7 Stories and Storytelling

Consider the following text:

> "There once was a fish named Marlin, who loved his son Nemo more than anything. Every day he tried to protect Nemo from the ocean, which Marlin feared. One day Nemo decided his dad was wrong and he swam away. But he was captured by a diver. Because of that, Marlin had to leave the safety of his reef to find his son. And because of that, he learned to let go of his fears and trust that Nemo had what it takes to take care of himself. Ever since that day, Marlin gave Nemo the space to learn on his own."

You will, of course, have recognized the plot of Pixar's Finding Nemo. Is this blurb (not the movie itself) a **story** in its own right? If so, what is its **purpose**? Its **audience**? Its **moral**?

7.1 What are Stories?

Humans are **social animals**; and integral part of the human experience is **communication with other humans** (and some pets). Communication is an evolutionary trick, which played a crucial role in the brain's development and its ability to **host a mind**: the transfer of ideas happens **much faster** than the transfer of genes.

What concept ("idea") comes to mind when you see the following picture?

In fact, we do not even need an image: a simple mention of the word "elephant" will make one think of an elephant. It is that easy to transmit ideas. We communicate with one another in a rather clever manner: **we tell stories to one another**.[1]

1: Are there other ways to communicate? Other modes? Other tools?

Greek Myth: Cassiopeia

Queen Cassiopeia was the wife of King Cepheus of Ethiopia. She boasted that she was more beautiful than the Nereïds, the 50 sea nymphs. Enraged, they appealed to Poseidon to punish Cassiopeia for her boastfulness.

The sea god sent Cetus, a sea monster, to ravage the coast of Cepheus' kingdom. Cepheus turned to an oracle for help: in order to appease Poseidon, he and Cassiopeia had to sacrifice their daughter Andromeda to the sea monster. They reluctantly left Andromeda chained to a rock for Cetus to find. However, she was saved at the last minute by Perseus, a Greek hero.

Perseus and Andromeda were later married. At the wedding, one of her former suitors claimed that he was the only one who had the right to marry her. There was a fight and Perseus, outnumbered, used the head of Medusa to defeat his opponents. One look at Medusa's head turned them all into stone. The king and queen also met their end.

Poseidon then placed Cassiopeia and Cepheus in the sky: Cassiopeia was condemned to circle the celestial pole forever, and spends half the year upside down in the sky as punishment for her vanity (based on [69]).

No one believes that this **actually** happened. Poseidon does not exist;[2] there is no sea monster; Cassiopeia and Cephus were not placed into the sky.[3]

But the **point** of the story is still crystal clear: vanity is the root of all problems. Had the Queen stayed humble, no calamity would have befallen her (and her land). As above, so below: this is a lesson for all ancient Greeks.[4]

A secondary consequence of the story is that it turned the night sky from:

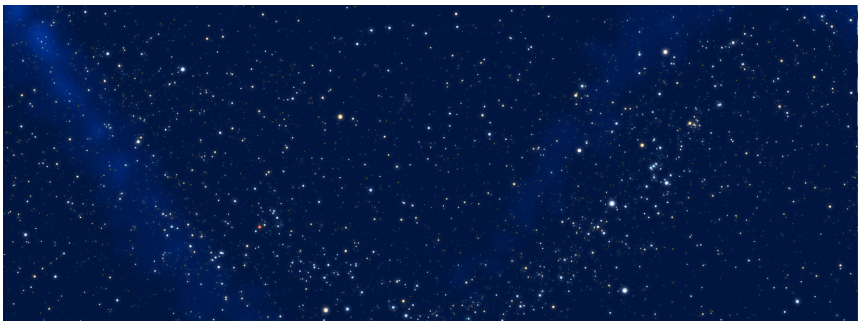


Figure 7.1: A distorted projection of the night sky (based on [70]).

into a veritable treasure troves of stories (see Figure 7.2).

2: Percy Jackson adventures notwithstanding.

3: There might have been an Andromeda and a Perseus, however, or at least real individuals on whom the mythology characters were based; the sea monster might represent the sighting of a giant squid, perhaps, or a once-in-a-lifetime storm that caused untold damages? At this point in time, so far removed from any historical events that may have informed the story, it matters but very little.

4: Well, for all ancient Greek *women*: Achilles was a noted braggart in *The Iliad*, but it is not boasting that causes *his* downfall. But in (some) ancient cultures, the night sky is also linked to **navigation**. So which came first: the need or the story?

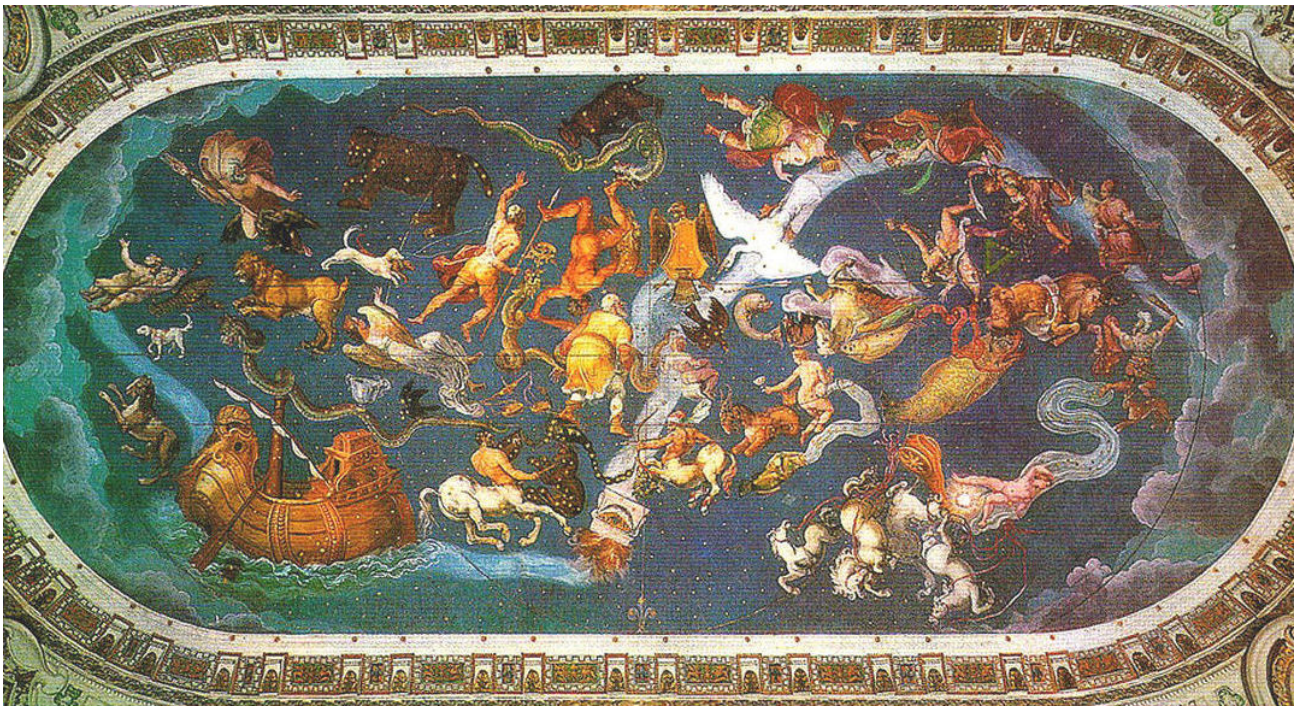


Figure 7.2: The *Map of the Heavens*, by Giovanni Antonio da Varese (1575).

> "We have always had a drive to paint stories onto the Universe. When humans first looked at stars, which are great flaming suns an unimaginable distance away, they saw amongst them giant bulls, dragons, and local heroes. Humans think in stories." [71]

In modern days, the *International Astronomical Union* (IAU) recognizes 88 constellations (distorted due to the projection of the celestial vault on a flat surface):

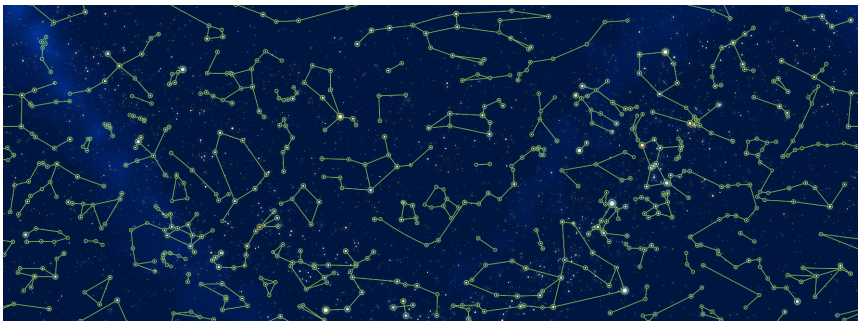


Figure 7.3: Modern constellations, according to the IAU [70].

The section of the night sky that "corresponds" to the tale presented above is highlighted in Figure 7.4.[5]

5: Here is another look at it, with constellation names (author unknown):

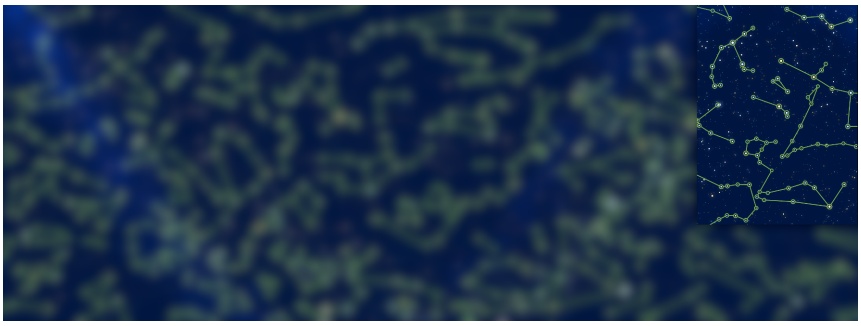


Figure 7.4: Modern constellations, according to the IAU [70].

with a close-up:

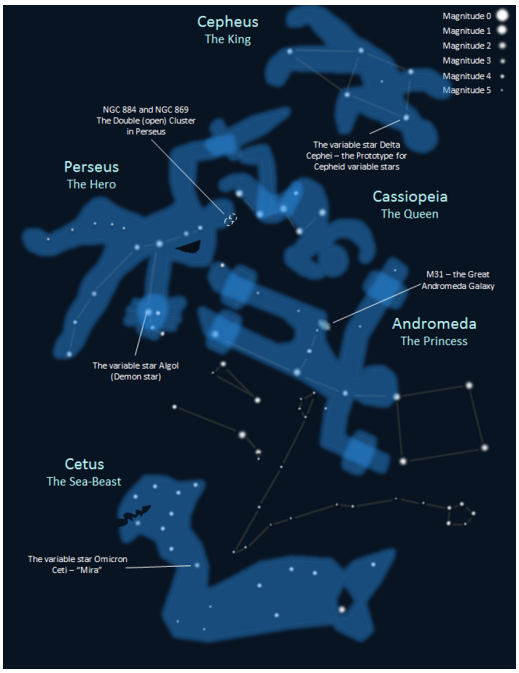


Figure 7.5: Cassiopeia's night sky neighbourhood [Ontario Parks].

As the Earth turns on its axis, Cassiopeia indeed spends half the time "upside down": a fitting punishment for a tragically flawed character.

What is a Story?

This is a surprisingly difficult question to answer – we are not even certain that we are completely in agreement amongst ourselves. To paraphrase U.S. judge Potter Stewart: "We may not be able to define what a story is, but we know one when we see one".[6]

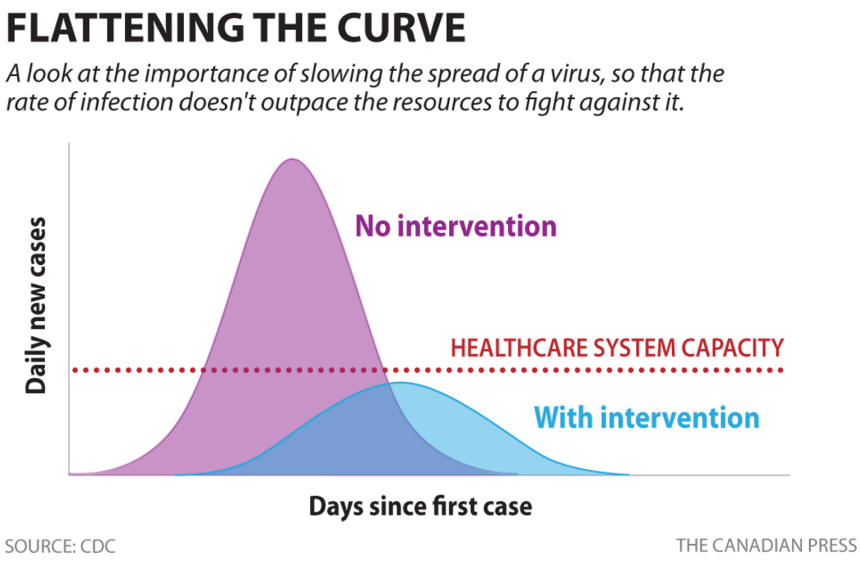
1. According to [73], a story could be defined as the (re-)telling[7] of a temporal sequence of "events", either true or fictional. A story is "told" so that the audience experiences or learns something from it; it is a means of transferring information, experiences, attitudes, or points of view. In this general sense, stories characterized by their **use**: they explain, describe, argue, persuade, teach, entertain, and so on.

