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The Happiness Hypothesis

Jonathan Haidt

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About the Book

Every culture rests on a bedrock of folk wisdom handed down through generations. The pronouncements of philosophers are homespun by our grandmothers, and find their way into our common sense: what doesn’t kill you makes you stronger. Do unto others as you would have done unto you. Happiness comes from within.

But are these ‘truths’ really true?

About the Author

Jonathan Haidt is an Associate Professor of Psychology at the University of Virginia. His research examines the emotional basis of morality and the ways that morality varies across cultures, including the cultures of liberals and conservatives. He is the co-editor of *Flourishing: Positive Psychology and the Life Well-Lived*. He lives in Charlottesville, Virginia.

For further information on topics discussed in this book, visit www.happinesshypothesis.com.

Also by Jonathan Haidt

Flourishing: Positive Psychology and the Live Well-Lived
(co-editor)

THE HAPPINESS HYPOTHESIS

JONATHAN HAIDT

Putting Ancient Wisdom and Philosophy to the Test of Modern Science

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for Jayne

Introduction: Too Much Wisdom

WHAT SHOULD I do, how should I live, and whom should I become? Many of us ask such questions, and, modern life being what it is, we don't have to go far to find answers. Wisdom is now so cheap and abundant that it floods over us from calendar pages, tea bags, bottle caps, and mass e-mail messages forwarded by well-meaning friends. We are in a way like residents of Jorge Luis Borges's *Library of Babel*—an infinite library whose books contain every possible string of letters and, therefore, somewhere an explanation of why the library exists and how to use it. But Borges's librarians suspect that they will never find that book amid the miles of nonsense.

Our prospects are better. Few of our potential sources of wisdom are nonsense, and many are entirely true. Yet, because our library is also effectively infinite—no one person can ever read more than a tiny fraction—we face the paradox of abundance: Quantity undermines the quality of our engagement. With such a vast and wonderful library spread out before us, we often skim books or read just the reviews. We might already have encountered the Greatest Idea, the insight that would have transformed us had we savored it, taken it to heart, and worked it into our lives.

This is a book about ten Great Ideas. Each chapter is an attempt to savor one idea that has been discovered by several of the world's civilizations—to question it in light of what we now know from scientific research, and to extract from it the lessons that still apply to our modern lives.

I am a social psychologist. I do experiments to try to figure out one corner of human social life, and my corner is morality and the moral emotions. I am also a teacher. I teach a large introductory psychology class at the University of Virginia in which I try to explain the entire field of psychology in twenty-four lectures. I have to present a thousand research findings on everything from the structure of the retina to the workings of love, and then hope that my students will understand and remember it all. As I struggled with this challenge in my first year of teaching, I realized that several ideas kept recurring across lectures, and that often these ideas had been stated eloquently by past thinkers. To summarize the idea that our emotions, our reactions to events, and some mental illnesses are caused by the mental filters through which we look at the world, I could not say it any more concisely than Shakespeare: "There is nothing either good or bad, but thinking makes it so."[1] I began to use such quotations to help my students remember the big ideas in psychology, and I began to wonder just how many such ideas there were.

To find out, I read dozens of works of ancient wisdom, mostly from the world's three great zones of classical thought: India (for example, the Upanishads, the Bhagavad Gita, the sayings of the Buddha), China (the Analects of Confucius, the Tao te Ching, the writings of Meng Tzu and other philosophers), and the cultures of the Mediterranean (the Old and New Testaments, the Greek and Roman philosophers, the Koran). I also read a variety of other works of philosophy and literature from the last five hundred years. Every time I found a psychological claim—a statement about human nature or the workings of the mind or heart—I wrote it down. Whenever I found an idea expressed in several places and times I considered it a possible Great Idea. But rather than mechanically listing the top ten all-time most widespread psychological ideas of

humankind, I decided that coherence was more important than frequency. I wanted to write about a set of ideas that would fit together, build upon each other, and tell a story about how human beings can find happiness and meaning in life.

Helping people find happiness and meaning is precisely the goal of the new field of positive psychology,[2] a field in which I have been active,[3] so this book is in a way about the origins of positive psychology in ancient wisdom and the applications of positive psychology today. Most of the research I will cover was done by scientists who would not consider themselves positive psychologists. Nonetheless, I have drawn on ten ancient ideas and a great variety of modern research findings to tell the best story I can about the causes of human flourishing, and the obstacles to well being that we place in our own paths.

