

SuperSense

WHY WE BELIEVE IN THE UNBELIEVABLE

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What Secret Do John McEnroe and David Beckham Share?

WEIRD STUFF HAPPENS all the time. Some years ago, before we were married, Kim and I traveled to London. It was our first trip to the capital, and we decided to use the Underground. London's Underground train system transports more than three million passengers every single day, and so we were relieved to find two seats together inside one of the crowded carriages. As we settled down, I looked up to read the various advertisements, as one does to avoid direct eye contact with fellow passengers, but I noted that the young man seated opposite seemed vaguely familiar. I nudged Kim and said that the man looked remarkably like her brother, whom we last heard was traveling in South America. It had been years since we last saw him. Kim stared at the man, and at that instant the man looked up from the paper he was reading and returned the stare. For what seemed a very long time, the two held each other's gaze before the quizzical expression on the man's face turned to a smile and he said, "Kim?" Brother and sister could not believe their chance encounter.

Most of us have experienced something similar. At dinner parties, guests exchange stories about strange events and coincidences that have happened either to them or, more typically, to someone else they know. They talk about events that are peculiar

or seem beyond reasonable explanation. They describe examples of knowing or sensing things either before they happen or over great distances of time and space. They talk of feeling energies or auras associated with people, places, and things that give them a creepy sensation. They talk about ghosts and sensing the dead. It is precisely because these experiences are so weird that they are brought up in conversation. Pierre Le Loyer captured this notion well four hundred years ago in writing about spirits and the supernatural when he said: "It is the topic that people most readily discuss and on which they linger the longest because of the abundance of examples, the subject being fine and pleasing and the discussion the least tedious that can be found."¹

Most of us have had these bizarre experiences. Have you ever run into a long-lost friend in the most unlikely place? How often have you thought of someone only to receive a phone call from that person out of the blue? Sometimes it seems as if thoughts are physical things that can leap from one mind to another. How often have two people puzzled and said, "I was just thinking the same thing!" Many of us feel that there is something strange going on. Humans appear synchronized at times, as if they were joined together by invisible bonds. Some of us get a sense that there are mysterious forces operating in the world, acting to connect us together, that cannot be explained away. How do we make sense of all these common experiences?

Many people believe that such occurrences are proof of the supernatural. Beliefs may turn out to be true or false, but supernatural beliefs are special. To be true, they would violate the natural laws that govern our world. Hence, they are *supernatural*. For example, I may believe that the British Secret Service murdered Princess Diana in a car crash in Paris. That belief may be true or false. Maybe they did and maybe they did not. It's not impossible. To be true, my belief would have to not violate any natural laws. All that would have been required was a very elaborate plan and cover-up. So it is possible that the British Secret Service murdered Princess Diana—but unlikely. However, if I believe that someone can communicate with the dead princess, then that would be a supernatural belief because it violates our natural understanding of how communication between two

people works. They usually both have to be alive. As Michael Shermer says, "We can all talk to the dead. It's getting them to talk back that's the hard part."²

People can be fully aware that their beliefs are supernatural and yet they continue to believe. Why do people believe in things that go against natural laws? It cannot simply be ignorance.

The answer is evidence. The number-one reason given by people who believe in the supernatural is personal experience.³ Of course, other people influence what we think, but firsthand experience gives us a mighty powerful reason to believe. As they say, "Seeing is believing," and when it happens to you, it proves what you suspected all along.

For believers, examples of the supernatural are so plentiful and convincing that to simply ignore all the evidence is to bury our heads in the sand. But is there really such an abundance of examples of the supernatural? One major problem is that we are simply not good at estimating the likelihood of how often weird stuff happens. We tend to overestimate the likelihood of events that are very rare, such as being killed in a plane crash. At the same time, we underestimate the likelihood of events that are really quite common. For example, what is the likelihood of two strangers at a party sharing the same birthday? Let's say you're the sociable type and attend a party about once a week. Take a guess at how many people have to be at a party for two of them to share a birthday at half the parties you attend throughout the year. What sort of number do you think you would need? I imagine most of you have come up with quite a big number. But would you believe that statisticians tell us the minimum number is only twenty-three! If you go to a different party each week, with at least twenty-three new people at each, on average two people will have the same birthday half of the time. Or to put it another way, among the thirty countries taking part in the 2010 World Cup soccer tournament in South Africa, half of the twenty-three-member teams taking part will include two players with the same birthday.⁴ What could be more unlikely? Now think of how much more common it is for two people to share the same astrological sign when there are only twelve of those compared to 365 different birthdays in the year. People seem so

