DEEPAK
CHOPRA

SUPER BRAIN

Unleash the Explosive Power of Your Mind

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PART 3: MYSTERY AND PROMISE

About the Book

Are you bound to lose memory as you age?
Can you change the hard wiring in your brain?
How do you replace lost brain cells?
Is it true you only use 10% of your brain?
Can you become more conscious?
Where does reality begin?

In this trailblazing book, two pioneers in health – Dr Deepak Chopra (author of the bestselling *Ageless Body, Timeless Mind*) and Prof. Rudolph Tanzi (one of the world's most foremost experts on the causes of Alzheimer's) come together for the first time. Drawing on the very latest findings of neuroscience, they offer a new, practical vision of the brain and show how to understand, and use, it to achieve optimum physical, mental and spiritual well being.

Think of your brain as a grand piano; there is no biological difference between your instrument and Einstein's. Chopra and Tanzi teach you how to play it like a maestro and unleash the explosive power of your very own *super* brain.

About the Authors

Deepak Chopra, M.D., is the author of more than sixty-five books, including numerous *New York Times* bestsellers. His medical training is in internal medicine and endocrinology, and he is a Fellow of the American College of Physicians, a member of the American Association of Clinical Endocrinologists, Adjunct Professor of Executive Programs at the Kellogg School of Management at Northwestern University, and Distinguished Executive Scholar at the Columbia Business School, Columbia University. Since 1997 he has participated annually as a lecturer at the Update in Internal Medicine event sponsored by Harvard Medical School, Department of Continuing Education, and the Department of Medicine, Beth Israel Deaconess Medical Center. Deepakchopra.com

Rudolph E. Tanzi, Ph.D., is the Joseph P. and Rose F. Kennedy Professor of Neurology at Harvard University, and Director of the Genetics and Aging Research Unit at Massachusetts General Hospital (MGH). Dr. Tanzi has been investigating the genetics of neurological disease since the 1980s, when he participated in the first study using genetic markers to find a disease gene (Huntington's disease). Dr. Tanzi isolated the first Alzheimer's disease gene and discovered several others; he now heads the Alzheimer's Genome Project. He is currently developing promising new therapies for Alzheimer's disease. Dr Tanzi serves on dozens of editorial and scientific advisory boards, and chairs the Cure Alzheimer's Fund Research Consortium. He has received numerous awards, including the two highest awards for Alzheimer's disease research: the Metropolitan

Life Award and the Potamkin Prize. Dr. Tanzi has coauthored more than four hundred scientific research articles and book chapters. He also coauthored the book *Decoding Darkness: The Search for the Genetic Causes of Alzheimer's Disease*.

Also by Rudolph E. Tanzi

Decoding Darkness (with coauthor Ann B. Parson)

Also by Deepak Chopra

Creating Health

Return of the Rishi

Quantum Healing

Unconditional Life

Journey into Healing

Creating Affluence

Perfect Weight

Restful Sleep

The Seven Spiritual Laws of Success

The Return of Merlin

Boundless Energy

Perfect Digestion

The Way of the Wizard

Overcoming Addictions

Raid on the Inarticulate

The Path to Love

The Seven Spiritual Laws for Parents

The Love Poems of Rumi (edited by Deepak Chopra; translated by Deepak Chopra and Fereydoun Kia)

Healing the Heart

Everyday Immortality

The Lords of Light

The Soul in Love

How to Know God

The Chopra Center Herbal Handbook (with coauthor David Simon)

The Angel Is Near

The Daughters of Joy

Golf for Enlightenment

Soulmate

Synchrodestiny

Peace is the Way

The Book of Secrets

Fire in the Heart

The Seven Spiritual Laws of Yoga (with coauthor David Simon)

Magical Beginnings, Enchanted Lives (coauthored by David Simon and Vicki Abrams)

