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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 horse-whip 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 time and look at why we have these two processes, why we have a small rider and a large elephant.

When the first clumps of neurons were forming the first brains more than 600 million years ago, these clumps must have conferred some advantage on the organisms that had them because brains have proliferated ever since. Brains are adaptive because they integrate information from various parts of the animal's body to respond quickly and automatically to threats and opportunities in the environment. By the time we reach 3 million years ago, the Earth was full of animals with extraordinarily sophisticated automatic abilities, among them birds that could navigate by star positions, ants that could cooperate to fight wars and run fungus farms, and several species of hominids that had begun to make tools. Many of these creatures possessed systems of communication, but none of them had developed language.

Controlled processing requires language. You can have bits and pieces of thought through images, but to plan something complex, to weigh the pros and cons of different paths, or to analyze the causes of past successes and failures, you need words. Nobody knows how long ago human beings developed language, but most estimates range from around 2 million years ago, when hominid brains became much bigger, to as recently as 40,000 years ago, the time of cave paintings and other artifacts that reveal unmistakably modern human minds.[23] Whichever end of that range you favor, language, reasoning, and conscious planning arrived in the most recent eye-blink of evolution. They are like new software, Rider version 1.0. The language parts work well, but there are still a lot of bugs in the reasoning and planning programs.[24] Automatic processes, on the other hand, have been through thousands of product cycles and are nearly perfect. This difference in maturity between automatic and controlled processes helps explain why we have inexpensive computers that can solve logic, math, and chess problems better than any human beings can (most of us struggle with these tasks), but none of our robots, no matter how costly, can walk through the woods as well as the average six-year-old child (our perceptual and motor systems are superb).

Evolution never looks ahead. It can't plan the best way to travel from point A to point B. Instead, small changes to existing forms arise (by genetic mutation), and spread within a population to the extent that they help organisms respond more effectively to current conditions. When language evolved, the human brain was not reengineered to hand over the reins of power to the rider (conscious verbal thinking). Things were already working pretty well, and linguistic ability spread to the extent that it helped the elephant do something important in a better way. *The rider evolved to serve to the elephant.* But whatever its origin, once we had it, language was a powerful tool that could be used in new ways, and evolution then selected those individuals who got the best use out of it.

One use of language is that it partially freed humans from "stimulus control." Behaviorists such as B. F. Skinner were able to explain much of the behavior of animals as a set of connections between stimuli and responses. Some of these connections are innate, such as when the sight or smell of an animal's natural food triggers hunger and eating. Other connections are learned, as demonstrated by Ivan Pavlov's dogs, who salivated at the sound of a bell that had earlier announced the arrival of food. The behaviorists saw animals as slaves to their environments and learning histories who blindly respond to the reward properties of whatever they encounter. The behaviorists thought that people were no different from other animals. In this view, St. Paul's lament could be restated as: "My flesh is under stimulus control." It is no accident that we find the carnal pleasures so rewarding. Our brains, like rat brains, are wired so that food and sex give us little bursts of dopamine, the neurotransmitter that is the brain's way of making us enjoy the activities that are good for the survival of our genes.[25] Plato's "bad" horse plays an important role in pulling us toward these things, which helped our ancestors survive and succeed in becoming our ancestors.

But the behaviorists were not exactly right about people. The controlled system allows people to think about long-term goals and thereby escape the tyranny of the here-and-now, the automatic triggering of temptation by the sight of tempting objects. People can imagine alternatives that are not visually present; they can weigh long-term health risks against present pleasures, and they can learn in conversation about which choices will bring success

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and prestige. Unfortunately, the behaviorists were not entirely wrong about people, either. For although the controlled system does not conform to behaviorist principles, it also has relatively little power to cause behavior. The automatic system was shaped by natural selection to trigger quick and reliable action, and it includes parts of the brain that make us feel pleasure and pain (such as the orbitofrontal cortex) and that trigger survival-related motivations (such as the hypothalamus). The automatic system has its finger on the dopamine release button. The controlled system, in contrast, is better seen as an advisor. It's a rider placed on the elephant's back to help the elephant make better choices. The rider can see farther into the future, and the rider can learn valuable information by talking to other riders or by reading maps, but the rider cannot order the elephant around against its will. I believe the Scottish philosopher David Hume was closer to the truth than was Plato when he said, "Reason is, and ought only to be the slave of the passions, and can never pretend to any other office than to serve and obey them."[26]

In sum, the rider is an advisor or servant; not a king, president, or charioteer with a firm grip on the reins. The rider is Gazzaniga's interpreter module; it is conscious, controlled thought. The elephant, in contrast, is everything else. The elephant includes the gut feelings, visceral reactions, emotions, and intuitions that comprise much of the automatic system. The elephant and the rider each have their own intelligence, and when they work together well they enable the unique brilliance of human beings. But they don't always work together well. Here are three quirks of daily life that illustrate the sometimes complex relationship between the rider and the elephant.