surprised to meet someone with the same astrological sign and often consider this some sort of fateful coincidence. Our minds are simply not equipped to think about likelihood very accurately, and so we interpret these coincidences as if something supernatural were involved. When we hear of examples that seem bizarre, we treat them as auspicious. The thing about coincidences is that they are not the exception but the rule. As Martin Plimmer and Brian King have observed:

We frisk each other for links. We're like synchronized swimmers in search of a routine. We relish connections, and we're a highly connected species. If it were possible to map all human activity, drawing lines between friends and relatives, departures and arrivals, messages sent and received, desires and objects, you would soon have a planet-sized tangle of lines, growing ever denser, with trillions of connections.⁵

Uncanny events punctuate our lives, but they seem unusual and beyond explanation. We treat them as significant and profound, leading many of us to believe that there must be supernatural powers at work. Most of us entertain these beliefs even though we may deny them. I am going to show how rational, educated adults as well as the more superstitious among us behave as if there were invisible supernatural forces and energies operating in the world. Over the course of the book, I am going to present a theory that explains why we believe and why some of us are more prone to belief than others. I am going to focus on the individual rather than culture because I think the answer can be found within each one of us.

SOMETHING MORE TO REALITY

The great American philosopher and early psychologist William James wrote more than one hundred years ago that ordinary people tend to believe not only in the reality of existence but in the presence of "something there"—something intangible that we are bound to infer over and beyond what our normal senses detect.

But the whole array of our instances leads us to a conclusion something like this: It is as if there were in the human consciousness a sense of reality, a feeling of objective presence, a perception of what we may call “something there,” more deep and more general than any of the special and particular “senses” by which the current psychology supposes existent realities to be originally revealed.⁶

James is telling us that it is natural to think that there is something more to reality. This something is unknown, unseen, and unmeasurable, and beyond natural explanations. It is supernatural. Moreover, this sense of something more is the basis of all the world’s religions, which

all agree that the “more” really exists; though some of them hold it to exist in the shape of a personal god or gods, while others are satisfied to conceive it as a stream of ideal tendency embedded in the eternal structures of the world. They all agree, moreover, that it acts as well as exists, and that something is really effected for the better when you throw your life into its hands.⁷

Why do people think like this? Why do we come to believe that there must be something more to nature than can be measured? Where do these ideas come from? From where do we get our supernatural beliefs? There are two schools of thought here: either these are ideas that we hear from other people or they are ideas that partly come from within us. Let’s examine both propositions. First, we may be born to believe anything and everything we are told by others. So beliefs are simply the stories we tell each other, and especially our children. Alternatively, we may be born to believe, and what we think might be possible is a reflection of our own way of seeing the world.

Consider the first explanation. Children believe what they are told by adults. We love to tell them about fantasy figures like Santa Claus, the Tooth Fairy, and even the Bogeyman if they are misbehaving: “If you are good, Santa will bring you that PlayStation” or “If you misbehave, the Bogeyman will take you.”

Fairy tales have been around for a long time as a way of teaching our children how to behave. All of the characters in these stories are magical—cats that can talk, witches that can fly, and so on. Characters with supernatural powers are understood to be special and thus are more easily remembered. Because they are so unusual, they work. Isn't it ironic that we immerse our children in make-believe as preschoolers, only to tell them to put away such foolish ideas and "grow up" when they reach school age?

The psychologist Stuart Vyse argues that culture is most important when it comes to the supernatural: "We are not born knocking on wood; we learn to do so. We are not innate believers in astrology; we become believers."⁸ I agree in part. Many rituals are passed on as customs and traditions. Some of them are so old that we have forgotten why we do them. Every year in the West, children take part in the archaic ceremonies and rituals associated with Halloween and Christmas, mostly unaware of their true origins.⁹ On All Hallows' Eve, the practice of dressing up in scary costumes was intended to banish evil village demons. Kissing under the mistletoe and lighting the Yule log were originally pagan fertility rites that became incorporated into Christmas activities. Today we observe these rituals because they have become traditions handed down to us through our culture. But a purely cultural explanation is missing an important point. Why are we so inclined to engage in ceremony and rituals? People may treat these festivals as a bit of fun, but many still believe in real supernatural phenomena. Why would a person accept the supernatural in the first place?