6: Most of the time. We think. It is complicated: "A literate human being can look at a sequence of letters and spaces [and colours, sounds, lines, dots, etc.] and decide whether it constitutes a story; they know how to 'read' the code and work out its meaning, if it's a language they understand. They can make a stab at deciding whether it's a good story or not. However, we do not know how to transfer this ability to a computer. The rules that our minds use to decide whether what we're reading is a story are implicit in the networks of nerve cells in our brains. Nobody has yet been able to make these rules explicit." [72]

7: Through word or other means, we are not particular.

2. Another popular approach is to think of stories as **memes** (in the Dawkinsian sense), which is to say that they spread by means of imitation from person to person within a culture and often carry symbolic meaning representing a particular phenomenon or theme. Memes act as **carrier** for cultural ideas, symbols, or practices, and are transmitted from one mind to another through writing, speech, gestures, rituals, and so on. They are the cultural analogues of biological **genes**: they self-replicate, mutate, and respond to selective pressures [74].[8]
3. Finally, we provide a **simple**, **pragmatic definition**: a story consists of **events** (sequential or not) presented in some **context** (the story's premise, actors, locations), and out of which arise an **outcome** (result, consequence, or resolution).

Under each of these definitions, the myth of Cassiopeia is indeed a story (do you agree?), whereas neither a grocery list nor a phone directory would qualify. But what about the following?

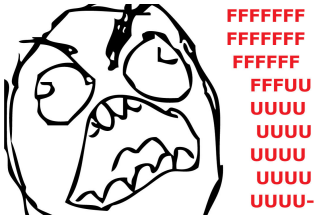


This chart made the rounds at the start of the worldwide COVID-19 pandemic (during the spring 2020); the expression "flatten the curve" became memetic at about the same time.

The message is clear: in a pandemic (**context**), measures that slow the spread of a virus (**event 1**) are recommended as they spread the cases over longer time horizons (**consequence 1**), resulting in a health care system that is not overrun (**outcome 1**); failure to adopt such measures (**event 2**) leads to an increase of cases over shorter time horizons (**consequence 2**), resulting in a healthcare system reaching critical capacity (**outcome 2**).

Note, however, that this is **not a story about reducing the number of cases**, although it could have become one if adopting measures to slow the spread of the virus also leads to a reduction in the total number of cases.

8: In popular culture, a meme (rhymes with 'gene') "is a virally transmitted image embellished with text, usually sharing pointed commentary on cultural symbols, social ideas, or current events. A meme is typically a photo or video, although sometimes it can be a block of text. When a meme resonates with many people, it's spread via social platforms like Twitter, Facebook, Instagram, texting, and more. The more a meme is spread, the greater the cultural influence it has." [75] Memes are packed with in-knowledge, and may not be intelligible to members of different Internet sub-cultures. The mere mention of a specific meme is often enough to get a point, emotion, or mood across to a wide audience; consequently, memes are sometimes used in lieu of explicit and long-form communication, which adds to the generational divide. Such memes have a relatively short shelf life, however: how many now remember the Rage Guy meme or the context in which he first appeared in 2008?



How long before the Coffin Dance meme fades out of our collective memory?

Osbert Lancaster, a British cartoonist active from just prior to the start of the Second World War to the early 1980s, once remarked that "a professional preoccupation with the topical is the surest passport to oblivion, and nothing [...] dates so quickly as the apt comment." [76] No doubt, this also applies to memes of all kinds.

Ultimately, this story was borne out [77, 78]. Unfortunately, a meme is no substitute for a comprehensive healthcare strategy, no matter how successful it was: in the U.S., flattening the curve worked as intended at first, but as there was no national plan (some would say, no story) for what would come after, the virus spread soon overcame the initial story [79]. Incidentally, that failure can also be conveyed as a story:

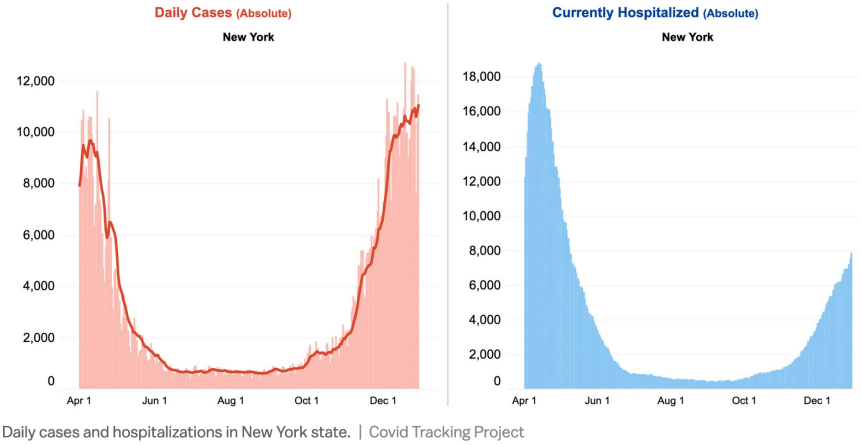


Figure 7.6: The eventual failure of the U.S. to move beyond "flatten the curve" [79].

This is part of a more general problem that humans have with stories, perhaps best exemplified by the concept of the **lie-to-children:**

> "A lie-to-children is a statement that is false, but which nevertheless leads the child's mind towards a more accurate explanation, one that the child will only be able to appreciate if it has been primed with a lie. The early stages of education have to include a lot of lies-to-children, because early explanations have to be simple. However, we live in a complex world, and lies-to-children must **eventually be replaced** by more complex stories if they are not to become delayed-action genuine lies." [71]

We are relatively simple creatures living in a very complicated world: we may attempt to explain the Universe with "lies-to-children", but that does not mean that the Universe ultimately has to comply with our stories (see Figure 7.7).

Abstraction (lies-to-children) require **choices**; these choices are informed by the storytelling **context** and the **storytellers** – we will revisit this in Section 7.2 (*Elements of Storytelling*).

From which domains of human endeavour are stories most likely to arise? P. Dodds, the director of the University of Vermont's *Complex Systems Center*, provides the following list [80]:

- news
- books, magazines
- art and music industry
- television, movie studios, Netflix, HBO, Disney+, etc.
- social media: Facebook, Instagram, Snapchat, etc.

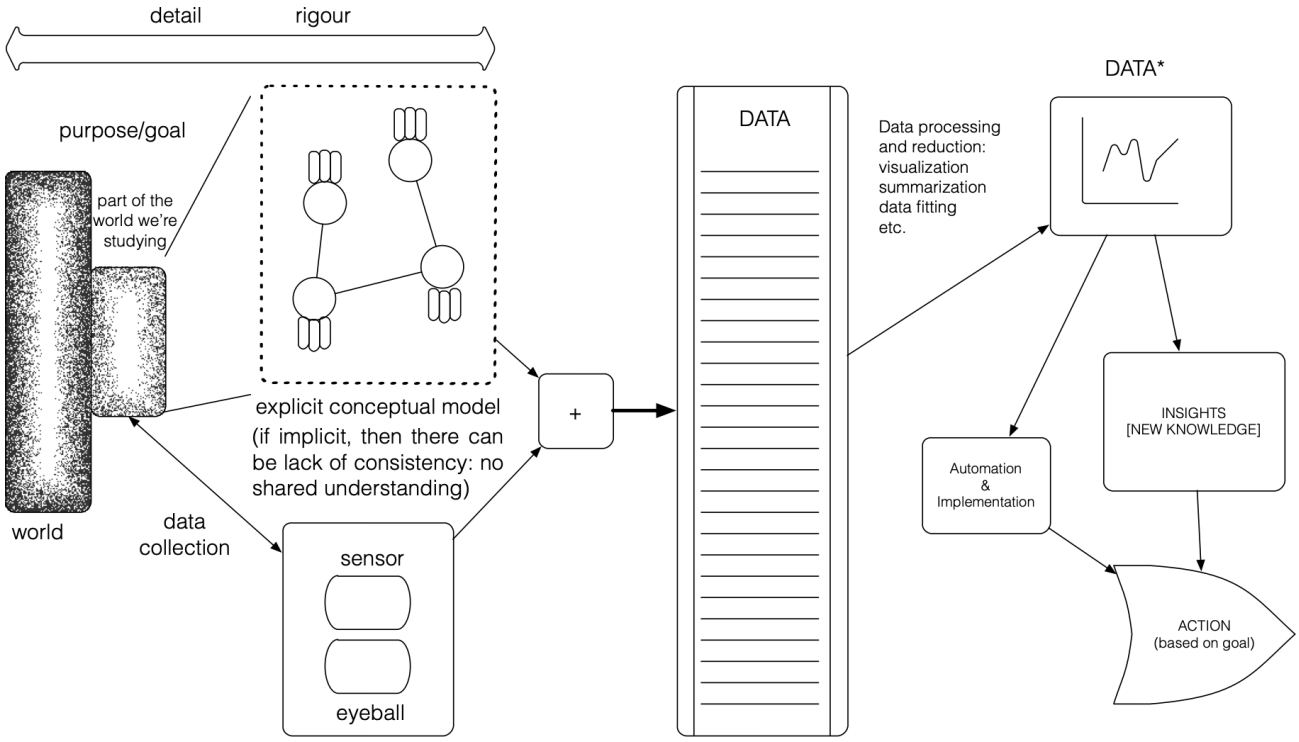


Figure 7.7: A schematic diagram of systems thinking as it applies to a general problem: as we move from the concrete world (left; details) to abstractions (right, rigour), our understanding gets "storified" [1].

- sports and video games
- evidence: data, science experiments, etc.
- religions, ideologies, belief systems, etc.
- enduring coherent groups: cultures, countries, cities, etc.
- commerce: adverts

Humans are awash in stories – it takes a herculean[9] amount of effort to **avoid** them in our lives, perhaps because:

> "[...] the anthropologists got it wrong when they named our species *Homo sapiens* ('wise man'). [...] In reality, we are *Pan narrans*, the storytelling chimpanzee." [72]

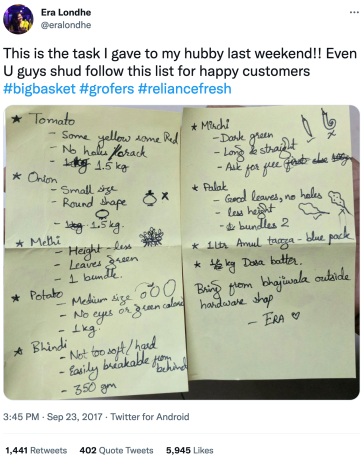
What is Not a Story?

For grocery lists, the classification is straightforward;[10] in general, it's less clear cut. Is a theorem a story? A headline? A joke? A chart?

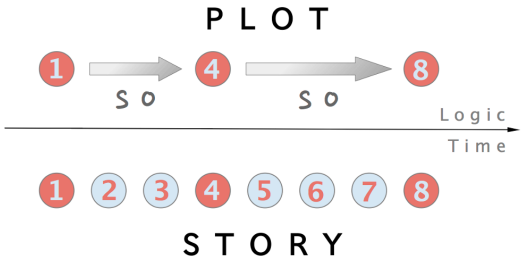
One distinction that is sometimes made is that between a story and its **plot**. A story's plot is the **essential sequence of its elements**, the skeleton of the story: the blurb presented at the start of this module is *Finding Nemo*'s plot. The plot typically resides in **logical space** (if "this" happens, then "that" will happen, and so "this final thing" will also happen), whereas the story lives in **sequential space** (a number of related events are presented sequentially,

9: Another story?

10: Or is it? Is the following grocery list *only* about the items?



although they could be shown out of order). This is illustrated by Twitter user matoryoshika:



Reading this Marvel Cinematic Universe's *Infinity Saga* overview is emphatically not the same thing as getting the full story from the 23 movies (and assorted TV shows, one-offs, and comic books), but ... well, it still provides *something*, something that is **story-adjacent**. While stories are more than their plots[11] , maybe plots can still function as **bare stories**.

11: Humans basically only need nutrition, but they do enjoy a a little pizzaz and flourish every once in a while.

Sometimes, narratives have the **trappings** of stories without actually being stories. Consider, for instance, the following text:

> "There once was a fish named Marlin, who loved his son Nemo more than anything. Every day he tried to protect Nemo from the ocean, which he feared. When he died, his father looked into the vast, terrible sea and he could not find him. Then a great monster, the Devilfish, saw Marlin's mourning face and he cackled,"You're mine!" Suddenly, the devilfish attacked Marlin, dragging him to his death, and Marlin has never looked back."

This reads, looks, and feels like a story, but we do not think it a story, at least, not one with **memetic power**.

12: A variation on The Taste of Banzo's Sword

Consider instead the following tale, titled *30 Years*,[12] :

> "A fellow went to a Zen master and said,"If I work very hard, how soon can I be enlightened?" The Zen master looked him up and down and said, "Ten years." The fellow said, "No, listen, I mean if I really work at it, how long –" The Zen master cut him off. "I'm sorry. I misjudged. Twenty years." "Wait!" said the young man, "You don't understand! I'm –" "Thirty years," said the Zen master."

