

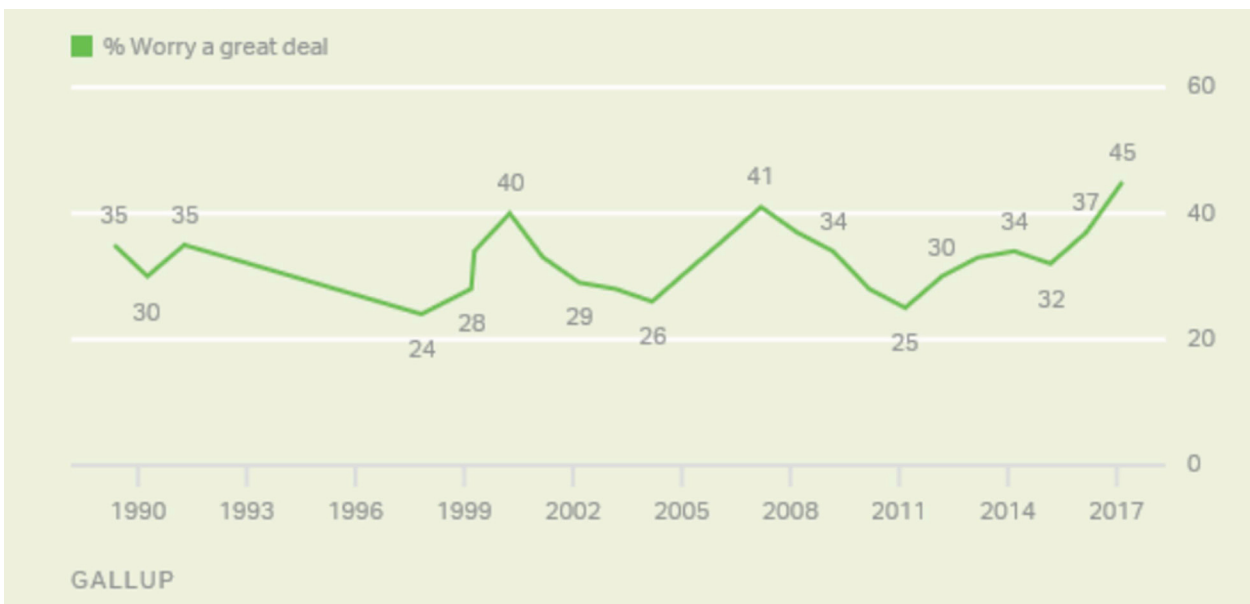


A New Approach Beyond 'Data Visualization'

It was May 2006 and the movie theater audience erupted to their feet, cheering and applauding loudly. They had just seen *An Inconvenient Truth* featuring Al Gore presenting a set of photographs, stories and even graphs to support his thesis that CO2 levels were causing global warming and we still had time to save the planet.

It was perhaps the greatest example of telling stories using graphs to date. The movie went on to win two Academy Awards. Gore earned a Nobel Peace Prize for his efforts. And global warming became a hot political topic.

The main question, though, is this: did Gore's 2006 graph- and story-heavy presentation change people's minds? Decide for yourself.



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The Gallup data is messy. But we do see that Americans reporting they were concerned “a great deal” spiked to 41% in 2006 when *An Inconvenient Truth* came out from just 26% in 2004. You might argue Gore’s movie reinvigorated a movement that had been losing steam. And while concern has varied over the past decade, it reached 45% again in 2018.

Now, scientists had been talking about global warming for decades, and showing the data to prove it. But it was Gore’s combination of graphs and storytelling that turned the tide.

That same year, Hans Rosling excited audiences with his TED talk on global health. Using an animated bubble chart with each country represented as a separate bubble, Rosling showed how the poorer countries were actually becoming more like the richer countries over time as their health and family planning improved. He narrated the moving bubbles by calling out the events in different countries that contributed to their changing status.

In 2010, the movie *An Inside Job* was released documenting the greed and corruption that fueled the 2008 financial crisis. The movie used a mixture of graphs, personal interviews and documentary-style news footage to explain the forces that lead to the collapse.

