

**THE
EXPECTATION
EFFECT**

*How Your
Mindset
Can
Change Your
World*

**DAVID
ROBSON**

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Change Your World*

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INTRODUCTION

The mind is its own place and in it self
Can make a Heaven of Hell, a Hell of Heaven.

—John Milton, *Paradise Lost*

Our expectations are like the air we breathe—they accompany us everywhere, yet we are rarely conscious of their presence. You might assume that your body is resilient, or that it is prone to sickness. You might think you are naturally lean and sporty, or that you are predisposed to gaining weight. You might believe that the stresses in your life are harming your health, and that a night of poor sleep will render you a walking zombie the next day.

These assumptions may appear to be inescapable, objective truths. But in this book I will show you how those beliefs, *in themselves*, shape your health and well-being in profound ways, and that learning to reset our expectations about these issues can have truly remarkable effects on our health, happiness, and productivity.

Don't believe me? Then consider one attention-grabbing study from Harvard University. The participants were hotel cleaners, whose work is often physically intense yet feels very different from the exercise you might perform at the gym. To change the cleaners' perceptions of their own fitness, the researchers explained the amount of energy that was exerted by vacuuming the floor, changing beds, or moving furniture—which, over the course of a week, easily amounts to the level of exercise recommended for good health. One month later, the researchers found that the cleaners' fitness had noticeably improved, with significant changes in their weight and blood pressure.¹ Quite amazingly, the shift in their beliefs about their bodies, and their new expectations of their work, had brought about real physiological benefits—without any change in lifestyle.

We will discover how “expectation effects” like this can also influence our susceptibility to illness, our ability to maintain a stable body weight, and the short- and long-term consequences of stress and insomnia. As the following story shows, the power of expectation is so strong that it can

even determine how long you live.

★ ★ ★

Starting in the late 1970s, the US Centers for Disease Control began to receive reports that a worrying number of recent Laotian immigrants were dying in their sleep. They were almost all male, aged between their midtwenties and midforties, and most were from the persecuted Hmong ethnic group who had fled Laos after the rise to power of the Pathet Lao. For their loved ones, the only warning was the sound of them struggling for breath and, occasionally, a gasp, a moan, or a cry. By the time help arrived, however, they were already dead.

Try as they might, epidemiologists could find no good medical explanation for these “Sudden Unexpected Nocturnal Death Syndrome” cases. Autopsies showed no evidence of poisoning; nor was there anything particularly unusual about their diet or their mental health. At its peak, however, the mortality rate was so high among young Hmong men that SUNDS accounted for more lives lost than all the other top five causes of death combined. Why were so many seemingly healthy adults passing away in their sleep?

Investigations by the medical anthropologist Shelley Adler would eventually solve the mystery. According to Hmong traditional folklore, an evil demon called the “dab tsog” roamed the world at night. When it had found its victim, it would lie on the body, paralyzing the victim and smothering their mouth until they could no longer breathe.

Back in the mountains of Laos, the Hmong could ask a shaman to build a protective necklace, or they could sacrifice animals to appease their ancestors, who would fend off the dab tsog. But now these men were in the United States—there were no shamans, and they were no longer able to perform their ritual sacrifices to appease their ancestors, meaning they had no more protection from the dab tsog. Many had converted to Christianity so that they could better integrate into American culture, neglecting their old rituals altogether.

Guilt at having abandoned their traditions was itself a source of chronic stress that could have harmed their overall health. But it was at night that the fears of the dab tsog became a reality, with disturbing nightmares that resulted in the experience of sleep paralysis, in which the mind becomes

conscious, as if you were fully awake, but the body is unable to move. Sleep paralysis is not in itself dangerous—it affects around 8 percent of people.² For the Hmong immigrants, however, it seemed like the dab tsog had come to wreak revenge. The result, Adler concluded, was a panic so strong it could exacerbate a heart arrhythmia, leading to cardiac arrest.³ And as the deaths mounted, the Hmong men only became more scared, creating a kind of hysteria among the population that may have caused even more deaths. The explanation is now accepted by many scientists.⁴

Newspaper reports at the time described the “cultural primitivity” of these people, who were “frozen in time” and “ruled by superstition and myth.” But scientists now argue that we are all susceptible to beliefs that are just as potent as the dab tsog. You may not believe in demons, but thoughts about fitness and expectations about long-term health may have real consequences for your longevity, including the risk of heart disease. This is the enormous power of the expectation effect. It is only once we recognize its influence that we can begin to use it to our advantage to ensure a longer, healthier, happier life.

