



SURVIVING SURVIVAL

THE ART AND SCIENCE OF RESILIENCE

LAURENCE GONZALES

BEST-SELLING AUTHOR OF
DEEP SURVIVAL: WHO LIVES, WHO DIES, AND WHY

Also by Laurence Gonzales

The Still Point

The Hero's Apprentice

One Zero Charlie

Deep Survival

Everyday Survival

Lucy

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For my wife, Debbie

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Thine hands have made me and fashioned me together round about; yet thou dost destroy me.

—Job, 10:8

The drama's done. Why then here does any one step forth?—
Because one did survive the wreck.

—*Moby-Dick*

NO WAY HOME

DEBBIE KILEY WAS a sailor in her twenties when her ship went down in a hurricane. The captain's girlfriend, Meg Mooney, tried to make her way across the listing deck so that she could swim away. A towering wave swept Meg's sweatpants off and she fell naked into the rigging, which cut through her thigh down to the bone. Debbie had already leapt into the water, which was now filled with Meg's blood. As Debbie watched, Meg screamed and another wave collapsed upon her, again sending her into the water. Debbie swam back to the boat to help Meg into the water.

The first mate, Mark Adams, panicked. He inflated the life raft before tethering it to the ship. The raft blossomed into a perfect kite, and the gale-force winds whipped it away, carrying Mark with it until he was able to let go. Another crew member, Brad Cavanagh, managed to get an 11-foot Zodiac into the water. The five crew members swam for that boat. All the supplies for survival had been lost with the raft. They had nothing to sustain them. They were as good as dead.

Deep inside the brain, the hypothalamus monitors your bloodstream, its pressure and volume as well as how much salt is in it. When you become dehydrated and the hypothalamus sends its command to drink, it is nearly irresistible. Debbie described it this way: "Thirst begins as an urge, a need, a wariness, but after a while, it becomes an all-consuming passion, then an incandescent pain that begins in the nose and mouth and eyes and spreads to consume the whole body." Debbie and Brad were able to resist this torture. Mark and the captain, John Lippoth, were not; they drank seawater on the third day. Within 24 hours they both went mad. They began hallucinating and became convinced that they were a short distance from shore. John began talking to Meg in a calm and seemingly rational way, saying, "I'm just going to get the car. We're just off Falmouth." He went over the side. Debbie screamed at him to stop, but he calmly said, "I'll be back in a few." Brad joined Debbie in trying to talk John out of going, but he replied, "I can't take this anymore. I'm going to get the car." And he pushed off into the sea.

The sun was setting. Thin decks of cloud lay upon the horizon like crimson smoke. In a few moments, they heard John's shrieking as he was eaten alive by the sharks that had been circling the Zodiac. Meg lay in the bottom of the boat, covered in saltwater and seaweed, naked from the waist down. Debbie could see how severe her injuries were, her leg and torso deeply lacerated by the ship's rigging. Later that night, when Mark climbed on top of her in his delirium, all Meg could do was whimper. Then Mark flew into a rage, screaming, "I'm tired of playing games. I'm going back to the 7-Eleven to get some cigarettes." He, too, slipped over the side. Everything was quiet for a time. Then the Zodiac was hammered from underneath and flung into the air. A second concussion spun the boat around, lifting the bow and slamming it back onto the surface of the water. Debbie and Brad lay in the bottom of the boat, holding each other in terror, as they realized that sharks were in a feeding frenzy over Mark, just below the hull.

Full night descended, and above the moonless ocean the Milky Way emerged like a faint galactic mist in the sky. All was quiet once more. New stars drifted along their upward trajectory. Debbie and Brad fell asleep together. She woke to the sound of Meg speaking incoherently as if in tongues and waving her hands in the air. Meg seemed at peace, her voice without inflection. Soon the muttering ceased and Meg closed her eyes and stopped breathing. Brad and Debbie committed her body to the sea. They then made a pact to look out for each other, to take turns sleeping, not to drink seawater. To survive.

The next day, their fifth without water, they were picked up by a Russian freighter 290 miles off Cape Hatteras. When I told that story in my book *Deep Survival*, that's where it ended: with the rescue. But the rescue marked the beginning of an entirely new story for Debbie, because a relentless system for making memories had been hard at work throughout her ordeal. She endured excruciating pain over the course of the five days she spent adrift at sea. In addition to the pain of thirst, the terror of the physical brutality of the sea, she witnessed the horrifying deaths of three friends. Much of what the brain does is unconscious. It works behind the scenes to forge memories of what is dangerous and what is beneficial so that in the future we can respond correctly and automatically. During her crisis Debbie's brain was working overtime to map out those memories in preparation for the next assault. In the brain, the cardinal rule is: future equals past; what has happened before will happen again. In response to trauma, the brain encodes protective memories that force you to behave in the future the way you behaved in the past. Any sight, sound, or smell, any fragment of the scene in which you were threatened, can set off that automatic behavior. The trouble was that in all likelihood, Debbie would never again face a similar hazard. It is rare to be shipwrecked. The chances of its happening twice to the same person are vanishingly small (though, as we'll see, that can happen sometimes). In other words, Debbie's natural and normally useful systems for forming important memories were working on a job that had no practical value. Indeed, those systems were working to make her miserable.

AFTER THEIR rescue, when they were out of the hospital, Debbie and Brad, the sole survivors, went to lunch with their families. It was a celebration. They had survived. They were going home. But after the meal, Debbie and Brad walked away from the group and down to the harbor to look out and say good-bye. "Somehow," Debbie later said, "we couldn't fit in with those people, we couldn't yet return to the world." That clearly echoed what Viktor Frankl wrote about being liberated from a Nazi death camp at the end of World War II: "We did not yet belong to this world." That is one of the most common sentiments people express after an experience of extreme survival. Frankl said that when he and his fellow inmates were freed from the horror of the Nazi death camp, they experienced no joy. Their first steps into the world were timid and tentative, and they were not yet able to trust their own freedom. Although they passed through fields of flowers, they were unable to form an emotional reaction to them. The men came together that evening to examine their feelings about liberation and discovered that they had literally forgotten how to feel anything at all. The experience in the camp had inscribed a set of memories that obscured the old. The memories of survival had to be slowly overwritten by a newer layer of experience. Only then could freedom be trusted.