Life After Death

Buddha

The Essential How to Know God

The Essential Spontaneous Fulfillment of Desire

The Essential Ageless Body, Timeless Mind

The Third Jesus

Jesus

Reinventing the Body, Resurrecting the Soul

The Ultimate Happiness Prescription

Muhammad

The Soul of Leadership

The Seven Spiritual Laws of Superheroes (with coauthor Gotham Chopra)

Consciousness in the Universe: Quantum Physics, Evolution, Brain and Mind (with Stuart Hameroff and Sir Roger Penrose)

Is God An Illusion? (with co-author Leonard Mlodinow)

Self Power

God: A Story of Revelation

For Children

On My Way to a Happy Life (with Kristina Tracy, illustrated by Rosemary Woods)

You with the Stars in Your Eyes (illustrated by Dave Zaboski)

SUPER BRAIN

UNLEASHING THE EXPLOSIVE POWER OF YOUR MIND TO MAXIMIZE HEALTH, HAPPINESS, AND SPIRITUAL WELL-BEING

DEEPAK CHOPRA

AND

RUDOLPH E. TANZI

RIDER

LONDON · SYDNEY · AUCKLAND · JOHANNESBURG

To our wives and loving families

Aristotle taught that the brain exists merely to cool the blood and is not involved in the process of thinking. This is true only of certain persons.

—Will Cuppy

PART 1

DEVELOPING YOUR GREATEST GIFT

A GOLDEN AGE FOR THE BRAIN

WHAT DO WE really know about the human brain? In the 1970s and 1980s, when the authors gained their training, the honest answer was “very little.” There was a saying circulating back then: Studying the brain was like putting a stethoscope on the outside of the Astrodome to learn the rules of football.

Your brain contains roughly 100 billion nerve cells forming anywhere from a trillion to perhaps even a quadrillion connections called synapses. These connections are in a constant, dynamic state of remodeling in response to the world around you. As a marvel of nature, this one is minuscule and yet stupendous.

Everyone stands in awe of the brain, which was once dubbed “the three-pound universe.” And rightly so. Your brain not only interprets the world, it creates it. Everything you see, hear, touch, taste, and smell would have none of those qualities without the brain. Whatever you experience today—your morning coffee, the love you feel for your family, a brilliant idea at work—has been specifically customized solely for you.

Immediately we confront a crucial issue. If your world is unique and customized for you and you alone, who is behind such remarkable creativity, you or the brain itself? If the answer is *you*, then the door to greater creativity is flung open. If the answer is *your brain*, then there may be drastic physical limitations on what you are able to achieve. Maybe your genes are holding you back, or toxic memories, or low self-esteem. Maybe you fall short because of limited

expectations that have contracted your awareness, even though you don’t see it happening.

The facts of the case could easily tell both stories, of unlimited potential or physical limitation. Compared with the past, today science is amassing new facts with astonishing speed. We have entered a golden age of brain research. New breakthroughs emerge every month, but in the midst of such exciting advances, what about the individual, the person who depends upon the brain for everything? Is this a golden age for *your* brain?

We detect an enormous gap between brilliant research and everyday reality. Another medical school saying from the past comes to mind: Each person typically uses only 10 percent of their brain. Speaking literally, that’s not true. In a healthy adult, the brain’s neural networks operate at full capacity all the time. Even the most sophisticated brain scans available would show no detectable difference between Shakespeare writing a soliloquy from *Hamlet* and an aspiring poet writing his first sonnet. But the physical brain is not nearly the whole story.

To create a golden age for your brain, you need to use the gift nature has given you in a new way. It’s not the number of neurons or some magic inside your gray matter that makes life more vital, inspiring, and successful. Genes play their part, but your genes, like the rest of the brain, are also dynamic. Every day you step into the invisible firestorm of electrical and chemical activity that is the brain’s environment. You act as leader, inventor, teacher, and user of your brain, all at once.

s leader, you hand out the day’s orders to your brain.
s inventor, you create new pathways and connections inside your brain that didn’t exist yesterday.
s teacher, you train your brain to learn new skills.
s user, you are responsible for keeping your brain in good working order.