There’s increased energy around data visualization coming from many sectors. From the academic community, Edward Tufte is the grandfather of data visualization and his writing has influenced a generation of data analysts. From the practitioner side, writers like Stephen Few, Cole Nussbaumer Knaflic and Naomi Robbins have weighed in with books providing guidance on how to properly create graphs for business.

But now there’s increased focus on telling stories with graphs. The promise of Big Data is that we can mine the stories in all that data if we have the right analytic tools. Infographics often claim to “tell a story”. Newspapers like the Washington Post and the Wall Street Journal have entire departments focused on visualizing data to support the news story.

But what does it mean to tell stories with graphs?

I conduct workshops with mostly Fortune 500 business leaders and I ask them what they want to learn about graph design. They typically say things like:

I’d like to be more credible when I present data. Right now, it seems like our team is treated like number-crunchers. We want to be treated as strategic partners.

I want my graphs to be more engaging. Right now people seem bored while I’m presenting graphs. Even I feel bored.

I want my graphs to tell a story. Right now, it’s just a lot of data. People don’t know what they’re supposed to be looking at. There’s a lot of quibbling about things that don’t matter.

I want to know how to present data so it’s more convincing. Right now, there seems to be a lot of argument about the data. It’s right there but they still don’t want to believe it.

I want to know more creative ways to show data. Right now it’s line chart...line chart...line chart. What else can I do?

I know what they mean. As a market researcher, one of the first things I do when I start a new project is review the existing research. I look at a lot of graphs. Usually people copy and paste their graphs from Excel into a PowerPoint slide. They might pretty it up: change the colors, add drop shadows, change the font. But essentially, it’s just a pretty graph that says nothing.

I've been to those data presentations. They can be tedious as we go from graph to graph. They can be confrontational as people argue about how to interpret the data. They can be random, as people go off on tangents. They can be time-wasting, as people stare uncomprehendingly at a complex graph copied and pasted from Excel. Graphs can be a difficult medium.

If you work in business, you probably present data to executives to support business recommendations, report how well you're reaching financial targets or monitor how well systems are working.

If you work in marketing, you may be reporting the results of a price promotion to decide if you should reduce prices permanently. Or you're showing survey data to select an advertising campaign.

If you work in sales, you use graphs to convince customers your product is more effective than a competitor's. If you're an account manager, you want to show your clients how much money your services are saving the client, and how much more they could save if they upgraded to your premium package.

This book has a central thesis: **don't approach your data as an analyst. Approach it as a journalist.** Decide what story needs to be told, for your audience's benefit, and then tell it using the right graph, designed correctly and brought to life using storytelling principles.

Exploratory vs Explanatory Graphs

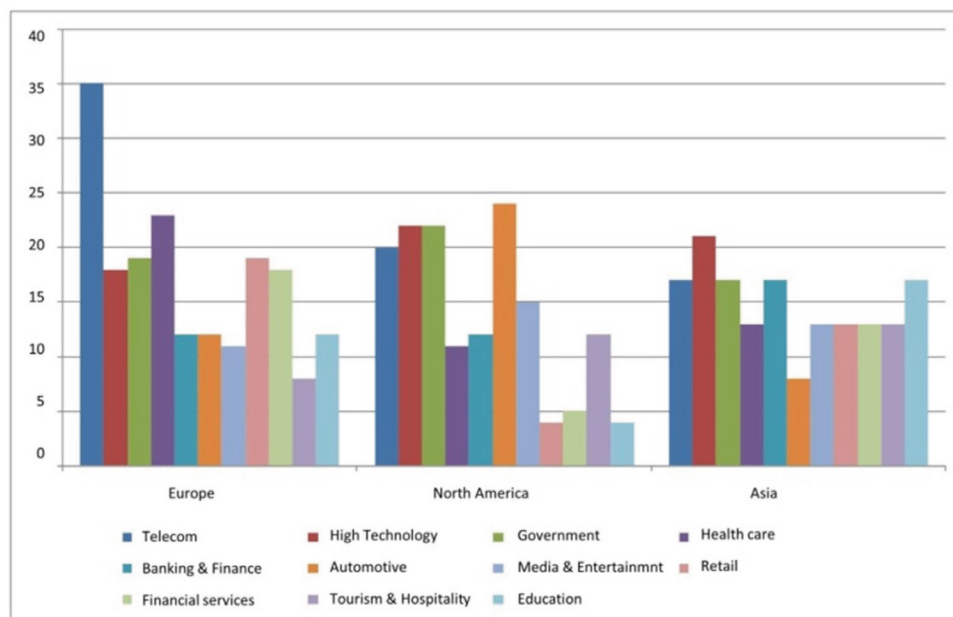
There are two types of graphs: exploratory and explanatory. **Exploratory graphs** are for the analyst to explore the data, look for patterns and try to answer specific questions.

