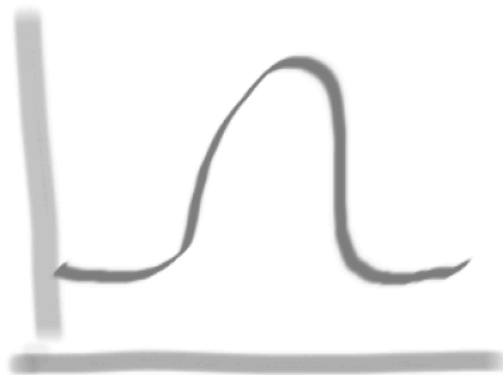
vis



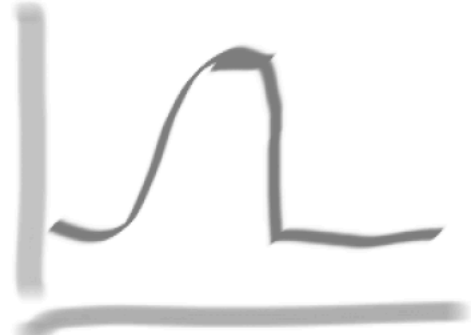
transitions



discrete



continuous



hybrid





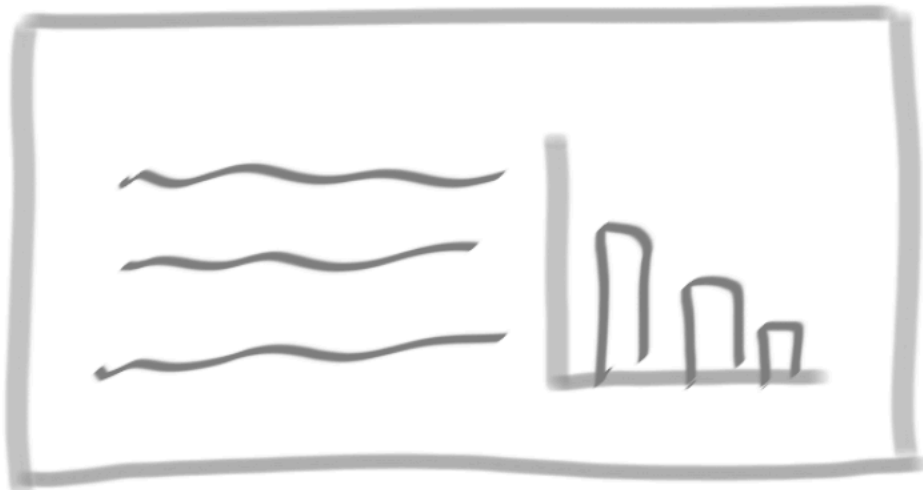
document



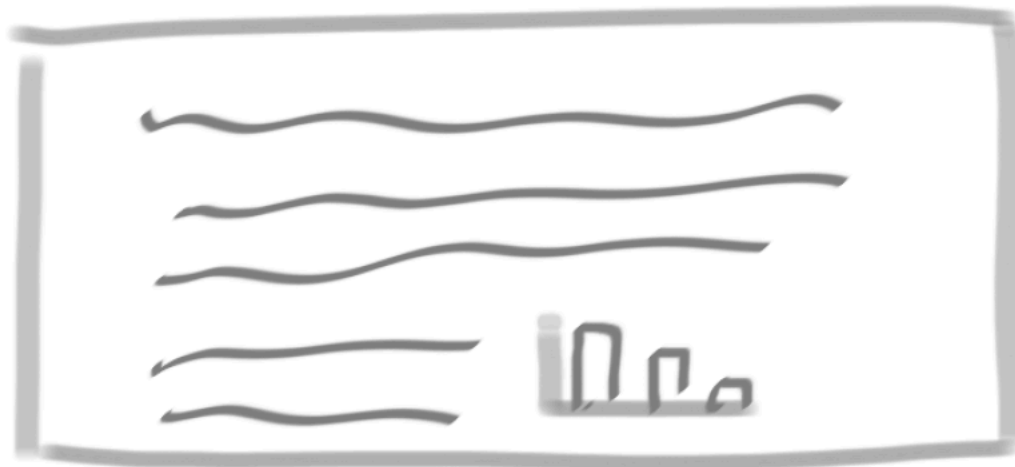
slideshow



hybrid



equal