The story begins with an account of how the human mind works. Not a full account, of course, just two ancient truths that must be understood before you can take advantage of modern psychology to improve your life. The first truth is the foundational idea of this book: The mind is divided into parts that sometimes conflict. Like a rider on the back of an elephant, the conscious, reasoning part of the mind has only limited control of what the elephant does. Nowadays, we know the causes of these divisions, and a few ways to help the rider and the elephant work better as a team. The second idea is Shakespeare's, about how "thinking makes it so." (Or, as Buddha[4] said, "Our life is the creation of our mind.") But we can improve this ancient idea today by explaining why most people's minds have a bias toward seeing threats and engaging in useless worry. We can also do something to change this bias by using three techniques that increase happiness, one ancient and two very new.

The second step in the story is to give an account of our social lives— again, not a complete account, just two truths, widely known but not sufficiently appreciated. One

is the Golden Rule. Reciprocity is the most important tool for getting along with people, and I'll show you how you can use it to solve problems in your own life and avoid being exploited by those who use reciprocity against you. However, reciprocity is more than just a tool. It is also a clue about who we humans are and what we need, a clue that will be important for understanding the end of the larger story. The second truth in this part of the story is that we are all, by nature, hypocrites, and this is why it is so hard for us to follow the Golden Rule faithfully. Recent psychological research has uncovered the mental mechanisms that make us so good at seeing the slightest speck in our neighbor's eye, and so bad at seeing the log in our own. If you know what your mind is up to, and why you so easily see the world through a distorting lens of good and evil, you can take steps to reduce your self-righteousness. You can thereby reduce the frequency of conflicts with others who are equally convinced of their righteousness.

At this point in the story, we'll be ready to ask: Where does happiness come from? There are several different "happiness hypotheses." One is that happiness comes from getting what you want, but we all know (and research confirms) that such happiness is short-lived. A more promising hypothesis is that happiness comes from within and cannot be obtained by making the world conform to your desires. This idea was widespread in the ancient world: Buddha in India and the Stoic philosophers in ancient Greece and Rome all counseled people to break their emotional attachments to people and events, which are always unpredictable and uncontrollable, and to cultivate instead an attitude of acceptance. This ancient idea deserves respect, and it is certainly true that changing your mind is usually a more effective response to frustration than is changing the world. However, I will present evidence that this second version of the happiness

hypothesis is wrong. Recent research shows that there are some things worth striving for; there are external conditions of life that can make you lastingly happier. One of these conditions is relatedness—the bonds we form, and need to form, with others. I'll present research showing where love comes from, why passionate love always cools, and what kind of love is "true" love. I'll suggest that the happiness hypothesis offered by Buddha and the Stoics should be amended: Happiness comes from within, and happiness comes from without. We need the guidance of both ancient wisdom and modern science to get the balance right.

The next step in this story about flourishing is to look at the conditions of human growth and development. We've all heard that what doesn't kill us makes us stronger, but that is a dangerous oversimplification. Many of the things that don't kill you can damage you for life. Recent research on "posttraumatic growth" reveals when and why people grow from adversity, and what you can do to prepare yourself for trauma, or to cope with it after the fact. We have also all heard repeated urgings to cultivate virtue in ourselves, because virtue is its own reward, but that, too, is an oversimplification. I'll show how concepts of virtue and morality have changed and narrowed over the centuries, and how ancient ideas about virtue and moral development may hold promise for our own age. I'll also show how positive psychology is beginning to deliver on that promise by offering you a way to "diagnose" and develop your own strengths and virtues.

