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Chapter 11

The powers and perils of intuition

David G. Myers*

You don't know your own mind.
Jonathan Swift, *Polite conversation*, 1738

Even after spending a career pondering the connections between feeling and fact, intuition and reality, I am predisposed to welcome unbidden hunches. I once took an instant liking to a fellow teen, to whom I've now been married more than 40 years. Upon meeting job applicants, my gut reactions sometimes run ahead of my head's rationality. As a sign in Albert Einstein's office is rumoured to have read, 'Not everything that can be counted counts, and not everything that counts can be counted'.

However, I also know that my intuition—my effortless, immediate, unreasoned sense of truth—sometimes errs. My geographical intuition tells me that Reno is east of Los Angeles, Rome is south of New York, and Atlanta is east of Detroit; but I am wrong, wrong and wrong. 'The first principle', said Einstein's fellow physicist Richard Feynman, 'is that you must not fool yourself—and you are the easiest person to fool'.

So, what *are* intuition's powers? And what are its perils? When hiring, firing and investing, should we plug into our 'right brain' premonitions? Or with bright people so often believing demonstrably stupid things, do we instead need more 'left brain' rationality?

My message in a nutshell: psychological science reveals some astounding powers of intuition, and some notable perils. Creative yet critical thinkers will appreciate both.

Does comprehending intuition's powers and perils matter? I contend it matters greatly. Consider:

1. Judges' and jurors' intuitions determine the fate of lives. (Is she telling the truth? Will he do it again if released? Does applying the death penalty deter homicide?)
2. Investors' intuitions affect fortunes. (Has the market bottomed? Are tech stocks due for another plunge? Is it time to shift into bonds?)
3. Coaches' intuitions guide their decisions about whom to play. (Does she have the hot hand tonight? Is he in a batting slump?)

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4. Clinicians' intuitions steer their practice. (Is he at risk for suicide? Was she sexually abused?)

Intuitions shape our fears (do we fear the right things?), impressions (are our stereotypes accurate?) and relationships (does she like me?). Intuitions influence prime ministers in times of crisis, gamblers at the table and personnel directors when eyeing applicants.

Intuition's powers

Intuition's powers are widely acclaimed. 'I work through instinct, and instinct is my best counselor', declared Princess Diana in her last interview.[1] 'I'm a gut player. I rely on my instincts', said George W. Bush shortly before launching the Iraq War.[2] 'Buried deep within each and every one of us, there is an instinctive, heart-felt awareness that provides—if we allow it to—the most reliable guide', agreed Prince Charles. We need, he believes, 'to listen rather more to the common sense emanating from our hearts'.[3]

The princess, president and prince have plenty of company. Writers, counsellors and speakers galore offer to develop our sixth sense, to harness our inner wisdom, to unlock the power of our subconscious mind. Books (see Table 11.1) guide us toward intuitive healing, learning, selling, investing and managing.

Deciding what to make of this intuition industry is tricky. 'Intuitives'—intuition authors and trainers—seem largely oblivious to new scientific explorations of how the human mind processes information. Are their intuitions about intuition valid? Is consciousness often invaded by uninvited truth, there to grasp if we will but restrain our

Table 11.1 Books on intuition

Intuitive healing	**Intuitive business**
The intuitive healer: accessing your inner physician	*The intuitive manager*
Dr. Judith Orloff's guide to intuitive healing	*The intuitive trader*
The intuitive heart	*The intuitive business woman*
Intuitive cooking	*Intuitive selling*
Intuitive eating	*Intuition at work*
Intuitive learning	**Intuitive spirituality**
The intuitive principal	*Intuitive thinking as a spiritual path*
Understanding and teaching the intuitive mind	*Intuitive techniques for getting thru to your soul*
The intuitive approach to reading and learning abilities	*Divine intuition*
The wise child: a spiritual guide to nurturing your child's intuition	**Intuitive living**
Intuitive living: a sacred path	*The intuitive edge*
	The intuitive way
	You already know what to do

