

ENTANGLED MINDS

EXTRASENSORY EXPERIENCES
IN A QUANTUM REALITY

DEAN RADIN

Bestselling author of *The Conscious Universe*

"From the Einstein of consciousness research comes a work that could change forever how we view the nature of human consciousness and our origins and destiny."

—Larry Dossey, M.D., author of *Healing Words*



PARAVIEW

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PREFACE

If you do not get *schwindlig* [dizzy] sometimes when you think about these things then you have not really understood it [quantum theory].

Niels Bohr

One of the most surprising discoveries of modern physics is that objects aren't as separate as they may seem. When you drill down into the core of even the most solid-looking material, separateness dissolves. All that remains, like the smile of the Cheshire Cat from *Alice in Wonderland*, are relationships extending curiously throughout space and time. These connections were predicted by quantum theory and were called “spooky action at a distance” by Albert Einstein. One of the founders of quantum theory, Erwin Schrödinger, dubbed this peculiarity *entanglement*, and said “I would not call that *one* but rather *the* characteristic trait of quantum mechanics.”

The deeper reality suggested by the existence of entanglement is so unlike the world of everyday experience that until recently, many physicists believed it was interesting only for abstract theoretical reasons. They accepted that the microscopic world of elementary particles could become curiously entangled, but those entangled states were assumed to be fleeting and

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have no practical consequences for the world as we experience it. That view is rapidly changing.

Scientists are now finding that there are ways in which the effects of microscopic entanglements “scale up” into our macroscopic world. Entangled connections between carefully prepared atomic-sized objects can persist over many miles. There are theoretical descriptions showing how tasks can be accomplished by entangled groups without the members of the group communicating with each other in any conventional way. Some scientists suggest that the remarkable degree of coherence displayed in living systems might depend in some fundamental way on quantum effects like entanglement. Others suggest that conscious awareness is caused or related in some important way to entangled particles in the brain. Some even propose that the entire universe is a single, self-entangled object.

If these speculations are correct, then what would human experience be like in such an interconnected universe? Would we occasionally have numinous feelings of connectedness with loved ones, even at a distance? Would such experiences evoke a feeling of awe that there’s more to reality than common sense implies? Could “entangled minds” be involved when you hear the telephone ring and somehow know—instantly—who’s calling? If we did have such experiences, could they be due to real information that somehow bypassed the usual sensory channels? Or are such reports better understood as coincidences or delusions?

These are the types of questions explored in this book. We’ll find that there’s substantial experimental evidence for a few types of genuine psi phenomena. And we’ll learn why, until very recently, science has largely ignored these interesting effects. For centuries, scientists assumed that everything can be explained by mechanisms analogous to clockworks. Then, to everyone’s surprise, over the course of the twentieth century we learned that this commonsense assumption is wrong. When the fabric of reality is examined very closely, nothing resembling clockworks

can be found. Instead, reality is woven from strange, “holistic” threads that aren’t located precisely in space or time. Tug on a dangling loose end from this fabric of reality, and the whole cloth twitches, instantly, throughout all space and time.

Science is at the very earliest stages of understanding entanglement, and there is much yet to learn. But what we’ve seen so far provides a new way of thinking about psi. No longer are psi experiences regarded as rare human talents, divine gifts, or “powers” that magically transcend ordinary physical boundaries. Instead, psi becomes an unavoidable consequence of living in an interconnected, entangled physical reality. Psi is reframed from a bizarre anomaly that doesn’t fit into the normal world—and hence is labeled *paranormal*—into a natural phenomenon of physics.

The idea of the universe as an interconnected whole is not new; for millennia it’s been one of the core assumptions underlying Eastern philosophies. What is new is that Western science is slowly beginning to realize that *some* elements of that ancient lore might have been correct. Of course, adopting a new ontology is not to be taken lightly. When it comes to serious topics like one’s view of reality, it’s sensible to adopt the conservative maxim, “if it ain’t broke, don’t fix it.” So we’re obliged to carefully examine the evidence and see if psi is real or not. If the conclusion is positive, then previous assumptions about the relationship between mind and matter are wrong and we’ll need to come up with alternatives.

As we explore the concept of psi as “entangled minds,” we’ll consider examples of psi experiences in life and lab, we’ll take a survey of the origins of psi research, we’ll explore the outcomes of thousands of controlled laboratory tests, and we’ll debunk some skeptical myths. Then we’ll explore the fabric of reality as revealed by modern physics and see why it’s becoming increasingly relevant to understanding why and how psi exists. At the end, we’ll find that the nineteenth century English poet Francis Thompson may have said it best:

All things by immortal power,
Near and Far
Hiddenly
To each other linked are,
That thou canst not stir a flower
Without troubling of a star

Tekijänoikeuksin suojattu kuva

FORBIDDEN SCIENCE

The general public has always been interested in psi phenomena. But within the scientific orthodoxy psi has been regarded as either a genuine hot potato or a Mr. Potato Head toy. Many scientists believe that psi is real, but like a hot potato it's too uncomfortable to handle. Others believe that psi is a childish novelty unworthy of serious attention.

The majority who believe that psi is real are forced to confront the problem of “forbidden knowledge,” taboo topics that restrict the conduct, funding, and publication of certain ideas. An article on this issue in the journal *Science* in 2005 described the results of a survey on forbidden knowledge from scientists at prestigious academic departments in the United States. It found that most felt that “informal constraints” limited what they could study. These constraints included concerns over what they thought the news media, journal editors, activists or peers might think of their interests. Because of such social and political pressures, scientists shy away from controversial topics. As one respondent in the survey put it, “I would like to lunatic-proof my life as much as possible.”²

This is the state of affairs for research on ordinary topics, so you can imagine the situation for psi research. Traditional sources of funding hardly ever consider touching hot potatoes, and as a result there are fewer than 50 conventionally trained doctoral-level scientists around the world engaged in full-time psi research. A common feature among members of this group is that they're not intimidated by orthodoxy. As one of those card-carrying iconoclasts, I'm often asked why I became interested in psi research, and why I persist in such an apparently quixotic quest. To answer those questions, I'll briefly review my background.

A PERSONAL VIEW

I've been consumed with the question of personal existence for as long as I can remember. In the first grade, when morning recess period began the other children scampered out to the playground to cheerfully stomp on each other. But I hung behind to pepper my teacher, Miss Platt, with existential questions. Elementary school teachers are not paid nearly enough to indulge annoying kids troubled by philosophical uncertainties, especially before lunchtime.

I was fascinated with such questions as, Why are we here? Is this all we're capable of? Does life have any real purpose, or is all this emphasis on arithmetic and spelling just a distraction to avert our attention from more important questions, like the futility of existence? One day, some kids were shooting spitballs in class and creating a commotion. As I watched the uprising unfold, I remember thinking, "What's wrong with those kids? They're acting like children!" The instant this thought came to mind, I was struck with a peculiar moment of mental clarity. These couldn't be *my* thoughts. These were the exasperated thoughts of an adult charged with supervising gangs of misbehaving, preadolescent primates. But I was one of those mischievous monkeys, so what was I doing thinking such thoughts? Like a thunderbolt, I realized that "me" and my thoughts weren't necessarily the same thing. In retrospect, perhaps I was empathizing with our poor teacher, whose face was slowly congealing into the permanently anguished expression made famous in Edvard Munch's painting, *The Scream*. This episode sparked similar incidents of acute self-awareness, and it led me to ponder questions like, What is the "I" that's watching my thoughts? And, Who's asking *that* question?

The curiosity wasn't due to existential angst. I had a happy childhood, and I was raised in a blithely agnostic, artistic family. My interests were undoubtedly inherent; a friend joked that I must have been born with an extra set of "why" chromosomes.

