

**'One of the most important books I've ever read —  
an indispensable guide to thinking clearly about the world' Bill Gates**

# **FACT FUL NESS**

**TEN REASONS  
WE'RE WRONG ABOUT  
THE WORLD — AND WHY  
THINGS ARE BETTER  
THAN YOU THINK**

**Hans Rosling** with **Ola Rosling** and  
**Anna Rosling Rönnlund**

## About the Author

**Hans Rosling** was a medical doctor, professor of international health, and renowned public educator. He was an adviser to the World Health Organization and UNICEF, and he cofounded Médecins Sans Frontières in Sweden and the Gapminder Foundation. His TED talks have been viewed more than thirty-five million times, and he was listed as one of Time magazine's one hundred most influential people in the world. Hans died in 2017, having devoted the last years of his life to writing this book.

**Ola Rosling and Anna Rosling Rönnlund**, Hans's son and daughter-in-law, are cofounders of the Gapminder Foundation, and Ola its director from 2005 to 2007 and from 2010 to the present day. After Google acquired Trendalyzer, the bubblechart tool invented and designed by Anna and Ola, Ola became head of Google's Public Data Team and Anna became the team's senior user-experience (UX) designer. They have both received international awards for their work.

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*To the brave barefoot woman,  
whose name I don't know but whose rational arguments  
saved me from being sliced  
by a mob of angry men with machetes*

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## AUTHOR'S NOTE

*Factfulness* is written in my voice, as if by me alone, and tells many stories from my life. But please don't be misled. Just like the TED talks and lectures I have been giving all over the world for the past ten years, this book is the work of three people, not one.

I am usually the front man. I stand onstage and deliver the lectures. I receive the applause. But everything you hear in my lectures, and everything you read in this book, is the output of eighteen years of intense collaboration between me, my son Ola Rosling, and my daughter-in-law Anna Rosling Rönnlund.

In 2005 we founded the Gapminder Foundation, with a mission to fight devastating ignorance with a fact-based worldview. I brought energy, curiosity, and a lifetime of experience as a doctor, a researcher, and a lecturer in global health. Ola and Anna were responsible for the data analysis, inventive visual explanations, data stories, and simple presentation design. It was their idea to measure ignorance systematically, and they designed and programmed our beautiful animated bubble charts. Dollar Street, a way of using photographs as data to explain the world, was Anna's brainchild. While I was getting ever angrier about people's ignorance about the world, Ola and Anna instead took the analysis beyond anger and crystallized the humble and relaxing idea of Factfulness. Together we defined the practical thinking tools that we present in this book.

What you are about to read was not invented according to the "lone genius" stereotype. It is instead the result of constant discussion, argument, and collaboration between three people with different talents, knowledge, and perspectives. This unconventional, often infuriating, but deeply productive way of working has led to a way of presenting the world and how to think about it, that I never could have created on my own.



# INTRODUCTION

## **Why I Love the Circus**

I love the circus. I love to watch a juggler throwing screaming chain saws in the air, or a tightrope walker performing ten flips in a row. I love the spectacle and the sense of amazement and delight at witnessing the seemingly impossible.

When I was a child my dream was to become a circus artist. My parents' dream, though, was for me to get the good education they never had. So I ended up studying medicine.

One afternoon at medical school, in an otherwise dry lecture about the way the throat worked, our professor explained, "If something is stuck, the passage can be straightened by pushing the chin bone forward." To illustrate, he showed an X-ray of a sword swallower in action.



I had a flash of inspiration. My dream was not over! A few weeks earlier, when studying reflexes, I had discovered that of all my classmates, I could push my fingers farthest down my throat without gagging. At the time, I had not been too proud: I didn't think it was an important skill. But now I understood its value, and instantly my childhood dream sprang back to life. I decided to become a sword swallower.

My initial attempts weren't encouraging. I didn't own a sword so used a fishing rod instead, but no matter how many times I stood in front of the bathroom mirror and tried, I'd get as far as an inch and it would get stuck. Eventually, for a second time, I gave up on my dream.

Three years later I was a trainee doctor on a real medical ward. One of my first patients was an old man with a persistent cough. I would always ask what my patients did for a living, in case it was relevant, and it turned out he used to swallow swords. Imagine my surprise when this patient turned out to be the very same sword swallower from the X-ray! And imagine this, when I told him all about my attempts with the fishing rod. "Young doctor," he said,

“don’t you know the throat is flat? You can only slide flat things down there. That is why we use a sword.”

