STAYING CLOSE

TO ORDONARY CHARTS

Charts have become ubiquitous in the corporate world. You can't go through a report or view a slide deck without seeing a chart. And business dashboards are full of them, of course! Most of these fall into what I call the "ordinary charts" category. You could also call them standard, traditional, or straightforward charts. They include line charts and bar charts, and their sole purpose is to show the data. Many chart purists glorify extreme versions of these charts, and believe that every pixel should be dedicated to showing data in its most minimal form. No embellishments allowed!

It's hardly a wonder that these straightforward charts are everywhere: Many people know how to interpret them without needing an explanation. They are hugely important because they allow people to grasp data-based insights quickly and easily.

But therein lies the crux. How do you make an impact if your audience has seen hundreds of line charts? How do you make yours stand out? How do you inject some creativity into even the most common chart without diminishing its effectiveness?

In this section, I'll demonstrate design techniques that can enhance a traditional chart. I'll explain how to add small but significant touches to the design, use uncommon chart forms, and even merge two standard charts to create something completely new and exciting.

By the end, you'll be able to take the ordinary chart forms that we all know and love and make them more suitable for your data, more memorable, and more effective!

LESSON ONE

GIVE A CHART

The topic or subject of the data can be great inspiration to elevate a straightforward chart

I love to customize each project according to the dataset, even if there isn't much data to work with. I try to add something to catch the viewer's eye, to make them curious about a visual that they haven't seen before.

Consider bar charts. Bar charts are everywhere! It's impossible to recall all the bar charts you've seen. I've personally created more bar charts than any other chart type, particularly in my preliminary analysis stage, when I'm exploring and trying to wrap my head around a new data set. I also often use them as smaller, supplemental charts around a central, more prominent visual. However, when a bar chart (or any other straightforward chart type) needs to be the primary visual, I try to go beyond the default. I

SOMETHING UNIQUE

look to elevate it in a unique way and make it stand out from all the other bar charts in the world.

Depending on the data you're working with, this process can be easy or challenging. I find that when working with data that has lots of elements (rows) or variables (columns), customization happens more naturally. I see myself as "painting with the data." The more data I have available, the bigger my toolset. I have more opportunity to create something visually diverse using a variety of shapes, in various sizes and colors. Smaller data sets don't often allow me to paint so freely. I need to sit down and think about how to make the visual more memorable and engaging.

Whether I'm working with an expansive data set or a succinct one, I first consider the data's topic and what each data point represents. If the data set is about people, cities, technology, or nature, for instance, I'll tap into those categories for creative inspiration.

MAKE IT MORE HUMAN

When I'm representing individuals within my data visualization, I try to make each person visible—showing each as a separate entity.

An almost stacked bar chart

BUSINESS | 2019 | ADYEN

investors.adyen.com/financials/h2-2018

For example, the grid of (somewhat) stacked bar charts in figure 1.1 puts a twist on traditional stacked bar charts. Of all my creative work, this is the closest I've gotten to featuring a standalone bar chart as the primary visual. I created it for a bi-yearly shareholder letter for Adyen, a payment technology company in the Netherlands. It shows the one-year growth of full-time employees (or FTEs) in each office. The number of employees at year-end 2017 is in bright green and the number of added employees at year-end 2018 is in dark green.

Since I was creating a chart about a relatively small number of people, I wanted to draw each person separately. I especially wanted to emphasize the individuals running an entire office by themselves. After some rough sketches, I eventually made a visual that looks like a stacked bar chart (if you squint your eyes a little), but where each employee is a single diamond.

Initially, I used a square to represent each person. However, I found that rotating the squares 45 degrees to form diamond shapes was a little more visually attractive (and as a metaphor, I felt that a diamond shape looked more like a "human" shape than a square).

I could have styled each diamond a little differently. Humans are all unique, and adding a little randomness to the icons makes them appear more organic, more natural, more human. (I'll dive deeper into randomness as a creative tool in Lesson 12.) However, in this case, it was better to show restraint and make each icon look the same. Embellishing the diamonds further simply wouldn't have been a good visual match for Adyen's brand style and the report's overall design. In addition, making each diamond a little different (in size, for example) would obfuscate the stacked bar chart shape I was going for.

There are no strict rules that determine how far you can go in turning a more standard chart into something unique. You have to rely somewhat on your gut, and ask yourself,

Figure 1.1

Adyen's employee growth from 2017 to 2018, by office.

1.1

"Does it feel right?" You develop this intuition with experience, but, along the way, you should:

- Consider the importance of the visual. This was one of many charts in the whole report and not the most important one. I made the most important charts in the report as visually attractive and memorable as possible and while keeping the others more straightforward.

- Make it fit with the overall brand style (if applicable).

- Ensure the chart still reveals the same insights as the more standard version would have.

Just two intentional design decisions—to plot individuals instead of grouping them and showing them as diamonds instead of squares—was all it took to spruce up a standard chart. By preserving simplicity, this visual has all the benefits of traditional stacked bar charts while sparking intrigue and offering a little more detail.

DRAW INSPIRATION FROM PHYSICAL SHAPES

Let's look beyond human-centric data. If your data points represent any kind of tangible entity (cats, clothes, computers) or have a relationship to something physical (such as data about daylight hours corresponding to the sun), you can use that physical subject for inspiration. You can also find inspiration for concepts with a clear visual mark or metaphor (such as showing love through the heart shape). Basically, you have the liberty to use any form, silhouette or shape—whether simple or complex—that represents the data.

Personally, I try not to be too on the nose. Icons might come to mind quickly. However, an overload of icons makes a visual appear less refined. It puts the viewer's focus more on the icons themselves, not the data. Furthermore, using many icons often creates visual clutter. The more complex the icon's shape, the less elegant I generally find the result.

Nevertheless, that doesn't mean an icon can't be a good jumping-off point.

I'm not against icons completely; there's always an "it depends." However, I would caution you to apply icons only when you've considered it thoroughly, and even then, use them sparingly and make sure they complement the rest of the visual.

1.2

Triangle flights

BUSINESS | 2018 | TRANSAVIA
visualcinnamon.com/portfolio/a-year-in-flights

Often, when I want to represent a single data point, I opt for the tried-and-true circle. Circles are universally recognized as individual data points. A circle is the most minimal shape, perfectly symmetrical; dot your pen on a piece of paper and you have a circle. It's a
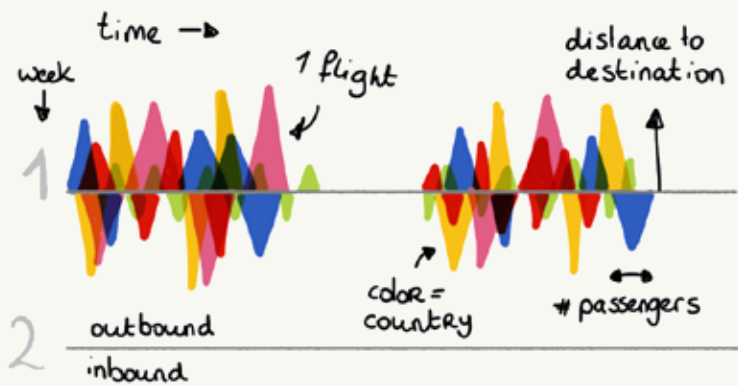
1.3a

Figure 1.2

A sketch of the various ways each flight is encoded through its triangle shape, orientation, position, and color.

