Introduction

Tenth Anniversary Edition of **Emotional Intelligence**

In 1990, in my role as a science reporter at *The New York Times*, I chanced upon an article in a small academic journal by two psychologists, John Mayer, now at the University of New Hampshire, and Yale's Peter Salovey. Mayer and Salovey offered the first formulation of a concept they called "emotional intelligence."

Those were days when the preeminence of IQ as the standard of excellence in life was unquestioned; a debate raged over whether it was set in our genes or due to experience. But here, suddenly, was a new way of thinking about the ingredients of life success. I was electrified by the notion, which I made the title of this book in 1995. Like Mayer and Salovey, I used the phrase to synthesize a broad range of scientific findings, drawing together what had been separate strands of research—reviewing not only their theory but a wide variety of other exciting scientific developments, such as the first fruits of the nascent field of affective neuroscience, which explores how emotions are regulated in the brain.

I remember having the thought, just before this book was published ten years ago, that if one day I overheard a conversation in which two strangers used the phrase *emotional intelligence* and both understood what it meant, I would have succeeded in spreading the concept more widely into the culture. Little did I know.

The phrase *emotional intelligence*, or its casual shorthand *EQ*, has become ubiquitous, showing up in settings as unlikely as the cartoon strips *Dilbert* and *Zippy the Pinhead* and in Roz Chast's sequential art in *The New Yorker*. I've seen boxes of toys that claim to boost a child's EQ; lovelorn personal ads sometimes trumpet it in those seeking prospective mates. I once found a quip about EQ printed on a shampoo bottle in my hotel room.

And the concept has spread to the far corners of our planet. *EQ* has become a word recognized, I'm told, in languages as diverse as

German and Portuguese, Chinese, Korean, and Malay. (Even so, I prefer *EI* as the English abbreviation for *emotional intelligence.*) My e-mail inbox often contains queries from, for example, a doctoral student in Bulgaria, a schoolteacher in Poland, a college student in Indonesia, a business consultant in South Africa, a management expert in the Sultanate of Oman, an executive in Shanghai. Business students in India read about EI and leadership; a CEO in Argentina recommends the book I later wrote on that topic. I've also heard from religious scholars within Christianity, Judaism, Islam, Hinduism, and Buddhism that the concept of EI resonates with outlooks in their own faith.

Most gratifying for me has been how ardently the concept has been embraced by educators, in the form of programs in "social and emotional learning," or SEL. Back in 1995 I was able to find only a handful of such programs teaching emotional intelligence skills to children. Now, a decade later, tens of thousands of schools worldwide offer children SEL. In the United States many districts and even entire states currently make SEL a curriculum requirement, mandating that just as students must attain a certain level of competence in math and language, so too should they master these essential skills for living.

In Illinois, for instance, specific learning standards in SEL abilities have been established for every grade from kindergarten through the last year of high school. To give just one example of a remarkably detailed and comprehensive curriculum, in the early elementary years students should learn to recognize and accurately label their emotions and how they lead them to act. By the late elementary years lessons in empathy should make children able to identify the nonverbal clues to how someone else feels; in junior high they should be able to analyze what creates stress for them or what motivates their best performance. And in high school the SEL skills include listening and talking in ways that resolve conflicts instead of escalating them, and negotiating for win-win solutions.

Around the world Singapore has undertaken an active initiative in SEL, as have some schools in Malaysia, Hong Kong, Japan, and Korea. In Europe the U.K. has led the way, but more than a dozen other countries have schools that embrace EI, as do Australia and New Zealand, and here and there countries in Latin America and Africa. In 2002 UNESCO began a worldwide initiative to promote SEL, sending a statement of ten basic principles for implementing SEL to the

ministries of education in 140 countries.

In some states and nations SEL has become the organizing umbrella under which are gathered programs in character education, violence prevention, antibullying, drug prevention, and school discipline. The goal is not just to reduce these problems among schoolchildren but to enhance the school climate and, ultimately, students' academic performance.

In 1995 I outlined the preliminary evidence suggesting that SEL was the active ingredient in programs that enhance children's learning while preventing problems such as violence. Now the case can be made scientifically: helping children improve their self-awareness and confidence, manage their disturbing emotions and impulses, and increase their empathy pays off not just in improved behavior but in measurable academic achievement.

This is the big news contained in a recently completed meta-analysis of 668 evaluation studies of SEL programs for children from preschoolers through high school.[1] The massive survey was conducted by Roger Weissberg, who directs the Collaborative for Academic, Social and Emotional Learning at the University of Illinois at Chicago —the organization that has led the way in bringing SEL into schools worldwide.

The data show that SEL programs yielded a strong benefit in academic accomplishment, as demonstrated in achievement test results and grade-point averages. In participating schools, up to 50 percent of children showed improved achievement scores, and up to 38 percent improved their grade-point averages. SEL programs also made schools safer: incidents of misbehavior dropped by an average of 28 percent; suspensions by 44 percent; and other disciplinary actions by 27 percent. At the same time, attendance rates rose, while 63 percent of students demonstrated significantly more positive behavior. In the world of social science research, these are remarkable results for any program promoting behavioral change. SEL has delivered on its promise.

In 1995 I also proposed that a good part of the effectiveness of SEL came from its impact in shaping children's developing neural circuitry, particularly the executive functions of the prefrontal cortex, which manage working memory—what we hold in mind as we learn —and inhibit disruptive emotional impulses. Now the first preliminary scientific evidence for that notion has arrived. Mark Greenberg of Pennsylvania State University, a codeveloper of the PATHS curriculum

in SEL, reports not only that this program for elementary school students boosts academic achievement but, even more significantly, that much of the increased learning can be attributed to improvements in attention and working memory, key functions of the prefrontal cortex.[2] This strongly suggests that neuroplasticity, the shaping of the brain through repeated experiences, plays a key role in the benefits from SEL.

Perhaps the biggest surprise for me has been the impact of EI in the world of business, particularly in the areas of leadership and employee development (a form of adult education). The *Harvard Business Review* has hailed emotional intelligence as "a ground-breaking, paradigm-shattering idea," one of the most influential business ideas of the decade.

Such claims in the business world too often prove to be fads, with no real underlying substance. But here a far-flung network of researchers has been at work, ensuring that the application of EI will be grounded in solid data. The Rutgers University-based Consortium for Research on Emotional Intelligence in Organizations (CREIO) has led the way in catalyzing this scientific work, collaborating with organizations that range from the Office of Personnel Management in the federal government to American Express.

Today companies worldwide routinely look through the lens of EI in hiring, promoting, and developing their employees. For instance, Johnson & Johnson (another CREIO member) found that in divisions around the world, those identified at midcareer as having high leadership potential were far stronger in EI competencies than were their less-promising peers. CREIO continues to foster such research, which can offer evidence-based guidelines for organizations seeking to enhance their ability to achieve their business goals or fulfill a mission.

When Salovey and Mayer published their seminal article in 1990, no one could have envisioned how the scholarly field they founded would be thriving just fifteen years later. Research has blossomed in this area; while in 1995 there was virtually nothing in the scientific literature on EI, today the field has legions of researchers. A search of the database for doctoral dissertations investigating aspects of emotional intelligence yields more than seven hundred completed to date, with many more in the pipeline—not to mention studies done by

professors and others not counted in that database.[3]

The growth of this area of scholarship owes much to Mayer and Salovey, who, along with their colleague David Caruso, a business consultant, have worked tirelessly on behalf of the scientific acceptance of emotional intelligence. By formulating a scientifically defensible theory of emotional intelligence and providing a rigorous measure of this capacity for effective living, they have set an impeccable research standard for the field.

Another major source of the burgeoning academic findings about EI has been Reuven Bar-On, now at the University of Texas Medical Branch in Houston, whose own theory of EI—and high-energy enthusiasm—have inspired many studies using a measure he devised. Bar-On has also been instrumental in developing and editing academic books that have helped give the field a critical mass, including *The Handbook of Emotional Intelligence*.

The growing EI field of study has met some entrenched opposition within the insular world of scholars of intelligence, particularly those who embrace IQ as the sole acceptable measure of human aptitudes. Nevertheless, the field has emerged as a vibrant paradigm. Any important theoretical model, observed the philosopher of science Thomas Kuhn, should become progressively revised and refined as more stringent tests of its premises are made. That process seems well under way for EI.

There are by now three main models of EI, with dozens of variations. Each represents a different perspective. That of Salovey and Mayer rests firmly in the tradition of intelligence shaped by the original work on IQ a century ago. The model put forth by Reuven Bar-On is based on his research on well-being. And my own model focuses on performance at work and organizational leadership, melding EI theory with decades of research on modeling the competencies that set star performers apart from average.

Unfortunately, misreadings of this book have spawned some myths, which I would like to clear up here and now. One is the bizarre—though widely repeated—fallacy that "EQ accounts for 80 percent of success." This claim is preposterous.

The misinterpretation stems from data suggesting IQ accounts for about 20 percent of career success. Because that estimate—and it is only an estimate—leaves a large portion of success unaccounted for,

we must seek other factors to explain the rest. It does *not* mean, however, that emotional intelligence represents the rest of the factors in success: they certainly include a very wide range of forces—from the wealth and education of the family we are born into, to temperament, to blind luck and the like—in addition to emotional intelligence.

As John Mayer and his associates point out: "To the unsophisticated reader, bringing up the '80 percent unaccounted for variance' suggests that there may indeed be a heretofore overlooked variable that truly can predict huge portions of life success. Although that is desirable, no variable studied in a century of psychology has made such a huge contribution."[4]

Another common misconception takes the form of recklessly applying this book's subtitle—"Why it can matter more than IQ"—to domains like academic achievement, where it does not apply without careful qualification. The extreme form of this misconception is the myth that EI "matters more than IQ" in all pursuits.

Emotional intelligence trumps IQ primarily in those "soft" domains where intellect is relatively less relevant for success—where, for example, emotional self-regulation and empathy may be more salient skills than purely cognitive abilities.

As it happens, some of these circumscribed realms are of major importance in our lives. One that comes to mind is health (as detailed in Chapter 11), to the extent that disturbing emotions and toxic relationships have been identified as risk factors in disease. Those who can manage their emotional lives with more calm and self-awareness seem to have a distinct and measurable health advantage, as has now been confirmed by many studies.

Another such domain is romantic love and personal relationships (see Chapter 9), where, as we all know, very smart people can do very dumb things. A third—though I have not written about it here—occurs at the top levels of competitive endeavors such as world-class sports. At that level, as I was told by a sports psychologist who coaches U.S. Olympic teams, everyone has put in the requisite ten thousand-plus hours of practice, so success hinges on the athlete's mental game.

Research findings about leadership in business and the professions paint a more complex picture (Chapter 10). IQ scores predict extremely well whether we can handle the cognitive challenges that a given position demands. Hundreds, perhaps thousands, of studies have

shown that IQ predicts which career rungs a person can manage. No question there.

But IQ washes out when it comes to predicting who, among a talented pool of candidates *within* an intellectually demanding profession, will become the strongest leader. In part this is because of the "floor effect": everyone at the top echelons of a given profession, or at the top levels of a large organization, has already been sifted for intellect and expertise. At those lofty levels a high IQ becomes a "threshold" ability, one needed just to get into and stay in the game.

As I proposed in my 1998 book *Working with Emotional Intelligence*, EI abilities rather than IQ or technical skills emerge as the "discriminating" competency that best predicts who among a group of very smart people will lead most ably. If you scan the competencies that organizations around the world have independently determined identify their star leaders, you discover that indicators of IQ and technical skill drop toward the bottom of the list the higher the position. (IQ and technical expertise are much stronger predictors of excellence in lower-rung jobs.)

That point was developed more fully in my 2002 book *Primal Leadership: Learning to Lead with Emotional Intelligence* (coauthored with Richard Boyatzis and Annie McKee). At the very highest levels, competence models for leadership typically consist of anywhere from 80 to 100 percent EI-based abilities. As the head of research at a global executive search firm put it, "CEOs are hired for their intellect and business expertise—and fired for a lack of emotional intelligence."