That night after work I found a soup ladle with a straight flat handle and immediately resumed my practice. Soon I could slide the handle all the way down my throat. I was excited, but being a soup ladle shaft swallower was not my dream. The next day, I put an ad in the local paper and soon I had acquired what I needed: a Swedish army bayonet from 1809. As I successfully slid it down my throat, I felt both deeply proud of my achievement and smug that I had found such a great way to recycle weapons.

Sword swallowing has always shown that the seemingly impossible can be possible, and inspired humans to think beyond the obvious. Occasionally I demonstrate this ancient Indian art at the end of one of my lectures on global development. I step up onto a table and rip off my professorial checked shirt to reveal a black vest top decorated with a gold sequined lightning bolt. I call for complete silence, and to the swirling beat of a snare drum I slowly slide the army bayonet down my throat. I stretch out my arms. The audience goes wild.

## Test Yourself

This book is about the world, and how to understand it. So why start with the circus? And why would I end a lecture by showing off in a sparkly top? I’ll soon explain. But first, I would like you to test your knowledge about the world. Please find a piece of paper and a pencil and answer the 13 fact questions below.

1. In all low-income countries across the world today, how many girls finish primary school?
  - A: 20 percent
  - B: 40 percent
  - C: 60 percent
2. Where does the majority of the world population live?
  - A: Low-income countries
  - B: Middle-income countries
  - C: High-income countries

3. In the last 20 years, the proportion of the world population living in extreme poverty has ...

- A: almost doubled
- B: remained more or less the same
- C: almost halved

4. What is the life expectancy of the world today?

- A: 50 years
- B: 60 years
- C: 70 years

5. There are 2 billion children in the world today, aged 0 to 15 years old. How many children will there be in the year 2100, according to the United Nations?

- A: 4 billion
- B: 3 billion
- C: 2 billion

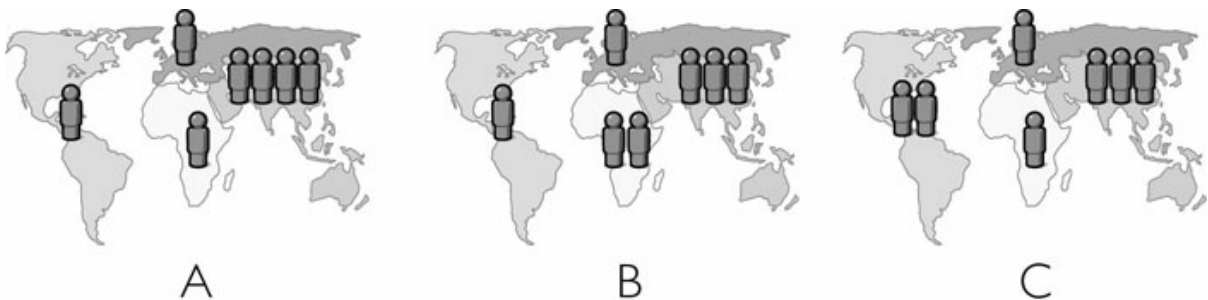
6. The UN predicts that by 2100 the world population will have increased by another 4 billion people. What is the main reason?

- A: There will be more children (age below 15)
- B: There will be more adults (age 15 to 74)
- C: There will be more very old people (age 75 and older)

7. How did the number of deaths per year from natural disasters change over the last hundred years?

- A: More than doubled
- B: Remained about the same
- C: Decreased to less than half

8. There are roughly 7 billion people in the world today. Which map shows best where they live? (Each figure represents 1 billion people.)



9. How many of the world's 1-year-old children today have been vaccinated against some disease?

- A: 20 percent
- B: 50 percent
- C: 80 percent

10. Worldwide, 30-year-old men have spent 10 years in school, on average. How many years have women of the same age spent in school?

- A: 9 years

- B: 6 years
- C: 3 years

11. In 1996, tigers, giant pandas, and black rhinos were all listed as endangered. How many of these three species are more critically endangered today?

- A: Two of them
- B: One of them
- C: None of them

12. How many people in the world have some access to electricity?

- A: 20 percent
- B: 50 percent
- C: 80 percent

13. Global climate experts believe that, over the next 100 years, the average temperature will ...

- A: get warmer
- B: remain the same
- C: get colder

Here are the correct answers:

1: C, 2: B, 3: C, 4: C, 5: C, 6: B, 7: C, 8: A, 9: C, 10: A, 11: C, 12: C, 13: A

*Score one for each correct answer, and write your total score on your piece of paper.*

## **Scientists, Chimpanzees, and You**

How did you do? Did you get a lot wrong? Did you feel like you were doing a lot of guessing? If so, let me say two things to comfort you.

