"A fascinating, in-depth look at human behavior under extreme pressure. Its gut-wrenching stories span the full spectrum of action under duress, from panic to heroism. Not only is this book fast-paced and engrossing, it's illuminating."

—Michael Tougas, author of Fatal Forecast: An Incredible True Tale of Disaster and Survival at Sea

The Unthinkable
Who Survives When Disaster Strikes—and Why

AMANDA RIPLEY

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Introduction

"Life Becomes Like Molten Metal"

On the morning of December 6, 1917, a bright, windless day, a French freighter called the Mont Blanc began to slowly pull out of the Halifax harbor in Nova Scotia. At the time, Halifax was one of the busiest ports in the British Empire. There was a war on in Europe, and the harbor groaned with the churn of ships, men, and weapons. The Mont Blanc was headed for France that day, carrying over twenty-five hundred tons of explosives, including TNT. While passing through a narrow channel in the harbor, a larger ship, the Imo from Belgium, accidentally rammed the bow of the Mont Blanc.

The collision itself was not catastrophic. The Imo sailed on, in fact. But the crew of the Mont Blanc knew that their ship was a floating time bomb. They tried to put out the fire, but not for very long. Then they scrambled into lifeboats and paddled for shore. For a few heartbreaking moments, the Mont Blanc drifted in the harbor. It brushed up against the pier, setting it on fire. Children gathered to watch the spectacle.

Many of the worst disasters in history started quite modestly. One accident led to another, until a fault line opened up in a civilization. About twenty minutes after the collision, the Mont Blanc exploded, sending
black rain, iron, fire, and wind whipsawing through the city. It was the largest bomb explosion on record. The blast shattered windows sixty miles away. Glass blinded some one thousand people. Next, a tidal wave caused by the explosion swamped the shore. Then fire began to creep across the city. In the harbor, a black column of fire and smoke turned into a hovering white mushroom cloud. Survivors fell to their knees, convinced that they had seen a German zeppelin in the sky.

At the moment of the explosion, an Anglican priest and scholar named Samuel Henry Prince happened to be eating breakfast at a restaurant near the port. He ran to help, opening up his church as a triage station. It was, strangely enough, Prince's second disaster in five years. He had responded to another local cataclysm in 1912, when a luxury cruise liner called the Titanic had sunk some five hundred miles off the coast of Halifax. Back then, Prince had performed burials at sea in the frigid waters.

Prince was the kind of man who marveled at things others preferred not to think about. On the awful day of the explosion, he was astounded by what he saw. Prince watched men and women endure crude sidewalk operations without obvious pain. How was one young soldier able to work the entire day with one of his eyes knocked out? Some people experienced hallucinations. Why did parents fail to recognize their own children at the hospital—and, especially, at the morgue? Small details nagged at Prince. On the morning of the explosion, why was the very first relief station set up by a troupe of actors, of all people?

That night, a blizzard hit Halifax, the epic's final act. By the time the catastrophe had rippled out across the land, 1,963 people would be dead. In silent film footage taken after the blast, Halifax looks like it was hit by a nuclear weapon. Houses, train terminals, and churches lie like pick-up sticks on the snow-covered ground. Sleighs are piled high with corpses. "Here were to be found in one dread assembling the combined horrors of war, earthquake, fire, flood, famine and storm—a combination for the first time in the records of human disaster," Prince would write. Later, scientists developing the atomic bomb would study the Halifax explosion to see how such a blast travels across land and sea.

After helping rebuild Halifax, Prince moved to New York City to study sociology. For his PhD dissertation at Columbia University, he deconstructed the Halifax explosion. "Catastrophe and Social Change," published in 1920, was the first systematic analysis of human behavior in a disaster. "Life becomes like molten metal," he wrote. "Old customs crumble, and instability rules."

What makes Prince's work so engaging is his optimism. Despite his funereal obsessions, he saw disasters as opportunities—not just, as he put it, "a series of vicissitudes mercifully ending one day in final cataclysm." He was a minister, but he was clearly enchanted by industry. The horrific explosion had, in the end, "blown Halifax into the 20th century," forcing many changes that were for the better. His thesis opened with a quote from St. Augustine: "This awful catastrophe is not the end but the beginning. History does not end so. It is the way its chapters open."

After Prince's death, the field of human behavior in disasters would languish. Then with the onset of the cold war and a new host of anxieties about how the masses might respond to nuclear attacks, it would come back to life. After the fall of communism, it would stagnate again—until the terrorist attacks of September 11, 2001. Prince seemed to anticipate the temptation for people to avert their eyes. "This little volume on Halifax is offered as a beginning," he wrote. Don't let it be the end, he pleaded. "Knowledge will grow scientific only after the most faithful examination of many catastrophes." The remainder of the century would prove rich with material.

Most of us have imagined what it might be like to experience a plane crash or a fire or an earthquake. We have ideas about what we might do or fail to do, how it might feel for our hearts to pound in our chests, whom we might call in the final moments, and whether we might be suddenly compelled to seize the hand of the businessman sitting in the window seat. We have fears that we admit to openly and ones that we never discuss. We carry around this half-completed sentence, filling in different scenarios depending on the anxiety of the times: I wonder what I would do if...
say the word disaster, many of us think of panic, hysterical crowds, and a kind of every-man-for-himself brutality; an orgy of destruction interrupted only by the civilizing influence of professional rescuers. Yet all evidence from Prince until today belies this script. Reality is a lot more interesting—and hopeful.

What Prince discovered in Halifax was that our disaster personalities can be quite different from the ones we expect to meet. But that doesn’t mean they are unknowable. It just means we haven’t been looking in the right places.

The Things Survivors Wish You Knew

This book came about unexpectedly. In 2004, as a reporter working on Time magazine’s coverage of the third anniversary of 9/11, I decided to check in with some of the people who had survived the attacks. I wondered how they were doing. Unlike many of the families of the victims, the survivors had kept to themselves, for the most part. They felt so lucky—or guilty or scarred—that they hadn’t wanted to make too much noise. But there were tens of thousands of these survivors out there, people who had gone to work in a skyscraper one morning and then spent hours fighting to get out of it. I was curious to hear what had happened to their lives.

I got in touch with the World Trade Center Survivors’ Network, one of the first and largest support groups, and they invited me to sit in on one of their regular meetings. They met in a fluorescent-lit office space, high above the racket of Times Square. As I rode up in the elevator one evening, I prepared myself for an exchange of grief. After 9/11, I had heard so many stories. Every widow, firefighter, and victim had a unique tragedy to tell, and I can still recite those interviews almost word for word. The city’s pain seemed to have no bottom.

But this meeting was not what I had expected. These people had an agenda. They had things they wanted to tell other people before the next terrorist attack, and there was urgency in the room. The survivors were from all different neighborhoods, professions, and ethnicities, but they said very similar, surprising things. They had learned so much that morning, and they wondered why no one had prepared them. One man even proposed starting a lecture circuit to educate people about how it feels to escape a skyscraper. “We were the first responders,” one woman said. A sign-up sheet was passed around to start planning speaking engagements at churches and offices.

Watching them, I realized these people had glimpsed a part of the human condition that most of us never see. We worry about horrible things happening to us, but we don’t know much about what it actually feels like. I wondered what they had learned.

I started to research the stories of survivors from other disasters. The overlaps were startling. People in shipwrecks, plane crashes, and floodwaters all seemed to undergo a mysterious metamorphosis. They performed better than they ever would have expected in some ways and much worse in others. I wanted to know why. What was happening to our brains to make us do so many unexpected things? Were we culturally conditioned to risk our lives for strangers in shipwrecks? Were we evolutionarily programmed to freeze in emergencies? My search for answers led me across the world, to England for its long history of studying fire behavior, to Israel for its trauma psychologists and counterterrorism experience, and back to the States to participate in simulated plane crashes and fires, as well as military research into the brain.

Writing a book about disasters may sound voyeuristic or dark, and there are times when it was. But the truth is, I was mesmerized by this subject because it gave me hope. You spend enough time covering tragedies and you start to look for a foothold. I knew there was no way to prevent all catastrophes from happening. I knew it made sense to prepare for them and work to minimize the losses. We should install smoke detectors, buy insurance, and pack “go bags.” But none of those things ever felt very satisfying.

Listening to survivors, I realized we’d been holding dress rehearsals for a play without knowing any of our lines. Our government had warned us to be prepared, but it hadn’t told us why. In New Orleans, after Hurricane Katrina, I learned more from regular people on street corners than I learned covering any homeland security conference.
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In firehouses and brain research labs, I learned that if we get to know our disaster personalities before the disaster, we might have a slightly better chance of surviving. At the very least, we’ll expunge some of the unknowns from our imaginations, and we’ll uncover secrets about ourselves.

I never expected to use what I had learned anytime soon. I usually show up at disaster sites after they happen, in time for the regrets and recriminations, but not the shaking or the burning. But I was wrong, in a way. From a physiological perspective, everyday life is full of tiny disaster drills. Ironically, after writing a book about disasters, I feel less anxious overall, not more. I am a much better judge of risk now that I understand my own warped equation for dread. Having studied dozens of plane crashes, I’m more relaxed when I’m flying. And no matter how many Code-Orange-be-afraid-be-very-afraid alerts I see on the evening news, I feel some amount of peace having already glimpsed the worst-case scenario. The truth, it turns out, is usually better than the nightmare.

The Problem with Rescue Dogs

Conversations about disasters have always been colored by fear and superstition. The word disaster, from the Latin dis (away) and astrum (stars), can be translated as “ill-starred.” After Hurricane Katrina in 2005, New Orleans mayor Ray Nagin said that God was clearly “mad at America” for invading Iraq—and at black people for “not taking care of ourselves.” Inchoate as these plot lines may be, Nagin’s impulse—to inject meaning into chaos—was understandable. Narrative is the beginning of recovery.

But narrative can miss important subplots. In books and official reports, the tragedy of Katrina was blamed on politicians, poverty, and poor engineering, as it should have been. But there was another conversation that should have happened—not about blame, but about understanding. What did regular people do before, during, and after the storm? Why? And what could they have done better?

These days, we tend to think of disasters as acts of God and government. Regular people only feature into the equation as victims, which is a shame. Because regular people are the most important people at a disaster scene, every time.

In 1992, a series of sewer explosions caused by a gas leak ripped through Guadalajara, Mexico’s second-largest city. The violence came from below, rupturing neighborhoods block by block. Starting at 10:30 A.M., at least nine separate explosions ripped open a jagged trench more than a mile long. About three hundred people died. Some five thousand houses were razed. The Mexican Army was called in. Rescuers from California raced to help. Search-and-rescue dogs were ordered up.

But first, before anyone else, regular people were on the scene saving one another. They did incredible things, these regular people. They lifted rubble off survivors with car jacks. They used garden hoses to force air into voids where people were trapped. In fact, as in most disasters, the vast majority of rescues were done by ordinary folks. After the first two hours, very few people came out of the debris alive. The search-and-rescue dogs did not arrive until twenty-six hours after the explosion.

It’s only once disaster strikes that ordinary citizens realize how important they are. For example, did you know that most serious plane accidents are survivable? On this point, the statistics are quite clear. Of all passengers involved in serious accidents between 1983 and 2000, 56 percent survived. (“Serious” is defined by the National Transportation Safety Board as accidents involving fire, severe injury, and substantial aircraft damage.) Moreover, survival often depends on the behavior of the passenger. These facts have been well known in the aviation industry for a long time. But unless people have been in a plane crash, most individuals have no idea.

Since 9/11 the U.S. government has sent over $23 billion to states and cities in the name of homeland security. Almost none of that money has gone toward intelligently enrolling regular people like you and me in the cause. Why don’t we tell people what to do when the nation is on Orange Alert against a terrorist attack—instead of just telling them to be afraid? Why does every firefighter in Casper, Wyoming (pop. 50,632),
have an eighteen-hundred-dollar HAZMAT suit—but we don’t each have a statistically derived ranking of the hazards we actually face, and a smart, creative plan for dealing with them?

All across the nation we have snapped plates of armor onto our professional lifesavers. In return, we have very high expectations for these brave men and women. Only after everything goes wrong do we realize we’re on our own. And the bigger the disaster, the longer we will be on our own. No fire department can be everywhere at once, no matter how good their gear.

The July 7, 2005, terrorist attacks on London buses and subway trains killed fifty-two people. The city’s extensive surveillance camera system was widely praised for its help during the ensuing investigation. Less well known is how unhelpful the technology was to regular people on the trains. The official report on the response would find one “overarching, fundamental lesson”: emergency plans had been designed to meet the needs of emergency officials, not regular people. On that day, the passengers had no way to let the train drivers know that there had been an explosion. They also had trouble getting out; the train doors were not designed to be opened by passengers. Finally, passengers couldn’t find first aid kits to treat the wounded. It turned out that supplies were kept in subway supervisors’ offices, not on the trains.