When I wrote *Emotional Intelligence*, I saw my role as that of a science journalist, reporting on a significant new trend in psychology, particularly the merging of neuroscience with the study of emotions. But as my involvement in the field deepened, I stepped back into my old role as psychologist to offer my insights into models of EI. As a result, my formulation of emotional intelligence has progressed since I wrote these pages.

In *Working with Emotional Intelligence* I proposed an expanded framework that reflects how the fundamentals of EI—self-awareness, self-management, social awareness, and the ability to manage relationships—translate into on-the-job success. In doing so, I borrowed a concept from David McClelland, the Harvard psychologist who had been my mentor in graduate school: *competency*.

While our emotional *intelligence* determines our potential for learning the fundamentals of self-mastery and the like, our emotional *competence* shows how much of that potential we have mastered in ways that translate into on-the-job capabilities. To be adept at an emotional competence like customer service or teamwork requires an underlying ability in EI fundamentals, specifically social awareness and relationship management. But emotional competencies are learned abilities: having social awareness or skill at managing relationships does not guarantee that one has mastered the additional learning required to handle a customer adeptly or to resolve a conflict. One simply has the potential to *become* skilled at these competencies.

Again, an underlying EI ability is necessary, though not sufficient, to manifest a given competency or job skill. A cognitive analog would be the student who has excellent spatial abilities yet never learns geometry, let alone becomes an architect. So, too, can one be highly empathic yet poor at handling customers—without having learned the competency for customer service. (For those ultradedicated souls wanting to understand how my current model nests twenty or so emotional competencies within the four EI clusters, see the appendix to *Primal Leadership*.)

In 1995 I reported data from a nationwide, demographically representative sample of more than three thousand children aged seven to sixteen, rated by their parents and teachers, showing that over the decade or so between the mid-1970s and mid-1980s, indicators of emotional well-being among America's kids underwent a marked decline. These children were more troubled and had more problems, ranging from loneliness and anxiety to disobedience and whining. (Of course, there are always individual exceptions—children who grow up to be outstanding human beings—whatever the overall numbers show.)

But a later group of children, rated in 1999, seem to have improved markedly, rating far better than those in the late 1980s, though they were not quite restored to the levels recorded in the mid-1970s.[5] True, parents are still likely to complain in general about their kids, still concerned that their children are hanging out with "bad influences," and whining seems worse than ever. But the trend is clearly upward.

Frankly, I'm puzzled. I had conjectured that today's children are

unintended victims of economic and technological progress, deskilled in EI because their parents spend more time at work than in previous generations, because increased mobility has cut ties to extended family, and because "free" time has become so structured and overorganized. After all, emotional intelligence has traditionally been passed on in the midst of everyday life—with parents and relatives, and in the rough-and-tumble of free play—opportunities that are now being lost to the young.

Then there's the technological factor. Today's children spend more time alone than ever before in human history, staring at a video monitor. That amounts to a natural experiment on an unprecedented scale. Will these tech-sawy children become adults who are as comfortable with other people as they are with their computers? I suspected, rather, that a childhood spent relating to a virtual world would deskill our young people when it came to relating person to person.

So went my arguments. Nothing has happened in the last decade or so to reverse these trends. Yet children, thankfully, seem to be faring better.

Thomas Achenbach, the University of Vermont psychologist who has done these studies, hypothesizes that the economic boom of the 1990s lifted children as well as adults; more jobs and less crime meant better childrearing. Should there be another major economic recession, he suggests, we would see another decline in this measure of children's skills for life. That may well be; only time will tell.

The hyperspeed at which EI has become a topic of importance in a wide array of fields makes prediction difficult, but let me offer some thoughts on what I hope for the field in the near future.

Many of the benefits that accrue from developing emotional intelligence capabilities have gone to the privileged, such as high-level business executives and children in private schools. Of course, many children in impoverished neighborhoods have also benefited—for instance, if their schools implemented SEL. But I encourage a further democratization of this variety of human skill development, reaching into often-neglected pools, like families in poverty (where children so often suffer emotional wounds that compound their plight) and to prisons (particularly for young offenders who could benefit enormously from strengthening skills like anger management, self-awareness, and empathy). Given the right help with these abilities,

their lives would improve, and their communities would be safer.

I'd also like to see the scope of thinking about emotional intelligence itself expand, leaping from a focus on capacities within the individual to a focus on what emerges when people interact, whether one on one or in larger groups. Some research, notably the University of New Hampshire psychologist Vanessa Druskat's work on how teams can become emotionally intelligent, has seamlessly made this leap already. But much more could be done.

Finally, I envision a day when emotional intelligence will have become so widely understood that we need not mention it because it has melded with our lives. In such a future, SEL would have become standard practice in schools everywhere. Likewise, EI qualities such as self-awareness, managing destructive emotions, and empathy would be givens in the workplace, "must-haves" for being hired and promoted, and most especially for leadership. If EI were to become as widespread as IQ has become, and as ingrained in society as a measure of human qualities, then, I believe, our families, schools, jobs, and communities would be all the more humane and nourishing.

Aristotle's Challenge

Anyone can become angry—that is easy. But to be angry with the right person, to the right degree, at the right time, for the right purpose, and in the right way—that is not easy.

ARISTOTLE, *The Nichomachean Ethics*

It was an unbearably steamy August afternoon in New York City, the kind of sweaty day that makes people sullen with discomfort. I was heading back to a hotel, and as I stepped onto a bus up Madison Avenue I was startled by the driver, a middle-aged black man with an enthusiastic smile, who welcomed me with a friendly, "Hi! How you doing?" as I got on, a greeting he proffered to everyone else who entered as the bus wormed through the thick midtown traffic. Each passenger was as startled as I, and, locked into the morose mood of the day, few returned his greeting.

But as the bus crawled uptown through the gridlock, a slow, rather magical transformation occurred. The driver gave a running monologue for our benefit, a lively commentary on the passing scene around us: there was a terrific sale at that store, a wonderful exhibit at this museum, did you hear about the new movie that just opened at that cinema down the block? His delight in the rich possibilities the city offered was infectious. By the time people got off the bus, each in turn had shaken off the sullen shell they had entered with, and when the driver shouted out a "So long, have a great day!" each gave a smiling response.

The memory of that encounter has stayed with me for close to twenty years. When I rode that Madison Avenue bus, I had just finished my own doctorate in psychology—but there was scant attention paid in the psychology of the day to just how such a transformation could happen. Psychological science knew little or nothing of the mechanics of emotion. And yet, imagining the spreading virus of good feeling that must have rippled through the city, starting from passengers on his bus, I saw that this bus driver was an urban peacemaker of sorts, wizardlike in his power to transmute the sullen irritability that seethed in his passengers, to soften and open their hearts a bit. In stark contrast, some items from this week's paper:

• At a local school, a nine-year-old goes on a rampage, pouring paint over school desks, computers, and printers, and vandalizing a car in the school parking lot. The reason: some third-grade classmates called him a “baby” and he wanted to impress them.

• Eight youngsters are wounded when an inadvertent bump in a crowd of teenagers milling outside a Manhattan rap club leads to a shoving match, which ends when one of those affronted starts shooting a .38 caliber automatic handgun into the crowd. The report notes that such shootings over seemingly minor slights, which are perceived as acts of disrespect, have become increasingly common around the country in recent years.

• For murder victims under twelve, says a report, 57 percent of the murderers are their parents or stepparents. In almost half the cases, the parents say they were “merely trying to discipline the child.” The fatal beatings were prompted by “infractions” such as the child blocking the TV, crying, or soiling diapers.

• A German youth is on trial for murdering five Turkish women and girls in a fire he set while they slept. Part of a neo-Nazi group, he tells of failing to hold jobs, of drinking, of blaming his hard luck on foreigners. In a barely audible voice, he pleads, “I can’t stop being sorry for what we’ve done, and I am infinitely ashamed.”

Each day’s news comes to us rife with such reports of the disintegration of civility and safety, an onslaught of mean-spirited impulse running amok. But the news simply reflects back to us on a larger scale a creeping sense of emotions out of control in our own lives and in those of the people around us. No one is insulated from this erratic tide of outburst and regret; it reaches into all of our lives in one way or another.

The last decade has seen a steady drumroll of reports like these, portraying an uptick in emotional ineptitude, desperation, and recklessness in our families, our communities, and our collective lives. These years have chronicled surging rage and despair, whether in the quiet loneliness of latchkey kids left with a TV for a babysitter, or in the pain of children abandoned, neglected, or abused, or in the ugly intimacy of marital violence. A spreading emotional malaise can be read in numbers showing a jump in depression around the world, and in the reminders of a surging tide of aggression—teens with guns in schools, freeway mishaps ending in shootings, disgruntled ex-

employees massacring former fellow workers. *Emotional abuse, drive-by shooting,* and *post-traumatic stress* all entered the common lexicon over the last decade, as the slogan of the hour shifted from the cheery "Have a nice day" to the testiness of "Make my day."

This book is a guide to making sense of the senselessness. As a psychologist, and for the last decade as a journalist for *The New York Times*, I have been tracking the progress of our scientific understanding of the realm of the irrational. From that perch I have been struck by two opposing trends, one portraying a growing calamity in our shared emotional life, the other offering some hopeful remedies.

WHY THIS EXPLORATION NOW

The last decade, despite its bad news, has also seen an unparalleled burst of scientific studies of emotion. Most dramatic are the glimpses of the brain at work, made possible by innovative methods such as new brain-imaging technologies. They have made visible for the first time in human history what has always been a source of deep mystery: exactly how this intricate mass of cells operates while we think and feel, imagine and dream. This flood of neurobiological data lets us understand more clearly than ever how the brain's centers for emotion move us to rage or to tears, and how more ancient parts of the brain, which stir us to make war as well as love, are channeled for better or worse. This unprecedented clarity on the workings of emotions and their failings brings into focus some fresh remedies for our collective emotional crisis.

I have had to wait till now before the scientific harvest was full enough to write this book. These insights are so late in coming largely because the place of feeling in mental life has been surprisingly slighted by research over the years, leaving the emotions a largely unexplored continent for scientific psychology. Into this void has rushed a welter of self-help books, well-intentioned advice based at best on clinical opinion but lacking much, if any, scientific basis. Now science is finally able to speak with authority to these urgent and perplexing questions of the psyche at its most irrational, to map with some precision the human heart.

This mapping offers a challenge to those who subscribe to a narrow view of intelligence, arguing that IQ is a genetic given that cannot be

changed by life experience, and that our destiny in life is largely fixed by these aptitudes. That argument ignores the more challenging question: What *can* we change that will help our children fare better in life? What factors are at play, for example, when people of high IQ flounder and those of modest IQ do surprisingly well? I would argue that the difference quite often lies in the abilities called here *emotional intelligence*, which include self-control, zeal and persistence, and the ability to motivate oneself. And these skills, as we shall see, can be taught to children, giving them a better chance to use whatever intellectual potential the genetic lottery may have given them.

Beyond this possibility looms a pressing moral imperative. These are times when the fabric of society seems to unravel at ever-greater speed, when selfishness, violence, and a meanness of spirit seem to be rotting the goodness of our communal lives. Here the argument for the importance of emotional intelligence hinges on the link between sentiment, character, and moral instincts. There is growing evidence that fundamental ethical stances in life stem from underlying emotional capacities. For one, impulse is the medium of emotion; the seed of all impulse is a feeling bursting to express itself in action. Those who are at the mercy of impulse—who lack self-control—suffer a moral deficiency: The ability to control impulse is the base of will and character. By the same token, the root of altruism lies in empathy, the ability to read emotions in others; lacking a sense of another's need or despair, there is no caring. And if there are any two moral stances that our times call for, they are precisely these, self-restraint and compassion.