The obvious answer is that there is a real benefit to believing what others tell you. Communicating and sharing ideas with others expands your knowledge so that you don't have to discover everything by yourself. And who best to learn from but older and wiser members of the tribe? If they say that certain plants have healing powers or that some caves are dangerous, it is sensible to believe what they say. In this way, beliefs can easily pass from one generation to the next. If culture and society spread belief, then we should be careful what we tell our children. If this is the root of supernatural thinking, then perhaps we should be held responsible for informing the naive and the young who do not yet know.

This is why the biologist Richard Dawkins thinks that religion is a form of child abuse. He wants a world without God, religion, or any form of supernaturalism. There is only room for science, he asserts, when it comes to understanding nature. Dawkins accuses the churches of indoctrinating our youth with superstitious beliefs. Children are “information caterpillars” with “wide open ears and eyes, and gaping, trusting minds for sucking up language and other knowledge.” They gullibly gobble up any facts because of an evolved predisposition to trust whatever their parents and elders tell them.¹⁰

This brings me to the second explanation for beliefs that I want to draw to your attention. The problem with the gullibility view is that most researchers who study the development of the mind do not regard humans as blank slates for any idea or belief. Rather, the bulk of the work on young children’s thinking shows that before they are capable of instruction, preschool children are already deeply committed to a number of misconceptions. I think that these misconceptions are the true origin of adults’ supernatural beliefs. Yes, culture and church play a role in supernatural belief, but they do not act alone. Rather, they provide the framework to make sense of our own beliefs that we come up with by ourselves.

Even if ideas are transmitted by culture, we still have to answer two fundamental questions: Where did the first supernatural ideas originate? And why do so many isolated cultures share the same basic misconceptions? The common types of belief and reasoning shared by distant cultures, long separated in time and far distant geographically, suggest something intrinsic to the way humans think. For example, almost all cultures have creation myths to explain the origins of the world and the diversity of life that usually involve gods. Gods and spiritual agents are also held responsible for unforeseen events. Whenever we find such universal beliefs and behaviors, we should start looking for reasons why these explanations of origins and events are similar. Like the instinct for language found in every society since the beginnings of civilization, is it possible that a supersense is also part of the human endowment? Do we all start off with a natural inclination to the supernatural that only some of us can

overcome? Why is it so damned hard for people to become scientific in their thinking?

I think supernatural beliefs work so well because they seem plausible. And they seem plausible because they fit with what we want to believe and already think is possible. They also make sense of all the weird and uncanny events that pepper our lives. Ideas and beliefs may be transmitted, but only those that resonate with what we think is possible take hold and make sense. This is a really important point that is often overlooked. We either accept ideas or reject them, but seldom do we consider why. Ideas have to fit with what we already know. Otherwise, they do not make sense.

To prove this, let me give you a new idea I want you to believe in. It's not a supernatural one, but it makes the point about how ideas work. If I told you that "colorless green ideas sleep furiously," would you believe me? Think about it for a moment and try to take the idea on board. At first it sounds okay, but eventually you see that the idea is meaningless. The statement is actually a famous sentence among scientists who study language and thinking. In 1957 the linguist Noam Chomsky constructed this perfectly grammatical but completely meaningless phrase to demonstrate that sentence structure alone is not enough to convey ideas.¹¹ The content of the sentence follows all the rules of language, but as a sentence it does not compute in our minds. It is meaningless because of what we already know about color, ideas, sleep, and anger. Something cannot be both green and colorless. Ideas do not sleep. Sleep is not normally furious. These are concepts that already exist in our minds, and because they contradict each other, they dictate that Chomsky's statement makes no sense. So any new idea has to fit into existing frameworks of knowledge. This is why some ideas can be so difficult to grasp. Science, for example, is full of ideas that seem bizarre simply because we are not used to them. It's not that people are being stupid when it comes to science. Rather, many scientific ideas are just too difficult for many of us to get our heads around. On the other hand, folk beliefs about the supernatural seem quite possible. That's why it is easier to imagine a ghost than a light wave made up of photons. We have seen neither,

but ghosts seem plausible, whereas the structure of light is not something we can easily consider.¹²

