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ABOUT THE AUTHOR

Adam Grant is an organizational psychologist at Wharton, where he has been the top-rated professor for seven straight years. A #1 *New York Times* bestselling author and one of TED's most popular speakers, his books have sold more than 2 million copies and been translated into 35 languages, his talks have been viewed more than 25 million times, and his podcast WorkLife has topped the charts. His pioneering research has inspired people to rethink their fundamental assumptions about motivation, generosity, and creativity. He has been recognized as one of the world's 10 most influential management thinkers and *Fortune's* 40 under 40, and has been honored with distinguished scientific achievement awards from the American Psychological Association and the National Science Foundation.

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Give and Take

Originals

Option B

To Kaan, Jeremy, and Bill,
My three oldest friends—one thing I won't rethink

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Tossed into the scalding pot, the frog will get burned badly and may or may not escape. The frog is actually better off in the slow-boiling pot:[12] it will leap out as soon as the water starts to get uncomfortably warm.

It's not the frogs who fail to reevaluate. It's us. Once we hear the story and accept it as true, we rarely bother to question it.

AS THE MANN GULCH WILDFIRE raced toward them, the smokejumpers had a decision to make. In an ideal world, they would have had enough time to pause, analyze the situation, and evaluate their options. With the fire raging less than 100 yards behind, there was no chance to stop and think. "On a big fire there is no time and no tree under whose shade the boss and the crew can sit and have a Platonic dialogue about a blowup,"[13] scholar and former firefighter Norman Maclean wrote in *Young Men and Fire*, his award-winning chronicle of the disaster. "If Socrates had been foreman on the Mann Gulch fire, he and his crew would have been cremated while they were sitting there considering it."

Dodge didn't survive as a result of thinking slower. He made it out alive thanks to his ability to rethink the situation faster. Twelve smoke-jumpers paid the ultimate price because Dodge's behavior didn't make sense to them. They couldn't rethink their assumptions in time.

Under acute stress, people typically revert to their automatic,[14] well-learned responses. That's evolutionarily adaptive—as long as you find yourself in the same kind of environment in which those reactions were necessary. If you're a smokejumper, your well-learned response is to put out a fire, not start another one. If you're fleeing for your life, your well-learned response is to run away from the fire, not toward it. In normal circumstances, those instincts might save your life. Dodge survived Mann Gulch because he swiftly overrode both of those responses.

No one had taught Dodge to build an escape fire. He hadn't even heard of the concept; it was pure improvisation. Later, the other two survivors testified under oath that nothing resembling an escape fire was covered in their training. Many experts had spent their entire careers studying wildfires without realizing it was possible to stay alive by burning a hole through the blaze.

When I tell people about Dodge's escape, they usually marvel at his resourcefulness under pressure. *That was genius!* Their astonishment quickly melts into dejection as they conclude that this kind of eureka moment is out of reach for mere mortals. *I got stumped by my fourth grader's math homework*. Yet most acts of rethinking don't require any special skill or ingenuity.

Moments earlier at Mann Gulch, the smokejumpers missed another opportunity to think again—and that one was right at their fingertips. Just before Dodge started tossing matches into the grass, he ordered his crew to drop their heavy equipment. They had spent the past eight minutes racing uphill while still carrying axes, saws, shovels, and 20-pound packs.

If you're running for your life, it might seem obvious that your first move would be to drop anything that might slow you down. For firefighters, though, tools are essential to doing their jobs. Carrying and taking care of equipment is deeply ingrained in their training and experience. It wasn't until Dodge gave his order that most of the smokejumpers set down their tools—and even then, one firefighter hung on to his shovel until a colleague took it out of his hands. If the crew had abandoned their tools sooner, would it have been enough to save them?

We'll never know for certain, but Mann Gulch wasn't an isolated incident. Between 1990 and 1995 alone, a total of twenty-three wildland firefighters perished trying to

outrace fires uphill even though dropping their heavy equipment could have made the difference between life and death.[15] In 1994, on Storm King Mountain in Colorado,[16] high winds caused a fire to explode across a gulch. Running uphill on rocky ground with safety in view just 200 feet away, fourteen smokejumpers and wildland firefighters—four women, ten men—lost their lives.

Later, investigators calculated that without their tools and backpacks, the crew could have moved 15 to 20 percent faster.[17] "Most would have lived had they simply dropped their gear and run for safety,"[18] one expert wrote. Had they "dropped their packs and tools,"[19] the U.S. Forest Service concurred, "the firefighters would have reached the top of the ridge before the fire."

It's reasonable to assume that at first the crew might have been running on autopilot, not even aware that they were still carrying their packs and tools. "About three hundred yards up the hill," one of the Colorado survivors testified, "I then realized I still had my saw over my shoulder!" Even after making the wise decision to ditch the 25-pound chainsaw, he wasted valuable time: "I irrationally started looking for a place to put it down where it wouldn't get burned.... I remember thinking, 'I can't believe I'm putting down my saw.'" One of the victims was found wearing his backpack, still clutching the handle of his chainsaw. Why would so many firefighters cling to a set of tools even though letting go might save their lives?