Whatever the cause, my interests in the human mind were further catalyzed by my first career. I started playing the violin at age 5, and before I knew it I had spent the next 20 years performing as a classical soloist and in orchestras and quartets.

During those formative years, my parents and violin teachers teased me with a certain phrase. After I'd finish practicing a difficult piece, they'd say, "That was good, but you're not living up to your potential." This mantra was undoubtedly meant to inspire me to work harder. But its actual effect was to cause me to wonder, with growing intensity over the years, what *is* my potential? How would I know when I've achieved it? What *are* the farthest reaches of the human mind?

My absorption with such questions eventually steered me away from a career in music. Instead I became attracted to the question of human capacities and potentials. Today, after spending the majority of my career investigating this question, I have yet to find where human potential ends. The more I look into it, the more I discover how much is left to learn. I've come to agree with Willis Harman, president of the Institute of Noetic Sciences from 1977 to 1997, who wrote extensively on these issues. Harman succinctly summarized the situation as: "Perhaps the only limits to the human mind are those we believe in."

Of the many interesting topics associated with human potential, one quickly caught my attention—psychic experiences. I became interested in psi around age 10, after I discovered that wonderful section of the public library that housed the fairy tales, mythology, parables, and science fiction. In those fictional realms, it was taken for granted that the mind had exceptional powers and capabilities, and it all seemed perfectly reasonable to my youthful intuition. Around this time, I also discovered that I had an affinity for science and math. But it was clear that science and fairy tales shared only one commonality—creative imagination. Beyond that, I didn't see how they could possibly have any connection.

Still, I was struck by the way that psychic powers in yogic lore, the *siddhis*, were described in such matter-of-fact tones in ancient texts, like in Patanjali's *Yoga Sutras*. Such abilities were not portrayed as supernatural fairy tales, but as pragmatic, ho-hum consequences of practicing meditation. Such claims far exceeded the bounds of science, but the authors of those books seemed thoughtful and intelligent, and they appeared to be as adept at investigating "inner space" as Western scientists had become at investigating "outer space." Surely, I thought, such claims were just children's stories, mere imaginative fantasies of prescientific peoples. I found it natural to adopt a skeptical stance, as my interests were not motivated by frequent psi experiences, but rather by strong curiosity and a natural disposition for empathy.

One day after I had pestered a kindly librarian with one too many questions, she introduced me to books describing scientific investigations of psychic phenomena. I was hooked. I discovered that there *was* a link between psychic abilities and science—these abilities can be tested in the laboratory.

I soon learned that for every two books I read that presented scientific evidence for psi, I found a third that countered it. I'd read a skeptical book and find myself feeling cynical about the varieties of human stupidity, and then I'd read a book by a scientist who had actually conducted experiments and find myself becoming excited about the prospects of exploring the frontiers of the human mind. Both sides of the controversy seemed sensible enough; both argued their side convincingly. But after reading all of these books I noticed that the debate followed a predictable pattern: One side presented experimental evidence that something interesting was going on; the other argued that the evidence wasn't good enough to be taken seriously. Some skeptics pushed doubt to extremes and insisted that positive evidence was *always* due to mistakes or intentional fraud.

As I saw it, within this dialectic one side was struggling to understand the depths of inner space by probing Nature with

clever questions. The other was trying to maintain the status quo through passionate, and sometimes vicious, denial. The former were willing to take risks to advance knowledge, the latter were naysayers interested mainly in defending dogma. I found the explorers far more interesting than the skeptics, and I was impressed to learn that some of the greatest minds in modern times, people like Nobel laureate physicist Wolfgang Pauli and psychoanalyst Carl Jung, were deeply interested in psi.³

About fifteen years after I started following the literature on psi research, I had earned a master's degree in electrical engineering and a doctorate in psychology from the University of Illinois at Urbana-Champaign. Besides psi, I was interested in cybernetics and artificial intelligence. My electrical engineering thesis advisor was Heinz von Foerster, a pioneer in the foundations of cybernetics. One of von Foerster's lasting contributions was clarifying the role of self-reference in complex domains, including such perplexing conditions as when the observer observes himself. Cybernetics gave birth to topics known today as self-organizing systems and chaos theory, and I continue to be interested in those disciplines as I believe that self-reference and psi are deeply related.⁴ My graduate work involved designing computer models of cognition and applications of artificial intelligence. My advisor was Andrew Ortony, known for his research on cognition and emotion. One of the members of my doctoral committee was John Bardeen, one of only four scientists to be awarded two Nobel Prizes.

Throughout my university years I dabbled with simple psi experiments, but after joining the staff at AT&T's Bell Laboratories,⁵ I began to attend the annual conferences of the Parapsychological Association (PA). The PA is the international professional organization for scientists and scholars interested in psi phenomena; it's been an affiliate of the American Association for the Advancement of Science (AAAS) since 1969.⁶ Later I worked at SRI International (formerly known as Stanford Research Institute) on a classified program investigating psi phe-

ENTANGLEMENT

But perhaps the most significant discovery is *entanglement*, a prediction of quantum theory that Einstein couldn't quite believe, calling it "spooky action at a distance." Erwin Schrödinger, one of the founders of quantum theory, used the word entanglement to refer to connections between separated particles that persisted regardless of distance. These connections are instantaneous, operating "outside" the usual flow of time.¹⁵ They imply that at very deep levels, the separations that we see between ordinary, isolated objects are, in a sense, illusions created by our limited perceptions. The bottom line is that physical reality is connected in ways we're just beginning to understand.

Entanglement was predicted based upon the mathematics of quantum theory. It was originally thought to be so fragile that, in the estimation of a prominent physicist, "anything, even the passage of a cosmic ray in the next room, would disrupt the [quantum] correlations enough to destroy the effect."¹⁶ Today we know that entanglement is not just an abstract theoretical concept, nor is it a quantum hiccup that only appears for infinitesimal instants within the atomic realm. It has been repeatedly demonstrated as fact in physics laboratories around the world since 1972. As research accelerates on this surprising characteristic of nature, entangled connections are proving to be more pervasive and robust than anyone had previously imagined.¹⁷ A review of developments on entanglement research in March 2004 by *New Scientist* writer Michael Brooks concluded that "Physicists now believe that entanglement between particles exists everywhere, all the time, and have recently found shocking evidence that it affects the wider, 'macroscopic' world that we inhabit."¹⁸

A FANTASTIC SCENARIO

I believe that entanglement suggests a scenario that may ultimately lead to a vastly improved understanding of psi. The sce-

nario begins with the exploding use of digital information systems in every realm of modern life. The need to keep that information secure has placed massive pressure on the computing and communication industries, and it has generated a need for computers that can process information thousands of times faster than today's fastest supercomputers. One possible solution is quantum computing. It has been estimated that a single quantum computer could theoretically perform more computations than would be possible for a classical computer the size of the entire universe.¹⁹ Such electrifying pronouncements have attracted substantial funding and as a result, research in quantum communication and information processing is rapidly advancing.