MIND DESIGN

Mind design is the reason why certain ideas are obvious while others are obscure. By mind design I mean the organized way in which our brains are configured to understand and interpret the world. The brain, like every other part of the human body, has evolved over millions of years. Your hands have been designed to manipulate objects. Your legs have been designed for bipedal locomotion. Your liver has been designed to do all sorts of jobs. Likewise, your brain has been designed in certain ways through the process of evolution. Most scientists agree that the brain has many specialized, built-in mechanisms that equip us to process the world of experience. These mechanisms are not learned or taught by others. They form the package of mental tools that each of us is equipped with as part of our mind design. But this design does not need a designer. You don't need a god to explain where the design came from. It's simply the way gradual adaptation of biological systems through the process of evolution has produced a complex problem-solver. Natural selection is our designer.

The brain did not fall out of the sky, ready packaged to deal with the world.¹³ Rather, our brains gradually evolved to solve the problems that faced our ancestors. Our complex modern brain has emerged by accumulating small, subtle changes in its structure passed on from one generation to the next. This is the field of evolutionary psychology, and as one of its main proponents, Steven Pinker, succinctly puts it, the mind is what the brain does. Our minds are constantly active, trying to make sense of the world by figuring out how it works. This is because the world is complex, confusing, and filled with missing information. Each of us is a sleuth trying to complete the puzzle, find the culprit, and solve the crime when it comes to understanding.

What we do naturally and spontaneously at the most basic level is look constantly for patterns, imagining hidden forces and causes. Even the way we see the world is organized by brain mechanisms looking for patterns. At the turn of the twentieth

century, the German Gestalt psychologists demonstrated that humans naturally see patterns by organizing input with certain unlearned rules. What these early psychologists realized was that the world is full of input that is often cluttered, ambiguous, or simply missing. The only way the mind can sort out this mess is by making guesses about what is really out there.

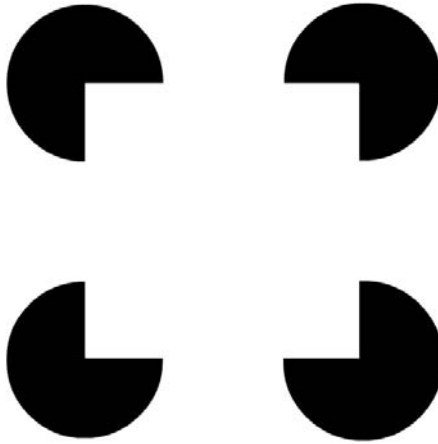


FIG. 2: Both infants and adults see an illusory white square in the typical Kaniza figure. AUTHOR'S IMAGE.

For example, a pattern made up of four pies with a slice taken out of each one is usually seen as a white square sitting in front of four dark circles. Our mind even fills in the missing edges of the square in between the pies. But the square does not really exist. Our brains have created something out of nothing. More spookily, we can measure activity in those areas of the brain that would be active if the square really existed! This area, known as the visual cortex, is a three-millimeter layer about the size of your credit card that sits directly at the back of your head. Contrary to popular misconception, it's not your eyes but your brain that does the seeing. The brain cells in this region are all related to vision in some form or another. So, in this region, the brain registers what is *really* out there in the world, makes a decision

about what *should* be out there, and then generates its own brain activity *as if* what it has decided should be out there really is.¹⁴ Even when a perception is a trick of the mind, it still shows up as real brain activity. This filling-in process reveals how our brains are wired to make sense of missing information. Four-month-old babies also see this ghostly square.¹⁵ We know this from a simple behavior: babies get bored when shown the same pattern over and over again. Wouldn't you? So if you present babies with the ghostly square, they eventually stop looking at it. If you then show them a real square, they remain bored, whereas they perk up and get excited if you show them something else, like a circle. In other words, they must have seen the illusory square, eventually got tired of looking at it, and found the real square just the same as the imaginary one their mind had created out of nothing. Such studies tell us that baby brains are designed for filling in missing information and making sense of the world.