If you're a firefighter, dropping your tools doesn't just require you to unlearn habits and disregard instincts. Discarding your equipment means admitting failure and shedding part of your identity. You have to rethink your goal in your job—and your role in life. "Fires are not fought with bodies and bare hands, they are fought with tools that are often distinctive trademarks of firefighters," organizational psychologist Karl Weick explains: "They are the firefighter's reason for being deployed in the first place.... Dropping one's tools creates an existential crisis. Without my tools, who am I?"[20]

Wildland fires are relatively rare. Most of our lives don't depend on split-second decisions that force us to reimagine our tools as a source of danger and a fire as a path to safety. Yet the challenge of rethinking assumptions is surprisingly common—maybe even common to all humans.

We all make the same kind of mistakes as smokejumpers and fire-fighters, but the consequences are less dire and therefore often go un-noticed. Our ways of thinking become habits that can weigh us down, and we don't bother to question them until it's too late. Expecting your squeaky brakes to keep working until they finally fail on the freeway. Believing the stock market will keep going up after analysts warn of an impending real estate bubble. Assuming your marriage is fine despite your partner's increasing emotional distance. Feeling secure in your job even though some of your colleagues have been laid off.

This book is about the value of rethinking. It's about adopting the kind of mental flexibility that saved Wagner Dodge's life. It's also about succeeding where he failed: encouraging that same agility in others.

You may not carry an ax or a shovel, but you do have some cognitive tools that you use regularly. They might be things you know, assumptions you make, or opinions you hold. Some of them aren't just part of your job—they're part of your sense of self.

Consider a group of students who built what has been called Harvard's first online social network. Before they arrived at college, they had already connected more than

an eighth of the entering freshman class in an "e-group."[21] But once they got to Cambridge, they abandoned the network and shut it down. Five years later Mark Zuckerberg started Facebook on the same campus.

From time to time, the students who created the original e-group have felt some pangs of regret. I know, because I was one of the cofounders of that group.

Let's be clear: I never would have had the vision for what Facebook became. In hindsight, though, my friends and I clearly missed a series of chances for rethinking the potential of our platform. Our first instinct was to use the e-group to make new friends for ourselves; we didn't consider whether it would be of interest to students at other schools or in life beyond school. Our well-learned habit was to use online tools to connect with people far away; once we lived within walking distance on the same campus, we figured we no longer needed the e-group. Although one of the cofounders was studying computer science and another early member had already founded a successful tech startup, we made the flawed assumption that an online social network was a passing hobby, not a huge part of the future of the internet. Since I didn't know how to code, I didn't have the tools to build something more sophisticated. Launching a company wasn't part of my identity anyway: I saw myself as a college freshman, not a budding entrepreneur.

Since then, rethinking has become central to my sense of self. I'm a psychologist but I'm not a fan of Freud, I don't have a couch in my office, and I don't do therapy. As an organizational psychologist at Wharton, I've spent the past fifteen years researching and teaching evidence-based management. As an entrepreneur of data and ideas, I've been called by organizations like Google, Pixar, the NBA, and the Gates Foundation to help them reexamine how they design meaningful jobs, build creative teams, and shape collaborative cultures. My job is to think again about how we work, lead, and live—and enable others to do the same.

I can't think of a more vital time for rethinking. As the coronavirus pandemic unfolded, many leaders around the world were slow to rethink their assumptions—first that the virus wouldn't affect their countries, next that it would be no deadlier than the flu, and then that it could only be transmitted by people with visible symptoms. The cost in human life is still being tallied.

In the past year we've all had to put our mental pliability to the test. We've been forced to question assumptions that we had long taken for granted: That it's safe to go to the hospital, eat in a restaurant, and hug our parents or grandparents. That live sports will always be on TV and most of us will never have to work remotely or homeschool our kids. That we can get toilet paper and hand sanitizer whenever we need them.

In the midst of the pandemic, multiple acts of police brutality led many people to rethink their views on racial injustice and their roles in fighting it. The senseless deaths of three Black citizens—George Floyd, Breonna Taylor, and Ahmaud Arbery—left millions of white people realizing that just as sexism is not only a women's issue, racism is not only an issue for people of color. As waves of protest swept the nation, across the political spectrum, support for the Black Lives Matter movement climbed nearly as much in the span of two weeks as it had in the previous two years.[22] Many of those who had long been unwilling or unable to acknowledge it quickly came to grips with the harsh reality of systemic racism that still pervades America. Many of those who had long been silent came to reckon with their responsibility to become antiracists and act against prejudice.

Despite these shared experiences, we live in an increasingly divisive time. For some people a single mention of kneeling during the national anthem is enough to end a

friendship. For others a single ballot at a voting booth is enough to end a marriage. Calcified ideologies are tearing American culture apart. Even our great governing document, the U.S. Constitution, allows for amendments. What if we were quicker to make amendments to our own mental constitutions?

My aim in this book is to explore how rethinking happens. I sought out the most compelling evidence and some of the world's most skilled rethinkers. The first section focuses on opening our own minds. You'll find out why a forward-thinking entrepreneur got trapped in the past, why a long-shot candidate for public office came to see impostor syndrome as an advantage, how a Nobel Prize–winning scientist embraces the joy of being wrong, how the world's best forecasters update their views, and how an Oscar-winning filmmaker has productive fights.