Articles reporting new developments in entanglement theory and applications now appear regularly in scientific journals. Demonstrations of entanglement initially relied on extremely sensitive measurements in exotic conditions like extreme cold or incredibly short periods of time, but now researchers are reporting increasingly complex forms of entanglement that are lasting for much longer periods of time, and at higher temperatures. For practical uses like quantum computers, proposals like "entanglement purification" and "coherence repeaters," which are ways of extending the special quantum states required to sustain entanglement, are likely to be further refined to allow increasingly large objects to remain entangled at room temperature and for indefinite lengths of time.²⁰

Physicists have been able to entangle ensembles of trillions of atoms in gaseous form, and entanglement has been demonstrated among the atoms of relatively large chunks (centimeter-square) of salt.²¹ Entangled photons shot through sheets of metal have been shown to remain entangled after punching through to the other side.²² Photons also remain entangled after being sent through 50 kilometers of optical fiber, and while being transmitted through the open atmosphere. Clusters of four entangled photons have been demonstrated to

make quantum computing significantly easier to accomplish than it was previously imagined.²³ And organic molecules, like tetraphenylporphyrin ($C_{44}H_{30}N_4$), have been successfully entangled.²⁴

While practical difficulties must be overcome before entanglement is demonstrated in viruses, proteins, and living systems, there's no theoretical limit to how large an entangled object can be. Of course, physicists are quick to point out that when carefully prepared atomic-sized objects interact with the environment, by say colliding with air molecules or passing through electromagnetic fields, they become entangled with those objects. Those interactions tend to quickly smooth out the special state of quantum "coherence" in which simple forms of entanglement can be most easily observed. This loss of coherence, appropriately called decoherence, is (among other reasons) why we perceive everyday objects as separate and not as blurred together. But decoherence doesn't magically make quantum effects vanish. We're still thoroughly permeated by entangled particles. The question posed here is whether these deeply entangled states are meaningfully related to human experience, and if so, are they also related to psi? I propose that the answers are yes and yes, as we'll see.

One reason is that some scientists now believe that bioentanglement—quantum connections within and among living systems—will be useful in explaining the holistic properties of life itself. Numerous scientists, including Nobel laureate physicist Brian Josephson, have also proposed that biological systems might find ways of *using* entanglement in novel ways.²⁵ In 2005, physicist Johann Summhammer, from the Vienna University of Technology, proposed that because entanglement is everywhere in nature, it's conceivable that evolution has taken advantage of it. In particular, he proposed that

Entanglement would lead to a Darwinian advantage: Entanglement could coordinate biochemical reactions in differ-

ent parts of a cell, or in different parts of an organ. It could allow correlated firings of distant neurons. And . . . it could coordinate the behavior of members of a species, because it is independent of distance and requires no physical link. It is also conceivable that entanglement correlates processes between members of different species, and even between living systems and the inanimate world.²⁶

Physicists have even speculated that entanglement extends to everything in the universe, because as far as we know, all energy and all matter emerged out of a single, primordial Big Bang. And thus everything came out of the chute already entangled. Some further speculate that empty space, the quantum vacuum itself, may be filled with entangled particles.²⁷ Such proposals suggest that despite everyday appearances, we might be living within a holistic, deeply interconnected reality.²⁸ To be clear, these speculations are being proposed by traditional physicists, not by starry-eyed new agers or mystics.

THE FUTURE

In the near future, when the concept of entanglement is better understood, I expect that someone will get a bright idea and ask, “I wonder what would happen if two human beings became entangled? Perhaps they’d show correlated behavior at a distance too, just like entangled atomic matter does.” Case studies of identical twins will be used to justify this speculation. For example, consider the true case where twin boys raised separately were independently named “Jim” by their adoptive parents. Each Jim married a woman named Betty, divorced her, then married a woman named Linda. Both Jims were firemen, and each built a circular white bench around a tree in his backyard.²⁹ Could such coincidences arise from common genes that programmed Betty tendencies, Linda tendencies, and firemen tendencies? Or does it reflect “entangled Jims”?

Intrigued by such stories and by demonstrations of bioentanglement, an enterprising scientist will conduct an experiment. She'll isolate two identical twins in dark, soundproof and electromagnetically shielded chambers. She'll ask them to keep each other in mind while at random times she'll flash a bright light at one of them. Each of those light flashes will generate a predictable response in that twin's brain. After confirming the presence of those responses, she'll examine the brain activity of the *other*, nonstimulated twin, to see if there's a corresponding response at the same time. This electroencephalograph or "EEG correlation" experiment will successfully demonstrate a positive correlation between the two brains, and it will be widely hailed as a breakthrough of stunning proportions.

Then someone will quietly ask, "I wonder what it *feels like* when my brain is entangled with another brain." And then the panoply of psi phenomena will be rediscovered for the umpteenth time. But this time, for the first time, it will be accompanied by a solid theoretical foundation.

How long will we have to wait before this fanciful scenario unfolds? No time at all. The "entangled brains" experiments have already been performed over a dozen times over the past 40 years by independent groups.³⁰ *And they work.*

One of the first such experiments was published in 1965 in the journal *Science*. That study reported that the EEGs of pairs of separated identical twins (two such pairs out of 15 pairs tested) displayed unexpected correspondences. When one twin was asked to close his or her eyes, which causes the brain's alpha rhythms to increase, the distant twin's alpha rhythms were also found to increase.³¹ The same effect was not observed in unrelated pairs of people.

Today, positive results in these EEG correlation experiments continue to be reported. A notable advance was published in 2003 by Leanna Standish and her colleagues at Bastyr Univer-

CHAPTER 2

NAKED PSI

How do you know but ev'ry Bird that cuts the airy way,
Is an immense world of delight, clos'd by your senses five?

–William Blake

Once upon a time, in a sleepy country town far, far away, there was an introspective young boy named Hans.¹ Hans was more interested in his grandfather's poetry and in stargazing than in becoming a doctor like his father. After finishing high school, he decided to attend the university in the city, aspiring to become an astronomer. But the pace of big city life disagreed with his quiet ways, and after a short time he left school. It was a time of peace, so he decided to enlist for a year of service in the cavalry, looking forward to a year of riding horses and enjoying the outdoors in relative serenity.

One morning, while he was on horseback during a training exercise, his horse suddenly reared. Hans was tossed into the air and he landed hard on the road directly in the path of a fast-approaching, horse-drawn cannon. He realized with horror that he was about to be crushed, but miraculously, the driver of the artillery battery managed to stop the horses just in time. The accident left Hans thoroughly shaken but without serious injury.

At that very moment, many miles away in his family's

home, Hans's older sister was suddenly overwhelmed with an ominous certainty that something bad had happened to Hans. She anxiously insisted that their father contact him, and so he did via a telegram.

That evening, when Hans received the telegram, he was initially concerned, as he had never before received a telegram from his father. Then, upon reading his sister's urgent concern about his well-being, he knew that his feelings of intense fear earlier in the day had somehow reached his sister. Many years later, Hans wrote, "This is a case of spontaneous telepathy in which at a time of mortal danger, and as I contemplated certain death, I transmitted my thoughts, while my sister, who was particularly close to me, acted as the receiver."²

This experience profoundly transformed Hans's interests from the depths of outer space to the depths of the human psyche. After he finished his military service, he immediately returned to the university and focused on learning medicine, determined to understand how "psychic energy," as he called it, could carry a telepathic message to his sister a hundred miles away.

After many years of concentrated effort, working mostly in solitude in his laboratory at the university, Hans finally devel-

oped a method of recording human brain waves. For a time they were called “Berger rhythms,” after Hans’s last name. Now we call these signals an electroencephalogram, or EEG. With this invention he established for the first time that electrical activity of the human brain was correlated with different subjective states of mind. But Hans didn’t forget his original passion; he also carried out an experimental program involving 200 subjects, each of whom was tested for telepathy while in a hypnotic trance.

Hans’s driving passion to understand psychic energy did not succeed in explaining his sister’s telepathic experience, but it did establish the foundations of modern neuroscience. We are indebted to Hans not only for his development of the EEG, but also for revealing the basic brain mechanisms used in medical imaging devices like positron emission tomography (PET) and functional magnetic resonance imaging (fMRI).³

Tragically, as is all too common when it comes to scientific breakthroughs, Hans didn’t live to enjoy his well-earned recognition. Most of his scientific peers around the world believed that his recordings were due to some sort of electrical or mechanical artifact. Even his own colleagues considered him a naïve amateur and a suspect loner. After a long illness, despondent, and suffering from a painful skin infection, he committed suicide in 1941.