Table 11.2 From Daniel Kahneman's Nobel Lecture

Intuition System 1	Reasoning System 2
Fast	Slow
Parallel	Serial
Automatic	Controlled
Effortless	Effortful
Associative	Rule-governed
Slow-learning	Flexible
Emotional	Neutral

Most judgments and actions are governed by System 1. They are unproblematic, skilled and adequately successful.

rational thinking and attune to the still small voice within? Or are intuitives' writings perpetuating mind myths? Are they to cognitive science what professional wrestling is to athletics?

Today's cognitive science *is* revealing a fascinating unconscious mind that Freud never told us about. Thinking occurs on stage, but more so off stage, out of sight. Studies of (excuse some jargon) automatic processing, subliminal priming, implicit memory, heuristic judgements, spontaneous trait inference, right-brain processing, instant emotions, non-verbal communication, implicit attitudes and creativity unveil our intuitive capacities. The bottom line: thinking, memory and attitudes all operate on two levels—the conscious/deliberate and the unconscious/automatic. 'Dual processing', researchers call it (see Table 11.2). We know more than we know we know. Intuition does, indeed, have remarkable powers.

The extent to which our everyday thinking, feeling and acting operate outside conscious awareness is difficult for people to appreciate and accept, report psychologists John Bargh and Tanya Chartrand.[4] Our consciousness is biased to think that its own intentions and deliberate choices rule our lives; but consciousness over-rates its own control.

The automaticity of everyday living

We can recognize 'the automaticity of everyday living' (to use a Bargh–Chartrand phrase). Just compare our effortful control when first learning to drive, with total concentration, with our now well-practised intuitive driving skill. While our mind is making plans or engaging in conversation, our hands and feet, as if managed by an unseen mind inside our mind, will take us where we need to go. Or consider simple speech. Most of us could easily explain to a non-English speaker how we form the words 'dad' (with the tongue) and 'pad' (with the lips); but how would we teach the difference between 'pad' and

'bad'? Most of us cannot explain the difference. However, intuitively our mouths know. Moreover, strings of words effortlessly spill out our mouths with near-perfect syntax. It is as if there were servants upstairs, busily hammering together sentences that get piped down to the mouth and larynx and fluidly shoved out.

Even as these words spill onto my computer screen, my fingers gallop across the keyboard under instructions from . . . somewhere. If a person enters my office while I am typing, the cognitive servants running my fingers will finish the sentence while I start up a conversation. We have, it seems, two minds: one for momentary awareness and executive decisions, the other for everything else.

Reading thin slices

Do you ever, after but a moment's observing someone, form a lasting impression from their animation, gestures and voice? Such 'thin slices' of someone's behaviour can reveal much, report Nalini Ambady and Robert Rosenthal.[5] They invited people to view three thin slices—mere 10-s clips—of college professors' teaching, and from nothing more than this to rate the professors' confidence, energy and warmth. With remarkable accuracy, these ratings predicted end-of-term ratings by the professors' students. Thinner slices—three 2-s clips—yielded ratings that were similarly congruent with student evaluations. To form a reasonable accurate sense of someone's personality, 6 s will often do.

Even micro-thin slices tell us something. When John Bargh flashed an image of an object or face for just two-tenths of a second, his New York University students evaluated it instantly.[6] 'We're finding that everything is evaluated as good or bad within a quarter second', he reports. Before engaging in any rational thought, we may find ourselves mildly loathing or loving a portrait, a person or a poodle.

There is biological wisdom to this express link between perception and response. When meeting a stranger in the wilderness, one needed to decide instantly: friend or foe? Those who could read a person quickly and accurately were more likely to survive and leave descendants. That helps explain why we today can distinguish at a glance between facial expressions of anger, sadness, fear and pleasure.