The second section examines how we can encourage other people to think again. You'll learn how an international debate champion wins arguments and a Black musician persuades white supremacists to abandon hate. You'll discover how a special kind of listening helped a doctor open parents' minds about vaccines, and helped a legislator convince a Ugandan warlord to join her in peace talks. And if you're a Yankees fan, I'm going to see if I can convince you to root for the Red Sox.

The third section is about how we can create communities of lifelong learners. In social life, a lab that specializes in difficult conversations will shed light on how we can communicate better about polarizing issues like abortion and climate change. In schools, you'll find out how educators teach kids to think again by treating classrooms like museums, approaching projects like carpenters, and rewriting time-honored textbooks. At work, you'll explore how to build learning cultures with the first Hispanic woman in space, who took the reins at NASA to prevent accidents after space shuttle *Columbia* disintegrated. I close by reflecting on the importance of reconsidering our best-laid plans.

It's a lesson that firefighters have learned the hard way. In the heat of the moment, Wagner Dodge's impulse to drop his heavy tools and take shelter in a fire of his own making made the difference between life and death. But his inventiveness wouldn't have even been necessary if not for a deeper, more systemic failure to think again. The greatest tragedy of Mann Gulch is that a dozen smokejumpers died fighting a fire that never needed to be fought.

As early as the 1880s, scientists had begun highlighting the important role that wildfires play in the life cycles of forests.[23] Fires remove dead matter, send nutrients into the soil, and clear a path for sunlight. When fires are suppressed, forests are left too dense. The accumulation of brush, dry leaves, and twigs becomes fuel for more explosive wildfires.

Yet it wasn't until 1978 that the U.S. Forest Service put an end to its policy that every fire spotted should be extinguished by 10:00 a.m. the following day. The Mann Gulch wildfire took place in a remote area where human lives were not at risk. The smokejumpers were called in anyway because no one in their community, their organization, or their profession had done enough to question the assumption that wildfires should not be allowed to run their course.

This book is an invitation to let go of knowledge and opinions that are no longer serving you well, and to anchor your sense of self in flexibility rather than consistency. If you can master the art of rethinking, I believe you'll be better positioned for success at work and happiness in life. Thinking again can help you generate new solutions to old problems and revisit old solutions to new problems. It's a path to learning more from the people around you and living with fewer regrets. A hallmark of wisdom is

knowing when it's time to abandon some of your most treasured tools—and some of the most cherished parts of your identity.

Most of us take pride in our knowledge and expertise, and in staying true to our beliefs and opinions. That makes sense in a stable world, where we get rewarded for having conviction in our ideas. The problem is that we live in a rapidly changing world, where we need to spend as much time rethinking as we do thinking.

Rethinking is a skill set, but it's also a mindset. We already have many of the mental tools we need. We just have to remember to get them out of the shed and remove the rust.

SECOND THOUGHTS

With advances in access to information and technology, knowledge isn't just increasing. It's increasing at an increasing rate. In 2011, you consumed about five times as much information per day as you would have just a quarter century earlier.[4] As of 1950, it took about fifty years for knowledge in medicine to double. By 1980, medical knowledge was doubling every seven years,[5] and by 2010, it was doubling in half that time. The accelerating pace of change means that we need to question our beliefs more readily than ever before.

This is not an easy task. As we sit with our beliefs, they tend to become more extreme and more entrenched.[6] [7] *I'm still struggling to accept that Pluto may not be a planet*. In education, after revelations in history and revolutions in science, it often takes years for a curriculum to be updated and textbooks to be revised. Researchers have recently discovered that we need to rethink widely accepted assumptions about such subjects as Cleopatra's roots (her father was Greek,[8] not Egyptian, and her mother's identity is unknown); the appearance of dinosaurs (paleontologists now think some tyrannosaurs had colorful feathers on their backs);[9] and what's required for sight (blind people have actually trained themselves to "see"—sound waves can activate the visual cortex and create representations in the mind's eye,[10] much like how echolocation helps bats navigate in the dark).[fn1] Vintage records, classic cars, and antique clocks might be valuable collectibles, but outdated facts are mental fossils that are best abandoned.

We're swift to recognize when other people need to think again. We question the judgment of experts whenever we seek out a second opinion on a medical diagnosis. Unfortunately, when it comes to our own knowledge and opinions, we often favor *feeling* right over *being* right. In everyday life, we make many diagnoses of our own, ranging from whom we hire to whom we marry. We need to develop the habit of forming our own second opinions.

Imagine you have a family friend who's a financial adviser, and he recommends investing in a retirement fund that isn't in your employer's plan. You have another friend who's fairly knowledgeable about investing, and he tells you that this fund is risky. What would you do?

When a man named Stephen Greenspan found himself in that situation, he decided to weigh his skeptical friend's warning against the data available. His sister had been investing in the fund for several years, and she was pleased with the results. A number of her friends had been, too; although the returns weren't extraordinary, they were consistently in the double digits. The financial adviser was enough of a believer that he had invested his own money in the fund. Armed with that information, Greenspan decided to go forward. He made a bold move, investing nearly a third of his retirement savings in the fund. Before long, he learned that his portfolio had grown by 25 percent.