It is clearly memetic, having been passed along among certain modern adepts of Zen Buddhism (ultimately finding its way in these pages); while it appears **Zen koan** -like to non-expert eyes, we wonder if it is not simply a joke.

Jokes can be stories, of course, and a story's **meaning** is not always apparent (or in the case of Zen koans, even a requisite quality, apparently), but this one seems too vague to qualify as a story in our books. What do you think?

What about *La Munkya*, the absurdly adorable "Written by a Kid" video featuring a paper panty-clad horse, a jailbreak, and turtles?

Figure 7.8: Written by a Kid | Episode 3 | La Munkya | by Emily

Although *La Munkya* does not qualify as story in our view, Emily is a superb **storyteller**: she almost carries the meandering narrative to the promised land on the strength of her confident voice and commanding presence alone.

Recently, **data stories** have also become common place: Figure 7.9 shows the *Kantar Information is Beautiful Awards* winner for 2019. While the subject matter is of global significance[13] and tons of useful information is available on the chart, this is also not quite what we have in mind when we think of (data) stories; to our minds, this meaningful visualization lands squarely into **infographic** and **data art** territories.

13: "To prevent climate breakdown and keep global heating below 3–4 degrees Celsius, we have to reduce greenhouse gas emissions and transition to renewable energy – globally. Here's a graphical blueprint on how we might get to net zero carbon emissions by 2050 [81]."

Adjacent Narratives

Dodds also reminds us that real stories are never told **in their entirety** [80]: it is impossible to record every detail of an **ideal** (Platonic) **story**, as recording entails **compression to medium format and scale**.[14]

14: The so-called narrative hierarchy.

Storytelling converges to the **story logic**, while seemingly irrelevant aspects (which remain part of the story) are **discarded** in favour of aspects which are likely to **carry more weight with the audience**.

These **adjacent stories**[15] afford "better" stories, namely stories that are:

15: Of which there can be infinitely many, at least in theory.

- more **engaging**;
- more **motivating to spread** (more memetic), and
- more **durable** (robust) under spreading.

These "better" stories are used by "**true-to-life**" recorders and re-tellers (such as journalists) to reach larger audiences, but the infinitude of adjacent stories also means that "better" stories are used for **disinformation**: adjacent stories may be low on truth and bear falsehoods.

When adjacent stories conform to a group's world view and ideology, they tend to spread like wildfire (or more accurately, like a virus); this is not surprising, since even non-adjacent stories must be coherent and at least possible.[16]

16: As various conspiracy theories through the ages attest to, humans are not skilled at differentiating between "possibility" and "plausibility" (see Plausible Reasoning [1]): it is possible, we suppose (in the sense that the probability is not 0), that lizard-like aliens have reached the Earth years ago and are secretly running the planet's governments, but we could easily list a few million statements that are more plausible.

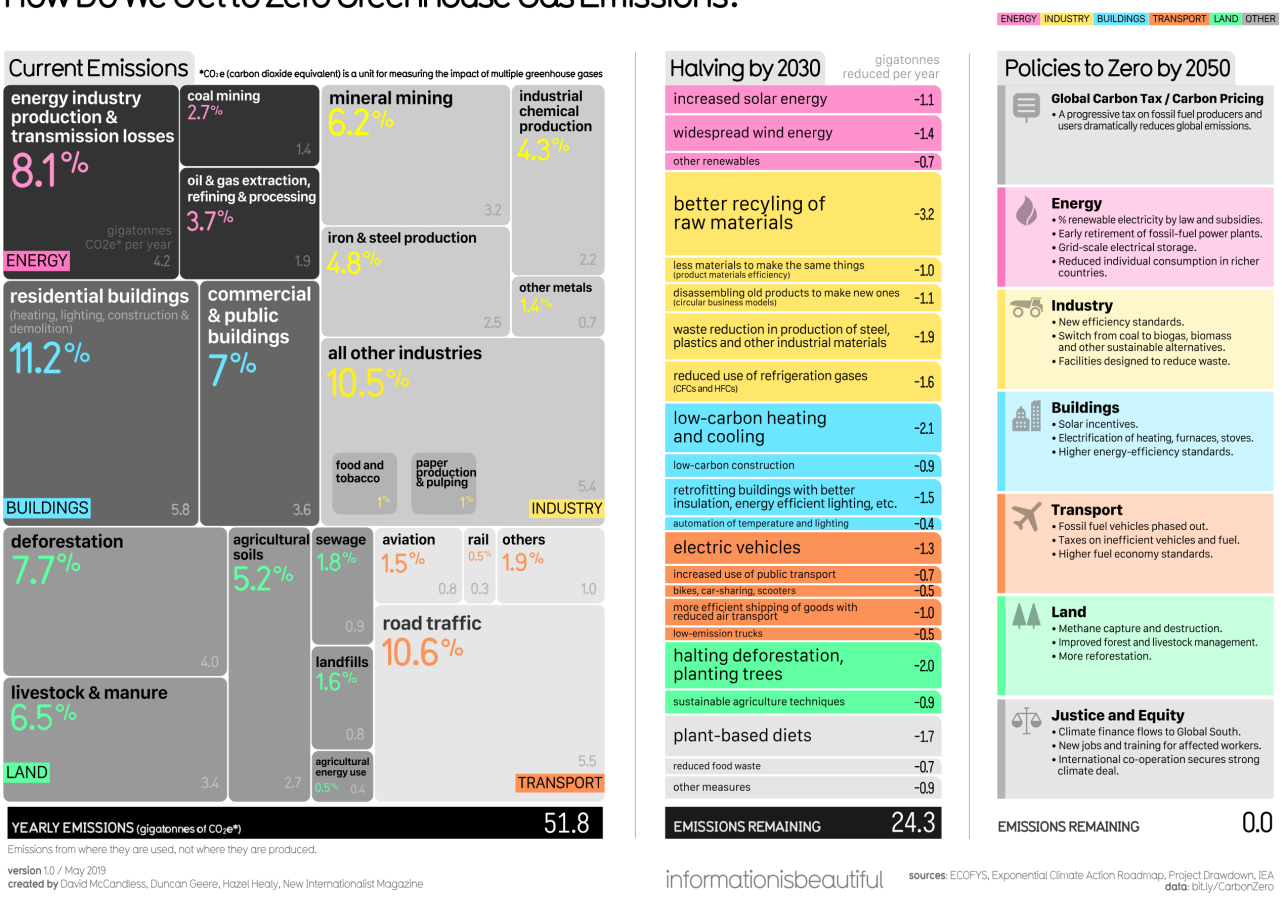


Figure 7.9: A data story (additional design: Fabio Bergamaschi) [81].

Example (also from [80]): the Phantom Time Hypothesis, by pseudohistorian H. Illig, illustrates the seductive power of adjacent stories.[17]

It is a powerful story, and it concords with some of our prejudices: most of us could easily conceive of a Holy Roman Emperor, a Byzantine emperor (possibly), and a Pope thirsting for power, and scheming behind the scenes to find ways to stay in power as long as they live; it even touches on our cultural love of numerology!

Illig also brings forward evidence to support his claim (in case the story itself should prove insufficient to persuade a world determined to stay in the dark!); the nature of the evidence is such that it is **easily refuted** by records of solar eclipses and comet appearances over the years, as well as dendrochronology (the study of tree rings).

By proposing an alternative to "establishment" history (the *null hypothesis*), phantom time hypothesists hold the **burden of proof**: while it is inconvenient that their evidence does not necessarily support their claim, it is downright fatal that it supports the chronology they are trying to overthrow.[18]

Beware the adjacent narrative!

17: The long and the short of it is that the the years AD (CE) 614-911 never existed, and so that the year AD (CE) 2022 should really be labeled AD (CE) 1825. Supposedly, a 1st millenium cabal consisting of "the Holy Roman Emperor Otto III, Pope Sylvester II (and possibly the Byzantine Emperor Constantine VII) fabricated the Anno Domini dating system retroactively, in order to place themselves at the special year of AD 1000, and to rewrite history to legitimize Otto's claim to the HRE."

18: Or, as a meme:

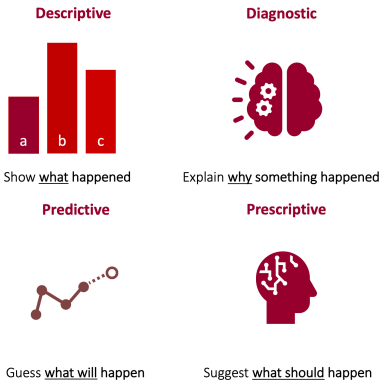
Data Stories

In [82], C. Cote describes **data storytelling** as effectively communicating insights from datasets using narratives and visualizations. It can be used to put data insights into **context** for, and inspire **action** from, your audience. There are 3 key components:

- the **data** (and why it is analyzed) is the foundation of the data story;
- the **narrative** is the storyline that helps to communicate the insights gleaned from data and context, as well as any of the actions these recommend, and
- the **visuals** are the representations of the data and analysis diagrams, pictures, or videos.

Data analysis can (roughly) be broken down into four **key modes**, informed by the analysis and storytelling objectives, which move roughly from **low value/low difficulty** propositions (top left, sidenote) to **high value/high difficulty** propositions (bottom right, sidenote).[19]

19: Analytical modes; infographic by M. Kashef:



The chart of Figure 7.10, selected from [83] shows what is, in our opinion, a brilliant data story; can you determine the data, the context, the narrative, and the visuals in the chart? So what is the story? In the words of the author,

> "Despite analyzing the same data, the researchers got a variety of results. Twenty teams concluded that soccer referees gave more red cards to dark-skinned players, and nine teams found no significant relationship between skin color and red cards.
>
> The variability in results wasn't due to fraud or sloppy work. These were highly competent analysts who were motivated to find the truth, said Eric Luis Uhlmann, a psychologist at the Insead business school in Singapore and one of the project leaders. Even the most skilled researchers must make subjective choices that have a huge impact on the result they find.
>
> But these disparate results don't mean that studies can't inch us toward truth. 'On the one hand, our study shows that results are heavily reliant on analytic choices,' Uhlmann told me. 'On the other hand, it also suggests there's a *there* there. It's hard to look at that data and say there's no bias against dark-skinned players.' Similarly, most of the permutations you could test in the study of politics and the economy produced, at best, only weak effects, which suggests that if there's a relationship between the number of Democrats or Republicans in office and the economy, it's not a strong one.
>
> The important lesson here is that a single analysis is not sufficient to find a definitive answer. Every result is a temporary truth, one that's subject to change when someone else comes along to build, test and analyze anew." ([83], reporting on the results of [84])

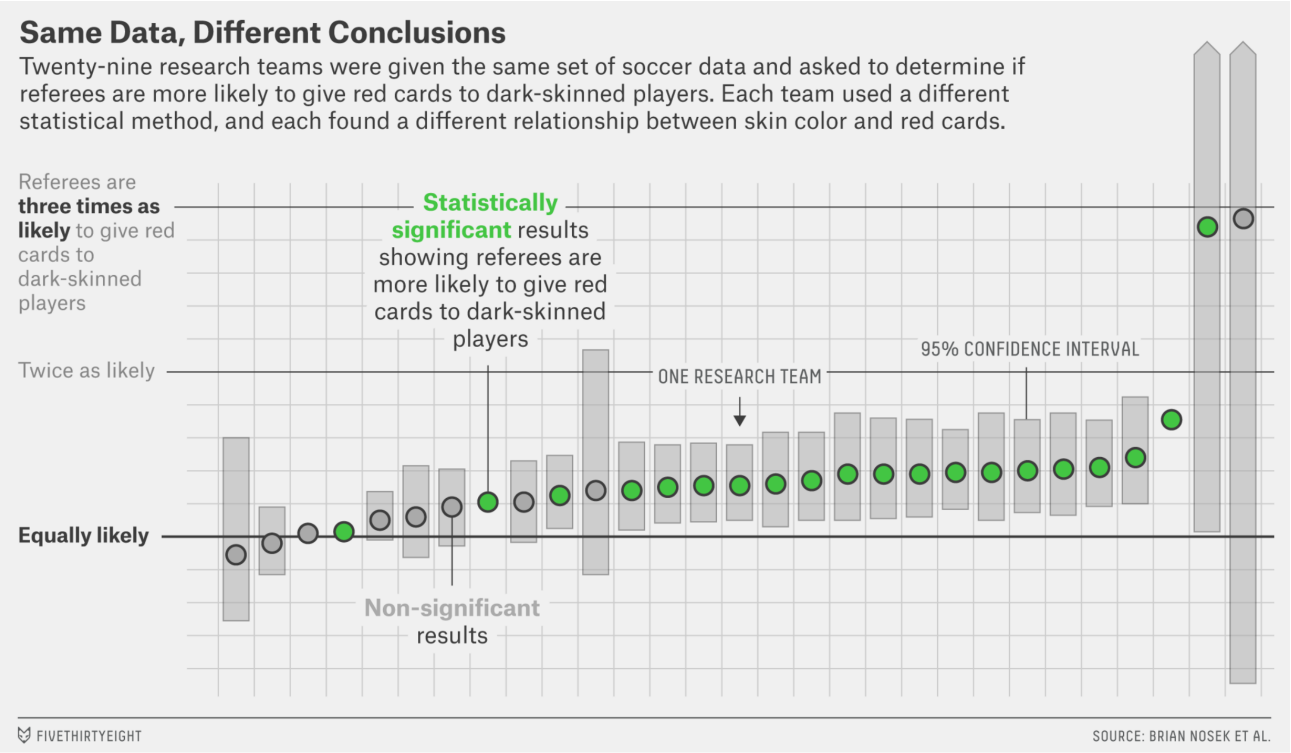


Figure 7.10: Chart produced by Ritchie King, describing the results found in [84].