As my colleague Richard Gregory has argued, illusions like the missing-square pattern reveal that the mind is not lazy. Our minds are actively trying to make sense of the world by thinking of the best explanation. For example, if someone took a handful of coffee beans and scattered them across a table in front of you, you would immediately see patterns. Some beans would instantly cluster together into groups as you simply looked at the array. Have you ever watched the clouds on a summer's day turn into faces and animals? You can't stop yourself because your mind has evolved to organize and see structure. The ease with which we see faces in particular has led to the idea that we are inclined to see supernatural characters at the drop of a hat. Each year some bagel, muffin, burnt toast, potato chip, or even ultrasound of a fetus showing the face of some deity is paraded as evidence for divine miracles.

We also seek out patterns in events. Our mind design forces us to see organization where there may be none. When something unusual or unexpected happens, we immediately look for order and causes. We cannot handle the possibility that things happen randomly by chance. It may even be impossible for the mind to think in terms of random patterns or events. If I asked you to generate a random pattern, you would find this incredibly hard to do. Try it out for yourself at a keyboard. Empty your

mind and simply press either the “1” or “0” key whenever you feel like it. Be as random as you can. For example, here’s my attempt with forty-eight key presses.

```
1 0 0 1 1 0 0 1 0 1 0 0 0 1 1 1 0 0 1 0 0 1 0 1 1 0 1 1 0 0 1
0 1 0 1 1 0 1 0 0 1 0 1 1 0 0 1 1
```

I felt I was being random, and at first glance the pattern looks pretty disorganized. If you count the number of times I typed “1,” then I have done pretty well with exactly half (twenty-four). Now consider the same sequential key presses in groups of two.

```
10 01 10 01 01 00 01 11 00 10 01 01 10 11 00 10 10 11 01
00 10 11 00 11
```

There are five 00 pairs, seven 01 pairs, seven 10 pairs, and five 11 pairs. If the sequence was truly random, then these pairs should be equal, but I was much more likely to alternate (fourteen times with either 10 or 01) key presses than to press the same key twice (ten times with either 00 or 11). The difference may seem small, but it becomes highly significant over more trials. If you break the sequence into the eight possible triplets, then the patterns become even more obvious.

Our brain has its natural rhythms that it likes to settle into. This is how the best rock-paper-scissors players succeed. To remind you, it’s a game between two players in which, after the count of three, each player has to produce a rock (fist), paper (open hand), or scissors (first two fingers open). Scissors beats paper, which beats rock, which in turn beats scissors. The object of the game is to guess what your opponent will produce. To succeed you have to be as random in the three options as possible. World champion players (yes, they do exist) are not psychic.¹⁶ They are expert at detecting patterns and generating their own random sequences, but this skill requires a lot of mental energy, especially from the frontal parts of the brain that control planning.¹⁷

It is just as difficult to think and act randomly by effort of will as it is to perceive a random world. Because our minds are designed to see the world as organized, we often detect patterns that are not really present. This is particularly true if we believe

that patterns should be there in the first place. So someone who believes that supernatural forces operate in the world is on the lookout for examples of strange, inexplicable phenomena and conveniently ignores the multitude of mundane events that do not fit this interpretation. We forget every typical phone call but remember the unexpected one because it draws our attention. The flip side of mind design is that we also fail to realize that events that we think are highly unlikely are in fact not so unlikely. Meeting people at a party who share the same birthday seems unlikely. With this bias toward detecting patterns, someone who is inclined to supernatural belief has ample opportunity to see evidence for significant chains of events where there is none. This is the product of our mind design, and there is good evidence that we all differ in the extent to which we see order or chaos in the world. Later, I examine the idea that the difference between believers and nonbelievers may be due more to how they interpret the world than to what they have been told to believe.