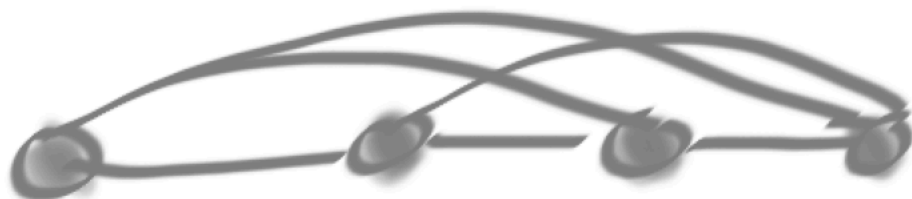
figure



annotated



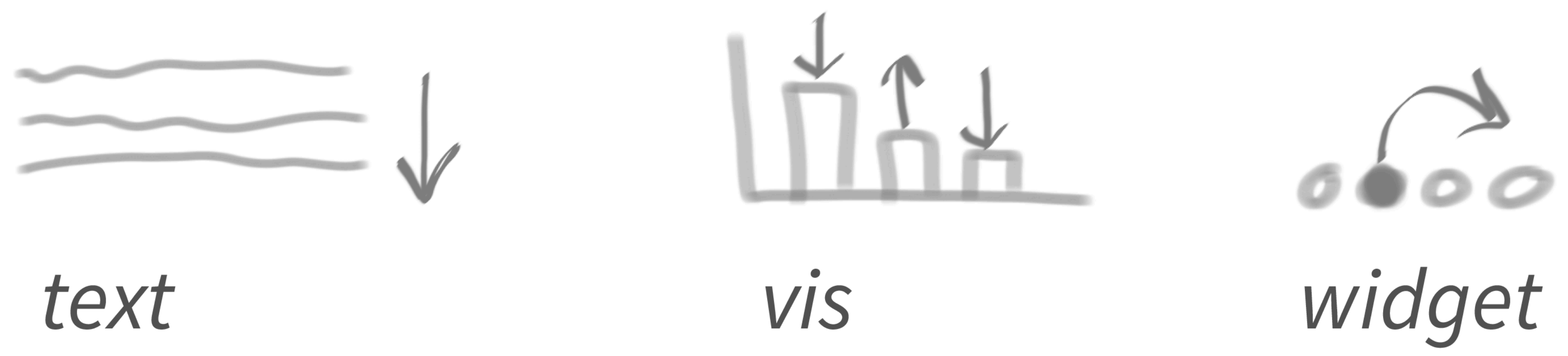
linear



linear skip



tree/graph



design space for *flow factors*, taxonomies like theirs can be helpful in seeing many example variations of these techniques