OUR JOURNEY

In this book I serve as a guide in a journey through these scientific insights into the emotions, a voyage aimed at bringing greater understanding to some of the most perplexing moments in our own lives and in the world around us. The journey's end is to understand what it means—and how—to bring intelligence to emotion. This understanding itself can help to some degree; bringing cognizance to the realm of feeling has an effect something like the impact of an observer at the quantum level in physics, altering what is being observed.

Our journey begins in Part One with new discoveries about the

brain's emotional architecture that offer an explanation of those most baffling moments in our lives when feeling overwhelms all rationality. Understanding the interplay of brain structures that rule our moments of rage and fear—or passion and joy—reveals much about how we learn the emotional habits that can undermine our best intentions, as well as what we can do to subdue our more destructive or self-defeating emotional impulses. Most important, the neurological data suggest a window of opportunity for shaping our children's emotional habits.

The next major stop on our journey, Part Two of this book, is in seeing how neurological givens play out in the basic flair for living called *emotional intelligence:* being able, for example, to rein in emotional impulse; to read another's innermost feelings; to handle relationships smoothly—as Aristotle put it, the rare skill "to be angry with the right person, to the right degree, at the right time, for the right purpose, and in the right way." (Readers who are not drawn to neurological detail may want to proceed directly to this section.)

This expanded model of what it means to be "intelligent" puts emotions at the center of aptitudes for living. Part Three examines some key differences this aptitude makes: how these abilities can preserve our most prized relationships, or their lack corrode them; how the market forces that are reshaping our worklife are putting an unprecedented premium on emotional intelligence for on-the-job success; and how toxic emotions put our physical health at as much risk as does chain-smoking, even as emotional balance can help protect our health and well-being.

Our genetic heritage endows each of us with a series of emotional set-points that determines our temperament. But the brain circuitry involved is extraordinarily malleable; temperament is not destiny. As Part Four shows, the emotional lessons we learn as children at home and at school shape the emotional circuits, making us more adept—or inept—at the basics of emotional intelligence. This means that childhood and adolescence are critical windows of opportunity for setting down the essential emotional habits that will govern our lives.

Part Five explores what hazards await those who, in growing to maturity, fail to master the emotional realm—how deficiencies in emotional intelligence heighten a spectrum of risks, from depression or a life of violence to eating disorders and drug abuse. And it documents how pioneering schools are teaching children the emotional and social skills they need to keep their lives on track.

Perhaps the most disturbing single piece of data in this book comes from a massive survey of parents and teachers and shows a worldwide trend for the present generation of children to be more troubled emotionally than the last: more lonely and depressed, more angry and unruly, more nervous and prone to worry, more impulsive and aggressive.

If there is a remedy, I feel it must lie in how we prepare our young for life. At present we leave the emotional education of our children to chance, with ever more disastrous results. One solution is a new vision of what schools can do to educate the whole student, bringing together mind and heart in the classroom. Our journey ends with visits to innovative classes that aim to give children a grounding in the basics of emotional intelligence. I can foresee a day when education will routinely include inculcating essential human competencies such as self-awareness, self-control, and empathy, and the arts of listening, resolving conflicts, and cooperation.

In *The Nichomachean Ethics*, Aristotle's philosophical enquiry into virtue, character, and the good life, his challenge is to manage our emotional life with intelligence. Our passions, when well exercised, have wisdom; they guide our thinking, our values, our survival. But they can easily go awry, and do so all too often. As Aristotle saw, the problem is not with emotionality, but with the *appropriateness* of emotion and its expression. The question is, how can we bring intelligence to our emotions—and civility to our streets and caring to our communal life?

1

What Are Emotions For?

It is with the heart that one sees rightly; what is essential is invisible to the eye.

ANTOINE DE SAINT-EXUPÉRY,
The Little Prince

Ponder the last moments of Gary and Mary Jane Chauncey, a couple completely devoted to their eleven-year-old daughter Andrea, who was confined to a wheelchair by cerebral palsy. The Chauncey family were passengers on an Amtrak train that crashed into a river after a barge hit and weakened a railroad bridge in Louisiana's bayou country. Thinking first of their daughter, the couple tried their best to save Andrea as water rushed into the sinking train; somehow they managed to push Andrea through a window to rescuers. Then, as the car sank beneath the water, they perished.[1]

Andrea's story, of parents whose last heroic act is to ensure their child's survival, captures a moment of almost mythic courage. Without doubt such incidents of parental sacrifice for their progeny have been repeated countless times in human history and prehistory, and countless more in the larger course of evolution of our species.[2] Seen from the perspective of evolutionary biologists, such parental self-sacrifice is in the service of "reproductive success" in passing on one's genes to future generations. But from the perspective of a parent making a desperate decision in a moment of crisis, it is about nothing other than love.

As an insight into the purpose and potency of emotions, this exemplary act of parental heroism testifies to the role of altruistic love —and every other emotion we feel—in human life.[3] It suggests that our deepest feelings, our passions and longings, are essential guides, and that our species owes much of its existence to their power in human affairs. That power is extraordinary: Only a potent love—the urgency of saving a cherished child—could lead a parent to override the impulse for personal survival. Seen from the intellect, their self-sacrifice was arguably irrational; seen from the heart, it was the only

choice to make.

Sociobiologists point to the preeminence of heart over head at such crucial moments when they conjecture about why evolution has given emotion such a central role in the human psyche. Our emotions, they say, guide us in facing predicaments and tasks too important to leave to intellect alone—danger, painful loss, persisting toward a goal despite frustrations, bonding with a mate, building a family. Each emotion offers a distinctive readiness to act; each points us in a direction that has worked well to handle the recurring challenges of human life.[4] As these eternal situations were repeated and repeated over our evolutionary history, the survival value of our emotional repertoire was attested to by its becoming imprinted in our nerves as innate, automatic tendencies of the human heart.

A view of human nature that ignores the power of emotions is sadly shortsighted. The very name *Homo sapiens*, the thinking species, is misleading in light of the new appreciation and vision of the place of emotions in our lives that science now offers. As we all know from experience, when it comes to shaping our decisions and our actions, feeling counts every bit as much—and often more—than thought. We have gone too far in emphasizing the value and import of the purely rational—of what IQ measures—in human life. For better or worse, intelligence can come to nothing when the emotions hold sway.

WHEN PASSIONS OVERWHELM REASON

It was a tragedy of errors. Fourteen-year-old Matilda Crabtree was just playing a practical joke on her father: she jumped out of a closet and yelled “Boo!” as her parents came home at one in the morning from visiting friends.

But Bobby Crabtree and his wife thought Matilda was staying with friends that night. Hearing noises as he entered the house, Crabtree reached for his .357 caliber pistol and went into Matilda’s bedroom to investigate. When his daughter jumped from the closet, Crabtree shot her in the neck. Matilda Crabtree died twelve hours later.[5]

One emotional legacy of evolution is the fear that mobilizes us to protect our family from danger; that impulse impelled Bobby Crabtree to get his gun and search his house for the intruder he thought was prowling there. Fear primed Crabtree to shoot before he could fully register what he was shooting at, even before he could recognize his

daughter's voice. Automatic reactions of this sort have become etched in our nervous system, evolutionary biologists presume, because for a long and crucial period in human prehistory they made the difference between survival and death. Even more important, they mattered for the main task of evolution: being able to bear progeny who would carry on these very genetic predispositions—a sad irony, given the tragedy at the Crabtree household.

But while our emotions have been wise guides in the evolutionary long run, the new realities civilization presents have arisen with such rapidity that the slow march of evolution cannot keep up. Indeed, the first laws and proclamations of ethics—the Code of Hammurabi, the Ten Commandments of the Hebrews, the Edicts of Emperor Ashoka—can be read as attempts to harness, subdue, and domesticate emotional life. As Freud described in *Civilization and Its Discontents*, society has had to enforce from without rules meant to subdue tides of emotional excess that surge too freely within.

Despite these social constraints, passions overwhelm reason time and again. This given of human nature arises from the basic architecture of mental life. In terms of biological design for the basic neural circuitry of emotion, what we are born with is what worked best for the last 50,000 human generations, not the last 500 generations—and certainly not the last five. The slow, deliberate forces of evolution that have shaped our emotions have done their work over the course of a million years; the last 10,000 years—despite having witnessed the rapid rise of human civilization and the explosion of the human population from five million to five billion—have left little imprint on our biological templates for emotional life.

For better or for worse, our appraisal of every personal encounter and our responses to it are shaped not just by our rational judgments or our personal history, but also by our distant ancestral past. This leaves us with sometimes tragic propensities, as witness the sad events at the Crabtree household. In short, we too often confront postmodern dilemmas with an emotional repertoire tailored to the urgencies of the Pleistocene. That predicament is at the heart of my subject.

Impulses to Action

One early spring day I was driving along a highway over a mountain pass in Colorado, when a snow flurry suddenly blotted out the car a few lengths ahead of me. As I peered ahead I couldn't make out

anything; the swirling snow was now a blinding whiteness. Pressing my foot on the brake, I could feel anxiety flood my body and hear the thumping of my heart.

The anxiety built to full fear: I pulled over to the side of the road, waiting for the flurry to pass. A half hour later the snow stopped, visibility returned, and I continued on my way—only to be stopped a few hundred yards down the road, where an ambulance crew was helping a passenger in a car that had rear-ended a slower car in front; the collision blocked the highway. If I had continued driving in the blinding snow, I probably would have hit them.

The caution fear forced on me that day may have saved my life. Like a rabbit frozen in terror at the hint of a passing fox—or a protomammal hiding from a marauding dinosaur—I was overtaken by an internal state that compelled me to stop, pay attention, and take heed of a coming danger.

All emotions are, in essence, impulses to act, the instant plans for handling life that evolution has instilled in us. The very root of the word *emotion* is *motere*, the Latin verb "to move," plus the prefix "e-" to connote "move away," suggesting that a tendency to act is implicit in every emotion. That emotions lead to actions is most obvious in watching animals or children; it is only in "civilized" adults we so often find the great anomaly in the animal kingdom, emotions—root impulses to act—divorced from obvious reaction.[6]

In our emotional repertoire each emotion plays a unique role, as revealed by their distinctive biological signatures (see Appendix A for details on "basic" emotions). With new methods to peer into the body and brain, researchers are discovering more physiological details of how each emotion prepares the body for a very different kind of response:[7]

• With *anger* blood flows to the hands, making it easier to grasp a weapon or strike at a foe; heart rate increases, and a rush of hormones such as adrenaline generates a pulse of energy strong enough for vigorous action.

• With *fear* blood goes to the large skeletal muscles, such as in the legs, making it easier to flee—and making the face blanch as blood is shunted away from it (creating the feeling that the blood "runs cold"). At the same time, the body freezes, if only for a moment, perhaps allowing time to gauge whether hiding might be a better reaction. Circuits in the brain's emotional centers trigger a flood of hormones

that put the body on general alert, making it edgy and ready for action, and attention fixates on the threat at hand, the better to evaluate what response to make.

• Among the main biological changes in *happiness* is an increased activity in a brain center that inhibits negative feelings and fosters an increase in available energy, and a quieting of those that generate worrisome thought. But there is no particular shift in physiology save a quiescence, which makes the body recover more quickly from the biological arousal of upsetting emotions. This configuration offers the body a general rest, as well as readiness and enthusiasm for whatever task is at hand and for striving toward a great variety of goals.

• *Love*, tender feelings, and sexual satisfaction entail parasympathetic arousal—the physiological opposite of the "fight-or-flight" mobilization shared by fear and anger. The parasympathetic pattern, dubbed the "relaxation response," is a bodywide set of reactions that generates a general state of calm and contentment, facilitating cooperation.

• The lifting of the eyebrows in *surprise* allows the taking in of a larger visual sweep and also permits more light to strike the retina. This offers more information about the unexpected event, making it easier to figure out exactly what is going on and concoct the best plan for action.