The conclusion of the story is the question of meaning: Why do some people find meaning, purpose, and fulfillment in life, but others do not? I begin with the culturally widespread idea that there is a vertical, spiritual dimension of human existence. Whether it is called nobility, virtue, or divinity, and whether or not God exists, people simply *do* perceive sacredness, holiness, or some ineffable goodness

in others, and in nature. I'll present my own research on the moral emotions of disgust, elevation, and awe to explain how this vertical dimension works, and why the dimension is so important for understanding religious fundamentalism, the political culture war, and the human quest for meaning. I'll also consider what people mean when they ask, "What is the meaning of life?" And I'll give an answer to the question—an answer that draws on ancient ideas about having a purpose but that uses very recent research to go beyond these ancient ideas, or any ideas you are likely to have encountered. In doing so, I'll revise the happiness hypothesis one last time. I could state that final version here in a few words, but I could not explain it in this brief introduction without cheapening it. Words of wisdom, the meaning of life, perhaps even the answer sought by Borges's librarians—all of these may wash over us every day, but they can do little for us unless we savor them, engage with them, question them, improve them, and connect them to our lives. That is my goal in this book.

1

The Divided Self

> *For what the flesh desires is opposed to the Spirit, and what the Spirit desires is opposed to the flesh; for these are opposed to each other, to prevent you from doing what you want.*
>
> —St. Paul, Galatians 5:17[1]

> *If Passion drives, let Reason hold the Reins.*
>
> —Benjamin Franklin[2]

I first rode a horse in 1991, in Great Smoky National Park, North Carolina. I'd been on rides as a child where some teenager led the horse by a short rope, but this was the first time it was just me and a horse, no rope. I wasn't alone—there were eight other people on eight other horses, and one of the people was a park ranger—so the ride didn't ask much of me. There was, however, one difficult moment. We were riding along a path on a steep hillside, two by two, and my horse was on the outside, walking about three feet from the edge. Then the path turned sharply to the left, and my horse was heading straight for the edge. I froze. I knew I had to steer left, but there was another horse to my left and I didn't want to crash into it. I might have called out for help, or screamed, "Look out!"; but some part of me preferred the risk of going over the edge to the certainty of looking stupid. So I just froze. I did nothing at all during

the critical five seconds in which my horse and the horse to my left calmly turned to the left by themselves.

As my panic subsided, I laughed at my ridiculous fear. The horse knew exactly what she was doing. She'd walked this path a hundred times, and she had no more interest in tumbling to her death than I had. She didn't need me to tell her what to do, and, in fact, the few times I tried to tell her what to do she didn't much seem to care. I had gotten it all so wrong because I had spent the previous ten years driving cars, not horses. Cars go over edges unless you tell them not to.

Human thinking depends on metaphor. We understand new or complex things in relation to things we already know.[3] For example, it's hard to think about life in general, but once you apply the metaphor "life is a journey," the metaphor guides you to some conclusions: You should learn the terrain, pick a direction, find some good traveling companions, and enjoy the trip, because there may be nothing at the end of the road. It's also hard to think about the mind, but once you pick a metaphor it will guide your thinking. Throughout recorded history, people have lived with and tried to control animals, and these animals made their way into ancient metaphors. Buddha, for example, compared the mind to a wild elephant:

> In days gone by this mind of mine used to stray wherever selfish desire or lust or pleasure would lead it. Today this mind does not stray and is under the harmony of control, even as a wild elephant is controlled by the trainer.[4]

Plato used a similar metaphor in which the self (or soul) is a chariot, and the calm, rational part of the mind holds the reins. Plato's charioteer had to control two horses:

> The horse that is on the right, or nobler, side is upright in frame and well jointed, with a high neck and a regal nose; … he is a lover of honor with modesty and self-control; companion to true glory, he needs no whip, and is guided by verbal commands alone. The other horse is a crooked great jumble of limbs … companion to wild boasts and indecency, he is shaggy around the ears—deaf as a post—and just barely yields to horsewhip and goad combined.[5]

For Plato, some of the emotions and passions are good (for example, the love of honor), and they help pull the self in the right direction, but others are bad (for example, the appetites and lusts). The goal of Platonic education was to help the charioteer gain perfect control over the two horses. Sigmund Freud offered us a related model 2,300 years later.[6] Freud said that the mind is divided into three parts: the ego (the conscious, rational self); the superego (the conscience, a sometimes too rigid commitment to the rules of society); and the id (the desire for pleasure, lots of it, sooner rather than later). The metaphor I use when I lecture on Freud is to think of the mind as a horse and buggy (a Victorian chariot) in which the driver (the ego) struggles frantically to control a hungry, lustful, and disobedient horse (the id) while the driver's father (the superego) sits in the back seat lecturing the driver on what he is doing wrong. For Freud, the goal of psychoanalysis was to escape this pitiful state by strengthening the ego, thus giving it more control over the id and more independence from the superego.