In these four roles lies the whole difference between the everyday brain—let's dub it the baseline brain—and what we are calling super brain. The difference is immense. Even though you have not related to the brain by thinking *What orders should I give today?* or *What new pathways do I want to create?* that's precisely what you are doing. The customized world that you live in needs a creator. The creator isn't your brain; it's you.

Super brain stands for a fully aware creator using the brain to maximum advantage. Your brain is endlessly adaptable, and you could be performing your fourfold role —leader, inventor, teacher, and user—with far more fulfilling results than you now achieve.

Leader: The orders you give are not just command prompts on a computer like "delete" or "scroll to end of page." Those are mechanical commands built into a machine. Your orders are received by a living organism that changes every time you send an instruction. If you think *I want the same bacon and eggs I had yesterday*, your brain doesn't change at all. If instead you think *What will I eat for breakfast today? I want something new*, suddenly you are tapping into a reservoir of creativity. Creativity is a living, breathing, ever new inspiration that no computer can match. Why not take full advantage of it? For the brain has the miraculous ability to give more, the more you ask of it.

Let's translate this idea into how you relate to your brain now and how you could be relating. Look at the lists below. Which do you identify with?

BASELINE BRAIN

don't ask myself to behave very differently today than I did yesterday.

am a creature of habit.

don't stimulate my mind with new things very often.

like familiarity. It's the most comfortable way to live.

I’m being honest, there’s boring repetition at home, work, and in my relationships.

SUPER BRAIN
ook upon every day as a new world.
pay attention not to fall into bad habits, and if one sets in, I can break it fairly easily.
ike to improvise.
abhor boredom, which to me means repetition.
gravitate to new things in many areas of my life.

Inventor: Your brain is constantly evolving. This happens individually, which is unique to the brain (and one of its deepest mysteries). The heart and liver that you were born with will be essentially the same organs when you die. Not the brain. It is capable of evolving and improving throughout your lifetime. Invent new things for it to do, and you become the source of new skills. A striking theory goes under the slogan “ten thousand hours,” the notion being that you can acquire any expert skill if you apply yourself for that length of time, even skills like painting and music that were once assigned only to the talented. If you’ve ever seen Cirque du Soleil, you might have assumed that those astonishing acrobats came from circus families or foreign troupes. In fact, every act in Cirque du Soleil, with few exceptions, is taught to ordinary people who come to a special school in Montreal. At one level, your life is a series of skills, beginning with walking, talking, and reading. The mistake we make is to limit these skills. Yet the same sense of balance that allowed you to toddle, walk, run, and ride a bicycle, given ten thousand hours (or less), can allow you to cross a tightrope strung between two skyscrapers. You are asking very little of your brain when you stop asking it to perfect new skills every day.

Which one do you identify with?

BASELINE BRAIN

can't really say that I am growing as much as when I was younger.

I learn a new skill, I take it only so far.

m resistant to change and sometimes feel threatened by it.

lon't reach beyond what I am already good at.

spend a good deal of time on passive things like watching television.

SUPER BRAIN

will keep evolving my whole lifetime.

I learn a new skill, I take it as far as I can.

dapt quickly to change.

I'm not good at something when I first try it, that's okay. I like the challenge.

hrive on activity, with only a modicum of down time.

Teacher: Knowledge is not rooted in facts; it is rooted in curiosity. One inspired teacher can alter a student for life by instilling curiosity. You are in the same position toward your brain, but with one big difference: you are both student and teacher. Instilling curiosity is your responsibility, and when it comes, you are also the one who will feel inspired. No brain was ever inspired, but when you are, you trigger a cascade of reactions that light up the brain, while the incurious brain is basically asleep. (It may also be crumbling; there is evidence that we may prevent symptoms of senility and brain aging by remaining socially engaged and intellectually curious during our entire lifetime.) Like a good teacher, you must monitor errors, encourage strengths, notice when the pupil is ready for new challenges, and so on. Like a bright pupil, you must remain open to the things you don't know, being receptive rather than close-minded.