Figure 1.3a & b

The final poster of "A Year in Flights," showing a year of Transavia's flights, using triangles to represent each plane.

fundamental shape, and available in any graphical software. But there are other options that fall somewhere between circles and very complex shapes that are ripe for exploration.

Consider, for instance, the piece I created for Transavia, a Dutch airline. I placed all their tens of thousands of flights from the previous year in one visual. I didn't use tiny airplane icons to represent airline flight data. Instead, I used a more schematic idea of airplanes: elongated triangles. As shown in my sketch in figure 1.2, there were various ways that I encoded the flight data into triangles. For instance, the taller the triangles, the farther the distance to the destination. The wider, the more passengers. Up or downward pointing triangles represent outgoing or incoming flights, respectively. Color shows the country the flights were going to (for outbound) or coming from (inbound).

In figure 1.3, you can see the final result that was printed on a canvas spanning almost 3 meters wide by 1 meter high (9'10" by 3'3").

Easter

Liberation Day

I also thought the elongated triangles evoked the airplane exhaust trails that fan out as the particles dissipate. This symbolism, in addition to the schematic airplane shape, made triangles a more natural shape than dots to represent each flight.

Vinyl record circles

PERSONAL | 2016 | THE TOP 2000 ❤ THE 70S & 80S
top2000.visualcinnamon.com

Figure 1.4 shows a poster I created for "Data Sketches." It explores the top 2,000 best songs—as chosen by a Dutch audience—where each song is a circle. The songs are clustered by year of release and plotted along a diagonal axis with 1960 at the bottom left and 2010 at the top right. The bigger the circle, the higher the position in the top 2,000.

As this dataset represented music across the decades, I made the top 10 songs stand out by designing them to look like vinyl records. I was lucky that a vinyl record is circular and quite schematic in its basic design; I only had to add two smaller circles to the main black/gray circle to create the record's label (in red) and the tiny hole in the middle (in white).

Making each of the 2,000 circles look like vinyl records would have overloaded the visual, resulting in a cluttered mess. Instead, by only applying this embellishment to the top 10 songs, I made those data points stand out. The vinyl records add that small "something" to make the visual more unique.

Figure 1.4a & b

"The Top 2000 ❤ the 70s & 80s" visual (a) and the full poster (b).

1.4a
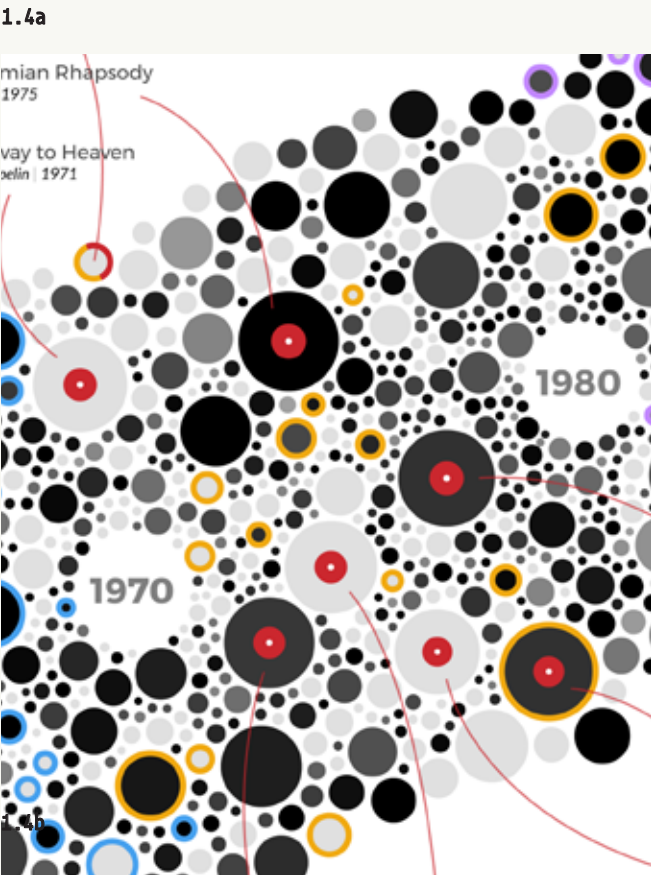
TOP 2000 ♥ 70's & 80's

Since 1999 the 2000 most popular songs of all time, as voted by the show's audience, are played on Dutch national Radio 2 in a yearly marathon. The 2000 songs are on the air between noon on December 25th until New Year's Eve and over half of the Dutch population listens to the Top 2000 each year.

Each ● to the right represents a song in the Top 2000. It is placed according to its year of release. In the legend below you can see what the size and color of a song means.

The bulk of the songs and most of the top 10 are from the 70's & 80's…

Position in Top 2000

1 10 25 50 100 250 500 1000 2000
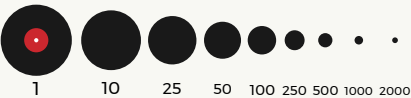
Highest position reached in weekly Top 40

1 — 40 never reached the top 40*

Golden oldie
The oldest song in the list, Billie Holiday's *Strange Fruit*, is from 1939. It's 17 years older than the second-oldest song. If it will make the 2017 edition remains to be seen, it's barely in now, on position 1989.

Year of release

Newly discovered
Although already released in 1972, *Starman* from David Bowie is the highest new song in the list. It never appeared in the previous 17 editions of the Top 2000 and entered in 2016 on position 270.

Prince
Another legend who passed away in 2016 (on April 21st). It seems that new people discovered his works, with all 9 songs that were in 2015's list rising significantly and 8 more songs joining in 2016.

6 Avond
Boudewijn de Groot | 1997

High riser
Adele's *When we were young* from 2015 apparently needed some time to become fully appreciated. It is the song with the highest increase in the list, shooting 1599 places from position 1743 to 144.

1 Bohemian Rhapsody
Queen | 1975

3 Stairway to Heaven
Led Zeppelin | 1971

2016's most popular
The swinging new song from Justin Timberlake, *Can't stop the feeling*, is the highest newcoming song that was released in 2016. It is part of the soundtrack of the animated movie *Trolls*.

8 Mag ik dan bij jou
Claudia de Breij | 2011

Pokémon
Already in the list in 2015 due to a social media campaign, nobody can deny the impact that Pokémon had on many people's daily lives in 2016. *Gotta catch 'em all* by Jason Paige rises 1434 spots to position 232!

10 Black
Pearl Jam | 1991

2 Hotel California
Eagles | 1977

7 Heroes
David Bowie | 1977

9 Wish you were here
Pink Floyd | 1975

David Bowie
Passing away only days after the release of his new album *Blackstar* on January 10th 2016. His legend remains strong with 26 songs in the Top 2000. His most popular song *Heroes* jumps from 34 to position 7.