Then he lost it all overnight when the fund collapsed. It was the Ponzi scheme managed by Bernie Madoff.[12]

Two decades ago my colleague Phil Tetlock discovered something peculiar. As we think and talk, we often slip into the mindsets of three different professions:[13] preachers, prosecutors, and politicians. In each of these modes, we take on a particular identity and use a distinct set of tools. We go into preacher mode when our sacred beliefs are in jeopardy: we deliver sermons to protect and promote our ideals. We enter prosecutor mode when we recognize flaws in other people's reasoning: we marshal arguments to prove them wrong and win our case.[14] We shift into politician mode when we're seeking to win over an audience: we campaign and lobby for the approval of our constituents. The risk is that we become so wrapped up in preaching that we're right, prosecuting others who are wrong, and politicking for support that we don't bother to rethink our own views.

When Stephen Greenspan and his sister made the choice to invest with Bernie Madoff, it wasn't because they relied on just one of those mental tools. All three modes together contributed to their ill-fated decision. When his sister told him about the money she and her friends had made, she was preaching about the merits of the fund. Her confidence led Greenspan to prosecute the friend who warned him against investing, deeming the friend guilty of "knee-jerk cynicism."[15] Greenspan was in politician mode when he let his desire for approval sway him toward a yes—the financial adviser was a family friend whom he liked and wanted to please.

Any of us could have fallen into those traps. Greenspan says that he should've known better, though, because he happens to be an expert on gullibility. When he decided to go ahead with the investment, he had almost finished writing a book on why we get duped.[16] Looking back, he wishes he had approached the decision with a different set of tools. He might have analyzed the fund's strategy more systematically instead of simply trusting in the results. He could have sought out more perspectives from credible sources. He would have experimented with investing smaller amounts over a longer period of time before gambling so much of his life's savings.

That would have put him in the mode of a scientist.

A DIFFERENT PAIR OF GOGGLES

If you're a scientist by trade, rethinking is fundamental to your profession. You're paid to be constantly aware of the limits of your understanding. You're expected to doubt what you know, be curious about what you don't know, and update your views based on new data. In the past century alone, the application of scientific principles has led to dramatic progress. Biological scientists discovered penicillin. Rocket scientists sent us to the moon. Computer scientists built the internet.

But being a scientist is not just a profession.[17] It's a frame of mind—a mode of thinking that differs from preaching, prosecuting, and politicking. We move into scientist mode when we're searching for the truth: we run experiments to test hypotheses and discover knowledge. Scientific tools aren't reserved for people with white coats and beakers, and using them doesn't require toiling away for years with a microscope and a petri dish. Hypotheses have as much of a place in our lives as they do in the lab. Experiments can inform our daily decisions. That makes me wonder: is it possible to train people in other fields to think more like scientists, and if so, do they end up making smarter choices?

Recently, a quartet of European researchers decided to find out. They ran a bold experiment with more than a hundred founders of Italian startups in technology, retail, furniture, food, health care, leisure, and machinery. Most of the founders'

businesses had yet to bring in any revenue, making it an ideal setting to investigate how teaching scientific thinking would influence the bottom line.

The entrepreneurs arrived in Milan for a training program in entrepreneurship. Over the course of four months, they learned to create a business strategy, interview customers, build a minimum viable product, and then refine a prototype. What they didn't know was that they'd been randomly assigned to either a "scientific thinking" group or a control group. The training for both groups was identical, except that one was encouraged to view startups through a scientist's goggles.[18] From that perspective, their strategy is a theory, customer interviews help to develop hypotheses, and their minimum viable product and prototype are experiments to test those hypotheses. Their task is to rigorously measure the results and make decisions based on whether their hypotheses are supported or refuted.

Over the following year, the startups in the control group averaged under $300 in revenue. The startups in the scientific thinking group averaged over $12,000 in revenue. They brought in revenue more than twice as fast—and attracted customers sooner, too. Why? The entrepreneurs in the control group tended to stay wedded to their original strategies and products. It was too easy to preach the virtues of their past decisions, prosecute the vices of alternative options, and politick by catering to advisers who favored the existing direction. The entrepreneurs who had been taught to think like scientists, in contrast, pivoted more than twice as often. W 't supported, they knew it was time to rethink their business models.

What's surprising about these results is that we typically celebrate great entrepreneurs and leaders for being strong-minded and clear-sighted. They're supposed to be paragons of conviction: decisive and certain. Yet evidence reveals that when business executives compete in tournaments to price products,[19] the best strategists are actually slow and unsure. Like careful scientists, they take their time so they have the flexibility to change their minds. *I'm beginning to think decisiveness is overrated . . . but I reserve the right to change my mind.*

Just as you don't have to be a professional scientist to reason like one, being a professional scientist doesn't guarantee that someone will use the tools of their training. Scientists morph into preachers when they present their pet theories as gospel and treat thoughtful critiques as sacrilege. They veer into politician terrain when they allow their views to be swayed by popularity rather than accuracy. They enter prosecutor mode when they're hell-bent on debunking and discrediting rather than discovering. After upending physics with his theories of relativity, Einstein opposed the quantum revolution: "To punish me for my contempt of authority,[20] Fate has made me an authority myself." Sometimes even great scientists need to think more like scientists.

Decades before becoming a smartphone pioneer, Mike Lazaridis was recognized as a science prodigy. In middle school, he made the local news for building a solar panel at the science fair and won an award for reading every science book in the public library. If you open his eighth-grade yearbook, you'll see a cartoon showing Mike as a mad scientist, with bolts of lightning shooting out of his head.