Which one do you identify with?

BASELINE BRAIN
n pretty settled in how I approach my life.
ım wedded to my beliefs and opinions.
eave it to others to be the experts.
arely watch educational television or attend public lectures.
s been a while since I felt really inspired.

SUPER BRAIN
ike reinventing myself.
e recently changed a long-held belief or opinion.
ere's at least one thing I am an expert on.
ravitate toward educational outlets on television or in local colleges.
n inspired by my life on a day-to-day basis.

User: There's no owner's manual for the brain, but it needs nourishment, repair, and proper management all the same. Certain nutrients are physical; today a fad for brain foods sends people running for certain vitamins and enzymes. But the proper nourishment for the brain is mental as well as physical. Alcohol and tobacco are toxic, and to expose your brain to them is to misuse it. Anger and fear, stress and depression also are a kind of misuse. As we write, a new study has shown that routine daily stress shuts down the prefrontal cortex, the part of the brain responsible for decision making, correcting errors, and assessing situations. That's why people go crazy in traffic snarls. It's a routine stress, yet the rage, frustration, and helplessness that some drivers feel indicates that the prefrontal cortex has stopped overriding the primal impulses it is responsible for controlling. Time and again we find ourselves coming back to the same theme: Use your brain, don't let your brain use you. Road rage is an example of your brain using you, but so are toxic memories, the wounds of old traumas, bad habits you can't break, and

most tragically, out-of-control addictions. This is a vastly important area to be aware of.

Which one do you identify with?

BASELINE BRAIN

ıave felt out of control recently in at least one area of my life.

y stress level is too high, but I put up with it.

vorry about depression or am depressed.

y life can go in a direction I don't want it to.

y thoughts can be obsessive, scary, or anxious.

SUPER BRAIN

eel comfortably in control.

actively avoid stressful situations by walking away and letting go.

y mood is consistently good.

espite unexpected events, my life is headed in the direction I want it to go.

ike the way my mind thinks.

Even though your brain doesn't come with an owner's manual, you can use it to follow a path of growth, achievement, personal satisfaction, and new skills. Without realizing it, you are capable of making a quantum leap in how you use your brain. Our final destination is the enlightened brain, which goes beyond the four roles you play. It is a rare kind of relationship, in which you serve as the observer, the silent witness to everything the brain does. Here lies transcendence. When you are able to be the silent witness, the brain's activity doesn't enmesh you. Abiding in complete peace and silent awareness, you find the truth about the eternal questions concerning God, the soul, and life after death. The reason we believe that this aspect of life is real is that when the mind wants to transcend, the brain is ready to follow.

A New Relationship

When Albert Einstein died in 1955 at the age of seventy-six, there was tremendous curiosity about the most famous brain of the twentieth century. Assuming that something physical must have created such genius, an autopsy was performed on Einstein's brain. Defying expectations that big thoughts required a big brain, Einstein's brain actually weighed 10 percent less than the average brain. That era was just on the verge of exploring genes, and advanced theories about how new synaptic connections are formed lay decades in the future. Both represent dramatic advances in knowledge. You can't see genes at work, but you can observe neurons growing new axons and dendrites, the threadlike extensions that allow one brain cell to connect with another. It's now known that the brain can form new axons and dendrites up to the last years of life, which gives us tremendous hope for preventing senility, for example, and preserving our mental capacity indefinitely. (So astounding is the brain's ability to make new connections that a fetus on the verge of being born is forming 250,000 new brain cells per minute, leading to millions of new synaptic connections per minute.)

Yet in so saying, we are as naïve as newspaper reporters waiting eagerly to tell the world that Einstein possessed a freakish brain—we still emphasize the physical. Not enough weight is given to how a person relates to the brain. We feel that without a new relationship, the brain cannot be asked to do new, unexpected things. Consider discouraged children in school. Such students existed in every classroom that all of us attended, usually sitting in the back row. Their behavior follows a sad pattern.