The Beatles
No other artist or band has more songs in the Top 2000 as the Beatles. With 38 songs they are responsible for 14% of all titles before 1970. Nonetheless, only 5 years ago they still had 50 songs in the list.

4 Piano Man
Billy Joel | 1974

5 Child in Time
Deep Purple | 1972

1960 1970 1980 1990 2000 2010

Spread across release years of the 2000 songs
For 4 editions of the Top 2000
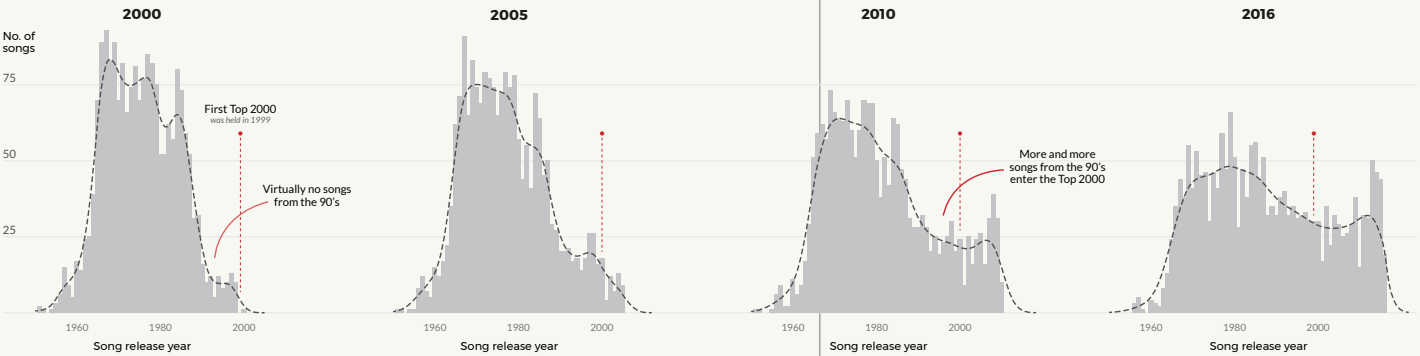
The charts on the right represent all 2000 songs from 3 past editions of the Top 2000 (held in 2000, 2005, 2010) and the most recent 2016 edition.

The songs are stacked according to their year of release. The higher a rectangle, the more songs that are in the Top 2000 list from that release year.

The black dotted line represents a smoothed curve over all 2000 songs. This makes the comparison between the 4 charts easier.

2000
No. of songs
75
50
25
First Top 2000 *was held in 1999*
Virtually no songs from the 90's
1960 1980 2000
Song release year

2005
1960 1980 2000
Song release year

2010
More and more songs from the 90's enter the Top 2000
1960 1980 2000
Song release year

2016
1960 1980 2000
Song release year

But they're losing tracks to the new Millenium

It makes sense that the Top 2000 will be more spread out for each new edition, since there are more songs to choose from. However, if we compare the distributions of the Top 2000 songs over 4 editions, we see that, especially, the 90's has been gaining a lot of popularity.

Even though all songs from the 90's were out in the 2000 edition, only a few songs from that decade were chosen. Whereas in the 2016 edition the number of songs from the 90's has risen significantly. This could be due to a new generation who has grown up during the 90's taking over from those who voted in the early 2000's (who apperantly didn't appreciate the new music).

1.5a

1.5b
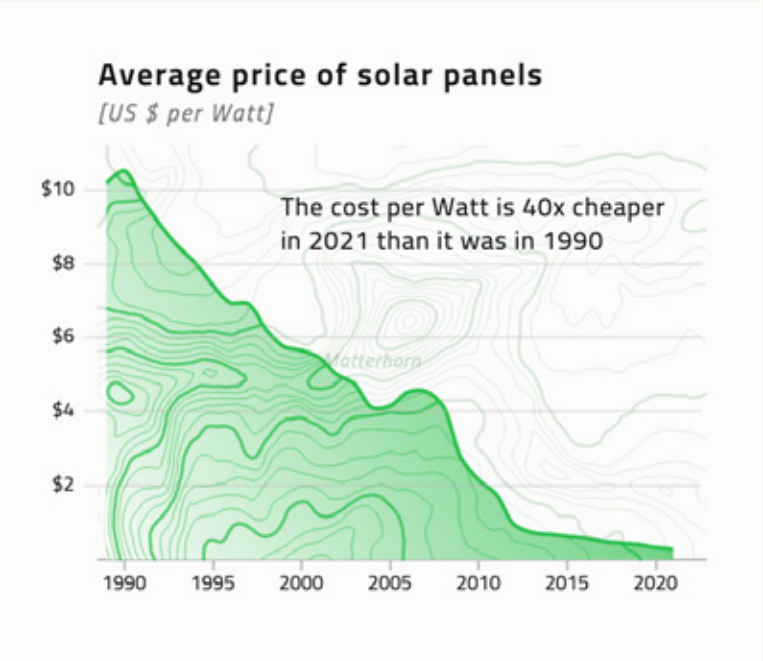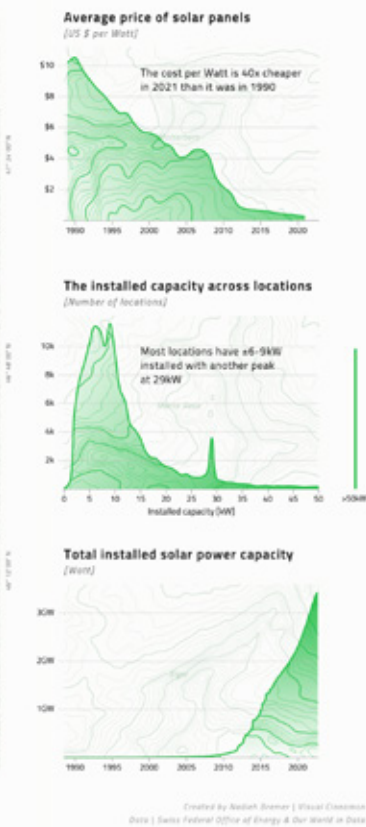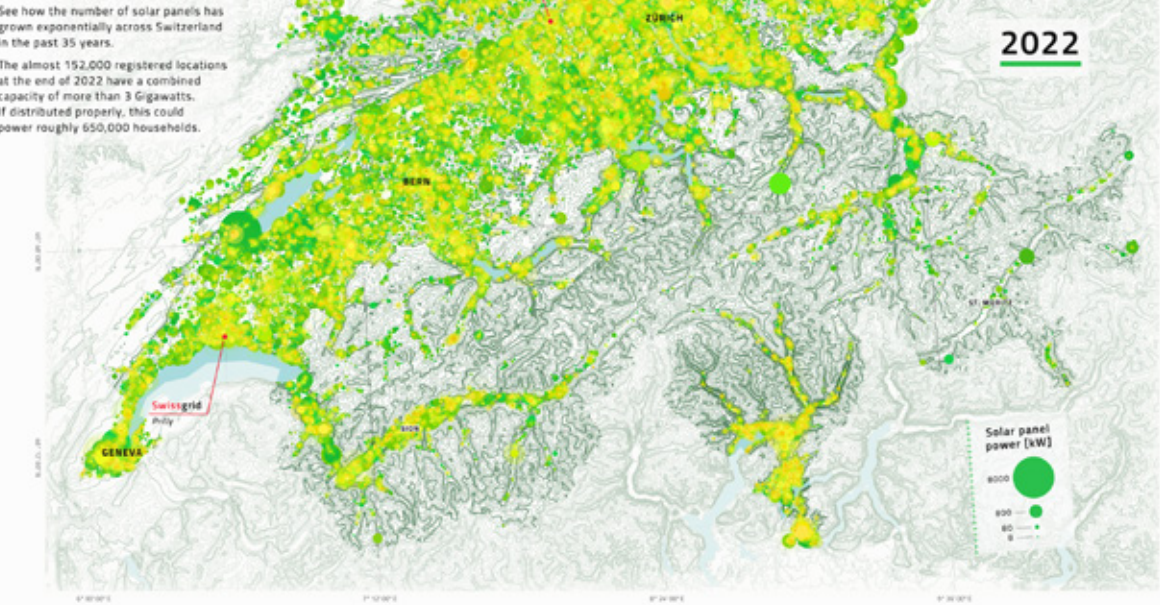
My client, Swissgrid, the Swiss national electrical grid company, wanted to add a few extra insights to contextualize the main map, such as the decrease in the average price of solar panels. Line charts made the most sense for these smaller datasets. However, the simple line charts I initially created looked too plain compared with the detailed map. Design-wise, the elements didn't go well together.