When Mike created the BlackBerry, he was thinking like a scientist. Existing devices for wireless email featured a stylus that was too slow or a keyboard that was too small. People had to clunkily forward their work emails to their mobile device in-boxes, and they took forever to download. He started generating hypotheses and sent his team of engineers off to test them. What if people could hold the device in their hands and type with their thumbs rather than their fingers? What if there was a single mailbox synchronized across devices? What if messages could be relayed through a server and appear on the device only after they were decrypted?

As other companies followed BlackBerry's lead, Mike would take their smartphones apart and study them. Nothing really impressed him until the summer of 2007, when he was stunned by the computing power inside the first iPhone. "They've put a Mac in this thing," he said. What Mike did next might have been the beginning of the end for the Black-Berry. If the BlackBerry's rise was due in large part to his success in scientific thinking as an engineer, its demise was in many ways the result of his failure in rethinking as a CEO.

As the iPhone skyrocketed onto the scene, Mike maintained his belief in the features that had made the BlackBerry a sensation in the past. He was confident that people wanted a wireless device for work emails and calls, not an entire computer in their pocket with apps for home entertainment. As early as 1997, one of his top engineers wanted to add an internet browser, but Mike told him to focus only on email. A decade later, Mike was still certain that a powerful internet browser would drain the battery and strain the bandwidth of wireless networks. He didn't test the alternative hypotheses.

By 2008, the company's valuation exceeded $70 billion, but the BlackBerry remained the company's sole product, and it still lacked a reliable browser. In 2010, when his colleagues pitched a strategy to feature encrypted text messages, Mike was receptive but expressed concerns that allowing messages to be exchanged on competitors' devices would render the BlackBerry obsolete. As his reservations gained traction within the firm, the company abandoned instant messaging, missing an opportunity that WhatsApp later seized for upwards of $19 billion. As gifted as Mike was at rethinking the design of electronic devices, he wasn't willing to rethink the market for his baby. Intelligence was no cure—it might have been more of a curse.

THE SMARTER THEY ARE, THE HARDER THEY FAIL

Mental horsepower doesn't guarantee mental dexterity. No matter how much brainpower you have, if you lack the motivation to change your mind, you'll miss many occasions to think again. Research reveals that the higher you score on an IQ test, the more likely you are to fall for stereotypes, because you're faster at recognizing patterns.[21] And recent experiments suggest that the smarter you are,[22] the more you might struggle to update your beliefs.

One study investigated whether being a math whiz makes you better at analyzing data. The answer is yes—if you're told the data are about something bland, like a treatment for skin rashes. But what if the exact same data are labeled as focusing on an ideological issue that activates strong emotions—like gun laws in the United States?

Being a quant jock makes you more accurate in interpreting the results—as long as they support your beliefs. Yet if the empirical pattern clashes with your ideology, math prowess is no longer an asset; it actually becomes a liability. The better you are at crunching numbers, the more spectacularly you fail at analyzing patterns that contradict your views. If they were liberals, math geniuses did worse than their peers

at evaluating evidence that gun bans failed. If they were conservatives, they did worse at assessing evidence that gun bans worked.

In psychology there are at least two biases that drive this pattern. One is confirmation bias:[23] seeing what we expect to see. The other is desirability bias:[24] seeing what we want to see. These biases don't just prevent us from applying our intelligence. They can actually contort our intelligence into a weapon against the truth. We find reasons to preach our faith more deeply, prosecute our case more passionately, and ride the tidal wave of our political party. The tragedy is that we're usually unaware of the resulting flaws in our thinking.

My favorite bias is the "I'm not biased"[25] bias, in which people believe they're more objective than others. It turns out that smart people are more likely to fall into this trap.[26] The brighter you are, the harder it can be to see your own limitations. Being good at thinking can make you worse at rethinking.

When we're in scientist mode, we refuse to let our ideas become ideologies. We don't start with answers or solutions; we lead with questions and puzzles. We don't preach from intuition; we teach from evidence. We don't just have healthy skepticism about other people's arguments; we dare to disagree with our own arguments.

Thinking like a scientist involves more than just reacting with an open mind. It means being *actively* open-minded.[27] It requires searching for reasons why we might be wrong—not for reasons why we must be right—and revising our views based on what we learn.

That rarely happens in the other mental modes. In preacher mode, changing our minds is a mark of moral weakness; in scientist mode, it's a sign of intellectual integrity. In prosecutor mode, allowing ourselves to be persuaded is admitting defeat; in scientist mode, it's a step toward the truth. In politician mode, we flip-flop in response to carrots and sticks; in scientist mode, we shift in the face of sharper logic and stronger data.[28]

I've done my best to write this book in scientist mode.[fn2] I'm a teacher, not a preacher. I can't stand politics, and I hope a decade as a tenured professor has cured me of whatever temptation I once felt to appease my audience. Although I've spent more than my share of time in prosecutor mode, I've decided that in a courtroom I'd rather be the judge. I don't expect you to agree with everything I think. My hope is that you'll be intrigued by *how* I think—and that the studies, stories, and ideas covered here will lead you to do some rethinking of your own. After all, the purpose of learning isn't to affirm our beliefs; it's to evolve our beliefs.

One of my beliefs is that we shouldn't be open-minded in every circumstance. There are situations where it might make sense to preach, prosecute, and politick. That said, I think most of us would benefit from being more open more of the time, because it's in scientist mode that we gain mental agility.