In addition to organizing the world into patterns, mind design leads us to seek deeper, hidden causes operating in the world. Much of what controls the world is hidden from direct view, and so our minds have evolved to infer the existence of things we cannot see. We try hard to understand outcomes of events that have already happened and to which we were not privy. For example, imagine you arrive home to find a plate broken on the kitchen floor. *How did this happen?* you ask yourself. You start to reconstruct the order of events. The plate was on the table when you left that morning. Has someone else been in the house? Has there been an earthquake? Like a detective, you work backward in time trying to reconstruct why something happened. This is how we interpret and understand a chain of events. However, such reasoning can also lead to mistakes. A human mind that links events in this way is always in danger of committing the mistake of *post hoc, ergo propter hoc*: “after this, therefore because of this,” which means that we tend to group events together in a causal way. We see the first event as having caused the second. There are two problems with this. First, we infer the actions of forces where there may be none, and second, we tend to link events that are not actually even related.

By linking events together, we see sequences in terms of cause and effect. For example, consider a very simple event involving objects colliding with each other. Imagine watching a game of billiards or pool. If we see a white ball strike a red ball, we see one event causing another. It's the same for babies. If you show seven-month-old babies similar collision events, they interpret the first ball as causing the second to move, because if you reverse the sequence, they treat the reverse event as something different.¹⁸ Like adults, they see the red ball launching the white one. Nothing odd here you might think. In fact, you might say this is a very sensible way to interpret the world. However, the seventeenth-century Scottish philosopher David Hume tells us that such intuitions are an illusion because you cannot directly see cause. You cannot actually see the forces at work. You only see one event and then another event. This may seem far-fetched until you consider cartoon animations. When we observe a cartoon ball striking another, we infer the same causal force, but of course there is none. A cartoon is simply a set of drawings. Our mind interprets the sequence as if one ball were colliding with another. It is an illusion that helps us understand the world in terms of real forces because we often do not or cannot observe them at work.

So your mind design forces you to see patterns and to think something caused the patterns to form. You infer that what may be completely unrelated events are connected in some way. Things that happen after each other appear to be caused by forces that may not exist. This is all the more true when the outcome is not predictable, as in a game of chance. When something unexpected happens, you instinctively look for whatever caused it to happen. This type of thinking explains superstitious behavior: repeating actions or engaging in certain behaviors in an effort to control outcomes. For example, if you have a particularly successful day on the tennis court or at the poker table, you may feel a strong compulsion to duplicate whatever actions you took that day in an effort to repeat the success. It may be wearing a particular piece of clothing or sitting in a favorite seat. Soon these behaviors may become essential routines and obsessions.

Athletes are notorious for their superstitious rituals.¹⁹ Rituals usually start off as innocent habits—something we all have—but

because they become linked to important outcomes (like winning a game), they can take over an individual's life. The tennis ace Jelena Dokic was probably the most complicated in her rituals, or at least the most honest and open about them. First she avoided standing on the white lines on court. (John McEnroe did the same.) She preferred to sit to the left of the umpire. Before her first serve she bounced the ball five times, and before her second serve she bounced it twice. While waiting for serves, she would blow on her right hand. The ball boys and girls always had to pass the ball to her with an underarm throw. Dokic made sure she never read the drawsheet more than one round at a time. Finally—and bear this in mind sports memorabilia collectors—she always wore the same clothes throughout a tournament. Pheweee!

Jelena is not alone. Every year when I monitor exams I see a number of intelligent young adults engaging in routines (one had to walk around her table three times) or producing a multitude of lucky charms and “gonks” (soft toys) that they believe will improve their performance. Even if you don't believe in these rituals and charms, what's the harm in trying? Well, none, unless they take over your life and prevent you from achieving your goals, as illustrated by Neil the Hippie from the 1980s U.K. comedy about student life, *The Young Ones*:

I sat in the big hall and put my packet of Polos on the desk. And my spare pencil and my support gonk. And my chewing gum and my extra pen. And my extra Polos and my lucky gonk. And my pencil sharpener shaped like a cream cracker. And three more gonks with a packet of Polos each. And lead for my retractable pencil. And my retractable pencil. And spare lead for my retractable pencil. And chewing gum and pencils and pens and more gonks, and the guy said, “Stop writing, please.”²⁰

Superstitions are common in situations where the factors that control outcomes are unpredictable or the consequences of something going wrong could be fatal. However, rituals are also common among many high-achieving individuals in situations

where attention to detail can lead to success. Harrison Ford, Woody Allen, Michelle Pfeiffer, and Winona Ryder are just a few celebrities who allegedly engage in ritualistic behavior. In a recent TV interview, the soccer star David Beckham described some of his unusual rituals:

