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THE COMPULSIONS AND CREATIONS OF DR. JEFFREY SCHWARTZ

An exclusive e-single
by Steve Volk

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Chapter 1

The DiCaprio Effect

Dr. Jeffrey Schwartz got a phone call at 3 p.m., a script before 5 p.m. and the next afternoon he was there, sitting with Leonardo DiCaprio, exploring the intricacies of one of the most debilitating mental illnesses in medicine. "It happened really fast," remembers Schwartz, a decade later. "The agent called. I met Leo, and he was really invested—I mean totally—in learning everything he could."

DiCaprio was tackling the role of Howard Hughes in *The Aviator*, a part requiring him to arc—as Hughes did—from genius billionaire to shaggy recluse, caught in the grip of obsessive-compulsive disorder. Schwartz's books, *Brain Lock* and *The Mind and the Brain*, had established him as one of the world's foremost authorities on the underlying mechanisms and treatment of obsessive-compulsive disorder, an anxiety disorder that plagues sufferers with unreasonable thoughts and fears, which in turn compel repetitive behavior. Schwartz served as the film's expert consultant.

On day one, they sat down in DiCaprio's living room.

"What we're not going to be doing," Schwartz said, "is learning the mannerisms of people with OCD. Or learning how to *look* like a person with OCD. What we're going to be doing is learning how to become a person with OCD,

so that your brain is *like* the brain of a person who has the disease."

The message was ominous, but actors become famous in part for the lengths they travel to inhabit a character. Robert De Niro packed on 80 pounds to play boxer Jake LaMotta in *Raging Bull*. Tom Hanks starved himself—twice: once to appear as an attorney enduring the ravages of AIDS in *Philadelphia*, and again to portray a man trapped on a deserted island in *Cast Away*. DiCaprio proved game to join their ranks, and he quickly pointed Schwartz to a particular segment of the script. "Look at *this*," he told Schwartz. "Right here, for three pages, I only have one line."

Show me all the blueprints, repeated 46 times, with minor variations. *Show me the blueprints*.

Schwartz explained to DiCaprio that people afflicted with OCD engage in a wide variety of problematic behaviors—compulsive hand washing, door opening, repetitive checking of ovens and doors—even repeating the same word, phrase or sentence over and over. The cause, at a neurological level, is hyperconnectivity between two brain regions, the orbitofrontal cortex and the caudate nucleus, creating a tidal wave of unfounded, mortal fear and triggering habitual response as the only way to attain calm. But the subjective experience better describes an OCD victim's sense of suffering. A casual thought, *my hands are dirty*, is amplified by an overactive brain, until the concern takes on a kind of mortal weight. The habitual response reflects this impulse, transforming *I must wash*

my hands into a kind of compulsion, repeated until the fear finally subsides, which could mean applying soap and water for tens of minutes or even an hour. The worst part, however, is that the OCD sufferer recognizes that all these thoughts and behaviors are irrational, yet feels driven to obey them—to treat these strange imaginings as real.

Schwartz walked DiCaprio through the underlying neurology to help him understand that, for Hughes, caught in the throes of an obsessive-compulsive episode, those four words—*Show me the blueprints*—held a kind of magic power, offering him an escape from his fear. "Those words, he's repeating them like his life depends on them," Schwartz advised. "But he also understands that this doesn't make any sense. He goes along with these thoughts because he feels he has no choice. But the whole time, he's worried he might be going crazy."

In the 2004 film that eventually emerged, this scene is perhaps the most painful to watch. DiCaprio, as Hughes, keeps twisting the sentence in new directions with each re-phrasing, emphasizing different words and employing different cadences. Sometimes he races through the sentence almost under his breath. Other times, he slows down, seeking the right combination of sounds, the right rhythm, to free himself from the fear roiling in his gut. All the while, his face betrays confusion, a tortured self-revulsion.

DiCaprio left *The Aviator* with an Oscar-nominated performance and perhaps a mild case of the disease. "I was going around stepping on cracks," DiCaprio said in one

interview. “And for some reason, at airports, I had to step on every stain that I saw, so I’d be darting around doing that.”

It took DiCaprio about a year to get back to normal. And today, his willful descent into the illness and subsequent recovery represents one of the most dramatic, public examples in our popular culture of neuroplasticity—the ability of the brain to change in shape, function, configuration or size. But Schwartz says mainstream science has yet to come to grips with an experience like DiCaprio’s—or *any* patient he has successfully treated for OCD. According to Schwartz, his clinical use of what he calls “self-directed neuroplasticity” doesn’t only rescue his patients: It rescues free will.

“We’re talking about people with a biological brain disorder,” says Schwartz, “who learn through the use of neuroplasticity to change their brain function! That’s free will in action!”

It is a claim that flies in the face of most modern neuroscientific research, which suggests an ever-increasing number of our “choices” are somehow hard-wired into us—from which candidate we vote for to which flavor of ice cream tops our cone. In fact, neuroscientists like David Eagleman and Sam Harris have released best-selling books offering that we are, at bottom, high-functioning, delusional robots. And so, at a time when free will is on the run, few of our culture’s most prominent thinkers agree with Jeffrey Schwartz—a scientist, as it happens, who is entirely comfortable with being disagreeable.

Chapter 2

OCD Family

On a warm, fall evening in Los Angeles, Schwartz leads me to the UCLA campus to witness an OCD group therapy session. He calls himself "underemployed" and usually looks the part—outfitting himself in nothing more formal than shorts and a T-shirt. But he maintains a rigorous schedule. His apartment and office are loaded with books ranging from economics and quantum physics to neuropsychiatry and philosophy, grist for the academic papers he continues to write. He maintains a frequent travel schedule of lectures and workshops. And he continues to lead this weekly OCD group therapy session.

Short and squarely built, with tight, curly hair and the stooped shoulders of an aged wrestler, Schwartz ambles through the parking lot until he spots one of his patients and calls out to him, warmly, by name.

"How you doing?" he says.

The man, smoking a cigarette and leaning against a brick wall just outside the entrance to Schwartz's building, waves and indicates with a hand gesture, pointing inside, that he'll talk in the group session. Schwartz nods, turning to me as we pass him. "Uh-oh," he says. "Maybe things aren't going so well for him."

Schwartz takes the last couple of strides ahead of me

and opens the door to the Semel Institute for Neuroscience and Human Behavior, a three-story glass and brick collection of classrooms and labs. “Well,” he says, cocking an eyebrow at me. “Here we go.”

For most of our time together, over a long weekend in Los Angeles, he had been loud and shrill—his nasal voice cutting, his words delivered in stabbing exclamation points. In fact, during my very first conversation with him, less than a minute after I got him on the phone, he started hollering. “The entire scientific and medical establishment is built around the idea that mind equals brain! If you present them with a finding that suggests otherwise, let me tell you they don’t like it! They don’t like it at all!” By the time he finished with this opening harangue I’d learned to keep the phone a foot and a half from my ear. But now, just steps from his clients, he seems a different man altogether: gentle, paternal, caring and soft.

“This is it,” he says as we near the door to the conference room. “These are my people.”

Inside are 10 clients that span the length of his career—from Joshua, a young man who started attending “group” in the past year or so, to Paula Scott, a woman who was part of the initial research trial in which Schwartz achieved his greatest scientific victory.

The short version of that achievement goes like this: For a long time, OCD was a conundrum. People like Howard Hughes presented with a dizzying array of irrational fears—that, somehow, they had become fatally dirty; that the bump in the road they just struck was a human being;

that something had gone very wrong in their world and if they didn't correct it, they'd die. To non-sufferers, the disease provoked astonishment. Why would anyone think that touching a dirty napkin might be fatal? Why would anyone circle the same stretch of road for hours, looking for a body that clearly was not there?

Through the '50s, '60s, and '70s, OCD was considered almost untreatable—a disease that consumed and conquered. In the '80s, pharmaceuticals helped lessen the symptoms of OCD, but no one knew why they worked or what faulty brain chemistry had been corrected. Schwartz, working with neuropsychiatrist Lewis Baxter at UCLA, spent the early and mid-'90s revolutionizing the field. First, he helped illuminate what we now understand to be the OCD circuit, a hyperactive network of brain regions governing error-detection circuitry, fear responses and habitual behavior. Second, working directly with OCD patients, he proved that mental techniques associated with Buddhism could severely diminish OCD-related thoughts and behavior without the use of any drugs at all. Using new brain imaging technology, Schwartz even produced before-and-after shots that dramatically illustrated the reduction of activity in the faulty OCD circuit.