[Doug Robertson](#) drifted in a life raft for 37 days, trying to keep his young family alive after the sailboat, the *Lucette*, sank. The parents and four children were picked up at last by a fishing boat. Safe on deck, Robertson said he felt "like a merman suddenly abstracted from an environment which had become his own and returned to a forgotten way of life among strangers." Those feelings of alienation

and displacement represent one of the most common responses to trauma. Just ask Jessica Goodell, Marine who served in Iraq. Her job with Mortuary Affairs was to reassemble human bodies that had been blown apart by roadside bombs so that they could be sent home. After eight months of the horror, she tried to go home but realized that she, too, felt that there was no place for her in the world. After being trapped underground for 69 days in 2010, a Chilean miner expressed this same sentiment. "Part of me stayed down there," he said.

Survival is one triumph, but living through that ordeal delivers us into the next stage of the journey. Adaptation means adjusting the self to a particular environment. If the environment changes, as it does through the experience of trauma, you are lost and must adapt once more. The bigger the trauma, the more dramatic the requirement for change. In many cases, the necessary adaptation is so extreme that an entirely new self emerges from the experience. In those cases, there is no easy return to the old environment. Sometimes you can't go home at all.

It is nearly impossible to live a full life without trauma. It may not be a shipwreck or war. It might be a husband who tries to kill you. It could be a bear that tears off half of your face. It might be cancer. But all such events share a dramatic quality that seems irresistible to the storyteller within us. The stories always end like this: Just when Debbie and Brad seem doomed, the Russian freighter heaves into view and they are rushed to the hospital. Music up. Roll credits. Then they all live happily ever after. Offstage, of course. But let's put the players back on stage and see what happens next.

DEBBIE KILEY flew to New Orleans to recover at her mother's home. While still on the plane, she began reliving the moments when the captain, John Lippo, mad from drinking seawater, began talking about going to get the car. She could see him climbing over the side and slipping into the water. She watched him appear and disappear in the swells as he swam away. Merely closing her eyes brought the saturated images before her. She could still hear his horrifying screams like outraged metal as he was eaten alive by sharks. Each time the plane hit a bump, she said, "It felt as if someone was standing on my chest." During her five days adrift, she had used pleasant daydreams as a way to distract herself and to cope with the pain and terror. Now she couldn't rid herself of the powerful illusion that she was still at sea. The airplane ride was just another dream. Echoing Robertson, she later said, "It was as if some part of me still lived, could only live, on the raft, adrift at sea." That made perfect sense in terms of the parts of the brain concerned with survival: It would store away as much information as possible for future use. Debbie just wanted it all to go away. Her system for forming protective memories had done its job too well and had split her in two. Now her job was to knit herself together again.

She managed to get through the plane ride without going mad, but once she reached her mother's house, she lay in bed for days. She carried glass after glass of water back to the bedroom. An inner compulsion made her drink half of each glass and leave the rest to reassure herself that there would be more. After a week in bed, Debbie forced herself to go outside. This is the self divided by trauma: The rational part of her brain knew that her behavior was odd.

Out on the street, all the sights and sounds and people were too bright, too loud, overwhelming her senses. "I felt like I was not really there," she said, "or didn't belong there. I felt like I was on the verge of insanity." She went to St. Louis Cathedral and sat in a pew and released herself at last to uncontrollable sobbing. Debbie wondered how she would ever get back to her own life. But as she was to learn, you cannot return from a journey such as hers. Your only choice is to go forward.

DEBBIE SPENT most of that first month weeping in the cathedral. Angry and frustrated with herself, she decided to head back out to sea and confront her fears directly. She signed onto a boat that services other vessels during races. A storm broke over the race, sinking a number of boats and killing several sailors. Debbie returned worse off than before. She spent almost all her time hiding in church, praying and weeping. She tried getting a job and going back to school. She would be all right for a time “white knuckling it,” as she put it. But almost any adverse event would send her into panic. She would exhaust herself, fall into depression, and then lock herself in her apartment and cry for days on end. Over the coming years, she attempted many strategies. She tried getting married. She tried pregnancy and childbirth. And she still stood in the shower sobbing each morning. The constant stress began making her physically ill.

As Debbie told me about the nightmare in which she’d become trapped, I began to wonder who determined who did well after survival and why. I wanted to know what natural systems in our brains could make us respond the way Debbie had and what we could do to get on with our lives. Some people are innately more resilient than others in the wake of catastrophe. But we can also take steps to help ourselves. It turns out that many of the beliefs about this subject that psychotherapists have long held sacred are simply not true. For example, when the World Trade Center was attacked, the [Federal Emergency Management Agency spent \\$155 million](#) to make psychological counseling available to anyone who wanted it. The experts thought that a quarter of a million people would seek help from unmanageable grief over lost loved ones or for debilitating anxiety as a reaction to the horror they had witnessed. Just 300 people showed up. Of course, more people may have been in need of therapy, but new research suggests that if the bad news is that most people will experience trauma, the good news is that the majority are able to go on with their lives. Richard Tedeschi, a professor of psychology at the University of North Carolina, says that most people return to normal [within two years](#) after trauma. [James Pennebaker, a social psychologist at the University of Texas](#), called this fact “one of the best-kept secrets in the mental health world.” But the quality of life during those two years can be drastically different if you employ sound strategies for moving forward. After major trauma, few people find an exact fit into the old way of life. And this means that you face the task of building a new life and, in some cases, as we’ll see, even a new sense of who you are.

Your experience of life in the aftermath may be even more dramatic, sometimes more painful, than the experience of survival itself. But it can be beautiful and fulfilling, too, and a more lasting achievement than the survival that began it all. What comes after survival is, after all, the rest of your life.

BE HERE NOW: FROM VICTIM TO RESCUER

THE PREMONITIONS went way back. More than three decades, in fact, to the time when they didn't really know each other. They simply worked in the same office. The annual Christmas party was under way. Lisette duPré Brieger had seen Marshall Johnson sharpening an ax. Sharpening and sharpening and sharpening. She thought it odd, but perhaps it wasn't as odd as it seemed. They worked for an oil company and the company owned a 400-acre farm in the Virginia countryside. Various employees went out to the farm, so maybe the ax was for chopping firewood out there. Or maybe it wasn't.