• Around the world an expression of *disgust* looks the same, and sends the identical message: something is offensive in taste or smell, or metaphorically so. The facial expression of disgust—the upper lip curled to the side as the nose wrinkles slightly—suggests a primordial attempt, as Darwin observed, to close the nostrils against a noxious odor or to spit out a poisonous food.

• A main function for *sadness* is to help adjust to a significant loss, such as the death of someone close or a major disappointment. Sadness brings a drop in energy and enthusiasm for life's activities, particularly diversions and pleasures, and, as it deepens and approaches depression, slows the body's metabolism. This introspective withdrawal creates the opportunity to mourn a loss or frustrated hope, grasp its consequences for one's life, and, as energy returns, plan new beginnings. This loss of energy may well have kept saddened—and vulnerable—early humans close to home, where they were safer.

These biological propensities to act are shaped further by our life

experience and our culture. For instance, universally the loss of a loved one elicits sadness and grief. But how we show our grieving—how emotions are displayed or held back for private moments—is molded by culture, as are which particular people in our lives fall into the category of "loved ones" to be mourned.

The protracted period of evolution when these emotional responses were hammered into shape was certainly a harsher reality than most humans endured as a species after the dawn of recorded history. It was a time when few infants survived to childhood and few adults to thirty years, when predators could strike at any moment, when the vagaries of droughts and floods meant the difference between starvation and survival. But with the coming of agriculture and even the most rudimentary human societies, the odds for survival began to change dramatically. In the last ten thousand years, when these advances took hold throughout the world, the ferocious pressures that had held the human population in check eased steadily.

Those same pressures had made our emotional responses so valuable for survival; as they waned, so did the goodness of fit of parts of our emotional repertoire. While in the ancient past a hair-trigger anger may have offered a crucial edge for survival, the availability of automatic weaponry to thirteen-year-olds has made it too often a disastrous reaction.[8]

Our Two Minds

A friend was telling me about her divorce, a painful separation. Her husband had fallen in love with a younger woman at work, and suddenly announced he was leaving to live with the other woman. Months of bitter wrangling over house, money, and custody of the children followed. Now, some months later, she was saying that her independence was appealing to her, that she was happy to be on her own. "I just don't think about him anymore—I really don't care," she said. But as she said it, her eyes momentarily welled up with tears.

That moment of teary eyes could easily pass unnoted. But the empathic understanding that someone's watering eyes means she is sad despite her words to the contrary is an act of comprehending just as surely as is distilling meaning from words on a printed page. One is an act of the emotional mind, the other of the rational mind. In a very real sense we have two minds, one that thinks and one that feels.

These two fundamentally different ways of knowing interact to

construct our mental life. One, the rational mind, is the mode of comprehension we are typically conscious of: more prominent in awareness, thoughtful, able to ponder and reflect. But alongside that there is another system of knowing: impulsive and powerful, if sometimes illogical—the emotional mind. (For a more detailed description of the characteristics of the emotional mind, see Appendix B.)

The emotional/rational dichotomy approximates the folk distinction between "heart" and "head"; knowing something is right "in your heart" is a different order of conviction—somehow a deeper kind of certainty—than thinking so with your rational mind. There is a steady gradient in the ratio of rational-to-emotional control over the mind; the more intense the feeling, the more dominant the emotional mind becomes—and the more ineffectual the rational. This is an arrangement that seems to stem from eons of evolutionary advantage to having emotions and intuitions guide our instantaneous response in situations where our lives are in peril—and where pausing to think over what to do could cost us our lives.

These two minds, the emotional and the rational, operate in tight harmony for the most part, intertwining their very different ways of knowing to guide us through the world. Ordinarily there is a balance between emotional and rational minds, with emotion feeding into and informing the operations of the rational mind, and the rational mind refining and sometimes vetoing the inputs of the emotions. Still, the emotional and rational minds are semi-independent faculties, each, as we shall see, reflecting the operation of distinct, but interconnected, circuitry in the brain.

In many or most moments these minds are exquisitely coordinated; feelings are essential to thought, thought to feeling. But when passions surge the balance tips: it is the emotional mind that captures the upper hand, swamping the rational mind. The sixteenth-century humanist Erasmus of Rotterdam wrote in a satirical vein of this perennial tension between reason and emotion:[9]

> Jupiter has bestowed far more passion than reason—you could calculate the ratio as 24 to one. He set up two raging tyrants in opposition to Reason's solitary power: anger and lust. How far Reason can prevail against the combined forces of these two the common life of man makes quite clear. Reason does the only thing she can and shouts herself hoarse, repeating formulas of virtue, while the other two bid her go hang herself, and are increasingly noisy and offensive, until at last their Ruler is exhausted,

gives up, and surrenders.

HOW THE BRAIN GREW

To better grasp the potent hold of the emotions on the thinking mind —and why feeling and reason are so readily at war—consider how the brain evolved. Human brains, with their three pounds or so of cells and neural juices, are about triple the size of those in our nearest cousins in evolution, the nonhuman primates. Over millions of years of evolution, the brain has grown from the bottom up, with its higher centers developing as elaborations of lower, more ancient parts. (The growth of the brain in the human embryo roughly retraces this evolutionary course.)

The most primitive part of the brain, shared with all species that have more than a minimal nervous system, is the brainstem surrounding the top of the spinal cord. This root brain regulates basic life functions like breathing and the metabolism of the body's other organs, as well as controlling stereotyped reactions and movements. This primitive brain cannot be said to think or learn; rather it is a set of preprogrammed regulators that keep the body running as it should and reacting in a way that ensures survival. This brain reigned supreme in the Age of the Reptiles: Picture a snake hissing to signal the threat of an attack.

From the most primitive root, the brainstem, emerged the emotional centers. Millions of years later in evolution, from these emotional areas evolved the thinking brain or "neocortex," the great bulb of convoluted tissues that make up the top layers. The fact that the thinking brain grew from the emotional reveals much about the relationship of thought to feeling; there was an emotional brain long before there was a rational one.

The most ancient root of our emotional life is in the sense of smell, or, more precisely, in the olfactory lobe, the cells that take in and analyze smell. Every living entity, be it nutritious, poisonous, sexual partner, predator or prey, has a distinctive molecular signature that can be carried in the wind. In those primitive times smell commended itself as a paramount sense for survival.

From the olfactory lobe the ancient centers for emotion began to evolve, eventually growing large enough to encircle the top of the brainstem. In its rudimentary stages, the olfactory center was

composed of little more than thin layers of neurons gathered to analyze smell. One layer of cells took in what was smelled and sorted it out into the relevant categories: edible or toxic, sexually available, enemy or meal. A second layer of cells sent reflexive messages throughout the nervous system telling the body what to do: bite, spit, approach, flee, chase.[10]

With the arrival of the first mammals came new, key layers of the emotional brain. These, surrounding the brainstem, look roughly like a bagel with a bite taken out at the bottom where the brainstem nestles into them. Because this part of the brain rings and borders the brainstem, it was called the "limbic" system, from "limbus," the Latin word for "ring." This new neural territory added emotions proper to the brain's repertoire.[11] When we are in the grip of craving or fury, head-over-heels in love or recoiling in dread, it is the limbic system that has us in its grip.

As it evolved, the limbic system refined two powerful tools: learning and memory. These revolutionary advances allowed an animal to be much smarter in its choices for survival, and to fine-tune its responses to adapt to changing demands rather than having invariable and automatic reactions. If a food led to sickness, it could be avoided next time. Decisions like knowing what to eat and what to spurn were still determined largely through smell; the connections between the olfactory bulb and the limbic system now took on the tasks of making distinctions among smells and recognizing them, comparing a present smell with past ones, and so discriminating good from bad. This was done by the "rhinencephalon," literally, the "nose brain," a part of the limbic wiring, and the rudimentary basis of the neocortex, the thinking brain.

About 100 million years ago the brain in mammals took a great growth spurt. Piled on top of the thin two-layered cortex—the regions that plan, comprehend what is sensed, coordinate movement—several new layers of brain cells were added to form the neocortex. In contrast to the ancient brain's two-layered cortex, the neocortex offered an extraordinary intellectual edge.

The *Homo sapiens* neocortex, so much larger than in any other species, has added all that is distinctly human. The neocortex is the seat of thought; it contains the centers that put together and comprehend what the senses perceive. It adds to a feeling what we think about it—and allows us to have feelings about ideas, art, symbols, imaginings.

In evolution the neocortex allowed a judicious fine-tuning that no doubt has made enormous advantages in an organism's ability to survive adversity, making it more likely that its progeny would in turn pass on the genes that contain that same neural circuitry. The survival edge is due to the neocortex's talent for strategizing, long-term planning, and other mental wiles. Beyond that, the triumphs of art, of civilization and culture, are all fruits of the neocortex.

This new addition to the brain allowed the addition of nuance to emotional life. Take love. Limbic structures generate feelings of pleasure and sexual desire—the emotions that feed sexual passion. But the addition of the neocortex and its connections to the limbic system allowed for the mother-child bond that is the basis of the family unit and the long-term commitment to childrearing that makes human development possible. (Species that have no neocortex, such as reptiles, lack maternal affection; when their young hatch, the newborns must hide to avoid being cannibalized.) In humans the protective bond between parent and child allows much of maturation to go on over the course of a long childhood—during which the brain continues to develop.

As we proceed up the phylogenetic scale from reptile to rhesus to human, the sheer mass of the neocortex increases; with that increase comes a geometrie rise in the interconnections in brain circuitry. The larger the number of such connections, the greater the range of possible responses. The neocortex allows for the subtlety and complexity of emotional life, such as the ability to have feelings *about* our feelings. There is more neocortex-to-limbic system in primates than in other species—and vastly more in humans—suggesting why we are able to display a far greater range of reactions to our emotions, and more nuance. While a rabbit or rhesus has a restricted set of typical responses to fear, the larger human neocortex allows a far more nimble repertoire—including calling 911. The more complex the social system, the more essential is such flexibility—and there is no more complex social world than our own.[12]

But these higher centers do not govern all of emotional life; in crucial matters of the heart—and most especially in emotional emergencies—they can be said to defer to the limbic system. Because so many of the brain's higher centers sprouted from or extended the scope of the limbic area, the emotional brain plays a crucial role in neural architecture. As the root from which the newer brain grew, the emotional areas are intertwined via myriad connecting circuits to all

2

Anatomy of an Emotional Hijacking

Life is a comedy for those who think and a tragedy for those who feel.

HORACE WALPOLE

It was a hot August afternoon in 1963, the same day that the Rev. Martin Luther King, Jr., gave his "I Have a Dream" speech to a civil rights march on Washington. On that day Richard Robles, a seasoned burglar who had just been paroled from a three-year sentence for the more than one hundred break-ins he had pulled to support a heroin habit, decided to do one more. He wanted to renounce crime, Robles later claimed, but he desperately needed money for his girlfriend and their three-year-old daughter.

The apartment he broke into that day belonged to two young women, twenty-one-year-old Janice Wylie, a researcher at *Newsweek* magazine, and twenty-three-year-old Emily Hoffert, a grade-school teacher. Though Robles chose the apartment on New York's swanky Upper East Side to burglarize because he thought no one would be there, Wylie was home. Threatening her with a knife, Robles tied her up. As he was leaving, Hoffert came home. To make good his escape, Robles began to tie her up, too.

As Robles tells the tale years later, while he was tying up Hoffert, Janice Wylie warned him he would not get away with this crime: She would remember his face and help the police track him down. Robles, who had promised himself this was to have been his last burglary, panicked at that, completely losing control. In a frenzy, he grabbed a soda bottle and clubbed the women until they were unconscious, then, awash in rage and fear, he slashed and stabbed them over and over with a kitchen knife. Looking back on that moment some twenty-five years later, Robles lamented, "I just went bananas. My head just exploded."

To this day Robles has lots of time to regret those few minutes of rage unleashed. At this writing he is still in prison, some three decades later, for what became known as the "Career Girl Murders."