When psychologist Mihaly Csikszentmihalyi studied eminent scientists like Linus Pauling and Jonas Salk, he concluded that what differentiated them from their peers was their cognitive flexibility, their willingness "to move from one extreme to the other as the occasion requires."[29] The same pattern held for great artists, and in an independent study of highly creative architects.[30]

We can even see it in the Oval Office. Experts assessed American presidents on a long list of personality traits and compared them to rankings by independent historians and political scientists.[31] Only one trait consistently predicted presidential greatness after

The curse of knowledge is that it closes our minds to what we don't know. Good judgment depends on having the skill—and the will—to open our minds. I'm pretty confident that in life, rethinking is an increasingly important habit. Of course, I might be wrong. If I am, I'll be quick to think again.

CHAPTER 2

The Armchair Quarterback and the Impostor

Finding the Sweet Spot of Confidence

> Ignorance more frequently begets confidence than does knowledge.[1]
>
> —CHARLES DARWIN

When Ursula Mercz was admitted to the clinic, she complained of headaches, back pain, and dizziness severe enough that she could no longer work. Over the following month her condition deteriorated. She struggled to locate the glass of water she put next to her bed. She couldn't find the door to her room. She walked directly into her bed frame.

Ursula was a seamstress in her midfifties, and she hadn't lost her dexterity: she was able to cut different shapes out of paper with scissors. She could easily point to her nose, mouth, arms, and legs, and had no difficulty describing her home and her pets. For an Austrian doctor named Gabriel Anton, she presented a curious case. When Anton put a red ribbon and scissors on the table in front of her, she couldn't name them, even though "she confirmed, calmly and faithfully, that she could see the presented objects."

She was clearly having problems with language production, which she acknowledged, and with spatial orientation. Yet something else was wrong: Ursula could no longer tell the difference between light and dark. When Anton held up an object and asked her to describe it, she didn't even try to look at it but instead reached out to touch it. Tests showed that her eyesight was severely impaired. Oddly, when Anton asked her about the deficit, she insisted she could see. Eventually, when she lost her vision altogether, she remained completely unaware of it. "It was now extremely astonishing," Anton wrote, "that the patient did not notice her massive and later complete loss of her ability to see.... she was mentally blind to her blindness."[2]

It was the late 1800s, and Ursula wasn't alone. A decade earlier a neuropathologist in Zurich had reported a case of a man who suffered an accident that left him blind but was unaware of it despite being "intellectually unimpaired." Although he didn't blink when a fist was placed in front of his face and couldn't see the food on his plate, "he thought he was in a dark humid hole or cellar."

Half a century later, a pair of doctors reported six cases of people who had gone blind but claimed otherwise. "One of the most striking features in the behavior of our patients was their inability to learn from their experiences,"[3] the doctors wrote:

> As they were not aware of their blindness when they walked about, they bumped into the furniture and walls but did not change their behavior. When confronted with their blindness in a rather pointed fashion, they would either deny any visual difficulty or remark: "It is so dark in the room; why don't they turn the light on?"; "I forgot my glasses," or "My vision is not too good, but I can see all right." The patients would not accept any demonstration or assurance which would prove their blindness.

This phenomenon was first described by the Roman philosopher Seneca,[4] who wrote of a woman who was blind but complained that she was simply in a dark room. It's now accepted in the medical literature as Anton's syndrome—a deficit of self-awareness in which a person is oblivious to a physical disability but otherwise doing fairly well cognitively.[5] It's known to be caused by damage to the occipital lobe of the brain. Yet I've come to believe that even when our brains are functioning normally, we're all vulnerable to a version of Anton's syndrome.

We all have blind spots in our knowledge and opinions. The bad news is that they can leave us blind to our blindness, which gives us false confidence in our judgment and prevents us from rethinking. The good news is that with the right kind of confidence, we can learn to see ourselves more clearly and update our views. In driver's training we were taught to identify our visual blind spots and eliminate them with the help of mirrors and sensors. In life, since our minds don't come equipped with those tools, we need to learn to recognize our cognitive blind spots and revise our thinking accordingly.

A TALE OF TWO SYNDROMES

On the first day of December 2015, Halla Tómasdóttir got a call she never expected. The roof of Halla's house had just given way to a thick layer of snow and ice. As she watched water pouring down one of the walls, the friend on the other end of the line asked if Halla had seen the Facebook posts about her. Someone had started a petition for Halla to run for the presidency of Iceland.

Halla's first thought was, *Who am* I *to be president?* She had helped start a university and then cofounded an investment firm in 2007. When the 2008 financial crisis rocked the world, Iceland was hit particularly hard; all three of its major private commercial banks defaulted and its currency collapsed. Relative to the size of its economy, the country faced the worst financial meltdown in human history, but Halla demonstrated her leadership skills by guiding her firm successfully through the crisis. Even with that accomplishment, she didn't feel prepared for the presidency. She had no political background; she had never served in government or in any kind of public-sector role.