These provocative claims may sound dangerously close to the content of many New Age self-help books, such as Rhonda Byrne’s 35-million-copy best seller *The Secret*. Byrne promoted the “law of attraction”—the idea that, for example, visualizing yourself rich will bring more money into your life. Such ideas are pure pseudoscience, whereas the findings in this book are based on robust experiments published in peer-reviewed journals, and they can be explained by well-accepted psychological and physiological mechanisms, such as the actions of the nervous and immunological systems. We will learn how our beliefs can influence many important life outcomes without any appeal to the paranormal.

You may also wonder how the content of our thoughts could have any meaningful influence in the chaos of the world today. I wrote much of this book in the midst of the Covid-19 pandemic, when many of us were grieving for loved ones and fearing for our livelihoods. We have also faced huge political uncertainty and unrest, and many continue to wrestle with enormous structural inequalities. Our own expectations and beliefs may seem to hold little power in the face of all these barriers.

It would be foolish to argue that “positive thinking” could eliminate all this unhappiness and anxiety—and I would be the last person to make that claim. (Scientific research continues to show that simply denying the

difficulties of a situation will only lead to worse outcomes.) As we shall soon see, however, there are many ways that our beliefs about our own capacities can influence how we cope with challenges, and can determine the toll they take on our physical and mental health. While many of today's crises are beyond our control, our responses to difficult situations are often the product of our expectations—and understanding this allows us to increase our resilience and to react in the most constructive way to the problems we face.

Crucially—and this is something that I will emphasize throughout the book—the expectation effects described in these chapters concern *specific* beliefs rather than a general optimism or pessimism. Armed with scientific knowledge about the ways your expectations are shaping your life, you can learn to reframe and reappraise your thinking without any self-deception, and you don't need to turn into a cheery Pollyanna to benefit.



My own understanding of the enormous power of expectations came seven years ago during a period of turmoil in my own life.

Like many people, I had previously suffered from depression and anxiety, but for most of my life I had managed to weather the waves of unhappiness until they passed. Then, after a period of intense stress, the troughs in my mood started to get deeper, and longer, to the point that they were no longer bearable.

Recognizing those symptoms, I went to my family doctor, who prescribed me a course of antidepressants and offered some of the usual warnings about the known side effects, including migraine. Sure enough, my mood seemed to stabilize, but on those first few days I also experienced splitting headaches that felt like an ice pick had penetrated my skull. The pain was so intense that I was sure that something terrible was happening to my brain. How could this agony not be some kind of warning?

It just so happened, however, that I had also started writing a popular science article about the placebo effect (from the Latin, “I shall please”). As is now well known, inert sugar pills can often reduce symptoms and accelerate recovery through the patient's mere expectation that they will heal the body, and this coincides with physiological changes to blood

circulation, hormone balance, and immunological response.

While working on my article, I discovered that not only do many people taking placebo pills experience the benefits of the drug they believe they are taking; they also report its side effects, too, from nausea, headaches, and fainting to sometimes dangerous drops in blood pressure. And the more people are told about those side effects, the more likely they are to report them. These are known as nocebo effects (from the Latin, “I will harm”), and like the placebo responses, these symptoms are not “imagined” but are the result of measurable physiological changes—including significant shifts in our hormones and neurotransmitters.