To that point in the history of science, neuroplasticity was thought to exist mostly, if not only, in children. The thought that the adult human brain could "rewire itself" was controversial at best. But Schwartz proved an adult could change brain function and configuration solely by *thinking differently*. Experience always alters the brain, no

matter the stage of life. But what Schwartz had proven was that his patients could rewire their brains (and reinvent their lives) through sheer force of will, with thought alone.

In this sense, walking into a room filled with Schwartz's patients is like walking in on a band of revolutionaries. They have that easy air of familiarity and quiet sense of accomplishment. They greet Schwartz, their leader, warmly. People speak of regaining time previously lost to their compulsions. One man, an actor, says he feels confident enough to audition for parts again. Paula, the senior client among them, captures just how dramatic their trip has been.

"When I first met Jeffrey," Paula says, "I was thinking about killing myself. Now, I am not even struggling with my OCD."

Paula's illness is still present, but the condition no longer torments her, no longer controls her. OCD is just something she handles as she goes about her day. As Paula talks, the depth of Schwartz's scientific achievement becomes abundantly clear. But for him, the quest has always been about something more. "Not to be pretentious," he says, "but this is about *human beings*. We are conscious agents, causal actors, in our lives, and the experience of my patients is evidence of that."

Chapter 3

All Is Suffering

The journey, through research labs and support groups, through neuroscience and philosophy and straight into the heart of what it means to be human, started in upstate New York, when Jeffrey Schwartz was just a boy.

"Did Jeff tell you how he chose what college he would attend?" says Marty Wax, a friend from childhood.

He hadn't. So Wax told me the story.

Schwartz came to his house one day, during their senior year of high school, and asked him where he sent his college application: University of Rochester.

"OK," said Schwartz. "That's good enough for me."

"You're going to apply there because I am?" said Wax.

"Yeah, yeah," replied Schwartz.

Wax wrote a letter to the university soon after, saying "Jeffrey Schwartz is a friend of mine who is applying to the school. Please don't assign us to the same dorm room."

Of course, when Wax arrived at the university and got his dorm assignment, he found his roommate was none other than Schwartz. Moving swiftly, he requested another room.

"Why?" said Schwartz. "We're friends. Why don't you want to share a room with me?"

"Because," Wax replied, "I want to stay friends with you."

***

Jeffrey Schwartz was born in the town of Newburgh in upstate New York.

The Holocaust had ravaged his bloodline not even a full generation earlier, a heavy legacy about which an elder relative educated him. “I remember he told me that it was my job to live for these people who had died,” says Schwartz, “and he didn’t mean that as some sort of metaphor, or to inspire me. He meant it literally. As in, my life was not totally or even mostly my own.”

Today, he describes this formative experience with no trace of bitterness. “I’m glad for it,” he says. “It taught me early on that life is serious business.”

This is the perspective of a 60-something man. But even at 12 Schwartz responded with a dire solemnity. While other kids played, he spent long hours in the local library, reading through entire Holocaust trial transcripts. On page after page, he read testimony about people who performed horrifying acts for the sake of power, money, or simply to get along in a country suddenly steeped in the wicked. He emerged thinking that the idea, so common in our culture, that humanity is basically good, is simply wrong. Cruelty and even, for lack of a better word, evil, struck him as inescapable aspects of the human condition. “I had this image,” he says, “and I think it’s the right one, of humanity as being fallen and in need of some kind of help.”

Perhaps because he was so invested with a sense of life’s seriousness and saw everyone he met as potentially corruptible, Jeffrey Schwartz always found relationships

problematic. According to Marty Wax, a man who has been friends with Schwartz for 50 years, Schwartz had a habit, even early in high school, of chasing people away by treating every word, deed and opinion as a matter of vital importance.

"It was all the time, with everyone," Wax says. "He took any disagreement as a personal affront and he still does. He was and remains more than socially awkward. He has no understanding of how he's being received and he fails to pick up on people's cues. He has this habit of yelling at people. And he takes that as normal conversation. But of course, most people don't. And he refuses to change."

With this sort of ringing endorsement, why would Jeff Schwartz need an enemy? And why would Wax, an accomplished ophthalmologist, remain his friend? "I always felt and continue to feel like I walk away from my conversations with him richer for it," he says. "So I'm very grateful for my friendship with him, and as for the people who walked away, I figure: It's their loss."

In turn, Schwartz calls Wax "maybe my only real friend that I'm not thrown together with by work circumstances," and admits his biography contains only a few flesh-and-blood mentors and allies. The twists and turns of his life were dictated by forces he couldn't offend—by the books he encountered, the philosophers, poets and musicians he met while unfurling his youthful intellect. Dylan. Yeats. Economist Adam Smith. Philosopher William James. In high school, a classmate's father learned he was interested in pursuing psychiatry and suggested he read Freud.

Schwartz responded by reading all the Freud he could gather from the local library. He critiqued, edited and winnowed it down in his mind. And then he sat down with Wax and delivered monologues on what he made of it all. Wax couldn't have grasped back then that the adolescent Schwartz was performing the same excising of Freud it would take the profession of psychology decades more to perform. Schwartz, the youth, raced ahead of his chosen profession. He rejected the Oedipal fantasies and maintained that a cigar can just be a cigar. But Freud's insight into the unconscious processes that undergird all of our thinking, his vision of mind as beset by thoughts and impulses from the darkened corners of the brain? Schwartz saw that this vision of cognitive function fit his own experience. It even went some way toward explaining humankind's fallen nature: The capacity for a Holocaust lay in minds not always fit to govern their own impulses.

He emerged more determined than ever to pursue a career in psychiatry. And as he began college, following Wax to Rochester, he hatched a plan. For his undergraduate degree, he'd study philosophy, figuring that coming to grips with the best, most sophisticated thinking in human history would only benefit him in his eventual medical practice.

The transition from high school to college did nothing to aid Schwartz's social capacities. Friendships didn't become any easier. He still remembers crossing the campus at Rochester in 1970, directly after news spread that four college students had been killed by Ohio National Guard

troops at Kent State University. His fellow students mounted a protest, which consisted of lying about on the grassy campus in their bare feet or occupying the quad with Frisbee. The serious young man felt alienated from his entire generation.

His college experience did yield the final two influences that would later define his science. First, a classmate suggested meditation—specifically mindfulness, a Buddhist practice in which adherents learn to view their own thoughts and impulses with complete impartiality. People learning mindfulness might focus on some innocuous sensory data, like the sensation of their own breathing; or merely sit back and watch all the thoughts and ideas that rise into their awareness. Schwartz felt a natural skepticism, but that waned almost immediately. The pursuit of mindfulness—of learning to view every thought and emotion impartially—struck him as great background for an aspiring psychiatrist. But on a more personal note, Schwartz felt touched, to the core of his being, by Buddhism's First Noble Truth: All is suffering.

"I read that and thought 'OK, we're on to something,'" he says now. "Because I had been infused with the knowledge, early on, that life is hard."

In the early going, he felt the practice fit his dogged personality. He had wrestled in high school and mindfulness demanded the same discipline and commitment. Meditation also slowed him down and gave him some needed distance from his own emotions. Before long, he also began practicing yoga. And he studied

Buddhist texts like a scholar. The serious young Jewish man from upstate New York, whose thinking had been shaped by the Holocaust, now considered himself an adherent of Buddhism, the religion most closely associated with the Far East.

Aided by mindfulness, Schwartz did so well in school that he was accepted as an honors scholar in philosophy in Edinburgh, Scotland. Among other philosophers, he found maybe the only home where his combative conversational style proved an attribute. He also learned how to think in ways he believes most scientists struggle.

"This will get me into trouble," he explains: "I think most scientists are good at constructing studies and gathering data. But they are not always very good at understanding what their own data mean."

Schwartz embarked on his career in medicine, then, looking for some way to combine all the major influences of his early life in his science. He wanted to demonstrate that the Buddhist practice of mindfulness could help us choose something other than holocausts and heal our fallen humankind.

Chapter 4

Scanning States of Mind

Schwartz completed medical school and his residency at Cedars Sinai in Los Angeles, but his first meaningful opportunity to study the brain in the way he wanted came in 1983, when he agreed to work under the mentorship of neuropsychiatrist Lewis Baxter at UCLA. Baxter was leading a study on OCD, and before reporting for the job, Schwartz spent several weeks reading up on the intricacies of the disease. The deep dive suggested that OCD might present him with an excellent opportunity to test the psychiatric efficacy of mindfulness.