Lisette liked Marshall the first time she saw him. There was an instant electricity. A friend had driven Lisette to the party, and now, as the crowd began to thin out, she realized that she had no way to get home. So, when Marshall offered her a ride, Lisette accepted. As they drove through that dark and snowy night, Marshall asked if she'd ever been out to the farm. She had not. He turned off the highway and drove away from the lights of town and out into the countryside. It was a pleasant enough ride and they made small talk. By and by, they arrived at the farm. There was a long rutted lane, now snow-blown and wintry, and the car bounced along in the frozen ruts, sweeping its beams of light across the house, then the cottage; the hilly ground and dried weeds sticking up through the snow were colorless in the night. Beyond the cottage was a coppice of trees and bushes and beyond that the plowed fields wreathed in darkness. Marshall drove down by the barn and parked the car. Then he reached into the backseat for the ax. Without having to think about it, Lisette threw open the door and began running across the snow-covered ground in her high heels, her party dress, escaping what she was sure would be the end of her. She was making her way up the hill, struggling toward the farmhouse, when she glanced back and saw him standing in the illumination from the headlights, holding a small box and looking out at her with a puzzled expression on his face. Lisette slowed and turned, then stopped altogether.

"What are you doing?" he called out.

She still hesitated. What was that in his hands? Not the ax. He held it up. A little box. Lisette's breathing began to slow. She took a tentative step toward him, reading the subtle cues of his body language. No threat there. Where had she gotten the idea? What subconscious signal had she picked up? What sixth sense had read the awful truth? Her logical mind dismissed it. Suddenly unsteady on her heels, Lisette wobbled her way awkwardly back down the hill, now conscious of how wet her feet were, how ruined her shoes and stockings, how silly her notion, how terrified she had been, and how sure that he had meant her harm.

"What's going on?" he called as she approached. He was smiling. He handed her the box.

"What's this?" she asked.

"Open it," he said. "What were you doing?"

“I thought you might be about to murder me with that ax.”

“I’m hardly an ax murderer,” he said with a chuckle. All at once, it was a joke. And the flicker of something sinister that she had seen in the car subsided beneath the surface once again.

She opened the box. It contained a necklace. She was the administrative assistant at the company and he was technically one of her bosses, so this was in keeping with the Christmas tradition. Even so, Lisette was touched. How silly of me, she thought. And: What an odd thing to think, that he wanted to kill me. Where had such a notion come from? Lisette was split in two. Years later, looking back at the contours of her life, it was sharply evident that something sleek and bony had been racing along, tracking her at every turn, invisible beneath the surface. As she stood there holding the necklace, she had no idea that 30 years later she would stand on the same spot in an icy scene much like this one and that same man would be ashes and she would scatter them into just such a wintry wind as this.

HERE’S HOW it happens: It’s October 4, 2009. You’ve just returned from church. A fresh breeze sighs through the sliding glass doors that open from your bedroom onto the patio. A kaleidoscope of falling leaves, yellow and tan and orange, drifts through autumn light. You can hear the feet of children rustling through them. You’ve hung up your dress and you now sit on a chair in a corner, wearing bra and panties, reading e-mails on your laptop. You no longer sleep together, you and your husband, not since the children were born. Graham just turned ten, Natalie eleven. The psychological and verbal abuse have become too extreme. It’s time that you all stopped living in this haze of emotional terrorism. You’ve told him that you’re leaving.

He enters the room now. From deep within the unconscious layers of memory, something rises to the surface. Your whole body goes on alert, though you don’t know why. You set the laptop on the floor to be unencumbered. Your first conscious thought is that the towel covers nothing more than his hand, held like a child’s hand in the shape of a pistol. It’s pretend. It’s not real. But beneath the surface, in the memories that your brain has been silently writing all along, you know something else to be true, something terribly important for your survival. Your body is now preparing for what it must do. It has no time to ask your permission. It must sweep all your thoughts out of the way and simply act.

He’s very calm as he says, “I love you too much to live without you.” Then, even before he lifts the towel, the subterranean memory bursts into action. You had just seen it in that book you were reading the night before: Be here now. It’s real. You don’t have to think. You see the revolver in his hand rising. Time expands to encompass the whole world.

LISETTE JOHNSON had felt a strange sense of foreboding the night before. Darkness came slowly as the autumn shadows gradually absorbed her world for what, she felt, would be the last time. The moon rose full and tremendous as she lay in bed reading. Earlier that day, she had celebrated her son Graham’s tenth birthday with eight of his friends: *Toy Story* at the cinema and birthday cake at home. And then the quiet of a suburban night, the breathing of the house, and Marshall acting strangely. He had been threatening her, first saying that he’d never see the children again if she left and then that she’d never get custody, because she was crazy. Only later would Lisette remember the ax and the scene at the farm, when she had run from the car. Thirty years. Thirty years of her emotional system working secretly beneath the surface, gathering information, waiting to protect her in the fullness of time.

The next morning was Sunday. She went to church, leaving the children at home with Marshall. She

returned at one o'clock. She had plans to meet her friend Gretchen and take a walk on the James River. But she found her husband sitting on the bed in the guest room. He asked her to lie down with him, but she refused again that foreboding soured within her. Her sixth sense. She knew that something wasn't right. She couldn't say what, but she refused his request. Whatever he had in mind, she didn't want any part of it. He had been strange enough over the years and all the more so since she'd announced that she was divorcing him.

Lisette turned and went to her bedroom. Marshall rose and followed her, asking that she please come and lie down with him or at the very least give him a hug. She refused again, sensing the danger there. He lashed out angrily, saying, "I want to know how you are going to live when you leave here. Where are you going to live on?" He stormed out of the room and Lisette sighed with relief. She undressed and sat to check her e-mail. She was due to meet Gretchen in less than an hour. Then Marshall returned with the towel over his hand.

Lisette stood immediately, suddenly knowing what she knew in that deep place of knowing that required no conscious thought: Be here now. She stood at the exact moment that he pulled the trigger, firing point-blank at her head. And because she stood instead of sitting there in disbelief, the bullet struck her not in the head but halfway between her collarbone and her right breast. She bolted for the open door and he fired a second time, hitting her in the abdomen. As she ran across the yard, she screamed for the children. He fired again, hitting her in the back. She could hear her daughter screaming, "What's wrong? What's happened?"

Lisette managed to call out, "Daddy shot me!" All the time running, running. The woods. The grass. The rustling of the yellow leaves. The neighbor's house, all brightly lit with luminous colors, festive with ghouls for Halloween. She heard another shot but felt nothing. Then, all at once, she knew what he had done. That last shot had been for him. She put it from her mind. She had a single purpose now: Survive. For the children. She was heading for the neighbor's house, where someone could call an ambulance. She collapsed in a pile of leaves, for it was autumn and everyone was raking leaves in this quiet woodsy suburb. The smell of leaves. Smoke. Natalie kneeling over her, crying, "Mommy, mommy, wake up!"