For many antidepressants, the vast majority of side effects can be explained by the nocebo response rather than an inevitable reaction. In other words, the terrible pain I had been feeling while taking medication was perfectly real—but the product of my mind’s expectation rather than the actual chemical effects of the drug. With this knowledge, the pain soon vanished. After a few more months of taking the antidepressant (side-effect-free), my depression and anxiety had lifted. Knowing that many of the symptoms of withdrawal may arise from the nocebo effect undoubtedly helped me to eventually wean myself off the medication, too.

Ever since, I have closely followed the research on the mind’s capacity to shape our health and well-being and our physical and mental capacities. And it is now becoming apparent that the placebo and nocebo responses to drugs are just two examples of the ways that beliefs can become self-fulfilling prophecies, changing our lives for better or worse. In the scientific literature, these phenomena are variously called “expectation effects,” “expectancy effects,” “Oedipus effects” (after the self-fulfilling prophecy in Sophocles’s famous play), and “meaning responses.” For simplicity, I use the first—“expectation effects”—to describe all the scientific phenomena that underlie the real-world consequences of our beliefs.

The study of hotel cleaners is just one example of this cutting-edge research, but there are many other fascinating findings. So-called “complaining good sleepers”—people who vastly overestimate how much time they spend awake and restless each night—are much more likely to suffer greater fatigue and poor concentration during the day, while “non-complaining bad sleepers” seem to escape the ill effects of insomnia. For the purposes of our next-day performance, we slept as well as we think we

did.

Beliefs about the consequences of anxiety, meanwhile, can change someone's physiological responses to stress, affecting both short-term performance and the long-term toll on mental and physical health. Positive and negative self-fulfilling prophecies can also determine memory capacity, concentration, and fatigue during hard mental tasks, and creativity in problem solving. Even someone's intelligence—long considered to be an immutable trait—may climb or fall according to their expectations.

These findings are causing some scientists to question the fundamental limits of the brain, suggesting that we may all have untapped mental reserves that we can free if we develop the right mindset. And that has immediate implications for work and education, and the ways that we cope under new pressures.

The most mind-blowing results concern the aging process. People with a more positive attitude to their later years are less likely to develop hearing loss, frailty, and illness—and even Alzheimer's disease—than people who associate aging with senility and disability. In a very real sense, we are as young as we feel inside.

As the Harvard study of the hotel cleaners shows, our expectations are not set in stone. Once we acknowledge the power that our expectations hold over our lives, the research offers some straightforward psychological techniques that we can apply to boost our physical and mental health and unleash our full intellectual potential. In the words of one of the most influential researchers in this field, Alia Crum at Stanford University: “Our minds aren't passive observers simply perceiving reality as it is; our minds actually change reality. In other words, the reality we will experience tomorrow is in part a product of the mindsets we hold today.”⁵

So how do the body, brain, and culture interact so potently to produce these self-fulfilling prophecies? What are the beliefs and expectations that rule our physical and mental well-being? And how can we use these fascinating findings to our own benefit? These are the central questions this book sets out to answer.

We will begin this journey with a revolutionary new theory, which sees the brain as a “prediction machine” that constantly simulates the future. This theory can explain how conscious and unconscious expectations can powerfully influence our perceptions of reality—from the strange

hallucinations of Arctic explorers to our experience of pain and illness. Importantly, this prediction machine can also alter our body's physiology—leading us to explore the power of belief in medicine, including an extraordinary psychological intervention that can accelerate your recovery from surgery. We will discover the ways that expectations can be transmitted between individuals through social contagion and can explain the psychosomatic origins of many recent health crises, including the perplexing rise in food allergies—and the ways to avoid falling victim to these expectation effects yourself.

We will then move beyond medicine to explore the power of expectation in everyday health and well-being. We will see how food labeling can change the way your body processes nutrients, with a direct impact on your waistline; how to use your mind to take the pain out of exercise and improve your athletic performance, without performance-enhancing drugs; and how to change your physical and mental responses to stress. We shall understand how prevailing cultural beliefs in countries such as India produce much better concentration and willpower. We will also learn the secrets of “super-agers” from the world's oldest acrobatic salsa dancer, and the powerful potential of belief to slow the ravages of time—right down to the aging of our individual cells. Finally, we will return to the Hmong and discover how their story can help us create our own self-fulfilling prophecies.