**Luck Is Unreliable**

Here’s the central conundrum addressed by this book: we flirt shamelessly with risk today, constructing city skylines in hurricane alleys and neighborhoods on top of fault lines. Largely because of where we live, disasters have become more frequent and more expensive. But as we build ever more impressive buildings and airplanes, we do less and less to build better survivors.

How did we get this way? The more I learned, the more I wondered how much of our survival behaviors—and misbehaviors—could be explained by evolution. After all, we evolved to escape predators, not buildings that reach a quarter mile into the sky. Has technology simply outpaced our survival mechanisms?

But there are two kinds of evolution: the genetic kind and the cultural kind. Both shape our behavior, and the cultural kind has gotten a lot faster. We now have many ways to create “instincts”: we can learn to do better or worse. We can pass on traditions about how to deal with modern risks, just as we pass on language.

So then the question became, why weren’t we doing a better job instilling survival skills through our culture? *Globalization* is one of those words that gets hijacked so often it loses its meaning. That’s partly because the word encompasses so much, including opposing ideas. In the past two centuries, we have become far less connected to our families and communities. At the same time, we have become more dependent upon one another and technology. We are isolated in our codependence, paradoxically.

More than 80 percent of Americans now live in or near cities and rely upon a sprawling network of public and private entities to get food, water, electricity, transportation, and medicine. We make almost nothing for ourselves. So a disaster that strikes one group of people is more likely than ever to affect others. But just as we have become more interdependent, we have become more detached—from our neighborhoods and traditions. This is a break from our evolutionary history. Humans and our evolutionary ancestors spent most of the past several million years living in small groups of relatives. We evolved through passing on our genes—and our wisdom—from generation to generation. But today, the kinds of social ties that used to protect us from threats get neglected. In their place, we have substituted new technology, which only works some of the time.

In May of 1960, the largest earthquake ever measured occurred off the coast of Chile, killing a thousand people. Luckily, Hawaii’s automated alert system kicked in, and tsunami sirens went off ten hours before the island was hit. The technology worked exactly as planned. But it turned out that most of the people who heard the siren did not evacuate. They weren’t sure what the noise meant. Some thought it signaled that they should be alert for more information. The technology was
there but the traditions weren’t. A total of sixty-one people died in Hawaii that day.

It’s hard to trace a single cause for why we do what we do under extreme duress. The chapters that follow allow us to test several hypotheses against real disasters. I’ve tried to resist the urge to concoct one grand narrative. But even in that complexity, simple truths emerge. The more disaster survivors I met, the more convinced I became that the solutions to our problems were not necessarily complicated. They were more social than technological. Some were old-fashioned. But we need to understand how our brain works in disasters before we can save ourselves.

Before we go any further, it’s probably wise to acknowledge that the vast majority of Westerners do not die in disasters; they die of diseases that attack from within, not violence that comes from outside. Alzheimer’s disease kills many more people than fire. Even if you do make a particularly dramatic exit, it probably won’t be in a disaster. You are more likely to die of food poisoning than you are of drowning.

It is, however, quite likely that you will be affected by a disaster. In an August 2006 Time magazine poll of one thousand Americans, about half of those surveyed said they had personally experienced a disaster or public emergency. In fact, about 91 percent of Americans live in places at a moderate-to-high risk of earthquakes, volcanoes, tornadoes, wildfires, hurricanes, flooding, high-wind damage, or terrorism, according to an estimate calculated in 2006 for Time by the Hazards and Vulnerability Research Institute at the University of South Carolina.

Traditionally, the word disaster refers to any sudden calamity causing great loss of life or property. You’ll notice that in this book I veer off into misfortunes that don’t technically fit: car accidents and shootings, for example. But I want to include these everyday tragedies for two reasons. First, because human behavior is the same, whether we are in a cruise ship or a Honda. We can, strange as it may sound, learn how we will behave in earthquakes from studying how we behave in a holdup, and vice versa. Car accidents and shooting rampages are, like airplane crashes, modern calamities that we did not evolve to survive.

The other reason to define disasters broadly is that small tragedies add up to megadisasters. Cumulatively, car accidents kill forty thousand people in the United States each year. Everyone reading this book knows someone who died in a car accident. Guns kill another thirty thousand Americans every year. For the rippling circles of friends and families that the victims leave behind, a gunshot feels exactly like a disaster, without the national recognition. So I define the word broadly to include all kinds of accidents that kill too many people.

One last caveat: disasters are predictable, but surviving them is not. No one can promise you a plan of escape. If life—and death—were that simple, this book would already have been written. But that doesn’t mean we should live in willful ignorance, either. As Hunter S. Thompson said, “Call on God, but row away from the rocks.”

We need to get to know our oldest personality; the one that takes over in a crisis and even makes fleeting appearances in our daily lives. It is at the core of who we are. “If an engineer wants to know about what he’s designing, he puts it under great amounts of stress,” says Peter Hancock, who has been studying human performance for more than twenty years for the U.S. military. “It’s the same with human beings. If you want to find out how things operate under normal conditions, it’s very interesting to find out how we operate under stress.” Without too much trouble, we can teach our brains to work more quickly, maybe even more wisely, under great stress. We have more control over our fates than we think. But we need to stop underestimating ourselves.

The knowledge is out there. In laboratories and on shooting ranges, there are people who know what happens to our bodies and minds under extreme duress. Scientists who study the brain’s fear response can now see which parts of our brains light up under stress. Military researchers conduct elaborate experiments to try to predict who will melt down in a crisis and who will thrive. Police, soldiers, race car drivers, and helicopter pilots train to anticipate the strange behaviors they will encounter at the worst of times. They know that it’s too late to learn those lessons in the midst of a crisis.

Then there are the survivors of disasters, the witnesses who channel the voices of the victims. They were there, sitting next to them, seeing what they saw. And afterward, the survivors spend some portion of their lives thinking about why they lived when so many did not. They were
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lucky, all of them. Luck is unreliable. But almost all of the survivors I have met say there are things they wish they had known, things they want you to know.

Unfortunately, all of these good people rarely talk to one another. Airplane safety experts don’t trade stories with neuroscientists. Special Forces instructors don’t spend a lot of time with hurricane victims. And none of these people have much opportunity to share what they know with regular people. So their wisdom remains stashed away in a sort of black box of the human experience.

This book goes inside the black box and stays there. The Unthinkable is not a book about disaster recovery; it’s about what happens in the midst—before the police and firefighters arrive, before reporters show up in their rain slickers, before a structure is imposed on the loss. This is a book about the survival arc we all must travel to get from danger to safety.

The Survival Arc

In every kind of disaster, we start in about the same place and travel through three phases. We’ll call the first phase denial. Except in extremely dire cases, we tend to display a surprisingly creative and willful brand of denial. This denial can take the form of delay, which can be fatal, as it was for some on 9/11. But why do we do it, if it is so dangerous? What other functions does denial serve?

How long the delay lasts depends in large part on how we calculate risk. Our risk analysis depends less upon facts than upon a shadowy sense of dread, as Chapter 2 details through the story of a man waiting for Hurricane Katrina in New Orleans.

Once we get through the initial shock of the denial phase, we move into deliberation, the second phase of the survival arc. We know something is terribly wrong, but we don’t know what to do about it. How do we decide? The first thing to understand is that nothing is normal. We think and perceive differently. We become superheroes with learning disabilities. Chapter 3 explores the anatomy of fear through the story of a diplomat taken hostage at a cocktail party. “There are times when fear is good,” Aeschylus said. “It must keep its watchful place at the heart’s controls.” But for every gift the body gives us in a disaster, it takes at least one away—sometimes bladder control, other times vision.

We all share a basic fear response. So why do some people get out of a burning building while others do not? Chapter 4 investigates resiliency, that elixir of survival. Who has it? Does gender matter? What about personality or race? But almost no one goes through a disaster alone. Chapter 5 is about groupthink, the effect of the crowd on our deliberation. How well our group functions depends largely on who is in the group, Whom we live and work with matters.

Finally, we reach the third phase of the survival arc: the decisive moment. We’ve accepted that we are in danger; we’ve deliberated our options. Now we take action. We’ll start with the exception. Chapter 6 is about panic, the most misunderstood behavior in the disaster repertoire. What does it take to spark a panic? And what does it feel like to be caught in one?

Many—if not most—people tend to shut down entirely in a disaster, quite the opposite of panicking. They go slack and seem to lose all awareness. But their paralysis can be strategic. Chapter 7 will take us into the horrific Virginia Tech shooting rampage, the deadliest in U.S. history, through the eyes of a fortunate student who did nothing.

Next, we will consider the opposite of nothing. Chapter 8 investigates the hero. What possible evolutionary explanation could there be for a man who jumps into a frozen river to save strangers?

Finally, we think bigger: how can we turn ourselves into better survivors? We’ll meet revolutionaries who have trained regular people to survive, according to how our brains actually work—individuals who have taught entire towns to escape tsunami and major corporations to flee a skyscraper.

The three chronological phases—denial, deliberation, and the decisive moment—make up the structure of this book. Real life doesn’t usually follow a linear arc, of course. Sometimes the path to survival is more like a looping roller coaster, doubling up and back upon itself as we struggle to find true north. So within each section you will notice that we
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often glimpse the other stages. There is, unfortunately, no single script in these situations. But it’s rare that anyone survives a disaster without pushing—or being pushed—through each of these three main stages at least once.

On our tour of the black box, I will take you down a stairwell in the World Trade Center, onto a sinking ship in the Baltic Sea, and out of a burning airplane that forever changed the way safety experts thought about passengers. The point of all of this is to answer two simple questions: What happens to us in the midst of a disaster? And why do some of us do so much better than others? Our disaster personalities are more complex and ancient than we think. But they are also more malleable.

Part One

Denial
On February 26, 1993, when terrorists attacked the World Trade Center for the first time, Elia Zedeño was in an express elevator carrying a slice of Sbarro's pizza. She had taken a new temporary worker to the food court to show him around, and they were on their way back to their desks. When the bomb exploded, they heard a loud pop and the elevator stopped and began to descend. Then it stopped for good, trapping her and five other people. Smoke began to slowly coil in from below. Two men grappled with the door. A woman dropped to her knees and started praying, making Zedeño nervous. Then one of the men calmly directed everyone to get low and cover their faces. They all did as they were told.

Zedeño concentrated on keeping her breathing shallow and slow. But the more she tried to calm down, the harder her heart seemed to pound. Then they heard a man screaming in the elevator next to them. “I'm burning up!” he yelled as he banged on the metal box around him. But soon he was quiet. “I remember thinking, ‘We’re going to be next,’” Zedeño says. She visualized rescue workers finding them dead inside the elevator later. Just then, she thought she would lunge for the doors
and start banging herself. But before she could, the temp had started doing it for her. He was screaming and banging. So Zedeño took charge of quieting him down. “Robert, calm down. You’re going to inhale too much smoke,” she told him. He started to cough and returned to the floor.

It was around then that Zedeño was filled with a wave of peace, inexplicably. “Regardless of the outcome, I knew everything was going to be OK,” she remembers. “My breath became effortless. My mind no longer wandered. Suddenly, I wasn’t there anymore. I was just watching. I could see the people lying in the elevator. The sounds were far away, and I was just hovering. I had no emotions.”

When they’d been in the elevator for about an hour, a firefighter managed to rip open the door and pull them out. It turned out the car had returned to the lobby level, and that’s where they’d been all along. Zedeño could not see the face of the firefighter who pulled her out; the smoke was too thick. She did as he instructed, grabbing onto a rope and following it out through the lobby and out the doors. She was stunned by the darkness in the lobby and the emptiness outside. She thought that once she had made it out of her own private catastrophe, everything would be normal, bustling and bright. She never imagined that a place could look so different.

In the basement below, a Ryder truck full of eleven hundred pounds of explosives had left a crater five stories deep. Six people had died. It was the largest full-building evacuation in U.S. history, and nothing had gone the way it was supposed to go. Smoke purled up the stairways. The power failed, rendering the emergency communications system useless and the stairways dark. People moved extraordinarily slowly. Ten hours after the explosion, firefighters were still finding people who had not yet evacuated in their offices.

After the bombing, glow-in-the-dark tape and backup power generators were installed in the Trade Center. Both helped save lives eight years later. But still no one fully answered the fundamental question: why did people move so slowly? And what did it mean about all of our assumptions about skyscrapers—and the Trade Center in particular? The 1993 bombing became a story about terrorism, as would the attacks on the same buildings eight years later, and rightly so. But they were also stories of procrastination and denial, the first phase of the human disaster experience.