First the child attempts to keep up with other children. When these efforts fail, for whatever reason, discouragement sets in. The child stops trying as hard as the children who meet with success and encouragement.

The next phase is acting out, making disruptive noises or pranks to attract attention. Every child needs attention, even if it is negative. The disruptions can be aggressive, but eventually the child realizes that nothing good is happening. Acting out leads to disapproval and punishment. So he enters the final phase, which is sullen silence. He makes no more effort to keep up in class. Other children mark him as slow or stupid, an outsider. School has turned into a stifling prison rather than an enriching place.

It's not hard to see how this cycle of behavior affects the brain. We now know that babies are born with 90 percent of their brains formed and millions of connections that are surplus. So the first years of life are spent winnowing out the unused connections and growing the ones that will lead to new skills. A discouraged child, we can surmise, aborts this process. Useful skills are not developed, and the parts of the brain that fall into disuse atrophy. Discouragement is holistic, encompassing brain, psyche, emotions, behavior, and opportunities later in life.

For any brain to operate well, it needs stimulation. But clearly stimulation is secondary to how the child feels, which is mental and psychological. A discouraged child relates to his brain differently than an encouraged child, and their brains must respond differently, too.

Super brain rests on the credo of connecting the mind and brain in a new way. It's not the physical side that makes the crucial difference. It's a person's resolve, intention, patience, hope, and diligence. These are all a matter of how the mind relates to the brain, for better or worse. We can summarize the relationship in ten principles.

A SUPER BRAIN CREDO

HOW THE MIND RELATES TO THE BRAIN

1. The process always involves feedback loops.
2. These feedback loops are intelligent and adaptable.
3. The dynamics of the brain go in and out of balance but always favor overall balance, known as homeostasis.
4. We use our brains to evolve and develop, guided by our intentions.
5. Self-reflection pushes us forward into unknown territory.
6. Many diverse areas of the brain are coordinated simultaneously.
7. We have the capacity to monitor many levels of awareness, even though our focus is generally confined to one level (i.e., waking, sleeping, or dreaming).
8. All qualities of the known world, such as sight, sound, texture, and taste, are created mysteriously by the interaction of mind and brain.
9. Mind, not the brain, is the origin of consciousness.
10. Only consciousness can understand consciousness. No mechanical explanation, working from facts about the brain, suffices.

These are big ideas. We have a lot of explaining to do, but we wanted you to see the big ideas up front. If you lifted just two words from the first sentence—*feedback loops*—you could mesmerize a medical school class for a year. The body is an immense feedback loop made up of trillions of tiny loops. Every cell talks to every other and listens to the answer it receives. That's the simple essence of feedback, a term taken from electronics. The thermostat in your living room senses the temperature and turns the furnace on if the room gets too cold. As the temperature rises, the thermostat takes in that information and responds by turning the furnace off.

The same back-and-forth operates through switches in the body that also regulate temperature. That's nothing fascinating, so far. But when you think a thought, your brain sends information to the heart, and if the message is one of excitement, fear, sexual arousal, or many other states, it can make the heart beat faster. The brain will send a countermessage telling the heart to slow down again, but if this feedback loop breaks down, the heart can keep racing like a car with no brakes. Patients who take steroids are replacing the natural steroids made by the endocrine system. The longer you take artificial steroids, the more the natural ones ebb, and as a result the adrenal glands shrink.

The adrenals are responsible for sending the message that slows down a racing heart. So if a patient stops taking a steroid drug all at once rather than tapering off, the body may be left with no brakes. The adrenal gland hasn't had time to regrow. In that event, somebody could sneak up behind you, yell "Boo!" and send your heart racing out of control. The result? A heart attack. With such possibilities, suddenly feedback loops start to become fascinating. To make them mesmerizing, there are extraordinary ways to use the brain's feedback. Any ordinary person hooked up to a biofeedback machine can quickly learn to control bodily mechanisms that usually run on automatic. You can lower your blood pressure, for example, or change your heart rate. You can induce the alpha-wave state associated with meditation and artistic creativity.