First, when you have finished this book, you will do much better. Not because I will have made you sit down and memorize a string of global statistics. (I am a global health professor, but I'm not crazy.) You'll do better because I will have shared with you a set of simple thinking tools. These will help you get the big picture right, and improve your sense of how the world works, without you having to learn all the details.

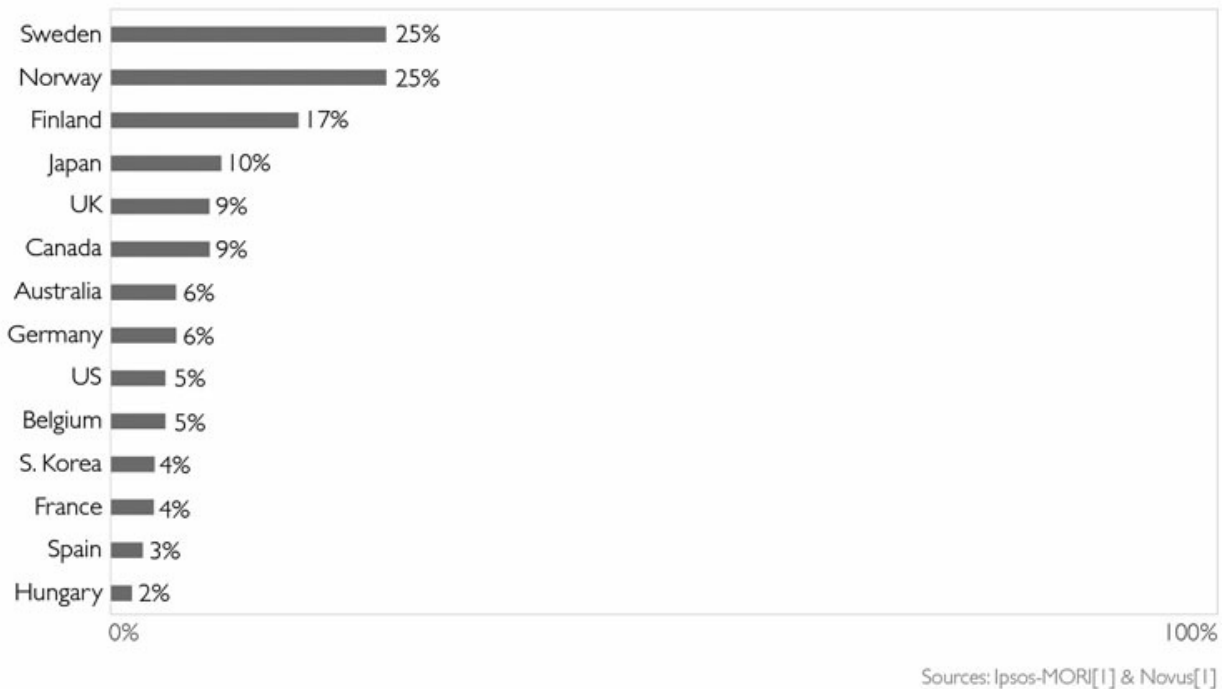
And second: if you did badly on this test, you are in very good company.

Over the past decades I have posed hundreds of fact questions like these, about poverty and wealth, population growth, births, deaths, education, health, gender, violence, energy, and the environment—basic global patterns and trends—to thousands of people across the world. The tests are not

complicated and there are no trick questions. I am careful only to use facts that are well documented and not disputed. Yet most people do extremely badly.

Question three, for example, is about the trend in extreme poverty. Over the past twenty years, the proportion of the global population living in extreme poverty has halved. This is absolutely revolutionary. I consider it to be the most important change that has happened in the world in my lifetime. It is also a pretty basic fact to know about life on Earth. But people do not know it. On average only 7 percent—less than one in ten!—get it right.

FACT QUESTION 3 RESULTS: percentage who answered correctly.  
In the last 20 years, the proportion of the world population living in extreme poverty has ... ?  
(Correct answer: almost halved.)



(Yes, I have been talking a lot about the decline of global poverty in the Swedish media.)