At the end of each chapter, you will also find summaries of the techniques to employ expectation effects to your advantage. These will vary in their details—but in general they will work better with repetition and practice. I encourage you to approach them with an open mind—testing the principles in comfortable situations, with the aim of building on any small gains. While it may be tempting to skip ahead to the practical news you can use, these expectation effects tend to be more potent if you understand the science behind their success. The more deeply you process the material, the greater the benefits—so it may also be useful to write down the specific ways you hope to apply it in your life. You may even like to share your results on social media, through the [#expectationeffect](#) hashtag, or upload them to the website www.expectationeffect.com, which I shall be updating regularly; there is some research suggesting that sharing an expectation effect with others—and hearing about their experiences in return—can increase its power.

Let me be absolutely clear. Your mind alone cannot perform miracles—you cannot simply imagine piles of money and think yourself rich, or cure yourself of a terminal illness through positive visualizations. But your expectations and beliefs can influence—indeed are already influencing—your life in many other surprising and powerful ways, and if you want to learn how to turn them to your advantage, read on. You may be astonished by your potential for personal change.

THE PREDICTION MACHINE

How your beliefs shape your reality

It was just a few nights before Christmas, and the drones seemed to be everywhere and nowhere at the same time.

The drama began at nine p.m. on December 19, 2018, when a security officer at London Gatwick Airport reported two unmanned aerial vehicles—one flying around the perimeter fence, another inside the complex. The runway was soon closed for fear of an impending terrorist attack. It was only nineteen months after the Islamist bombing at the Manchester Arena, after all, and there had been reports that members of ISIS were planning to carry explosives on commercial drones.

The chaos escalated over the following thirty hours as dozens of further sightings kept the airport in lockdown. Try as they might, however, the security officers and police just couldn't locate the drones, which seemed to disappear as soon as they were sighted. Even more astonishingly, their operators appeared to have found a way to avoid the military's track-and-disable system, which was unable to detect any unusual activity in the area, despite a total of 170 reported sightings. The news soon spread to the international media, which warned that similar attacks might occur in other countries.

By six a.m. on December 21, the threat finally seemed to have passed, and the airport reopened for business. Whoever was behind the attack—be it a terrorist or a joker—had achieved their aim of chaos, disrupting the travel of 140,000 passengers with the cancelation of more than a thousand flights. Despite offering a substantial reward, the British police have been completely unable to find a culprit, and there is not a single photo offering evidence of an attack—leading some (including members of the police) to

question whether there were ever any drones at all.¹ Even if there was, at one point, a drone near the airport, it's clear that the vast majority of the sightings were false, and the ensuing chaos was almost certainly unnecessary.

With so many independent reports from dozens of sources, we can easily rule out the possibility that this was some kind of lie or conspiracy. Instead, the event demonstrates the power of expectation to change our perception, and—occasionally—to create a vision of something that is entirely false.

According to an increasing number of neuroscientists, the brain is a “prediction machine” that constructs an elaborate simulation of the world, based as much on its expectations and previous experiences as on the raw data hitting the senses. For most people, most of the time, these simulations coincide with objective reality, but they can sometimes stray far from what is actually in the physical world.²

Knowledge of the prediction machine, and its workings, can help us to understand everything from ghost sightings to disastrously bad calls by sports referees—and the mysterious appearance of nonexistent drones in the winter sky. It can help us to understand why the name we call a beer changes its taste; and it shows how to someone with a phobia the world looks much more terrifying than it really is. This grand new unifying theory of the brain also sets the stage for all the expectation effects that we'll examine in this book.