But **explanatory graphs** are used to present those findings to an audience. They are cleaned-up versions that draw attention to the main point being made.

Excel creates exploratory graphs. These are not the graphs you want to show to an audience. Because Excel does not know the story you want the data to tell. Only you know that.

Here's an example of a graph I once saw. This comes from the deck of a very well-known and expensive consulting firm. But what is the message?

Key Verticals Focused Upon



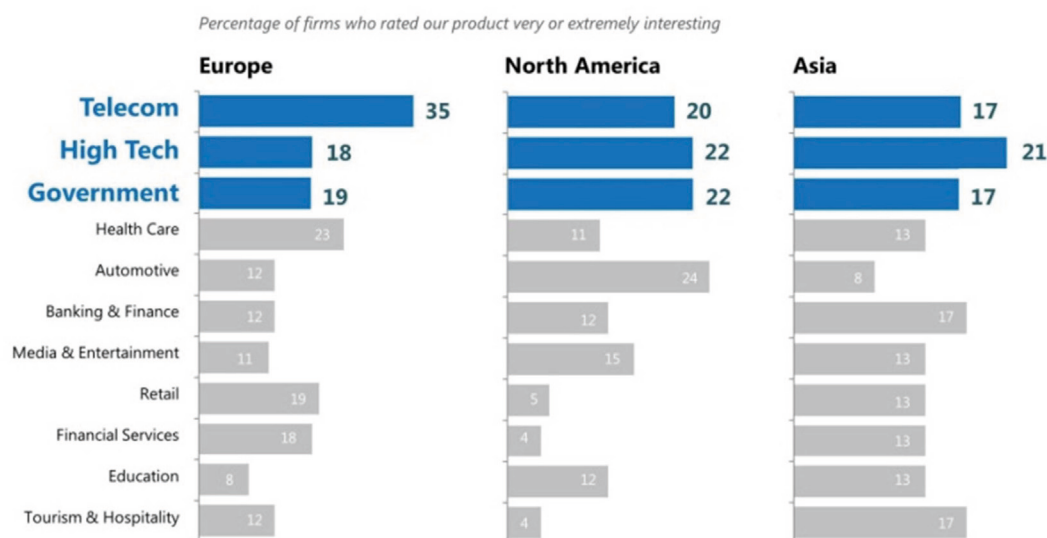
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This is an exploratory graph. It's a pretty graph. And given enough time, I can explore the data and figure out the meaning. But at first glance, it doesn't say anything at all.

If I show this to an executive audience, what will their reaction be? They will lean forward and squint and try to figure out what it all means. They may focus on the wrong things. They will become impatient and annoyed. And that will not put them in the best mood to agree with my recommendations.

But if I know what the audience wants to learn from this graph, I can focus the conversation on the main insights and design the story into the graph.

Our primary focus should be **Telecom, High Technology and Government** because they show the highest interest in our product



This is the exact same data. But I've figured out what I want to say, I've designed the graph to make that story instantly understandable, and I've even chosen a different graph to make it easier to discuss other points in the data. This is an explanatory graph.