Tekijänoikeuksin suojattu kuva

This is the true story of Hans Berger, German psychiatrist and father of the EEG. His invention sparked the rapid development of ever-more sophisticated ways of measuring brain activity. There’s little doubt that Hans would have been deeply satisfied if he could have known that a quarter-

century after his death his discovery would spark a new chapter in the quest to understand the “psychic energy” he was seeking most of his life.⁴

As with the untold history of the EEG, most textbooks present well-mannered, sanitized origins of the major scientific discoveries. Naturally, the true origins of ideas are far more circuitous and perplexing. Most neuroscientists today don’t know that their discipline was inspired by a telepathic experience, or that the functions of the cerebral cortex, corpus callosum, and corpus striatum were all accurately described two hundred years before the rise of modern neuroscience.⁵ Most medical scientists don’t realize that the gold standard “randomized controlled trial” design used in clinical research was initially developed to investigate psychic phenomena. The same can be said for key developments in clinical psychology, mind/body medicine, psychophysiology, and experimental psychology. Even the discovery of isotopes, an advancement that helped pave the way to the atomic bomb, can be traced to a case of clairvoyance.

Modern science itself might have been spawned in a series of feverish dreams on the night of November 10, 1619, by a 24-year-old Frenchman named René Descartes. He had three dreams that evening, involving terrifying phantoms, whirlwinds, fiery sparks, and books of symbolic wisdom. Those dreams are said to have inspired Descartes to found the principles of rational empiricism.⁶ Coincidentally, that same evening, November 10, was St. Martin’s Eve. A traditional ceremony performed on St. Martin’s Eve is a procession with lamps, used to symbolize the bringing of spiritual light into the darkness. As Descartes dreamt of banishing the darkness of ignorance, all over Europe rituals were taking place, seeking a similar goal.

WHEN FICTION BECOMES FACT

The science fiction author Philip K. Dick had a uniquely imaginative mind. He published 112 short stories and over 30 novels.

Many of his stories were turned into popular science fiction movies, including the cult classic *Blade Runner*, and later *Total Recall* and *Minority Report*. His interest in the nature of reality and time was motivated by many unusual personal experiences associated with his stories. One such episode he describes is as follows:

In 1970 I wrote a novel called *Flow My Tears, the Policeman Said*. One of the characters is a nineteen-year-old girl named Kathy. Her husband's name is Jack. Kathy appears to work for the criminal underground, but later, as we read deeper into the novel, we discover that actually she is working for the police. She has a relationship going on with a police inspector. The character is pure fiction. Or at least I thought it was.

Anyhow, on Christmas Day of 1970, I met a girl named Kathy—this was after I had finished the novel, you understand. She was nineteen years old. Her boyfriend was named Jack. I soon learned that Kathy was a drug dealer. I spent months trying to get her to give up dealing drugs; I kept warning her again and again that she would get caught. Then, one evening as we were entering a restaurant together, Kathy stopped short and said, “I can't go in.” Seated in the restaurant was a police inspector whom I knew. “I have to tell you the truth,” Kathy said. “I have a relationship with him.”

Certainly, these are odd coincidences. Perhaps I have pre-cognition.⁷

PREMONITIONS OF 9/11

The following is an excerpt of a premonition involving the collapse of the World Trade Towers in New York City during the terrorist attacks of September 11, 2001. Physician Betsy MacGregor and her husband, Charles, were on a plane, fly-

view of the Pentagon because our road goes right by it.' It was one of the things we had said we wanted to do when we visited Washington. So I opened my eyes to look, and when I looked to the right, there it was. But it had huge billows of thick, black smoke pouring out of it, just huge clouds of smoke. I didn't see fire, I saw smoke, like a bomb had gone off, billows and billows of black smoke going up in the sky.

I yelled out and slammed my hands on the dashboard. My poor husband didn't know what was happening. I mean, I really screamed out loud. His first thought was that we were going to be in an accident, and I was warning him he was going to hit someone. But it was pretty open space on the highway, and nobody was cutting in front of us or anything at that moment.

I truly felt like we were in danger, even though we were actually on the highway and a couple of miles away from the Pentagon. I thought it was on fire. My husband said the Pentagon was not on fire, and then I finally realized that in fact it wasn't. And as fast as it had started, it stopped. It had all happened in a few seconds.

Many similar forebodings of 9/11 have surfaced. Are they true premonitions, poignant coincidences, or due to psychological frailties like selective memory or wishful thinking? Given the billions of dreams experienced nightly by people around the world, we would expect to hear about occasional "miraculous" coincidences every so often. How then can we tell if a premonition is real or illusory? And why, given the horrific circumstances of 9/11, or the colossal tsunami tragedy of December 2004, aren't more such premonitions reported? From a basic science point of view, what we'd like to know is whether such premonitions are possible even *in principle*.

UNCONSCIOUS PREMONITIONS OF 9/11?

Most of this book is concerned with the “in principle” question. Before we begin that expedition, let’s pause to consider a new approach to studying the question of premonitions. In September 2000, I designed a suite of Web-based games located at www.GotPsi.org and hosted by the Boundary Institute, a Silicon Valley thinktank I cofounded with computer scientist Richard Shoup. This Web site allows users to test their psychic abilities online. All of the data contributed there are recorded for research purposes, and as of late 2005 the database consisted of over 60 million individual trials contributed by almost a quarter million people worldwide.

One of the tests on that site assesses precognitive ability. It tests how well a user can describe a photo that the computer will randomly select *after* the user enters a description of the photo. The description can be entered in the form of words, or by checking boxes indicating whether the user thinks the photo will be of an indoors or outdoors scene, will involve people, will have water present, and so on. Because this test asks people to imagine a visual scene they are about to see, I thought it might be interesting to investigate whether premonitions of 9/11 might have spontaneously intruded into their attempts to describe an image the computer would soon display. So I looked at the words that people used to describe their imagery from September 9 through the morning of September 11, 2001. This included a set of about 900 trials and just over 2,500 words.

On Sunday, September 9, 2001, between 8:48 and 8:57 a.m. Eastern Daylight Time, a user nicknamed *sean* wrote the following impressions in a series of three successive trials:

airliner (seen from left-rear) against stormy cloud back-
drop, flashes of streaky cloud, ovoids, two persons
firstly a dragonfly? then a log [or] branch suggestive of

Everglades, then a fast dynamic scene of falling between two tall buildings, past checkered patterns of windows

first tall structure like an industrial chimney, then flashes of rounded crenulated form—peacock-like headdress of American Indian woman? then surface like volcanic ash plume or cauliflower

Sean's precognitive descriptions failed to match the photos subsequently selected at random by the computer. But they do provide a rather startling impressionistic sense of the chaos associated with the events of 9/11 in New York City. The next day, September 10, 2001, starting at 5:00 p.m. Eastern Time, user *shakey* wrote these words in two successive trials:

it is of something falling; it will be a chaotic scene

Again these were poor descriptions of the targets, but meaningful in the context of 9/11. A half hour later, a different user, nicknamed *justatest*, wrote in four successive trials:

intense . . . too hot to handle; blasting; is the coast clear?;
they were checking the coast!!!

The following morning, Tuesday, September 11, 2001, about an hour before the first airplane crashed into the World Trade Center tower, user *xixi* wrote the following words in a series of 11 trials:

White House; gone in the blink of an eye; scald; man's folly; band red; surging; palace; not easily conned; US power base; flexing muscles; surprise.