Indeed, thanks to emotional pathways that run from the eye to the brain's emotional control centres—bypassing the cortex—we often react emotionally before we have had time to interpret the situation consciously. Below the radar of our awareness, we intuitively process threatening information in milliseconds. Then, after the cortex has had time to interpret the threat, the thinking brain asserts itself. In the forest, we jump at the sound of a cracking twig, leaving the cortex to decide later whether the sound came from the wind, a squirrel or a predator.

Clearly, human intelligence is more than logic and comprehension is more than conscious awareness. Cognitive psychologist George Miller offers a metaphor for this truth: 'There sure is a lot of water in the ocean', said one ship passenger to another. 'Yes' said the other, 'and we've only seen the top of it'.[7]

Gender and intuition

Shortly after Jackie Larsen left her Minnesota church group one April morning, she encountered Christopher Bono, a clean-cut, well-mannered youth whose car had broken down. Larsen invited him to use her shop telephone to call for assistance. When he later appeared, she felt a stomach pain. Sensing that something was wrong, she insisted they talk outside. 'I can tell by your manners that you have a nice mother', she explained. 'I don't know where my mother is', Bono replied.

Larsen directed Bono back to the church, then called the police and suggested they trace his licence plate. Discovering the car registered to his mother, Lucia Bono, who lived several hundred miles away, they sent local police to her apartment. There they discovered her dead in the bathtub. Bono, 16, was charged with first-degree murder.

Does Jackie Larsen's accurate intuition that something was awry illustrate what so many believe—that women have superior intuition? When surveyed, women are far more likely than men to describe themselves as empathic, as being able to feel what another feels. To a lesser extent, the self-reported empathy gap extends to behaviour. Women, for example, are more likely to cry or report distress at another's distress. This empathy gap helps explain why both genders report that their friendships with women are more intimate, enjoyable and nurturing than are their friendships with men. When seeking understanding, both men and women usually turn to women.

Underlying the empathy gap is women's seemingly superior skill at reading others' emotions. In an analysis of 125 studies of social sensitivity, Judith Hall discerned that women generally surpass men at decoding emotional messages.[8] When shown a silent, 2-s film clip of an upset woman, women more often than men accurately guess that she is discussing her divorce rather than criticizing someone. Women's non-verbal sensitivity also gives them an edge in spotting lies, and in discerning whether a male–female couple is genuinely romantic or a posed, phony couple.

The gender intuition gap often gets overstated. 'Activating intuition always starts with a shift into softness and silence', suggests Penny Peirce in *Intuition* magazine; it tunes down 'the linear, left-brained masculine mind'. Actually, some men are more empathic and sensitive than the average woman. Even so, the modest but apparently real gender difference is celebrated by some feminist scholars as one of 'women's ways of knowing'. Women more often base knowledge on intuitive and personal grounds. Slightly more than half of the intuition books in Table 11.1 are written by females. In contrast, among books in the 'science and the paranormal' section of a recent Prometheus books catalogue—all offering a rational, sceptical perspective—I counted 110 male and but four female authors.

Psychologists debate whether the intuition gap is truly intrinsic to gender. Whatever the reason, Western tradition has historically viewed rational thinking as masculine and intuition as feminine, notes feminist historian Evelyn Fox Keller. Women's ways of knowing give greater latitude to subjective knowledge, argues Mary Field Belinky. She contends that women winnow competing ideas less through hostile scrutiny than by

getting inside another's mind, and often by way of friendly conversation. On the popular Myers–Briggs personality test, nearly six in 10 men score as 'thinkers' (claiming to make decisions objectively using logic), while three in four women score as 'feelers' (claiming to make decisions subjectively based on what they feel is right).

Women and men are more alike than different. However, it is the small differences that capture our fascination, one of which is women's seeming somewhat more empathic and intuitively sensitive to non-verbal cues.