What I've learned is there are effective and ineffective ways to present data. The least effective way is to copy and paste the graph from Excel. As the analyst, you've added no value at all. When you present this data to executives, they will have to do all the work of interpreting it. Why should they treat you as a strategic partner?

But when you approach your data, not as an analyst, but as a journalist, you immediately earn a seat at the table. When you come with clear insights and conclusions that matter to the audience, you focus the conversation on the things that are most important to them.

Here's an example. On April 14, 1912, the "unsinkable" ship Titanic with 2,224 lives onboard scraped along the edge of an iceberg in the freezing waters of the North Atlantic Ocean. The iceberg's bony shoulders ripped long holes along the side of the mighty craft, below the waterline, sending tens of thousands of gallons of freezing water pouring into five of the Titanic's eight watertight compartments. The Titanic took on water and began to sink.

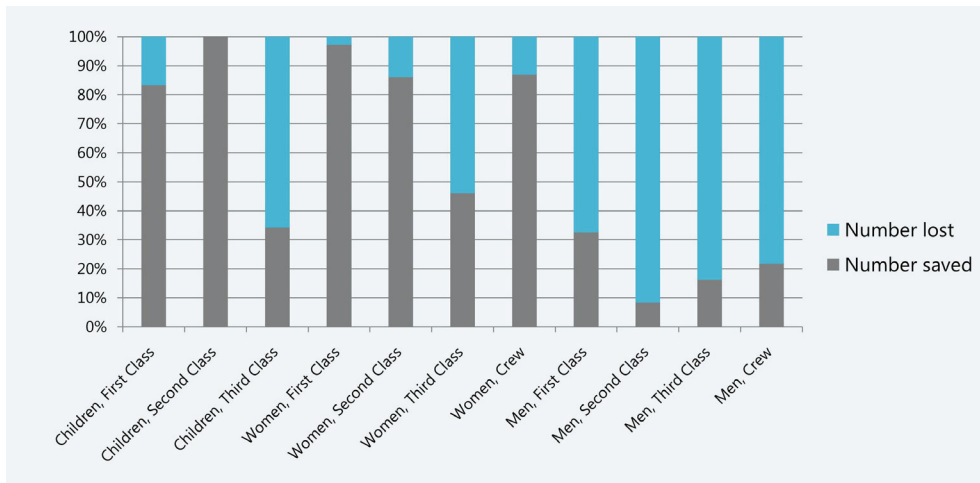
There were not enough lifeboats to save everyone. So decisions had to be made about who would be saved first and who would have to fend for themselves. The unhappy end to this story is that 2 hours and 40 minutes later just 710 of 2,224 persons onboard was saved.

The data from that tragic night is below

Passenger category	Number saved	Number lost
Children, First Class	5	1
Children, Second Class	24	0
Children, Third Class	27	52
Women, First Class	140	4
Women, Second Class	80	13
Women, Third Class	76	89
Women, Crew	20	3
Men, First Class	57	118
Men, Second Class	14	154
Men, Third Class	75	387
Men, Crew	192	693
Total	710	1514

Likely, you cannot easily see any patterns looking at a table of figures. And this is where graphs come in handy. They convert numbers into size, shape, position, color and slope so that important patterns can be detected. The story can be found in those patterns.

For instance, we might render the Titanic data in this way.



This is a graph using Excel’s defaults, which means it’s an exploratory graph. There are a ton of things wrong with this graph as an explanatory graph, as you’ll learn by the end of this book. But as an exploratory graph you can start to see a few things:

- A higher percentage of men died than women and children. There was clearly a “women and children first” principle at work that night
- Women and children in first and second class were more likely to survive than those in third class. Did the crew make an explicit decision to save the wealthier passengers first? Or were the wealthiest passengers simply closer to the deck and so to the lifeboats?
- The crew, both men and woman, had a higher survival rate than passengers in third class. Did the strict “women and children first” principle bend when panicked male crew members begged to board lifeboats alongside women and children?

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This is an okay analytical graph. But it is poor at telling the story of what happened that night. That stands to reason: Excel does not know the story you want to tell. Only you do.