Are these genuine premonitions of 9/11? The ideas suggested by these words were unusual in the context of this online precognition experiment, as most of the photos used in the test

are of benign landscapes, people, animals, and other pleasant scenes with neutral content. Still, this is just a handful of potentially interesting matches out of 900 trials, and arguments based solely on subjective assessments have little currency in science. So I devised a way to judge whether the words used in this precognition test prior to 9/11 were in fact unusual.

MASS PREMONITIONS OF 9/11?

I should emphasize that the following is speculative and not representative of the controlled laboratory work we'll discuss later. Nevertheless, I present it because it illustrates a way that web-based experiments are beginning to offer new ways of studying *collective* psi effects. With that caveat in mind, I first examined the data from all the online precognition trials contributed from September 2, 2000, through June 30, 2003.¹⁰ There were 428,000 trials contributed by about 25,000 people. From those data, I selected only trials that included word descriptions; this included 256,000 trials and 841,000 words.

For each of those trials, I matched the words entered against a set of nine concepts that captured the chaotic context associated with 9/11: *airplane*, *falling*, *explode*, *fire*, *attack*, *terror*, *disaster*, *pentagon*, and *smoke*. The idea was to see how closely the words provided by hundreds of users each day matched these concepts. Counting only exact word matches wouldn't be fair because someone might have used a synonym or an associated word that an exact wordmatch would overlook. So I developed a computer-based *concept* matching technique to create a daily terrorism ideation score.¹¹

This analysis showed, to my surprise, that on 9/11 the curve dropped to its lowest point in 3 years of collecting data (Figure 2-1). Rather than increase in value, as might be predicted if lots of people were suddenly having spontaneous premonitions of disaster, and inadvertently reporting those impressions in this online test, the scores significantly *dropped* as 9/11 approached.

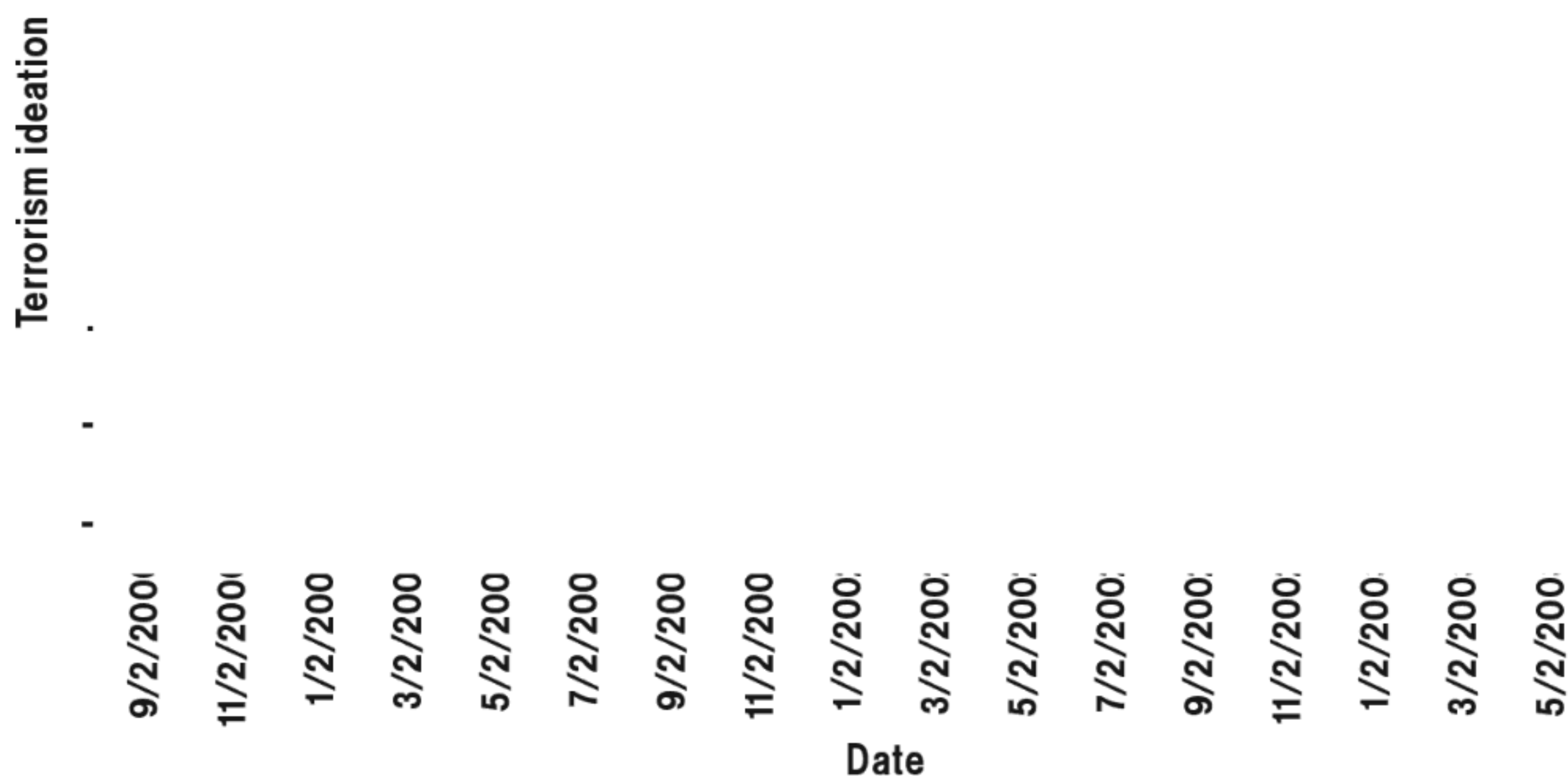


Figure 2–1. Fluctuations in daily terrorism ideation scores from September 2000 through June 2003. The arrow points to September 11, 2001. The dip at 9/11 suggests that participants in an online remote viewing test were actively avoiding terrorism-related concepts just before 9/11.

A statistical test compared to similarly constructed, randomly scrambled datasets showed that the odds against the chance of obtaining a terrorism ideation score as low as the observed minimum, and falling on 9/11 as observed, was 3,300 to 1.¹² Thus, the data didn’t indicate that premonitions intruded into people’s thoughts just prior to 9/11. Rather it suggests that, on average, such thoughts were significantly *avoided*.

If this isn’t a coincidence, then what might cause such an effect? One possibility is that in the days before 9/11 many people begin to unconsciously sense trouble brewing, but there was no context for those feelings so they were repressed. Repression is an unconscious psychological mechanism we use to actively avoid disturbing emotions or images. No one wants to walk around with troubling images of disasters rattling around in their heads, so repression is expected. Only the rare individ-

CHAPTER 3

WHO BELIEVES?

When a belief is widely held in the face of overwhelming evidence to the contrary, we call it a superstition. By that criterion, the most egregious superstition of modern times, perhaps of all time, is the “scientific” belief in the non-existence of psi.

–Thomas Etter¹

The ideal in science is to allow our experiences, in the form of formal observations and measurements, to rationally shape our beliefs. We do this through controlled experiments. In practice, we can't personally experience everything, so we're obliged to place our faith in what others report. When faith collides with experiments, disagreements invariably arise. We usually think of this conflict in terms of religion vs. science. But sometimes disagreements arise because *scientific faith* clashes with repeated *human experiences*. When this happens, emotions trump reason. Let's examine one of these disputes.

If we are to believe the assertions of the scientific mainstream, scientists view the general public as stupid, tobacco-spitting hillbillies who “ain't got no book-larning.” Why? Because the unwashed masses believe in things that science regards as beyond rational discourse, or reeking of superstition, or as just plain impossible.