Since the three line charts looked a little like mountains, and the primary visual was a map of Switzerland, a country known for its peaks, I applied the topographic contour lines from the main map to the background of each line chart. I selected contours from the regions around three famous Swiss mountains. The background contours don't add data insights, but they bring the design style of the central map into the line charts, visually connecting them. In addition, the contour lines made the line charts a bit more interesting to look at and more memorable.

It's subtle, but if you look closely, the contour lines below the chart's plot line are greener and thicker than the lines above the plot line. Furthermore, a subtle green gradient from the top right to the bottom left adds a little extra touch to the design to make the area below the line chart stand out more against the background.

Five circles instead of one

PERSONAL | 2016 | OLYMPIC FEATHERS
olympicfeathers.visualcinnamon.com

The visual in figure 1.6 shows every gold medal winner in the Summer Olympics from the first games in 1896 up to 2016, split by sport, edition (year), event, gender, and continent of the winning country. It was another personal project I created for "Data Sketches."

I'm not saying that inspiration can never come from anything else than the data or its topic. Sometimes, inspiration strikes out of the blue. This doesn't happen often, and I generally think the ideas that relate to the data or topic are stronger.

USE THE DATA'S TOPIC

Instead of focusing on the data points (like individual people or individual songs), you can also take a step back and look at the data set as a whole. The overall subject can often act as a form of creative inspiration. Is the data set about something as broad as movies? About something more narrow, such as science fiction movies? Or something super specific—data that perhaps dives deep into one particular movie?

Line charts with map backgrounds

BUSINESS | 2023 | SWISSGRID
visualcinnamon.com/portfolio/swissgrid-gencoop

Figure 1.5 shows one of the final frames in an animation about the growth of solar panels across Switzerland. The main visual is a map of Switzerland with circles that "pop up" at each new location that added solar panels over the past 35 years. The circles first appear in yellow and slowly turn green as the animation progresses.

Figure 1.5a & b

One of the final frames in an animation about the rise of solar panels in Switzerland over the past 35 years (a) and a zoomed-in view of the line charts (b).
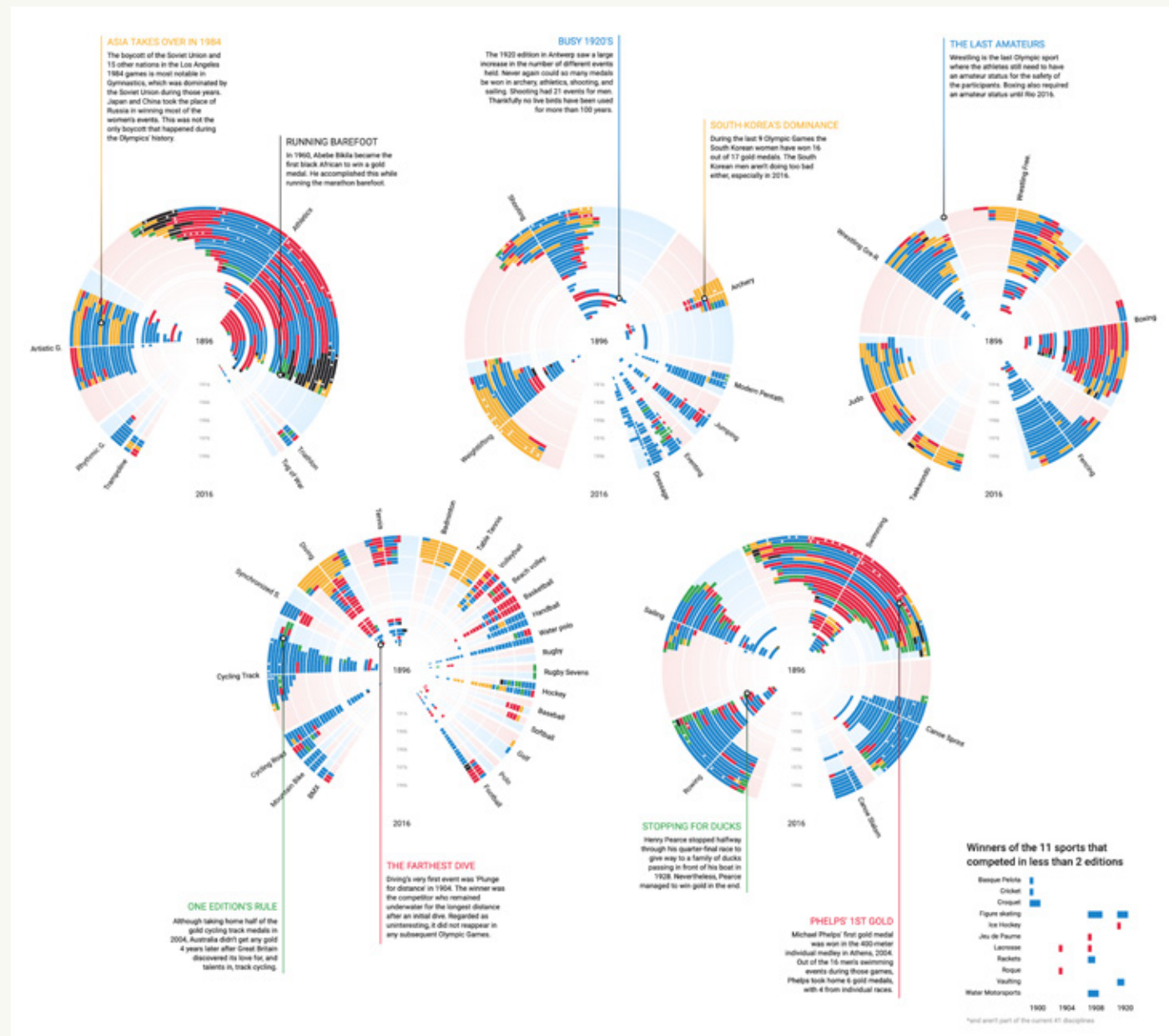
1.7

Figure 1.6

"Olympic Feathers" (without the introduction and legend) showing some 5,000 gold medal winners from every Summer Olympics.