The always excellent Visual Cinnamon (N. Bremer) provides us with another data story example (see below).

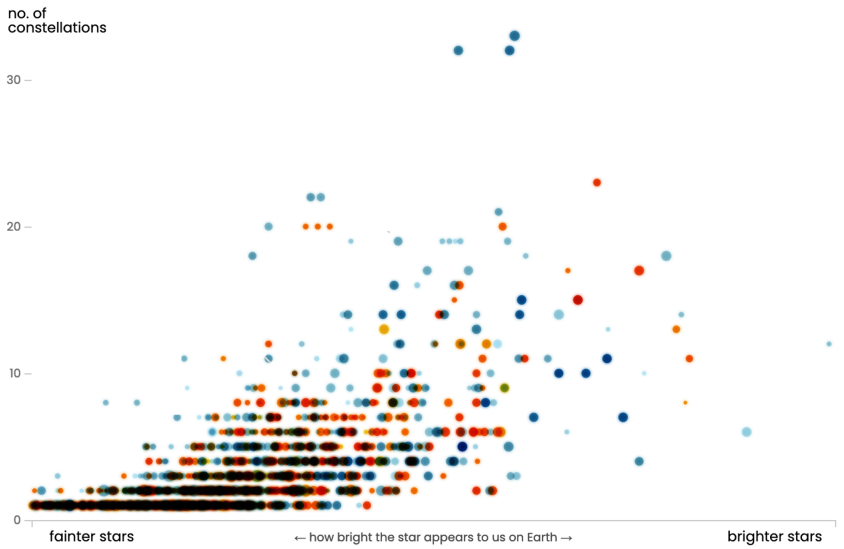
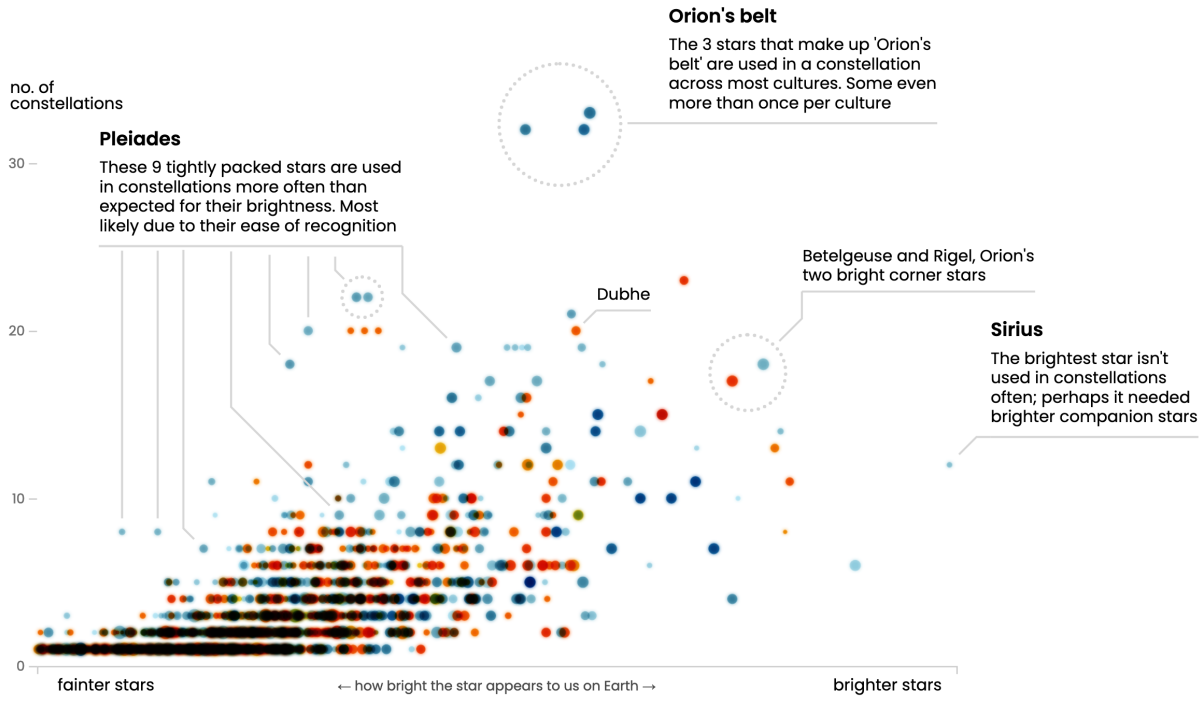


Figure 7.11: What is going on here?

Or is it? The visuals are clear: this is a scatter plot, and the dots appear to represent stars. But what is the context? The underlying data? Is there a narrative? In fact, this does not seem to be a good data story, let alone a data story at all.



NOTE | Star colors, based on their actual visible colors, have been exaggerated/saturated for better visibility. The sizes of the stars are (not-linearly) scaled to the *actual brightness* of the stars (called absolute magnitude); how bright they would be if they were all placed the same distance from Earth. Because stars are all at widely different distances from the Earth, how bright a star appears to us is called the *apparent* magnitude.

Sirius is about 25 times more luminous than the Sun, but Canopus is ~10,000 times more luminous!

Take Sirius, the brightest star, it appears almost twice as bright to us as Canopus, the next brightest star. However, compared to the other stars we see at night it's actually not exceptionally bright. The reason it appears so bright to *us*, is because it's one of our closest neighboring stars (at 8.6 light-years).

Figure 7.12: This is what is going on here!

We must come clean (and beg forgiveness of Ms. Bremer): **this is not the data story published by Visual Cinnamon**. Instead, we pared down the original story to its naked visuals – a simple chart – in order to make it clear that a data visualization alone may not necessarily tell a story. Contrast with the actual data story of Figure 7.12, for which the context, data, and narrative are readily apparent [70]. A little bit of text (and context) goes a long way!

Storytelling Risks

But stories are not all fun and games.

The Impact of Storytelling Choices A good story can help shed insights on a situation, but it is important to remember that storytelling requires **choices** (as does data analysis, see Figure 7.10), and the outcome and impact of a story are affected by what is **included** in the telling and what is **omitted**.

Stories That Mislead It is surprisingly easy to mislead by **accident**, but it is also quite easy to mislead by **design**. Whether one is faced with one or the other of (or potentially both) these situations is often difficult to ascertain. Consider this headline from a CNN article published on May 4, 2021:

> "France kept classrooms open 'at all costs.' At a school where 20 pupils lost loved ones, some say the price was too high." [85]

Without additional context or details, what conclusions would you draw from this? It is open to interpretation, of course, but our first reading of the headline is that a link exists between the school staying open and the death of the loved ones. Except that the article states:

> "In all, at least 20 students from her high school, Eugene Delacroix, in nearby Drancy, lost a relative to the virus in 2020, according to the town hall. Nothing suggests these deaths were caused by infections at the school." [85]

This passage contradicts our earlier reading; the headline (a story in its own right?) could be seen as misleading. C. Douglas Golden, an American writer for the far-right *The Western Journal*[20] suggests, rather unsurprisingly, that the misleading is deliberate and should be expected given the "propagandistic nature of the piece" [87] (and, although he does not come out and state it explicitly, of CNN and "mainstream" media, by extension).

This is emphatically not how we interpret the disconnect between the headline and the text of the article: in the tradition of Occam's razor ,[21] it seems much more plausible that this disconnect could simply be explained by the headline and the article writers being two distinct people, and signals getting crossed, than it is due to some all-encompassing attempt by liberals (in the U.S. sense) to control the narrative of the "mainstream" media.[22]

So which is it? By design, or by accident? Is it even misleading at all?

Survivorship Bias With data stories, there is an added complication: we usually only have access to the **available data**. The data that was not collected is, by definition, not available. Even the collected data may only be partly available, for a variety of reasons.[23] This creates **implicit bias** in the data, which can lead to compelling yet **fundamentally flawed** data stories.

The following example has become a bit of a cliché among practitioners of data visualization, but it illustrates perfectly the risks associated with this **survivorship bias** [88]. During WWII, A. Wald, a Hungarian mathematician, undertook a study on behalf of the U.S. Air Force, to help protect Allied bombers who were flying missions over occupied and enemy territory in Europe and in the Pacific.

The collected study data consisted of the **number** and **location** of bullet holes on returning aircraft; the goal was to use this information to determine where to add armour plating in order to save the lives of crew members and best protect the plane's structure (which would then be available for other sorties).

20: A publication the *Center for Countering Digital Hate* places among "ten fringe publishers" that were responsible for nearly 70 percent of Facebook user interactions with climate change denialist content in 2021 [86], and whose un-ironic motto is "Equipping Readers With the Truth".

21: "Plurality should not be posited without necessity."

22: Occam's razor does not claim that of two theories that explain some aspect of the Universe, the simplest one is by necessity the true one; it has itself become a bit of a story in modern times, one that is sometimes used as a crutch, indiscriminately, to dismiss claims that go against dearly-held beliefs. The real world is more complicated than our stories.

23: Such as inadequate security clearances, data governance restrictions, and so on.

The chart of Figure 7.13 (the aforementioned cliché) shows the uneven distribution of bullet hole locations, which were actually "concentrated on the wings and fuselage, almost twice as much as [...] the engines [88]." The military's conclusion was to add armour to these more prevalent locations, as these were the ones that were drawing fire.

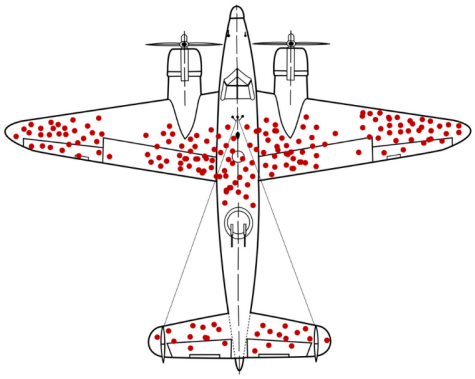


Figure 7.13: Obligatory hypothetical representation of Axis bullets on returning Allied bombers [Grandjean, McGeddon, Cameron Moll].

Wald realized that this strategy could only make sense if Axis pilots were somehow able to **direct gunfire to desired locations** on Allied planes, a skill which Allied pilots with WWII-era technology decidedly did not possess. The crucial insight was that Axis gunfire was almost certainly uniformly distributed[24] , and that the available data only concerned **returning aircraft**.

24: E.g., every location on a bomber was as likely to get hit by bullets as any other.

Counter-intuitively, armour should be added to the areas with the **fewest holes**: if no returning bomber had holes in their wing spars and in the engines, then even a few bullets hitting those locations is **deadly**. The take-away is that the missing data may be **just as important** to the story as the available data – data storytelling is not an obvious endeavour.

May the Best Story/Storyteller Win Being "too good" at storytelling might seem like a strange addition to a list of storytelling risks, but it can play out not unlike data analysis' *Tyranny of Past Success* [1]; Tetlock and Gardner give us a vivid example:

> "Open any newspaper, watch any TV news show, and you find experts who forecast what's coming. Some are cautious. Most are bold and confident. A handful claim to be Olympian visionaries able to see decades into the future. With few exceptions, they are not in front the camera because they possess any skill at forecasting.
>
> Accuracy is seldom even mentioned. [...] The one undeniable talent that talking heads have is their skill at **telling a compelling story with conviction**, and that is enough. Many have become wealthy peddling forecasting of untested value to corporate executives, government officials and ordinary people who would never think of swallowing medicine of unknown efficacy and safety but who routinely pay for forecasts that are as dubious as elixirs sold from the back of a wagon." [89]

Having a good story is no guarantee that the story is true or useful, or that it supports and/or agrees with the data and the analysis [90].

Consider the following data story, which large swaths of the anti-vaccine population has found extremely compelling:

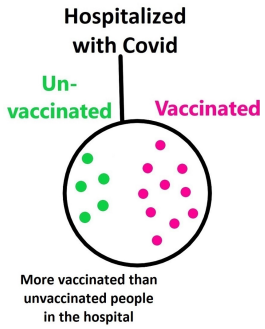


Figure 7.14: An anti-vaccine "argument" against COVID-19 vaccines.

At face value, this data story would seem to sound the death knell for COVID-19 vaccination: assuming the underlying data is valid, who would get the vaccine knowing that they are more likely to get the disease?