That stereotype is a bit harsh. And I'm sure that tobacco aficionados from the Appalachian Mountains do not appreciate such sentiments. But according to a key document published by the U.S. government's National Science Foundation (NSF), you'll find that this statement isn't all that far off the mark. The NSF believes that the majority of the general population is stupid because they believe in psi and other "pseudosciences."² In this chapter we'll investigate who's likely to be closer to the truth, the NSF or the hillbillies.

Let's consider two flavors of stupidity: Just Plain Stupid and Mentally Deficient. For the sake of science, let's dignify Just Plain Stupid into something more official sounding by calling it *the ignorance hypothesis*. This proposes that people believe in the paranormal because they're uneducated. The assumption is that if only people would pay more attention to what science teaches about the way the world works, then they'd stop believing in delusions like telepathy. Everyone knows, so this hypothesis goes, that concepts like psi violate basic scientific laws, thus anyone who is unaware of such elementary laws must be ignorant and is therefore likely to believe in anything or anyone. That in turn threatens the fabric of a civilized, rational society, and must be squashed. A testable prediction of this hypothesis is that *lower* levels of formal education ought to be associated with *higher* levels of belief in psi.

The second form of stupidity we'll call the *mental deficiency hypothesis*. It asserts that superstitious beliefs arise in some people because they're dim-witted or mentally ill. Like the ignorance hypothesis, the mental deficiency hypothesis is taken for granted by some within the medical orthodoxy. For example, in the 1994 edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders" (called the DSM-IV), a portion of the description for *schizotypal personality disorder* is as follows:

A pervasive pattern of social and interpersonal deficits marked by acute discomfort with, and reduced capacity for, close relationships as well as by cognitive or perceptual distortions and eccentricities of behavior, beginning by early adulthood and present in a variety of contexts, as indicated by five (or more) of the following:

Ideas of reference (excluding delusions of reference), odd beliefs or magical thinking that influences behavior and is inconsistent with subcultural norms (e.g., superstitiousness, belief in clairvoyance, telepathy, or “sixth sense” . . .).

In other words, if you’re an eccentric introvert and believe in clairvoyance or telepathy, you might have an official psychiatric disorder. Fortunately, there are a broad array of excellent drugs that can alleviate your eccentricities and help you conform to the ideal norm where infantile fantasies like the “sixth sense” are no longer entertained. A nice course of treatment with some low potency neuroleptics (antipsychotic drugs) will help rid you of those troublesome beliefs. You may have trouble urinating and experience blurred vision for a while, but it’s worth it if you can rub out those irksome beliefs in a sixth sense.

To be fair, in some forms of mental illness the ability to distinguish between reality and fantasy is so compromised that normal functioning becomes seriously degraded. A key symptom of schizophrenia is hearing voices and seeing things that no one else can hear or see. Such experiences can lead the sufferers to believe that they’re extremely strong telepaths, or the world’s greatest clairvoyants, or that the FBI and CIA are controlling their brains. Such beliefs can rapidly devolve into compulsions and destructive paranoia because the perceptions are uncontrolled and intrusive. Such situations are no laughing matter, and medical intervention and treatment are fully justified.

EVIDENCE

The National Science Foundation (NSF) periodically publishes a report entitled *Science and Technology Indicators*, which summarizes the state of science and technology.³ A chapter in that report reviews the public understanding of science and technology, and one section in that chapter discusses what the NSF calls the “widespread and growing” problem of belief in pseudoscience. These are ideas or claims that superficially mimic science but do not follow standard scientific principles or rules of evidence.

A 2001 nationwide poll cited in the NSF’s 2002 report asked the question, “Some people possess psychic powers or ESP. Do you strongly agree, agree, disagree, or strongly disagree?” This NSF-sponsored survey found that 60% of adult Americans agreed or strongly agreed with the statement.⁴ Earlier Gallup polls taken in 1990, 1996, and 2001 showed that these percentages have been increasing over time.⁵ These figures were presented in the context of demonstrating the deplorable state of science education in the United States.

This would indeed be discouraging, except that the report tiptoes around an interesting fact. When survey respondents were separated by educational level, 46% with less than a high school education agreed that some people possess ESP, but a whopping 62% with high school or more education agreed. Among the “attentive public,” those defined as “very interested” in a topic, “very well informed” about it, and regularly read a daily newspaper or relevant national magazine, a healthy majority of 59% agreed. Thus, the survey actually revealed that belief in ESP was *not* explainable as a matter of poor education.

To check the NSF’s findings, I examined data collected by the National Opinion Research Center, which is affiliated with the University of Chicago.⁶ This Center, one of the oldest academic survey research groups in the United States, collects in its annual *General Social Survey* a wide range of questions used to

form a snapshot of opinions in the United States. One of the questions asked over the years has been about psi. The specific question I was interested in asks: “How often have you felt as though you were in touch with someone when they were far away from you?” The possible answers ranged from “never in my life” to “often.” I compared those answers to questions on educational achievement, which ranged from 0 to 20 years of formal education. The ignorance hypothesis predicts a negative relationship—the more education you have, the less you should believe in psi. The actual result, based on 3,880 survey responses, was not negative. In fact, it was significantly *positive*, with odds against chance of 80 to 1. This is not just the case in the United States. The same trend has been observed in Australia, France, and virtually every other country that has reported these surveys. This finding is even widely acknowledged by skeptics, who gnash their teeth about it.⁷

This is not to say that increased education has no effect on paranormal beliefs. Higher education is known to reduce belief in “religious paranormal” concepts, such as heaven, hell, the devil, and creationism. A large-scale survey in the southern United States, reported in 2003 by political scientist Tom Rice in the *Journal for the Scientific Study of Religion*,⁸ compared beliefs in the religious paranormal versus psi. The survey, which involved 1,200 respondents, adopted the working hypothesis that para-

normal beliefs of both types are basically a psychological coping mechanism for people in disadvantaged social, economic, and educational conditions. Increased education was expected to correlate with decreased levels of belief for both the reli-

Students that scored well on these [science knowledge] tests were no more or less skeptical of pseudoscientific claims than students that scored very poorly. Apparently, the students were not able to apply their scientific knowledge to evaluate these pseudoscientific claims. We suggest that this inability stems in part from the way that science is traditionally presented to students: Students are taught what to think but not how to think.¹⁷

But maybe Shermer misinterpreted this finding. An alternative view is that students are more open to their experiences than their teachers, who are defending a scientific faith that is not supported by evidence!

ON COMMON SENSE

How can beliefs so easily distort common sense? Consider something obvious like the purpose of the human heart. In the early seventeenth century, people thought that everything important to know about anatomy was already known; the Greek anatomist Claudius Galen had written it all down many centuries before. Everyone knew that the heart was a heater of the blood, and the brain, a cooler.¹⁸ But when British physician William Harvey looked at the heart in 1628, he saw something new.¹⁹ To him the heart looked like a pump at the center of a closed circulatory system.