"Like a dream," Lisette would later say, "where you can't run. Your feet are anchored to the ground and your mouth opens to scream, but no sound comes out."

They lived in an upper-middle-class suburb. They'd been married for 21 years. He was well liked, successful, and had many lifelong friends. Lisette later learned that he had taken the phone off the hook so that the children couldn't call the police.

LISETTE WAS given 10 units of blood in the emergency room. Both of her lungs had collapsed. She still has one of the bullets in her liver. But she got up by herself in the first week. Her physical recovery went well. She returned to work, took care of the children. She functioned. But the deep systems of memory had done their work too well. Driving her son, Graham, to therapy, the sound of an ambulance set off the emotional cascade and she found herself driving through a veil of tears, her heart hammering wildly in her chest.

On her first Christmas without her husband, she was up at two in the morning, struggling with the paradox of missing him, loving and hating him. She knew the children would feel the loss. She wrote in her diary: *All I want to do is fall apart. Just be in the sadness and not fight it.* She lay in bed and longed to be held.

Lisette took the children to visit her family for New Year's Day and, like Debbie Kiley, she began to feel how such extreme survival sets you apart. "I was surrounded by love," she said, "but I had this odd sense of isolation. Difference. Like I knew something they didn't." At midnight on New Year's Eve, she simply burst into uncontrollable sobbing.

The children experienced hysterical crying jags. Lisette had to stand in the middle of it, the room trying to calm them when she, too, felt like curling up in a ball and falling apart. Back at home during the first week of 2010, she went through the motions of pretending to be normal. She took Graham and Natalie to school, practiced *tai chi* for a while, took a shower, checked her e-mail, visited her attorney to sign some papers. Made a business call. Then hung up and burst into tears. *It is there. Just like standing in front of the mirror and touching the scars, it is part of me now. Part of who I am. I am beginning to accept the scars as a completion of my uniqueness.* Lisette resolved to do whatever was necessary for the children. She recognized that ultimately her responsibility to be happy was the same as making sure that her children survived. And she wrote in her diary something that is true of all of us: *My scars are my victory.*

She was not alone. She had a generous network of friends and family who hugged her and made food and conversation. It was comforting but also a bit eerie. Lisette began to feel as though she were attending her own funeral. And she was beset by the clash of feelings. At one time she had cherished the intimate physical relationship with her husband. But that was so far behind her now. Lisette began to turn her feelings of fear and loneliness into anger. In her diary, she wrote: *Fuck you! I hate you. What a fucked up pair we were. Well, guess what? I'm not going back there. I'm done. Thank you for facilitating that. For bringing me to the point where I had to choose survival over death. I had to make a conscious decision. And I did it and I can do this, without you, without anyone. It's in me and always has been. The truth is, I feel more alive than I have felt in years.*

In mid-January, she began cleaning out his closet. She felt at last that she was saying good-bye, cutting him out of her life, deleting him and any evidence that they had existed as a couple. Driving the car full of his clothing to donate it to charity, she felt on the point of emotional collapse.

Spring came. The woods that surrounded the house were exploding with life. The leaves spread out in fans of green. Lisette was cleaning out the linen closet, moving sheets and blankets, when she discovered the bullet hole in the wall. The workmen had patched the hole in the bedroom where he had shot her and then himself. But they hadn't seen the exit hole inside the linen closet. She stared at it now, marveling at how the bullet could have passed through her husband's brain and then through the bedroom wall and through this wall as well. She felt a sense of peace and detachment. A new kind of strength filled her.

Even so, the dreams still came. Fewer as time went on, with more space in between, but sometimes they were overwhelmingly vivid and would leave her feeling haunted through the next day, as though she moved in a world of living ghosts. She dreamed that she was with him in the guest room, where she had once found him loading his revolver. She approached him and he looked up at her, put the pistol to his temple, and shot himself. In her dream, she passed out. She awoke so disturbed that at first she couldn't even cry. She just lay there paralyzed. Then she broke down, alone in her bed in the middle of the night.

At times she could not remember the dreams themselves and was left with just the feeling of them, the tremendous aching melancholy underneath everything she did that day, as if she moved under water. The tumult of her emotions embodied mourning and rage and terror and longing in endless

combinations. Before Marshall shot her, Lisette used to dream about the river flooding, about being trapped on one side when she needed to get to the other. But the James was too wide, too violent. She never had that dream again after he shot her. One memory, more powerful, overwrote the other. That is how experience revises us.

LISETTE BEGAN giving talks for the police at the domestic-violence task force. For them Lisette provided a rare glimpse inside a world that they usually viewed as a grouping of corpses. She had been there and had survived. They wanted to mine her for clues to future cases. Talking, helping others, gave Lisette strength, but the trauma had filled her world with emotional land mines.

She went to a friend's wedding and "Jesu, Joy of Man's Desiring" by Bach was played as the bride walked down the aisle. It was the same song that had been played at Lisette's wedding. She fled to the bathroom and cried. *Cried for the dream lost, the anger of a promise broken, the betrayal. How rare my emotions were just below the surface.* But she gradually began to feel grateful for having any feelings at all. She began to realize how long she had been completely numb in her marriage, and how deeply she had denied all the warning signs, beginning with the ax three decades earlier.

One day in early May, the weather turned cool and she had the windows open just as she had on the night before he shot her. That eerie sense, the same foreboding, descended on her once again. She got up and went into the bathroom. Marshall was standing by the bathtub. Lisette was so excited that she ran to him, embraced him, and told him that she was glad he wasn't dead. She reassured him that they could work it out. Then she began to hear the sirens approaching, one, then three, then five, then choir of sirens wailing. She asked Marshall not to let them take her, because she wanted to be with him now. Then she realized that the bathroom was actually an operating room.

She woke to silence. It was morning. But it was as if every bird had died. Lisette rose weeping and walked through the day in a trance, upset with herself but not knowing why. Perhaps for begging him to stay. For loving him. Even as he stood there and simply ignored her as he had done in life. Her feelings were doubly confusing because her trauma was also bereavement for a loved one, and that loved one was also her murderer. Moving through spring, she began to recognize some of the other paradoxes of her marriage. She used to feel lonely all the time. Now that she was really alone, she rarely felt true loneliness.

As the season wore on, Natalie turned thirteen. She made dinner for her mother one evening. Afterward, they walked along the river, and Lisette saw how beautiful the sunlight was on the water, the lawny clouds, the luminous mist in the distance. She felt the serenity of the water in the failing light and watched the grace of a paddler gliding along in a kayak, the whisper of his strokes. She felt alive, excited.