A few days later, Zedeño was right back at work in a neighboring building. One month later, her office reopened on the seventy-third floor of Tower 1. She started riding the same elevator to work. But it was months before she could get the taste of soot out of her mouth. She thought about leaving the towers, but not with any conviction. “I remember saying, ‘This could happen again.’ And someone said, ‘Lightning never strikes twice.’”

“Don’t Worry. It’s in Your Head!”

Zedeño has a small stature, round glasses, and Dizzy Gillespie cheeks when she smiles, which happens often. She came to America with her family from Cuba when she was eleven. Her parents had spent her entire childhood plotting to get away from Fidel Castro. When they finally got permission to leave in the early 1970s, they moved to West New York, New Jersey, where their daughter could see the brand-new Trade Center Towers rising themselves almost everywhere she went.

When she was nineteen, Zedeño visited the Trade Center for the first time. She came to apply for a secretarial job with the Port Authority of New York/New Jersey. She had no idea what the Port Authority did—or even that it owned the Trade Center—but a girlfriend convinced her to fill out the application. When she returned for her second interview, her mother came with her. The boss hired her on the spot, and, on her lunch break, Zedeño ran to the plaza to tell her mother. “What will you do?” she asked her mother, who had no idea how to get home to New Jersey. “I will sit right here and wait for you,” her mother announced. They took the train home together that evening.

Eventually, Zedeño got promoted to the finance section. Her office had regular fire drills, which consisted of gathering in the hallway to gossip. During a blackout in 1990, she and her office mates walked down the tower’s stairs. That’s how they learned that homeless people had
been using the lower stairwells as bathrooms. “We were laughing and talking,” she remembers. When Zedeño talks, her voice goes up at the end of her sentences, like a child telling you something outrageously. “The whole thing was a joke!”

Zedeño is a witness wherever she goes. She remembers life in surround-sound detail. When I ask her what it was like to leave Cuba as a little girl, she tells me about the day she left in April of 1971. Her mother was doing her hair when they heard the sound of a motorcycle. “Only one man in town had a motorcycle, and it didn’t sound like that,” she says. Suddenly, the sound stopped in front of their house. A soldier walked in the front door without knocking and told them to leave. Zedeño knew this was good news: they had finally won permission to go to America. Fifteen minutes later, they left their house forever. They were terrified the whole journey out, but they made it. When they arrived in Miami, Zedeño ran down the aisles of a supermarket yelling out descriptions of everything she saw.

By September 2001, Zedeño had worked in the towers for over twenty-one years. She was forty-one years old, and she managed five employees on the seventy-third floor of Tower 1. Her group oversaw the Port Authority’s engineering consultants. On 9/11, Zedeño got to work a little after 8:00 a.m. She settled into her cubicle and listened to her voice-mail messages. In an hour, she would head up to the cafeteria to get some breakfast, as usual.

The Trade Center did not feel like a cluster of seven buildings; it felt like a city. Every day, fifty thousand people came to work there, and another two hundred thousand passed through. The plaza underneath held the largest shopping mall in Lower Manhattan. “You didn’t need to leave for anything,” Zedeño says. The complex had 103 elevators—and its own zip code (10048). Bomb threats and small fires were not uncommon. The engine company across the street sometimes got called to the Trade Center eight times a day. Zedeño got used to seeing firefighters in the elevators. Days later, she would hear that there had been smoke somewhere in the building. It might have been two football fields away from her.

At 8:46 a.m., an American Airlines Boeing 767 traveling 490 mph struck the building eleven floors above her. When the plane hit Zedeño’s building, the effect was not subtle. It obliterated four floors immediately. From her desk, Zedeño heard a booming explosion and felt the building lurch to the south, as if it might topple. It had never done that before, not even in 1993. This time, she grabbed her desk and held on, lifting her feet off the floor. “I actually expected the ceiling to fall and the building to cave in,” she remembers. At the time, she screamed, “What’s happening?”

Talking about it now, in a deli across from the void where the towers once stood, Zedeño wonders why she didn’t immediately run for the stairs. She’d been through this before, after all. But what she really wanted, quite desperately, was for someone to answer back: “Everything is OK! Don’t worry. It’s in your head!” At the moment of impact, Zedeño had entered a rarefied zone. The rules of normal life were suspended. Her entire body and mind changed. She would wind her way through a series of phases along the survival arc. First would be a thicket of disbelief, followed by frantic deliberation, and, finally, action. We will witness all three here, but more than anything else, Zedeño’s story is one of denial.

Zedeño has revisited the moments of her escape from the Trade Center until they are worn and familiar. She now gives tours of Ground Zero to tourists from around the world. But still there are riddles she cannot decipher, behavioral glitches that don’t make obvious sense. More than anything else, she is mystified by how slow she was to accept what was happening all day long.

After the plane hit the building, Zedeño told me, she wanted nothing so much as to stay. Like her, I was perplexed by this reaction. Shouldn’t a primal, survival instinct have kicked in, propelling her to the door? I wondered if Zedeño was unusual. So I went to the National Fire Academy to find out more. The instructors at the school, located on the rolling grounds of a former Catholic college in rural Maryland, are veteran firefighters who have witnessed just about every conceivable form of human behavior in fire. I met Jack Rowley, who spent thirty-three years as a firefighter in Columbus, Ohio. When I told him about Zedeño, he told me that he saw this kind of curious indifference all the
time. In fact, he came to consider one particular kind of fire a regular Saturday night ritual. His station house would get dispatched to a bar; he would walk into the establishment and see smoke. But he would also see customers sitting at the bar nursing their beers. “We would say, ‘Looks like there’s a fire here,’” he says. He’d ask the customers if they felt like evacuating. “They would say, ‘No, we’ll be just fine.’”

One of the few people who has extensively analyzed behavior at the Trade Center in both 1993 and 2001 is Guyène Proulx at Canada’s National Research Council. And what she saw fit with Zedeño’s memory exactly. “Actual human behavior in fires is somewhat different from the ‘panic’ scenario. What is regularly observed is a lethargic response,” she wrote in a 2002 article in the journal Fire Protection Engineering. “People are often cool during fires, ignoring or delaying their response.”

In a May 19, 2006, column in the Wall Street Journal, Matthew Kaminski wrote about a recent flight he’d taken from Paris to New York. Three hours out of Paris, halfway into the movie Jarhead, Kaminski heard a loud thud and felt the plane shudder and swerve. “The captain made no announcement. No one asked the flight attendants a thing,” he wrote. And yet, wrote Kaminski, a veteran traveler, “My stomach told me to worry.”

About an hour later, the pilot announced the plane would be making an emergency landing in St. John’s, Newfoundland. It seems one of the plane’s four engines had blown out. As the plane approached the landing strip, the passengers could see fire trucks and ambulances on the tarmac below. The French flight attendant’s English was deteriorating fast. In a high-pitched voice, she ordered the passengers to “Brace, brace!” And what did about half the passengers do in this moment of exquisite tension? Did they panic or weep or pray to God? No. They laughed.

The plane, as it turned out, landed safely. And Kaminski was left to marvel at his fellow passengers’ well-developed sense of irony.

Laughter—or silence—is a classic manifestation of denial, as is delay. Zedeño was not alone. On average, Trade Center survivors waited six minutes before heading downstairs, according to a 2005 National Institute of Standards and Technology (NIST) study drawn from interviews with nearly nine hundred survivors. (The average would likely be higher if those who died had been able to respond to the survey.) Some waited as long as forty-five minutes. People occupied themselves in all kinds of interesting ways. Some helped coworkers who were disabled or obese. In Tower 2, many people followed fatal instructions to stay put. Staying inside was, after all, the standard protocol for skyscraper fires. But ultimately, the threat should have demanded immediate attention. Eventually, almost everyone saw smoke, smelled jet fuel, or heard someone giving the order to leave. Even then, many called relatives and friends. About one thousand individuals took the time to shut down their computers, according to NIST. “The building started to sway and everything started shaking,” one person on a floor in the sixties of Tower 1 told NIST. “I knew there was something wrong.” Notice what comes next: “I ran to my desk and made a couple of phone calls. I dialed about five times trying to reach my [spouse]. I also called my sisters to find out more information.”

Why do we procrastinate leaving? The denial phase is a humbling one. It takes a while to come to terms with our miserable luck. Rowley puts it this way: “Fires only happen to other people.” We have a tendency to believe that everything is OK because, well, it almost always has been before. Psychologists call this tendency “normalcy bias.” The human brain works by identifying patterns. It uses information from the past to understand what is happening in the present and to anticipate the future. This strategy works elegantly in most situations. But we inevitably see patterns where they don’t exist. In other words, we are slow to recognize exceptions. There is also the peer-pressure factor. All of us have been in situations that looked ominous, and they almost always turn out to be innocuous. If we behave otherwise, we risk social embarrassment by overreacting. So we err on the side of underreacting.

But it would be a mistake to assume that we just waste time during this delay. Given time to think, people in disasters need information like they need shelter and water. Their brains lack the patterns they need to make a good decision, so they wisely search for better data. No matter what we are told by a man in a uniform, no matter how shrill the alarm, we check in with one another. This “milling” ritual is part of the second
phase of deliberation. How and with whom you will can dramatically
influence your chances of survival. For now, it’s fair to say that milling is
a useful process that can take a painfully long time to complete.

“Get Out of the Building!”

Luckily, one of Zedeño’s colleagues passed through the denial phase
immediately. He screamed at her: “Get out of the building!” His brain
worked faster, for reasons we’ll go into later. Zedeño still wonders what
she would have done if she hadn’t told her to leave. As it was, she still
found ways to delay a little longer. First, she reached for her purse. Then
she started walking in circles in her cubicle. “I was looking for some-
thing to take with me. It was like I was in a trance.” She picked up a mys-
tery novel she’d been reading. Then she looked for more things to take.
This gathering process is common in life-or-death situations. Facing a
void of unknown, we want to be prepared with as many supplies as pos-
able. And, as with normalcy bias, we find comfort in our usual habits.
(In a survey of 1,444 survivors after the attacks, 40 percent would say
they gathered items before leaving.)

Finally, Zedeño headed into the stairwell. She was taking action, the
last stage in the process. But her journey had only just begun. She would
cycle through the phases of “disaster think” over and over. Disbelief and
deliberation would continue to stall her descent. “I never found myself
in a hurry,” she says. “It’s weird because the sound, the way the building
shook, should have kept me going fast. But it was almost as if I put the
sound away in my mind.”

On average, the estimated 15,410 people who got out of the Trade
Center took about a minute to make it down each floor, the NIST find-
ings show. A minute may not sound like a long time, but it was shocking
to people who design and build tall buildings. It was twice as long as the
standard engineering codes had predicted—and the buildings were less
than half full. In a 110-story building, a minute per floor is just too slow.

Most of the people who died on 9/11 had no choices. They were
above the impact zone of the planes and could not find a way out. Of the
thousands who had access to open stairwells and time to use them, all but
about 135 did manage to escape, the NIST report found. But the most
important finding from the Trade Center evacuation is what did not hap-
pen. The attacks took place on the same day as the mayoral election in
New York City. Many people had stopped at the polls to vote and were
late to work. Others had taken their children into school for the first day
of classes. Meanwhile, the New York Stock Exchange does not open until
9:30 A.M., so the trading firms were not fully staffed yet. And the Trade
Center’s visiting platform did not open to tourists until 9:30 A.M.

The fires caused by the 9/11 attacks were the deadliest in American
history, killing 2,666 people. Had the buildings been full that morning,
the slow evacuation would have translated into more than five times the
casualties. It’s hard to imagine that kind of body count. This was already
an unprecedented tragedy for the United States, after all. But had the
attacks happened at a different time, at least fourteen thousand people
would have been killed, according to NIST’s conservative estimates
based on the rate of movement on 9/11. And the exasperating crawl of
the evacuation would have been a topic of endless public debate.

Since the first skyscraper was built in 1885 in Chicago, these monu-
ments to human engineering have been designed without much consid-
eration for how human beings actually behave. The people who work in
skyscrapers have never been required to undergo regular full-evacuation
drills, which could dramatically improve their escape times. When they
do have drills, most people see them as a waste of time. They overesti-
mate how well their minds will perform in a real crisis. When the alarm
goes off, they know they are being interrupted and inconvenienced, but
they don’t necessarily know how much they might one day appreciate
the remedial help.

When she gives tours of Ground Zero, the number one question
Zedeño gets asked is, How did people behave in the stairwell? Were
people panicking? No one expects the answer they get. “Everybody was
very calm, very calm,” Zedeño tells them. Only one woman got hysteri-
cal—screaming and hyperventilating in the staircase. Zedeño gives her
the benefit of the doubt. “I don’t know what this woman saw,” she says.
The woman was walking with a man who had blood on his forehead.
The man kept repeating, “We were the lucky ones, we were the lucky ones.” Zedeño and the rest of the crowd moved to the side in the narrow stairway so the two of them could go ahead.