Now we accept Harvey's description of the heart as common sense, and we regard Galen's earlier concept as quaintly naïve. But when Harvey's idea was first proposed, it was considered ridiculous by his medical colleagues on the European continent. They couldn't hear the heart beating as Harvey had claimed, so they saw no reason to support his proposal. A leading medical doctor of the day, Emilio Parisano of Venice, wrote the following in response to Harvey's idea:

That a pulse should arise in the breast that can be heard, when the blood is transported from the veins to the [arteries], this we certainly can't perceive and we do not believe that this will ever happen, except Harvey lends us his hearing aid. . . . He also claims that this movement produces a pulse, and, moreover, a sound: that sound, however, we deaf people cannot hear, and there is no one in Venice who can.²⁰

One might think that today no one could possibly make such an obvious mistake. Unfortunately, it's not so. Beliefs can easily cause us to become blind to the obvious. Recent research on "inattention blindness" has shown that even minor tweaks to one's expectations can cause a form of blindness. A simple experiment developed by University of Illinois psychologist Daniel Simons provides a dramatic demonstration of this effect. I've seen people take Simons's experiment and literally gasp in astonishment when they discover that they've overlooked the obvious.²¹

Simons's experiment consists of a twenty-five second video clip of six people playing a basketball game. Three are dressed in white T-shirts and three in black T-shirts. The white team is passing a basketball amongst themselves, and the black team is doing likewise. During the game, a person dressed in a black gorilla suit calmly walks into the middle of the game, beats its chest, and then

Tekijänoikeuksin suojattu kuva

walks off. The gorilla is not understated or camouflaged—it's blatantly obvious. And yet the majority of people viewing this clip do not see the gorilla provided that they're given a very simple instruction: count the number of basketballs tossed between the members wearing white T-shirts. This minor deflection of attention is sufficient to cause complete blindness to something as obvious as a gorilla. The power of deflecting attention is well known to stage magicians, who specialize in creating such illusions.

If we can so easily overlook a gorilla right in front of us, what else might we be missing? When the National Science Foundation bemoans the public's belief in topics it doesn't happen to believe in, who is being blind?

CHARACTERISTICS OF BELIEVERS

At a conference of the Institute of Noetic Sciences in 2003, we asked 465 people questions about their education, allergies, bodily sensitivities, mental practices, and unusual experiences.²² The latter referred to experiences ranging from telepathy and precognition to reported encounters with angels and aliens. From their responses we were able to discern what kinds of people were more or less likely to report unusual experiences.

We found strong differences between men (131 respondents) and women (331). Consistent with the results of other surveys, women were less skeptical than men and reported more unusual experiences (Figure 3-1). On every type of unusual experience, from telepathy to seeing "little people," women reported higher levels of belief.²³

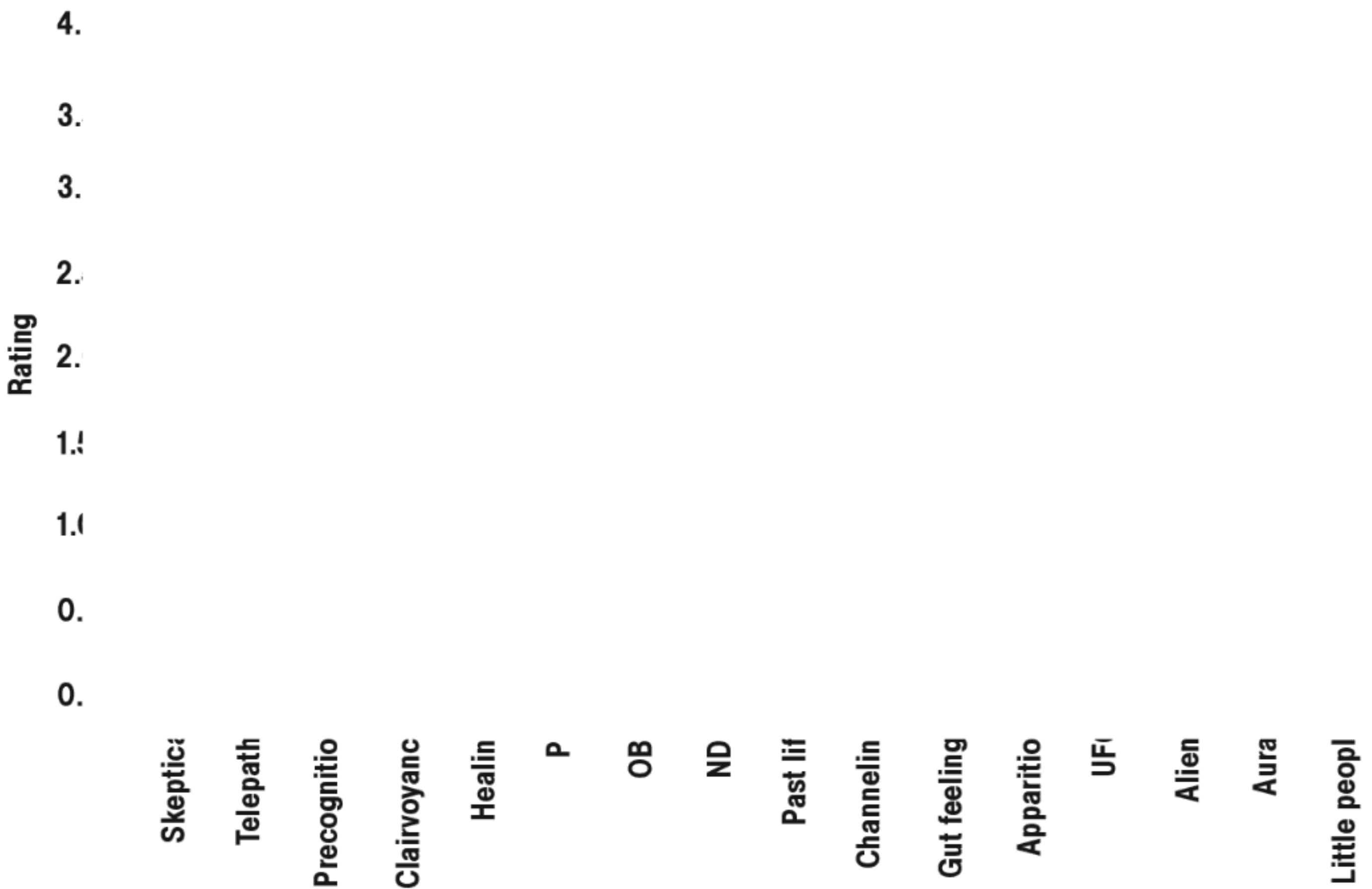


Figure 3-1. Average responses to questions about belief in unusual experiences, for women (white circles) and men (black squares), with error bars indicating the likely range of the “true” average value.

We found that left-handed and ambidextrous people were significantly more likely to believe in exceptional experiences than right-handed people, and that younger people were significantly more likely to believe than older people. Then, by comparing 55 people who reported no experiences of telepathy against 60 who frequently reported such experiences, we found a clear pattern emerging about bodily sensitivities. The “telepaths” were much more sensitive to a wide range of body and mind sensitivities (Figure 3-2). Among the no-telepathy group, half (50.9%) were female, but among the “telepaths” most (85%) were female. There were no differences in educational levels among the no-telepathy group and the telepaths.