But, as was the case with the Wald example, this data story is fundamentally flawed: it considers the hospitalization rates in the general population, but not taking into account the vaccination rates. The additional data actually **reverses** the story:

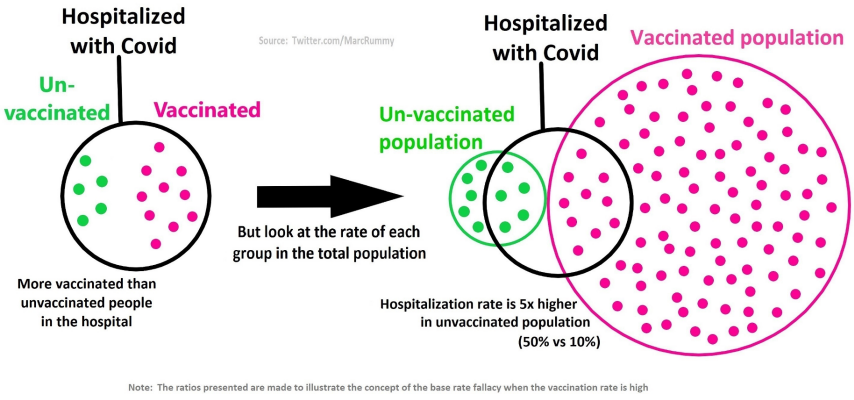


Figure 7.15: The fuller data argument in favour of COVID-19 vaccines: the story changes completely [MarkRummy].

This makes it clear that the high number of hospitalization cases among the vaccinated is due to the preponderance of vaccinated individuals in the population: in fact, the hospitalization rate is much higher among the non-vaccinated population (again, depending on the actual underlying numbers).

The Story Trap Finally, we must remember that we have evolved with the help of stories; they are part and parcel of the human experience; we naturally prefer explanations that are **packaged** as human (or human-digestible) stories. Is it possible that the "lies-to-children" approach [72] is holding us back? Is it time to shed the **story trap**?

> "We might wonder if the ultimate intelligibility of the universe will be determined not so much by the capacity of our minds to formulate the appropriate concepts and equations, but by whether we can find a meaningful story to tell about it." [91]

Stories are powerful, but they cannot be all things to all people, in all circumstances. Remain aware of their limitations, however, and their learning/teaching potential increases.

Storytelling Roles and Functions

> "Humans *love* humans! They can't get enough of themselves. They crave the company of humans, they value the opinions of humans, and they love hearing stories about humans!" [47]

We keep this final section purposely short, as we will be revisiting its key ideas over and over again in the text. We use stories of all kinds for **persuasion**, **education**, **entertainment**, etc. For these goals to be achieved, our stories have to remain **simple** and they have to be about other humans: **individuals**, **organizations**, **societies**, **cultures**, etc.

7.2 Elements of Storytelling

In this section, we take a closer look at what makes a story .... well, a story.

Goals

The **storytelling goals** are intertwined with the type of story that is being told. **Cultural Stories** are stories whose goal(s) may be to:

- **entertain** an audience (Legend of Zelda: Breath of the Wild , The Eternals , Percy Jackson and the Olympians , Good Kid, M.A.A.D City);
- **inform** and call to action (For Sama , An Inconvenient Truth , Kony 2012 , Shi-shi-etko);
- **teach** children and adults alike (The Paper Bag Princess , The Three Little Pigs , Attarnajuat: The Fast Runner , Making Comics);
- **explore** and **experiment** in an artistic space (Un chien Andalou , Eunoia , The Lion-Eating Poet in the Stone Den , La disparition);
- **evoke** an emotional response, such as shock or horror (Friday the 13th , Sarah McLachlan's SPCA Commercials , Sandman , I Know Why the Caged Bird Sings).

Stories may have more than one objective: is it possible to call to action *without* also evoking an emotional response, for instance? It would not be out of place to see some of these examples appear in two or more categories, or even some entirely new category (sell, convert, etc.).

Data (scientific) stories are somewhat more restricted in their goals. Typically, we seek to:

- **describe** what has happened (*The Big Bang*, etc.)
- **diagnose** why something happened (*Smoking Causes Cancer*, etc.);
- **predict** what will happen next (*Global Warming*, etc.);
- **prescribe** what should happen (*Wald's Bomber*, etc.);
- **persuade** an audience to change their minds or to adopt a policy (*Flatten the Curve!*, etc.)

The comment regarding overlaps and missing categories also applies.

Audiences

Storytelling requires a **teller** and a **story**, obviously, but also an **audience**; while it might still be expected for authors to claim that they only write for themselves, say, without an audience (if only an idealized, generic audience), a story is just a sequence of words and images [92].

The **story**'s first and foremost responsibility is to not come in the way of the **teller**'s job, which is to convince the **audience** to accept:

- the **premise** ("I'm about to tell you an interesting story, so listen up!");
- the **contents** ("Here's what happened. Honest!")
- the **conclusion** ("And that's why you should never wash your laundry with peanut butter.")

It is not too difficult to see how two storytellers telling nominally the same story could end up telling two vastly different stories, in terms of audience buy-in and reaction.

That **audience** is a nebulous entity to define. In many cases, the teller never interacts directly with the audience: for all that we know, the audience for this book (not exactly a story, but play along) could be a single child, or the entire nation of Finland. This **ambiguity** typically leads beginning storytellers to imagine the largest possible audience: their story will be one for the ages, stand the test of time, and lead to the adulation of the species.[25]

25: And possibly beyond!

This is a common mistake: in storytelling (as with data analysis), **less is more**. But in order not to miss the mark when we strip the fat away and converge on a lean story, it pays to **know the audience**.

For the most part there are only two kinds of audiences for stories: **individuals** and **organizations**. What can we **expect** from them? If individuals engage with the story of their own free will, we should at the very least assume that they are willing to suspend their disbelief, that is to say, that they are willing to entertain the specific teller and the **idea** of the story.

As it happens, the opinion of a select few influencers might inform the opinions of larger audience sub-groups: humans being social animals, this should hardly come as a surprise.[26]

26: Although there have been a number of controversies over the years, such as the *FTC/YouTube* influencer scandal [93], the *Payola* scandal of the 1950s [94], or the absolutely baffling *Gamergate* [95], if taken at face value.

Importantly, if it is an organization that engages with the story, we can no longer assume that the audience is participating on its own volition, and that makes the storyteller's tasks more difficult to achieve. Especially when it comes to **data stories** – in our experience as quantitative consultants over a 15+ year period, a surprisingly large proportion of hierarchical structures accross all sectors is reticent to use data (and data stories) in their **strategic** and **service activities**, especially for organizations that could seriously be deemed "data young".[27]

27: Mind you, being **data positive** is no guarantee that data stories will be well received: organizations tend to remain **data friendly** only as long as the data story supports the (at times, implicit and hidden) narrative that permeates their levels and teams.

It is a rare (individual) audience who can change their mind when presented with new evidence; for organizations, that requires a nearly superhuman (and rarely forthcoming) effort.

Context and Universality

Stories travel; they may reach **unexpected** (and **untargeted**) audiences. Even the most homogeneous audiences exhibit some degree of **heterogeneity** (individuals, competing factions, etc.). A particular action or event may be viewed positively or negatively by audiences (or audience members) with **differing contexts** (i.e., pre-existing feelings/knowledge concerning the situations and the agents they involve):

- would you be able to recognize nobility in a political enemy's actions?
- could a fan of the Maple Leafs/Habs ever have something worthy to say about hockey?[28]

28: Replace with your own bugaboos, as needed. Go Sens!

The same story may thus have different **outcomes/impacts** in different contexts. Consider, for instance, Trevor Greenway's article Wakefield nurse fires up Freedom Convoy ↗ (see Figure 7.16).

Based only on the headline, the photo, and the accompanying blurb, what is your opinion on the subject (the nurse)? The author? Now read the article: have your opinions changed?

According to Nikki Mantel, the *Low Down*'s publisher, this was one of their most "controversial" articles ever, in terms of reader responses [personal communication]. Some calls and letters to the Editor excoriated the newspaper for painting an "anti-vaxxer" in a sympathetic light, others for ridiculing a hard-working and honest citizens.

For Mr. Greenway and the *Low Down*, it remains one (and only one) story: it was written (and published) once, for all the world to see. But it was not the same story for different audiences. Context matters.

> "To some, this might smack of post-modernism:"you are saying that there is no truth, and that data analysis is pointless!" To which our response is: "analysts have agency (lots of it, as it turns out), and their choices *DO* influence the results... so run multiple analyses to determine the variability of the outcomes". That is simply the nature of the discipline." [1]

Trevor Greenway · Feb 9 · 5 min read

Wakefield nurse fires up Freedom Convoy

Wakefield's Bethan Nodwell is known in the Gatineau Hills for many things: being the hospital's former head nurse, singing onstage at the Black Sheep Inn, and more recently, disseminating debatable facts and anti-vax sentiments on social media. Now she's running the main stage at the Freedom Convoy in downtown Ottawa, firing up the crowd as seen here Feb. 4. Trevor Greenway photo

Figure 7.16: published in *The Low Down to Hull and Back* on Feb 9, 2022.

The same goes for stories and data stories: **multiplicity** helps get a better idea of exactly what is going on (definitely in the preparation stage, at least!).

As an illustration, let us re-visit the constellation example of Figure 7.3. You will not be surprised to find out that different culture had different night skies: of course, the skies themselves were the same (give or take a few stars based on a culture's location on Earth), but they were definitely **viewed** differently, based on the various myths (see Figure 7.17).

There are marked differences:

- Chinese constellations are much more numerous (and so smaller) than the modern IAU constellations;
- there are very few southern Korean constellations (presumably due to the northern location of Korea);
- the Navajo constellations that are presented are more easily recognizable as human figures than they are in the other systems;
- the Maori constellations are nautically themed (fishing hook, etc.).

Upon reflection it is not too surprising that all these cultures had different constellations, and that all of them are as "true" as one another, but it is somewhat surprising that all cultures **have** constellations... Might **this** be the actual story?

This is an unspoken challenge of storytelling – the audience may fail to agree that the story is what the author think it is: the "author is dead" [96] (at least, up to a point). Stories are universally appealing to humans, but their **interpretations are not universal**.

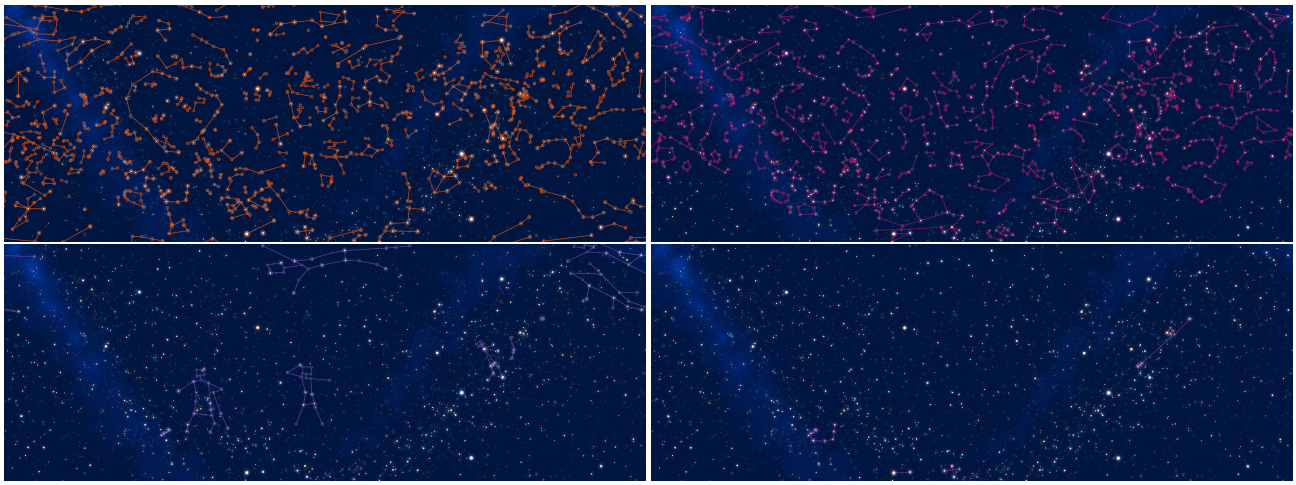


Figure 7.17: Traditional constellations: Chinese (top left); Korean (top right); Navajo (subset, bottom left), and Maori (bottom right) [70].

Aesop's The Boy Who Cried Wolf

There once was a bored shepherd boy who sat on the hillside watching the village sheep. To amuse himself he took a great breath and sang out, "Wolf! Wolf! The Wolf is chasing the sheep!"

The villagers came running up the hill to help the boy drive the wolf away. But when they arrived at the top of the hill, they found no wolf. The boy laughed at the sight of their angry faces. "Don't cry 'wolf', shepherd boy," said the villagers, "when there's no wolf!" They went grumbling back down the hill.

Later, the boy sang out again, "Wolf! Wolf! The wolf is chasing the sheep!" To his naughty delight, he watched the villagers run up the hill to help him drive the wolf away.

When the villagers saw no wolf they sternly said, "Save your frightened song for when there is really something wrong! Don't cry 'wolf' when there is NO wolf!" But the boy just grinned and watched them go grumbling down the hill once more.

Later, he saw a REAL wolf prowling about his flock. Alarmed, he leaped to his feet and sang out as loudly as he could, "Wolf! Wolf!" But the villagers thought he was trying to fool them again, and so they didn't come.