I have got this disorder where I have to have everything in a straight line or everything has to be in pairs. I'll put my Pepsi cans in the fridge and if there's one too many then I'll put it in another cupboard somewhere. I'll go into a hotel room and before I can relax I have to move all the leaflets and all the books and put them in a drawer.²¹

Such behaviors reflect an obsessive attention to detail. It may be the case that those with a personality characterized by a need for discipline and control are more likely to achieve professional success in their striving for perfection. Such individuals can be found in all walks of life. We all know people who seem to pay excessive attention to detail and order. In about two out of every one hundred members of the general public, ritualistic behavior that controls the individual's life becomes the medical problem of obsessive-compulsive disorder. These sufferers have to engage in ritualistic behavior and are incapable of breaking out of their routines. They are aware that their behaviors are odd, but that knowledge does not help. The irony is that if prevented somehow from performing their rituals, they might not perform as well because of their increased anxiety that they are now luckless. These rituals give a sense of control in situations where control is important. So those with obsessive-compulsive disorder are not necessarily irrational, since this "illusion of control" is psychologically comforting in comparison to no control at all.²²

However, the belief that rituals work is supernatural. We may deny that rituals are based on supernatural beliefs and claim that many of them, such as throwing salt over one's shoulder when it is spilled on the table, are no more than harmless traditional customs of long-forgotten origin, much like the Christmas rituals discussed earlier. But if we think there is nothing to them, why do we see an increase in such behavior at times of crisis?

During the first Iraq war in 1991, Saddam Hussein fired SCUD missiles indiscriminately into Tel Aviv. What could be more stressful than sheltering during an air raid, not knowing if your family is about to be killed? In subsequent interviews, those living in the highest-risk areas were asked about their experiences, and it was observed that during the conversation they “knocked on wood” significantly more than those from low-risk areas. It’s not clear where the practice of rapping on wood to ward off bad luck first came from. It may be linked to the pagan practice of tapping on trees to signal one’s presence to the wood spirits, or maybe it’s a reference to the Christian cross. Who knows? Whatever its origin, the threat of danger triggered a superstitious behavior.²³ We may deny the supersense, but it nevertheless lingers in the background of our minds, waiting for an opportunity to make a guest appearance at times of stress, when rationality can so easily abandon us.

The beliefs behind superstitious practices may be supernatural, but here’s the interesting point: they do work to reduce the stress caused by uncertainty. Rituals produce a sense of control, or at least the belief that we have control even when we don’t. The illusion of control is an immensely powerful mechanism to immunize against harm, especially if it is unpredictable. Not only do we find it hard to think randomly, but we don’t like unpredictable punishment. We all know what it’s like waiting for something bad to happen. We just want to get it over and done with as soon as possible. As a child growing up in Scotland, I remember sitting outside the headmaster’s office waiting to be “strapped” for fighting in the playground. I think it was my foreign accent that made me the focus of attention. By that age, stories about the Bogeyman were no longer effective, and corporal punishment was deemed the best deterrent. The strap was a barbaric leather belt specifically designed for whipping the hands—a practice that has now been outlawed. It wasn’t the pain of being strapped that was unbearable, however, so much as the wait and the sense of helplessness. I had no control over the situation. Studies of pain thresholds reveal that humans can tolerate much higher electric shocks if they think that they can stop the punishment at any point in comparison to those who do

not think they have this option.²⁴ Doing something, or believing that you can do something, makes the unpleasant more bearable. The inability to act is psychologically distressing.