Freud, Plato, and Buddha all lived in worlds full of domesticated animals. They were familiar with the struggle to assert one's will over a creature much larger than the self. But as the twentieth century wore on, cars replaced horses, and technology gave people ever more control over their physical worlds. When people looked for metaphors,

they saw the mind as the driver of a car, or as a program running on a computer. It became possible to forget all about Freud's unconscious, and just study the mechanisms of thinking and decision making. That's what social scientists did in the last third of the century: Social psychologists created "information processing" theories to explain everything from prejudice to friendship. Economists created "rational choice" models to explain why people do what they do. The social sciences were uniting under the idea that people are rational agents who set goals and pursue them intelligently by using the information and resources at their disposal.

But then, why do people keep doing such stupid things? Why do they fail to control themselves and continue to do what they know is not good for them? I, for one, can easily muster the willpower to ignore all the desserts on the menu. But if dessert is placed on the table, I can't resist it. I can resolve to focus on a task and not get up until it is done, yet somehow I find myself walking into the kitchen, or procrastinating in other ways. I can resolve to wake up at 6:00 A.M. to write; yet after I have shut off the alarm, my repeated commands to myself to get out of bed have no effect, and I understand what Plato meant when he described the bad horse as "deaf as a post." But it was during some larger life decisions, about dating, that I really began to grasp the extent of my powerlessness. I would know exactly what I should do, yet, even as I was telling my friends that I would do it, a part of me was dimly aware that I was not going to. Feelings of guilt, lust, or fear were often stronger than reasoning. (On the other hand, I was quite good at lecturing friends in similar situations about what was right for them.) The Roman poet Ovid captured my situation perfectly. In *Metamorphoses*, Medea is torn between her love for Jason and her duty to her father. She laments:

> I am dragged along by a strange new force. Desire and reason are pulling in different directions. I see the right way and approve it, but follow the wrong.[7]

Modern theories about rational choice and information processing don't adequately explain weakness of the will. The older metaphors about controlling animals work beautifully. The image that I came up with for myself, as I marveled at my weakness, was that I was a rider on the back of an elephant. I'm holding the reins in my hands, and by pulling one way or the other I can tell the elephant to turn, to stop, or to go. I can direct things, but only when the elephant doesn't have desires of his own. When the elephant really wants to do something, I'm no match for him.

I have used this metaphor to guide my own thinking for ten years, and when I began to write this book I thought the image of a rider on an elephant would be useful in this first chapter, on the divided self. However, the metaphor has turned out to be useful in every chapter of the book. To understand most important ideas in psychology, you need to understand how the mind is divided into parts that sometimes conflict. We assume that there is one person in each body, but in some ways we are each more like a committee whose members have been thrown together to do a job, but who often find themselves working at cross purposes. Our minds are divided in four ways. The fourth is the most important, for it corresponds most closely to the rider and the elephant; but the first three also contribute to our experiences of temptation, weakness, and internal conflict.

First Division: Mind vs. Body

We sometimes say that the body has a mind of its own, but the French philosopher Michel de Montaigne went a step further and suggested that each part of the body has its own emotions and its own agenda. Montaigne was most fascinated by the independence of the penis:

> We are right to note the license and disobedience of this member which thrusts itself forward so inopportunely when we do not want it to, and which so inopportunely lets us down when we most need it. It imperiously contests for authority with our will.[8]

Montaigne also noted the ways in which our facial expressions betray our secret thoughts; our hair stands on end; our hearts race; our tongues fail to speak; and our bowels and anal sphincters undergo "dilations and contractions proper to [themselves], independent of our wishes or even opposed to them." Some of these effects, we now know, are caused by the autonomic nervous system—the network of nerves that controls the organs and glands of our bodies, a network that is completely independent of voluntary or intentional control. But the last item on Montaigne's list—the bowels—reflects the operation of a second brain. Our intestines are lined by a vast network of more than 100 million neurons; these handle all the computations needed to run the chemical refinery that processes and extracts nutrients from food.[9] This gut brain is like a regional administrative center that handles stuff the head brain does not need to bother with. You might expect, then, that this gut brain takes its orders from the head brain and does as it is told. But the gut brain possesses a high degree of autonomy, and it continues to function well even if the vagus nerve, which connects the two brains together, is severed.