Such emotional explosions are neural hijackings. At those moments, evidence suggests, a center in the limbic brain proclaims an emergency, recruiting the rest of the brain to its urgent agenda. The hijacking occurs in an instant, triggering this reaction crucial moments before the neocortex, the thinking brain, has had a chance to glimpse fully what is happening, let alone decide if it is a good idea. The hallmark of such a hijack is that once the moment passes, those so possessed have the sense of not knowing what came over them.

These hijacks are by no means isolated, horrific incidents that lead to brutal crimes like the Career Girl Murders. In less catastrophic form—but not necessarily less intense—they happen to us with fair frequency. Think back to the last time you "lost it," blowing up at someone—your spouse or child, or perhaps the driver of another car—to a degree that later, with some reflection and hindsight, seemed uncalled for. In all probability, that, too, was such a hijacking, a neural takeover which, as we shall see, originates in the amygdala, a center in the limbic brain.

Not all limbic hijackings are distressing. When a joke strikes someone as so uproarious that their laughter is almost explosive, that, too, is a limbic response. It is at work also in moments of intense joy: When Dan Jansen, after several heartbreaking failures to capture an Olympic Gold Medal for speed skating (which he had vowed to do for his dying sister), finally won the Gold in the 1,000-meter race in the 1994 Winter Olympics in Norway, his wife was so overcome by the excitement and happiness that she had to be rushed to emergency physicians at rinkside.

THE SEAT OF ALL PASSION

In humans the amygdala (from the Greek word for "almond") is an almond-shaped cluster of interconnected structures perched above the brainstem, near the bottom of the limbic ring. There are two amygdalas, one on each side of the brain, nestled toward the side of the head. The human amygdala is relatively large compared to that in any of our closest evolutionary cousins, the primates.

The hippocampus and the amygdala were the two key parts of the primitive "nose brain" that, in evolution, gave rise to the cortex and then the neocortex. To this day these limbic structures do much or

most of the brain's learning and remembering; the amygdala is the specialist for emotional matters. If the amygdala is severed from the rest of the brain, the result is a striking inability to gauge the emotional significance of events; this condition is sometimes called "affective blindness."

Lacking emotional weight, encounters lose their hold. One young man whose amygdala had been surgically removed to control severe seizures became completely uninterested in people, preferring to sit in isolation with no human contact. While he was perfectly capable of conversation, he no longer recognized close friends, relatives, or even his mother, and remained impassive in the face of their anguish at his indifference. Without an amygdala he seemed to have lost all recognition of feeling, as well as any feeling about feelings.[1] The amygdala acts as a storehouse of emotional memory, and thus of significance itself; life without the amygdala is a life stripped of personal meanings.

More than affection is tied to the amygdala; all passion depends on it. Animals that have their amygdala removed or severed lack fear and rage, lose the urge to compete or cooperate, and no longer have any sense of their place in their kind's social order; emotion is blunted or absent. Tears, an emotional signal unique to humans, are triggered by the amygdala and a nearby structure, the cingulate gyrus; being held, stroked, or otherwise comforted soothes these same brain regions, stopping the sobs. Without an amygdala, there are no tears of sorrow to soothe.

Joseph LeDoux, a neuroscientist at the Center for Neural Science at New York University, was the first to discover the key role of the amygdala in the emotional brain.[2] LeDoux is part of a fresh breed of neuroscientists who draw on innovative methods and technologies that bring a previously unknown level of precision to mapping the brain at work, and so can lay bare mysteries of mind that earlier generations of scientists have found impenetrable. His findings on the circuitry of the emotional brain overthrow a long-standing notion about the limbic system, putting the amygdala at the center of the action and placing other limbic structures in very different roles.[3]

LeDoux's research explains how the amygdala can take control over what we do even as the thinking brain, the neocortex, is still coming to a decision.

As we shall see, the workings of the amygdala and its interplay with the neocortex are at the heart of emotional intelligence.

THE NEURAL TRIPWIRE

Most intriguing for understanding the power of emotions in mental life are those moments of impassioned action that we later regret, once the dust has settled; the question is how we so easily become so irrational. Take, for example, a young woman who drove two hours to Boston to have brunch and spend the day with her boyfriend. During brunch he gave her a present she'd been wanting for months, a hard-to-find art print brought back from Spain. But her delight dissolved the moment she suggested that after brunch they go to a matinee of a movie she'd been wanting to see and her friend stunned her by saying he couldn't spend the day with her because he had softball practice. Hurt and incredulous, she got up in tears, left the cafe, and, on impulse, threw the print in a garbage can. Months later, recounting the incident, it's not walking out she regrets, but the loss of the print.

It is in moments such as these—when impulsive feeling overrides the rational—that the newly discovered role for the amygdala is pivotal. Incoming signals from the senses let the amygdala scan every experience for trouble. This puts the amygdala in a powerful post in mental life, something like a psychological sentinel, challenging every situation, every perception, with but one kind of question in mind, the most primitive: "Is this something I hate? That hurts me? Something I fear?" If so—if the moment at hand somehow draws a "Yes"—the amygdala reacts instantaneously, like a neural tripwire, telegraphing a message of crisis to all parts of the brain.

In the brain's architecture, the amygdala is poised something like an alarm company where operators stand ready to send out emergency calls to the fire department, police, and a neighbor whenever a home security system signals trouble.

When it sounds an alarm of, say, fear, it sends urgent messages to every major part of the brain: it triggers the secretion of the body's fight-or-flight hormones, mobilizes the centers for movement, and activates the cardiovascular system, the muscles, and the gut.[4] Other circuits from the amygdala signal the secretion of emergency dollops of the hormone norepinephrine to heighten the reactivity of key brain areas, including those that make the senses more alert, in effect setting the brain on edge. Additional signals from the amygdala tell the brainstem to fix the face in a fearful expression, freeze unrelated movements the muscles had underway, speed heart rate and raise blood pressure, slow breathing. Others rivet attention on the source of

the fear, and prepare the muscles to react accordingly. Simultaneously, cortical memory systems are shuffled to retrieve any knowledge relevant to the emergency at hand, taking precedence over other strands of thought.

And these are just part of a carefully coordinated array of changes the amygdala orchestrates as it commandeers areas throughout the brain (for a more detailed account, see Appendix C). The amygdala's extensive web of neural connections allows it, during an emotional emergency, to capture and drive much of the rest of the brain—including the rational mind.

THE EMOTIONAL SENTINEL

A friend tells of having been on vacation in England, and eating brunch at a canalside cafe. Taking a stroll afterward along the stone steps down to the canal, he suddenly saw a girl gazing at the water, her face frozen in fear. Before he knew quite why, he had jumped in the water—in his coat and tie. Only once he was in the water did he realize that the girl was staring in shock at a toddler who had fallen in—whom he was able to rescue.

What made him jump in the water before he knew why? The answer, very likely, was his amygdala.

In one of the most telling discoveries about emotions of the last decade, LeDoux's work revealed how the architecture of the brain gives the amygdala a privileged position as an emotional sentinel, able to hijack the brain.[5] His research has shown that sensory signals from eye or ear travel first in the brain to the thalamus, and then—across a single synapse—to the amygdala; a second signal from the thalamus is routed to the neocortex—the thinking brain. This branching allows the amygdala to begin to respond *before* the neocortex, which mulls information through several levels of brain circuits before it fully perceives and finally initiates its more finely tailored response.

LeDoux's research is revolutionary for understanding emotional life because it is the first to work out neural pathways for feelings that bypass the neocortex. Those feelings that take the direct route through the amygdala include our most primitive and potent; this circuit does much to explain the power of emotion to overwhelm rationality.

The conventional view in neuroscience had been that the eye, ear,

and other sensory organs transmit signals to the thalamus, and from there to sensory processing areas of the neocortex, where the signals are put together into objects as we perceive them. The signals are sorted for meanings so that the brain recognizes what each object is and what its presence means. From the neocortex, the old theory held, the signals are sent to the limbic brain, and from there the appropriate response radiates out through the brain and the rest of the body. That is the way it works much or most of the time—but LeDoux discovered a smaller bundle of neurons that leads directly from the thalamus to the amygdala, in addition to those going through the larger path of neurons to the cortex. This smaller and shorter pathway—something like a neural back alley—allows the amygdala to receive some direct inputs from the senses and start a response *before* they are fully registered by the neocortex.

This discovery overthrows the notion that the amygdala must depend entirely on signals from the neocortex to formulate its emotional reactions. The amygdala can trigger an emotional response via this emergency route even as a parallel reverberating circuit begins between the amygdala and neocortex. The amygdala can have us spring to action while the slightly slower—but more fully informed—neocortex unfolds its more refined plan for reaction.

LeDoux overturned the prevailing wisdom about the pathways traveled by emotions through his research on fear in animals. In a crucial experiment he destroyed the auditory cortex of rats, then exposed them to a tone paired with an electric shock. The rats quickly learned to fear the tone, even though the sound of the tone could not register in their neocortex. Instead, the sound took the direct route from ear to thalamus to amygdala, skipping all higher avenues. In short, the rats had learned an emotional reaction without any higher cortical involvement: The amygdala perceived, remembered, and orchestrated their fear independently.

“Anatomically the emotional system can act independently of the neocortex,” LeDoux told me. “Some emotional reactions and emotional memories can be formed without any conscious, cognitive participation at all.” The amygdala can house memories and response repertoires that we enact without quite realizing why we do so because the shortcut from thalamus to amygdala completely bypasses the neocortex. This bypass seems to allow the amygdala to be a repository for emotional impressions and memories that we have never known about in full awareness. LeDoux proposes that it is the

THE SPECIALIST IN EMOTIONAL MEMORY

Those unconscious opinions are emotional memories; their storehouse is the amygdala. Research by LeDoux and other neuroscientists now seems to suggest that the hippocampus, which has long been considered the key structure of the limbic system, is more involved in registering and making sense of perceptual patterns than with emotional reactions. The hippocampus's main input is in providing a keen memory of context, vital for emotional meaning; it is the hippocampus that recognizes the differing significance of, say, a bear in the zoo versus one in your backyard.

While the hippocampus remembers the dry facts, the amygdala retains the emotional flavor that goes with those facts. If we try to pass a car on a two-lane highway and narrowly miss having a head-on collision, the hippocampus retains the specifics of the incident, like what stretch of road we were on, who was with us, what the other car looked like. But it is the amygdala that everafter will send a surge of anxiety through us whenever we try to pass a car in similar circumstances. As LeDoux put it to me, "The hippocampus is crucial in recognizing a face as that of your cousin. But it is the amygdala that adds you don't really like her."

The brain uses a simple but cunning method to make emotional memories register with special potency: the very same neurochemical alerting systems that prime the body to react to life-threatening emergencies by fighting or fleeing also stamp the moment in memory with vividness.[8] Under stress (or anxiety, or presumably even the intense excitement of joy) a nerve running from the brain to the adrenal glands atop the kidneys triggers a secretion of the hormones epinephrine and norepinephrine, which surge through the body priming it for an emergency. These hormones activate receptors on the vagus nerve; while the vagus nerve carries messages from the brain to regulate the heart, it also carries signals back into the brain, triggered by epinephrine and norepinephrine. The amygdala is the main site in the brain where these signals go; they activate neurons within the amygdala to signal other brain regions to strengthen memory for what is happening.

This amygdala arousal seems to imprint in memory most moments of emotional arousal with an added degree of strength—that's why we are more likely, for example, to remember where we went on a first date, or what we were doing when we heard the news that the space

shuttle *Challenger* had exploded. The more intense the amygdala arousal, the stronger the imprint; the experiences that scare or thrill us the most in life are among our most indelible memories. This means that, in effect, the brain has two memory systems, one for ordinary facts and one for emotionally charged ones. A special system for emotional memories makes excellent sense in evolution, of course, ensuring that animals would have particularly vivid memories of what threatens or pleases them. But emotional memories can be faulty guides to the present.