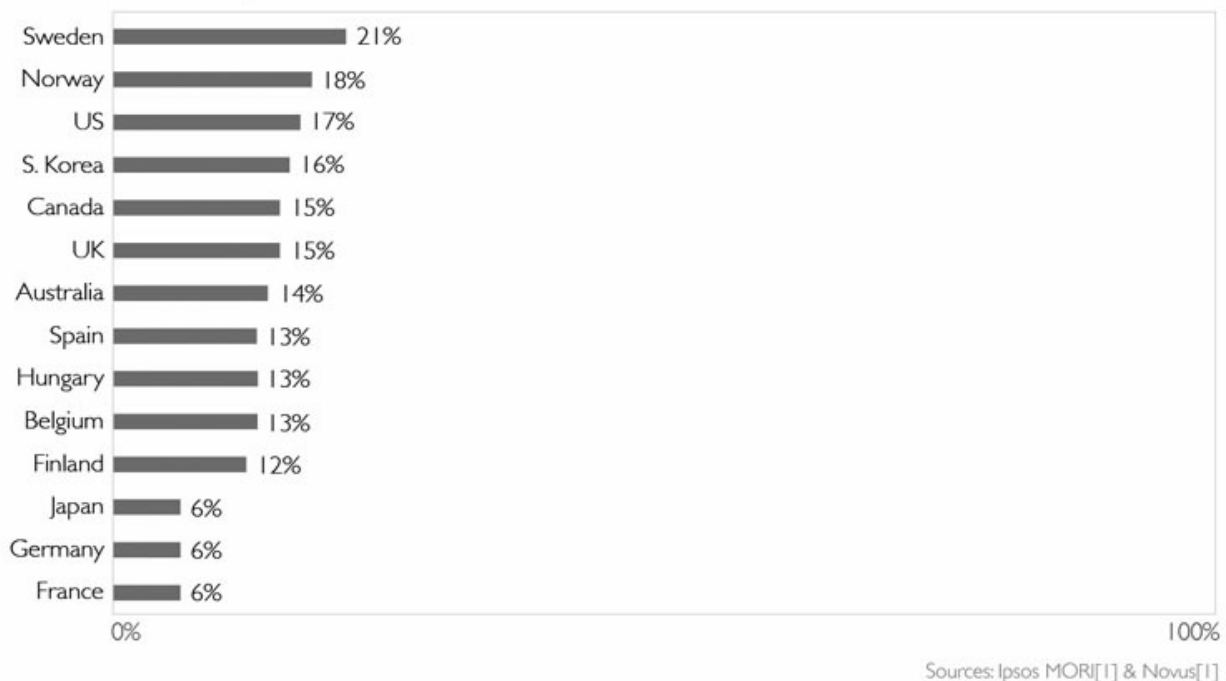
The Democrats and Republicans in the United States often claim that their opponents don't know the facts. If they measured their own knowledge instead of pointing at each other, maybe everyone could become more humble. When we polled in the United States, only 5 percent picked the right answer. The other 95 percent, regardless of their voting preference, believed either that the extreme poverty rate had not changed over the last 20 years, or,

worse, that it had actually doubled—which is literally the opposite of what has actually happened.

Let's take another example: question nine, about vaccination. Almost all children are vaccinated in the world today. This is amazing. It means that almost all human beings alive today have some access to basic modern health care. But most people do not know this. On average just 13 percent of people get the answer right.

#### FACT QUESTION 9 RESULTS: percentage who answered correctly.

How many of the world's one-year-old children today have been vaccinated against some disease?  
(Correct answer: 80%.)



Eighty-six percent of people get the final question about climate change right. In all the rich countries where we have tested public knowledge in online polls, most people know that climate experts are predicting warmer weather. In just a few decades, scientific findings have gone from the lab to the public. That is a big public-awareness success story.

Climate change apart though, it is the same story of massive ignorance (by which I do not mean stupidity, or anything intentional, but simply the lack of correct knowledge) for all twelve of the other questions. In 2017 we asked nearly 12,000 people in 14 countries to answer our questions. They scored on average just two correct answers out of the first 12. No one got full marks,

and just one person (in Sweden) got 11 out of 12. A stunning 15 percent scored zero.

Perhaps you think that better-educated people would do better? Or people who are more interested in the issues? I certainly thought that once, but I was wrong. I have tested audiences from all around the world and from all walks of life: medical students, teachers, university lecturers, eminent scientists, investment bankers, executives in multinational companies, journalists, activists, and even senior political decision makers. These are highly educated people who take an interest in the world. But most of them—a stunning *majority* of them—get most of the answers wrong. Some of these groups even score *worse* than the general public; some of the most appalling results came from a group of Nobel laureates and medical researchers. It is not a question of intelligence. Everyone seems to get the world devastatingly wrong.