The gut brain makes its independence known in many ways: It causes irritable bowel syndrome when it "decides"

to flush out the intestines. It triggers anxiety in the head brain when it detects infections in the gut, leading you to act in more cautious ways that are appropriate when you are sick.[10]

And it reacts in unexpected ways to anything that affects its main neurotransmitters, such as acetylcholine and serotonin. Hence, many of the initial side effects of Prozac and other selective serotonin reuptake inhibitors involve nausea and changes in bowel function. Trying to improve the workings of the head brain can directly interfere with those of the gut brain. The independence of the gut brain, combined with the autonomic nature of changes to the genitals, probably contributed to ancient Indian theories in which the abdomen contains the three lower chakras—energy centers corresponding to the colon/anus, sexual organs, and gut. The gut chakra is even said to be the source of gut feelings and intuitions, that is, ideas that appear to come from somewhere outside one's own mind. When St. Paul lamented the battle of flesh versus Spirit, he was surely referring to some of the same divisions and frustrations that Montaigne experienced.

Second Division: Left vs. Right

A second division was discovered by accident in the 1960s when a surgeon began cutting people's brains in half. The surgeon, Joe Bogen, had a good reason for doing this: He was trying to help people whose lives were destroyed by frequent and massive epileptic seizures. The human brain has two separate hemispheres joined by a large bundle of nerves, the corpus callosum. Seizures always begin at one spot in the brain and spread to the surrounding brain tissue. If a seizure crosses over the corpus callosum, it can spread to the entire brain, causing the person to lose consciousness, fall down, and writhe uncontrollably. Just as

a military leader might blow up a bridge to prevent an enemy from crossing it, Bogen wanted to sever the corpus callosum to prevent the seizures from spreading.

At first glance this was an insane tactic. The corpus callosum is the largest single bundle of nerves in the entire body, so it must be doing something important. Indeed it is: It allows the two halves of the brain to communicate and coordinate their activity. Yet research on animals found that, within a few weeks of surgery, the animals were pretty much back to normal. So Bogen took a chance with human patients, and it worked. The intensity of the seizures was greatly reduced.

But was there really no loss of ability? To find out, the surgical team brought in a young psychologist, Michael Gazzaniga, whose job was to look for the after-effects of this "split-brain" surgery. Gazzaniga took advantage of the fact that the brain divides its processing of the world into its two hemispheres—left and right. The left hemisphere takes in information from the right half of the world (that is, it receives nerve transmissions from the right arm and leg, the right ear, and the *left* half of each retina, which receives light from the *right* half of the visual field) and sends out commands to move the limbs on the right side of the body. The right hemisphere is in this respect the left's mirror image, taking in information from the left half of the world and controlling movement on the left side of the body. Nobody knows why the signals cross over in this way in all vertebrates; they just do. But in other respects, the two hemispheres are specialized for different tasks. The left hemisphere is specialized for language processing and analytical tasks. In visual tasks, it is better at noticing details. The right hemisphere is better at processing patterns in space, including that all-important pattern, the face. (This is the origin of popular and oversimplified ideas about artists being "right-brained" and scientists being "left-brained").

Gazzaniga used the brain's division of labor to present information to each half of the brain separately. He asked patients to stare at a spot on a screen, and then flashed a word or a picture of an object just to the right of the spot, or just to the left, so quickly that there was not enough time for the patient to move her gaze. If a picture of a hat was flashed just to the right of the spot, the image would register on the left half of each retina (after the image had passed through the cornea and been inverted), which then sent its neural information back to the visual processing areas in the left hemisphere. Gazzaniga would then ask, "What did you see?" Because the left hemisphere has full language capabilities, the patient would quickly and easily say, "A hat." If the image of the hat was flashed to the left of the spot, however, the image was sent back only to the right hemisphere, which does not control speech. When Gazzaniga asked, "What did you see?", the patient, responding from the left hemisphere, said, "Nothing." But when Gazzaniga asked the patient to use her left hand to point to the correct image on a card showing several images, she would point to the hat. Although the right hemisphere had indeed seen the hat, it did not report verbally on what it had seen because it did not have access to the language centers in the left hemisphere. It was as if a separate intelligence was trapped in the right hemisphere, its only output device the left hand.[11]