#	title	navigation input			level of control			navigation progress				story layout			role of visualization			story progression			navigation feedback			
		scroll	button	slider	text	vis	anim	text	dots	vis	other	doc	slide	cols	equal	figure	annot.	linear	skip	other	text	vis	widget	order
1	A Visual Introduction to Machine Learning	●			C	C	C			○		●		2	●			●			●			sync
2	Scientific Proof that Americans are Completely	●			C	C	D					●		2	●			●			●			sync
3	Fewer Helmets, More Deaths	●	●		C	C	D		●			○	○	2	●			●			●			vis
4	A 3-D View of a Chart That Predicts The Econ		●		D	D	D		●					1			●		●					sync
5	A Visual Analysis of Battle at the Berrics	●			C	C	D					●	●	1		●		●			●			sync
6	Budget Forecasts Compared With Reality		●	●	D	D	D		●		○		●	1			●		●				●	sync
7	Human Development Trends, 2005		●		D	D	D	●		●			●	1			●		●				●	hyb
8	Diary of a Food Tracker	●	●		H	H	H					○	○	1				●			●	●		vis
9	How Americans Die		●		D	D	D		●				●	1			●		●				●	text
10	Visualizing MBTA Data: An Interactive Explor	●			C	C	C					●		1		●	●	●			●			vis
11	The World According to China	●			C	C	D					●		1		●		●						swap
12	How the U.S. and OPEC Drive Oil Prices	●			C	H	D		●			○	○	1		●			●		●		●	sync
13	Scaling Mt. Everest: A Scroll Up the Icy Path	●		●	C	C	C			●		●		3	●			●		●			●	sync
14	Snow Fall: The Descent Begins	●			C	C	D				○			2	●			●			●			sync
15	The Story of Jess & Russ	●			C	C	C					●		1	●			●			●			sync
16	2014 Was the Hottest Year on Record	●			C	C	D			○		●		1			●					●		sync
17	The World's Ball	●	●		C	C	D					●		1		●	●	●			●			swap
18	The Russia Left Behind	●	●		C	C	C			●		●		2		●	●		●			●		sync
19	The Water We Eat	●			C	H	C			○		○	○	1-2	●	●	●	●			●	○		sync
20	Ski Jumping	●	●		C	H	C		●			○	○	1			●		●		●		●	swap
21	The Dawn Wall: El Capitan's Most Unwelcom	●			C	C	C			○		●		2	●		●	●				○		sync
22	Russia's Endgame in Ukraine	●			C	C	-					●		1		●	●	●	●		●	○		swap
23	At Top Colleges, an Admissions Gap for Mino		●		D	D	D	●				●		1			●		●			○		text
24	Greenland Is Melting Away	●			C	C	C			○		●		2			●	●			●	○		sync
25	How Different Groups Spend Their Day		●		D	D	D	●				●		1			●			graph		●		sync
26	Deconstructing the Past: A New Look at Histo	●	●		D	D	D				block	●		1			●		●		●		●	sync
27	Dollar-a-Day Schools	●	●		D	D	D				image	●		1			●		●		●		●	sync
28	ChopTainer	●			H	C	-					○	○	1		●	●	●			●	○		sync
29	Neurotic Neurons: An Interactive Explanation		●		D	D	D			○		●		1			●			tree				hyb
30	The Year Ahead 2016: 50 Companies to Watc	●	●		C	C	-	●				●		2	●		●		●		●	●		sync
31	The Museum of the World	●	●		-	C	C			●		○	○	1		●		●				●		sync
32	Bloomberg Carbon Clock	●			D	D	D					●		1			●	●						vis
33	Interactive: Global Emission		●		-	D	D	●				●		1			●		●			●		vis
34	A Map of Olympic Medals		●	●	-	D	D	●				●		1			●		●			●	●	sync
35	Shaun White's Double McTwist		●		D	D	D			○		●		1			●	●				●	●	vis
36	Bubble to Bust to Recovery		●		D	D	D		●			●		1			●		●		●	●		vis
37	A Nation Divided	●	●		D	C	D		●			○	○	1		●	●	●					●	sync
38	342,000 Swings Later, Derek Jeter Calls It a C	●			C	D	C					○	○	1	●			●			●			sync