Crowds generally become very quiet and docile in a true disaster. Of course, on 9/11, no one in the stairways expected the towers to collapse. We’ll never know how they would have behaved had they known. But even in other, more overtly dire situations, crowds don’t tolerate irrational panic behavior. Most of the time, people remain consistently orderly—and kind, much kinder than they would have been on a normal day. One of Zedeño’s coworkers weighed over three hundred pounds and was in a wheelchair. He worked on the sixty-ninth floor in 1993—and in 2001. Both times, his coworkers carried him all the way down the stairs.

During the first thirty floors of her descent, Zedeño learned that the explosion she’d heard was a plane hitting the tower. She promptly made up a story for herself to explain what had happened. Her brain reached into its database of patterns for a reasonable explanation, in other words. “I said to myself, ‘Poor pilot. He must have had a heart attack or a stroke.’” She would revise the story again and again that day, underestimating the gravity of the attacks each time.

At the forty-fourth floor, someone told Zedeño and the people near her to switch stairways. She’s not sure who said this, but she remembers someone saying there were fires below in that staircase. So they all filed out into the sky lobby and queued up at another stairway entrance. Zedeño stood facing the windows of the sky lobby. About seventeen minutes had passed since the first plane hit.

Suddenly, another explosion shook the tower. Zedeño looked up and saw balls of fire and black smoke. “I don’t remember the sound, for some reason,” she says. Like many people in disasters, her memory and her senses switched on and off at certain key points. But she does remember somebody screaming: “Get away from the windows!” Zedeño turned and ran toward the center of the building.

Until now, Zedeño had been mostly calm and quiet. But as she ran from the explosion, she felt a new sensation. She was filled with a rush of anger. I ask her whom she was angry at, expecting her to say whoever was causing the explosions. But what she says, very slowly and deliberately, is this: “How could I have been so stupid to put myself inside this building again after what happened in 1993? I should have known better.” Zedeño was furious at herself. As she ran, she experienced a moment of clarity—which can be decidedly unhelpful. “I kept saying to myself, ‘I’m on the forty-fourth floor of a building. Where am I going? I’m still way up high. I can’t go anywhere!’”

Then everything changed again as quickly. The group stopped running, the anger faded away, and things returned, instantly, to the previous calm. “Every single one of us turned around and marched right back to the stairway as if nothing ever had happened,” Zedeño says. She smiles when she says this. She knows it sounds strange. Disaster victims often oscillate between horrifying realizations and mechanical submission. As Zedeño describes it, they can be remarkably obedient:

We were like robots. There were no comments as to, “What do you think happened outside?” Nobody ran to the windows to see what was happening. Nobody pushed anybody. Nobody tried to get into the stairway before anyone else. Everybody just went right back as a group and continued to funnel into the stairway in an orderly fashion.

I ask Zedeño what she thought the sound of this second explosion was. At that moment, she says, she did not think about it at all. “As far as I’m concerned, I’m telling you, it was as if it didn’t happen. It’s not even that I forgot it. It’s just that it was as if it never happened. Never.” Psychologists call this “dissociation.” Most often, you hear the word used to describe the way children distance themselves from physical or sexual abuse. But it happens in life-or-death situations too. It can be a coping mechanism—a productive and extreme form of denial, in a sense. As Zedeño puts it, “I could not afford to dwell on it. My job was to just take it one step at a time.”

Soon afterward, though, Zedeño heard someone in the stairwell say
that another plane had hit the towers. That information conflicted with her heart-attack theory. So she promptly made up a new story for herself. This, too, was a clever coping device. "I said, 'Those idiots! They were racing! And they ended up hitting us. I can't believe people are so stupid.'"

Several floors later, as the slow descent wore on, she heard some more disturbing information. A man behind her noted that one plane had hit about fifteen minutes after the other. She turned to him as if he had told her something new and surprising, and she announced to herself as much as to him, "It was intentional!" He looked back at her. "Yes," he said. Her carefully constructed narrative could not absorb this information. So Zedeño did the most pragmatic thing she could do: she ignored it. "I put it out of my mind as if it hadn't happened," she says. Denial can be remarkably agile.

Around the twentieth floor, Zedeño started passing a lot of firefighters coming up the stairs. Again, the instinct of the crowd was to be generous. "I remember thinking the firemen looked tired. I wished we had bottles of water to give them," she says. The evacuees kept moving to the side to give the firefighters more space, but the firefighters urged them to keep going down, don't stop, don't stop.

Zedeño remembers certain sounds from that descent with perfect clarity. There were two men, probably firefighters, coming up below her. At each floor, they would stop and yell, "Does anyone need help? Is there anyone here?" She heard their voices floating upward several minutes before she saw the men. Then they passed her and she heard their voices above her, getting farther and farther away. She doesn't know what happened to them. "Their voices stayed with me. I can still hear them now. Their voices haunted me for a long time."

Nothing imprints the brain more effectively than fear. Certain details from life-or-death events stay with us for the rest of our lives, like scars in our consciousness. They can cause debilitating problems. They can require years of therapy to repair. But, like most disaster behaviors, they can be helpful, too. They are there to protect us from getting into the same situation again.

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A Woman in Red

Finally, about an hour after she had left her cubicle, Zedeño emerged into the light of the Trade Center lobby. She felt a flush of happiness. She was on the ground at last. She looked around and saw firefighters and other people moving in slow motion, a common distortion in extreme situations. Then she looked outside and gasped.

As she'd emerged from the elevator after the 1993 bombing, she'd expected to see normal life, bustling on indifferently. Here is how Zedeño describes this powerful presumption that the trouble was limited to her immediate vicinity, which psychologists call the "illusion of centrality":

When you're in trauma, the mind says, this is a very local problem. This is your little world, and everything outside is fine. It can't afford to say that everything outside is horrible. The sound that I heard on the seventy-third floor should have told me, this is bad. The feeling of the building shaking should have told me, this is bad. The explosion when I was on the forty-fourth floor: bad. The smell of debris in the lower stairways: bad. Yet in every single moment, I made it my little world here. And nothing else exists.

But on 9/11, when she looked out the windows of the Trade Center lobby, Zedeño could no longer suspend disbelief. Pay close attention to what happened next, as she walked toward the front doors, staring at the bodies lying motionless on the plaza. It is the story of how the human mind processes overwhelming peril:

I'm slowing down because I'm starting to realize I'm not just looking at debris. My mind says, "It's the wrong color." That was the first thing. Then I start saying, "It's the wrong shape." Over and over in my mind: "It's the wrong shape." It was like I was trying to keep the information out. My eyes were not allowing me to understand.


“Freezing” is as common as fleeing in the repertoire of human disaster responses. But it’s also a fascinating, complicated response. It has meant certain death for many thousands of people over the centuries. Zedeño, however, had a personal savior.

Just then, a woman—a stranger—appeared at Zedeño’s side and linked arms with her. The woman said: “We’re getting out of here.” Zedeño looked down at the woman’s arm. She still remembers the woman’s dark skin tone, similar to her own, and the red sleeve of her shirt. And then, Zedeño stopped being able to see altogether. “Because of the smoke?” I ask her. “No, no, no. There was no smoke there. I didn’t see anything at all.”

Zedeño went temporarily blind at that moment. When she describes this remarkable occurrence now, she does it matter-of-factly. She was not frightened when this happened, she says. Just numb. She relied on hearing—and this woman in red, who began to pull her toward the doors. As they walked, the woman talked and talked. Zedeño can’t remember a word she said. “It’s funny how I tuned out everything she said. But she kept talking, she never shut up,” she says, laughing. “It was so weird! She never shut up.” But when the two of them got outside, Zedeño did hear her say, “Look, we made it.” In response, Zedeño remembers saying: “Yeah, we’re outside.” But in fact she still couldn’t see anything. She never saw the woman’s face.

At that moment, Zedeño heard a new sound. It was a rumbling, and it was close by. It was 9:59 a.m. At the time, she thought, “It’s another airplane.” Three notions passed through her mind in rapid sequence: “Airplane, war, a building is coming down.” With that, she screamed—either out loud or in her head, she can’t remember which—“Inside!” Her vision returned, just when she needed it again. This time, there was no denial. She turned and saw the revolving door of Five World Trade, with Borders bookstore on her right. And she ran through the door. She never saw the woman in red again.

“The only thing I remember is the sound getting louder behind me, and I felt a strong wind. And when I felt the wind rushing right through me, I remember thinking, ‘I’m not going to outrun this. It’s too late. I can’t run fast enough.’ As the other tower—Tower 2—collapsed like a locomotive running into the ground, the force knocked her off her feet.

Right after the tremendous crack of the collapse, there was total quiet. Zedeño remembers thinking she must be dead, perhaps because of that silent blankness. As soon as she realized she was still alive, she realized she couldn’t breathe. The dense gray matter of Tower 2 was lodged in her nose, mouth, and ears. She dug her hand into her mouth to clear out the debris, but more debris took its place. “I kept trying to catch my breath, but I couldn’t. Oh my God, it was horrible,” she says.

During this moment, choking on great piles of ash, the anger she felt on the forty-fourth floor came surging back. This time, it was more than anger; it was rage, and it was directed not at herself but at God:

I was thinking, “I was outside already! I almost made it! Why couldn’t I get out?” After all that trouble! I just didn’t understand. And this anger, this overwhelming anger is saying, “Why can’t you give me a break! I was there in 1993. I’m here now, I was almost out, and I’m still here! Ah! God almighty!”

The dust started to settle. Zedeño was able to empty out her mouth, and as she leaned against a wall, she tried to clean her glasses and blow her nose. She couldn’t see through all the dust, but she heard a voice asking her to move out of the way. It was a firefighter and he was trying to break through a wall to get them out. She moved and stumbled over some debris, falling on top of someone else. It turned out to be a police officer. He was screaming that his eyes were burning. And at the same time, he was telling her, “Don’t worry, don’t worry! We’re gonna get out of here.” Zedeño could see his hands shaking. But she never saw his face.

By then, her anger had vanished again. She got very quiet. It helped to have the police officer there, even though he was hurt. Then she heard a voice: “I found a way out. Everybody, hold hands.” And that’s what they did. They went into Borders and out through the door at the
corner of Vesey and Church Streets. The books were still on the shelves, Zedeño noticed. “The idea of what had happened slipped away completely. Gone! I had no feeling anymore. It was almost like I was daydreaming.”

Zedeño had traveled a long way. From the seventy-third floor to the ground, she had invented at least three different explanations for what was happening, all of which she had been forced to abandon. She had passed in and out of bouts of rage as her brain worked to make sense of it all. Denial both slowed her down, by distracting her with false hope, and kept her moving, by calming her down.

The Ten-Thousand-Pound Planters

Before the 1993 bombings, the fire safety plan for the Trade Center was naïve: each tenant company selected a volunteer to act as a fire marshal. Then the volunteer was allegedly trained to know what to do in a fire. That meant there was about one volunteer marshal for every fifty employees. As it turns out, the vast majority of the fire marshals had never left their own floor or the building in any previous alarm or drill, according to a NIST survey of all the marshals after the 1993 bombing. As a result, most of the fire marshals were unfamiliar with the stairs, despite the fact that they were the only ones “trained” to get out. In fact, they were trained only to meet in the corridor and wait for instructions. But no instructions ever came. The bomb, which was relatively weak compared with a 767 airplane, disabled the power and communications systems in the towers.

Afterward, many of the 1993 fire marshals complained about their lack of training. They hadn’t known that two-thirds of the stairwells required people to wind through transfer hallways. No one had told them that it would take firefighters several hours to reach the upper floors. So they waited and waited, some for four hours before descending. Logically, the study’s authors concluded: “Training should not be limited to members of the fire safety team. Many fire marshals weren’t even in their areas when the incident occurred. . . . All building occupants need some level of training or education if they are going to react safely to a fire in a high-rise.” It wasn’t enough to rely upon volunteer fire marshals or even firefighters. People needed to be able to get out on their own.

After 1993, it was obvious that changes needed to be made. The Port Authority spent more than $100 million on improvements. But notice where the money went: the perimeter of the complex was ringed with ten-thousand-pound planters to prevent vehicles from getting too close. Some two hundred cameras went up. Truck drivers were photographed on their way into the truck dock. Dogs sniffed for explosives. The Port Authority also installed a repeater system to help boost the fire department’s radios when firefighters had to go up into the buildings.