At sunset, everyone wondered why the shepherd boy hadn't returned to the village with their sheep. They went up the hill to find the boy. They found him weeping. "There was a wolf! The flock has scattered! I cried out,"Wolf!" Why didn't you come?"

An old man tried to comfort the boy as they walked back to the village. "We'll help you look for the lost sheep in the morning," he said, putting his arm around the youth, "[...]" The Boy Who Cried Wolf

What does the old man say to comfort the young boy? What is the **moral** of the story? Even if this specific one is unknown to you, a lifetime of experience with similar tales makes it clear that the missing words are something to the effect of: "Nobody believes a liar, even when they are telling the truth."

The interpretation is that we build trust by being trustworthy and straightforward, by demonstrably telling the truth in our dealings with others. The good functioning of human society hinges on this interpretation; it is almost certainly the one you were taught as a child.[29]

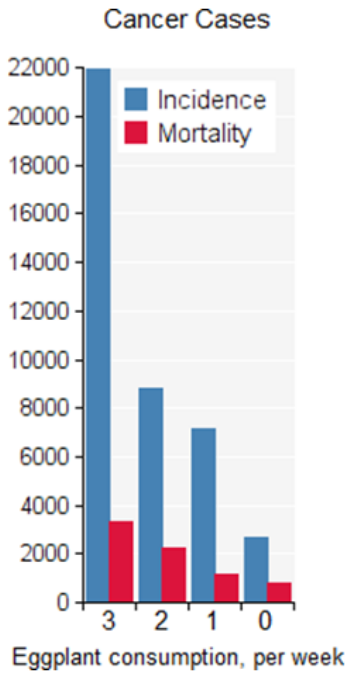
Thankfully (in this case, at least), it takes a fair amount of effort to overcome the **cultural momentum** generated by fables and cautionary tales in general, which makes the second interpretation seem off-kilter (and thus wrong) to us: we have heard too many stories over the years to be fooled.

29: There is (at least) another, **more sinister** (if not downright sociopathic) interpretation: if in truth you are a liar, then it is crucial to keep that fact hidden from everybody. In that interpretation, the boy was foolish for **repeatedly** using the same lie, because that clearly marked him as a liar in the eyes of the villagers (and hence as someone who could not be trusted). Essentially the same point was made by Elim Garak to Julian Bashir in the *Deep Space Nine* episode Improbable Cause, which served to underline how culturally different the Cardassians (Garak's species) were from humans.

But data stories are a different matter: for the most part, they have not yet penetrated human "**extelligence**".[30] Additionally, whereas the vast majority of us are **story-literate** (according to the standards of our respective cultures and sub-cultures), we cannot claim to be a **data-literate** species *yet*. In practical terms, this means that the "right" interpretation of a data story often escapes us if it is not explicitly provided with the charts and tables.

30: A term coined by Ian Stewart and Jack Cohen to denote the collective cultural capital available to humanity in the form of external media (e.g., tribal legends, folklore, nursery rhymes, books, videotapes, CD-ROMs, Wikipedia, etc.). [97]

Take a look at the following (facetious AND fictitious) chart:



What is the "moral" of the accompanying data story? Is it that increased eggplant consumption is linked to increased cancer incidence, or that it is linked to diminishing mortality rates? Is the chart suggesting that we eat more eggplant, or that we cut down on eggplant consumption?[31]

31: One of us (Patrick) hates eggplant, so he knows which way his personal bias is taking him... what about you?

7.3 Form and Structure

We have mentioned that most humans are **story-literate**, which is to say, that they know and understand the **storytelling rules and conventions** of the various sub-cultures to which they belong.[32]

32: This section's material is **heavily** influenced by the excellent tvropes.com [98]; we will link to tropes as they occur, but you should be aware that the site is a considered a rabbit hole *par excellence*... once you enter the site, you might not emerge for a few hours.

Storytelling Tropes

In storytelling, a **trope** is a conceptual "figure of speech", a storytelling shorthand for a concept that the audience will recognize and understand instantly, without the authors having to go into detailed descriptions. It is, in other words, a storytelling **convention**, or a contract between the audience and the teller. Tropes can cover a variety of storytelling concepts, such as:

- plot tricks
- setups
- narrative structures
- character types
- linguistic idioms, etc.

The most commonly-used tropes tend to become **clichés**, which is to say, elements that are *expected* to be part of any story in a given genre.[33] Tropes are usually neither intrinsically good nor bad; they are simply storytelling **units**, **building blocks**, and/or **patterns**,[34] not solely within the works themselves, but also behind-the-scenes, in particular when it comes to:

- aspects of creation
- technical features of a medium
- audience experience and expectations

The **entire process of creating and telling/showing a story** has to be integrated in order for stories to work.

None of this is new, however: we have been identifying and discussing patterns in media for **centuries**. Aristotle wrote the *Poetics* (c. 335 BCE), in which he studied tragic plays and epics, making him the first "troper" of whom we have knowledge. He first diagnosed many of the tropes still in use, including:

- Acceptable Breaks from Reality
- Anti-Hero
- Bittersweet Ending
- Contrived Coincidence
- Deus ex Machina
- Downer Ending
- Emotional Torque
- Happy Ending
- Random Events Plot
- Reality Is Unrealistic
- The Reveal
- Rule of Cool

33: The word "cliché" has a negative connotation; works that rely too heavily on them tend to be described as "lazy", "tired", "derivative", "old-fashioned", and so on. This should be taken with a grain of salt, however, as no story ever gets a 0% Approval Rating; as N. Gabler reminds us,

> "One does not necessarily have to cluck in disapproval to admit that entertainment is all the things its detractors say it is: fun, effortless, sensational, mindless, formulaic, predictable and subversive. In fact, one might argue that those are the very reasons so many people love it." [99]

34: Or, as "tvtropers" have it: Tropes Are Tools.

- Special Effects Failure
- Spectacle
- Three-Act Structure
- Twist Ending
- Unsympathetic Comedy Protagonist
- Willing Suspension of Disbelief

There are upwards of a few hundred tropes on record; user *SonicLover* has organized some of them into a *Periodic Table of Storytelling* (see Figure 7.18).

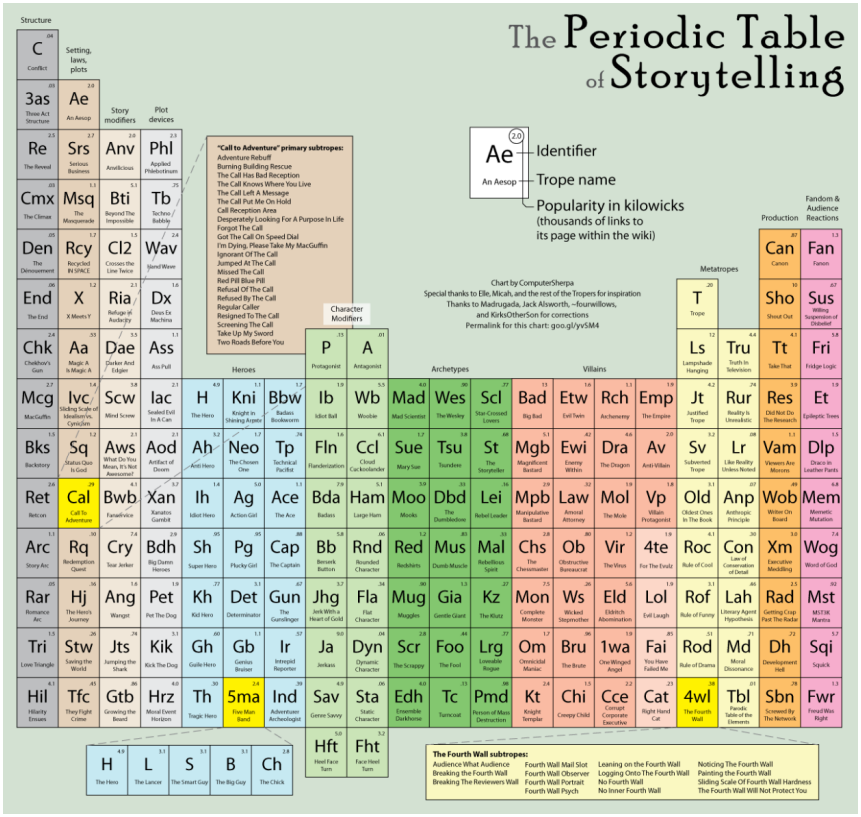


Figure 7.18: We could spend hours here...

It works "more or less" like the *Periodic Table of the Elements*: tropes belong to families, and they can be combined to form simple **storytelling molecules**.

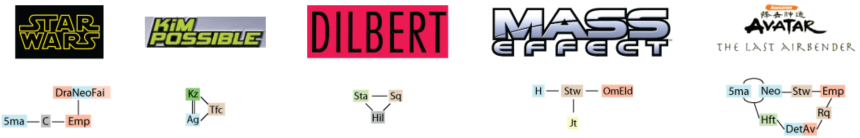


Figure 7.19: Also by user *SonicLover*.

Storytelling Molecules

- **Star Wars** is basically the story of a 5 Man Band (Luke as The Hero, Han as The Lancer, Obi-Wan as The Smart Guy, Chewbacca as The Big Guy, Leia as The Chick [35]) in Conflict with The Empire (Palpatine) and The Dragon (Darth Vader), a ruthless killer (You

35: Their term, not ours.

Have Failed Me) who also happens to be The Chosen One (the one who will bring balance to the Force);
- **Kim Possible** is an Action Girl (Kim Possible) in a relationship with The Klutz (Ron Stoppable); together, They Fight Crime ;
- **Dilbert** is a collection of Static Characters (office workers) who never grow through their misadventures (Status Quo Is God); Hilarity Ensues .
- We have never played **Mass Effect** , so we do not know how accurate its story molecule is, but apparently it's The Hero Saving the World from an Eldritch Abomination Omnicidal Maniac .
- **Avatar the Last Airbender** is seemingly about a 5 Man Band and The Chosen One who band together with an Anti-Villain Determinator on a Redemption Quest (after experiencing a Heel-Face Turn) to Save the World from The Empire .

Obviously, stories are much more than their **synopsis**, but our experience with stories is extensive enough for us to get the gist through the molecules.

Playing With Tropes: The Wicked Stepmother

Tropes are most useful when they are **played with** by the storytellers. Since the conventions are known and understood by the audience, any departure from a trope can be used to convey special information (see Figure 7.20).

In data stories, this often takes the form of looking for **what is missing** or **what differs from expectations** (see our discussion on the Gestalt Principles in Chapter 4, *The Mechanics of Visual Perception*).

The Wicked Stepmother is one of the most familiar (and oldest) tropes in fairy tales and folklore. The defining characteristic of the wicked stepmother is that she is hostile to her stepchildren; but for the trope to real take effect, her spouse has to be out of the way (dead, away, deadbeat, etc.) or fail to intervene on behalf of the children (and possibly be blind to the hostility in the first place).[35]

35: The Western fiction standard is probably the one found in Cinderella .

Here are some ways in which we can play with this trope.

- **Played Straight:** the stepmother is hostile to her stepson, which is not taken as a given in the world of the story.
- **Justified:** the stepmother is hostile to her stepdaughter, but that is because the stepdaughter is bullying the stepmother's son.
- **Inverted:** every adult but the stepmother is hotile to the stepchildren.
- **Backfired:** the stepmother is hostile to her stepchildren, but she's unaware that they love her.
- **Subverted:** the stepmother is hostile to her stepchildren, but she is just hostile to anyone and everyone.
- **Double Subverted:** everyone expects the stepmother to be hostile to her stepchildren, but she is perfectly nice to them . . . except that she is secretly working to make their lives miserable.

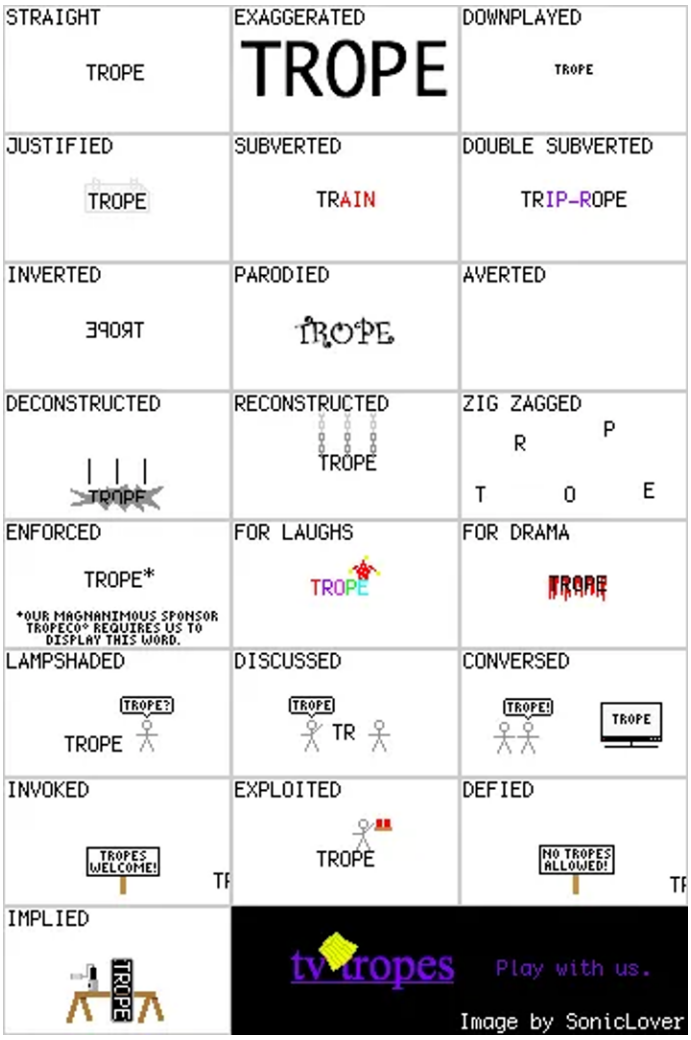


Figure 7.20: Playing with tropes, by user *SonicLover*.