OUT-OF-DATE NEURAL ALARMS

One drawback of such neural alarms is that the urgent message the amygdala sends is sometimes, if not often, out-of-date—especially in the fluid social world we humans inhabit. As the repository for emotional memory, the amygdala scans experience, comparing what is happening now with what happened in the past. Its method of comparison is associative: when one key element of a present situation is similar to the past, it can call it a "match"—which is why this circuit is sloppy: it acts before there is full confirmation. It frantically commands that we react to the present in ways that were imprinted long ago, with thoughts, emotions, reactions learned in response to events perhaps only dimly similar, but close enough to alarm the amygdala.

Thus a former army nurse, traumatized by the relentless flood of ghastly wounds she once tended in wartime, is suddenly swept with a mix of dread, loathing, and panic—a repeat of her battlefield reaction triggered once again, years later, by the stench when she opens a closet door to find her toddler had stashed a stinking diaper there. A few spare elements of the situation is all that need seem similar to some past danger for the amygdala to trigger its emergency proclamation. The trouble is that along with the emotionally charged memories that have the power to trigger this crisis response can come equally outdated ways of responding to it.

The emotional brain's imprecision in such moments is added to by the fact that many potent emotional memories date from the first few years of life, in the relationship between an infant and its caretakers. This is especially true for traumatic events, like beatings or outright neglect. During this early period of life other brain structures,

particularly the hippocampus, which is crucial for narrative memories, and the neocortex, seat of rational thought, have yet to become fully developed. In memory, the amygdala and hippocampus work hand-in-hand; each stores and retrieves its special information independently. While the hippocampus retrieves information, the amygdala determines if that information has any emotional valence. But the amygdala, which matures very quickly in the infant's brain, is much closer to fully formed at birth.

LeDoux turns to the role of the amygdala in childhood to support what has long been a basic tenet of psychoanalytic thought: that the interactions of life's earliest years lay down a set of emotional lessons based on the attunement and upsets in the contacts between infant and caretakers.[9] These emotional lessons are so potent and yet so difficult to understand from the vantage point of adult life because, believes LeDoux, they are stored in the amygdala as rough, wordless blueprints for emotional life. Since these earliest emotional memories are established at a time before infants have words for their experience, when these emotional memories are triggered in later life there is no matching set of articulated thoughts about the response that takes us over. One reason we can be so baffled by our emotional outbursts, then, is that they often date from a time early in our lives when things were bewildering and we did not yet have words for comprehending events. We may have the chaotic feelings, but not the words for the memories that formed them.

WHEN EMOTIONS ARE FAST AND SLOPPY

It was somewhere around three in the morning when a huge object came crashing through the ceiling in a far corner of my bedroom, spilling the contents of the attic into the room. In a second I leapt out of bed and ran out of the room, terrified the entire ceiling would cave in. Then, realizing I was safe, I cautiously peered back in the bedroom to see what had caused all the damage—only to discover that the sound I had taken to be the ceiling caving in was actually the fall of a tall pile of boxes my wife had stacked in the corner the day before while she sorted out her closet. Nothing had fallen from the attic: there was no attic. The ceiling was intact, and so was I.

My leap from bed while half-asleep—which might have saved me from injury had it truly been the ceiling falling—illustrates the power

of the amygdala to propel us to action in emergencies, vital moments before the neocortex has time to fully register what is actually going on. The emergency route from eye or ear to thalamus to amygdala is crucial: it saves time in an emergency, when an instantaneous response is required. But this circuit from thalamus to amygdala carries only a small portion of sensory messages, with the majority taking the main route up to the neocortex. So what registers in the amygdala via this express route is, at best, a rough signal, just enough for a warning. As LeDoux points out, "You don't need to know exactly what something is to know that it may be dangerous."[10]

The direct route has a vast advantage in brain time, which is reckoned in thousandths of a second. The amygdala in a rat can begin a response to a perception in as little as twelve milliseconds—twelve thousandths of a second. The route from thalamus to neocortex to amygdala takes about twice as long. Similar measurements have yet to be made in the human brain, but the rough ratio would likely hold.

In evolutionary terms, the survival value of this direct route would have been great, allowing a quick-response option that shaves a few critical milliseconds in reaction time to dangers. Those milliseconds could well have saved the lives of our protomammalian ancestors in such numbers that this arrangement is now featured in every mammalian brain, including yours and mine. In fact, while this circuit may play a relatively limited role in human mental life, largely restricted to emotional crises, much of the mental life of birds, fish, and reptiles revolves around it, since their very survival depends on constantly scanning for predators or prey. "This primitive, minor brain system in mammals is the main brain system in non-mammals," says LeDoux. "It offers a very rapid way to turn on emotions. But it's a quick-and-dirty process; the cells are fast, but not very precise."

Such imprecision in, say, a squirrel, is fine, since it leads to erring on the side of safety, springing away at the first sign of anything that might signal a looming enemy, or springing toward a hint of something edible. But in human emotional life that imprecision can have disastrous consequences for our relationships, since it means, figuratively speaking, we can spring at or away from the wrong thing —or person. (Consider, for example, the waitress who dropped a tray of six dinners when she glimpsed a woman with a huge, curly mane of red hair—exactly like the woman her ex-husband had left her for.)

Such inchoate emotional mistakes are based on feeling prior to thought. LeDoux calls it "precognitive emotion," a reaction based on

neural bits and pieces of sensory information that have not been fully sorted out and integrated into a recognizable object. It's a very raw form of sensory information, something like a neural *Name That Tune*, where, instead of snap judgments of melody being made on the basis of just a few notes, a whole perception is grasped on the basis of the first few tentative parts. If the amygdala senses a sensory pattern of import emerging, it jumps to a conclusion, triggering its reactions before there is full confirming evidence—or any confirmation at all.

Small wonder we can have so little insight into the murk of our more explosive emotions, especially while they still hold us in thrall. The amygdala can react in a delirium of rage or fear before the cortex knows what is going on because such raw emotion is triggered independent of, and prior to, thought.

THE EMOTIONAL MANAGER

A friend's six-year-old daughter Jessica was spending her first night ever sleeping over at a playmate's, and it was unclear who was more nervous about it, mother or daughter. While the mother tried not to let Jessica see the intense anxiety she felt, her tension peaked near midnight that night, as she was getting ready for bed and heard the phone ring. Dropping her toothbrush, she raced to the phone, her heart pounding, images of Jessica in terrible distress racing through her mind.

The mother snatched the receiver, and blurted, "Jessica!" into the phone—only to hear a woman's voice say, "Oh, I think this must be a wrong number…."

At that, the mother recovered her composure, and in a polite, measured tone, asked, "What number were you calling?"

While the amygdala is at work in priming an anxious, impulsive reaction, another part of the emotional brain allows for a more fitting, corrective response. The brain's damper switch for the amygdala's surges appears to lie at the other end of a major circuit to the neocortex, in the prefrontal lobes just behind the forehead. The prefrontal cortex seems to be at work when someone is fearful or enraged, but stifles or controls the feeling in order to deal more effectively with the situation at hand, or when a reappraisal calls for a completely different response, as with the worried mother on the phone. This neocortical area of the brain brings a more analytic or

appropriate response to our emotional impulses, modulating the amygdala and other limbic areas.

Ordinarily the prefrontal areas govern our emotional reactions from the start. The largest projection of sensory information from the thalamus, remember, goes not to the amygdala, but to the neocortex and its many centers for taking in and making sense of what is being perceived; that information and our response to it is coordinated by the prefrontal lobes, the seat of planning and organizing actions toward a goal, including emotional ones. In the neocortex a cascading series of circuits registers and analyzes that information, comprehends it, and, through the prefrontal lobes, orchestrates a reaction. If in the process an emotional response is called for, the prefrontal lobes dictate it, working hand-in-hand with the amygdala and other circuits in the emotional brain.

This progression, which allows for discernment in emotional response, is the standard arrangement, with the significant exception of emotional emergencies. When an emotion triggers, within moments the prefrontal lobes perform what amounts to a risk/benefit ratio of myriad possible reactions, and bet that one of them is best.[11] For animals, when to attack, when to run. And for we humans … when to attack, when to run—and also, when to placate, persuade, seek sympathy, stonewall, provoke guilt, whine, put on a facade of bravado, be contemptuous—and so on, through the whole repertoire of emotional wiles.

The neocortical response is slower in brain time than the hijack mechanism because it involves more circuitry. It can also be more judicious and considered, since more thought precedes feeling. When we register a loss and become sad, or feel happy after a triumph, or mull over something someone has said or done and then get hurt or angry, the neocortex is at work.

Just as with the amygdala, absent the workings of the prefrontal lobes, much of emotional life would fall away; lacking an understanding that something merits an emotional response, none comes. This role of the prefrontal lobes in emotions has been suspected by neurologists since the advent in the 1940s of that rather desperate—and sadly misguided—surgical “cure” for mental illness: the prefrontal lobotomy, which (often sloppily) removed part of the prefrontal lobes or otherwise cut connections between the prefrontal cortex and the lower brain. In the days before any effective medications for mental illness, the lobotomy was hailed as the answer

to grave emotional distress—sever the links between the prefrontal lobes and the rest of the brain, and patients' distress was "relieved." Unfortunately, the cost was that most of patients' emotional lives seemed to vanish, too. The key circuitry had been destroyed.

Emotional hijackings presumably involve two dynamics: triggering of the amygdala and a failure to activate the neocortical processes that usually keep emotional response in balance—or a recruitment of the neocortical zones to the emotional urgency.[12] At these moments the rational mind is swamped by the emotional. One way the prefrontal cortex acts as an efficient manager of emotion—weighing reactions before acting—is by dampening the signals for activation sent out by the amygdala and other limbic centers—something like a parent who stops an impulsive child from grabbing and tells the child to ask properly (or wait) for what it wants instead.[13]

The key "off" switch for distressing emotion seems to be the left prefrontal lobe. Neuropsychologists studying moods in patients with injuries to parts of the frontal lobes have determined that one of the tasks of the left frontal lobe is to act as a neural thermostat, regulating unpleasant emotions. The right prefrontal lobes are a seat of negative feelings like fear and aggression, while the left lobes keep those raw emotions in check, probably by inhibiting the right lobe.[14] In one group of stroke patients, for example, those whose lesions were in the left prefrontal cortex were prone to catastrophic worries and fears; those with lesions on the right were "unduly cheerful"; during neurological exams they joked around and were so laid back they clearly did not care how well they did.[15] And then there was the case of the happy husband: a man whose right prefrontal lobe had been partially removed in surgery for a brain malformation. His wife told physicians that after the operation he underwent a dramatic personality change, becoming less easily upset and, she was happy to say, more affectionate.[16]

The left prefrontal lobe, in short, seems to be part of a neural circuit that can switch off, or at least dampen down, all but the strongest negative surges of emotion. If the amygdala often acts as an emergency trigger, the left prefrontal lobe appears to be part of the brain's "off" switch for disturbing emotion: the amygdala proposes, the prefrontal lobe disposes. These prefrontal-limbic connections are crucial in mental life far beyond fine-tuning emotion; they are essential for navigating us through the decisions that matter most in life.

HARMONIZING EMOTION AND THOUGHT

The connections between the amygdala (and related limbic structures) and the neocortex are the hub of the battles or cooperative treaties struck between head and heart, thought and feeling. This circuitry explains why emotion is so crucial to effective thought, both in making wise decisions and in simply allowing us to think clearly.

Take the power of emotions to disrupt thinking itself. Neuroscientists use the term "working memory" for the capacity of attention that holds in mind the facts essential for completing a given task or problem, whether it be the ideal features one seeks in a house while touring several prospects, or the elements of a reasoning problem on a test. The prefrontal cortex is the brain region responsible for working memory.[17] But circuits from the limbic brain to the prefrontal lobes mean that the signals of strong emotion—anxiety, anger, and the like—can create neural static, sabotaging the ability of the prefrontal lobe to maintain working memory. That is why when we are emotionally upset we say we "just can't think straight"—and why continual emotional distress can create deficits in a child's intellectual abilities, crippling the capacity to learn.