But the new vision for the World Trade Center did not feature a role for regular people. Alan Reiss, who was the director of the Port Authority’s World Trade Department, which ran the World Trade Center, put it this way in his testimony to the September 11th Commission: “Evacuation protocols did not change after 1993, but training and equipment certainly did.” Safety engineers’ recommendations to widen the stairways were overruled. It would cost too much money in lost real estate. Fire drills were held twice a year, but the Trade Center’s definition of a fire drill was to ask everyone to gather in the middle of their floors and pick up an emergency phone to obtain directions. Employees did not generally go into the stairwells, let alone down them.

Information and responsibility remained the province of the exclusive few—the building’s fire safety director, the Port Authority police, and other first responders. The role of regular people was to await orders.

On 9/11, the ten-thousand-pound planters didn’t help, unfortunately. Neither did the repeater: it was never correctly turned on, and, in the chaos of that morning, firefighters concluded it was broken. Meanwhile, the relatively cheap addition of glow-in-the-dark strips along the stairs after 1993 made the evacuation much easier, survivors reported. But many thousands of people did not even know where the stairs were. Fewer than half the survivors had ever entered the stairwells before, the NIST report found. Only 45 percent of 445 Trade Center workers interviewed after 9/11 had known the buildings even had three stairwells, according to the early results of a study conducted at Columbia University. “I found the
lack of preparedness shocking. People were not thinking vertically. They were thinking horizontally,” says lead investigator Robyn Gershon, a professor at Columbia. “Many people said they hesitated to get into the stairways because they didn’t know where they would end up.”

Most people had no idea how to navigate the transfer hallways on lower floors. Only half had known the doors to the roof would be locked, according to Gershon’s findings. The 9/11 Commission Report concluded that people may have died as a result: “Once the South Tower was hit, civilians on upper floors wasted time ascending the stairs instead of searching for a clear path down, when stairwell A was at least initially passable.”

After 1993, the fire-marshals system remained in effect. Zedeño was a marshal on 9/11. In fact, she was the only member of the fire-safety team on her floor that morning. Everyone else had yet to arrive to work. Keep in mind that each floor of the Trade Center was about an acre in size. Zedeño was a “searcher,” meaning she was supposed to search the women’s bathroom before she went into the stairs. In reality, she didn’t search for anyone anywhere. She didn’t even remember she was a fire marshal until months after the towers had collapsed.

It turns out that on 9/11, fire marshals did not know much more than regular people. Of those interviewed in the Columbia study, 94 percent had never exited the buildings as part of a drill. Only 50 percent said they were knowledgeable enough to evacuate on their own.

After she left Tower 1 on 9/11, Zedeño walked north with the police officer with the burning eyes. Eventually, they were picked up by ambulances. Zedeño was taken to Woodhull Hospital in Brooklyn, where she was given oxygen and a change of clothes. She then wandered from one train station to the next, trying to get back home. Around 7:00 P.M., she finally found her way back to New Jersey—and to her parents, who had watched from their balcony as her tower collapsed over eight hours earlier.

Over a period of three years, Zedeño met with me many times to relive her ordeal in microdetail. It can’t have been pleasant for her. But she did it because she wanted her experience to be worth something. “In
On September 9, 1965, Hurricane Betsy slammed into Louisiana with winds of up to 125 mph. In Eastern New Orleans, Meaher Patrick Turner and his family did what they always did: his four children, wife, and elderly father rode out the storm together in their shotgun house. But this time, the ferocious category 3 hurricane breached the levees around Lake Pontchartrain, and the streets began to gurgle with water. As the water rose, first one foot, then another, the children noticed a faint meowing sound from under the floorboards. A cat had found its way into the crawlspace under the house. As the hours began to pass, its cries got louder. It would be days before the water receded. It was clear that the cat would either drown or starve, and they would have to listen to it die.

This would not do. Turner told the kids to get down on their stomachs and put their ears to the floor. Find the cat’s exact location, he told them. After crawling around on their bellies, the kids concluded that the cat was under the washing machine. So Turner moved the washing machine into the kitchen and got his saw. Then he carved a circle out of the wooden floor, just like a character in a cartoon, and the cat bounded up out of the hole to safety.

Turner was a World War II veteran who had a job of some responsibility at the Federal Housing Administration. The rest of his life was about his family. He liked having them around, and he dedicated himself to the rituals that kept them together. Every Sunday, he cooked a big family dinner of roast beef with mashed potatoes and green beans. On holidays, even the minor holidays, he decked the house with ornaments. On St. Patrick’s Day, he stationed leprechauns all around the house. On Valentine’s Day, he hung little cardboard hearts from the bushes. It was known in the neighborhood as the little holiday house, and people would drive by to see it. Christmas was the grand finale. On Christmas Eve, Turner hosted a party for all his relatives. Nearly a hundred people would pack the house. Cousins flew in from San Francisco and Birmingham. Every year, no matter how warm it was, Turner put on a big, heavy red suit and played Santa Claus. He did this for forty-eight years. “He was very handsome,” remembers his youngest daughter, Sheila Williams. “He had a full set of white hair.”

But Turner was also stubborn. And the older he got, the more obstinate he became. “My dad was always right,” Williams says. “He was strictly Catholic. There was no other religion that existed except Catholicism. And ooh, my gosh, don’t say nothing bad about President [George W.] Bush. He kept his Christmas card Scotch-taped to the window in the kitchen.”

Sometimes Turner’s certainty masked his fear. He hated hospitals, for instance. “He was an Archie Bunker, a terrible patient,” Williams says. He had a deep distrust of doctors, convinced they were using him for his Medicare reimbursements. He didn’t often talk about his experiences in World War II, but the memories stalked him after dark. Several times a week, he used to wake up at night crying from nightmares. And he was also afraid of dying, Williams says. “I know he was scared.”

When Hurricane Katrina began its approach toward New Orleans in August of 2005, Turner’s children, now grown, knew it was serious. By Friday, three days before landfall, they had moved past denial and
attics. People couldn’t get out. If you’re going to stay, please put some tools up there in your attic.”

By this point, Turner was starting to get truly annoyed with his children and their entreaties. He’d already stopped watching the weather on TV. “I don’t think he even knew the name of the storm,” Williams says. It was around then that he took his phone off the hook.

**Blind Spots**

About 80 percent of New Orleans’s population got out before the storm—a huge success compared with previous evacuations there and around the country. The vast majority of people navigated through the denial and deliberation phases and took action. But what happened to the remaining 20 percent? The consensus in most media reports was that people were simply too poor to leave. And it’s true that the more resources you have, the more choices you have about how to evacuate and where to go. About 21 percent of New Orleans households were carless when Katrina hit, according to the Census Bureau.

But poverty does not explain what happened in New Orleans. An analysis of 486 Katrina victims by Knight Ridder Newspapers found that they were not disproportionately poor—or black. Michael Lindell, director of the Hazard Reduction and Recovery Center at Texas A&M University, has studied scores of evacuations, and he says people’s behavior defies simple explanations. “If you’re looking at 100% of the variance in evacuation behavior, income accounts for no more than 5–10 percentage points,” he says. “What really accounts for the differences are people’s beliefs.”

Why wouldn’t Patrick Turner leave? Turner had an old Chevrolet and a family full of people with cars headed out of town. In New Orleans, most people knew much of the city lay below sea level. In July 2002, the New Orleans Times-Picayune ran a five-part series on the inevitable. “It’s a matter of when, not if,” wrote reporters John McQuaid and Mark Schleifstein about a hurricane decimating the city. “It’s happened before and it’ll happen again.” They described a precarious levee system and flooding that could kill thousands.
In hindsight, it’s always easy to craft a narrative for any disaster; to see all the signs stacking up like dominoes, if only we’d been paying attention. But that’s not what happened with Hurricane Katrina. It was that most unusual of fiascoes: almost nothing was a surprise. “This was not a comet hitting us,” says Stephen Leatherman, director of the International Hurricane Research Center in Miami. “This is Hurricane Alley.” Leatherman has studied hurricanes for thirty years. In 2002, he wrote a paper warning that Louisiana had lost many of its natural defenses against storms and New Orleans was particularly vulnerable. When we spoke just days after landfall, while tens of thousands of people remained stuck at the Superdome in New Orleans, he sounded sick with vindication. “You do all these computer models, but [now] you have a human face on it,” he said quietly. “It’s something. It really hurts.”

We gauge risk literally hundreds of times per day, usually well and often subconsciously. For more predictable calamities, the first phase of disaster think actually begins with this calculus. We start assessing risk before the disaster even happens. We are doing it right now. We decide where to live and what kind of insurance to buy, just like we process all kinds of everyday risks: we wear bike helmets, or not. We buckle our seat belts, smoke a cigarette, and let our kids stay out until midnight. Or not.

To deconstruct how we place these bets, I called Nassim Nicholas Taleb, a man obsessed with risk. Taleb spent twenty years as a trader in New York and London, earning money off other people’s blind spots. While other traders indulged in big short-term risks in hopes of big, short-term gains, Taleb set up his investments so that he could never win big—nor lose big. He was hedged every which way. “I never have blown up, and I never will,” he likes to say.

One autumn day, Taleb and I met for tea in Washington, D.C. Taleb, who has a balding head and a gray beard, is an author and a professor now, in addition to holding a large stake in a hedge fund. He likes to do many things at once, and he speaks so quickly that it is sometimes hard to keep up. That afternoon, he had come from the Pentagon, where he had briefed officials on his theories about uncertainty. The Pentagon was a strange place for him to be, since Taleb is a self-described pacifist. But he’s the kind of pacifist the Pentagon can tolerate—which is to say, the stoic kind. “I am a peace activist simply out of rationality,” he explains.

Taleb grew up in Lebanon, a country haunted by war’s unintended consequences. He has concluded that human beings are unable to handle war in the modern age. “We’re not really able to assess how long wars will take and what the net outcome will be.” The risk is too complex for our abilities. Once upon a time, we were better at war. “In a primitive environment, if someone is threatening me, I go kill him,” he says in his clipped, matter-of-fact way. “And I get good results most of the time.” He calls this environment “Mediocristan,” a place where it is hard to kill many people at once; a place where cause and effect are more closely connected. Homo sapiens spent hundreds of thousands of years living in Mediocristan. We rarely needed to understand probability because, most of the time, life was simpler, and the range of possible events was narrower.

But today, we live in a place Taleb calls “Extremistan,” subject to the “tyranny of the singular, the accidental, the unseen and the unpredictable.” Technology has allowed us to create weaponry that can strafe the planet in minutes. Lone individuals can alter the course of history. People kill each other every day without much physical exertion. And, at the same time, we have become ever more interdependent. What happens on one continent now has consequences for another. World War I, Taleb points out, was expected to be a rather small affair. So was Vietnam. In fact, the twentieth century was, and now the twenty-first century is, characterized by wars of unforeseen results. America’s war in Iraq was certainly not intended to create more terrorists bent on attacking the United States. But that is what happened, as a national intelligence estimate completed by U.S. government intelligence agencies concluded in April 2006.

Risk is often counterintuitive in Extremistan. Our old tricks don’t work. For example, just like Turner, many of Louisiana’s oldest residents had survived Hurricane Betsy in 1965. They had also survived Hurricane Camille, a category 5 storm that struck in 1969. Turner rode out both storms without a problem. So he saw no reason to leave for Katrina. He hunkered down in denial.

As it turned out, the veteran Louisianans were half right: Katrina was
Indeed less powerful than Camille. Had the world stood still since then, they would have been just fine. In Mediocristan, they would have survived.

But since Camille, rapid development had destroyed much of the wetlands that had created a natural barrier against storm surge. The force field, in other words, was down. Humankind had literally changed the shape of the earth, and we had done it faster, thanks to technology, than we could have throughout most of history. This fact was well reported in popular media. But the firsthand experience of Camille was more powerful than any warning.

As it turned out, the victims of Katrina were not disproportionately poor; they were disproportionately old. Three-quarters of the dead were over sixty, according to the Knight Ridder analysis. Half were over seventy-five. They had been middle-aged when Hurricane Camille struck. “I think Camille killed more people during Katrina than it did in 1969,” says Max Mayfield, director of the National Hurricane Center. “Experience is not always a good teacher.”

After Katrina, a poll of 680 New Orleans residents asked why they had not evacuated before the storm. The respondents could give multiple explanations. A slim majority did indeed cite a lack of transportation. But that was not the biggest reason. The most popular explanation, given by 64 percent, was that they did not think the storm would be as bad as it was. In fact, in retrospect, half of those who hadn’t evacuated said that they could have found a way to leave if they had really wanted to, according to the study, conducted for the Henry J. Kaiser Family Foundation and the Washington Post. Motivation, in other words, mattered more than transportation.

**A Baseball Bat and a Crucifix**

At 7:00 a.m. on Monday, August 29, Katrina made landfall in Louisiana with winds of up to 140 mph. At 9:00 a.m., Turner’s children dialed his number again. Sometime before then, as the storm screamed by his window, he’d put his phone back on the hook.
don’t know. When people passed by, maybe people who knew him as Santa Claus or whatever, would remember."