Intuitive expertise

As a mushrooming mountain of evidence plainly indicates, we have two minds—two ways of knowing, two kinds of memory, two levels of attitudes—one above the surface in our moment-to-moment awareness, the other below, operating the autopilot that guides us through most of life. We see the results of those unseen cognitive workers in the social intuitions they slip into our awareness, and also in our developing expertise and creative inspirations. Through experience, we gain practical intuition—subtle, complex, ineffable knowledge that aids our problem solving.

From your two eyes your brain receives slightly differing images of an object. In a microsecond, it analyses their difference and infers the object's distance. Even with a calculator at hand, your conscious mind would be hard pressed to make the same computation. No matter, your intuitive mind already knows. Indeed, we know much that is too complex for our conscious minds to understand.

What you know, but do not know you know, affects you more than you know. That is the bottom line of more than 300 experiments on our powers of unconscious learning (or 'non-conscious' learning, as the cognitive scientists often prefer to call it, lest their concept be confused with Freud's idea of a seething unconscious mind). The multitasking non-conscious mind is not just tending to housekeeping details, reveal experiments by Pawel Lewicki. No, the mind is quick, agile, perceptive, and surprisingly capable of 'detecting complex patterns of information'.[9]

An example: you know which of these two phrases sounds better—'a big, red barn' or 'a red, big barn'—but your conscious mind struggles to articulate the rule that you intuitively know. Likewise, say Lewicki *et al.*, 'the seemingly simple act' of recognizing an object's shape and size and placing it 'in three-dimensional space requires a set of sophisticated geometrical transformations and calculations that go far beyond what most perceivers could articulate or even comprehend'.[10] Don't bother to ask chess masters to explain their next move, or poets where the image came from or lovers why they're in love. 'All they know is that they just do it'.

The Tulsa experiments reveal that people's non-conscious learning can anticipate patterns 'too complex and too confusing to be consciously noticed'. In one study, some students watched (others did not) as the numeral '6' jumped around a computer screen, from quadrant to quadrant. Although it seemed like a random order—no one consciously detected any rule—those who had seen the earlier presentations were quicker to find the

next 6 when it was hidden among a screen full of numbers. Without knowing how they did it, their ability to track the number from one quadrant to another was improving. When the numbers' movement became truly random, their performance declined.

Lewicki repeated the experiment with his quick-witted psychology professor colleagues, who knew he was studying non-conscious learning. They, too, gained speed in locating the target's next position, and they too did not know why. When the experimenters switched to a random sequence and performance declined, the professors conjectured reasons for the decline (threatening subliminal messages, perhaps?). To students who had displayed unconscious learning, Lewicki even offered US$100 if they could uncover the hidden pattern. Some spent hours trying to decipher the sequence. None succeeded.

In 1998, World Checkers (draughts) Champion Ron 'Suki' King of Barbados set a new record by simultaneously playing 385 players in 3 h and 44 min. While his opponents often could leisurely plot their moves, King could devote only about 35 s to each game—barely more than a glance at the board for each move. Yet he still managed to win all 385 games.[11] How did he do it? How are car mechanics, physicians and swimming coaches (all of whom have been subjects of study) often able to diagnose problems instantly?

Compared with novices, experts know much more. In a classic study, William Chase and Herbert Simon found that chess experts, unlike the rest of us, could often reproduce a chess board layout after a mere 5 s glance.[12] Unlike a poor chess player who has few stored patterns in memory, a good player has 1000 and a chess master has roughly 50,000.[13] A chess master may also perceive the board in several chunks—clusters of positions they have seen before. A quick look at the board is therefore all it takes to recognize many layouts—unless the pieces are placed randomly, in which case the experts' memory becomes slightly *worse* than that of novices. Chess masters can therefore play by intuition at 5–10 s a move, without time for analysis of alternatives, and without much performance decline.

Physicians and mechanics likewise can often make intuitive diagnoses, as if thinking, 'This reminds me of symptoms I have seen before, when the problem was X'. The diagnosis is not dictated by logic—other ailments could produce the same symptoms. However, it is quick and usually right.