A unique facet of OCD, among mental illnesses, is that the condition is "ego dystonic," meaning the sufferer recognizes the thoughts don't make sense and are somehow separate from the true self. OCD patients see the fear they feel as unfounded, and the repetitive behavior they are compelled to perform as irrational. This experience is wildly different from that of someone in the throes of most other mental illnesses. Psychotics, for instance, remain convinced—at least during the length of an episode—that their delusions reflect reality.

Schwartz was immediately struck by this aspect of the disease, understanding the disconnect as the illness's primary source of suffering and perhaps his point of entry.

He imagined a woman caught in the grip of ceaselessly washing her hands yet aware her hands aren't dirty. Able to reflect on the bizarreness of her thoughts and her behavior, she continues to wash only because it seems like the only way to ease her fear that she is contaminated.

In this sense, OCD reflects a key aspect of mindfulness meditation—granting the patient a detached perspective from his or her own thoughts. Schwartz speculated that this awareness could enable a mindfulness-based treatment strategy. After all, if the point of mindfulness is to stand back dispassionately from all our ideas and impulses, couldn't an OCD patient use mindfulness to step back even from mortal fears and compulsions?

Before he could test this theory, however, Schwartz had to commit himself to Baxter's initial agenda—teasing out the physical mechanism of the disease, a mission informed by Baxter's willingness to challenge the dominant mode of thought.

In the mid-'80s, behaviorist approaches still held sway over psychology. The school of behaviorism, which considered the patient's mental life unimportant, was particularly tough on OCD patients. Treatment and research protocols typically involved triggering painful episodes. Behaviorists asked OCD sufferers to touch urine-soaked toilet paper or a dirty napkin to spark fears of contamination. For some, this "exposure and response prevention," or ERP, as it was called, actually worked. Immersion in what they dreaded most desensitized them to their normal triggers. But many found the treatment too

painful to endure and rejected the therapy altogether.

Schwartz considered behaviorism inhumane and, worse, ineffectual for large swaths of patients. Baxter didn't share Schwartz's level of passion on the subject. But he wanted to avoid inflicting undue stress on test subjects. So, right at the outset, the Baxter-Schwartz partnership grounded itself in revolution and risk.

They would be using then-new imaging technologies like the positron emission tomography (PET) scanner, a hulking machine Schwartz remembers "looking like something out of *2001: A Space Odyssey."* The medical imaging device used positrons (essentially positively charged electrons) instead of X-rays to produce 3-D images. To conduct a PET scan, technicians injected patients with a biologically active radionuclide, or tracer particle made partly of positrons and attached to some other molecule with a role in metabolism, like water or glucose. By tracking the positrons emitted as the tracer breaks down, the machine can capture images of biological processes. In this case, Schwartz and Baxter aimed to follow blood flow in the brain.

In the '80s, this work was time-intensive. PET scans and workplace computers were each so new that no programs existed that could automatically spew out data. This meant the images were analyzed by hand, over many weeks, then checked and rechecked. This new technology was costly, demanding money and time. In this context, the behaviorist approach pretty much ensured test subjects would experience a compulsive episode, guaranteeing

costs would be minimized. But acting against their own self-interest, Baxter and Schwartz decided not to induce compulsive episodes in their research subjects. Instead, they would attempt to find the mechanism of OCD while their subjects' brains were relaxed or "at rest."

Schwartz's role was twofold. He oversaw most of the direct patient work of getting them into the machine and he led them through a questionnaire to quantify the severity of the OCD. But he also scoured the literature for insights.

He thought a largely overlooked study, by neuroscientist Edmund Rolls, held special meaning in OCD research. Rolls used monkeys to investigate the orbitofrontal cortex (OFC), an area associated with decision-making. The brains of the monkeys were imaged as they grew comfortable licking a bar in order to obtain a sweet liquid. Then they were imaged licking the same bar after the liquid was replaced with a salty brine. Rolls found activity in the OFC spiked when the monkeys were surprised by the new liquid.

It was an ingenious study, Schwartz thought. Rolls had revealed the OFC to act as an error detection circuit. It made sense then to look at the OFC in relation to OCD, which fills patients with mortal fear that *something is wrong*. Around the same time, Baxter recalls, Schwartz came in and suggested they also investigate the caudate nucleus, a tail-shaped structure near the OFC that serves as the habit center of the brain. The caudate nucleus, Schwartz thought, might act as a kind of nexus point for

OCD—a traffic hub where rational thinking in the cerebral cortex meets the more primitive, emotion-ruled, centers of the brain's limbic system. It would be a natural ground zero for the noxious brew of repetition and terror to collide. "Schwartz saved us a lot of time and money," says Baxter, "and the importance of that can't be overstated in an expensive study like that one. He really made the case for us to move the caudate way up the list."

The research took many months. But one day Baxter took Schwartz aside to say, "We've got it."

The data were clear. OCD subjects, as opposed to healthy controls, demonstrated significant hyperactivity in the OFC and caudate—even at rest. The representative images, which turn up in a PET scan as bursts of color, rendered these brain regions as small fires, perpetually burning. The findings struck Schwartz as sobering and fortuitous. What sobered him was OCD's apparent power to change the functioning of the brain even when no episode was underway—the disorder's ceaseless flames.

He knew his enemy now, and while he had few professional friends, the career he wanted was finally starting. "There's nothing like being right and having the images and data to prove it," he says. "We both felt our findings were so robust we'd have no trouble replicating them—and that turned out to be true. And that meant, you know, we could continue. We could do more big studies. We were on our way."

Chapter 5

Free Will Therapy

At one point, in his apartment, Schwartz seems tired of talking about the mind and the brain and starts discussing music. His two great loves are Bob Dylan and jazz. And of the 30 or so hours we spend hanging out together, the time spent listening to his jazz collection is the most relaxed.

As a series of descending piano chords cannon out from his stereo speakers, I ask him for a glass of water.

Hurriedly, Schwartz retreats into the kitchen, sticks a greasy measuring glass under the faucet and hands it over for me to drink.

Our eyes meet over that glass, and Schwartz's whole expression—normally so taut and intense—softens. When he sees me register the greasy glass, a kind of shudder passes through him, and he appears to search my face for any hint of judgment. It is a touching moment: the volatile, certain scientist suddenly rendered wholly human and vulnerable.

Then he darts away, back to the kitchen, before the drink can become a subject, leaving me with the dirty glass in my hand.

***

While the team prepped results confirming the new "OCD circuit" for publication, Baxter announced it was

time to begin testing treatments. Again, the scientists would use PET scanners. But this time they would image OCD patients' brains before and after a round of therapy.

By now Schwartz had affixed in his mind a solid, working mental picture of the neuroanatomical functioning of OCD: Any time something seems amiss in the environment, any time a potential threat appears, this information arises in our awareness for further inspection. In the case of OCD, the possibility that the sufferer's hands are dirty sparks activity in the orbitofrontal cortex. In a person without a compulsive disorder, this fear would immediately be contextualized for what it is: a minor inconvenience, quickly handled. *Are my hands dirty? If yes, wash—once. If no, move on.* In a patient with OCD, however, this information gets caught in a seemingly endless loop Schwartz calls "brain lock."

In OCD sufferers, the caudate—which normally fulfills a kind of gating function, determining what information is sent back and forth between the conscious awareness in our frontal lobes and the emotion-ruled centers of the brain—gets stuck in an "open" position, transmitting the same error message again and again. The result is a mounting sense of fear, even mortal terror. And because these parts of the brain are also involved in producing unconscious, habitual responses, patients soon find themselves performing the same habitual tasks, again and again, in an effort to break the cycle.

Baxter announced he wanted to test the effect of medication on OCD, but Schwartz asked to break ranks.

He felt nervous, but believed he had developed a good rapport with Baxter and approached him at the office. "I'm not interested in doing a pharmaceutical study," he told him, and he quickly sketched out the relationship he perceived between mindfulness practice and the ego-dystonic nature of OCD.

Baxter immediately agreed.

I asked Baxter about this fast decision some 25 years later, and he brushed aside any thought that he courted controversy. First off, the meditation-oriented approach to therapy could be buried inside the accepted norms of cognitive behavioral treatment; Schwartz would be asking his patients to alter their behavior—to follow the stream of thought telling them the fear was irrational, rather than the obsession itself. But he also said yes because Schwartz did the asking. "I think when you know Jeff and you understand him," he says, "you know that when he is passionate about something, as he was about this, it's best to say yes."