It wasn't the first time Halla had felt like an impostor. At the age of eight, her piano teacher had placed her on a fast track and frequently asked her to play in concerts, but she never felt she was worthy of the honor—and so, before every concert, she felt sick. Although the stakes were much higher now, the self-doubt felt familiar. "I had a massive pit in my stomach, like the piano recital but much bigger," Halla told me. "It's the worst case of adult impostor syndrome I've ever had." For months, she struggled with the idea of becoming a candidate. As her friends and family encouraged her to recognize that she had some relevant skills, Halla was still convinced that she lacked the necessary experience and confidence. She tried to persuade other women to run—one of whom ended up ascending to a different office, as the prime minister of Iceland.

Yet the petition didn't go away, and Halla's friends, family, and colleagues didn't stop urging her on. Eventually, she found herself asking, *Who am I* not *to serve*? She ultimately decided to go for it, but the odds were heavily stacked against her. She was running as an unknown independent candidate in a field of more than twenty contenders. One of her competitors was particularly powerful—and particularly dangerous.

When an economist was asked to name the three people most responsible for Iceland's bankruptcy, she nominated Davíð Oddsson for all three spots. As Iceland's prime minister from 1991 to 2004, Oddsson put the country's banks in jeopardy by privatizing them. Then, as governor of Iceland's central bank from 2005 to 2009, he allowed the banks' balance sheets to balloon to more than ten times the national GDP. When the people protested his mismanagement, Oddsson refused to resign and had to be forced out by Parliament. *Time* magazine later identified him as one of the twenty-five people to blame for the financial crisis worldwide. Nevertheless, in 2016 Oddsson announced his candidacy for the presidency of Iceland: "My experience and knowledge,[6] which is considerable, could go well with this office."

In theory, confidence and competence go hand in hand. In practice, they often diverge. You can see it when people rate their own leadership skills and are also evaluated by their colleagues, supervisors, or subordinates. In a meta-analysis of ninety-five studies involving over a hundred thousand people, women typically underestimated their leadership skills,[7] while men overestimated their skills.

You've probably met some football fans who are convinced they know more than the coaches on the sidelines. That's the armchair quarterback syndrome, where confidence exceeds competence. Even after calling financial plays that destroyed an economy, Davíð Oddsson still refused to acknowledge that he wasn't qualified to coach—let alone quarterback. He was blind to his weaknesses.

Jason Adam Katzenstein/ The New Yorker Collection/
The Cartoon Bank; © Condé Nast

The opposite of armchair quarterback syndrome is impostor syndrome, where competence exceeds confidence.[8] Think of the people you know who believe that they don't deserve their success. They're genuinely unaware of just how intelligent, creative, or charming they are, and no matter how hard you try, you can't get them to rethink their views. Even after an online petition proved that many others had confidence in her, Halla Tómasdóttir still wasn't convinced she was qualified to lead her country. She was blind to her strengths.

Although they had opposite blind spots, being on the extremes of confidence left both candidates reluctant to rethink their plans. The ideal level of confidence probably lies somewhere between being an armchair quarterback and an impostor. How do we find that sweet spot?

THE IGNORANCE OF ARROGANCE

One of my favorite accolades is a satirical award for research that's as entertaining as it is enlightening. It's called the Ig™ Nobel Prize[9], and it's handed out by actual Nobel laureates. One autumn in college, I raced to the campus theater to watch the ceremony along with over a thousand fellow nerds. The winners included a pair of physicists who created a magnetic field to levitate a live frog, a trio of chemists who discovered that

the biochemistry of romantic love has something in common with obsessive-compulsive disorder, and a computer scientist who invented PawSense—software that detects cat paws on a keyboard and makes an annoying noise to deter them. *Unclear whether it also worked with dogs.*

Several of the awards made me laugh, but the honorees who made me think the most were two psychologists, David Dunning and Justin Kruger. They had just published a "modest report" on skill and confidence that would soon become famous. They found that in many situations, those who can't.... don't know they can't. According to what's now known as the Dunning-Kruger effect, it's when we lack competence that we're most likely to be brimming with overconfidence.

In the original Dunning-Kruger studies,[10] people who scored the lowest on tests of logical reasoning, grammar, and sense of humor had the most inflated opinions of their skills. On average, they believed they did better than 62 percent of their peers, but in reality outperformed only 12 percent of them. The less intelligent we are in a particular domain,[11] the more we seem to overestimate our actual intelligence in that domain. In a group of football fans, the one who knows the least is the most likely to be the armchair quarterback, prosecuting the coach for calling the wrong play and preaching about a better playbook.

This tendency matters because it compromises self-awareness, and it trips us up across all kinds of settings. Look what happened when economists evaluated the operations and management practices of thousands of companies across a wide range of industries and countries,[12] and compared their assessments with managers' self-ratings:

Sources: World Management Survey; Bloom and Van Reenen 2007; and Maloney 2017b.

In this graph, if self-assessments of performance matched actual performance, every country would be on the dotted line. Overconfidence existed in every culture, and it was most rampant where management was the poorest.[13] fn1

Of course, management skills can be hard to judge objectively. Knowledge should be easier—you were tested on yours throughout school. Compared to most people, how much do you think you know about each of the following topics—more, less, or the same?