Then something remarkable happened. Lisette was sitting in the waiting room while Graham was in therapy. An eleven-year-old girl named Betty struck up a conversation. Betty told Lisette that she had been shot in the neck and that the bullet was still there and it hurt all the time. Lisette told her that she, too, had a bullet and pointed to her abdomen. Betty tried to reassure Lisette. She said that her mother had been shot twice and her brother was shot four times. Her father had done the shooting. Her brother, aged ten, was in the hospital on a ventilator.

A few weeks later, Lisette and Betty again found themselves together in the waiting room. Betty was sitting with her sister, Ruth, a girl like Lisette's daughter, Natalie, who had just turned thirteen. Betty was happy to see Lisette and told her sister the story. She said that Lisette's children were lucky

because they hadn't been shot. Then Betty told Lisette that on the day that it happened, she had been playing outside with her little brother and had a premonition that something bad would happen. A gut feeling. A sixth sense. Betty wanted to stay away from home, but her brother was cold and wanted to go inside. When they went in, their father was telling their mother that if he couldn't have her, no one could. Then he shot her. He tried to shoot her in the head but missed and shot her in the side of the face. As he shot each of the children, he told them that it was their mother's fault that he had to do this.

Lisette was trying to hold it together as she listened to this tale told by the beautiful child before her. She tried not to burst into tears and fall sobbing to the floor. She tried to view herself as someone who had come a bit farther down this road, who could perhaps help these girls along the way. Then the thirteen-year-old sister, Ruth, spoke up. She said that people think she's lucky because she wasn't shot. Lisette asked if she was out of the house that day and escaped because of her absence. But Ruth said no, she was right there the whole time. She said that she wished that her father had shot her. She wanted her dead. But instead, he made her watch him shoot the other children and then he forced her into the bedroom, where he raped her. Then he made her watch him shoot himself. But before he pulled the trigger, he told her to take the gun and shoot him once more when he fell down, to make sure that he was dead.

Lisette could hear the screaming noise in her head, like metal on metal, and see the room cloud over as if the walls had caught fire. She could feel the world move beneath her feet as if the very edifice of reality was faltering upon its pilings. Yet she forced herself to hold on for the sake of these girls before her and she managed to make her mouth move, to make her breath come forth so that she could tell them, promise them, that while what they experienced will never go away, they will learn to live again. She promised them that they would be happy one day, because she was happy. They exchanged phone numbers, and Lisette promised to be there for those girls. And since their mother couldn't drive a car yet, she promised to take them to their appointments. Lisette had found something apart from herself to care about more than herself. Of course, she had her children to care about. But now, in light of what Betty and Ruth had told her, she could see that there were people who were even worse off than they were. If Ruth could survive, then so would Natalie and Graham.

In achieving her success in the aftermath of extreme survival, Lisette was exhibiting several important traits. And in many ways, both surviving and the aftermath of survival require similar traits. If "be here now" saved her life, it also allowed her to go on with it, because she focused on what had to be done. She paid attention. But she also got out of herself, struggling both for the sake of her children and for Betty and Ruth. In that way, Lisette became a rescuer and she left behind the personhood of the victim.

[Helping others](#) is one of the most therapeutic steps you can take. Lisette frequently tells her story in support groups, especially to women who are the victims of verbal and psychological abuse and also don't realize that it is a precursor to violence, perhaps even murder. Her talks are electrifying. After each one, she told me, "People always want to touch me, hug me. I'm not sure if it is to comfort me or to comfort them." It is both. An area of the brain called the anterior cingulate cortex interprets pain, including social pain, such as grieving. It can also send signals of pleasure from sensing skin-to-skin contact. When emotional pain occurs, our first impulse is to put out the fire with skin-to-skin contact. When the unspeakable happens, people hug one another.

After I had known her for some months, I asked Lisette how she was doing. "I have some very da

times,” she said. But she referred to her progress as “amazing” and said that she was reconciled to the new facts of her life. “I’m never going to leave this behind. I have a very fulfilling, very happy life. I’ve always been a very optimistic person. Even on my worst day I’m so much happier than I was.”

THE CROCODILE WITHIN: THE BURDEN OF INVISIBLE MEMORY

EILEEN BERLIN SENT me a photograph of herself and her husband, Scott, relaxing in the pool at the hotel. They were on vacation in Mexico. Buff and beautiful. Grinning. Scott was laid out in his red trunks with a drink in his hand. Eileen was seated next to him, knees ricked up, wearing an athletic visor as if she'd just gone running. White plastic chaise lounges were arranged around the quarry-tile deck. Blue water. A tan and happy couple. Eileen's sister Beverly took the photo. It was Beverly's first anniversary with her husband, Charles. They felt like kids playing hooky.

After relaxing by the pool and taking a ride on the Jet Skis, the foursome dressed and went to dinner. They had a few drinks and watched as sunset leached all color from the scene. They decided to go for a swim. The surf was up on the ocean side, so they chose the peaceful bay behind the hotel. Full moon. Glassy smooth water. No worries.

The dock behind the hotel was deserted. The quiet warmth of the night seemed too good to be true. They stripped down and left their clothes and slid into the bay. The water was deep and warm, caressing. They drifted around, treading water, talking in whispers, giggling, in awe of the beauty beneath the full moon. Eileen let herself float away from the dock, moonlight sweeping across her long tan body. Indigo shadows lay all around, sparkling with the million daggers of moonlight that reflected from the water, the brightness of her naked skin seeming impossible against the smoky ripples. The tarry smell of the sea and of cut grass and pine mingled with the feel of the water to complete the impression of dreamy peace and contentment.

As she glided away from the others, she heard a hissing, roaring noise. Instantly, she knew what it was. Some ancient system in her brain had kicked in: a dragon, a reptile, a demon of old. The eight-foot crocodile took her head in its jaws with such force that it broke her cheekbone and severed her ear. The blinding pain, the riptide of adrenaline, * an explosion of light behind her eyes. The crocodile pulled her under. She knew what was coming. Somewhere in her past she must have heard: They roll with you until you drown. As they roll, their teeth tear off parts of you that they then swallow whole.