Even quicker and more astoundingly accurate are professional chicken sexers. Poultry owners once had to wait 5–6 weeks before the appearance of adult feathers enabled them to separate cockerels (males) from pullets (hens). Egg producers only wanted to buy and feed pullets, and were intrigued to hear that some Japanese had developed an uncanny ability to sex day-old chicks. Although even poultry farmers cannot tell male from female organs in a newborn chick, the Japanese experts could do it at a glance. Hatcheries elsewhere then gave some of their workers apprenticeships under the Japanese experts, by watching them do it and then beginning to sort on their own, with feedback on their accuracy. After months of training and ensuing experience, the best Americans and Australians could almost match the Japanese, by sexing 800–1000 chicks per hour

(about one a second) with 99 per cent accuracy.[14] But don't ask them how they do it. The sex difference, as any chicken sexer can tell you, is too subtle to explain.

When experienced gourmet cooks say they 'just use experience and intuition' in mixing ingredients, they are stating 'the theory of expert performance that has emerged in recent years'. noted Simon. 'In everyday speech, we use the word *intuition* to describe a problem-solving or question-answering performance that is speedy and for which the expert is unable to describe in detail the reasoning or other process that produced the answer. The situation has provided a cue; this cue has given the expert access to information stored in memory, and the information provides the answer. Intuition is nothing more and nothing less than recognition'.[15] Although we do not know what they are sensing, chicken sexers are intuitively recognizing subtle indicators of sex.

Creativity builds upon intuitive expertise. The solution to many a stubborn scientific or mathematical problem, such as Andrew Wiles' solution of Fermat's Last Theorem, have appeared unbidden, like a website pop-up ad. Poets, novelists, composers and artists readily recognize intuition's role in creativity. 'You get your intuition back when you make space for it, when you stop the chattering of the rational mind', counsels writer Anne Lamott.[16]

So try to calm down, get quiet, breathe and listen. Squint at the screen in your head and, if you look, you will see what you are searching for, the details of the story, its direction—maybe not right this minute, but eventually. If you stop trying to control your mind so much, you will have intuitive hunches about what this or that character is all about. It is hard to stop controlling, but you can do it. If your character suddenly pulls a half-eaten carrot out of her pocket, let her. Later you can ask yourself if this rings true. Train yourself to hear that small inner voice.

The perils of intuition

Thanks to the three pounds of wet neural tissue folded and jammed into our skulls, we are the world's greatest wonder. With circuitry more complex than the planet's telephone networks, we process boundless information, consciously and unconsciously. Right now your visual system is disassembling the light striking your retina into millions of nerve impulses, distributing these for parallel processing, and then reassembling a clear and colourful image. From ink on the page to a perceived image to meaning, all in an instant.

Our species, give us credit, has had the genius to invent cell phones and harvest stem cells; to unlock the atom and crack and map our genetic code; to travel to the moon and tour the sunken Titanic. Not bad, considering that we share 90 per cent of our DNA with a cow. Just by living, we acquire intuitive expertise that makes most of life effortless. Understandably, Shakespeare's Hamlet extolled us as 'noble in reason!... infinite in faculties!... in apprehension how like a god!' We are rightly called *Homo sapiens*—wise humans.

However, as Pascal taught 300 years ago, no single truth is ever sufficient, because the world is complex. Any truth, separated from its complementary truth, is a half-truth.

It is true that our intuitive information-processing powers are impressive for their efficiency, yet also true that they are prone to predictable errors and misjudgements. With remarkable ease, we form and sustain false beliefs. Just as understandably, T. S. Eliot called us 'the hollow men ... headpiece filled with straw.' We wise humans are sometimes fools.