These deficits, if more subtle, are not always tapped by IQ testing, though they show up through more targeted neuropsychological measures, as well as in a child's continual agitation and impulsivity. In one study, for example, primary school boys who had above-average IQ scores but nevertheless were doing poorly in school were found via these neuropsychological tests to have impaired frontal cortex functioning.[18] They also were impulsive and anxious, often disruptive and in trouble—suggesting faulty prefrontal control over their limbic urges. Despite their intellectual potential, these are the children at highest risk for problems like academic failure, alcoholism, and criminality—not because their intellect is deficient, but because their control over their emotional life is impaired. The emotional brain, quite separate from those cortical areas tapped by IQ tests, controls rage and compassion alike. These emotional circuits are sculpted by experience throughout childhood—and we leave those experiences utterly to chance at our peril.

Consider, too, the role of emotions in even the most "rational" decision-making. In work with far-reaching implications for understanding mental life, Dr. Antonio Damasio, a neurologist at the University of Iowa College of Medicine, has made careful studies of

just what is impaired in patients with damage to the prefrontal-amygdala circuit.[19] Their decision-making is terribly flawed—and yet they show no deterioration at all in IQ or any cognitive ability. Despite their intact intelligence, they make disastrous choices in business and their personal lives, and can even obsess endlessly over a decision so simple as when to make an appointment.

Dr. Damasio argues that their decisions are so bad because they have lost access to their *emotional* learning. As the meeting point between thought and emotion, the prefrontal-amygdala circuit is a crucial doorway to the repository for the likes and dislikes we acquire over the course of a lifetime. Cut off from emotional memory in the amygdala, whatever the neocortex mulls over no longer triggers the emotional reactions that have been associated with it in the past—everything takes on a gray neutrality. A stimulus, be it a favorite pet or a detested acquaintance, no longer triggers either attraction or aversion; these patients have "forgotten" all such emotional lessons because they no longer have access to where they are stored in the amygdala.

Evidence like this leads Dr. Damasio to the counter-intuitive position that feelings are typically *indispensable* for rational decisions; they point us in the proper direction, where dry logic can then be of best use. While the world often confronts us with an unwieldy array of choices (How should you invest your retirement savings? Whom should you marry?), the emotional learning that life has given us (such as the memory of a disastrous investment or a painful breakup) sends signals that streamline the decision by eliminating some options and highlighting others at the outset. In this way, Dr. Damasio argues, the emotional brain is as involved in reasoning as is the thinking brain.

The emotions, then, matter for rationality. In the dance of feeling and thought the emotional faculty guides our moment-to-moment decisions, working hand-in-hand with the rational mind, enabling—or disabling—thought itself. Likewise, the thinking brain plays an executive role in our emotions—except in those moments when emotions surge out of control and the emotional brain runs rampant.

In a sense we have two brains, two minds—and two different kinds of intelligence: rational and emotional. How we do in life is determined by both—it is not just IQ, but *emotional* intelligence that matters. Indeed, intellect cannot work at its best without emotional intelligence. Ordinarily the complementarity of limbic system and

3

When Smart Is Dumb

Exactly why David Pologruto, a high-school physics teacher, was stabbed with a kitchen knife by one of his star students is still debatable. But the facts as widely reported are these:

Jason H., a sophomore and straight-A student at a Coral Springs, Florida, high school, was fixated on getting into medical school. Not just any medical school—he dreamt of Harvard. But Pologruto, his physics teacher, had given Jason an 80 on a quiz. Believing the grade—a mere B—put his dream in jeopardy, Jason took a butcher knife to school and, in a confrontation with Pologruto in the physics lab, stabbed his teacher in the collarbone before being subdued in a struggle.

A judge found Jason innocent, temporarily insane during the incident—a panel of four psychologists and psychiatrists swore he was psychotic during the fight. Jason claimed he had been planning to commit suicide because of the test score, and had gone to Pologruto to tell him he was killing himself because of the bad grade. Pologruto told a different story: "I think he tried to completely do me in with the knife" because he was infuriated over the bad grade.

After transferring to a private school, Jason graduated two years later at the top of his class. A perfect grade in regular classes would have given him a straight-A, 4.0 average, but Jason had taken enough advanced courses to raise his grade-point average to 4.614—way beyond A+. Even as Jason graduated with highest honors, his old physics teacher, David Pologruto, complained that Jason had never apologized or even taken responsibility for the attack.[1]

The question is, how could someone of such obvious intelligence do something so irrational—so downright dumb? The answer: Academic intelligence has little to do with emotional life. The brightest among us can founder on the shoals of unbridled passions and unruly impulses; people with high IQs can be stunningly poor pilots of their private lives.

One of psychology's open secrets is the relative inability of grades,

IQ, or SAT scores, despite their popular mystique, to predict unerringly who will succeed in life. To be sure, there is a relationship between IQ and life circumstances for large groups as a whole: many people with very low IQs end up in menial jobs, and those with high IQs tend to become well-paid—but by no means always.

There are widespread exceptions to the myth that IQ predicts success—many (or more) exceptions than cases that fit the rule. At best, IQ contributes about 20 percent to the factors that determine life success, which leaves 80 percent to other forces.[2] As one observer notes, "The vast majority of one's ultimate niche in society is determined by non-IQ factors, ranging from social class to luck."

Even Richard Herrnstein and Charles Murray, whose book *The Bell Curve* imputes a primary importance to IQ, acknowledge this; as they point out, "Perhaps a freshman with an SAT math score of 500 had better not have his heart set on being a mathematician, but if instead he wants to run his own business, become a U.S. Senator or make a million dollars, he should not put aside his dreams.... The link between test scores and those achievements is dwarfed by the totality of other characteristics that he brings to life."[3]

My concern is with a key set of these "other characteristics," *emotional intelligence:* abilities such as being able to motivate oneself and persist in the face of frustrations; to control impulse and delay gratification; to regulate one's moods and keep distress from swamping the ability to think; to empathize and to hope. Unlike IQ, with its nearly one-hundred-year history of research with hundreds of thousands of people, emotional intelligence is a new concept. No one can yet say exactly how much of the variability from person to person in life's course it accounts for. But what data exist suggest it can be as powerful, and at times more powerful, than IQ. And while there are those who argue that IQ cannot be changed much by experience or education, I will show in Part Five that the crucial emotional competencies can indeed be learned and improved upon by children—if we bother to teach them.

EMOTIONAL INTELLIGENCE AND DESTINY

I remember the fellow in my own class at Amherst College who had attained five perfect 800 scores on the SAT and other achievement tests he took before entering. Despite his formidable intellectual

abilities, he spent most of his time hanging out, staying up late, and missing classes by sleeping until noon. It took him almost ten years to finally get his degree.

IQ offers little to explain the different destinies of people with roughly equal promises, schooling, and opportunity. When ninety-five Harvard students from the classes of the 1940s—a time when people with a wider spread of IQ were at Ivy League schools than is presently the case—were followed into middle age, the men with the highest test scores in college were not particularly successful compared to their lower-scoring peers in terms of salary, productivity, or status in their field. Nor did they have the greatest life satisfaction, nor the most happiness with friendships, family, and romantic relationships.[4]

A similar follow-up in middle age was done with 450 boys, most sons of immigrants, two thirds from families on welfare, who grew up in Somerville, Massachusetts, at the time a "blighted slum" a few blocks from Harvard. A third had IQs below 90. But again IQ had little relationship to how well they had done at work or in the rest of their lives; for instance, 7 percent of men with IQs under 80 were unemployed for ten or more years, but so were 7 percent of men with IQs over 100. To be sure, there was a general link (as there always is) between IQ and socioeconomic level at age forty-seven. But childhood abilities such as being able to handle frustrations, control emotions, and get on with other people made the greater difference.[5]

Consider also data from an ongoing study of eighty-one valedictorians and salutatorians from the 1981 class in Illinois high schools. All, of course, had the highest grade-point averages in their schools. But while they continued to achieve well in college, getting excellent grades, by their late twenties they had climbed to only average levels of success. Ten years after graduating from high school, only one in four were at the highest level of young people of comparable age in their chosen profession, and many were doing much less well.

Karen Arnold, professor of education at Boston University, one of the researchers tracking the valedictorians, explains, "I think we've discovered the 'dutiful'—people who know how to achieve in the system. But valedictorians struggle as surely as we all do. To know that a person is a valedictorian is to know only that he or she is exceedingly good at achievement as measured by grades. It tells you nothing about how they react to the vicissitudes of life."[6]

And that is the problem: academic intelligence offers virtually no

preparation for the turmoil—or opportunity—life's vicissitudes bring. Yet even though a high IQ is no guarantee of prosperity, prestige, or happiness in life, our schools and our culture fixate on academic abilities, ignoring *emotional* intelligence, a set of traits—some might call it character—that also matters immensely for our personal destiny. Emotional life is a domain that, as surely as math or reading, can be handled with greater or lesser skill, and requires its unique set of competencies. And how adept a person is at those is crucial to understanding why one person thrives in life while another, of equal intellect, dead-ends: emotional aptitude is a *meta-ability*, determining how well we can use whatever other skills we have, including raw intellect.

Of course, there are many paths to success in life, and many domains in which other aptitudes are rewarded. In our increasingly knowledge-based society, technical skill is certainly one. There is a children's joke: "What do you call a nerd fifteen years from now?" The answer: "Boss." But even among "nerds" emotional intelligence offers an added edge in the workplace, as we shall see in Part Three. Much evidence testifies that people who are emotionally adept—who know and manage their own feelings well, and who read and deal effectively with other people's feelings—are at an advantage in any domain of life, whether romance and intimate relationships or picking up the unspoken rules that govern success in organizational politics. People with well-developed emotional skills are also more likely to be content and effective in their lives, mastering the habits of mind that foster their own productivity; people who cannot marshal some control over their emotional life fight inner battles that sabotage their ability for focused work and clear thought.

A DIFFERENT KIND OF INTELLIGENCE

To the casual observer, four-year-old Judy might seem a wallflower among her more gregarious playmates. She hangs back from the action at playtime, staying on the margins of games rather than plunging into the center. But Judy is actually a keen observer of the social politics of her preschool classroom, perhaps the most sophisticated of her playmates in her insights into the tides of feeling within the others.

Her sophistication is not apparent until Judy's teacher gathers the

four-year-olds around to play what they call the Classroom Game. The Classroom Game—a dollhouse replica of Judy's own preschool classroom, with stick figures who have for heads small photos of the students and teachers—is a test of social perceptiveness. When Judy's teacher asks her to put each girl and boy in the part of the room they like to play in most—the art corner, the blocks corner, and so on—Judy does so with complete accuracy. And when asked to put each boy and girl with the children they like to play with most, Judy shows she can match best friends for the entire class.

Judy's accuracy reveals that she has a perfect social map of her class, a level of perceptiveness exceptional for a four-year-old. These are the skills that, in later life, might allow Judy to blossom into a star in any of the fields where "people skills" count, from sales and management to diplomacy.

That Judy's social brilliance was spotted at all, let alone this early, was due to her being a student at the Eliot-Pearson Preschool on the campus of Tufts University, where Project Spectrum, a curriculum that intentionally cultivates a variety of kinds of intelligence, was then being developed. Project Spectrum recognizes that the human repertoire of abilities goes far beyond the three R's, the narrow band of word-and-number skills that schools traditionally focus on. It acknowledges that capacities such as Judy's social perceptiveness are talents that an education can nurture rather than ignore or even frustrate. By encouraging children to develop a full range of the abilities that they will actually draw on to succeed, or use simply to be fulfilled in what they do, school becomes an education in life skills.