Around the time that I was looking at the data, I randomly happened to see an image of a fanned peacock tail. I began sketching circles, as I was inspired by both the circular shape of the tail and the symmetry of the individual feathers. However, after analyzing the data set and drawing some sketches (figure 1.7), I realized that one large circle wouldn't fit all of the data points unless I made each gold medal really, really small. Then it occurred to me to use the five rings of the Olympic symbol since it's so iconic and recognizable! Although the final design did not have the feather shape, I still named the project "Olympic Feathers" as feathers had been in my mind during the whole process.

Figure 1.7

A sketch where I was trying to figure out how to lay out all of the medals.

Thinking back on it now, I'm surprised that I hadn't thought of using a layout with the five circles from the very start. However, I often dive in straight away when I find a new, exciting project to work on; I get pulled by the "current" of whatever idea or thought I have in that moment. Only once I stumble across my first big problem do I "come back up for air" and think about it more holistically. To this day, it's a habit that I'm struggling to break!

I'll admit some topics aren't terribly inspiring, especially the more stuffy ones, such as financial data sets from banks. No more dollar signs or stacked coin icons, please. As an alternative, I suggest focusing your creative energy on the chart's design, such as the use of subtle color gradients (which I'll go into in Mini Chapter IV), the font choices, or the color palette.

There isn't one specific way to take an ordinary chart beyond the default, to make it stand out and be memorable. Nevertheless, I hope the specific examples I've shown here give you new ways to think about using the data points—as well as the data themes and associations—as a source of inspiration.

LESSON SEVEN

SHOW
ALL

Show the most granular level of detail in the dataset to supply a reader with intriguing context

One way to create visual diversity in a data visualization is to draw many visual elements, many points on the page. Whenever possible, I prefer to visualize the most granular level of detail I have in my data, rather than the aggregated values such as the sum or average. For example, in a visualization about daily air travel, I'd prefer to visualize each separate flight that occurred during a day instead of the total number of flights per airline per day. I love how using granular data gives me the largest number of visual elements that I can style in size, color, transparency, and more.

Indeed, using a granular level of detail increases visual diversity, and can reveal more context, nuances, stories, and patterns than if the data is aggregated into summary statistics. You can highlight a few of those "mini" stories with a textual annotation and let the interested reader continue to find their own insights.

Though you may not have noticed at the time, you've already seen several cases where I applied this technique. Recall, from Lesson 1, the "Top 2,000" music visual (figure 1.3a), where each of the 2,000 songs is a circle, and the "Olympic Feathers" project (figure 1.5), where each of the gold medal winners is a tiny rectangle. There's a lot of data baked into those visuals!

In fact, the "Landscape of Power Flows" project from Lesson 5 (figure 5.10a) has been the only instance where I didn't visualize the data set's most granular level of detail. The original data set had over 60 million data points—one value for every minute! I had to group the data in weekly averages to fit the result on my canvas.

OF
THE
DATA
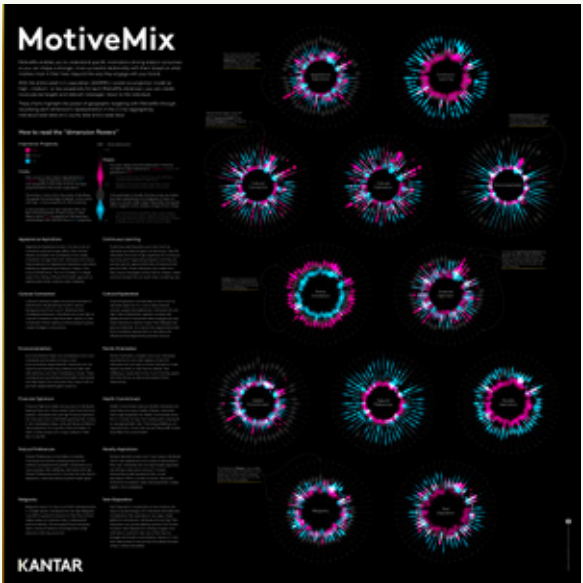
Turning US counties into bright flowers

BUSINESS | 2018 | KANTAR CONSULTING
visualcinnamon.com/portfolio/kantar-motivemix

Kantar Consulting, a market research advisory firm, asked me to visualize their MotiveMix data set. This data set looks at American consumers along 12 "attitudinal dimensions," such as tech disposition, environmentalism, and cultural connection, to better understand what is important to them.

The data set contained the percentage of each county's population with a low, medium, or high propensity for each attitudinal dimension. These three values together add up to 100%. Therefore, one county could hypothetically have 50% high propensity, 25% medium propensity, and 25% low propensity for appearance aspirations, 40% high, 30% medium, and 30% low for religiosity, and so on across all 12 dimensions.

The visual wasn't meant to have one central insight but instead reveal the breadth of the MotiveMix data—and the stories within. The final result would be hung in their office, to grab attention and spark conversations. It was a perfect opportunity to make a design that visualized the most granular level of detail available: the propensity percentages, per attitudinal dimension, per county.

In figure 7.1, you can see the final result of the black poster (there's also a white version). I represented each of the 12 attitudinal dimensions as a blue-magenta "flower." The US states are 51 spokes radiating outward from the center of each flower. Along each spoke, blue and magenta circles represent the counties in the state. Each county is shown twice on each spoke—one circle represents the county's low propensity percentage (in blue), and another circle represents the county's high propensity percentage (in magenta). The circle's size is scaled according to the population of the county. The farther away from the center, the higher the percentage.

I didn't draw the medium propensity values as circles, as I wanted to highlight the extremes. However, they are still in the visual as an almost transparent white violin plot along each spoke.