- **Parodied:** in the story's setting, young women are sent to a finishing school where they are taught finances, cleaning, cooking, and how to make a child life's miserable (in case she ever becomes a stepmother).
- **Deconstructed:** the stepmother was a friend of the mother since before her stepchildren were born, and there was never any conflict with anyone (including the mother before she passed away) – it would not make sense for the stepmother to suddenly become hostile to the stepchildren for no apparent reason.
- **Reconstructed:** the stepmother was friendly to her stepchildren at first, but suddenly became hostile, and the rest of the story is about figuring out why the change happened.
- **Zig Zagged:** the stepmother is hostile to her stepchildren, but she was under mind control at the time. And it later turns out that the mind controller was actually the stepmother's evil twin sister, who is also a stepmother (but to different stepchildren). In the end, we find out that a conspiracy hatched by the stepmother and her evil twin sister, one born out of necessity because the stepchildren were in fact the scouts for an alien invasion force.

- **Averted:** there is a stepmother, but she is friendly to her stepchildren.
- **Enforced:** the writer hated his stepmother, so he decided paint his story's stepmother as wicked.
- **Logical Extreme:** in the story's setting, all stepmothers are hostile to their stepchildren.
- **Other Variations on a Trope:** the stepmother is hostile to her stepchildren, but she is not called a stepmother in the story because that role as we know it does not exist in that place or time, even though her role in the family structure is basically that of a stepmother.
- **Lampshaded:** "So she's a wicked stepmother! I always wanted to say that."
- **Invoked:** stepmothers are employed as guards in a high-security prison because of their experience being hostile to their stepchildren.
- **Exploited:** the stepson purposely opens hotility with his soon-to-be stepmother, because the stepmother is always hostile to her stepchildren in the books he reads.
- **Discussed:** "Unlike what you may have seen on TV shows, most stepmothers have at least a neutral relationship with their stepchildren."
- **Implied**, **Exaggerated**, **Downplayed**, **Played for Laughs**, **Played for Drama**, **Played for Horror**, **Untwisted**, **Defied**, **Conversed**, **Parodied**, etc.

Data Storytelling Tropes

What could **data storytelling tropes** look like? What are the visual elements, the conventions, the shortcuts, the set-ups that chart and dashboard creators can reasonably expect their audience to recognize?

We will revisit this at a later stage, but for now remember that tropes are neither bad, nor good. They are simply **tools**.

Narrative Structures

It is common for storytelling books to bring up **narrative structure**, and to give some common examples. It is not entirely obvious how these could apply to **data stories**; talking about such structures has become a trope[36] and we feel that the audience has come to expect it, so we will touch on the topic briefly.

36: See what we did, there?

Narrative structure is the **order** in which events are organized into a beginning, middle, and ending. A story's structure directly affects the way the plot **unfolds** and how its **driving forces**[37] are introduced.

37: Characters, obstacles, setting, etc.

Tightly controlled narrative structure results in all questions being answered, provides a climax followed by resolution and information at the end of the story, furthers the characters' development, and unravels any central conflicts.[38]

38: Humans really like those!

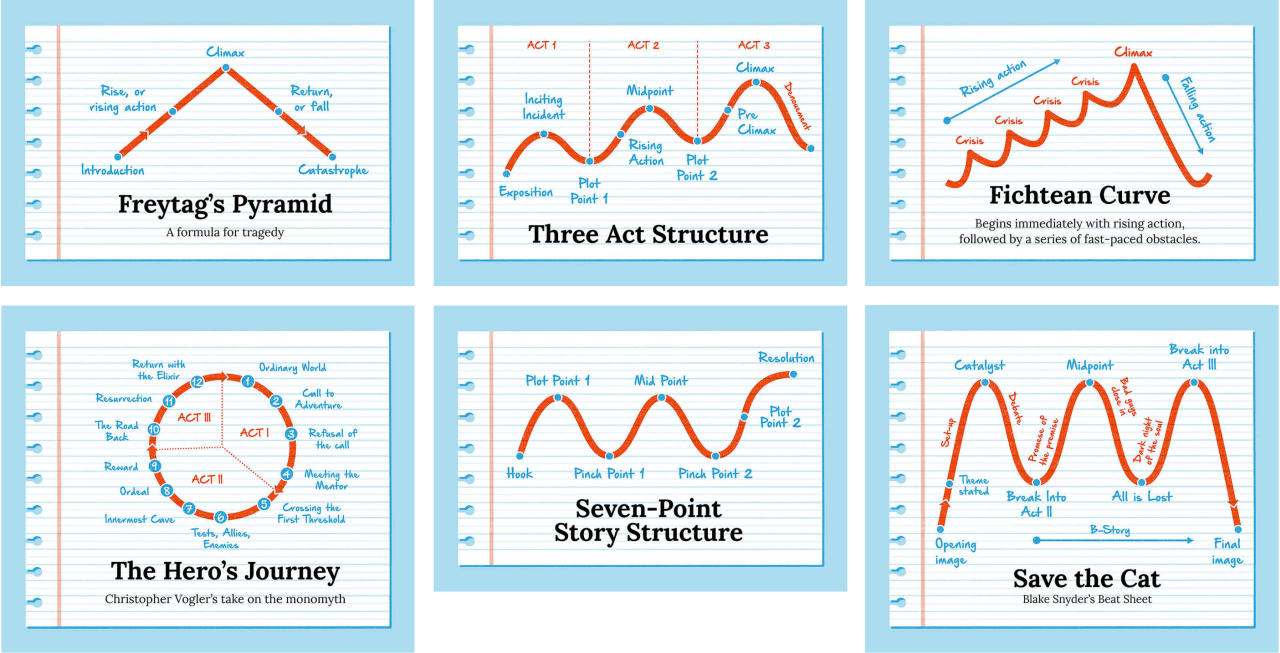


Figure 7.21: Narrative structures [100].

Structure helps creators draw connections between "things that happen" and "things that matter." For instance, a tale about two vastly different people falling in love **can also be** about the value of compromise [100].

Traditionally, storytelling books then introduce **specific narrative structures**, give them a catchy name, and study them in some detail, bringing up examples from the medium of interest, sometimes illustrating them with charts, some of which were reproduced in Figure 7.21.

E. Coates points out that *Pixar Studios* uses a simple narrative structure in its wildly successful movies: the **Pixar story spine** [101]. Roughly speaking, the movies follow this structure:

1. Once upon a time, there was ___.
2. Every day, ___.
3. One day ___.
4. Because of that, ___.
5. Because of that, ___.
6. Until finally ___.

The text we provided at the start of this module (p. 111) is a story spine for *Finding Nemo*.[39] Notice that we used the indefinite *a*: there could be **more than one** story spine for a given work. Where, for instance, does Dory come into the spine? The sharks? Nemo's friends in the dentist's aquarium? Are these secondary characters (and associated details) necessary to understand the narrative structure? Is the spine itself a story?

39: "There once was a fish named Marlin, who loved his son Nemo more than anything. Every day he tried to protect Nemo from the ocean, which Marlin feared. One day Nemo decided his dad was wrong and he swam away. But he was captured by a diver. Because of that, Marlin had to leave the safety of his reef to find his son. And because of that, he learned to let go of his fears and trust that Nemo had what it takes to take care of himself. Ever since that day, Marlin gave Nemo the space to learn on his own."

7.4 How to Tell a Story

> "Human beings do not just tell stories, or just listen to them. [...] (they) use the **power of story** to mould events according to (their) own wishes. [...] Priests, politicians, scientists, teachers, and journalists have learned to use the power of story to get their messages across to the public, and to manipulate or persuade people to behave in particular ways. [...]
>
> The proper [...] response to any new discovery or theory, especially your own, is to look for ways to disprove it. That is, to try to find a different story that explains the same things. [...] Stories have power because we have minds, and we have minds because stories have power." [72]

In this section, we briefly discuss:

- where story ideas might come from;
- what foundations a story should rest on;
- what material gets integrated into a story;
- issues related to story beginnings and endings, and
- how to best share stories.

The material presented in this section is heavily indebted to [102]; more details are available there as well.

Mining for Content

Stories are born when storytellers decide to tell them, for persuasion, entertainment, and so on. But where do **story ideas** come from? From memories of events and situations, from other stories, from "thin air", from decisions, from data and analysis. Where else could they come from?

For data stories, obviously, the last of these takes certain stage, but in instances where the data analysis is meant to be prescriptive, **decisions** are also a big source of stories. Think of moments when conscious (data) decisions were made: what happened as a result? What might be the decision's **impact** on you, your organization, your audience?

You may ask yourself what **triggered** the story/decision, what internal acts/events and factors outside of you control fed into the story; you may think of moments when **things went wrong** and they recovered, of the lessons learned along the way.

Keep in mind that trauma, struggle, challenges, difficulties should define the **story context, not the story itself**; stories need to go beyond "a bad thing happened", even when they are nominally about the bad thing happening.

Story Foundation

Storytellers should remember that audience buy-in depends, in a large part, on the **stakes**? Stakeholders will not turn to a data presentation solely because analysts have mastered the art of using bar charts, or to a report because it is well-written: there has to be a clear attempt at identifying what do people/organizations/countries/NHL teams/etc. stand to lose or to gain as a result of what they see in front of them. Stakes, in effect, tell audiences **why they should care**. The stakes do not have to be world-shattering at every step and turn, however; a story about an in-grown toenail might not be meaningful to very many people, but to a targeted audience of sufferers (a very small group, hopefully), the stakes may be high enough for them to adopt the story. Knowing your audience is, once again, crucial.

Is the purported story, at-best, an **anecdote**? Stories have messages and impact, anecdotes usually lack depth. They might very well be entertaining (and sometimes, that is all a storyteller is aiming for), but it is probably best for storytellers to only use them as a **basis** for their stories; they cannot carry the story on their own, so to speak.[40]

40: Collections of anecdotes, when viewed in their entirety and in the context in which they arise, can sometimes be interpreted as stories, over time: the body of Russian "anekdoty" (loosely translated as “anecdotes” or “jokes”, although with a strong political undercurrent) paints a vivid portrait of life under Soviet rule [103].

Impactful stories describe a **journey of change**. They have a clearly defined **arc**: how are things **transformed** or affected by decisions, policies, events, etc.? What were the **challenges** associated with the changes? How must things be done **differently** after the transformation? What are the **consequences** for various groups and stakeholders? Are the changes **permanent**? Can they be **undone**? Should they?

Storytellers (and the audience) should also have a sense of what the story is **ultimately about**. Surprisingly, that can be easier said than done; the ability to distill even the most sprawling of stories to a short paragraph of 1 or 2 sentences (e.g., a story spine) does wonders for the story’s **focus** and **clarity**, which is prized by audiences.

Finally, note that storytellers usually only tell/write/create **one story** from a given set of events/memories/data[41] But it will be useful for them to know whether this was, in fact, the **only story that could plausibly be told** about the situation. Since this is rarely the case, having a sense for the story’s **phase space** cannot help but have a positive impact on presentation and delivery.

41: As they should: even getting one right is full-time work . . . who has the time to for more?

Story Materials

So what goes into the story? What **important information** is needed to build the story arc? This is easy to answer after the fact; prior to having built the story, however, it can help to create a bullet list of **narrative stepping stones**, some of which become scenes/chart elements, some summaries, while others are discarded.

At every step of the story building process, the author should keep in mind what the story is **building up to**, how it will play out/**resolve**, and what role (if any) **hindsight** will play in the story’s telling: lessons will be learned, of course, but must they be relayed explicitly to the audience?

Storyteller often have "writer's block" early on in the process, only to see it be replaced by an avalanche of ideas: this is just as difficult to navigate, the tendency being to want to use every great idea, thought, analysis result, etc. that arose in the brainstorming stage.

In storytelling, as in life in general, discretion is the better part of valour;[42] the best recommendation we can offer beginning storytellers of all stripes is to **avoid detail overload**. Identify misleading and/or irrelevant tidbits and remove them from the final version; be on the lookout for too many dates, colours, characters, shapes, etc.

42: Or in less flowery language, "less is more".

When in doubt, return to the distilled story and determine if the details support the story, if your audience has the required **backstory** to understand the message or if it needs to be weaved into the story, somehow. In other words, you need to determine if the story arc **lands**.

Being too close to the story can make it difficult to get a true, unbiased sense of how things are going; this is one of the many location where a **tsarina of common sense** could be a good addition to the storytelling process. Show and tell the story to someone you trust who has not been involved with preparing the story – she will let you know if the story lands, if unwarranted assumptions about the audience and their background are made, and so on.[43]

43: Be prepared to return the favour, as well.