Beneath the surface of the water, Eileen managed to struggle out of the jaws. The crocodile thrashed around and attacked again, savage, relentless. It took her torso in its jaws and slashed her right breast, slicing through the muscles of her back. Eileen struggled free once more and instinctively dove, sensing that the crocodile would be looking for her on the surface. From her vantage on the bottom she could see the tremendous black shape above, slithering along in search of her, silhouetted by the moonlight that fell in silty spokes through the water. She surged to the surface behind its tail. Scott and Beverly got hold of her arm to try to pull her to safety. The crocodile shot forward yet again, the

time nearly ripping off Eileen's thumb. Her brother-in-law Charles fought furiously against the attack, beating the crocodile back, while Scott and Beverly moved Eileen to the dock. The animal snapped its tail one final time and then the black water sucked it down. With the crocodile gone at last, Eileen lay naked on the boards in a welter of blood, her back muscles ripped to shreds, her thumb hanging by a bit of skin, her breast half gone. It was June 6, 1998.

It took the ambulance forever, she later scrawled in a spiral notebook. Trying not to pass out—so much blood loss. Will I make it? Scott close to hysteria in the hospital, pain medicine not working, is Demerol? I throw a fit—crying. Wake up all night—blood coming out of my left ear. This really scared me. I need rabies shots.

Even before birth, we begin adapting to the environment in which we find ourselves. We learn its rules. We unconsciously take actions that help us avoid danger. But a catastrophic experience can undermine all that learning. Once we're safely beyond the shipwreck, the husband, the crocodile, we try to return to normal life. But there is no normal anymore. Yes, Eileen was rescued. And yes, she had surgery that saved her life. She returned home with Scott and Beverly and Charles and found a loving family around her. And then strange things began to happen. She had not escaped the crocodile. It had taken up residence inside her.

I will cry at anything. Tears for almost an hour. I had a bad nightmare. I was standing on the dock and a huge crocodile was creeping toward me. Water on one side, crocodile on the other. I woke up with my heart beating wildly, terrified. It was 3:20 A.M. I didn't sleep much after that. I feel exhausted and sad today.

Eileen was struggling to get back to normal, not yet fully aware that she would have to reinvent what normal meant to her. She was going to have to come up with a new set of adaptations, because the person who went into the water behind that hotel was not the same person who came out.

Undergoing surgery after surgery was bad enough. She was in constant pain. Her two-year-old daughter was afraid of her. *She won't come near me*, Eileen wrote. Her jaw wouldn't open. *I am so tired of eating mush. My teeth are loose. All I eat is soup, pudding, oatmeal.* She took her daughter to school and came home in tears. *Awful, everyone stares—it exhausts me. I always feel dirty. Lots of bites on my head.* July, August, September, she was beginning to despair of ever being normal. In early October, she went back to work for the first time.

I had to present myself to my supervisor for inspection (this meeting was disguised as concern), I guess to make sure that my appearance wouldn't frighten any of the [customers]. All this made me feel like some freak show. I am fighting the urge to yell, "Just go ahead and look!"

In the midst of the attack, as Eileen looked up at the crocodile from the seafloor, she became sharply aware that she might die down there. All that she loved—her daughter, her husband, her sister, this life—snatched away from her in the single appalling act of a mindless creature. As she hid there, a secret swimmer beneath the sea, that thought made her angry. She found inside herself an unfamiliar determination, a new kind of resolve, as fear turned to anger and anger turned to action. She would fight, she told herself. She would never give up. She would live. And she did that. She was a success, a real survivor. Once she was out of the water, bleeding on the dock, she felt the certainty that she would live. She had met the new Eileen, this fighter, this determined winner. Eileen completed one journey of survival only to be plunged into a new and unexpected one: how to live the rest of her life. [Bryan Shaw](#), a journalist and a veteran of the war in Iraq, wrote an essay to describe to soldiers how they would feel coming home after the trauma of combat. Home would not feel like home, he wrote

Everyone you loved before would now appear as a stranger. It was a good description of Eileen's experience.

Scott and I are going to counseling. We are not getting along very well lately. I am so miserable and I never sleep through the night. I feel crazy and can't concentrate or get along with anyone. I feel alone, separate, different. I wish I could make it go away.

IN ADDITION to healing her body, Eileen faced a more difficult journey. Her experience with the crocodile had physically changed her brain. A large amount of new information about herself and her environment had been dumped into that miraculous vessel of learning. This information was about survival. Certainly, the brain and the body would want to remember it. But the very system that evolved to save her became her worst enemy. She just wanted to forget the whole thing. But the system simply doesn't work that way.

Most people are familiar with what psychologists call **conditioned responses**. The most famous one was demonstrated by Ivan Pavlov, who conditioned a dog to salivate at the sound of a bell.* This happens because when two nerve cells fire together, even if by accident, they will fire together in the future. The saying is: When they fire together, they wire together. The cells become physically linked into what a Canadian psychologist named Donald Hebb called cell assemblies. When one fires, they all fire. And if, in the beginning of their assembly, they fire together because of an event that comes with high emotions, then it becomes difficult to keep them from firing together in the future, even if that firing represents the pairing of two completely unrelated events. Bells have nothing to do with food. They have no value for the dog's survival. But the sound became what's known as a retrieval cue, also called a trigger: It called up a memory and initiated an action. After the relationship between the bell and food had been established, the sound alone was enough to make the dog salivate. This effect is often manipulated by the people who make movies. In the movie *E.T.: The Extra-Terrestrial*, the tinkling of keys on Peter Coyote's belt was paired with the threat of the bad guys' capturing E.T. Despite the fact that keys have no meaning in the movie and present no threat, the tinkling sound was so crucial to the emotional progress of the drama that the character played by Coyote was identified in the credits only as "Keys."

When an experience is highly charged with pain or pleasure, the learning can take place instantly. For Eileen, this meant that any stimulus that was present during the attack had become inextricably linked at a cellular level with all the mad fear and frantic struggle that she experienced in the water. The retrieval cue might be moonlight, water, the tarry smell of the sea, darkness. Moreover, because of continuing pain and fear, many more things in her environment could become incorporated into those hair-trigger cell assemblies that could send her into a full-blown panic.