Baxter delivers this line with dry humor. And it is true that the awkwardness and argumentative nature that isolated Schwartz in adolescence continued throughout his career. In fact, at a social affair for neuropsychiatric faculty held during this same period of time, one of the department's senior members shook Schwartz's hand and informed him, in dark tones, that he should be "very grateful" to Baxter.

It isn't paranoia if someone is out to get you, and in this case Baxter confirms he felt occasional pressure to

sequester, marginalize or otherwise *do away with* Dr. Jeffrey Schwartz, whose combination of novel theories, social coarseness and outspoken demeanor proved difficult for many in academic medicine to tolerate. But for Baxter, an avowed fan, Schwartz's difficulties establishing warm relationships with colleagues emerged from another issue as well: The problem was that Schwartz was so often right. "Most scientists know a whole lot about a little," Baxter says. "Jeff knows a lot about a lot—science, philosophy, economics, meditation—and he isn't afraid to tell you so."

Baxter green-lighted Schwartz's passion project, then, not because of any sway Schwartz held with the senior faculty. He said yes because of the respect he personally developed for Schwartz along the way. "The word is thrown around too much," he says, "but Jeff is a genius. And he's able to pull together thoughts from areas he hasn't technically specialized in but he's learned about, at a deep level, on his own."

His suggestion that Baxter look into the caudate is a sterling example. Specialties in neuroscience are particularly narrow, and Schwartz was not a neuro-anatomist by training. But his keen interest in the topic had enabled him to spot the caudate as a likely key in unraveling the mystery of OCD. Now all he had to do was figure out how to teach mindfulness to a group of people in the throes of a severe psychiatric disorder.

Schwartz had, as he puts it, gone from "one tough task to an even tougher one." One of his early patients was Paula, who would attend Schwartz's weekly group session

while I was in Los Angeles a couple of decades later. When Schwartz met her, in 1987, they were both, on some level, blind. Schwartz had to teach her a skill he'd never taught before, and she was deep in the throes of a case of OCD so surreal and severe she regularly contemplated suicide.

Although instances of hand-washing, checking to make sure the stove is off and the door is locked are the most common presentations of OCD, Paula's illness manifested as the irrational fear her boyfriend was an alcoholic and drug addict. (In high school she had harbored the related, irrational fear that her boyfriend was in love with—and would ultimately leave her for—the supermodel Cheryl Tiegs.) OCD is, in fact, this idiosyncratic. But in Paula, Schwartz saw the elements suggesting his treatment might work.

Paula complained that knowing her thoughts were bizarre actually contributed to her feelings of desperation and despair. She told Schwartz how she would sit and stew, consumed by the fear that her high school boyfriend was desperately in love with Tiegs—a woman he'd never mentioned nor met. And she would simultaneously marvel at what she took to be her own insanity. "I knew it didn't make sense," she says. "I knew it was irrational."

Schwartz thought Paula's case was particularly compelling because the repetitive behavior she chose to alleviate her fear demonstrated just how aware she really was. She knew, for instance, that if she constantly peppered her current boyfriend with questions about drug and alcohol use, he'd realize something was off. "I had to find a

way to conceal my feelings from him," she says, "while still giving in to the compulsion."

Her solution: Question him rigorously without tipping him off to her particular fear. She asked him multiple questions about his day, essentially asking him to walk her through what he ate for breakfast, when he got to work, what he did that morning, and with whom he ate lunch, seeing if he might slip and say something that hinted at drug addiction.

Schwartz knew that most OCD sufferers, like Paula, can tailor their behavior. So even as they lose hours each day to hand washing, twisting door knobs or circling the block, they can still find some way to function and even hide their illness from loved ones. He also surmised that patients this able to disassociate themselves from their own pathology should be amenable to a mindfulness-based treatment.

As his therapy group started, people spoke of rubbing their hands raw to avoid contaminating themselves and by extension their loved ones. They talked of being late for work because they spent so much time checking the oven and the door locks before they could finally make it to the car. And each week, Schwartz urged his patients to experience their OCD symptoms the way a mindfulness practitioner, in meditation, strives to experience every thought—dispassionately, without succumbing to emotion.

Even the discomfort they felt, the gut-sickening fear, was something to simply allow—without reaction, he told them. But in these earliest days, Schwartz didn't really know where he was going, only his starting point. And

what he asked of his clients was truly dramatic: He asked them to recognize an OCD-related thought as soon as possible and relabel it as unreal—merely a symptom of their OCD—without giving in to it. The group responded enthusiastically, but things only took off after an older woman in the group, Dottie, suddenly exclaimed: "It's not me! It's my OCD!"

This became a kind of rallying cry for the group. And Schwartz realized he'd found his first step. He called it relabeling.

If a patient suffered from a constant obsession with dirty hands and a compulsion to wash them, Schwartz advised the patient to think, *This is not an urge to wash my hands. This is a bothersome thought brought about by my OCD.* As soon as he hit on this method, his patients came back the next week and reported improvement, claiming they no longer felt the disease controlled them.

This initial success set a pattern, between Schwartz and his patients, of collaboration. The answers to defeating OCD emerged as they interacted. Weeks in, as his patient group reported for another session, one of them asked, "Doc, can you just tell me why the damn thing keeps bothering me—why it doesn't go away?"

Schwartz happened to be carrying around some brain scans of OCD patients in a folder. "You want to know why it doesn't go away?" Schwartz said. "I'll show you why."

Retrieving the scans with a flourish, he pointed to the OCD circuit he'd worked with Baxter to establish. "This region of the brain is hugely overactive," he said,

and then *Pop!* He saw a change in his patient's face and the excitement in everyone listening. Paula was one of the patients who experienced this eureka moment and felt … liberated. Everyone did. These strange thoughts about her boyfriend's drug addiction were no longer a sign of insanity. They were no longer even a product of her *self.* They were just the faulty transmissions of a malfunctioning brain.

Her *self*—that was the part of her that recognized her OCD thoughts as irrational.

Schwartz felt the energy in the room rise, and he saw the previously defeated men and women of his OCD group rally and strengthen as surely as if they had just, suddenly, inexplicably, gained more muscle tone. This became the second step: reattribute. He was teaching his patients to reattribute their OCD symptoms to some gnarled brain wiring, teaching them to see the functioning of their brain as meaningfully separate from their sense of self.

Inside himself, Schwartz knew this was dangerous stuff—a way of thinking about the brain that most neuroscientists rejected. In fact, he knew most of his superiors at UCLA would find the position he was taking on the relationship between mind and brain to be inaccurate at best and scientifically irresponsible at worst. In modern, neuroscientific terms, declaring a break between self and brain, between subjective mind and objective matter, is anathema. We are our brains. But 25 years ago Schwartz gave his patients another idea, and they used it to free themselves from a life enslaved to their OCD.

Over the following weeks, patients started to report victories regularly. At first these wins were small. Paula, for instance, could hold off on questioning her boyfriend about his day for longer periods of time—first minutes, then an hour or more. She could get by while asking fewer questions. But as time passed, the patients reported something more remarkable: The intrusive thoughts of OCD were diminishing, occurring less frequently, and coming on with less power.

Schwartz believed that this was because his patients were in fact using the power of their minds to *rewire* their brains—a finding at odds with everything neuroscientists at the time believed. Schwartz was pursuing evidence of neuroplasticity, a change in brain function and structure, in human adults. Up to this point, changes of this magnitude were thought to be the province of children. The adult brain was believed to be relatively immutable. But Schwartz was almost singularly focused. With no romantic relationship and no close friends in Los Angeles, he spent most of his time thinking about ways to drive his group forward. They had made progress, but all of them, including Paula, were finding that they had essentially replaced one time-wasting activity with another. Instead of losing hours to expressing their compulsion, they now spent hours a week *thinking about it differently*. An improvement, but not yet a victory worth celebrating.

Then one evening, while out of the office, Schwartz realized his patients needed more to do, something to focus on besides the intrusive thoughts of OCD. He thought

back over the practice of mindfulness and found an analogy he liked. In meditation, if he became emotionally invested in a particular train of thought, he sought to refocus himself by drawing his attention back to his breathing. Using that same concept, he gave his patients license to replace monitoring their breath with whatever behavior they found most compelling. Some patients found it helpful to turn back to the same healthy behavior each time an OCD episode struck: going for a walk, perhaps, or gardening.