We can tell the story of that night using a different kind of graph – called a spineplot – which combines the percentages of a stacked bar graph with the absolute size of each population.



In this new display, the story is not only clearer, but also faster to understand. There are also a lot more stories that are clear to the analyst:

- There were relatively few children onboard that night
- There were about three times as many men onboard as women
- The majority of women were saved
- The vast majority of men did not survive
- The crew made up over one-third of the passengers onboard
- 2nd class men were the least likely to survive

Both displays take up a similar amount of space. But the spineplot does a better job of providing insights into the many stories of that night.

And there were many stories. Your job as an analyst is not only to unearth all those stories, but to prioritize them and tell the right story depending on what the audience needs.

For myself, I never want to present just data to an audience. I want to present insights. I want to present conclusions. That's the value I add as the analyst. No-one spends more time with the data than I do. I want to help lead the conversation. I want to be a strategic partner. I want to tell stories with graphs.

And what about you? When you are presenting data, have you selected an underlying story to tell? Or do you just present everything you have, using the Excel defaults? Are you using exploratory graphs or explanatory graphs?

Statistical Numbing

Once we've made the decision to use explanatory graphs, we will find that audiences understand us better and faster, the conversation becomes more focused on the key issues, and we are seen as more strategic partners rather than just number-crunchers.

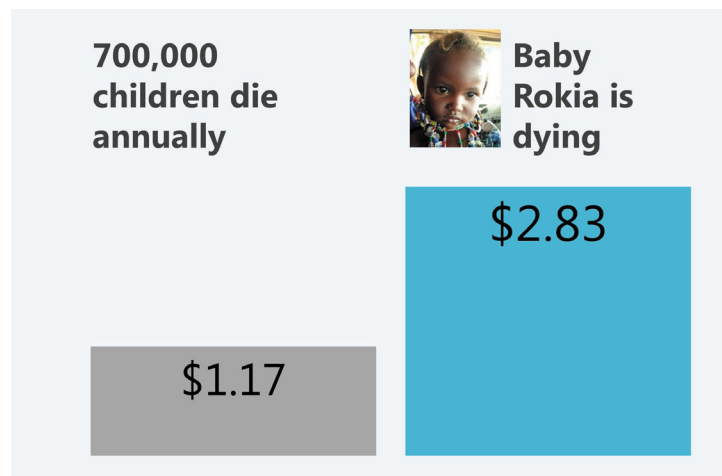
But clearer graphs is only half the battle when you are trying to sell ideas. What's needed is a new approach to graphs that realizes the perfect marriage involves storytelling plus graphs.

Many studies show when we are trying to convince an audience, storytelling plus graphs is more effective than graphs alone.

In 2007, researchers walked through a university cafeteria. They approached students and handed them five one-dollar bills. Then they handed them a brochure asking for donations for a charity called Save the Children. The student could donate all five dollars, any amount of money, or nothing as they wished.

One group of students received a brochure with statistics on the number of children in Africa who were dying of a certain disease. Typical copy read: "Every year, 700,000 children die a needless death." They donated an **average of \$1.17**.

A second group of students received a brochure with a story about one girl named Rokia, who was dying of this disease in Africa. They donated an **average of \$2.83** – more than twice as much!



What happened? Why did the story move people to action better than the graphs alone? Aren't we logical human beings? Don't we care about 700,000 children more than a single child?

It's an important dynamic called *statistical numbing*. Talk to people using numbers and you don't touch them emotionally. They are not likely to be moved to support you. But convert numbers into stories that touch the audience's heart and they are more likely to be moved.

There are several studies that test graphs alone versus graphs plus stories. And they all have similarly impressive results. So as a market researcher and communications consultant, trainer and author, I'm keenly aware of the problem of statistical numbing. I know when I present graphs alone, the audience will not be moved emotionally. When I combine storytelling principles and graphs together, I will be more effective at moving my audience to action.

Statistical numbing is a serious problem in business presentations, which are often thick with graphs and tables. And yet, this data is important to share with the audience. So, how do you do this?