All those circles of different sizes, in two colors, partially overlapping, placed along spokes, create a lot of visual diversity. No flower is the same as another, as the underlying data is different. Without showing the data at this granularity, that meaningful texture would be lost. Some dimensions, like family orientation, have similar values
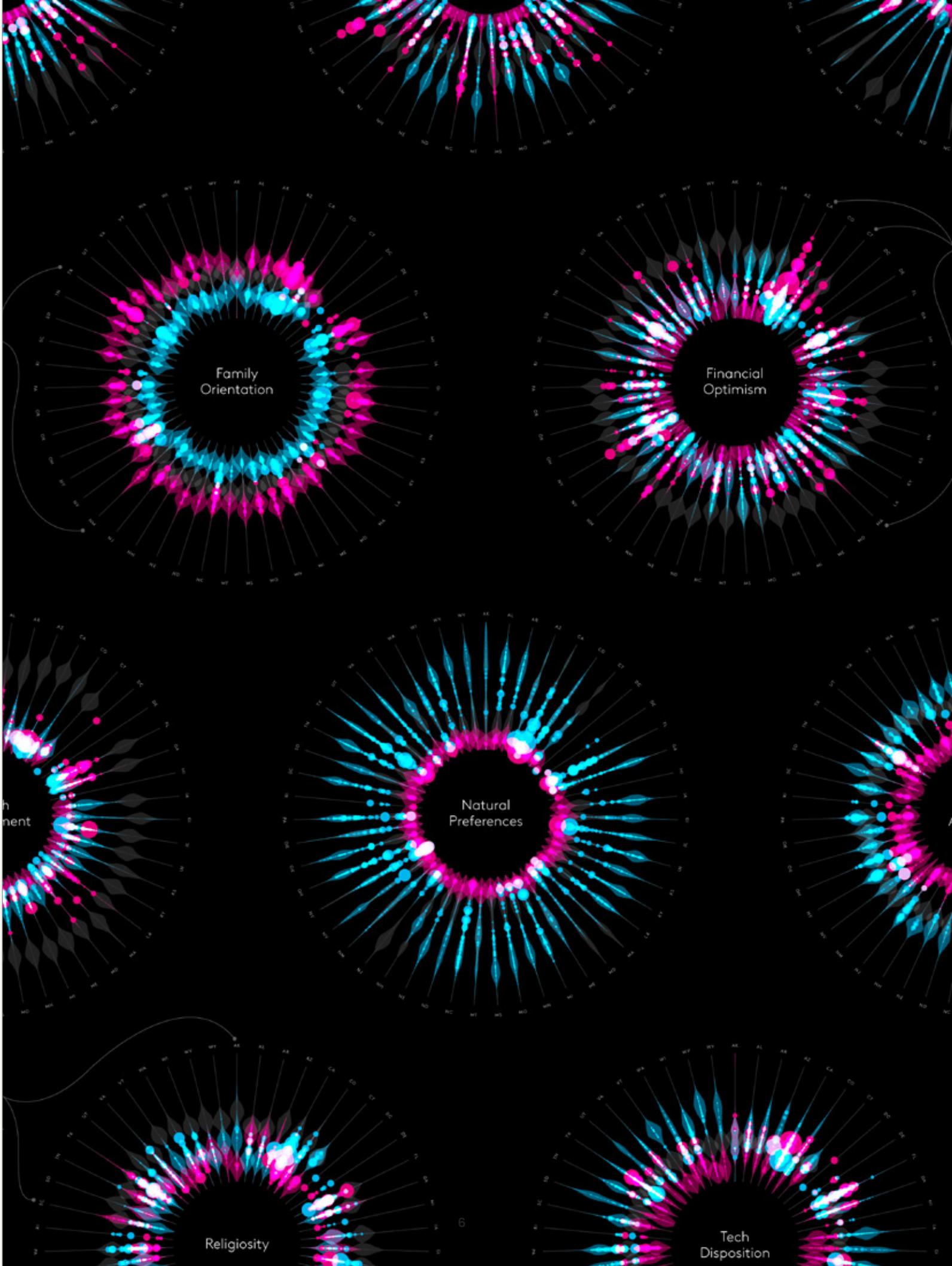
Figure 7.1

The black version of the Kantar MotiveMix poster with 12 "dimensional flowers." Along the poster's left is an introduction, a legend, and explanations of each dimension (a) and a close-up (b).

Figure 7.2

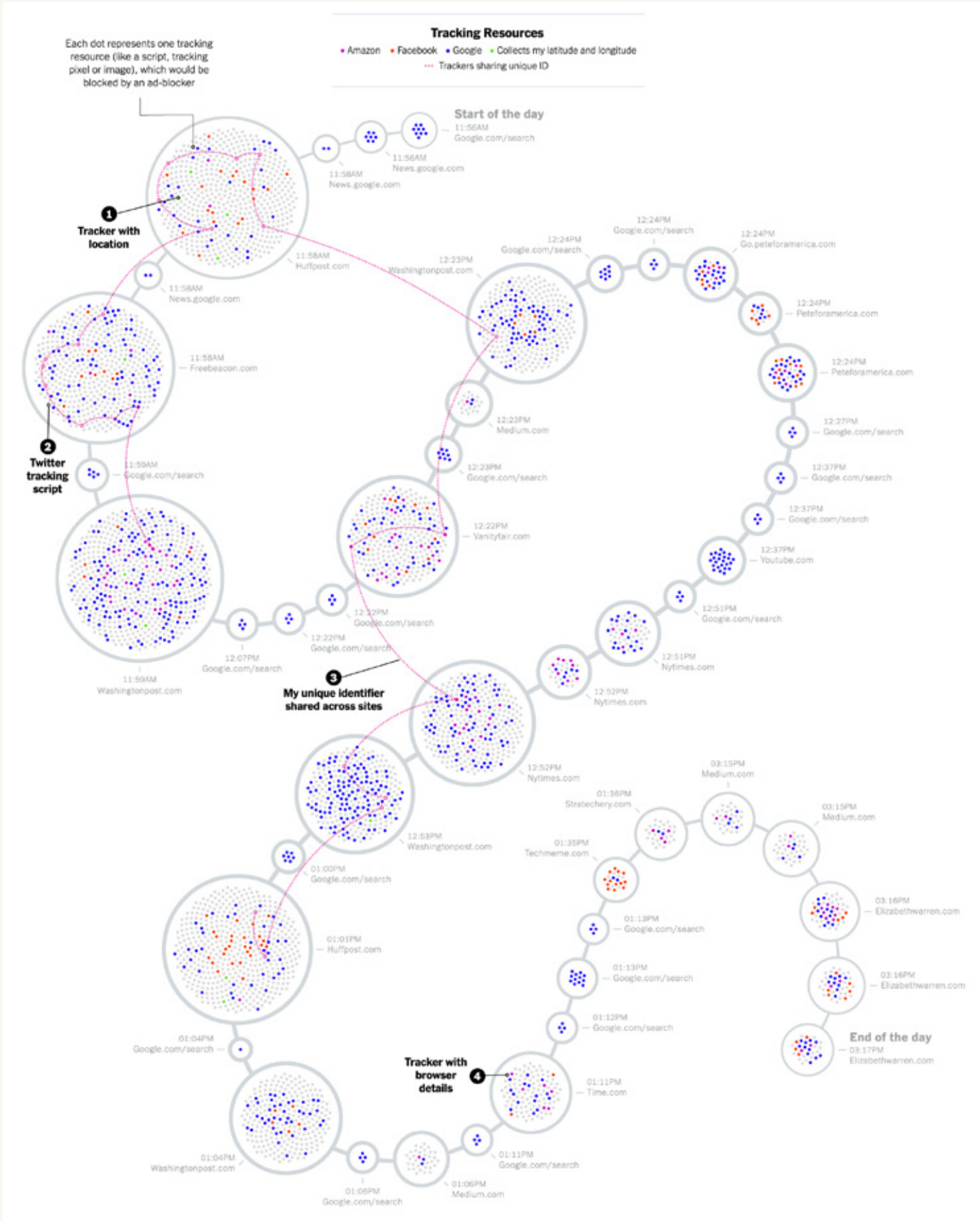Zooming in on the cultural connection flower in the white version of the poster.

across the states (see figure 7.2a), while other dimensions, like family orientation, have similar values across the states, while other dimensions, like financial optimism, are an explosion of different colors along each state's spoke (figure 7.1b),, meaning that people across the US states are split on how important it is.