In the confusion that followed the storm, the authorities lost Turner’s body. For five months, his family tried to find him. Morgue workers called Williams repeatedly to describe the bodies of dead men, none of whom were her father. “I kept telling them, ‘He doesn’t have a tattoo!’” Five months after he died, Turner’s body was found again and handed over to his family.

When we spoke a year and a half after the storm, Williams was having trouble forgiving her father. “It makes me so mad,” she said. “It didn’t have to happen. I took such good care of him for him to do something like that.” Since his death her family has not been nearly as close, she says. She wonders if they will ever reconnect. She agreed to be interviewed for this book because, she said, she wants other people to know how one decision can make all the difference.

Turner was nobody’s fool; he had accumulated a lot of wisdom in his long life. When Katrina came, he made a trade-off that is more complicated than it looks. As I came to know Turner through his daughter, I wanted to know more about his decision. Why had his risk calculus failed him this time—after working so well for so long? Could we predict these kinds of blind spots in our own risk equations? And if so, couldn’t we overcome them?

The Science of Risk

Now ask yourself whether these most-likely scenarios are also the ones you worry about more than any other. Are these the risks you actively work hardest to avoid? Do you start each day with twenty minutes of meditation? Do you work out for at least thirty minutes a day? When you swim in the ocean, are you more terrified of getting sunburned than you are of getting bit by a shark?

The human brain worries about many, many things before it worries about probability. If we really were just concerned with preventing the most likely causes of death, we would worry more about falling down than we would about homicide. The nightly news would feature back-to-back segments on tragic heart-attack deaths. And we might spend more money on therapists than police (you are twice as likely to kill yourself than you are to be killed by someone else during your lifetime). It’s as if we don’t fear death itself so much as dying. We fear the how, not so much the what.

Curiously, we have only recently begun to understand how we process risk. For centuries, philosophers and especially economists assumed that people were rational creatures—if not individually then certainly overall. To measure risk, it was thought, humans simply multiplied the probability of something happening by the consequences of it happening.

It took two psychologists to point out that this was simply not true. In the 1970s and 1980s, Daniel Kahneman and Amos Tversky published a series of revolutionary papers on human decision making. They explained that people rely on emotional shortcuts, called “heuristics,” to make choices. The more uncertainty, the more shortcuts. And the shortcuts, while very useful, lead to a slew of predictable errors. For example, in one study, they found that a majority of subjects judged a deadly flood triggered by a California earthquake to be more likely than an equally deadly flood occurring somewhere else in North America on its own. The notion of a California earthquake resonated more than the prospect of a flood—and so it was assigned a higher probability by the people in the study.

In fact, the chances of a flood occurring for some other reason is far greater. But that kind of workaday flood—the kind that kills people
every year—does not trigger the same cascading series of emotional shortcuts. It is less scary for a reason, which isn’t to say that it’s rational.

At first, Kahneman and Tversky were labeled pessimists. At a time when most Americans were enchanted by technology, they had concluded that people were in fact irrational. They were attacked for exaggerating the flaws of the human brain. More than one critic pointed to the fact that man had walked on the moon. How could a species that has evolved to walk on the moon be plagued by irrationality? But their work forever altered the study of risk. In 2002, six years after Tversky’s death, Kahneman was awarded the Nobel Prize in Economics for their work.

Today, most people who study decision making agree that human beings are not rational. “We don’t go around like risk assessors—doing calculations, multiplying probabilities. That’s been disproved,” says Paul Slovic, a psychology professor at the University of Oregon and one of the world’s most respected experts on risk. Instead, people rely on two different systems: the intuitive and the analytical. The intuitive system is automatic, fast, emotional, and swayed heavily by experiences and images. The analytical system is the ego to the brain’s id: logical, contemplative, and pragmatic.

One system can override the other, depending on the situation. For example, consider this question:

A coffee and a donut cost $1.10 in total. The coffee costs $1 more than the donut. How much does the donut cost?

If your first answer was ten cents, that’s your intuitive system talking. If you then caught yourself and came to the correct answer (five cents), that’s your analytical system policing your intuition.

Notice how deft the intuitive system is! It moved at lightning speed, and if the question were a mountain lion about to lunge at your throat, it might have saved your life—or at least distracted the lion for a moment.

But it was also wrong. And this is where we come to the truth-telling moment: we all make mistakes when we judge risk. Our risk formula, especially when it comes to disasters, almost never looks this rational:

\[
Risk = \text{Probability} \times \text{Consequence}
\]

No, if we could reduce our risk calculation to a simple formula, it might look more like this:

\[
Risk = \text{Probability} \times \text{Consequence} \times \text{Dread/Optimism}
\]

Dread. Rarely does a label used by scientists so aptly fit the emotion it describes. Think of dread as humanity in a word. It represents all of our evolutionary fears, hopes, lessons, prejudices, and distortions wrapped up in one dark X factor.

After talking about dread with risk experts, I started to imagine it as a sum of many other, powerful factors. Dread had its own equation. Each factor in the equation could raise or reduce the sensation of dread, depending on the situation. It seemed important to break dread into its parts in order to understand its imperfections. So here, with apologies to those experts for reducing their findings to a formula, is what I think the equation for dread might look like:

\[
\text{Dread} = \text{Uncontrollability} + \text{Unfamiliarity} + \text{Imaginability} + \text{Suffering} + \text{Scale of Destruction} + \text{Unfairness}
\]

Chances are the thing that most terrifies you is high in several of these factors. Dread explains why we fear plane crashes so much more than we fear heart disease or car crashes. First, planes (unlike cars) are not under our personal control, so that bumps up the dread factor. Second, planes are very unfamiliar to human beings; we are not comfortable at twenty thousand feet, perhaps because we have spent only a tiny fraction of our evolutionary history at such a height. So the dread score goes up again. At the same time, accidents are easy to imagine, given the salience of plane-crash images in movies and in the news media. On a plane, there’s
also a chance the suffering might be prolonged, at least compared to a car crash, in which you have little or no warning. Who hasn’t felt a sudden drop in altitude and imagined what it might portend? Minutes might pass between the anticipation of death and the end itself. The crash would also likely kill many people, not just one, further compounding the horror under the dread equation. (The importance of scale helps explain why we are more distressed by a bus accident that kills fifty people than we are by the one hundred people killed individually in cars on the same day.) A plane crash can also be brutally unfair if, for example, it is perpetrated by terrorists who turn a commercial jetliner into a weapon.

Terrorists understand dread. Unpredictable attacks on civilians are an extremely efficient way to create dread. And dread is a good way to get a population agitated. In fact, the number of Americans killed by international terrorism in the past fifty years is fewer than the number killed by food allergies. But terrorism is by nature a mind game.

After 9/11, many thousands of Americans decided to drive instead of fly. Driving felt safer, and, given the spasm of new security rituals in airports, certainly easier. In the months after 9/11, planes carried about 17 percent fewer passengers compared with the same period before the attacks. Meanwhile, the number of miles driven increased about 5 percent, according to government estimates.

But something terrible happened in the name of common sense. In the two years after 9/11, an estimated 2,302 additional people were likely killed because they drove instead of flew, according to a 2006 study of road accidents in America by three Cornell University professors. The study compared the total number of road fatalities in the years before 9/11 with the period after. It controlled for other things that might explain a spike in accidents—like bad weather. And after all of that, the researchers found 2,302 deaths above and beyond the “normal” tally of car-accident casualties; that’s 2,302 people who, if not for 9/11, almost certainly would have lived. These were the lesser-known, secondary victims of 9/11, casualties of the adjustments we make in times of great uncertainty. “The greatest cost of terrorism may be the public’s response to the attacks rather than the attacks themselves,” the authors note.

In reality, even after 9/11, driving remained much, much more dan-
gerous than flying. The chance of dying on a major domestic commercial flight from 1992 through 2001 was roughly 8 in 100 million, according to a 2003 analysis in American Scientist. Driving the same distance as the average flight segment is, by comparison, about sixty-five times riskier.

Hierarchy of Fears

Justin Klabin, a partner in a manufacturing firm in New Jersey, is not a coward. He has ridden motorcycles, played competitive rugby, and fought fires. In 2005, he even tried out for the America’s Cup bobsled team; that is, he willingly hurtled down an iced, steeply banked course at speeds up to 90 mph in a fiberglass sled controlled almost exclusively by gravity. But after 9/11, Klabin decided to stop flying on airplanes. He had watched the Twin Towers collapse from across the Hudson River in New Jersey, and he had responded to Ground Zero with his fire department. That was all he needed to see. “I’d like to get on a plane,” he says. “It would be a lot easier.” But he is convinced that plane travel is just not worth the risk. “Flying is so many things combined—claustrophobia, fear of heights, fear of being out of control,” says Klabin. Given all of those factors, the statistics mean little to him. “Even if the odds are 1 in 15 million, that’s one person. People like me think there’s no reason it can’t happen to me.”

In October 2001, when Klabin and his girlfriend went on a planned trip to Florida, they drove instead of flying. They traveled more than a thousand miles in his pickup truck. On the way back, at the end of a long day of driving, they stopped in South Carolina. As Klabin pulled the truck into a parking space, he heard a loud pop. The tie-rod, which connects the wheel to the steering column, had snapped. Both front tires were turned in toward each other, like snowplowing skis. The truck could not be driven a foot farther. Staring at the inverted tires, Klabin started laughing at himself. Here he was trying to be safe by driving instead of flying. But had the rod snapped just a few minutes earlier, when they were on the highway, the truck would have been uncontrollable at 80 mph. “There’s no question we would have been dead,” he says.
After his near miss, Klabin decided to do something radical. He took flying lessons. He thought he might feel better about flying if he understood the mechanics. So he went up in a Cessna plane (which is far more dangerous than a commercial jet). Surprisingly, he felt absolutely fine. He wasn’t scared!

Why wasn’t Klabin terrified? People who drive because they fear flying are not really looking for physical safety, explains Tom Bunn, a former commercial airline pilot who now counsels people with a fear of flying. “What they’re looking for is emotional safety.”

In the Cessna, Klabin felt in control. The dread factor plummeted. But he had no control on commercial planes. So he remained just as frightened as ever. When we spoke more than five years after 9/11, Klabin still had not set foot on a passenger plane.

“Hazards have personalities,” says Paul Slovic, the risk expert, “kind of like people.” In the mid-1980s, Slovic was studying the potential impact of building a nuclear waste repository at Yucca Mountain, Nevada. The more he talked to people about their concerns, the more he realized that anything with the word nuclear in it disturbed people—regardless of what the actual dangers were. The same goes for chemicals. When people are asked what comes to mind when they hear the word chemicals, the most frequent response by far is “dangerous”—or a synonym, like “toxic,” “hazardous,” “poison,” “deadly,” or “cancer.” Up to 75 percent of the public agrees with the following statement: “I try hard to avoid contact with chemicals and chemical products in my everyday life.”

Some of the most common disasters are the least feared. Fire, for example, usually kills more Americans each year than most other disasters combined. There is, at this point, very little we don’t know about fires. We know where and when they happen. We even know how to prevent them. Most fatal fires happen in people’s homes in December and January and are caused by arson or smoking. Deaths peak from midnight to 5:00 a.m. In 2005, according to the National Fire Protection Association, 3,675 Americans died in fires. If all homes had sprinklers and smoke detectors with working batteries, that number would probably drop by at least a third.

Lightning is another underappreciated threat. It may be the most dan-

gerous natural hazard in rich industrialized countries like the United States. About one hundred lightning strikes hit the earth every second, and in many years, these bolts of fire kill more people than any other kind of weather. But lightning is not something most of us worry about very much.

Ironically, the most destructive single disasters are usually the least surprising. Hurricanes, for example, happen at the same time every year in the same general locations. And yet we are shocked at the devastation, every year. Between official declarations of emergencies, we build and rebuild, upping the ante for the next storm season. By 2010, an estimated 70 percent of Americans will live within a hundred miles of a coast—where hurricanes, floods, and tropical storms are annual rites. Floridians, in particular, live dangerously. But they aren’t alone. Texas and California are the country’s other riskiest states. (The least hazardous are Vermont, Delaware, and Rhode Island. Fabulously boring places.)

Now think back to Patrick Turner, the man who refused to evacuate before Hurricane Katrina even though he had the means to do so. Turner was quite capable of feeling dread when it came to hospitals or doctors. But hurricanes did not move him. Why? For one thing, most of us fear natural threats less than those created by humans. Even though most of the devastation caused by hurricanes is humanmade (due to the overpopulation of the coasts, faulty levees, and depleted wetlands), the direct threat (wind and rain) is natural. If we consider the equation for dread, this makes sense: nuclear and chemical waste are far less familiar to us than weather; and they carry the potential for mass-scale casualties and suffering. If hazards have personalities, nuclear waste is the disheveled man standing on the street corner swearing. No one wants to get near him, regardless of how harmless he is. Hurricanes, on the other hand, are the slow, plodding types that the neighbors will later say looked perfectly harmless.