In July 2002, a Russian airliner's computer guidance system instructed its pilot to ascend as another jet approached in the sky over Switzerland. At the same time, a Swiss air traffic controller—whose computerized air traffic system was down—offered a human judgement: descend. Faced with conflicting advice, the pilot's intuitive response was to trust another human's intuition. Tragically, the two planes collided, killing everyone onboard, including 45 children.

The history of science tells story after story of challenges to human intuition. To our ancestors, the sun's daily travels had at least two plausible explanations: either the sun was circling Earth, or Earth was spinning while the sun stood still. Intuition preferred the first explanation. Galileo's scientific observations demanded the second.

Psychology, too, is replete with compelling examples of how people fool themselves. Even the most intelligent people make predictable and costly intuitive errors; coaches, athletes, investors, interviewers, gamblers and psychics fall prey to well-documented illusory intuitions. It is shocking how vulnerable we are to forming false memories, misjudging reality and mispredicting our own behaviour. Our intuition errs.

In *Intuition: its powers and perils* I describe predictable flaws in people's intuitions about reality (including intuitions about elementary principles in physics and mathematics) and in people's intuitions about their own past and future and abilities. Here is but one example—a well-documented problem in our intuitive predictions of our own emotions.

Intuiting our future feelings

Many of life's big decisions require intuiting our future feelings. Would marrying this person lead to lifelong commitment? Would entering this profession make for enduring satisfaction? Would going on this vacation produce happy memories? Or would the more likely results be divorce, burnout and disappointment?

Sometimes our intuitions are on target. We know how we will feel if we fail that exam, win that big game or soothe our tensions with a 3 mile jog. Our intuitions more often fail in predicting an emotion's intensity and duration. In recent studies of 'affective forecasting', people have mispredicted the durability of their emotions after a romantic break up, losing an election, winning that game and being insulted.[17]

To introduce this 'durability bias', Harvard psychologist Daniel Gilbert and his colleagues invite us to 'Imagine that one morning your telephone rings and you find yourself speaking with the King of Sweden, who informs you in surprisingly good English that you have been selected as this year's recipient of a Nobel prize. How would you feel and how long would you feel that way?' Might you not expect a 'sharp and lasting upturn' in your well-being? Now imagine that the telephone call is from your college president,

who regrets to inform you (in surprisingly good English) that the Board of Regents has dissolved your department, revoked your appointment, and stored your books in little cardboard boxes in the hallway. How would you feel and how long would you feel that way?' Most people facing this personal catastrophe, say Gilbert and his colleagues, would expect the emotional wounds to be enduring.

Such expectations are often wrong. Gilbert *et al.* offer examples:[18]

- When shown sexually arousing photos, then exposed to a passionate date scenario in which their date asks them to 'stop', many male youths admit that they might not stop. If not first aroused by the pictures, they more often deny the possibility of sexual aggression. When not aroused, one easily mispredicts how one will feel and act when sexually hot—a phenomenon that leads to professions of love during lust, to unintended pregnancies, and to repeat offences among sex abusers who have sincerely vowed 'never again'.
- Researchers have documented what obstetricians know—that women in labour sometimes reverse their stated preference for anaesthetic-free delivery.[19] When we mispredict intensity, pain as well as pleasure can hijack our intentions. As George MacDonald wrote in 1886, 'When a feeling was there, they felt as if it would never go; when it was gone, they felt as if it had never been; when it returned, they felt as if it had never gone'[20]
- Shoppers do more impulse buying when hungry than when shopping after dinner. When hungry, one mispredicts how gross those deep-fried doughnuts will seem when sated. When sated, one mispredicts how yummy a doughnut might be with a late-night glass of milk.