The annotations highlight interesting insights. They also serve as an entry point for the audience to dive in and better understand how the visual works so they can explore it on their own.

———

VISUAL GROUPING

Figure 7.3

The desktop version of the visual for the "Digital Trackers" article in The New York Times showing all of the trackers grouped into circles according to the website on which they operated.

Generally, when showing granular data, visually grouping the data points can help with the interpretation. In the previous case, the data was visually grouped by attitudinal dimension (the flower) and state (the spokes around each flower).
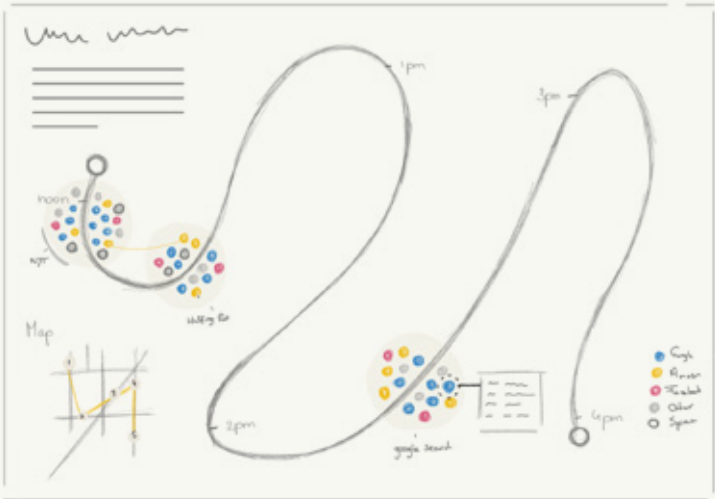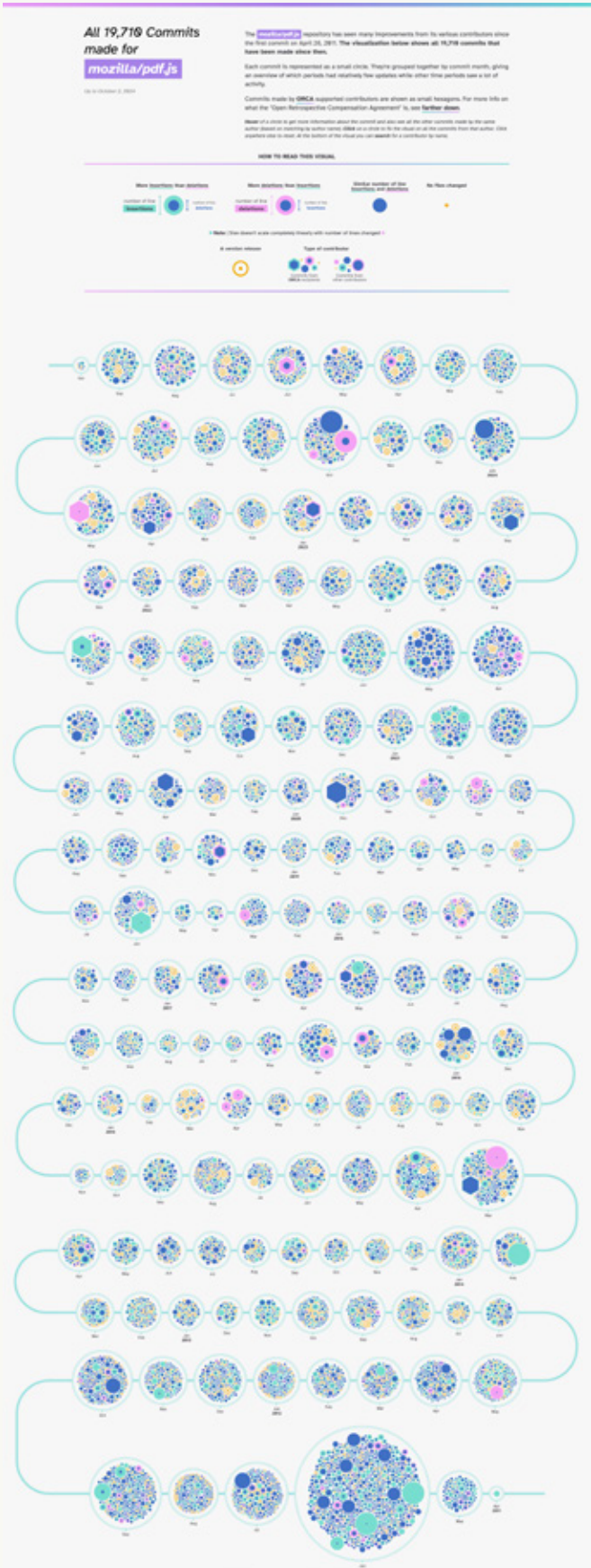
7.4

One of the most straightforward ways to execute visual grouping is to cluster all the visual marks and contain them within a bigger shape. I often do this by putting small circles or dots (the individual data points) inside a large circle (a common grouping). Let me show you two examples.

Circles within circles

BUSINESS | 2019 | THE NEW YORK TIMES
nytimes.com/interactive/2019/08/23/opinion/data-internet-privacy-tracking.html

The New York Times ran a story about how websites track users' data. One of the Times journalists installed a version of Firefox that monitors all the tracking resources (such as a script, tracking pixel, or image that an ad-blocker would block) on each visited website. This resulted in a data set of trackers, metadata about what they gathered, and from which domain or company they originated (e.g., Google, Facebook). The team working on the story was staggered by the obscene level of detail and scale of tracking, and they were looking for an eye-catching and illustrative visualization of this data that would be suitable f or both print and online editions.

Figure 7.4

An early sketch for the design of the version that would appear across two pages in the printed edition of The New York Times.

The final visual, figure 7.3, shows the full set of over a hundred trackers as dots, grouped into larger circles according to the website on which they operated.

Even More Circles Within Circles

BUSINESS | 2024 | MOZILLA
*nbremer.github.io/ORCA/commit-history*

I created two visualizations to promote the launch of Mozilla's ORCA program. ORCA is an experimental funding model that provides compensation to open-source contributors. (The acronym stands for Open Retrospective Compensation Agreement.)