Joseph LeDoux, a neuroscientist at New York University, uses the example of a car wreck to illustrate this effect. If you're injured in an auto accident and the horn is blaring, in the future, the sound of a horn alone may cause anxiety. LeDoux calls this emotional learning. When the accident happened, the brain laid down an important trace of unconscious memory to mark what was dangerous in the environment. The trace was essentially a message that said: Next time you encounter something that looks, smells, sounds, or feels like this, prepare to survive. So pain and panic were paired with car horns. **They fired together, so they were wired together.** As Eric Kandel, a neuroscientist at Columbia University pointed out, this effect may be permanent. LeDoux told me, "Meaningless stimuli that occur in connection with trauma . . . can later trigger fear and stress themselves. Evolutionarily

speaking, these kinds of associations help us anticipate harm. But sometimes, they also end up tying us up in knots.” Antonio Damasio, a neurologist at the University of Southern California, compares these activities of the emotional system to a flashlight beam cast into a dark room. It illuminates the thing you wish to see, but the light falls on everything else around it as well. Then, when any of those extraneous objects is perceived again, the emotional system rebroadcasts everything that was associated with the trauma. When something elicits a powerful feeling, it’s almost impossible to resist the automatic response. That’s why we can’t get back to normal life after trauma.

When the crocodile attacked, Eileen’s emotional system responded first to the hissing roar. That set her body in motion to fight back. Her fight began within milliseconds, before her conscious mind could even form thoughts about the attack. Earlier, I said that she instantly knew what it was. I might have said that her amygdala instantly knew what it was. The amygdala* is the centerpiece of the emotional system and helps create instant reminders of what the danger looks like (or sounds like or smells like). It writes down indelible memories of everything in the scene and turns whatever you do into a reflex for the next time. In reaction to Eileen’s severe trauma, her amygdala helped create an entirely new emotional landscape. Some of what the amygdala knows is inherited from our ancient ancestors (fear of loud noises, for example, especially the hissing or roaring of an animal). But most of what it knows is written by experience. And when bad things happen, this system can be the source of much sorrow.

An emotional system much like our own has served mammals well through millions of years of evolution. It relies on two important features. It initiates automatic behavior that requires no thought. And it creates long-lasting memories so that we can instantly do the same thing in the future. It interprets any fragment of the situation as representing the whole. So you don’t have to crash another car to get the reaction you had during the first crash. A honking car horn does the trick. For Eileen, the attack forged strong memories of what to look out for: sights, sounds, smells, pain. Once she was back at home, each time she was exposed anew to any one of those triggers, her emotional system told her that another crocodile was attacking. Most of Eileen’s emotional memories remained hidden. As a result, many of her reactions seemed to come out of nowhere. She couldn’t say what was setting her off. I’ve heard more than one New Yorker report having an anxious feeling on clear autumn mornings. That’s what the weather was like when two airliners burst through the World Trade Center. During that traumatic event, for some people, the amygdala irrationally labeled the weather as a sign of danger. A new trigger was created to bring on an attack of anxiety. This same system of emotional memory caused Lisette to feel fearful and to have bad dreams on cool autumn nights like the one when her husband shot her. The brain can seem at times like a confounding bureaucracy with different departments arguing with one another. The amygdala is not in the Rational Department. It doesn’t care that, at times, its responses might make no sense. The emotional system can’t allow you to think about your reactions. That takes too much time. If you stop to think, you’ll be eaten. So it’s tuned for instant reaction. And remember, too, that if Eileen had lived 50,000 years ago, that complex of memories would have served her well to avoid crocodiles. The system is driven by natural selection. If it gets you to survive long enough to reproduce, it gets passed on. It doesn’t care that it might make you miserable in certain circumstances.

[Kathy Russell Rich](#), who survived stage-four metastatic breast cancer, said that even a decade after her treatment, the mere memory of chemotherapy could induce nausea and “a horrible, drug-induced stomach burn.” She said those intrusive memories could literally cut off her ability to think. That

because under extreme stress, [the emotional part of the brain shuts down the frontal lobes](#), the area of the brain that we use for logic and reason. The frontal lobes have the calm and sensible voice that Eileen tried to use: My husband brought me home. I've been treated by competent doctors. I'm in my own bedroom now. The doors are locked. There are no crocodiles where I live. But to get its work done, the amygdala vetoes those distracting, if reasonable, thoughts. To the people around her, it must have seemed that the tremendous anxiety and terror that Eileen was experiencing weren't really real. It was all in her mind.

PEOPLE ONCE thought that the mind was some kind of spirit with no physical reality, a soul consisting of insubstantial ethereal force or energy. In 1861, a French neurologist named Paul Broca introduced the concept that the mind is simply an expression of physical processes in the brain. Mind, in other words, is meat. The brain and body are so intimately connected that there is little point in talking about one without the other. Sensory and motor nerves exist everywhere in the body. And the circulatory system carries hormones and neurotransmitters everywhere to directly influence the brain and body. Damasio calls it "the brain-body partnership" and says that neither brain nor body does anything alone.

It is common to see the brain characterized as a splendid invention that has to drag around behind a primitive throwback bag, the gross and sluggish body. That conception misses the point. In fact, it misses two points by a rather wide margin. The brain is not an elegantly functioning jewel, as it is often said to be. As my father used to say of certain aircraft that had been distressed by long overuse, the brain is a collection of spare parts flying in close formation. David J. Linden, a neuroscientist at Johns Hopkins, calls the brain "a kludge (pronounced 'klooj'), a design that is inefficient, inelegant, and unfathomable, but that nevertheless works."

In addition, with all the attention the brain has been getting in recent years, we tend to forget that the brain is the body. It is of and in the body. The body directs behavior through its control of the brain, which is there to serve its needs and whims. The brain itself cannot reproduce, so it had better pay attention to the body or it will go extinct in a hurry. In fact, during the body's attempts at reproduction, it generally tells the brain to go sit in a corner and pay no mind. That's why Damasio calls the brain "the body's captive audience." All feelings are generated in and by the body and they are all about the body. And feelings, conscious or occult, direct behavior. Unfortunately, we do not yet have a word in English that can unify the brain and body, the thing that gives rise to motion, thought, consciousness, feeling, and to the self that we perceive as whole. Maybe classical Chinese can help in the meantime. Lu Chi's ancient text, *Wen Fu (The Art of Writing)*, says, "Emotion and Reason are not two," and suggests the word *hsin* to unify heart (body) and mind (brain). So when I say "mind," I mean *hsin*, the mind that includes a heart (and a hand for doing and a gut for feeling). And when I say "brain," I also mean *hsin*, the body that includes a brain. The body is an organ of experience. Through its captive audience, the brain, the body is constantly recording what happens and what those events mean (bad or good, pain or pleasure). As it records, it looks into the past and tries to predict the future. The body's best guess is that they will look the same. The body is the instrument for these recordings, and the brain is the tablet on which that instrument writes. This work is daunting and mysterious. It sometimes seems almost magical. For it always tells us, eventually, what it has learned. But it may do so when we're not looking.