THE ART OF SEEING

The seeds of this extraordinary conception of the brain were sown in the mid-nineteenth century by the German polymath Hermann von Helmholtz. Studying the anatomy of the eyeball, he realized the patterns of light hitting the retina would be too confusing to enable us to recognize what is around us. The 3D world—with objects at various distances and odd angles—has been flattened onto two two-dimensional disks, resulting in obscured and overlapping contours that would be difficult to interpret. And even the same object may reflect very different colors depending on the light source. If you are reading this physical book indoors at dusk, for example, the page will be reflecting less light than a dark gray page in

direct sunlight—yet in both cases, the page looks distinctly white.

Helmholtz suggested that the brain draws on past experiences to tidy up the visual mess and to come up with the best possible interpretation of what it receives, through a process he called “unconscious inference.” We may think we are seeing the world unfiltered, but vision is really forged in the “dark background” of the mind, he proposed, based on what it assumes is most likely to be in front of you.³

Helmholtz’s theories of optics influenced postimpressionist artists like Georges Seurat,⁴ but it was only in the 1990s that the idea really started to take off in neuroscience—with signs that the brain’s predictions influence every stage of visual processing.⁵

Before you walk into a room, your brain has already built many simulations of what might be there, which it then compares with what it actually encounters. At some points, the predictions may need retuning to better fit the data from the retina; at others, the brain’s confidence in its predictions may be so strong that it chooses to discount some signals while accentuating others. Over numerous repetitions of this process, the brain arrives at a “best guess” of the scene. As Moshe Bar, a neuroscientist at Bar-Ilan University in Israel who has led much of this work, puts it: “We see what we predict, rather than what’s out there.”

A wealth of evidence now supports this hypothesis, right down to the brain’s anatomy. If you look at the wiring of the visual cortex at the back of the head, you find that the nerves bringing electrical signals from the retina are vastly outnumbered by the neural connections feeding in predictions from other regions of the brain.⁶ In terms of the data it provides, the eye is a relatively small (but admittedly essential) element of your vision, while the rest of what you see is created “in the dark” within your skull.

By measuring the brain’s electrical activity, neuroscientists like Bar can watch the effects of our predictions in real time. He has observed, for instance, the passing of signals from frontal regions of the brain—which are involved in the formation of expectations—back into the visual cortex at the earliest stages of visual processing, long before the image pops into our consciousness.⁷

There are lots of good reasons why we might have evolved to see the world in this way. For one thing, the use of predictions to guide vision helps the brain to cut down the amount of sensory information it processes,

so that it can focus on the most important details—the things that are most surprising, and which do not fit its current simulations.

As Helmholtz originally noted, the brain’s reliance on prediction can also help us to deal with incredible ambiguity.⁸ If you look at the image [here](#)—a real, albeit poor-quality, bleached photograph—you will probably struggle to identify anything recognizable.



If I tell you to look for a cow, however—facing you, with its large head toward the left of the image—you may find that something somehow “clicks,” and the image suddenly makes a lot more sense. If so, you’ve just experienced your brain’s predictive processing retuning its mental models to make use of additional knowledge, transforming the picture into something meaningful.

Or what do you see when you look at the image below? (Try for at least ten seconds before going on.)

If you’re like me, you will initially find it extremely hard to make out anything specific. But if you see the original image ([here](#)) it suddenly becomes a lot clearer: that’s your brain’s updated predictions making sense of the mess.⁹ Once you’ve seen the original, it’s almost impossible to believe that you were ever confused by the unclear image—and the effect of those updated predictions is enduring. Even if you return to this page in a year’s time, you’ll be much more likely to see the dog than when you first saw the incomprehensible splotches of black and white.