Schwartz had found three steps — relabel, reattribute and, now, refocus. But he felt he needed a final step, something to pull them all together. He found it while enjoying what passed as pleasure reading for him, in economics. Schwartz was reading a piece by an Austrian economist, Ludwig von Mises, when he came across some language that resonated with his own efforts in OCD: Mises defined value as a "man's emotional reaction to the various states of his environment, both that of the external world, and that of the physiological conditions of his own body."

Schwartz saw a corollary in Buddhism, which calls—with a bit more clarity—for seeing things as they really are, or "in accordance with the truth." The fourth step was settled.

Revaluing.

The OCD thoughts that patients once considered so important were to be systematically deconstructed, understood and finally revalued as, in Schwartz's words,

"trash … not worth the gray matter they rode in on." One man, who washed his hands until they were chapped and bleeding, began thinking of his compulsions as "toxic waste" from his brain. Conversely, Schwartz's patients learned to value their alternative behavior highly.

The method wasn't easy. It took, and these words struck Schwartz as key, a tremendous force of will. Schwartz remembers that Paula came in and talked about hanging on. She prevented herself from giving into her urge to pepper her boyfriend with needless questions, initially, for just 30-second increments. Once she crossed that barrier, she started pushing herself to achieve more. Paula describes those old feelings as "gut churning," the fear so real she felt like her stomach had just dropped out, like she was dying.

This was a description any of us could recognize from a close brush with extreme danger. A car swerves into your lane, and your stomach seems to plummet down to the floorboards. For most of us, that awful feeling is fleeting and occurs only in rare, dramatic instances. For Schwartz's OCD sufferers, this mordant dread arrived on a daily basis and persisted for long minutes or even hours.

Observing their struggles, Schwartz came to admire his patients, deeply. He hadn't just taught them; they had taught him. And he bore witness to their efforts. But he also suspected he was bearing witness to the resolution of a millennia-old philosophical argument. He was seeing free will in action: the people under his care choosing, again and again, to engage in a new behavior. But he needed to

wait and see if that evidence would turn up in a brain scan. And after 10 weeks of treatment in the four steps, it was time. His patients, their brains imaged before any treatment began, entered the hulking scanners a second time.

He felt confident that his patients' self-reports of greater mastery over their OCD were true. But he worried. This wasn't just a single study at stake. His life's work, his entire way of looking at the mind, hung in the balance. Baxter crunched the data and told him the news: He got a positive result. The amount of activity in the OCD circuit had decreased, to a degree commensurate with the best results achieved by pharmaceutical therapy. The OCD circuit, so brightly lit in the baseline scans of his OCD sufferers, now glowed more softly, the fire coming under control.

Schwartz's first paper on the subject, published in a 1992 issue of *Archives of General Psychiatry*, drew some positive press attention. But his replication of those results, published in 1996, changed Schwartz's trajectory forever.

His life was, by that time, "pretty lonely," he says, because "there was no one to run home and tell. So much of what I experienced, it was all internal. … Externally, you know, with other people, there was a lot of conflict."

What he had, as ever, were his books and his thoughts and, now, his findings. Schwartz still remembers discussing this new turn of events in Baxter's office. He thinks they might have shaken hands. But there was no fist-pumping or high-fiving—no gleeful race down the hall to spread the news. He felt, mostly, tired. In the seconds after he learned of his triumph, the best Schwartz could muster was a kind

of gallows humor. “This is it,” he told Baxter sarcastically. “Everything’s going to be different now. They’re going to give me a carpeted office.”

Baxter laughed. Because both men knew that, in terms of his academic career, Schwartz’s success had merely established a buffer between himself and the colleagues and superiors who considered him a target.

Chapter 6

Primal Scream

Some stories occurred beyond the lab, and they continue to haunt the narrative of Jeffrey Schwartz.

In the early ’90s, between his first successful demonstration of mindfulness therapy and its replication, he attended a lecture by Lewis Judd, a major figure in neuroscience from the University of California in San Diego. From the podium, Judd said he thought psychiatry would eventually be folded entirely into family practice and mental illness would be treated with pharmaceutical medicine, like every other illness.

Schwartz sat in the audience fuming while Judd dismissed his profession and promoted an argument countering the very concept of mindfulness therapy for OCD. “I felt that psychiatry had been my life,” says Schwartz, “so to hear him say it wasn’t worthy of an independent specialty…”

It was more than Schwartz could take. And so, rising from his seat, he gathered his cloth napkin in his hands, rolled it into as tight a ball as he could manage and flung it, violently, onto the table. With conference attendees now focused on him, Schwartz spoke. “This man …” he hollered, “has feces on his tongue!” And with that, he stormed out of the lecture.

All these years later, Baxter laughs about the episode and notes, within it, the emergence of the Edinburgh philosopher in Schwartz. “Those guys treated intellectual discourse as a full contact blood sport,” he chuckles. “And Jeff—he shouldn’t have, but he went there.”

Schwartz says he is ashamed of his behavior that day and in fact he called Baxter as soon as he calmed down. “I’m in big trouble here,” he told him.

A figure like Judd could, at that stage of his career, still effectively end him. But there was more to it than that for Schwartz. “I was just wrong,” he says. “At the time I was a practicing Buddhist, and I had violated a central teaching. Several, actually.”

Right Speech. Right Action. He had disrespected an elder. He wrote Judd a heartfelt letter, explaining his sorrow over the event in both professional and spiritual terms. And Judd, says Schwartz, “did something for which I’ll be forever grateful. He forgave me.”

The martial drumbeat of Schwartz’s life never truly ended, though.

Another faculty member, one with some authority over Baxter, suggested he take the lead author credit on the pivotal mindfulness studies Schwartz led. For a moment, Baxter confronted the opportunity to claim a major scientific finding as his own—and to enjoy the cover of a superior in performing this intellectual theft. But he refused.

“That was Jeff’s work,” he told me, in a recent phone interview. “He was the lead author in every sense of the

word, so what was being asked of me just wasn't right."

The same senior colleague even approached Schwartz one day on campus. "Tell me, Dr. Schwartz," he said, "you don't intend to make any trouble with this 'mind and brain' stuff, do you?"

Schwartz had, of course, been outspoken over the years about his belief that mind is more than a product of the brain—that mind shapes the material brain. His replication was just about to be published. But inside, Schwartz quaked a little because he intended to make a lot of trouble—to create a new conception of mind and brain and to argue for the existence of free will. But he had learned, over the years, to at least delay moments of conflict when he could.

"Oh no, doctor," he replied. "I won't make any trouble."

"That's good, Dr. Schwartz," his senior colleague said.

Schwartz earned meaningful press coverage in 1996 when the *Archives of General Psychiatry* finally published his successful replication. Publicly, he was celebrated. *The New York Times* and *The Wall Street Journal* trumpeted his results. Some practitioners in the field spoke up: "You can change your own biology," psychiatrist Eric Hollander, then director of the OCD treatment program at Mount Sinai School of Medicine, told the *Times*.

Schwartz landed a major publisher, the high-powered Judith Regan at Regan Books, and shared his four steps in *Brain Lock*. The book received a promotional push on *Oprah* and became a best-seller. He received piles of letters from people helped just by reading his book. And when

he spoke and lectured, his success announced itself. OCD sufferers and sometimes their loved ones, pushed up to block his exit. Many didn't even want to talk—just catch his eye and place a hand, briefly, on his shoulder or elbow. "It was like they expected something to rub off on them," says Schwartz.

He admits feeling uncomfortable with this aspect of his celebrity. But otherwise, he felt "truly blessed … like my life was coming together. Finally."

He had struck a major blow against behaviorism and in favor of mental life. He married his passion for Buddhist meditation with his passion for science. Behind the scenes, though, he continued to receive pushback.

In 1998, for instance, he was invited to Yale to meet with psychiatrists James Leckman and Donald Cohen of the Yale Child Study Center. The pair arranged for Schwartz to conduct a therapy session with an adolescent male as clinical staff observed.

So Schwartz sat down with the patient, explained the four steps and offered him the same distinction he gave his regular patients: The strange messages of OCD don't come from you, he said, but from a malfunctioning brain. The kid seemed liberated by this, ready to face his OCD with a new resolve.

Leckman turned to Schwartz with an amused expression. "So," he said, "it seems like you managed to sell that young man on your shtick."

"Well, it's not really a shtick," Schwartz began.

"It sounds like a shtick to me," Cohen said, cutting him off.