39	52 Places to Go in 2015	●			C	C	-					●		2		●	●	●			●	●		sync
40	A Walk Through the Gallery				D	D	C					●		2			●					●		text
41	Illuminating North Korea	●			C	C	-					●		1		●	●	●			●	●		sync
42	Walking New York		●		C	D	-					●		2	●	●		●				●		vis
43	Why Infectious Bacteria Are Winning	●			C	D	D					●		1	●	●	●	●			●			text
44	Hell and High Water	●	●		H	D	D			○	time	○	○	1-2	●		●	●					●	text
45	Eigenvectors and Eigenvalues	●			C	C	-					●		1		●	●	●			●	●		sync
46	Film Dialogue from 2,000 Screenplays, Broke	●			C	C	D					●		1	●	●	●	●			●			sync
47	What's Really Warming the World?		●		H	D	D		●			○	○	1			●		●		●		●	sync
48	If the Moon Were Only One Pixel	●			C	C	-					●		1	●			●			●	●		sync
49	State of the Gadget Union	●			C	C	-					●		1		●		●			●	●		text
50	Why Pinellas County is the Worst Place in Flo		●		D	D	D		●			●		1			●	●			●	●		vis
51	The Dark Side of Guardian Comments	●			C	C	D	●				○	○	1		●	●	●			●			text
52	Trolls of the West	●			H	H	C					○	○	1		●	●	●			●	●		sync
53	Make Your Money Matter				H	H	C					○	○	1		●	●	●			●	●		sync
54	Bond: License to Drive	●	●		D	C	C		●			○	○	1			●		●		●	●		sync
55	Every Last Drop - Water Saving Website	●			H	C	C					○	○	1			●	●			●	●		sync
56	Green Honey	●	●		C	D	D		●			●		2	●		●		●		●		●	sync
57	The Clubs that Connect The World Cup	●			C	C	D					●		2	●		●	●			●	●		vis
58	Gestalt Principles for Data Visualization	●			C	C	D					●		2	●	●	●	●			●			text
59	Money Wins Elections	●			C	C	C					○	○	1	●		●	●			●	●		sync
60	The Air We Breathe		●		H	C	D			●		●		1		●	●				●	●		text
61	Most Unlikely Comebacks: Using Historical Da	●			C	C	C			●		●		2	●		●	●			●	●		sync
62	Started From The Bottom	●			C	C	D					●		2	●		●	●			●			text
63	A Game of Shark and Minnow	●			C	H	D		●			●		1-2		●	●	●			●	○		text
64	Fleeing Syria for Europe: Safaa's fatal journey	●			C	C	C			●		●		2		●	●	●			●	●		sync
65	New Energy Outlook 2016				C	C	D					●		2		●	●	●			●			text
66	Introducing Serio Verify	●			H	C	C		●		slider	○	○	1			●	●			●	●		sync
67	im Zentrum Des Geschehens	●			H	C	D					●		2			●	●			●			sync
68	Das Tunnelsystem der Rekorde	●			C	C	-			●		●		2		●	●	●			●	●		vis
69	These Memories Won't Last	●			C	C	-					○	○	1		●		●			●	●		sync
70	Fuglefeilet	●			C	D	D					○	○	3	●		●	●			●			sync
71	Gun Deaths in America		●		D	D	D	●				●		1		●	●	●		●	●			vis
72	A Trail of Terror in Nice, Block by Block		●		D	D	D			○		●		1	●		●	●			●			vis
73	The Sieve of Eratosthenes	●	●		C	D	D					○	○	2	●	●	●	●			●	●		text
74	The Wild Path: An Icelandic Adventure	●			C	D	C			●		●		2	●	●		●			●	●		sync
75	How Fed Rates Move Markets	●			C	C	C				○	○	○	1			●	●			●	●		sync
76	What ECB Stimulus Has Done				H	C	C			●		○	○	1	●	●		●			●			vis
77	Sizing Up The Olympics	●			C	C	C			●	slider	○	○	1			●		●		●	●	●	vis
78	The Internet of Things		●		D	D	D					●		1			●	●			●	●		sync
79	Setting the Pace: The Fed Acts, Markets Mov		●	●	D	D	H		●	●		●		1			●		●		●	●		vis
80	What I Saw in Syria	●	●		D	D	-				slider	●		1			●		●		●	●	●	sync