When Gazzaniga flashed different pictures to the two hemispheres, things grew weirder. On one occasion he flashed a picture of a chicken claw on the right, and a picture of a house and a car covered in snow on the left. The patient was then shown an array of pictures and asked to point to the one that "goes with" what he had seen. The patient's right hand pointed to a picture of a chicken (which went with the chicken claw the left hemisphere had seen), but the left hand pointed to a picture of a shovel (which went with the snow scene presented to the right

hemisphere). When the patient was asked to explain his two responses, he did not say, “I have no idea why my left hand is pointing to a shovel; it must be something you showed my right brain.” Instead, the left hemisphere instantly made up a plausible story. The patient said, without any hesitation, “Oh, that’s easy. The chicken claw goes with the chicken, and you need a shovel to clean out the chicken shed.”[12]

This finding, that people will readily fabricate reasons to explain their own behavior, is called “confabulation.” Confabulation is so frequent in work with split-brain patients and other people suffering brain damage that Gazzaniga refers to the language centers on the left side of the brain as the interpreter module, whose job is to give a running commentary on whatever the self is doing, even though the interpreter module has no access to the real causes or motives of the self’s behavior. For example, if the word “walk” is flashed to the right hemisphere, the patient might stand up and walk away. When asked why he is getting up, he might say, “I’m going to get a Coke.” The interpreter module is good at making up explanations, but not at knowing that it has done so.

Science has made even stranger discoveries. In some split-brain patients, or in others who have suffered damage to the corpus callosum, the right hemisphere seems to be actively fighting with the left hemisphere in a condition known as alien hand syndrome. In these cases, one hand, usually the left, acts of its own accord and seems to have its own agenda. The alien hand may pick up a ringing phone, but then refuse to pass the phone to the other hand or bring it up to an ear. The hand rejects choices the person has just made, for example, by putting back on the rack a shirt that the other hand has just picked out. It grabs the wrist of the other hand and tries to stop it from executing the person’s conscious plans. Sometimes, the alien hand

actually reaches for the person's own neck and tries to strangle him.[13]

These dramatic splits of the mind are caused by rare splits of the brain. Normal people are not split-brained. Yet the split-brain studies were important in psychology because they showed in such an eerie way that the mind is a confederation of modules capable of working independently and even, sometimes, at cross-purposes. Split-brain studies are important for this book because they show in such a dramatic way that one of these modules is good at inventing convincing explanations for your behavior, even when it has no knowledge of the causes of your behavior. Gazzaniga's "interpreter module" is, essentially, the rider. You'll catch the rider confabulating in several later chapters.

Third Division: New vs. Old

If you live in a relatively new suburban house, your home was probably built in less than a year, and its rooms were laid out by an architect who tried to make them fulfill people's needs. The houses on my street, however, were all built around 1900, and since then they have expanded out into their backyards. Porches were extended, then enclosed, then turned into kitchens. Extra bedrooms were built above these extensions, then bathrooms were tacked on to these new rooms. The brain in vertebrates has similarly expanded, but in a forward direction. The brain started off with just three rooms, or clumps of neurons: a hindbrain (connected to the spinal column), a midbrain, and a forebrain (connected to the sensory organs at the front of the animal). Over time, as more complex bodies and behaviors evolved, the brain kept building out the front, away from the spinal column, expanding the forebrain more than any other part. The forebrain of the

earliest mammals developed a new outer shell, which included the hypothalamus (specialized to coordinate basic drives and motivations), the hippocampus (specialized for memory), and the amygdala (specialized for emotional learning and responding). These structures are sometimes referred to as the limbic system (from Latin *limbus*, "border" or "margin") because they wrap around the rest of the brain, forming a border.