- Why English became the official language of the United States
- Why women were burned at the stake in Salem
- What job Walt Disney had before he drew Mickey Mouse
- On which spaceflight humans first laid eyes on the Great Wall of China
- Why eating candy affects how kids behave

One of my biggest pet peeves is feigned knowledge, where people pretend to know things they don't. *It bothers me so much that at this very moment I'm writing an entire book about it.* In a series of studies, people rated whether they knew more or less than most people about a range of topics like these, and then took a quiz to test their actual knowledge. The more superior participants thought their knowledge was,[14] the more they overestimated themselves—and the less interested they were in learning and updating. If you think you know more about history or science than most people, chances are you know less than you think. As Dunning quips, "The first rule of the Dunning-Kruger club is you don't know you're a member of the Dunning-Kruger club."[15] fn2

with humility: that we'll end up having a low opinion of ourselves. We want to keep the seesaw balanced, so we go into Goldilocks mode and look for the amount of confidence that's just right. Recently, though, I learned that this is the wrong approach.

Humility is often misunderstood. It's not a matter of having low self-confidence. One of the Latin roots of *humility* means "from the earth." It's about being grounded—recognizing that we're flawed and fallible.

Confidence is a measure of how much you believe in yourself. Evidence shows that's distinct from how much you believe in your methods.[28] You can be confident in your ability to achieve a goal in the future while maintaining the humility to question whether you have the right tools in the present. That's the sweet spot of confidence.

We become blinded by arrogance when we're utterly convinced of our strengths and our strategies. We get paralyzed by doubt when we lack conviction in both. We can be consumed by an inferiority complex when we know the right method but feel uncertain about our ability to execute it. What we want to attain is confident humility: having faith in our capability while appreciating that we may not have the right solution or even be addressing the right problem. That gives us enough doubt to reexamine our old knowledge and enough confidence to pursue new insights.

When Spanx founder Sara Blakely had the idea for footless pantyhose,[29] she believed in her ability to make the idea a reality, but she was full of doubt about her current tools. Her day job was selling fax machines door-to-door, and she was aware that she didn't know anything about fashion, retail, or manufacturing. When she was designing the prototype, she spent a week driving around to hosiery mills to ask them for help. When she couldn't afford a law firm to apply for a patent, she read a book on the topic and filled out the application herself. Her doubt wasn't debilitating—she was confident she could overcome the challenges in front of her. Her confidence wasn't in her existing knowledge—it was in her capacity to learn.

Confident humility can be taught.[30] In one experiment, when students read a short article about the benefits of admitting what we don't know rather than being certain about it, their odds of seeking extra help in an area of weakness spiked from 65 to 85 percent. They were also more likely to explore opposing political views to try to learn from the other side.

Confident humility doesn't just open our minds to rethinking—it improves the quality of our rethinking. In college and graduate school,[31] students who are willing to revise their beliefs get higher grades than their peers. In high school,[32] students who admit when they don't know something are rated by teachers as learning more effectively and by peers as contributing more to their teams.[33] At the end of the academic year, they have significantly higher math grades than their more self-assured peers. Instead of just assuming they've mastered the material, they quiz themselves to test their understanding.

When adults have the confidence to acknowledge what they don't know, they pay more attention to how strong evidence is and spend more time reading material that contradicts their opinions.[34] [35] In rigorous studies of leadership effectiveness across the United States and China, the most productive and innovative teams aren't run by leaders who are confident or humble. The most effective leaders score high in both confidence *and* humility.[36] Although they have faith in their strengths, they're also keenly aware of their weaknesses. They know they need to recognize and transcend their limits if they want to push the limits of greatness.

CHAPTER 3

The Joy of Being Wrong

The Thrill of Not Believing Everything You Think

> I have a degree from Harvard.[1] Whenever I'm wrong, the world makes a little less sense.
>
> —DR. FRASIER CRANE, PLAYED BY KELSEY GRAMMER

In the fall of 1959, a prominent psychologist welcomed new participants into a wildly unethical study.[2] He had handpicked a group of Harvard sophomores to join a series of experiments that would run through the rest of their time in college. The students volunteered to spend a couple of hours a week contributing to knowledge about how personality develops and how psychological problems can be solved. They had no idea that they were actually signing up to have their beliefs attacked.

The researcher, Henry Murray, had originally trained as a physician and biochemist. After becoming a distinguished psychologist, he was disillusioned that his field paid little attention to how people navigate difficult interactions, so he decided to create them in his own lab. He gave students a month to write out their personal philosophy of life, including their core values and guiding principles. When they showed up to submit their work, they were paired with another student who had done the same exercise. They would have a day or two to read each other's philosophies, and then they would be filmed debating them. The experience would be much more intense than they anticipated.

Murray modeled the study on psychological assessments he had developed for spies in World War II. As a lieutenant colonel, Murray had been recruited to vet potential agents for the Office of Strategic Services, the precursor to the CIA. To gauge how candidates would handle pressure, he sent them down to a basement to be interrogated with a bright light shining in their faces. The examiner would wait for an inconsistency in their accounts to pop up and then scream, "You're a liar!" Some candidates quit on the spot; others were reduced to tears. Those who withstood the onslaught got the gig.

Now Murray was ready for a more systematic study of reactions to stress. He had carefully screened students to create a sample that included a wide range of personalities and mental health profiles. He gave them code names based on their character traits, including Drill, Quartz, Locust, Hinge, and Lawful—more on him later.

When students arrived for the debate, they discovered that their sparring partner was not a peer but a law student. What they didn't know was that the law student was in cahoots with the research team: his task was to spend eighteen minutes launching