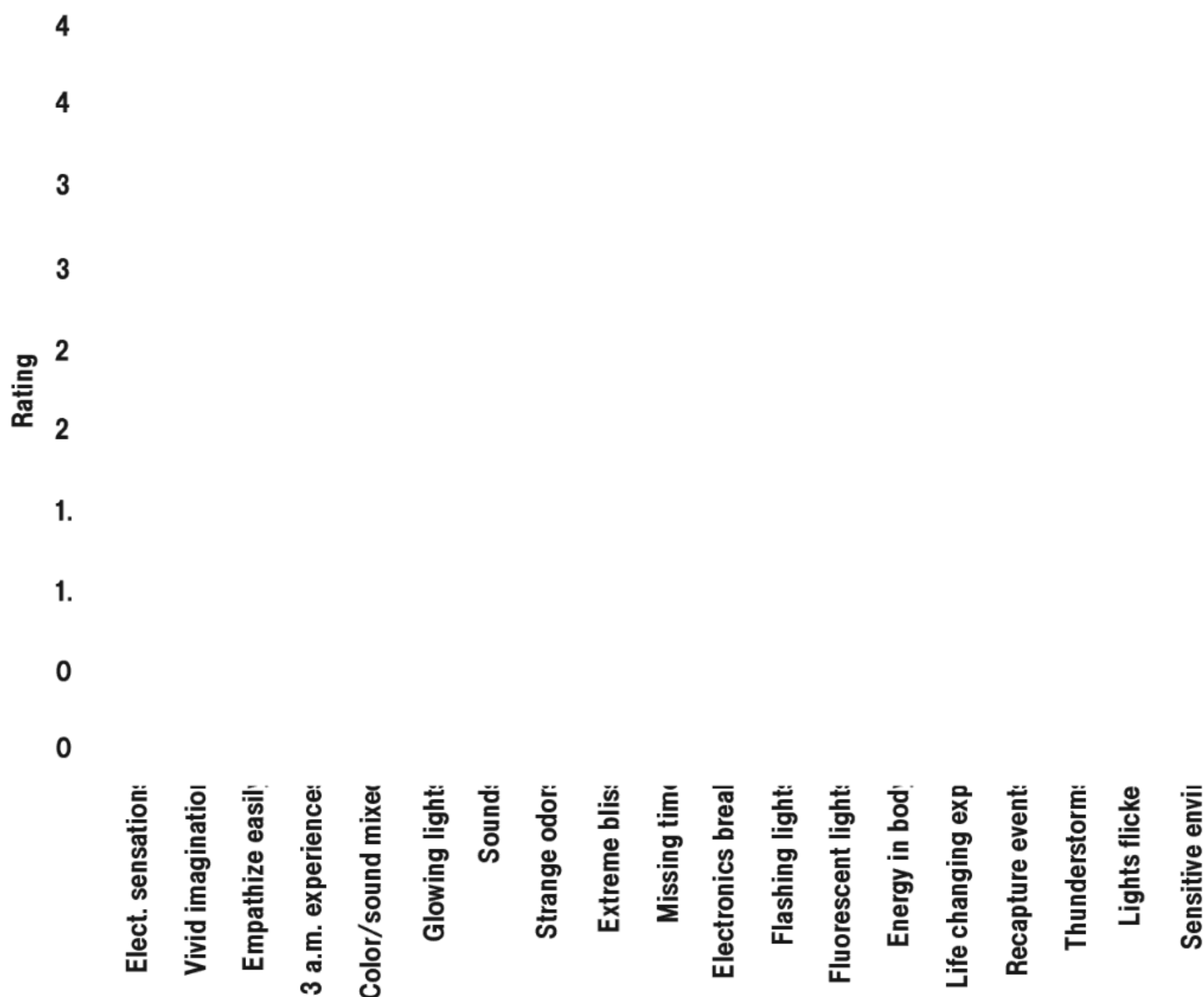


Figure 3-2. Average responses of 55 people reporting no experiences of telepathy (bottom line) and 60 people who reported it frequently (top line), with one standard error bars. The “telepaths” reported many more unusual bodily sensations, unexplained sounds and lights, sensitivities to flickering lights, thunderstorms approaching, periods of extreme bliss, and moments of missing time. The other categories in this graph are listed in this endnote.²⁴

From these findings we were able to form a profile of a person very likely to report psychic experiences: a left-handed female who is thirtysomething or younger, physically highly sensitive, suffers from chronic anxiety, is somewhat introverted, makes decisions based more on feelings than logic, practices one or more of the creative arts, engages in some form of mental discipline like meditation, is open to unconventional claims, and is interested more in possibilities than in facts.

has repeatedly demonstrated verifiable remote viewing expertise under controlled conditions, and evidence for Swann's accurate remote viewing ability was also found in Persinger's study. So the story of psi is not as simple as a misfiring brain.²⁸

LATENT INHIBITION

Maybe there's a simpler reason for the public's persistent belief in the paranormal: Maybe some of those experiences are real. And maybe the reason that creative people tend to report higher levels of belief in the paranormal is that they can see things that others can't.

An experiment supporting this idea was reported in 2003 by Harvard psychologist Shelley Carson and her colleagues in the *Journal of Personality and Social Psychology*. They examined a property known as latent inhibition. This refers to an unconscious brain process that degrades our ability to pay attention to stimuli that have had no consequences in the past.²⁹

Imagine, for example, that Pavlov's dogs were exposed to ringing bells without being fed. The dogs will quickly learn to ignore ringing bells because those sounds had no meaningful consequence (i.e. no association with food). Now, Pavlov decides to train the same dogs to salivate whenever they hear a bell by ringing the bells and feeding them. Unfortunately, these dogs had already learned to ignore bells, so they're going to have a hard time unlearning the old association. Dogs that hadn't previously heard

Tekijänoikeuksin suojattu kuva

the irrelevant bells will quickly learn to salivate. This “hard time unlearning” is due to latent inhibition.

Latent inhibition serves an important function in our brains. It allows us to perform multiple tasks, like driving a car on a busy highway while chatting with a passenger and sipping coffee without having to simultaneously pay attention to all three tasks. If we hadn’t previously learned what is important to pay attention to while driving, we’d quickly become overwhelmed with information and become paralyzed with uncertainty.

Healthy people tend to have high latent inhibition. It sounds paradoxical, but the more our sensory awareness is *suppressed* by what the brain considers irrelevant, the more we remain stable and focused. If latent inhibition becomes weak it can lead to serious problems. Low latent inhibition has been studied extensively in schizophrenic patients because a key symptom of that disease is perceiving meaningful relationships everywhere, even when there aren’t any. Distorted associations are associated with low latent inhibition because it reveals that the mind is having trouble ignoring irrelevant information. The 2001 Academy Award–winning movie, *A Beautiful Mind*, about the life of Nobel Laureate John Nash, suggested how this state might appear from a first-person perspective. The tag line for the movie was “He saw the world in a way no one could have imagined.”

That tag line is also a good description for creative people in general, so perhaps they too exhibit low latent inhibition. Previous experiments had indeed shown that low latent inhibition is associated with the personality trait “openness to experience,” which is in turn associated with divergent thinking and creativity.

Of course not all creative people are psychotic. Shelley Carson proposed that “some psychological phenomena might be pathogenic in the presence of decreased intelligence . . . but normative or even abnormally useful in the presence of increased intelligence.” They tested this idea on Harvard undergraduates who were given creativity measures, IQ tests, personality tests, and a latent inhibition test. They found that the high-creativity

IS EVERYTHING CONNECTED?

Can we sense what's happening to loved ones thousands of miles away? Why are we sometimes certain of a caller's identity the instant the phone rings? Do intuitive hunches contain information about future events? Is it possible to perceive without the use of the ordinary senses?

Many people believe that such "psychic phenomena" are rare talents or divine gifts. Others don't believe they exist at all. But the latest scientific research shows that these phenomena are both real and widespread, and are an unavoidable consequence of the interconnected, entangled physical reality we live in.

Albert Einstein called entanglement "spooky action at a distance" — the way two objects remain connected through time and space, without communicating in any conventional way, long after their initial interaction has taken place. Could a similar entanglement of minds explain our apparent psychic abilities? Dean Radin, senior scientist at the Institute of Noetic Sciences, believes it might.

In this illuminating book, Radin shows how we know that psychic phenomena such as telepathy, clairvoyance, and psychokinesis are real, based on scientific evidence from thousands of controlled lab tests. Radin surveys the origins of this research and explores, among many topics, the collective premonitions of 9/11. He reveals the physical reality behind our uncanny telepathic experiences and intuitive hunches, and he debunks the skeptical myths surrounding them. *Entangled Minds* sets the stage for a rational, scientific understanding of psychic experience.

**"Dean Radin brings parapsychology
into mainstream science. The revolution has begun."
—Deepak Chopra, author of *The Book of Secrets:
Unlocking the Hidden Dimensions of Your Life***



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