Not only devastatingly wrong, but *systematically* wrong. By which I mean that these test results are not random. They are worse than random: they are worse than the results I would get if the people answering my questions had no knowledge at all.

Imagine I decide to head down to the zoo to test out my questions on the chimpanzees. Imagine I take with me huge armfuls of bananas, each marked either A, B, or C, and throw them into the chimpanzee enclosure. Then I stand outside the enclosure, read out each question in a loud, clear voice, and note down, as each chimpanzee's "answer," the letter on the banana she next chooses to eat.

If I did this (and I wouldn't ever actually do this, but just imagine), the chimps, by picking randomly, would do consistently better than the well-educated but deluded human beings who take my tests. Through pure luck, the troop of chimps would score 33 percent on each three-answer question, or four out of the first 12 on the whole test. Remember that the humans I have tested get on average just two out of 12 on the same test.

What's more, the chimps' errors would be equally shared between the two wrong answers, whereas the human errors all tend to be in one direction. Every group of people I ask thinks the world is more frightening, more violent, and more hopeless—in short, more dramatic—than it really is.



## Why Don't We Beat the Chimpanzees?

How can so many people be so wrong about so much? How is it even possible that the majority of people score worse than chimpanzees? *Worse than random!*

When I got my first little glimpse of this massive ignorance, back in the mid-1990s, I was pleased. I had just started teaching a course in global health at Karolinska Institutet in Sweden and I was a little nervous. These students were incredibly smart; maybe they would already know everything I had to teach them? What a relief when I discovered that my students knew less about the world than chimpanzees.

But the more I tested people, the more ignorance I found, not only among my students but everywhere. I found it frustrating and worrying that people were so wrong about the world. When you use the GPS in your car, it is important that it is using the right information. You wouldn't trust it if it seemed to be navigating you through a different city than the one you were in, because you would know that you would end up in the wrong place. So how could policy makers and politicians solve global problems if they were operating on the wrong facts? How could business people make sensible decisions for their organizations if their worldview were upside down? And how could each person going about their life know which issues they should be stressed and worried about?

I decided to start doing more than just testing knowledge and exposing ignorance. I decided to try to understand why. Why was this ignorance about the world so widespread and so persistent? We are all wrong sometimes—even me, I will readily admit that—but how could so many people be wrong about so much? Why were so many people scoring worse than the chimps?

Working late one night at the university I had a eureka moment. I realized the problem couldn't simply be that people lacked the knowledge, because that would give randomly incorrect answers—chimpanzee answers—rather than worse-than-random, worse-than-chimpanzee, systematically wrong answers. Only actively wrong “knowledge” can make us score so badly.

Aha! I had it! What I was dealing with here—or so I thought, for many years—was an upgrade problem: my global health students, and all the other people who took my tests over the years, did have knowledge, but it was

outdated, often several decades old. People had a worldview dated to the time when their teachers had left school.

So, to eradicate ignorance, or so I concluded, I needed to upgrade people's knowledge. And to do that, I needed to develop better teaching materials setting out the data more clearly. After I told Anna and Ola about my struggles over a family dinner, both of them got involved and started to develop animated graphs. I traveled the world with these elegant teaching tools. They took me to TED talks in Monterey, Berlin, and Cannes, to the boardrooms of multinational corporations like Coca-Cola and IKEA, to global banks and hedge funds, to the US State Department. I was excited to use our animated charts to show everyone how the world had changed. I had great fun telling everyone that they were emperors with no clothes, that they knew nothing about the world. We wanted to install the worldview upgrade in everyone.

But gradually, gradually, we came to realize that there was something more going on. The ignorance we kept on finding was not just an upgrade problem. It couldn't be fixed simply by providing clearer data animations or better teaching tools. Because even people who loved my lectures, I sadly realized, weren't really hearing them. They might indeed be inspired, momentarily, but after the lecture, they were still stuck in their old negative worldview. The new ideas just wouldn't take. Even straight after my presentations, I would hear people expressing beliefs about poverty or population growth that I had just proven wrong with the facts. I almost gave up.

Why was the dramatic worldview so persistent? Could the media be to blame? Of course I thought about that. But it wasn't the answer. Sure, the media plays a role, and I discuss that later, but we must not make them into a pantomime villain. We cannot just shout "boo, *hiss*" at the media.