☒ scroll

☐ press/swipe

☒ continuous

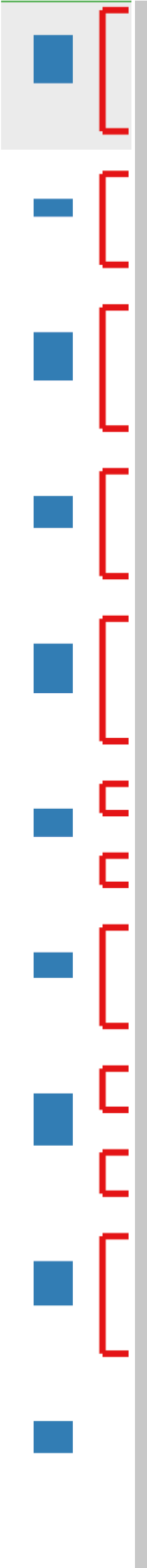
☐ discrete

☒ moving text

600

transition duration

☐ sticky text



Teaching Bar Charts through Data Visualization

showing the raw data

Data enables us to better understand the world around us.

Take this list of a few characters from the TV show, The Simpsons. It includes their names, genders, and their ages.

Let's start with just the 5 main Simpson family characters.



	Gender	Adult
Lisa	F	N
Bart	M	N
Homer	M	Y
Marge	F	Y
Maggie	F	N

design space for *flow factors*, *general preferred approach of “business intelligence experts”, one study*

Interactivity. ... *When creators were asked if they want the visualizations in the reports to be completely interactive and encourage readers to interact with them (e.g. using drill down/up, filter, link & brush), four of our experts prefer to have interactive visualizations that permit linking and brushing (i.e. data selection).*

But **they would limit the more advanced interactions** such as drill down/up or filtering.

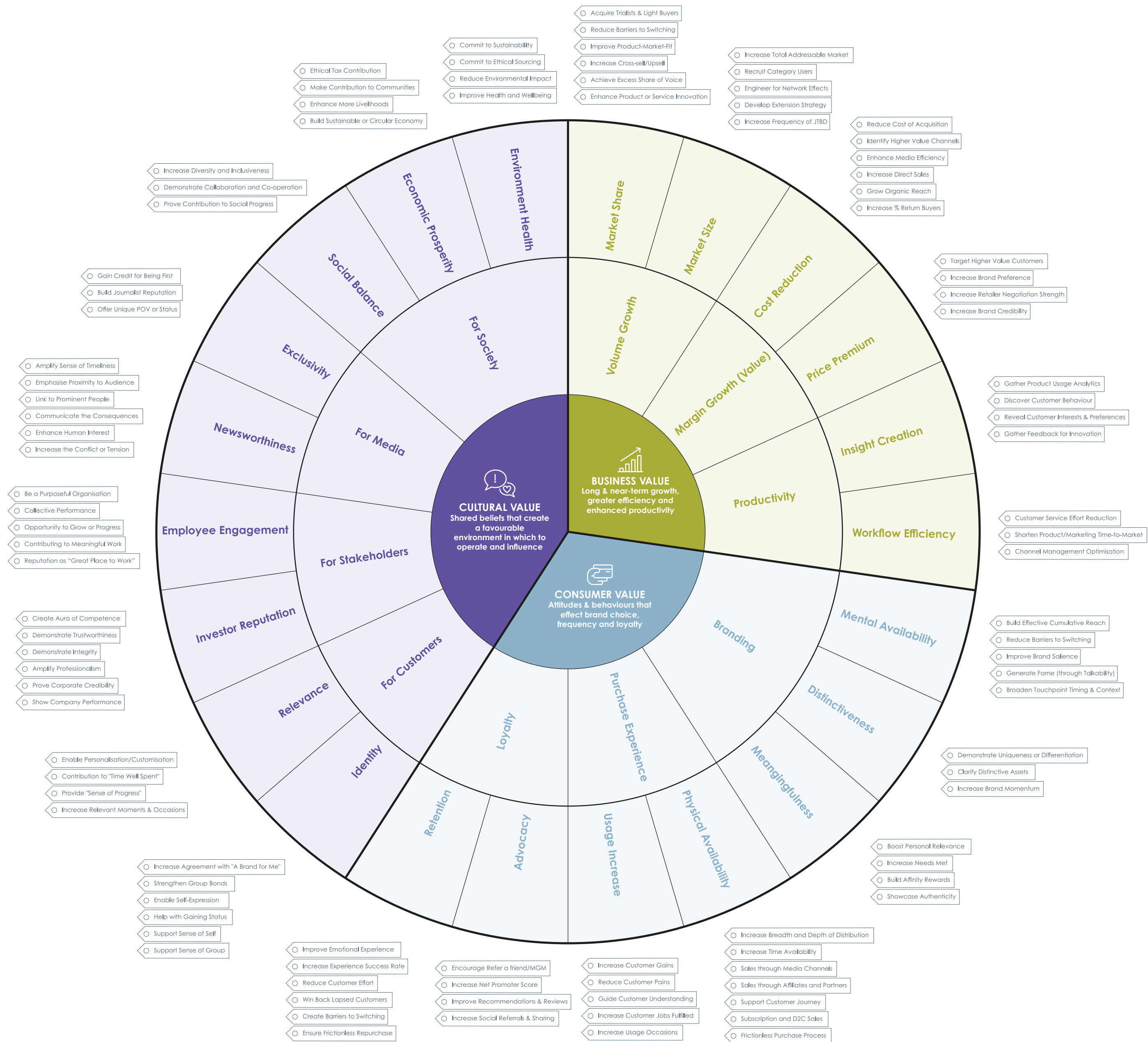
They felt that **all the data needed to tell the story should be displayed clearly in the report without the need to explore the data further....**