As mammals grew in size and diversified in behavior (after the dinosaurs became extinct), the remodeling continued. In the more social mammals, particularly among primates, a new layer of neural tissue developed and spread to surround the old limbic system. This neocortex (Latin for "new covering") is the gray matter characteristic of human brains. The front portion of the neocortex is particularly interesting, for parts of it do not appear to be dedicated to specific tasks (such as moving a finger or processing sound). Instead, it is available to make new associations and to engage in thinking, planning, and decision making—mental processes that can free an organism from responding only to an immediate situation.

This growth of the frontal cortex seems like a promising explanation for the divisions we experience in our minds. Perhaps the frontal cortex is the seat of reason: It is Plato's charioteer; it is St. Paul's Spirit. And it has taken over control, though not perfectly, from the more primitive limbic system— Plato's bad horse, St. Paul's flesh. We can call this explanation the Promethean script of human evolution, after the character in Greek mythology who stole fire from the gods and gave it to humans. In this script, our ancestors were mere animals governed by the primitive emotions and drives of the limbic system until they received the divine gift of reason, installed in the newly expanded neocortex.

The Promethean script is pleasing in that it neatly raises us above all other animals, justifying our superiority by our

rationality. At the same time, it captures our sense that we are not yet gods—that the fire of rationality is somehow new to us, and we have not yet fully mastered it. The Promethean script also fits well with some important early findings about the roles of the limbic system and the frontal cortex. For example, when some regions of the hypothalamus are stimulated directly with a small electric current, rats, cats, and other mammals can be made gluttonous, ferocious, or hypersexual, suggesting that the limbic system underlies many of our basic animal instincts.[14] Conversely, when people suffer damage to the frontal cortex, they sometimes show an increase in sexual and aggressive behavior because the frontal cortex plays an important role in suppressing or inhibiting behavioral impulses.

There was recently such a case at the University of Virginia's hospital.[15] A schoolteacher in his forties had, fairly suddenly, begun to visit prostitutes, surf child pornography Web sites, and proposition young girls. He was soon arrested and convicted of child molestation. The day before his sentencing, he went to the hospital emergency room because he had a pounding headache and was experiencing a constant urge to rape his landlady. (His wife had thrown him out of the house months earlier.) Even while he was talking to the doctor, he asked passing nurses to sleep with him. A brain scan found that an enormous tumor in his frontal cortex was squeezing everything else, preventing the frontal cortex from doing its job of inhibiting inappropriate behavior and thinking about consequences. (Who in his right mind would put on such a show the day before his sentencing?) When the tumor was removed, the hypersexuality vanished. Moreover, when the tumor grew back the following year, the symptoms returned; and when the tumor was removed again, the symptoms disappeared again.

There is, however, a flaw in the Promethean script: It assumes that reason was installed in the frontal cortex but that emotion stayed behind in the limbic system. In fact, the frontal cortex enabled a great expansion of emotionality in humans. The lower third of the prefrontal cortex is called the orbitofrontal cortex because it is the part of the brain just above the eyes (*orbit* is the Latin term for the eye socket). This region of the cortex has grown especially large in humans and other primates and is one of the most consistently active areas of the brain during emotional reactions.[16] The orbitofrontal cortex plays a central role when you size up the reward and punishment possibilities of a situation; the neurons in this part of the cortex fire wildly when there is an immediate possibility of pleasure or pain, loss or gain.[17] When you feel yourself drawn to a meal, a landscape, or an attractive person, or repelled by a dead animal, a bad song, or a blind date, your orbitofrontal cortex is working hard to give you an emotional feeling of *wanting* to approach or to get away.[18] The orbitofrontal cortex therefore appears to be a better candidate for the id, or for St. Paul's flesh, than for the superego or the Spirit.

The importance of the orbitofrontal cortex for emotion has been further demonstrated by research on brain damage. The neurologist Antonio Damasio has studied people who, because of a stroke, tumor, or blow to the head, have lost various parts of their frontal cortex. In the 1990s, Damasio found that when certain parts of the orbitofrontal cortex are damaged, patients lose most of their emotional lives. They report that when they ought to feel emotion, they feel nothing, and studies of their autonomic reactions (such as those used in lie detector tests) confirm that they lack the normal flashes of bodily reaction that the rest of us experience when observing scenes of horror or beauty. Yet their reasoning and logical abilities are intact. They perform normally on tests of

intelligence and knowledge of social rules and moral principles.[19]