Mozilla had given ORCA funding to several non-employees who had made noteworthy contributions to the company's pdf.js repository on GitHub.

The visualization in figure 7.5 shows nearly 20,000 updates that changed pdf.js files (known in programming speak as "commits"). Each commit is a circle or a hexagon—depending on whether the contributor received ORCA funding—and is sized according to the number of lines of code that changed. Added lines are turquoise and removed lines are pink. But if a commit added and subtracted lines, both colors are nested in the shape.

I wanted to arrange the data on a timeline, so I clustered the commits into a larger circle by month and strung them together on a line that weaves from top to bottom (moving back in time). This visual grouping makes it easier to absorb the whole data set. However, it also reveals some interesting trends about lower and higher activity periods.

In both the website tracker and the ORCA examples, showing all of the underlying data points provides a lot more context to the whole story than just showing the total number of trackers per website or commits per month. In both cases, the technique increases visual diversity and makes each piece more creative and unique.
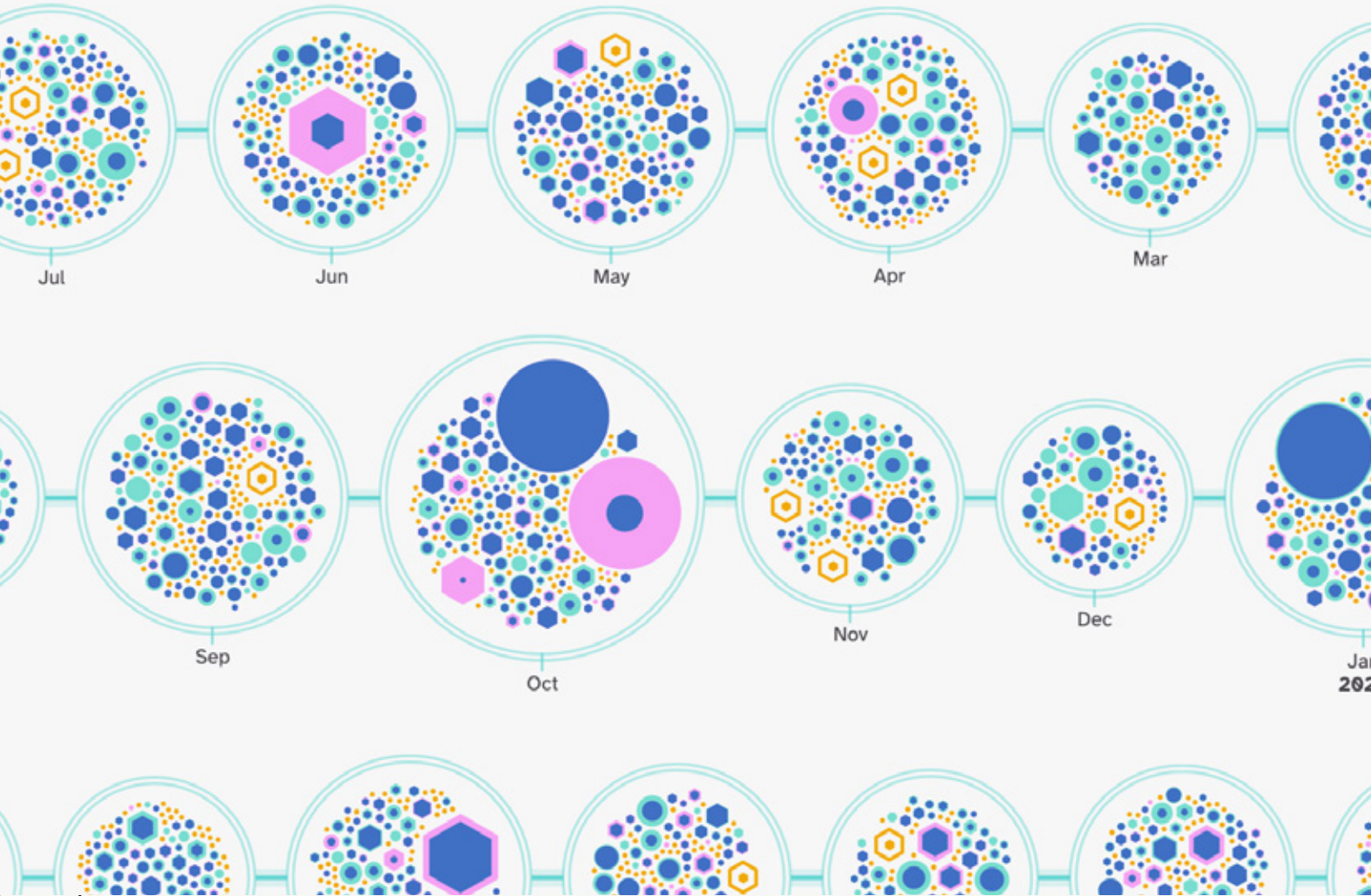
Figure 7.5a & b

All of the nearly 20,000 commits made to Mozilla's pdf. js GitHub repository, clustered by month and organized in reverse chronological order.

ADDITIONAL (MINI) CHARTS OF GROUPED VALUES

There are also times when it's beneficial to give the viewer more information about the grouped values, such as the averages or totals. In those cases, I like to add a mini chart—something straightforward, small and simple. It won't be the first thing people notice, but will give them more context with time. And yes, you've seen this technique already in "The Top 2000 ❤ the 70s & 80s" from Lesson 1, which included small histograms (figure 1.4) about the changing interests in musical styles across the past 20 years of the list.

REFINING YOUR USE OF COLOR

Figure IV.1

There is a lot to unpack in this interactive network visualization for Mozilla's ORCA project that shows how top contributors of pdf.js are connected to (other) repositories. But the one thing you should notice is that the lines are filled with gradients based on the colors of the connected circles. You can see and interact with the visual on *nbremer.github.io/ORCA/top-contributor-network*

A nice-looking color palette can have a massive impact on a chart's visual appeal. That's why I always spend a good amount of time iterating colors (unless there are fixed color schemes demanded by the brand that I have to adhere to). However, there's so much more to color than just the color selection—once you start playing with options like gradient and color blending. These techniques can truly take your color game up a notch.

GRADIENTS

I'm a big fan of using gradients in my visuals to get a more refined result. Sometimes, the color transitions are obvious, sometimes they are so subtle that I might be the only one to notice.

Perhaps the best-known gradient method is to use two (or more) colors to fill a shape. Another method, often underused, is to apply a gradient along a line or a stroke. For example, a line connecting two circles of different colors can feature a gradient that seamlessly blends the colors of the circles (as in figure IV.1).

Gradients don't need to be multi-color; they can transition a single color to a lighter/darker or a more/less saturated version of that color. (See the solar panel line charts in figure 1.5.)

They can also have a tiny shift in hue, adding a pinch of red to an orange, for example. These gentle color changes provide a little extra visual dimension without being in your face (the satellite circles in figure 9.1 are all filled with a subtle gradient).