By combining storytelling with graphs.

The Brain Science of Graphs and Storytelling

As I'm writing this book about graphs, I'm also working on my next book on storytelling. Hollywood did not invent storytelling. Humans have used storytelling as long as there have been human beings on the earth. We've kind of lost respect for storytelling in business, putting data on a pedestal and treating stories as more "soft". But I want to tell you that when you combine storytelling and data together, your data will become more clear, engaging and persuasive.

Brain science explains why.

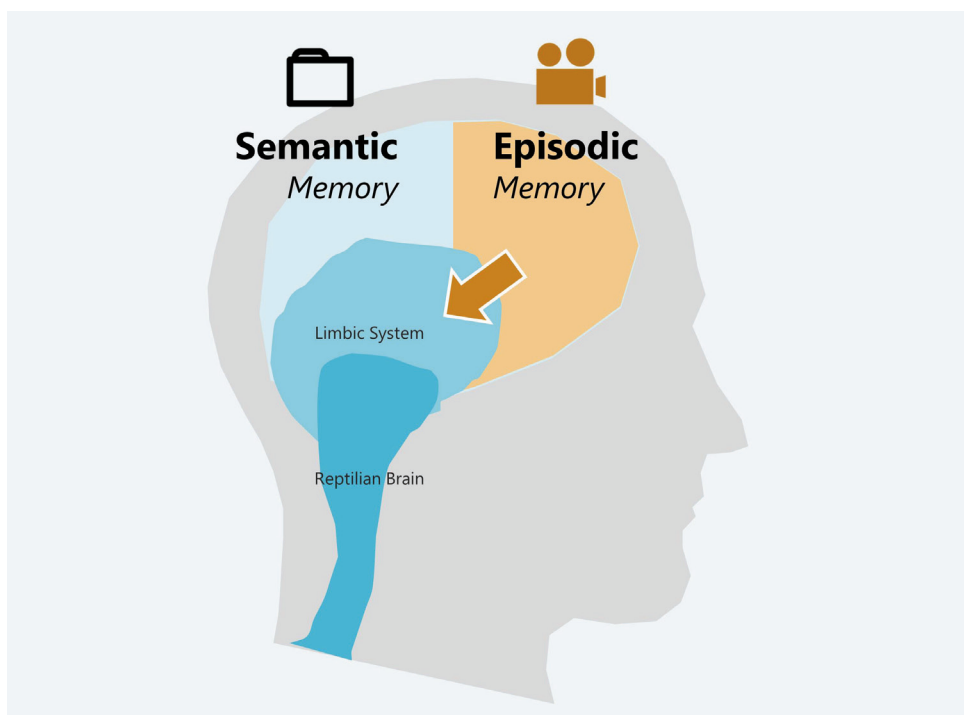
There are basically two parts of the brain, called *semantic memory* and *episodic memory*.

Semantic memory is like a filing cabinet in the brain. It stores facts: the population of China, your phone number, the schedule at the gym. Semantic memory is a fact-checker. If someone tells you your class at the gym was canceled, you might believe them or you might call the gym to double-check. If someone tells you the population of China is 5 billion, you'll compare that to what you already have stored about the population of China before you accept it.

Episodic memory is different. You can think about episodic memory like a video-camera in the brain. It records experiences: waking up, eating breakfast, driving to work. Importantly, episodic memory doesn't fact-check. If I see my boss walking toward me, I know that's my boss. If I eat a bagel, I know I ate a bagel. I experienced it.

Episodic memory is linked to the emotional centers of the brain, including the limbic system (relational emotions) and the reptilian brain (survival instincts). The reptilian brain is connected to the spine at the base of the skull, and the spine is the connection to the rest of the body's nerves that control action.

When I have an experience, like eating lunch or dancing or getting into an argument, it triggers emotions. Emotions lead to learning, so I can avoid, or seek, those feeling in the future. If I pat a strange dog in the park and he bites me, I learn that it's not safe to pat strange dogs. That's why we learn from experiences. And that's why traumatic experiences can be very hard to forget.