Our intuitive theory seems to be: we want. We get. We are happy. If that were true, this chapter would be shorter. In reality, note Gilbert and Timothy Wilson, we often 'miswant'. People who imagine an idyllic desert island holiday with sun, surf, and sand may be disappointed when they discover 'how much they require daily structure, intellectual stimulation, or regular infusions of Pop Tarts'. We think that if our candidate or team wins we will be delighted for a long time. However, study after study reveals that the emotional traces of good tidings evaporate more rapidly than we expect. Attention shifts, and in hours, days or weeks (depending on the extremity of the good or bad happening) the feelings subside and we recalibrate our ups and downs around the new reality.

It is after negative events that we are especially prone to durability bias—to mispredicting the durability of emotions. When people being tested for HIV predict how they will feel 5 weeks after getting the results, they expect to be feeling misery over bad news and elation over good news. Yet 5 weeks later, the bad news recipients are less distraught and the good news recipients less elated than they anticipated.[21] When Gilbert and his colleagues asked assistant professors to predict their happiness a few years after achieving tenure or not, most believed a favourable outcome was important for their future happiness.[22] 'Losing my job would crush my life's ambitions. It would be terrible'.

Yet when surveyed several years after the event, people who had been denied tenure were about as happy as those who had received it.

Let us make this personal. Gilbert and Wilson invite us to imagine how we might feel a year after losing our non-dominant hand. Compared with today, how happy would you be?

Thinking about this, you perhaps focused on what the calamity would mean: no clapping, no shoe tying, no golf, no speedy keyboarding. Although you probably would forever regret the loss, your general happiness some time after the tragedy would be influenced by 'two things: (1) the event; and (2) everything else'.[23] In focusing on the negative event, we discount the importance of everything else that matters, and so overpredict our enduring misery. 'Nothing that you focus on will make as much difference as you think', concur fellow researchers David Schkade and Daniel Kahneman.[24]

Moreover, say Gilbert and Wilson, people neglect the speed and power of their 'psychological immune system', which includes their strategies for rationalizing, discounting, forgiving and limiting trauma. Being largely ignorant of this emotional recovery system—this 'immune neglect', as they call it—we accommodate to disabilities, romantic break ups, exam failures, tenure denials, and personal and team defeats more readily than we would expect. 'Weeping may tarry for the night, but joy comes in the morning', reflected the Psalmist.[25] Ironically, Gilbert and his colleagues report, major negative events (which activate our psychological defences) can be less enduringly distressing than minor irritations (which do not activate our defences).[26] We are more resilient than we know.

Intuitively fearing the wrong things

For me the most fascinating chapters in my book *Intuition* are those exploring intuition's powers and perils in specific practical realms: sports intuitions, investors' intuitions, interviewers' intuitions, clinical intuition, gamblers' intuitions, psychic intuition and intuitions about risk. Here is a single example, drawn from our perilous intuitions about risk.

With 9/11 images etched on their memories and the media dramatizing orange-level warnings, travellers have had terrorists on their minds. 'I'm going Greyhound rather than fly to California', my Baltimore cousin explains. 'Al Qaeda's not so likely to target a bus'. Others, fearing the worst, have elected to drive rather than fly to that Florida vacation.

However, people's fears are often misaligned with the facts. The U.S. National Safety Council reports that from 2000 through 2002, Americans were, mile for mile, 39.5 times more likely to die in a vehicle crash than on a commercial flight.[27] Terrorists, perish the thought, could have taken down 50 more planes with 60 passengers each in 2001 and—had we kept flying (speaking hypothetically)—we would still have finished 2001 safer in planes than on the road.[28] If flying is scary (531 people died on US scheduled airlines in 2001, none in 2002), driving the same distance should be many times scarier.

In a late 2001 essay for the American Psychological Society, I calculated that if we now flew 20 per cent less and instead drove half those unflown miles, about 800 more people

would die in traffic accidents in the next year. In a follow-up article in *Psychological Science*, German psychologist Gerd Gigerenzer[29] confirms that the last 3 months of 2001 indeed produced 350 more American traffic fatalities than normal for those months. Long after 9/11, the terrorists were still killing us in ways unnoticed.