On one level, the scientific one, Cohen's response seems inexplicable. By the time of this exchange, Schwartz had published his findings on mindfulness therapy twice, in prestigious, peer-reviewed journals. And in terms of simple decorum, Schwartz was an invited guest, there to consult with faculty on his landmark research. This time he was clearly the aggrieved party. The episode lends support to his larger case: Sometimes, even in science, data finishes a distant second to the dominant paradigm.

"I mean, I guess he didn't like my methods or my results!" Schwartz hollers 15 years later, in his cramped UCLA office. "Helping a patient to heal, and change their own underlying neurology, by helping them to think differently, isn't supposed to happen! … Brain is supposed to produce mind, not the other way around. So on some level, he couldn't bring himself to believe it. And that's the kind of resistance I got."

Schwartz could and does go on with more examples, but it's worth stopping to consider the various reasons he encounters so much resistance. First, there is that personality—the hints, in his behavior, that he has perhaps fought his own mental issues.

Multiple sources who have known Schwartz professionally and personally say he has kept such matters private, but talk of "manic" episodes dogs him. I certainly encountered a man with an explosive personality—seemingly incapable of disagreeing over even the smallest matter without yelling.

There is also an odd moment we share in the hallway

of UCLA's neuroscience building. We are leaving his office, and he is going to give me a ride back to my hotel. Suddenly I realize he is not right behind me. Looking back, I see him twist the door knob, yank to make sure it is locked, and then run his right hand slowly up the door frame, as if checking for a tight seal. Then he twists the knob, yanks, and runs his hand slowly up the door frame.

He does this about five times before I interrupt. "Jeff!" I call.

He laughs. "Oh boy," he says, adding—far too late: "That's off the record."

Schwartz says that while he might have some compulsive behaviors, he does not have actual OCD. But he refuses to discuss anything more about his own mental health on the record, declaring it "a private matter." Which is both fair enough and an opportunity lost. It could be, for instance, that Schwartz's achievement is even greater than we understand, that he not only helped many thousands of people gain some mastery over OCD but also came to terms with that condition or a related one along the way. If that were the case, his achievement would stand not only as smart, insightful and scientifically important but heroic, too. He might even be the sort of figure who not only advises on Hollywood movies, but about whom a movie could be made.

But there is something else to understand about Schwartz, something easier to grasp than the "private matters" he won't discuss. I finally get it—feel it, really—in his office. The room is small, cold and tiled. (He never

did get the carpeted office he joked about.) Every available inch of wall and floor space is covered in densely packed bookcases or teetering towers of scientific papers and tomes. To make my way to the small, two-seater couch on the far wall, I clamber over stacks of books, like a kid scaling a barnyard fence.

Here, Schwartz discusses—or rather, yells about—the Leckman incident, among other things until, finally, he sneers, "If we're all just machines, if there is no choice, then how do we even rationally discuss changing our behavior or creating a better world? If we're all just machines, and it all comes down to deterministic physics, there's no meaningful hope!"

In that moment, I feel like I get Schwartz, fully: the connective tissue between the kid who sat at the library table, bereft at the horrors of the Holocaust, and the scientist bent on finding some accurate, workable definition of humanity that can help us overcome our darkest, most primitive impulses. In that moment, I realize that beyond the whirring blade of Schwartz's chain saw voice there is an underlying moral rectitude, even a sweetness about him—a man holding out hope.

Later, I check out this observation with Wax, his friend of 50 years. "Bingo!" he says. "My own sense of him is that he fights so hard to win arguments because he thinks the person across from him is worth convincing. The truth is, he deeply cares about people. Deeply."

It would be inaccurate, then, to say Schwartz's demeanor is the sole reason he lands in trouble. The Leckman episode

is a case in point, a day when he was on his “best behavior,” as he puts it, and provoked an incident merely by treating a patient in a manner that contextualized brain as less important than mind.

This, the primacy of mind over brain, is the central tenet, ultimately, of the world according to Jeffrey Schwartz—and exploring and promoting it has comprised the bulk of his professional and academic efforts over the past 15 years.

Chapter 7

Free Will and Hot Dogs

At Costco, Jeffrey Schwartz looks just right hunched over a shopping cart, peering up and down each long aisle. He sometimes refers to himself as "semi-retired," and he looks the part: an older man in a wrinkled T-shirt and shorts, his socks pulled up high toward his knees, strolling the aisles on a mission.

"They have these sardines I like," he says. "Sardines are one of the healthiest foods around. Loaded with vitamin D, B-12, omega-3 oils and selenium, which is good for the heart."

When he finds them, he holds out the tins at arm's length and takes a good look at them, like a man admiring an unexpected prize he's just won. "I have a lot of these at home already but you never know," he says. "They stop carrying some things without warning."

He tucks several boxes of sardine tins into his cart, to add to his inventory. Then he turns his attention to procuring the seaweed he likes.

"It's good, simple food," he says. "Most people don't like seaweed, but I like it a lot."

This, too, he buys in bulk, his arms encircling a pile of seaweed in boxes. And then we're on to the checkout line. "I know this seems a boring way to eat," he says. "Seaweed

and sardines. But this is pretty much all I eat. It keeps me healthy. Plus, eating the same thing all the time I don't waste a lot of time thinking about my next meal."

Perhaps out of deference to his guest, Schwartz decides to skip the sardines and seaweed that afternoon. Instead, we stroll to the food stand outside the supermarket, ringing a collection of tables shielded from the sun by big beach-style umbrellas. We each order a hot dog, which Schwartz describes as "a rare indulgence."

There, surrounded by fellow shoppers, Schwartz holds forth on the topic of free will. He starts by offering a definition, a task that can itself be contentious. In his view, to have free will means that we are the conscious source of our own behavior; or, to put it another way, to have free will means you might have done differently than you did in the past. "And it's this conception people have, of being the cause in their own lives, that's under attack!" Schwartz hollers. "And believe me I do mean attack!"

Heads turn. Mouths full of pizza and hot dogs stop chewing. How many of these people ever recognize that their ability to consciously choose, to do differently from what they'd done, is even up for discussion? "Not many," says Schwartz.

But free will is in trouble, particularly on academic campuses. Opponents of free will hold that the brain is the source of all our thoughts and behaviors, and the brain, as a physical object, must obey the laws of physics. If that is the case, what ghost in the machine could possibly reach into this physical system without also being subject

to the laws of physics—without itself being determined by preceding collisions of atoms? According to this mechanistic picture, Jeffrey Schwartz and I *thought* we chose to sit down outside Costco, to eat hot dogs and discuss one of mankind's most vexing debates. But in reality, physical processes occurring outside our conscious control determined everything that happened.

It is a compelling, naturalistic argument. And tracts undermining free will are growing ever more popular. Neuroscientists Sam Harris and David Eagleman published books on the topic in the past couple of years, both of which made best-seller lists. Harris is unequivocal, referring to humankind as "biochemical puppets." In his view, we can choose our path in life no more than the eight ball can choose whether or not to fall into the corner pocket. In his book, Eagleman is less certain that free will doesn't exist in some form, but he ponders what this current vision of mind and brain means for crime and punishment: If we really don't choose our actions, how can we blame criminals for the havoc and pain they cause?

Biologist Jerry Coyne even landed column space in *USA Today*, informing readers sitting down to continental breakfasts in hotels around America that their every thought and behavior is determined by preceding physical phenomena.

"We are biological creatures," he writes, "collections of molecules that must obey the laws of physics. All the success of science rests on the regularity of those laws, which determine the behavior of every molecule in the

universe. Those molecules, of course, also make up your brain—the organ that does the 'choosing.' … Everything that you think, say, or do, must come down to molecules and physics. True 'free will,' then, would require us to somehow step outside of our brain's structure and modify how it works. Science hasn't shown any way we can do this because 'we' are simply constructs of our brain. We can't impose a nebulous 'will' on the inputs to our brain that can affect its output of decisions and actions, any more than a programmed computer can somehow reach inside itself and change its program."

In Coyne's vision, we are merely "meat computers," suffering under the delusion that we make choices.

Schwartz refers to all these arguments as "unhealthy" and "damaging." And beyond his barbed wire voice, that inherent sweetness is apparent, the healer behind the hollerer. Because Schwartz considers his fight to be an obligation, a task he must perform on behalf of us all—to preserve the very dignity of his own OCD patients and the hard work they put in to reclaim the hours and minutes of their lives.

Chapter 8

The Ghost in the Machine

By what mechanism does free will operate? Where in the brain does it reside? We touch on this topic at length in Schwartz's office, directly after leaving the support group he leads.