Semantic memory is not attached to emotion. It's a cold analytical machine that just processes facts and numbers. That's where we do analysis. It does it very efficiently. But facts and numbers don't create emotions that moves us to action.

How does this relate to storytelling with graphs? Well, **semantic memory processes data**. There is no emotion attached to that processing, just a lot of efficient processing and skeptical fact-checking. That's why data does not generate great emotional reactions in the audience, and often leads to a lot of debate. That's why we see statistical numbing when we present data.

But **episodic memory process experiences, like stories**. Good stories do generate emotions, when they are told well, because they create experiences in our minds. Those experiences are not fact-checked and so they are simply accepted as true.

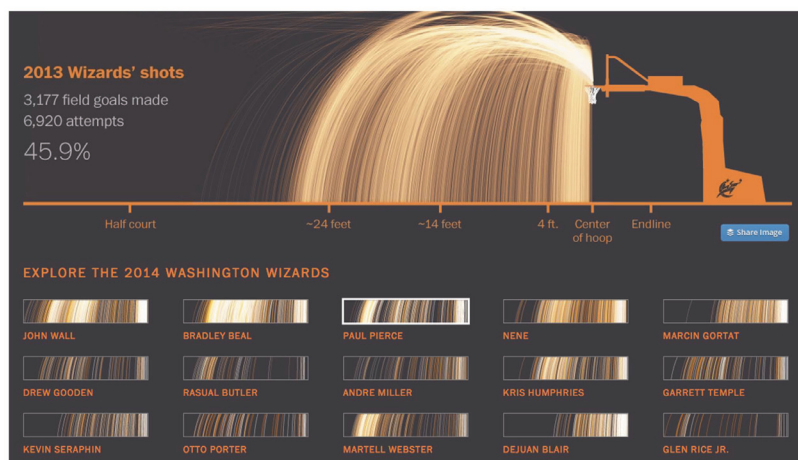
When we communicate with data alone, we are talking to semantic memory. When we combine stories and data, we are communicating to **both sides of the brain**.

People like Al Gore and Hans Rosling are onto something. Data is important and in the age of Big Data is only going to become more important. But if you want to engage audiences emotionally, you want to convince them and you want to move them to action, graphs combined with storytelling works better than graphs alone.

A New Approach to Graph Design

We've come quite far in the data visualization world. But it's time to take the next step from visualizing data to telling stories with data. We have a lot of research on how to tell stories, how to design graphs to tell that story quickly and how to incorporate storytelling and graphs together.

Here's an infographic from the Washington Post showing the Washington Wizards NBA team's shooting percentage from different distances from the basket. What's the story?



I can't tell what the story is. The data has been visualized. Beautifully. But this is still an exploratory graph. Most infographics that promise to "tell a story" actually say nothing. You might be able to find a story if you study it long enough. But the infographic isn't telling the story.

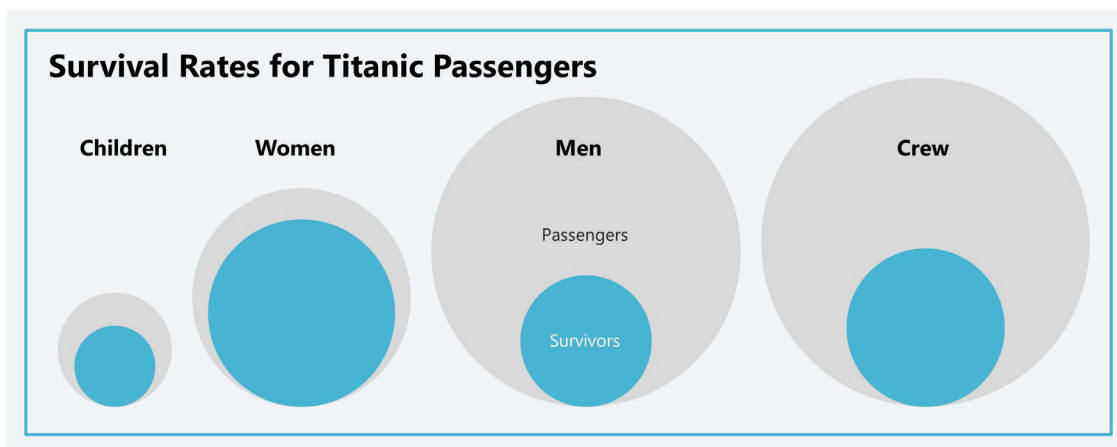
'Data visualization' emphasizes the accuracy of the visualization. But accuracy is not the most important thing: it's telling the story. It's driving the right conversations. It's adding urgency to an issue, like climate change, that data alone could not do. Forget accuracy. Accuracy is nothing if you don't have the story.