Stories grow with **feedback loops** that include audience stand-ins; becoming a better storyteller helps other storytellers improve as well.

Beginnings and Endings

> "We are ambivalent [...] about **beginnings** – their 'creation myth' aspect appeals to our sense of narrative imperative, but we sometimes find the 'first it wasn't, then it was' lie-to-children unpalatable. We have even more trouble with **becomings**. Our minds attach labels to things in the surrounding world, and we interpret those labels as discontinuities. If things have different labels, then we expect there to be a clean line of demarcation between them. The Universe, however, runs on processes rather than things, and a process starts as one thing and **becomes** another without ever crossing a clear boundary. Worst, if there is some apparent boundary, we are likely to point at it and shout '**that's *it*!**' just because we can't see anything else worth getting agitated about." [71]

In some sense, we understand story **beginnings** and **endings** as we understand of our own **birth** and **death**, which is to say that we have a tendency to think that nothing comes before, and nothing will come after: Après-moi, le déluge!, as le *Roi Soleil* had it.[44]

44: If you are so inclined philosophically and spiritually, of course.

But this (entirely reasonable) self-centered view obscures a reality: stories never **just begin** or **end** at their earliest or latest chronological points. They are **extensions** and **continuations** of stories that have come before them, and they provide **stepping stones** for stories yet to come.

With this caveat in mind, it is important to select the beginning and closing points of a story carefully:

- beginnings can be *in media res* , if necessary (you do not have to begin at the "start" if the story does not call for it), but it should be clear that the story has **begun**;
- endings that leave the audience wondering 'what was that about?', or 'is that it?' are **unsatisfying**; endings that come to a **definite stop** are satisfying.

This is akin to waking up bright and early, and going to bed at a reasonable hour: selecting the right **story endpoint** will help keep the story focused.

Sharing the Story

At some point in the story preparation process, you will have enough of a story to start thinking about **sharing it** with the audience. That can be a scary though for a lot of us, no matter what kind of story we are telling or what kind of audience will receive it; practicing to "tell" the story is a **necessity**, even for non-novices.

The first attempts are usually long, convoluted, complicated; that's normal! If the story is first shared with the tsarina of common sense, she can help decide if the story needs to be **restructured**, and how to do it:

- are there **redundancies** to remove?
- are there **too many details**, causing **confusion**?
- are there **too few details**, leading to **ambiguity**?
- is the message **clear**?
- are there **competing** (contradictory?) interpretations/insights to be drawn from the story?

Sharing a story of course requires **communication**: **anything that helps convey the message** is in play. In practice, the choice of communication mode has an impact on the type of story that can be told; a data presentation to the deputy director of a government department is probably not the right medium for a humorous story, say. But the communication mode also has an impact on how stories are built and conveyed: a 3-minute elevator pitch will have to avoid charts.

In practice, stories are communicated:

- **orally** (in person, conversation, play, radio, etc.)
- **with text** (newspaper, books, tweets, etc.)
- **visually** (graphic novels, infographics, posters, etc.)
- **with charts** (dashboards, visualizations, etc.)
- **in combination** (movies, memes, etc.)

Since the mode affects the style, type, building, and conveying of a story, it needs to be selected early on in the process; it may be too late (or costly) to change at a later stage.

Storytelling Examples

How we tell a story depends on a number of factors:

- the **subject matter**
- the **audience** (how much they know, how they are likely to receive the message, etc.)
- the **teller** (personality, preferences, etc.)
- format **constraints** (number of characters, number of pages, allotted time, etc.)

There are multiple tools available to storytellers: levity, seriousness, humour, terseness, flowery language, exaggerations, dramatic pauses, soundtracks, technologies, lists and $n-$steps plans, charts, dashboards, etc. With so many options, it is important to aim for **coherence** and **consistency** and to avoid creating a "word salad" (or the equivalent for non-verbal stories).

Some **storytelling formats** have themselves become tropes (and in some instance, **meta-stories**):

- infographics
- tweets and other social media products
- memes
- TED Talks
- The Moth
- news report
- rap battles, etc.

In our opinion, the following stories, while not necessarily perfect, are all examples of well "told" stories.

Figure 7.22: Robinah Babirye, This Is Just The Beginning, *The Moth* (13:48)

Robinah Babirye (This Is Just The Beginning)

Figure 7.23: Hans Rosling, The Best Stats You've Ever Seen , *TED Talk* (20:35)

Hans Rosling (The Best Stats You've Ever Seen)

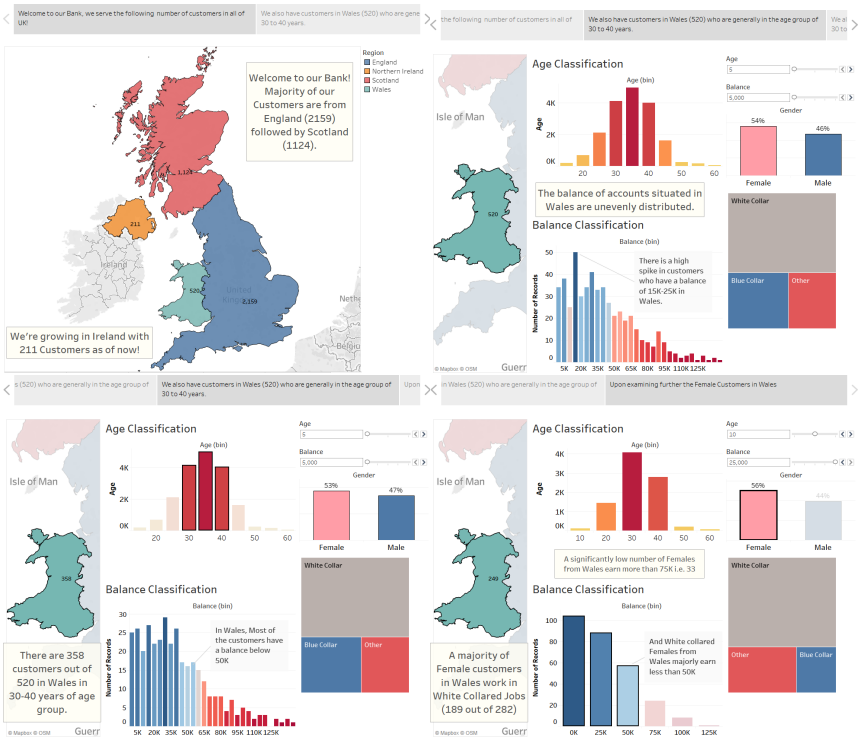


Figure 7.24: Yash Gupta's self-explanatory bank story, with annotations (Tableau) [104].

Yash Gupta (Bank Story)

Figure 7.25: Does this collection of 'memes' tell a story about parenting? [various online sources]

Parenting Memes

We can even get a fair amount of meta-contextual information by studying **story parodies** (that is to stay, stories which reside at least "one level below" what they nominally present to the world), since we suspect that it is nearly impossible to construct a great parody without understanding the inner workings of the format being parodied.

Figure 7.26: Pat Kelly, Thought Leader, *This is That* (04:15)

This is That (Thought Leader)

Figure 7.27: Charlie Booker, How to Report the News , *Newswipe* (02:02)

Figure 7.28: Emily Surname, Immigration Report , *Election Wipe* (03:36)

Newswipe (How to Report the News; Immigration Report)

Figure 7.29: Gigi D.G., Cucumber Quest

Gigi D.G. (Cucumber Quest)

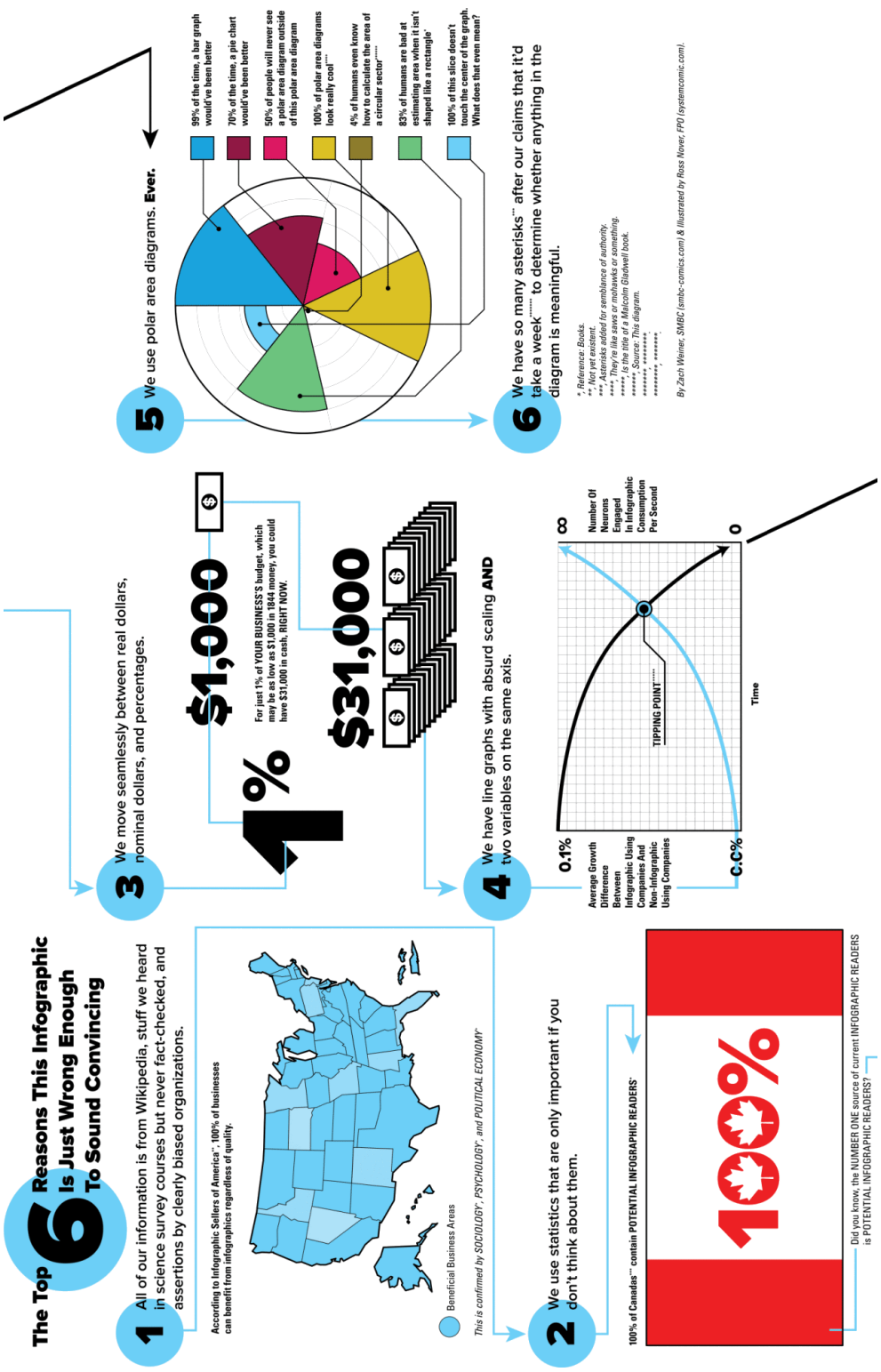


Figure 7.30: Zach Weinersmith and Ross Nover at their best, once again [105].

How Not to Tell a Story

We would be remiss if we did not also make recommendations about certain commonly used tropes that should likely be avoided (although, that may be in the eye of the beholder):

- Audience-Alienating Premise : some ideas are so foreign or alienating to an audience that any story that uses them is bound to fail, no matter how carefully the premise is presented; this again demonstrates the importance of knowing the audience;
- Author Filibuster / Author Tract : some stories need to be told, even if they make the audience uncomfortable, but unless the audience lives in an echo chamber, "preachiness" is unlikely to win converts;[45]
- Emphasize EVERYTHING : "you might find it hard to believe, but *some* writers actually use *way too much* emphasis in their descriptions! Using punctuation, formatting and endless superlatives, they *exhaust* you by **endlessly *insisting THAT EVERYTHING THEY TELL YOU IS TOTALLY EPIC!!***;"[46]
- Department of Redundancy Department : although a few repetitions here and there might help drive the point home, be careful not to overdo it (we will discuss this point again when we talk about data stories in more detail);
- Viewers Are Geniuses : beginning storytellers tend to assume that audience members know and see the world the same way they do, that the tropes and shortcuts used by the teller will be understood by the audience; while they may very well be, it is better for the teller to assume that this is not the case, absent specific knowledge about the audience and/or input from the tsarina of common sense.

When all is said and done, the only thing that matters is **getting the right message across**. Everything that helps in that endeavour is allowable, everything that hinders that goal is not recommended.

In this chapter, we provided an **overview** of what storytelling entails. It might not be immediately clear how any of it is relevant and applicable to data stories – we will be making the link explicit in the next chapter, *Effective Storytelling Visuals*.

45: Our political leaning and pro-vaccination stance have been made clear, and clear, and clear again in this chapter; even if you agree with them, you might start to be right sick and tired of them (and who could blame you, really?).

46: We are aware of the irony.