There is something else we need to understand about Turner. The year before Katrina, he had given in to his children’s pleadings. He had evacuated for Hurricane Ivan. But the experience was traumatic. The traffic jams were horrendous, partly due to poor planning on the part of city and state officials. A trip from New Orleans to Baton Rouge that normally took eighty to ninety minutes took as long as ten to twelve...
hours. Turner rode with his other daughter all the way to Austin, Texas, in a car jammed with people and possessions, and he vowed never to do it again. Firsthand experience was more powerful than any official warning could be; the palpable risks of evacuating seemed stronger than the abstract risks of staying.

Turner lived a life of small rituals. He went to Mass every day at 8:00 a.m. Every Tuesday, he played golf with his brothers. On Saturday, Williams came over to clean his house. And every Sunday, she took him to the cemetery to pay respects to her mother. They never missed a Sunday. Turner didn’t like the idea of disrupting his routines. The day before Katrina hit, he told his daughter he didn’t want to evacuate because he wanted to be able to go to Mass on Monday morning.

Remember Zedeño’s fog of disbelief after a Boeing 767 smashed into her building on 9/11? That disbelief, a natural and often helpful product of the human brain, sets in well before the crisis. In certain people facing certain threats, the fog can be impenetrable. “It just didn’t adjust in his head” is how Williams puts it.

Elderly people don’t like to evacuate. In 1979, after the accident at the Three Mile Island nuclear power plant in Pennsylvania, retirees and people over age seventy were least likely to evacuate—regardless of how close they were to the reactor. That’s partly because, even if they have a good means of leaving, older people do not like change, generally speaking. Turner had lived in his house for over three decades. Like his old shotgun house, it was well built, and it had survived many hurricanes. So why wouldn’t it survive this one?

It turned out that Turner’s house did survive. It flooded with five feet of water, but the walls and the roof held strong. It was the man that the hurricane claimed.

Overconfidence

When it comes to old-fashioned risks like weather, we often overestimate ourselves. Of the fifty-two people who died during Hurricane Floyd in 1999, for example, 70 percent drowned. And most of them drowned in their cars, which had become trapped in floodwaters. This is a recurring problem in hurricanes. People are overconfident about driving through water, even though they are bombarded with official warnings not to. (This tendency varies, of course, depending on the individual. One study out of the University of Pittsburgh showed that men are much more likely to try to drive through high water than women—and thus more likely to die in the process. But more about the individual profile of a risk taker in Chapter 4.)

Less than one year after Katrina, a research team from the Harvard School of Public Health interviewed 2,029 people who live in high-risk hurricane zones in eight states. They asked them what they would do if government officials said they had to evacuate before a major hurricane. Incredibly, with the images of the Superdome still on rotation on the evening news, one quarter said flat out that they would not leave. An additional 9 percent said they weren’t sure what they would do. So that means a third of people interviewed admitted they may not evacuate before a major storm.

Even more surprising was their reasoning; the number one rationale, given by 68 percent of those surveyed, was that they thought their homes were well built enough to survive a storm. Mobile home owners were no more likely to say they would evacuate. Like campers tucked into polyester tents in the deep woods, we seem to derive a false sense of protection from even the flimsiest shelter. And, as suggested by the early Katrina data, income did not predict behavior. In fact, the groups most likely to say they would ride out the storm were homeowners (39%), whites (41%), and long-term residents (45%).

Even in times of calm, we trend toward arrogance. About 90 percent of drivers think they are safer than the average driver. Most people also think they are less likely than others to get divorced, have heart disease, or get fired. And three out of four baby boomers think they look younger than their peers. People have a tendency to believe that they are, well, superior. Psychologists call this the “Lake Wobegon effect”—after the fictitious Minnesota town invented by Garrison Keillor, who described it as a place “where the women are strong, the men are good-looking, and all the children are above average.”
The Lake Wobegon effect may be warped, but it helps us deal. We can process horrible events more readily if we assume we will be exempt from future suffering. Shortly after 9/11, a survey of a thousand Americans found that they thought they had a 21 percent chance of being injured in a terrorist attack within the next year. That's way too high. But it's nowhere near as high as the 48 percent chance that they assigned to the rest of us.

Hurricanes are especially tricky because we have to respond to them before things get ugly. We have to evacuate when the skies are clear and blue. Going back to the dread equation, it's hard to imagine the violence to come. Without any tangible cues, denial comes easily. But as coastal cities get bigger and bigger, people have to evacuate earlier and earlier. The infrastructure is not set up for a fast exit, so ten- and twenty-hour traffic jams are becoming common—making people even more reluctant to leave on a sunny day, forty-eight to seventy-two hours before the actual storm.

Experts are vulnerable to the same biases, by the way. Subtle cues set a background mood that makes us more or less cautious. The stock market, perhaps the ultimate laboratory for studying the human risk equation, offers a particularly fascinating example. Five years ago, two business-school professors, David Hirshleifer and Tyler Shumway, were curious about what effect the weather has on stock trades. So they gathered weather data for twenty-six international cities from 1982 to 1997. Then they compared stock returns for each city on each day. What they found is remarkable: sunshine strongly correlated with daily stock returns—in ways that couldn't easily be explained by any other factors. If it was sunny in the morning, stocks were more likely to go up.

Risk analysts call these nuanced emotional judgments "affect"—or, as Slovic puts it, "faint whispers of emotion." Slovic has tremendous respect for affect. It is at once "wondrous and frightening." Wondrous because, once upon a time, making decisions based on such subconscious atmospherics would have made great sense. In small communities focused on short-term survival, the weather was an excellent indicator of safety. But in complex financial markets—or dense coastal cities—affect works like a broken compass.

Of course, too much dread can be as problematic as too little. Coming less than a month after Katrina, and striking many of the same places, Hurricane Rita hit a profound resonance in the cultural psyche. For a brief period, the worst-case scenario was easy to imagine. Though only 1.25 million people were told to evacuate, 2.5 million did so. A carefully planned evacuation quickly devolved into mass frustration. One-hundred-mile-long traffic jams clogged the freeways around Houston. A spokesman for the State Transportation Department, Mike Cox, told reporters that no one had predicted how many Texans would be so frightened by Katrina. "Not one of our fifteen thousand employees is a psychologist," he said, nicely summarizing the big problem.

The Man Without Dread

It's tempting to throw our hands up and conclude that people are simply irrational, a lost cause. But dread is not so easily dismissed. In some cases, it sends us reeling, making life less safe and less productive. But other times, like so many of our disaster reflexes, it is the wisdom of ages imbedded right there in our heads.

Neurologist Antonio Damasio encountered a baffling patient in the 1970s at the University of Iowa College of Medicine. The patient, whom he calls Elliot to protect his identity, was an accomplished businessman, father, and husband until he developed a brain tumor. The tumor, which was the size of a small orange when it was discovered, was successfully removed through surgery. And Elliot appeared cured: he could talk, move around, and remember things just as he had before. He took an IQ test and scored in the superior range.

Elliot was rationalism personified. He knew, as Damasio puts it, but he didn't feel. Ah, finally a human with 20/20 risk perception, right? Wrong. Elliot seemed normal in so many ways. But the more Damasio talked with him, the more the neurologist realized that something was missing. Elliot relayed the story of his life like a historian describing a long-ago tragedy. Listening to him talk, Damasio found himself getting more upset than Elliot. And Elliot's life was a mess. He could not seem
to function in the world. He had trouble making decisions and tended to
fixate on details that didn’t really matter. He couldn’t plan the day, much
less the week. He got fired from his job and then divorced. He lost his
life savings in a dubious business venture that his friends had warned
him was doomed.

Damasio studied Elliot’s brain and saw that the tumor had damaged
both frontal lobes—and especially the right frontal lobe. Everything else
was intact. Then Damasio found twelve other patients with prefrontal
damage similar to Elliot’s. Every single patient exhibited the same com-
bination of indecision and emotional flatness.

The more Damasio learned, the more he came to appreciate so-
called irrational sentiments. Emotions and feelings were not impediments
to reason; they were integral. “Reason may not be as pure as most
of us think it is or wish it were,” he wrote. “At their best, feelings point
us in the proper direction, take us to the appropriate place in a decision-
making space, where we may put the instruments of logic to good use.”

Once we factor in emotion, then, the human risk equation is actually
more sophisticated, not less. Damasio’s discoveries convinced me that
the way for people to get better at judging risk is not to avoid emotion—
or wish it away—but to capitalize upon it. Dread, properly tapped, can
save our lives.

Secure Your Own Mask First

Dennis Mileti has been studying how to warn people against threats like
hurricanes and earthquakes for more than thirty years. He knows how to
do it, he says. That’s not the problem. The problem is getting people—
in particular governments—to take his advice.

Today Mileti lives in the California desert. He is retired from his long-
time teaching post at the University of Colorado at Boulder, but he’s still
complaining to anyone who will listen. “In this great, highly educated, af-
fluent country, we do not have adequate warning systems,” Mileti says.
“We should have more than luck. We can have more than luck. We’ve
been studying warnings for half a century, and we have it nailed.”

Like a lot of disaster researchers, Mileti is perpetually disappointed.
Luckily, he also has a sense of humor. After he says something particu-
larly provocative, he laughs with a loud bark, showing off unnaturally
white, straight teeth. When he is asked to give speeches, which is often,
he sometimes shows up in a Hawaiian shirt. Then he unleashes sweeping
condemnations and calls to action. For all these reasons, in the small
and sometimes tedious world of disaster research, Mileti has something
of a cult following.

In July of 2006, at the annual disaster summit held at the University
of Colorado at Boulder, Mileti appeared at a panel titled “Risk-Wise
Behavior.” The auditorium was packed with 440 disaster experts.
Mileti, who spoke last, was the only one without a PowerPoint presen-
tation. He just got up and started ranting. “How many people do you
need to see pounding through their roofs before we tell them how high
the floodwaters can be, how hard the ground can shake? How many citi-
zens must die to get us to do it?” he nearly shouted. “If you can’t create
the political will, do it anyway.” The crowd went crazy.

As a smoker, Mileti likes to point out that the nation does take some
risks seriously: “Do you know how many no-smoking signs you see in an
airport? We’ve just not chosen to do the same thing for natural disas-
ters,” he said. “Why can’t we put up signs that say, ‘This is a tsunami in-
undation zone’ [along the coast] of California? If we’re not doing it for
other hazards, I say take the no-smoking signs out of the airport.”

Later, over hamburgers next to the Boulder Creek, Mileti rattled off
other counterexamples: “You know how everyone knows not to take an
elevator in a fire? How did that happen? In Hawaii, it’s now part of
the culture to get to high ground if you feel an earthquake. It should be the
same in Santa Monica. You need to acculturate a tsunami warning sys-
tem.” Like most people at the workshop, Mileti was heartbroken by
Hurricane Katrina—a catastrophe that did not have to happen. Unlike
some of the younger attendees, Mileti fully expects to be heartbroken
again. “We know exactly—exactly—where the major disasters will
occur,” he says, smiling. “But individuals underperceive risk. The pub-
lic totally discounts low-probability, high-consequence events. The in-
dividual says, it’s not going to be this plane, this bus, this time.”
We still measure risk with the ancient slide rule that worked for most of our evolutionary history, even though we have calculators at our side. Likewise, we still eat chocolate cake even though we no longer need to hoard calories. But we can learn to eat less cake, and it is possible to become better judges of risk.

So how do we override our worst instincts? First and most important, the people in charge of warning us should treat us with respect. It’s surprising how rarely warnings explain why you should do something, not just what you should do. Once you start noticing this problem, you’ll see it everywhere. In fact, I think that the mistakes the public makes in calculating risk are primarily due to this pervasive lack of trust on behalf of the people charged with protecting us. They are our escorts through Extremistan, but they don’t level with us often enough.

For example, you have heard flight attendants explain how to put on an oxygen mask, should it drop down from the ceiling of the plane. “Secure your own mask before helping others,” the warning goes. But the flight attendant does not tell you why. Imagine if you were told that, in the event of a rapid decompression, you would only have ten to fifteen seconds before you lost consciousness. Aha. Then you might understand why you should put your mask on before you help your child. You might understand that if you don’t put your mask on first, you’ll both be unconscious before you can say, “how does this thing work?” Suddenly the warning would not just sound like a nagging legalese; it would sound like common sense. It would motivate.