It is not just superstitious routines that reinforce the illusion of control. For many, this illusion explains the power of the mind and wishful thinking. The Harvard psychologist Dan Wegner has shown that the same causal mechanism can lead to “apparent mental causation”: an individual’s belief that his or her thoughts have caused things to happen when they are closely connected in time. Imagine that you wish someone harm and something bad actually happens to that person shortly afterward. Such a coincidence must occur regularly, but it is very hard not to think that you are responsible in some way. Wegner and his colleagues found that subjects who thought ill of someone behaving like a jerk believed that they had caused his subsequent headache. In fact, the “jerk” was the experimenters’ confederate, and the setup was a scam. Nevertheless, adults readily linked these two events together as if they had cursed the “victim.”²⁵ This is all the more apparent in young children, who still are not sure about the difference between mental thoughts and actions. They think that wishing can cause things to actually happen. However, Wegner’s research indicates that many adults continue to harbor such misconceptions even though they know that they should not think like this. For example, in games of chance such as gambling, people behave as if they have control when they don’t. They feel more confident about winning if they get to throw the dice. They prefer to bet before the dice are thrown rather than after. They think they are more likely to win the lottery if they choose the numbers, and so on. Such behavior would be utterly absurd if deep down we did not think that we have some influence over events. This is because of our mind design.

Later on, I examine how mind design emerges early in development as children come to understand and predict the physical world, the living world, and the mental world. We will look at studies that prove they must be reasoning about the hidden properties of objects, living things, and their own minds as well as those of other people. I show that young children are thinking about gravity, DNA, and consciousness—all invisible to the

naked eye—and that they do this long before teachers have had a chance to fill their heads with ideas. I show that this way of reasoning is very powerful for children's understanding, but that it can also let them down, because reasoning this way about the unseen properties of the natural world sometimes leads to supernatural explanations. Children may learn when they grow up that such supernatural notions are wrong, but what if such childish ideas never really go away?

Most adults think that when they learn something new that contradicts what they previously thought, they abandon their earlier misconceptions and mistaken ideas. However, it is not clear that this happens entirely: childish notions can linger on in the mature mind. Consider an example from the world of objects. Imagine two cannonballs of exactly the same size. One is made of light wood and the other one is solid iron that is one hundred times heavier. If you were to drop them both at the same time from the leaning Tower of Pisa, what would happen?²⁶ Children think that heavier objects fall much faster than lighter ones. Heavier objects do land before lighter ones, but only just, and that's because of air resistance. If you dropped the cannonballs in a vacuum where there was no air resistance, they would land exactly at the same time. As a child, I did not believe this until a physics teacher demonstrated that a feather and a coin fall at exactly the same speed in a vacuum. Most college students make the same mistake.²⁷ The amazing thing is not that adult students get it wrong, but rather that these are students who have been taught Newton's Laws of Object Motion and should know better. They should know the correct answer. Somehow the scientific knowledge they have so painstakingly learned loses out to their natural intuition about weight and falling objects.

The example of the falling cannonballs is important because it reveals that we may never truly abandon our childhood misconceptions when we become adults and learn new facts about the world. Some of us are more vulnerable to these misconceptions than others. Now imagine how difficult it is for us to abandon beliefs that include the supernatural. Here there is precious little evidence to dissuade us of our beliefs. If we hold childish

notions about the unseen mechanisms of reality, then the difference between believers and nonbelievers may have less to do with what we have been told and more to do with our susceptibility to our own childish misconceptions. If you are someone who is inclined to believe that there are supernatural forces operating in the world, then you will interpret all manner of events in light of this way of thinking. There will be no chance occurrences. Fate and luck will explain why things happen. You will infer the presence of supernatural agents, and evil and good will become tangible forces.

WHAT NEXT?

Our lives are punctuated by bizarre occurrences. How do we make sense of them? All too often we appeal to explanations that evoke some supernatural activity even though the evidence for such activity cannot be directly observed or studied. So we are left with belief. Where do these beliefs come from? One account is based on the idea that supernatural beliefs are spread by what other people tell us. Certainly this may be true for the content of a belief—the name of a spirit or the nature of the rituals that need to be performed—but what about the basis of the belief? And why are so many of us so willingly gullible? One reason may be that it is our natural way of thinking to assume that there is a supernatural dimension to reality—the “something there” that William James talked about.

Religion is the most familiar face of such supernatural belief: most religions have deities and other supernatural beings that are not restricted to natural laws. Even many people who do not believe in God are nevertheless willing to entertain the notion that there are phenomena, patterns, energies, and forces operating in the world that cannot be explained by natural laws. God may require supernatural belief, but supernatural beliefs do not require God.

In the next chapter, I want to develop this idea further by demonstrating that most of us can hold supernatural beliefs even when we are not fully aware that we do.

And for that, I need an old cardigan.