Failures of Self Control

Imagine that it is 1970 and you are a four-year-old child in an experiment being conducted by Walter Mischel at Stanford University. You are brought into a room at your preschool where a nice man gives you toys and plays with you for a while. Then the man asks you, first, whether you like marshmallows (you do), and, then, whether you'd rather have this plate here with one marshmallow or that plate there with two marshmallows (that one, of course). Then the man tells you that he has to go out of the room for a little while, and if you can wait until he comes back, you can have the two marshmallows. If you don't want to wait, you can ring this bell here, and he'll come right back and give you the plate with one; but if you do that, you can't have the two. The man leaves. You stare at the marshmallows. You salivate. You want. You fight your wanting. If you are like most four-year-olds, you can hold out for only a few minutes. Then you ring the bell.

Now let's jump ahead to 1985. Mischel has mailed your parents a questionnaire asking them to report on your personality, your ability to delay gratification and deal with frustration, and your performance on your college entrance exams (the Scholastic Aptitude Test). Your parents return the questionnaire. Mischel discovers that the number of seconds you waited to ring the bell in 1970 predicts not only what your parents say about you as a teenager but also the likelihood that you were admitted to a top university. Children who were able to overcome stimulus control and delay gratification for a few extra minutes in 1970 were better able to resist temptation as teenagers, to focus on their studies, and to control themselves when things didn't go the way they wanted.[27]

What was their secret? A large part of it was strategy—the ways that children used their limited mental control to shift attention. In later studies, Mischel discovered that the successful children were those who looked away from the temptation or were able to think about other enjoyable activities.[28] These thinking skills are an aspect of emotional intelligence—an ability to understand and regulate one's own feelings and desires.[29] An emotionally intelligent person has a skilled rider who knows how to distract and coax the elephant without having to engage in a direct contest of wills.

It's hard for the controlled system to beat the automatic system by willpower alone; like a tired muscle,[30] the former soon wears down and caves in, but the latter runs automatically, effortlessly, and endlessly. Once you understand the power of stimulus control, you can use it to your advantage by changing the stimuli in your environment and avoiding undesirable ones; or, if that's not possible, by filling your consciousness with thoughts about their less tempting aspects. Buddhism, for example, in an effort to break people's carnal attachment to their own (and others') flesh, developed methods of meditating on decaying corpses.[31] By choosing to stare at something that revolts the automatic system, the rider can begin to change what the elephant will want in the future.

Mental Intrusions

Edgar Allan Poe understood the divided mind. In *The Imp of the Perverse,* Poe's protagonist carries out the perfect murder, inherits the dead man's estate, and lives for years in healthy enjoyment of his ill-gotten gains. Whenever thoughts of the murder appear on the fringes of his consciousness, he murmurs to himself, "I am safe." All is well until the day he remodels his mantra to "I am safe—yes—if I be not fool enough to make open confession." With that thought, he comes undone. He tries to suppress the thought of confessing, but the harder he tries, the more insistent the thought becomes. He panics, he starts running, people start chasing him, he blacks out, and, when he returns to his senses, he is told that he has made a full confession.

I love this story, for its title above all else. Whenever I am on a cliff, a rooftop, or a high balcony, the imp of the perverse whispers in my ear, "Jump." It's not a command, it's just a word that pops into my consciousness. When I'm at a dinner party sitting next to someone I respect, the imp works hard to suggest the most inappropriate things I could possibly say. Who or what is the imp? Dan Wegner, one of the most perverse and creative social psychologists, has dragged the imp into the lab and made it confess to being an aspect of automatic processing.

In Wegner's studies, participants are asked to try hard *not* to think about something, such as a white bear, or food, or a stereotype. This is hard to do. More important, the moment one stops trying to suppress a thought, the thought comes flooding in and becomes even harder to banish. In other words, Wegner creates minor obsessions in his lab by instructing people not to obsess. Wegner explains this effect as an "ironic process" of mental control.[32] When controlled processing tries to influence thought ("Don't think about a white bear!"), it sets up an explicit goal. And whenever one pursues a goal, a part of the mind automatically monitors progress, so that it can order corrections or know when success has been achieved. When that goal is an action in the world (such as arriving at the airport on time), this feedback system works well. But when the goal is mental, it backfires. Automatic processes continually check: "Am I not thinking about a white bear?" As the act of monitoring for the absence of the thought introduces the thought, the person must try even harder to divert consciousness. Automatic and controlled processes end up working at cross purposes, firing each other up to ever greater exertions. But because controlled processes tire quickly, eventually the inexhaustible automatic processes run unopposed, conjuring up herds of white bears. Thus, the attempt to remove an unpleasant thought can guarantee it a place on your frequent-play list of mental ruminations.