Thus authors feel business stories should be mostly author-driven and constraint, known to work best when the goal is storytelling or efficient communication.

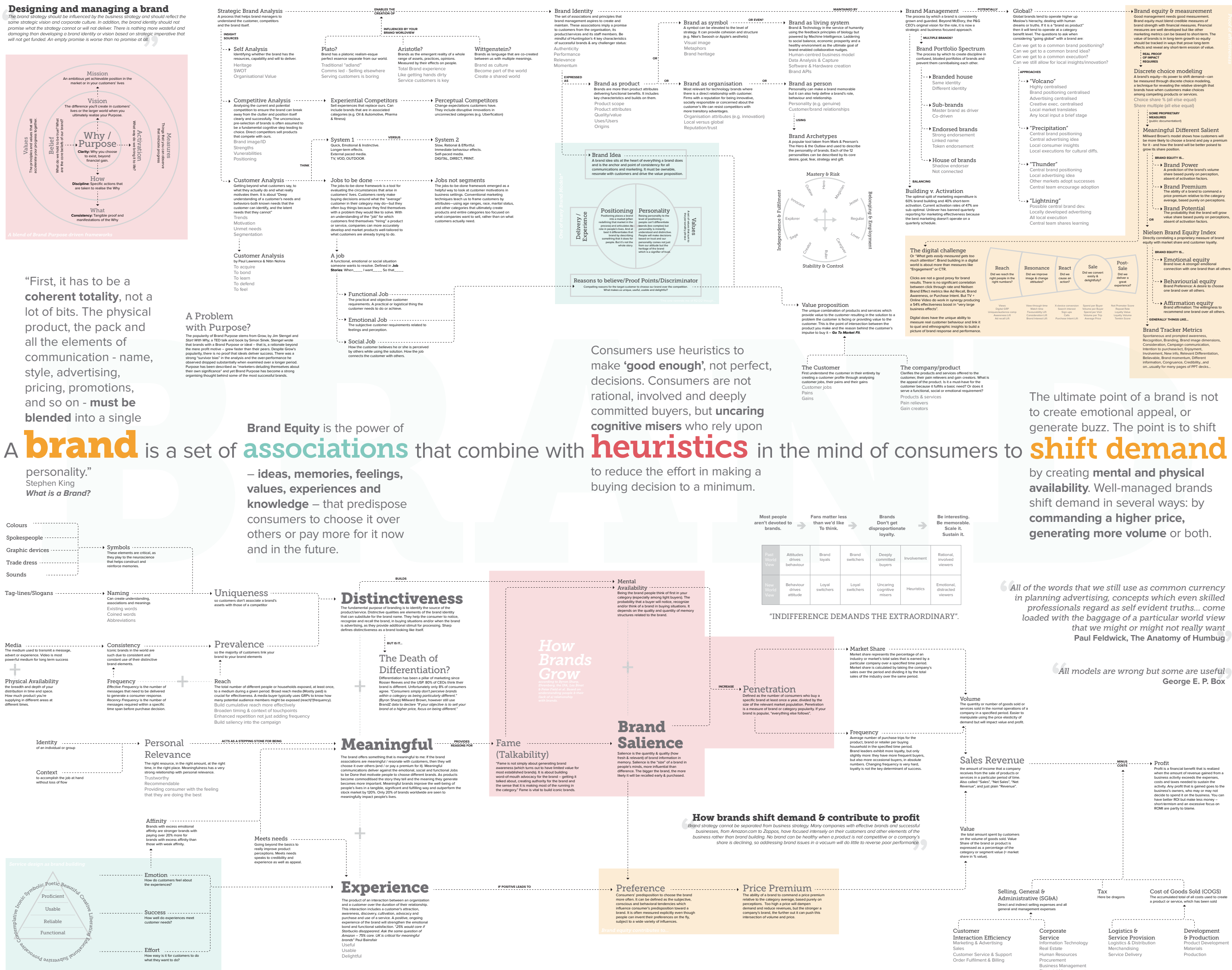
Agree? Disagree? Explain.