"They describe a *struggle*," he says of his clients. "They sit there, sweating, shifting their attention away from the compulsion and toward some healthy new behavior."

His influence might aid them for a short time, he allows, but his patients were going home for a week, or two, to fight OCD on their own. In a purely neurological sense, if determinism held sway his patients have no free will and no hope. Before they ever reached his support group, they had spent many long years, even a decade or more, giving in to their compulsions. "We know, from neuroplasticity, from the scans we developed with Baxter," says Schwartz, "that the circuits involved in OCD were incredibly strong."

Remember, the OCD circuit is so strong that it showed up as hyperactive even when patients were at rest, and not in the middle of an OCD attack at all. The new thought—to garden, read a book, or go for a walk—had no real chance to compete, in a purely neurological sense, against patients' long-established compulsion to, say, check the stove 37 times or, like Howard Hughes, repeat the same

sentence 46 times as a response to their fear.

According to Schwartz, only something outside this system, only something more powerful than mere neurochemistry, could cause a change. And for Schwartz, that superior influence is consciousness—awareness and will. This might sound like a ghost-in-the-machine argument, but other professionals working with compulsive behavioral disorders agree.

"There is something going on here," says Yale Child Study Center psychologist Denis Sukhodolsky, "which seems to suggest what people call 'free will' as a possibility."

When I spoke to him, Sukhodolsky was early in his own study of Tourette's syndrome, involving a method of refocusing patients very similar to Schwartz's. He expressed discomfort with the phrase free will—so loaded and controversial. Yet he also acknowledged we aren't in a position to write off the concept. His own patients, who struggle with facial and verbal tics, speak of feeling the urge to make some inappropriate sound or movement and "choosing" to give in or fight. They, like Schwartz's patients, have this sense of standing apart from the misfirings of their brains. Should opponents of free will stop and wonder if there is something here worth investigating?

Psychologist Steven Phillipson, an OCD treatment specialist at the Center for Cognitive-Behavioral Psychotherapy in New York, practices the very exposure therapy that Schwartz despises, but he also believes free

will is at work in his patients. “We find that without the mindfulness of making independent, autonomous choices, the patient’s chances of success are severely diminished,” he says. “Conversely, patients who take control over their responses to the stimuli that usually triggers them, can make great progress relatively quickly. I just don’t believe we’ve located where in the brain autonomy might exist. That’s why I love the saying about the ghost in the machine, because I believe free will exists. But within this biological mechanism, where is the thing that separates us from the machinery?”

Schwartz wanted to find an underlying mechanism for free will. And in 1998, research led him to a ruddy-faced physicist and explorer of exotic realms named Henry Stapp. A researcher at the Lawrence Berkeley National Laboratory in Berkeley, Calif., Stapp was an expert in quantum mechanics, the physics of subatomic particles, governed by laws that seem bizarre compared to those controlling the everyday world. Working from those principles, Stapp had an idea he thought might rewire our vision of the biological brain.

The notion was based on a fundamental law of quantum mechanics called superposition. Subatomic matter, such as an electron, is said to exist in all its possible states at once, moving this way and that, at all possible speeds, rotating in every possible direction, until it faces some form of interference, such as a physicist conducting a measurement. At that point, all the potential possibilities—captured in a formula called the wave function—are

said to collapse into a single, measurable state. Repeated experiments have shown that, at the subatomic level, matter inexplicably contains the properties of both wave—joining and unjoining as in a roiling surf—and particle-like separateness. And it is, in part, the physicist's choice of measuring matter as one or the other that determines which state it appears to assume.

The wave-particle duality struck Stapp as the fundamental mystery of human existence. How is it that subatomic matter should display the properties of a wave until it is measured, and then behave like a particle? Stapp thought the most elegant answer was consciousness: The physicist's choice of what question to ask nature collapsed the wave function and set reality on its course.

The notion that consciousness must be included as a dynamic, causal factor in physics got Stapp thinking about problems of mind and brain—of how subjective mind encounters gray matter.

"So when Jeffrey showed up, it's safe to say we had been looking for each other for quite some time, without realizing it," says Stapp.

Over long walks and dinners, the new friends worked to find specific proof for free will—for a conception of neuroscience in which the mind rules the brain. They looked to a foundational rule of neuroscience called Hebb's law, which holds that neurons that fire together wire together—in other words, the more that thoughts and habits occur in concert, the more powerful and entrenched the brain circuits driving them become.

Stapp had long been contemplating a principle of physics that might be seen as a corollary to that, called the quantum Zeno effect. Named after the Greek philosopher Zeno of Eleam, the quantum Zeno effect describes a phenomenon in which frequent observations of an evolving physical property slow down its evolution. In one example of the theory, a decaying atom, if subjected to an unending series of measurements, might not decay at all.

Today, Schwartz and Stapp suggest that the interplay of Hebb's law and the quantum Zeno effect mediates the relationship between the conscious mind and the physical brain. In this formulation, thoughts can arise into our awareness, unbidden, purely as a result of physical workings in the brain. But just as a physicist determines what question to ask of nature and collapses the wave function to determine the behavior of a subatomic particle, we determine, by focusing our attention, the circuitry of our brain. According to this theory, a thought or idea that arises into our awareness without receiving our attention will decay rapidly and is unlikely to be acted upon. But the thoughts we *choose to fixate on*—like an OCD patient focused on a compulsion—remain in place, are almost guaranteed to generate action and are more likely to reoccur.

Schwartz explained this to me in his office, after his clients had gone home. During the session, we heard people speak about using the four steps to relabel symptomatic thoughts and refocus on some new habit they wished to cultivate—like reading or cooking. "The quantum Zeno

effect means that, as they turn their attention away from their compulsion, that thought will begin to decay. And the more they focus on this new idea to do something healthy and productive, again through stabilizing brain circuitry, that thought will persist and be more likely to be acted upon."

At the same time, in accordance with Hebb's law, the neurons involved in generating that healthier thought will wire together and gain strength, while the OCD circuit weakens. Over time, OCD-related compulsions arrive with less urgency and decay more easily. "That's what we learned from my study—and that's how I interpret the brain scans," Schwartz says.

In strictly scientific terms, Schwartz realizes, this is an idea in its infancy. "The key element of any scientific hypothesis is, can we test it? And we're not there yet," he says. "I mean, can we show how focused attention creates physical changes in the brain? Yes. But can we demonstrate yet that this is the Zeno effect? No."

Schwartz also understands that, in strictly philosophical terms, this view of free will better describes a kind of *free won't*, best imagined, perhaps, through a baseball metaphor. We discussed this, too, after his group left for the night. The catcher (your brain), gives signals to the pitcher (your consciousness). Just as the pitcher can shake off a signal and ask the catcher for another option, our conscious mind can shake off impulses from the brain. Some of these impulses, like quick motor reflexes, get processed and acted upon automatically. When I see a car

drifting over into my lane, I register no choice to honk the horn and move to the shoulder of the highway; I begin the actions involved before I even have full, conscious awareness of the danger. But when I receive an impulse to eat a peach, I can shake that off—I'd rather have an apple—like the pitcher telling his catcher "no" and receiving another suggestion.

"The fact is, we behave automatically all the time," says Schwartz. "We behave without thinking. The brain is constantly sending us messages and thoughts and possible actions, and we can't control what thoughts our brain is going to bring up into our awareness. But once a thought has risen to conscious awareness, then we can step up and choose where we will focus our attention. And the behavior we focus on is the behavior we'll perform."

It is when we leave his office that night that he stops suddenly and begins checking the lock and the tightness of the seal on his office door. One time. Two. A third time. A fourth. Fifth.

"Jeff!" I call.

He looks up, sheepish, but maybe also, relieved. I had given him something else to focus on.

Schwartz's insight from OCD is that we can choose our actions, even when our brain *compels* us to do something else. In their initial brain scans, Schwartz's clients had a hyperactive OCD circuit, even at rest. Following the first principle of neuroplasticity, Hebb's law, these cells had fired together so many times they were quite solidly wired together and humming with activity. After treatment with

his four-step protocol, mindfulness alone had enabled his patients to alter their brains, weakening the well-established OCD circuit while forming healthy new habits, represented by alternate connections in their brains. To Schwartz, this contradicted the notion that the mind emerges from the brain: If the mind is pure brain product, how is it that focused attention, a purely subjective mental state, could act back on the physical stuff of brain, changing its circuitry and improving his patients' lives?