Now, back to me at that dinner party. My simple thought "don't make a fool of yourself" triggers automatic processes looking for signs of foolishness. I know that it would be stupid to comment on that mole on his forehead, or to say "I love you," or to scream obscenities. And up in consciousness, I become aware of three thoughts: comment on the mole, say "I love you," or scream obscenities. These are not commands, just ideas that pop into my head. Freud based much of his theory of psychoanalysis on such mental intrusions and free associations, and he found they often have sexual or aggressive content. But Wegner's research offers a simpler and more innocent explanation: Automatic processes generate thousands of thoughts and images every day, often through random association. The ones that get stuck are the ones that particularly shock us, the ones we try to suppress or deny. The reason we suppress them is not that we know, deep down, that they're true (although some may be), but that they are scary or shameful. Yet once we have tried and failed to suppress them, they can become the sorts of obsessive thoughts that make us believe in Freudian notions of a dark and evil unconscious mind.

The Difficulty of Winning an Argument

Consider the following story:

> Julie and Mark are sister and brother. They are traveling together in France on summer vacation from college. One night they are staying alone in a cabin near the beach. They decide that it would be interesting

> and fun if they tried making love. At the very least, it would be a new experience for each of them. Julie is already taking birth control pills, but Mark uses a condom, too, just to be safe. They both enjoy making love, but decide not to do it again. They keep that night as a special secret, which makes them feel even closer to each other.

Do you think it is acceptable for two consenting adults, who happen to be siblings, to make love? If you are like most people in my studies,[33] you immediately answered no. But how would you justify that judgment? People often reach first for the argument that incestuous sex leads to offspring that suffer genetic abnormalities. When I point out that the siblings used two forms of birth control, however, no one says, "Oh, well, in that case it's okay." Instead, people begin searching for other arguments, for example, "It's going to harm their relationship." When I respond that in this case the sex has made the relationship stronger, people just scratch their heads, frown, and say, "I know it's wrong, I'm just having a hard time explaining why."

The point of these studies is that moral judgment is like aesthetic judgment. When you see a painting, you usually know instantly and automatically whether you like it. If someone asks you to explain your judgment, you confabulate. You don't really know why you think something is beautiful, but your interpreter module (the rider) is skilled at making up reasons, as Gazzaniga found in his split-brain studies. You search for a plausible reason for liking the painting, and you latch on to the first reason that makes sense (maybe something vague about color, or light, or the reflection of the painter in the clown's shiny nose). Moral arguments are much the same: Two people feel strongly about an issue, their feelings come first, and their reasons are invented on the fly, to throw at each other. When you refute a person's argument, does she generally change her mind and agree with you? Of course not, because the argument you defeated was not the cause of her position; it was made up after the judgment was already made.

If you listen closely to moral arguments, you can sometimes hear something surprising: that it is really the elephant holding the reins, guiding the rider. It is the elephant who decides what is good or bad, beautiful or ugly. Gut feelings, intuitions, and snap judgments happen constantly and automatically (as Malcolm Gladwell described in *Blink*),[34] but only the rider can string sentences together and create arguments to give to other people. In moral arguments, the rider goes beyond being just an advisor to the elephant; he becomes a lawyer, fighting in the court of public opinion to persuade others of the elephant's point of view.

This, then, is our situation, lamented by St. Paul, Buddha, Ovid, and so many others. Our minds are loose confederations of parts, but we identify with and pay too much attention to one part: conscious verbal thinking. We are like the proverbial drunken man looking for his car keys under the street light. ("Did you drop them here?" asks the cop. "No" says the man, "I dropped them back there in the alley, but the light is better over here.") Because we can see only one little corner of the mind's vast operation, we are surprised when urges, wishes, and temptations emerge, seemingly from nowhere. We make pronouncements, vows, and resolutions, and then are surprised by our own powerlessness to carry them out. We sometimes fall into the view that we are fighting with our unconscious, our id, or our animal self. But really we are the whole thing. We are the rider, and we are the elephant. Both have their strengths and special skills. The rest of this book is about how complex and partly clueless creatures such as ourselves can get along with each other (chapters 3 and 4), find happiness (chapters 5 and 6), grow psychologically and morally (chapters 7 and 8), and find purpose and meaning in our lives (chapters 9 and 10). But first we have to figure out why the elephant is such a pessimist.