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I worked for an electronics company and my job was to calculate market share for our company and our competitors. But my manager wanted the percentages to the first decimal point. Not 45%, but 44.9% or 45.1%. I had to gather data from financial reports and SEC filings, so these weren't even completely accurate numbers. I did the calculations the way they wanted but I always wondered, does that change your strategy if the number is 44.9% or 45.1%?

When I would build marketing strategies as an executive at Microsoft I had to make a business case using forecasts of market size. But the forecasts were not accurate. One consulting report said it would be a \$10 billion industry in five years, another said it would be a \$25 billion industry. We calculated best and worst case estimates of future sales. But everything was based on uncertain assumptions. Accuracy was not necessary.

So accuracy isn't the most important thing if it doesn't change the decision. What's most important is telling the right story and having the right conversation. Look at this graph. What's the story?



You can see women and children had the highest survival rates, while most of the lost passengers were male passengers and crew. Did 80% of the women survive? 75%? 85%. I don't know. Does it matter? That accuracy doesn't change the implications and the conversation.

And so most books you read will teach you how to design graphs to be accurate. But I'd like to propose a new approach to graph design that focuses more on telling the story. Quickly, clearly and persuasively. Accuracy is important if you're looking at exploratory graphs and dashboards. But the story is what's important for explanatory graphs.

When you design graphs to tell the story, your point is clear immediately. People can focus on your main point and have productive discussions about how to solve a problem. They will see you as a strategic partner rather than a number-cruncher.

Combining storytelling with your well-designed graphs will engage audiences emotionally, will have them more ready to agree with you, and will move them to action.

Good-looking graphs will also make you look more professional and enhance your credibility. It's a joy to create graphs when they look pleasing. It's a joy to present graphs that are visually attractive. If you're a consultant, your client is also happy and proud to forward your presentation inside the organization. Ideas can go viral with better looking and clearer graphs.

These principles will also make you a better reviewer of others' graphs. Using this method, you can coach others on your team how to improve the graphs they've prepared before they go in front of executives. You can create a team of highly effective graph designers and data storytellers to drive change throughout your organization.

There are three steps to my method:

1. Find the story in the data. One of the biggest mistakes I see when I'm looking at others' graphs is they fail to find the story in the data. Instead, they present a column chart with a limp title like "Customer Preferences." I don't want to present data. I want to present insights. I want to present conclusions. That's the value-add that I provide as the analyst. That's how I earn the right to be called a strategic partner and not a number-cruncher. What does this data tell us? What's the story?

2. Design the graph. Every graph has a story to tell. But Excel does not know the story; only you do. So think of every graph that Excel creates like a canvas. Once you learn how to approach graph design to make a point, you can start to think of Excel's graphs as a canvas for you to paint on. Excel will produce that canvas with the click of a mouse. But you, as the business storyteller, must take control of each graph and use graphic design and storytelling principles to make the graph not only more professional-looking, but more clear, persuasive and quick to understand.

3. Choose the graph. There are literally dozens of graphs you might use to plot your data and most them cannot be created automatically in Excel. You'll discover a library of 40 different graph types and recommendation on when to use them depending on the story you want to tell.

In my research practice, I never use the default graphs Excel produces. Never. I always modify every single graph to tell the story I want to tell. The rest of this book shows you how.

Bruce R. Gabrielle
August 2018