**minimal example — interactive, exploratory
graphics for Lyft’s marketing executive**

minimal example, for what things are a marketing executive responsible?



minimal example, for what things are a marketing executive responsible?



minimal example, *how do marketing executives work with — and reason about — data?*



**Data drives marketing,
can reveal biases**

This marketing director knows that marketing is data-driven. Further, “Data can often show the basis for our biases and intuition.”

**Limitations in
data need to be
understood,
addressed**

He also understands issues with use of data:

Sources of unique data can be limited.

Data is often corrupted, unhygienic, or mistransformed when converting to information.


Data is often guesstimated, panel-skewed, inaccurate, and not proven, but at the same time “treated as gospel.”

Measured data is only part of the story; things that go unmeasured are important and can change what the total information mean from a business standpoint.

**Use of data is
about truth and trust,
requires openness
about source and
methodology**

“The debate about the use of data in marketing and communications is really a debate about truth and trust, the two biggest issues in the world today.”

minimal example, *what's the background of the head marketing executive for bikes at Lyft (CitiBike)?*



Message

...

lyft

Lyft

I

Imperial College London

Azmat Ali · 3rd

in

Head of Rider Product Marketing at Lyft

San Diego, California, United States · 500+ connections ·

Contact info

About

Results driven executive with over 25 years experience in leading start up, high growth and mature organizations through rapid growth and change worldwide. Consistently successful in identifying and developing growth opportunities, achieving operational results, building highly effective organizations and collaborating across organizational boundaries. Expertise includes management and diffusion of innovation, customer insights that drive action, consumer, SMB and enterprise customer segments, retail channel and international markets

Specialties: Strategic Marketing, Developing and delivering growth strategies, Management of Innovation, Consumer Marketing. Growth mindset. Innovation Funnel Management. New Category Creation. Excellent people and business management. Digital Marketing. PPC SEO and full funnel optimization. Data Analytics

Experience

lyft

Head of Rider Product Marketing

Lyft · Full-time

May 2020 – Present · 11 mos

San Francisco Bay Area

hp

HP

3 yrs 11 mos

Head of Innovation and Incubation

Nov 2019 – May 2020 · 7 mos

Global Head, Consumer Product and Segment Marketing

Jul 2016 – Nov 2019 · 3 yrs 5 mos

Palo Alto

evernote

VP Brand and Marketing

Evernote

Feb 2016 – Jul 2016 · 6 mos

San Francisco Bay Area

avegant

Chief Marketing Officer

Avegant

Mar 2015 – Mar 2016 · 1 yr 1 mo

San Francisco Bay Area

lytro

Vice President Marketing

Lytro Inc.

Jan 2014 – Mar 2015 · 1 yr 3 mos

Mountain View, California

Show 5 more experiences

Education

I

Imperial College London

MBA, Marketing and Innovation

1990 – 1991

Kingston University London

Kingston University

Bachelor of Engineering - BE, Electronic Systems Engineering , Honours

1986 – 1990

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Explore conditions of January, CitiBike ridership for segmentation and targeting.

How to explore : **Hovering** over any line will link the four variables — *weather*, *rides per minute*, *average age*, and *percent female* — and identify the *date* and *weekday* selected.