Why do we intuitively fear the wrong things? Why do so many smokers (whose habit shortens their lives, on average, by about 5 years) fret before flying (which, averaged across people, shortens life by 1 day)? Why do we fear violent crime more than clogged arteries? Why do we fear terrorism more than accidents—which kill nearly as many per *week* in just the USA as did worldwide terrorism in all of the 1990s. Even with the horrific scale of 9/11, more Americans in 2001 died of food poisoning (which scares few) than terrorism (which scares many).

Psychological science has identified four influences on our intuitions about risk. First, we fear *what our ancestral history has prepared us to fear*—which includes confinement and heights, and therefore flying.

Secondly, we fear *what we cannot control.* Driving we control, flying we do not. 'We are loathe to let others do unto us what we happily do to ourselves', noted risk analyst Chauncey Starr.[30]

Thirdly, we fear *what is immediate.* Teens are indifferent to smoking's toxicity because they live more for the present than the distant future. Likewise, the dangers of driving are diffused across many moments to come, each trivially dangerous.

Fourthly, we fear *what is most readily available in memory.* Horrific images of United Flight 175 slicing into the World Trade Center form indelible memories; and availability in memory provides our intuitive rule for judging risks. Thousands of safe car trips (for those who have survived to read this) have largely extinguished our anxieties about driving. A thousand massively publicized anthrax victims would similarly rivet our attention more than yet another 30 000+ annual gun deaths. If a surface to air missile brings down a single American commercial airliner, the result will be traumatic for the aviation industry. Probabilities will not matter—the human mind has trouble grasping the infinitesimal odds of its being a plane you will be on. Images will rule the mind.

We therefore fear too little those threats that will claim lives undramatically, one by one (rather than in bunches). Smoking kills 400 000 Americans a year, yet we subsidize tobacco growers. Although killing many fewer, terrorists kill in ways that cause more terror; and as George Orwell's *1984* long ago recognized, it serves those in power to keep our attention focused on perceived external threats. Many a social psychology experiment confirms the principle: a perceived external enemy serves to quell dissent and unify a group.

Ergo, we will spend tens of billions to save future thousands, yet are reluctant to spend a few billion to save millions. Ten billion dollars a year would spare 29 million world citizens from developing AIDS by 2010, according to a joint report by representatives of the United Nations, the World Health Organization and others. Also, a few tens of billions spent converting cars to hybrid engines and constructing renewable energy sources could help avert the anticipated future catastrophe of global warming and its

associated surging seas and extreme weather. In 2003, reports the World Meteorological Organization, Western Europe experienced its hottest weather ever, with 14 802 heat-related deaths in France alone. May of 2004, the warmest May in world history, brought the USA 562 tornados, easily breaking the previous monthly record of 399. Without making too much of one year's extreme weather, climatologists warn us that global warming will be a genuine weapon of mass destruction.

The moral: it is perfectly normal to fear purposeful violence from those who hate us. When terrorists strike again, we will all recoil in horror. However, smart thinkers will also want to check their intuitive fears against the facts, and to resist politicians who serve their own purposes by cultivating a culture of fear. To be prudent is to be mindful of the realities of how humans die. By so doing, we can take away the terrorists' most omnipresent weapon: exaggerated fear. If our fears cause us to live and spend in ways that divert our attention from tomorrow's biggest dangers, then we surely do have something to fear from fear itself.

Conclusion

Intuition is bigger than we realize. Intuition feeds our automatic behaviours, our creativity and our spirituality. Intuition is a wonder. But intuition is also perilous. Today's cognitive science aims not to destroy intuition but to fortify it, to sharpen our thinking and deepen our wisdom. Scientists who expose intuition's flaws note that it works well in some areas, but needs restraints and checks in others. In realms from sports to business to risk assessment, we now understand how perilous intuitions often go before a fall, and how we can therefore think smarter, even while listening to the creative whispers of our vast unseen mind.

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