As Schwartz puts it to me, "If mind is purely an epiphenomenon of the brain, and illusory, how is it that focusing your attention away from an OCD symptom and toward something else has any effect on the brain at all?"

No matter what his detractors might say, and there are many, Schwartz believes so strongly in free will that he believes it influences our evolution. In 2004, in fact, he signed on to The Discovery Institute's "Scientific Dissent From Darwinism." (Click here to see a copy of the document.) The Discovery Institute promotes the highly controversial notion of intelligent design. While he believes in evolution, he thinks our understanding of evolution needs to be expanded to include what he calls "willful striving." In other words, the mechanism of neuroplasticity, which changes the shape and configuration of our brains, has likely shaped and will continue to shape the evolution of our species. Schwartz's thinking may not comport with scientific orthodoxy, but it is ambitious, cutting across seemingly every frontier—the product of a scientist not content to stay in his corner.*

Chapter 9

The Infinite Value of Small Things

The years since Schwartz enjoyed his sudden celebrity run along the same, well-worn track of public approval and professional condemnation as the years before. Since 1998, he has co-authored theoretical papers, enjoyed perhaps his greatest level of fame due to his work with Leonardo DiCaprio, and even given a stirring talk at the United Nations on the topic of science and spirituality.

But at 61 years old, having delivered a seminal scientific study both in terms of OCD and neuroplasticity research, he lives in the same modest West Los Angeles apartment he moved into close to 30 years ago. He doesn't enjoy tenure. His own chairman, psychiatrist and neuroscientist Peter Whybrow, informed him he should be grateful for his part-time appointment at UCLA. And Schwartz, normally so combative, *agrees* with him.

In fact, both men recall the same initial conversation taking place when Whybrow took over. "I know you're going to have a lot on your plate," said Schwartz. "So I promise, Dr. Whybrow, not to cause you any trouble."

"That's good," replied Whybrow. "Because I'm one of the few people who think there is still a place in academia for someone like you."

Whybrow chuckles at the memory.

"I think Jeff is a special case," he says, "in that he unites different disciplines. He has done the science and he does a lot of the hard thinking, the philosophy. He leads a kind of hermetic existence so he has been down in the basement as it were, and he emerges with ideas that *push* people—that keeps the conversation about some of these big questions going. A lot of people do great science but they haven't been trained, in the same way Jeff has, to think about it at the level he does."

On a philosophical level, this is a convincing testimonial from a superior. But in strictly material terms, it means a life closer to the edge. Sitting in his small apartment, Schwartz and I discuss the financial sacrifice he has made by choosing to live a dual life as a philosopher-scientist.

He tells numerous stories of feeling slighted, but the one that seems to leave the biggest mark on him occurred in 1999, shortly after the esteemed Nobel Prize-winning neuroscientist Eric Kandel included Schwartz's work on OCD in his highly prestigious textbook *Principles of Neural Science*. Schwartz was attending a meeting at the American College of Neuropsychopharmacology. (An aside, but an important one: Schwartz developed a treatment for OCD that requires no medication, but he suffers no angst over prescribing meds when necessary, and at times he has served as a pitchman for the pharmaceutical industry.)

Before the sessions even got underway, he spotted Kandel and got up the nerve to approach him. He walked up toward the eminence grise, hand extended, and said,

“Dr. Kandel, I’m Jeffrey Schwartz …”

Schwartz didn’t expect Kandel to recognize him from his name alone but as Schwartz recalls, the Nobel Prize-winning scientist cut him off—in the worst possible way. Putting a hand over his face, as if he had just been splattered by a cream pie, Kandel said: “Jeffrey Schwartz! Jeffrey Schwartz! I want you to tell me something, Jeffrey Schwartz! Tell me—why am I getting letters from people saying I should never have put you in my textbook, Jeffrey Schwartz?”

Dumbfounded, Schwartz replied, “Oh, Dr. Kandel, I don’t kn—”

“Why am I getting letters telling me you are a con artist and I should have nothing to do with you? Why am I getting letters like that, Jeffrey Schwartz?”

Schwartz tried to mount some further response, but Kandel again cut him off.

“Listen to me,” he said. “Go to the lab. Do research. Publish it. Stop the philosophizing.”

“Yes sir, Dr. Kandel,” Schwartz replied.

“Gather data,” continued Kandel, seemingly heedless of anything Schwartz said. “Publish it. Do that, and you will have a successful career.”

Schwartz looks back at all this now with a grudging, angry acceptance: This may be the way it is, in other words, but he doesn’t have to like it, or agree to shut up. At one point, there in his apartment, he stops, midsentence, and points to a ratty old mat in the middle of his living room floor. “That is where I have meditated, or prayed, every day

for 27 years," he says. "That's the spot."

I try to imagine Schwartz coiling himself up there on the small mat, to meditate, and see him, even in my mind's eye, fuming, his face red with anger. Our expectation of meditation, particularly here in the West, is that it brings peace. Imagine instead the smiling monk in a saffron robe. But Schwartz says meditation brought him clarity and "moral courage" to continue his fight. In the case of Jeffrey Schwartz, meditation built a warrior.

"I won't keep silent," he says. "The subjects of free will, neuroplasticity, mind and brain are too important."

It is difficult to say if Schwartz will ever capture another wave of publicity, as he did with his first book or his foray into movies. He continues to lecture and plans to write more books. And although he has not spoken to DiCaprio in years, the pair maintain a professional relationship. The actor even blurbed Schwartz's latest book, the pointedly titled *You Are Not Your Brain*, with the endorsement: "It is the truth of the matter that sheer willpower can make you break free."

The most important new development in Schwartz's life underscores the schism between the champion of free will and the academics who oppose him: Schwartz has become a devoted Christian, his faith formed in great part by reading the essays of Dietrich Bonhoeffer, the German Lutheran pastor executed by the Nazis for insurrection. His faith seems odd at first—the young Jew, turned Buddhist, scientist and then Christian. But in the life-story of Bonhoeffer, Schwartz's guidepost for Christianity,

there is a finer and firmer example of Schwartz's own tough-mindedness. Bonhoeffer believed so strongly he died for it, openly opposing the Hitler regime that ultimately assassinated him.

Schwartz has faced no such threat but in his own time he has been forced to make peace with holding beliefs that render his life more complicated, contentious and uncomfortable than it might have been. "I don't apologize," he says. "And I don't want anyone to feel sorry for me. Nor do I feel sorry for myself. It may not always have been pretty. But I had a great career."

On Sunday, Dr. Jeffrey Schwartz goes to church.

The location is Pacific Crossroads, a Santa Monica, Calif., congregation for which he regularly delivers turkeys and various groceries each holiday season. The area, one of the toniest ZIP codes in the nation, has a small poverty rate, less than 10 percent. But again and again, I watch as some of the few poor residents regard the coiled, excitable figure of Jeffrey Schwartz, nasally intoning that this food is being provided as the act of a church community. And that merely by *saying* so, the recipient of this free poultry could also receive the grace of Jesus Christ. "Would *you* like to accept Jesus as your Lord and Savior?" he asks, his voice taking on a kind of lyrical singsong.

Schwartz isn't particularly eager for his faith to play a role in this story. Colleagues already oppose him. Why give them another reason to doubt? But he also never considers declining my request to accompany him to church or on

this charity run. “I have *nothing* to hide,” he says. “This is who I am.”

The church he attends has the bright air of a modern mega church. And the service leans heavily on a band using rock ’n’ roll instrumentation.

Throughout the weekend, in his car and apartment, he’d played favorite performances by artists ranging from The Bastard Sons of Johnny Cash to Billie Holiday. Still, as the church band unwinds one tune after another, it is a surprise to hear Jeffrey Schwartz—the man who spends so much time yelling—raise his voice for some other purpose: to sing.

Schwartz’s instrument is imperfect, maintaining only an intermittent connection to the proper key, but strong and surprisingly smooth. And as the band performs the final song of the service, a gently rocking treatment of “How Great Thou Art,” Schwartz hits the crescendo at a volume suggesting his depth of conviction, his voice keening out over the rest of the people nearby.

The music ends, then, and Schwartz breaks into a big, buoyant grin—the angry little man transformed into a portrait of something far more powerful and unexpected: a man at peace with his choices.

* *Updated Aug. 30, 2013. This paragraph was added after questions were raised about Schwartz’s support for The Discovery Institute’s statement and the role it might have played in the amount of opposition he faces. As the narrative demonstrates, he faced plenty of opposition in the’90s, well in advance of signing the institute’s statement.*

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