Quick takes : The morning and evening weekday peak commutes stand out from weekends, of course. But more

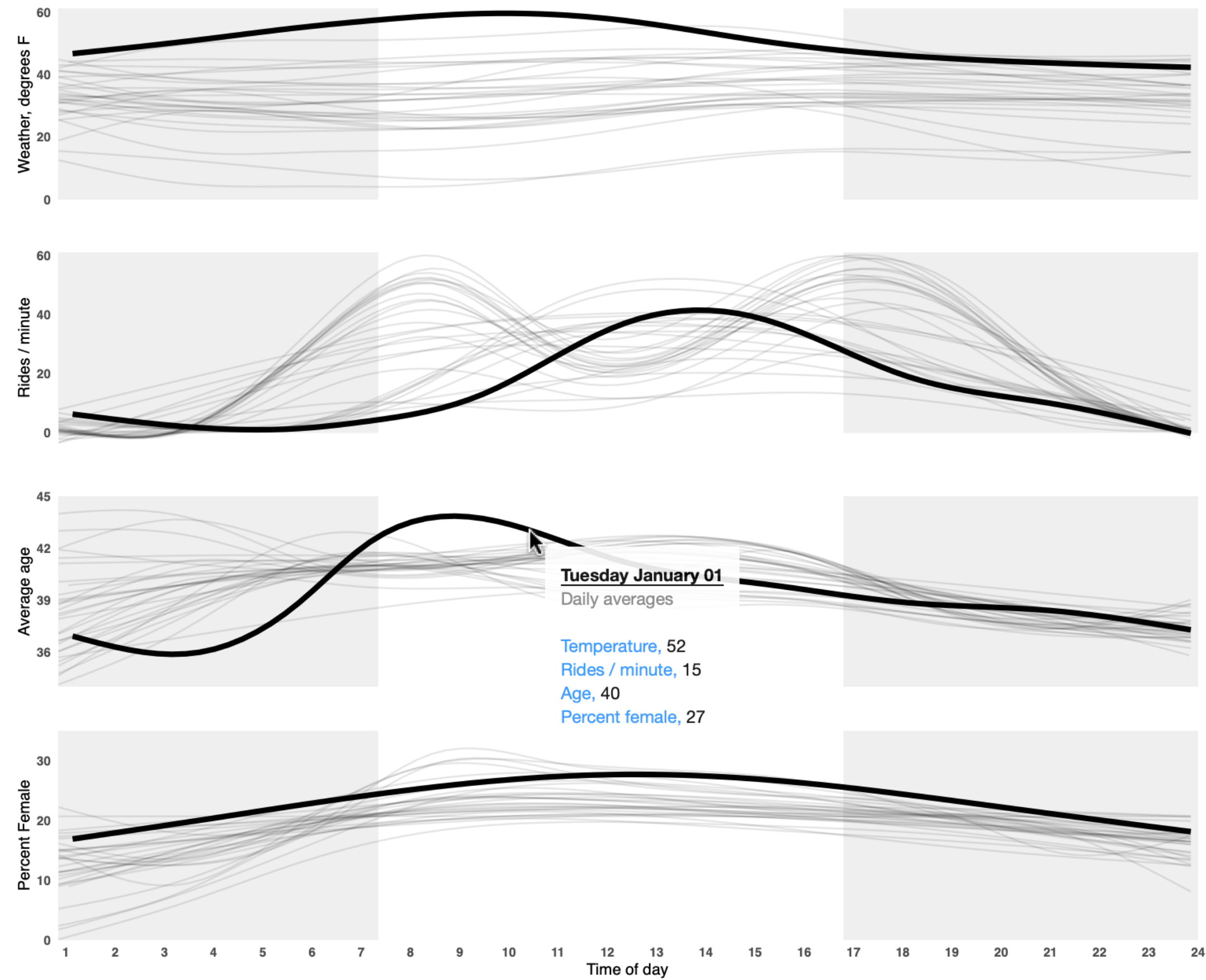
interestingly, on New Year's Day, our warmest of the month, you'll find a significant swing in average age as night became morning; were our younger commuters out late, sleeping in? Below are **smoothed functions** of the data.

Do rider **attributes** correlate with lower usage? Are we missing key target audiences?

Are there better **temperatures** for us to trigger marketing messages to encourage rides?

How can we **segment** our audience to find opportunities for increasing ridership?

Are there better **times of day** for us to trigger marketing messages to encourage rides?



The lines show cubic splines, smoothing variation of each variable over the day. Sources: NYC Open Data, The Open Bus project, and Weather Underground. 2019 January 1-31. Design and code by Scott Spencer. 2021 March 31.

group work

resources

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