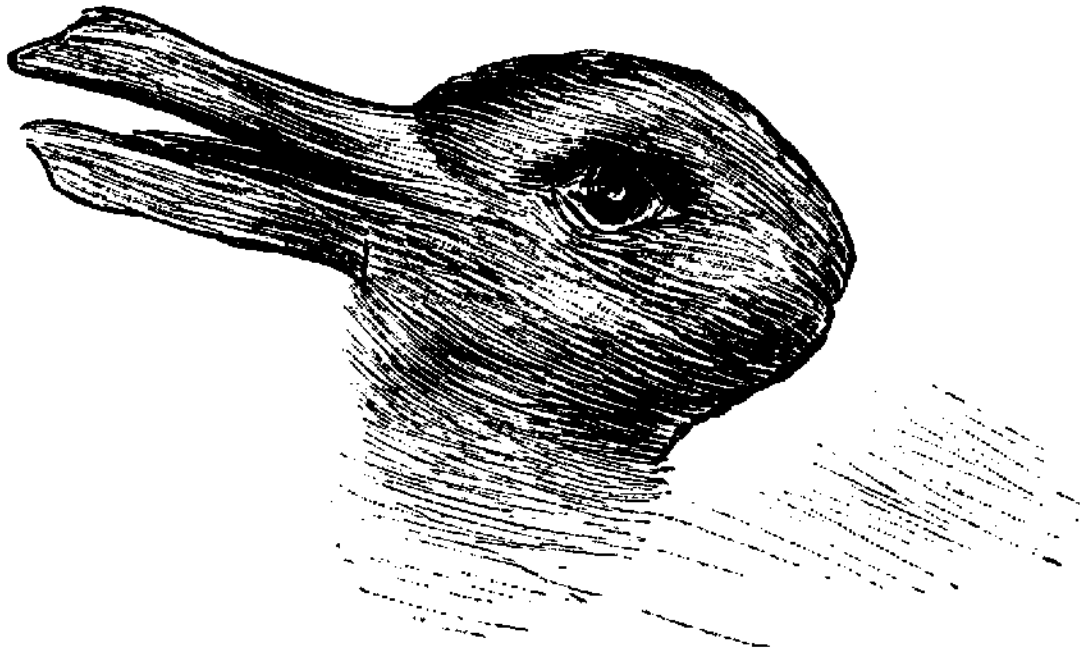


The brain will draw on any contextual information it can to refine its predictions—with immediate consequences for what we see. (If you'd seen the picture in a pet store or a veterinary surgeon's office, you might have been far more likely to have seen the dog at first glance.) Even the day of the year can determine how your brain processes ambiguous sights. A pair of Swiss scientists, for example, stood at the main entrance of Zoo Zürich and asked participants what they saw when they looked at a version of a famously ambiguous visual illusion (reproduced below).

In October, around 90 percent of the zoo visitors reported seeing a bird looking to the left. At Easter, however, that dropped to 20 percent, while the vast majority saw it as a rabbit looking to the right. Of children under ten, for whom the Easter Bunny may be an especially important figure, nearly 100 percent saw a rabbit on the holiday weekend. The prediction machine had weighed up which potential interpretation of the ambiguous picture was most relevant, and the season managed to tip the balance—with a tangible effect on people's conscious visual experience.¹⁰

Psychologists sometimes describe our expectations as having a “top-down” influence, as opposed to the raw data flowing “bottom-up” from the body. We now know that top-down influences are not limited to vision but govern all kinds of sensory perception. And it is an incredibly effective

way of experiencing the world. Suppose you are driving on a misty day: if you are familiar with the route, your previous experiences will help your brain to make out the sight of a road sign or another car, so that you avoid having an accident. Or imagine you are trying to work out the meaning of someone's words on a crackly telephone line. This will be much easier if you are already familiar with the accent and cadences of the speaker's voice, thanks to the prediction machine.



By predicting the effects of our movements, the brain can damp down the feeling of touch when one part of our body makes contact with another, so that we don't jump out of our skin whenever one of our legs brushes against the other, or our arm touches our side. (It is also for this very reason that we can't tickle ourselves.) Errors in people's internal simulations might also explain why amputees still often feel pain in their missing limbs—the brain hasn't fully updated its map of the body and erroneously predicts that the arm or limb is in great distress.

There will inevitably be some small errors in each of the brain's simulations of the world around us—a mistaken object or a misheard sentence that is soon corrected. Occasionally, however, those simulations can go completely awry, with heightened expectations evoking vivid illusions of things that do not exist in the real world—such as drones flying over the UK's second-biggest airport.

In one brilliant demonstration of this possibility, participants were