So what happens when these people go out into the world? Now that they are free of the distractions of emotion, do they become hyperlogical, able to see through the haze of feelings that blinds the rest of us to the path of perfect rationality? Just the opposite. They find themselves unable to make simple decisions or to set goals, and their lives fall apart. When they look out at the world and think, "What should I do now?" they see dozens of choices but lack immediate internal feelings of like or dislike. They must examine the pros and cons of every choice with their reasoning, but in the absence of feeling they see little reason to pick one or the other. When the rest of us look out at the world, our emotional brains have instantly and automatically appraised the possibilities. One possibility usually jumps out at us as the obvious best one. We need only use reason to weigh the pros and cons when two or three possibilities seem equally good.

Human rationality depends critically on sophisticated emotionality. It is only because our emotional brains works so well that our reasoning can work at all. Plato's image of reason as charioteer controlling the dumb beasts of passion may overstate not only the wisdom but also the power of the charioteer. The metaphor of a rider on an elephant fits Damasio's findings more closely: Reason and emotion must both work together to create intelligent behavior, but emotion (a major part of the elephant) does most of the work. When the neocortex came along, it made the rider possible, but it made the elephant much smarter, too.

Fourth Division: Controlled vs. Automatic

In the 1990s, while I was developing the elephant/rider metaphor for myself, the field of social psychology was

coming to a similar view of the mind. After its long infatuation with information processing models and computer metaphors, psychologists began to realize that there are really two processing systems at work in the mind at all times: controlled processes and automatic processes.

Suppose you volunteered to be a subject in the following experiment.[20] First, the experimenter hands you some word problems and tells you to come and get her when you are finished. The word problems are easy: Just unscramble sets of five words and make sentences using four of them. For example, “they her bother see usually” becomes either “they usually see her” or “they usually bother her.” A few minutes later, when you have finished the test, you go out to the hallway as instructed. The experimenter is there, but she’s engaged in a conversation with someone and isn’t making eye contact with you. What do you suppose you’ll do? Well, if half the sentences you unscrambled contained words related to rudeness (such as bother, brazen, aggressively), you will probably interrupt the experimenter within a minute or two to say, “Hey, I’m finished. What should I do now?” But if you unscrambled sentences in which the rude words were swapped with words related to politeness (“they her *respect* see usually”), the odds are you’ll just sit there meekly and wait until the experimenter acknowledges you—ten minutes from now.

Likewise, exposure to words related to the elderly makes people walk more slowly; words related to professors make people smarter at the game of Trivial Pursuit; and words related to soccer hooligans make people dumber.[21] And these effects don’t even depend on your consciously reading the words; the same effects can occur when the words are presented subliminally, that is, flashed on a screen for just a few hundredths of a second, too fast for your conscious mind to register them. But some part of the mind does see the words, and it sets in motion behaviors that psychologists can measure.

According to John Bargh, the pioneer in this research, these experiments show that most mental processes happen automatically, without the need for conscious attention or control. Most automatic processes are completely unconscious, although some of them show a part of themselves to consciousness; for example, we are aware of the "stream of consciousness"[22] that seems to flow on by, following its own rules of association, without any feeling of effort or direction from the self. Bargh contrasts automatic processes with controlled processes, the kind of thinking that takes some effort, that proceeds in steps and that always plays out on the center stage of consciousness. For example, at what time would you need to leave your house to catch a 6:26 flight to London? That's something you have to think about consciously, first choosing a means of transport to the airport and then considering rush-hour traffic, weather, and the strictness of the shoe police at the airport. You can't depart on a hunch. But if you drive to the airport, almost everything you do on the way will be automatic: breathing, blinking, shifting in your seat, daydreaming, keeping enough distance between you and the car in front of you, even scowling and cursing slower drivers.

Controlled processing is limited—we can think consciously about one thing at a time only—but automatic processes run in parallel and can handle many tasks at once. If the mind performs hundreds of operations each second, all but one of them must be handled automatically. So what is the relationship between controlled and automatic processing? Is controlled processing the wise boss, king, or CEO handling the most important questions and setting policy with foresight for the dumber automatic processes to carry out? No, that would bring us right back to the Promethean script and divine reason. To dispel the Promethean script once and for all, it will help to go back in