Not that a biofeedback machine is necessary. Try the following exercise: Look at the palm of your hand. Feel it as you look. Now imagine that it is getting warmer. Keep looking and focus on it getting warmer; see the color becoming redder. If you maintain focus on this intention, your palm will in fact grow warm and red. Tibetan Buddhist monks use this simple biofeedback loop (an advanced

meditation technique known as *tumo*) to warm their entire bodies.

This technique is so effective that monks who use it can sit in freezing ice caves meditating overnight while wearing nothing more than their thin silk saffron robes. Now the simple feedback loop has become totally engrossing, because what we can induce merely by intending it may have no limit. The same Buddhist monks reach states of compassion, for example, that depend on physical changes in the prefrontal cortex of the brain. Their brains didn't do this on their own; they were following orders from the mind. Thus we cross a frontier. When a feedback loop is maintaining normal heart rhythm, the mechanism is involuntary—it is using you. But if you change your heart rate intentionally (for example, by imagining a certain someone who excites you romantically), you are using it instead.

Let's take this concept to the place where life can be miserable or happy. Consider stroke victims. Medical science has made huge advances in patient survival after even massive strokes, some of which can be attributed to better medications and to the upsurge of trauma units, since strokes are ideally dealt with as soon as possible. Quick treatment is saving countless lives, compared to the past.

But survival isn't the same as recovery. No drugs show comparable success in allowing victims to recover from paralysis, the most common effect of a stroke. As with the discouraged children, with stroke patients everything seems to depend on feedback. In the past they mostly sat in a chair with medical attention, and their course of least resistance was to use the side of the body that was unaffected by their stroke. Now rehabilitation actively takes the course of most resistance. If a patient's left hand is paralyzed, for example, the therapist will have her use only that hand to pick up a coffee cup or comb her hair.

At first these tasks are physically impossible. Even barely raising a paralyzed hand causes pain and frustration. But if the patient repeats the intention to use the bad hand, over and over, new feedback loops develop. The brain adapts, and slowly there is new function. We now see remarkable recoveries in patients who walk, talk, and use their limbs normally with intensive rehab. Even twenty years ago these functions would have languished or shown only minor improvements.

And all we have done so far is to explore the implications of two words.

The super brain credo bridges two worlds, biology and experience. Biology is great at explaining physical processes, but it is totally inadequate at telling us about the meaning and purpose of our subjective experience. What does it feel like to be a discouraged child or a paralyzed stroke victim? The story begins with that question, and biology follows second. We need both worlds to understand ourselves. Otherwise, we fall into the biological fallacy, which holds that humans are controlled by their brains. Leaving aside countless arguments between various theories of mind and brain, the goal is clear: We want to use our brains, not have them use us.

We'll expand on these ten principles as the book unfolds. Major breakthroughs in neuroscience are all pointing in the same direction. The human brain can do far more than anyone ever thought. Contrary to outworn beliefs, its limitations are imposed by us, not by its physical shortcomings. For example, when we were getting our medical and scientific training, the nature of memory was a complete mystery. Another saying circulated back then: "We know as much about memory as if the brain were filled with sawdust." Fortunately, brain scans were on the horizon, and today researchers can watch in real time as areas of the brain "light up," to display the firing of

neurons, as subjects remember certain things. The Astrodome's roof is now made of glass, you could say.

But memory remains elusive. It leaves no physical traces in brain cells, and no one really knows how our memories are stored. But that's no reason to place any limitations on what our brains can remember. A young Indian math prodigy gave a demonstration in which she was asked to multiply two numbers, each thirty-two digits long, in her head. She produced the answer, which was sixty-four or-five digits long, within seconds of her hearing the two numbers. On average, most people can remember only six or seven digits at a glance. So what should be our norm for memory, the average person or the exceptional one? Instead of saying that the math prodigy has better genes or a special gift, ask another question: Did you train your brain to have a super memory? There are training courses for that skill, and average people who take them can perform feats like reciting the King James Bible from memory, using no more than the genes and gifts they were born with. Everything hinges on how you relate to your brain. By setting higher expectations, you enter a phase of higher functioning.