So, if Eileen's trouble was all in her mind, then her fear and anxiety, her tears and anguish, were a

being expressed as feelings in the material stuff of her body. Certainly, clusters of cells were communicating furiously with one another through electrical and chemical signals in her brain. But you cannot feel your brain. It has no sensory nerves. What was troubling Eileen was what she felt in her body, the racing heart, quaking muscles, churning gut, dry mouth, and pouring tears. It was her body that experienced the sweating, the hyperventilation, and an inability to sleep or eat properly. And in her mind, *indeed*. It was entirely in her body, and her body played out those feelings over and over again for the audience, the brain, which allowed Eileen to perceive, consciously, what a mess she was. If she was to feel better, she had to do something with her body.

Emotion and reason work like a seesaw. (Daniel Kahneman, a psychologist at Princeton and winner of the Nobel Prize in economics calls these **System One** and System Two.) The higher the emotion, the harder it is to think straight. But it can also work the other way around. If you can just get yourself started thinking straight, you can sometimes override emotion. In fact, that's what makes us different from the other great apes. One of the most important functions of the frontal lobes, the part of your brain behind your forehead, is restraint, the thoughtful and deliberate domination of reason over emotion. So, if you can manage to think clearly enough, you can start to tone down the fear. Eason said that done for a variety of reasons. One obvious reason was that Eileen was severely injured. An injured body makes recovering the mind that much more difficult. Physical injury produces stress which involves a host of changes in your muscles, your digestion, even your immune system. **Stress dumps special chemicals** into your bloodstream. And while those chemicals were necessary for the burst of energy that Eileen needed to survive the attack, if they continued to circulate over a long period of time, they could do real damage.

One of the chemicals of stress is cortisol, a steroid. A little bit of stress, a small rise in cortisol makes you more alert and puts you in a better mood. It improves your ability to concentrate and helps you form explicit (conscious) memories. A little bit of stress improves performance in sports and intellectual activities. A little cortisol improves your appetite. But that same chemical in large and prolonged doses has the opposite effect. It can disrupt the machinery of explicit memory. It can cause malfunctions in the frontal lobes so that you can't think straight. Making matters worse, too much cortisol stimulates the fight-or-flight reaction. So it becomes a feedback loop.

Many kinds of memory are formed in the brain and body. Explicit memory tells you such things as what you intend to buy at the grocery store. Another kind of memory, called episodic, allows you to tell someone everything that happened at that awful party last Saturday night. Implicit memory includes things such as learning to tense your muscles when the dentist brings the shrieking drill toward your mouth. It's an emotional memory, so you don't have to think about it. It just happens. Implicit memory also includes procedural memory, which allows you to learn, for example, to ride a bicycle or to tie your shoes. Automatic behaviors, such as your golf or tennis swing, are part of implicit memory.

The same cortisol that makes it difficult to create new explicit memories makes implicit memories stronger and faster, strengthening your response even when you can't remember why you're responding in the first place. While too much cortisol interferes with the work of the hippocampus (for making conscious memories), it improves the working of the amygdala (for producing fear and unconscious memories). When that steroid disrupts the formation of conscious memories while enhancing the formation of unconscious ones, you feel anxiety without ever knowing where it came from.

When Eileen wrote in her diary that she was miserable, never slept through the night, felt crazy and unable to get along with anyone, it was because she was experiencing the effects of those chemical changes I've been discussing. What Eileen needed, then, was to find some way to get at the chemicals in her brain that were setting off her alarms. She needed a way to readjust the chemistry that was causing her such disruptive anxiety. And if Eileen's trouble was all in her mind and her mind was a manifestation of her body, then it would be through her body that she would ultimately ease her mind.

EILEEN HAD gone to college and earned a master's degree in psychology, so she knew the fancy name for what was troubling her: post-traumatic stress disorder, or at least some of its symptoms. But Eileen's response to trauma is not a disorder. It is, in fact, the inviolable command of memory: Learn this to save your life. It is a perfectly reasonable response, given the way our brains are organized. A physical injury leaves scars. Let's call it post-traumatic stress. It sounds as if Eileen should have seen a psychiatrist, but psychiatrists like to talk, and [in many cases, talking therapy won't work](#) for severe anxiety disorders. Moreover, talking therapy can backfire. Jonathan Shay, in his book *Achilles and Vietnam*, wrote that [in the early days](#) of the war, psychologists encouraged veterans to tell their war stories, to get it all out, in the belief that this would help them release themselves from mental anguish. He called the results of this misguided effort "catastrophic." [This technique of forcing people to talk](#) after they experience trauma is known as Critical Incident Stress Debriefing and it's been shown to be ineffective and even harmful. In fact, a lot of the patients committed suicide. This does not mean that keeping trauma secret is the best approach. It means that writing about your experience or talking with friends and family only when you're ready are often better than being forced to unburden yourself in a formal, professional setting.

From the press and popular culture, we may get the impression that you have to go to war to experience post-traumatic stress. But injury can affect us along a broad spectrum, ranging from very mild symptoms to completely debilitating ones. If you're chopping onions and cut off the tip of your finger, you may find that your mind involuntarily replays the accident at times, causing you to flinch inwardly each time you remember the adrenaline-soaked sensation of knowing that sharp metal just slid through your own flesh to contact bone. That's one end of the spectrum. You'll get over it. Or not. It won't disrupt your life. At the other end, in the realm of extreme trauma, lies the abyss. Some people are able to go on. Others are not. But in dealing with the aftermath of trauma, it's important to realize that we don't get over it. We get on with it.

Eileen took off running. She had always been an enthusiastic runner. And she knew that exercise produces profound chemical changes in the body that could improve her mood. For example, exercise activates [a system in the brain that produces dopamine](#), a chemical that provides motivation to do something and a commitment to a particular course of action. Cortisol and dopamine work together to improve mood and relieve pain. People who are depressed are usually low on dopamine. Without sufficient dopamine, you wind up with Parkinson's disease.

Several months after the attack, still struggling with her nightmares, Eileen set a goal. "I began to approach my recovery as an athletic event," she told me. "Here's my future, let's get on with it." She got angry and made a decision to take action and do something. [George Vaillant, a psychiatrist](#) at Brigham and Women's Hospital in Boston and a professor at Harvard Medical School, is the director of the Harvard Study of Adult Development, the longest-running study of adaptation in humans ever.

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