In the late 1990s, the U.S. government conducted a large and priceless survey of 457 passengers involved in serious airplane evacuations. Over half of them said that they had not watched the entire preflight safety briefing because they had seen it before. Of those who did watch most of the briefing, 50 percent said it had not been helpful to them when the emergency came to pass. In retrospect, they wished they had been told more about exit routes, how to use the slides, and how to get off the wing after fleeing through the overwing exit. They wanted a more vivid, practical warning than they got.

Carry-on bags are a major problem in plane crashes. About half of all passengers try to take their carry-on with them in an evacuation, even though they have been ordered by flight attendants to leave everything behind. (This is the same gathering behavior exhibited by Elia Zedeño in the World Trade Center, when she felt compelled to take things, including a mystery novel, before she left her office.) Later, plane-crash survivors report that these collected carry-on bags posed a major obstacle to getting out quickly and safely. People tripped on them as they groped through the darkness, and the bags became weapons as they hurtled down the evacuation slides. The solution to this problem may not be that complicated, however. In a recent study in the United Kingdom, one volunteer suggested that flight attendants, instead of asking passengers to “leave all hand baggage behind,” tell passengers why they should do so. They should simply say this, the volunteer suggested: “Taking luggage will cost lives.”

Why don’t the airlines give people better warnings, even when plane-crash survivors tell them how to do it? For one thing, they are in business. They don’t want to scare customers by talking too vividly about crashes. Better to keep the language abstract and forgettable. But there’s another, more insidious reason. Airline employees, like professionals in most fields, don’t particularly trust regular people. “Like police, they think of civilians as a grade below them,” says Daniel Johnson, a research psychologist who has worked for the airlines in various capacities for more than three decades. At aviation conferences, he still has trouble getting experts to appreciate the human factor. “They would rather talk about hardware and training manuals—and not worry about what I consider equally important, which is the behavior of the actual people.” If the worst does happen, this distrust makes things harder still for regular people. “Often the pilots and the flight attendants do not want to inform the passengers about an emergency for fear of upsetting them,” Johnson says. “So they let them sit there in ignorance, and when the accident does happen, no one knows what the hell is going on.”

On the D.C. subway system recently, I heard this taped announcement: “In the event of a fire, remain calm and listen for instructions.” That’s it. Hundreds of conversations and thoughts were interrupted for
that announcement. What was the message? That the officials who run the subway system do not trust me. They think I will dissolve into hysterics and ignore instructions in the event of a fire.

Consider what the people who created this announcement did not do: they had an excellent opportunity to tell me how many subway fires happen in the D.C. system each year. That would have gotten my attention. They also had a chance to explain why it’s almost always better to stay in the subway car in case of a fire (because the rails on the track can electrocute you, and the tunnels are, in some places, too narrow to fit through if a train is coming). But instead, they just told me not to panic. Ah, thank you so much. And here I’d been planning on panicking!

Trust is the basic building block of any effective warning system. Right now, it’s too scarce in both directions: officials don’t trust the public, and the public doesn’t trust officials either. That’s partly an unintended consequence of the way we live. “Our social and democratic institutions, admirable as they are in many respects, breed distrust,” Slovic wrote in his 2000 book, *The Perception of Risk*. A capitalist society with a free press has many things to recommend it. But it is not a place where citizens have overwhelming confidence in authority figures. Distrust makes it harder for the government to compensate for its citizens’ blind spots—one of government’s most vital functions.

Overcoming the trust deficit requires some ingenuity. But it can be done. The easiest way to mesmerize the brain is through images. Anecdotes, as any journalist or advertiser knows, always trump statistics. That’s why lottery advertisements feature individual winners basking in the glow of newfound wealth. “Ramon Valencia celebrates Father’s Day by winning a cool $1 million!” reads a California Lottery announcement. Probabilities pale in comparison to Ramon Valencia, father of four, from La Puente.

Usually, people think in binary terms: either something will happen or it won’t. Either it will affect me, or it won’t. So when people hear they have a 1 in 100,000 chance of dying from a fall, they shelve that risk under the label “won’t happen to me,” even though falling is in fact the third most common cause of accidental deaths in the United States (after car crashes and poisoning). It would be much more powerful to tell people about Grant Sheal, age three, who fell and cut himself on a vase while playing at home in February 2007. The toddler died from his injuries. Or about Patryk Rzewalski, nineteen, who fell down and hit his head that same month while walking near his home. He was pronounced dead at the scene. These deaths are almost always described in news accounts as “freak accidents,” despite the fact that they are relatively common.

When people imagine good things happening to them, they become more prone to take risks—regardless of the odds. In human brain imaging studies, part of the brain called the “ventral striatum” is highly active in gamblers and drug addicts. Within this region, something called the “nucleus accumbens” lights up when people just anticipate winning money. When this region is activated, people have a tendency to take more risks. So all a casino has to do is get you to anticipate winning—even if you never actually experience it. This might explain why casinos play with minirewards like cheap food, free drinks, bonus points, and surprise gifts. Anticipating those rewards can activate the nucleus accumbens, which in turn can lead to more risk taking.

Another part of the brain lights up when people imagine losing. The “anterior insula” is active when people calculate the risk of bad things happening—like disasters. This region also shows activation when people are anticipating upsetting images. So it makes sense that insurance advertisements might encourage risk-averse behavior (i.e., buying policies) by activating the anterior insula through scary images.

This isn’t to say people need to be terrified into planning for disasters. Subtlety can work too. In Old Town Alexandria, Virginia, lines etched into a large renovated factory mark how high the Potomac River has risen in previous floods. At the Starbucks next door, one of the photos on the walls shows floodwaters surrounding the café and a man in a yellow rain slicker canoeing past. There are creative ways to institutionalize memory in everyday life.

In fact, it’s important not to overwhelm people with a warning that’s too frightening. Eric Holdeman ran King County’s Office of Emergency Management in Washington state for eleven years. He has found that there’s a fine line between getting people’s attention and losing them to
a sense of futility. In 2005, an organization in his state issued a big report about what would happen if a massive earthquake occurred on the Seattle fault. The fault could deliver a 7.4 earthquake. But the report’s authors deliberately proposed a less-frightening hypothetical (a magnitude 6.7 quake, which would kill an estimated 1,660 people), betting they would get more attention. Says Holdeman: “Sometimes it’s hard to get people to do worst-case planning because the worst case is so bad. People just throw up their hands.”

But given reasonable, tangible advice, people can be very receptive. In the nation of Vanuatu, east of Australia, the residents of a remote part of Pentecost Island have no access to modern amenities. But once a week, they get to watch TV. A truck with a satellite dish, a VCR, and a TV comes to town and everyone gathers round for some entertainment. After a 1998 earthquake in Papua New Guinea, the TV truck showed a UNESCO video on how to survive a tsunami. In 1999, the islanders felt the earth shake, just like in the video, and they ran for high ground. Thirty minutes later, a giant wave inundated the town. But only three people out of five hundred died.

But all over the world, even in developing nations, officials have an unfortunate preference for high-tech gadgetry over simplicity. In coastal Bangladesh, after a 1970 cyclone killed more than three hundred thousand people, the government devised a complex warning system. Volunteers were trained to hoist flags representing one of ten different warning levels. But a 2003 survey of rural villagers found that many took no notice of the semaphore system. “I know there are disaster signals ranging from Signal No. 1 to 10,” Mohammad Nurul Islam told a team from the Benfield Hazard Research Centre, based at University College of London. “But I have no idea what they mean.” He does have his own personal survival system, however. “I can predict any disaster coming when the sky turns gloomy, bees move around in clusters, the cattle become restless, and the wind blows from the south.”

Even a child can do better than a fancy warning system, if she has been trusted with some basic information. English schoolgirl Tilly Smith was vacationing with her parents and sister in Thailand in 2004 when the tide suddenly rushed out. Tourists pointed at the fish flopping on the sand. Out on the horizon, the water began to bubble strangely, and boats bobbed up and down. Smith, ten, had just learned about tsunami in her geography class, two weeks earlier. She had watched a video of a Hawaii tsunami and learned all the signs. “Mummy, we must get off the beach now. I think there is going to be a tsunami,” she said. Her parents started warning people to leave. Then the family raced up to the JW Marriott hotel where they were staying and alerted the staff, who evacuated the rest of the beach. In the end, the beach was one of the few in Phuket where no one was killed or seriously hurt.

The best warnings are like the best ads: consistent, easily understood, specific, frequently repeated, personal, accurate, and targeted. Now compare that description to the U.S. Department of Homeland Security’s color-coded alert system. It is indeed easy to understand, and it gets repeated frequently. But other than that, the alerts are inconsistent, unspecific, impersonal, and untargeted. “That isn’t a warning system,” says warnings expert Mileti. “That’s the first 10 percent of the system. It’s a risk classification system. It would be equivalent to saying, ‘It’s orange today for floods.’” Warnings need to tell people what to do. Since people aren’t sure what action they should take in response to an Orange Alert for terrorism, the color codes are unsatisfying—like someone clinking a glass to give a toast and then standing there in silence.

So what can regular people do to improve their own risk perception? When I asked risk experts this question, they told me their own tricks.

When it comes to financial risk, Taleb, the mathematical trader, refuses to read the newspaper or watch TV news. He doesn’t want to tempt his brain with buy-sell sound bites. Likewise, Slovic avoids short-term investments; he invests broadly and then walks away. Similarly, when it comes to disaster risk, there’s little to be gained by watching TV news segments: stories of shark attacks will distract your brain from focusing on far likelier risks. (Sharks kill an average of six people worldwide every year. Humans kill between 26 and 73 million sharks. This is not a battle humans are losing.)

“I tell people that if it’s in the news, don’t worry about it. The very definition of ‘news’ is ‘something that hardly ever happens,’” writes security expert Bruce Schneier. “It’s when something isn’t in the news,
when it's so common that it's no longer news—car crashes, domestic violence—that you should start worrying."

Repeatedly absorbing disaster images on TV can be particularly damaging. After 9/11, studies showed that the more hours of coverage adults and children watched, the more stress they experienced. In general, TV makes us worry about the wrong things. Your brain is better at filtering out media hype when it is reading. Words have less emotional salience than images. So it's much healthier to read the newspaper than watch TV.

The time to let your emotions run free is when you can't get good data. Long ago, that would have been all the time. You would have needed to rely on your emotions every minute of every day. "If you're back in a time before books and statistical research, and you need to know which mushrooms are poisonous, going by rumor and hearsay is a good strategy," says Gerd Gigerenzer, director of the Center for Adaptive Behavior and Cognition at the Max Planck Institute in Berlin. But when data are available—and they are now more available than any time before—there is no better complement to raw emotion.

David Ropeik, coauthor of Risk: A Practical Guide for Deciding What's Really Safe and What's Really Dangerous in the World Around You, does not totally repress his own instincts. He allows his emotions to help him make decisions. "We're always going to use our feelings. We're never going to have all the facts. So we have to use emotions to kind of fill in the blanks," Ropeik says. "But, and this is the challenge, that can be dangerous. If you go with how a risk feels, and that flies in the face of the facts, you could die." So Ropeik tries to check himself whenever his feelings clash with known facts. For example, he is emotionally opposed to wearing a bike helmet. He feels strongly that he looks "goofy and stupid" in a helmet. But he forces himself to wear one anyway. He knows his emotions clash with the data, so he suppresses his feelings, just the way he suppresses the desire to eat a piece of chocolate cake (most of the time).

The next time you hear about something that scares you, look for data. Be suspicious of absolute numbers—or no numbers at all. For example, new parents are now inundated with warnings about sudden infant death syndrome (SIDS), the name given to the unexplained death of a baby under age one. Given the enormous stakes, and the ready availability of preventive measures (like putting the baby to sleep on his or her back), these warnings make sense. But it would be much better if the scary pamphlets handed to new parents at the hospital put the risk into perspective. For instance, perhaps the warnings could include language like this: "SIDS is still not well-understood. But it is at an all-time low, partly because parents like you have been following basic precautions described in this pamphlet. Fewer than one baby per 1,000 dies this way (four times as many infants die from birth defects and low birthweight). So you don't need to get up seven times in the middle of the night to check if the baby is breathing. Just follow these simple rules—and concentrate on sleeping, which will make you a much better parent, with near 100 percent certainty."

Of course, even when people really do understand the risks, that doesn't mean they will make low-risk choices. Milet, one of the nation's foremost experts on hazards, lives along one of the biggest earthquake faults in North America. I ask him if this is wise. "No, it makes no sense," he says. But, unlike 86 percent of Californians, Milet has earthquake insurance. He also has several days' worth of supplies. And instead of paying off his house, he has stashed his savings in the bank, so he'll have cash if he needs it. He isn't mired in denial. He's made an informed gamble: until the megaearthquake he fully expects to occur one day, he gets to live in Palm Springs, California.