I had a defining moment in January 2015, at the World Economic Forum in the small and fashionable Swiss town of Davos. One thousand of the world's most powerful and influential political and business leaders, entrepreneurs, researchers, activists, journalists, and even many high-ranking UN officials had queued for seats at the forum's main session on socioeconomic and sustainable development, featuring me, and Bill and Melinda Gates. Scanning the room as I stepped onto the stage, I noticed several heads of state and a former secretary-general of the UN. I saw heads

of UN organizations, leaders of major multinational companies, and journalists I recognized from TV.

I was about to ask the audience three fact questions—about poverty, population growth, and vaccination rates—and I was quite nervous. If my audience *did* know the answers to my questions, then none of the rest of my slides, revealing with a flourish how wrong they were, and what they should have answered, would work.

I shouldn't have worried. This top international audience who would spend the next few days explaining the world to each other did indeed know more than the general public about poverty. A stunning 61 percent of them got it right. But on the other two questions, about future population growth and the availability of basic primary health care, they still did worse than the chimps. Here were people who had access to all the latest data and to advisers who could continuously update them. Their ignorance could not possibly be down to an outdated worldview. Yet even they were getting the basic facts about the world wrong.

After Davos, things crystallized.

## **Our Dramatic Instincts and the Overdramatic Worldview**

So here is this book. It shares with you the conclusions I finally reached—based on years of trying to teach a fact-based worldview, and listening to how people misinterpret the facts even when they are right there in front of them—about why so many people, from members of the public to very smart, highly educated experts, score worse than chimpanzees on fact questions about the world. (And I will also tell you what you can do about it.) In short:

Think about the world. War, violence, natural disasters, man-made disasters, corruption. Things are bad, and it feels like they are getting worse, right? The rich are getting richer and the poor are getting poorer; and the number of poor just keeps increasing; and we will soon run out of resources unless we do something drastic. At least that's the picture that most Westerners see in the media and carry around in their heads. I call it the overdramatic worldview. It's stressful and misleading.

In fact, the vast majority of the world's population lives somewhere in the middle of the income scale. Perhaps they are not what we think of as middle

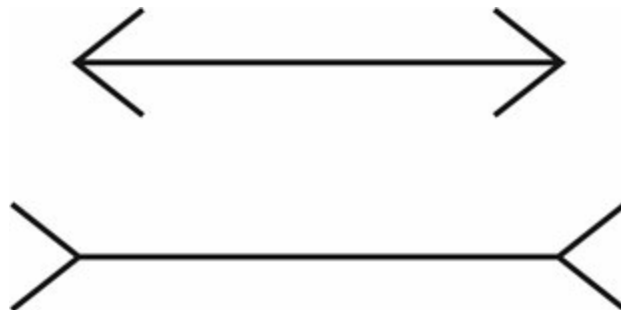
class, but they are not living in extreme poverty. Their girls go to school, their children get vaccinated, they live in two-child families, and they want to go abroad on holiday, not as refugees. Step-by-step, year-by-year, the world is improving. Not on every single measure every single year, but as a rule. Though the world faces huge challenges, we have made tremendous progress. This is the fact-based worldview.

It is the overdramatic worldview that draws people to the most dramatic and negative answers to my fact questions. People constantly and intuitively refer to their worldview when thinking, guessing, or learning about the world. So if your worldview is wrong, then you will systematically make wrong guesses. But this overdramatic worldview is not caused simply by out-of-date knowledge, as I once thought. Even people with access to the latest information get the world wrong. And I am convinced it is not the fault of an evil-minded media, propaganda, fake news, or wrong facts.

My experience, over decades of lecturing, and testing, and listening to the ways people misinterpret the facts even when they are right in front of them, finally brought me to see that the overdramatic worldview is so difficult to shift because it comes from the very way our brains work.

### Optical Illusions and Global Illusions

*Look at the two horizontal lines below. Which line is longest?*



Source: Müller-Lyer illusion

You might have seen this before. The line on the bottom looks longer than the line on the top. You know it isn't, but even if you already know, even if you measure the lines yourself and confirm that they are the same, you keep seeing them as different lengths.

My glasses have a custom lens to correct for my personal sight problem. But when I look at this optical illusion, I still misinterpret what I see, just like everyone else. This is because illusions don't happen in our eyes, they happen in our brains. They are systematic misinterpretations,