One of the unique things about the human brain is that it can do only what it thinks it can do. The minute you say, "My memory isn't what it used to be" or "I can't remember a thing today," you are actually training your brain to live up to your diminished expectations. Low expectations mean low results. The first rule of super brain is that your brain is always eavesdropping on your thoughts. As it listens, it learns. If you teach it about limitation, your brain will become limited. But what if you do the opposite? What if you teach your brain to be unlimited?

Think of your brain as being like a Steinway grand piano. All the keys are in place, ready to work at the touch of a finger. Whether a beginner sits down at the keyboard or a world-renowned virtuoso like Vladimir Horowitz or

Arthur Rubinstein, the instrument is physically the same. But the music that comes out will be vastly different. The beginner uses less than 1 percent of the piano's potential; the virtuoso is pushing the limits of the instrument.

If the music world had no virtuosos, no one would ever guess at the amazing things a Steinway grand can do. Fortunately, research on brain performance is providing us with stunning examples of untapped potential brilliantly coming to life. Only now are these amazing individuals being studied with brain scans, which makes their abilities more astonishing and at the same time more mysterious.

Let's consider Magnus Carlsen, the Norwegian chess prodigy. He earned the highest ranking in chess, grand master, at the age of thirteen, the third youngest in history. Around that time, in a speed game, he forced Gary Kasparov, the former world chess champion, to a draw. "I was nervous and intimidated," Carlsen recalls, "or I would have beat him." To play chess at this level, a grand master must be able to refer, instantly and automatically, to thousands of games stored in his memory. We know the brain is not filled with sawdust, but how a person is able to recall such a vast storehouse of individual moves—amounting to many million possibilities—is totally mysterious. In a televised demonstration of his abilities, young Carlsen, who is now twenty-one, played ten opponents simultaneously in speed chess—with his back turned to the boards.

In other words, he had to keep in mind ten separate chess boards, with their thirty-two pieces, while the clock permitted only seconds for each move. Carlsen's performance defines the limit of memory, or a small slice of it. If it is difficult for a normal person to imagine having such a memory, the fact is that Carlsen isn't straining his brain. What he does, he says, feels completely natural.

We believe that every remarkable mental feat is a signpost showing the way. You won't know what your brain

can do until you test its limits and push beyond them. No matter how inefficiently you are using your brain, one thing is certain: it is the gateway to your future. Your success in life depends on your brain, for the simple reason that all experience comes to us through our brains.

We want *Super Brain* to be as practical as possible, because it can solve problems that are far more difficult, or even impossible, for the baseline brain. Each chapter will end with its own Super Brain Solutions section, with a host of innovative suggestions for overcoming many of life's most common challenges.

FIVE MYTHS TO DISPEL

RELATING TO YOUR brain in a new way is the way you can change reality. The more neuroscientists learn, the more it seems that the brain has hidden powers. The brain processes the raw material of life, as a servant to any desire you have, any vision you can imagine. The solid physical world cannot resist this power, and yet unlocking it requires new beliefs. Your brain cannot do what it thinks it cannot do.

Five myths in particular have proved limiting and obstructive to change. All were once accepted as fact, even a decade or two ago.

The injured brain cannot heal itself.

Now we know that the brain has amazing powers of healing, unsuspected in the past.

The brain's hardwiring cannot be changed.

In fact, the line between hard and soft wiring is shifting all the time, and our ability to rewire our brains remains intact from birth to the end of life.

Aging in the brain is inevitable and irreversible.

To counter this outmoded belief, new techniques for keeping the brain youthful and retaining mental acuity are arising every day.