The guiding visionary behind Project Spectrum is Howard Gardner, a psychologist at the Harvard School of Education.[7] "The time has come," Gardner told me, "to broaden our notion of the spectrum of talents. The single most important contribution education can make to a child's development is to help him toward a field where his talents best suit him, where he will be satisfied and competent. We've completely lost sight of that. Instead we subject everyone to an education where, if you succeed, you will be best suited to be a college professor. And we evaluate everyone along the way according to whether they meet that narrow standard of success. We should spend less time ranking children and more time helping them to identify their natural competencies and gifts, and cultivate those. There are hundreds and hundreds of ways to succeed, and many, many different abilities that will help you get there."[8]

If anyone sees the limits of the old ways of thinking about intelligence, it is Gardner. He points out that the glory days of the IQ tests began during World War I, when two million American men were sorted out through the first mass paper-and-pencil form of the IQ test, freshly developed by Lewis Terman, a psychologist at Stanford. This led to decades of what Gardner calls the "IQ way of thinking": "that people are either smart or not, are born that way, that there's nothing much you can do about it, and that tests can tell you if you are one of the smart ones or not. The SAT test for college admissions is based on the same notion of a single kind of aptitude that determines your future. This way of thinking permeates society."

Gardner's influential 1983 book *Frames of Mind was* a manifesto refuting the IQ view; it proposed that there was not just one, monolithic kind of intelligence that was crucial for life success, but rather a wide spectrum of intelligences, with seven key varieties. His list includes the two standard academic kinds, verbal and mathematical-logical alacrity, but it goes on to include the spatial capacity seen in, say, an outstanding artist or architect; the kinesthetic genius displayed in the physical fluidity and grace of a Martha Graham or Magic Johnson; and the musical gifts of a Mozart or YoYo Ma. Rounding out the list are two faces of what Gardner calls "the personal intelligences": interpersonal skills, like those of a great therapist such as Carl Rogers or a world-class leader such as Martin Luther King, Jr., and the "intrapsychic" capacity that could emerge, on the one hand, in the brilliant insights of Sigmund Freud, or, with less fanfare, in the inner contentment that arises from attuning one's life to be in keeping with one's true feelings.

The operative word in this view of intelligences is *multiple:* Gardner's model pushes way beyond the standard concept of IQ as a single, immutable factor. It recognizes that the tests that tyrannized us as we went through school—from the achievement tests that sorted us out into those who would be shunted toward technical schools and those destined for college, to the SATs that determined what, if any, college we would be allowed to attend—are based on a limited notion of intelligence, one out of touch with the true range of skills and abilities that matter for life over and beyond IQ.

Gardner acknowledges that seven is an arbitrary figure for the variety of intelligences; there is no magic number to the multiplicity of human talents. At one point, Gardner and his research colleagues had stretched these seven to a list of twenty different varieties of

intelligence. Interpersonal intelligence, for example, broke down into four distinct abilities: leadership, the ability to nurture relationships and keep friends, the ability to resolve conflicts, and skill at the kind of social analysis that four-year-old Judy excels at.

This multifaceted view of intelligence offers a richer picture of a child's ability and potential for success than the standard IQ. When Spectrum students were evaluated on the Stanford-Binet Intelligence Scale—once the gold standard of IQ tests—and again by a battery designed to measure Gardner's spectrum of intelligences, there was no significant relationship between children's scores on the two tests.[9] The five children with the highest IQs (from 125 to 133) showed a variety of profiles on the ten strengths measured by the Spectrum test. For example, of the five "smartest" children according to the IQ tests, one was strong in three areas, three had strengths in two areas, and one "smart" child had just one Spectrum strength. Those strengths were scattered: four of these children's strengths were in music, two in the visual arts, one in social understanding, one in logic, two in language. None of the five high-IQ kids were strong in movement, numbers, or mechanics; movement and numbers were actually weak spots for two of these five.

Gardner's conclusion was that "the Stanford-Binet Intelligence Scale did not predict successful performance across or on a consistent subset of Spectrum activities." On the other hand, the Spectrum scores give parents and teachers clear guidance about the realms that these children will take a spontaneous interest in, and where they will do well enough to develop the passions that could one day lead beyond proficiency to mastery.

Gardner's thinking about the multiplicity of intelligence continues to evolve. Some ten years after he first published his theory, Gardner gave these nutshell summaries of the personal intelligences:

> *Interpersonal* intelligence is the ability to understand other people: what motivates them, how they work, how to work cooperatively with them. Successful salespeople, politicians, teachers, clinicians, and religious leaders are all likely to be individuals with high degrees of interpersonal intelligence. *Intra*personal intelligence … is a correlative ability, turned inward. It is a capacity to form an accurate, veridical model of oneself and to be able to use that model to operate effectively in life.[10]

In another rendering, Gardner noted that the core of interpersonal intelligence includes the "capacities to discern and respond

appropriately to the moods, temperaments, motivations, and desires of other people." In intrapersonal intelligence, the key to self-knowledge, he included "access to one's own feelings and the ability to discriminate among them and draw upon them to guide behavior."[11]

SPOCK VS. DATA: WHEN COGNITION IS NOT ENOUGH

There is one dimension of personal intelligence that is broadly pointed to, but little explored, in Gardner's elaborations: the role of emotions. Perhaps this is so because, as Gardner suggested to me, his work is so strongly informed by a cognitive-science model of mind. Thus his view of these intelligences emphasizes cognition—the *understanding* of oneself and of others in motives, in habits of working, and in putting that insight into use in conducting one's own life and getting along with others. But like the kinesthetic realm, where physical brilliance manifests itself nonverbally, the realm of the emotions extends, too, beyond the reach of language and cognition.

While there is ample room in Gardner's descriptions of the personal intelligences for insight into the play of emotions and mastery in managing them, Gardner and those who work with him have not pursued in great detail the role of *feeling* in these intelligences, focusing more on cognitions *about* feeling. This focus, perhaps unintentionally, leaves unexplored the rich sea of emotions that makes the inner life and relationships so complex, so compelling, and so often puzzling. And it leaves yet to be plumbed both the sense in which there is intelligence *in* the emotions and the sense in which intelligence can be brought *to* emotions.

Gardner's emphasis on the cognitive elements in the personal intelligences reflects the zeitgeist of psychology that has shaped his views. Psychology's overemphasis on cognition even in the realm of emotion is, in part, due to a quirk in the history of that science. During the middle decades of this century academic psychology was dominated by behaviorists in the mold of B. F. Skinner, who felt that only behavior that could be seen objectively, from the outside, could be studied with scientific accuracy. The behaviorists ruled all inner life, including emotions, out-of-bounds for science.

Then, with the coming in the late 1960s of the "cognitive revolution," the focus of psychological science turned to how the

mind registers and stores information, and the nature of intelligence. But emotions were still off-limits. Conventional wisdom among cognitive scientists held that intelligence entails a cold, hard-nosed processing of fact. It is hyperrational, rather like *Star Treks* Mr. Spock, the archetype of dry information bytes unmuddied by feeling, embodying the idea that emotions have no place in intelligence and only muddle our picture of mental life.

The cognitive scientists who embraced this view have been seduced by the computer as the operative model of mind, forgetting that, in reality, the brain's wetware is awash in a messy, pulsating puddle of neurochemicals, nothing like the sanitized, orderly silicon that has spawned the guiding metaphor for mind. The predominant models among cognitive scientists of how the mind processes information have lacked an acknowledgment that rationality is guided by—and can be swamped by—feeling. The cognitive model is, in this regard, an impoverished view of the mind, one that fails to explain the Sturm und Drang of feelings that brings flavor to the intellect. In order to persist in this view, cognitive scientists themselves have had to ignore the relevance for their models of mind of their personal hopes and fears, their marital squabbles and professional jealousies—the wash of feeling that gives life its flavor and its urgencies, and which in every moment biases exactly how (and how well or poorly) information is processed.

The lopsided scientific vision of an emotionally flat mental life—which has guided the last eighty years of research on intelligence—is gradually changing as psychology has begun to recognize the essential role of feeling in thinking. Rather like the Spockish character Data in *Star Trek: The Next Generation*, psychology is coming to appreciate the power and virtues of emotions in mental life, as well as their dangers. After all, as Data sees (to his own dismay, could he feel dismay), his cool logic fails to bring the right *human* solution. Our humanity is most evident in our feelings; Data seeks to feel, knowing that something essential is missing. He wants friendship, loyalty; like the Tin Man in *The Wizard of Oz*, he lacks a heart. Lacking the lyrical sense that feeling brings, Data can play music or write poetry with technical virtuosity, but not feel its passion. The lesson of Data's yearning for yearning itself is that the higher values of the human heart—faith, hope, devotion, love—are missing entirely from the coldly cognitive view. Emotions enrich; a model of mind that leaves them out is impoverished.

When I asked Gardner about his emphasis on thoughts about feelings, or metacognition, more than on emotions themselves, he acknowledged that he tended to view intelligence in a cognitive way, but told me, "When I first wrote about the personal intelligences, I *was* talking about emotion, especially in my notion of intrapersonal intelligence—one component is emotionally tuning in to yourself. It's the visceral-feeling signals you get that are essential for interpersonal intelligence. But as it has developed in practice, the theory of multiple intelligence has evolved to focus more on metacognition"—that is, awareness of one's mental processes—"rather than on the full range of emotional abilities."

Even so, Gardner appreciates how crucial these emotional and relationship abilities are in the rough-and-tumble of life. He points out that "many people with IQs of 160 work for people with IQs of 100, if the former have poor intrapersonal intelligence and the latter have a high one. And in the day-to-day world no intelligence is more important than the interpersonal. If you don't have it, you'll make poor choices about who to marry, what job to take, and so on. We need to train children in the personal intelligences in school."

CAN EMOTIONS BE INTELLIGENT?

To get a fuller understanding of just what such training might be like, we must turn to other theorists who agree with Gardner's view—most notably psychologists Peter Salovey and John Mayer. They have mapped in great detail the ways in which we can bring intelligence to our emotions.[12] This endeavor is not new; over the years even the most ardent theorists of IQ have occasionally tried to bring emotions within the domain of intelligence, rather than seeing "emotion" and "intelligence" as an inherent contradiction in terms. Thus E. L. Thorndike, an eminent psychologist who was also influential in popularizing the notion of IQ in the 1920s and 1930s, proposed in a *Harper's Magazine* article that one aspect of emotional intelligence, "social" intelligence—the ability to understand others and "act wisely in human relations"—was itself an aspect of a person's IQ. Other psychologists of the time took a more cynical view of social intelligence, seeing it in terms of skills for manipulating other people—getting them to do what you want, whether they want to or not. But neither of these formulations of social intelligence held much sway

with theorists of IQ, and by 1960 an influential textbook on intelligence tests pronounced social intelligence a "useless" concept.

But personal intelligence would not be ignored, mainly because it makes both intuitive and common sense. For example, when Yale psychologist Robert Sternberg asked people to describe an "intelligent person," practical people skills were among the main traits listed. More systematic research by Sternberg led him back to Thorndike's conclusion: that social intelligence is both distinct from academic abilities and a key part of what makes people do well in the practicalities of life. Among the practical intelligences that are, for instance, so highly valued in the workplace is the kind of sensitivity that allows effective managers to pick up tacit messages.[13]

In recent years a growing group of psychologists has come to similar conclusions, agreeing with Gardner that the old concepts of IQ revolved around a narrow band of linguistic and math skills, and that doing well on IQ tests was most directly a predictor of success in the classroom or as a professor but less and less so as life's paths diverged from academe. These psychologists—Sternberg and Salovey among them—have taken a wider view of intelligence, trying to reinvent it in terms of what it takes to lead life successfully. And that line of enquiry leads back to an appreciation of just how crucial "personal" or emotional intelligence is.

Salovey, with his colleague John Mayer, offered an elaborated definition of emotional intelligence, expanding these abilities into five main domains:[14]

1. *Knowing one's emotions*. Self-awareness—recognizing a feeling *as it happens*—is the keystone of emotional intelligence. As we will see in Chapter 4, the ability to monitor feelings from moment to moment is crucial to psychological insight and self-understanding. An inability to notice our true feelings leaves us at their mercy. People with greater certainty about their feelings are better pilots of their lives, having a surer sense of how they really feel about personal decisions from whom to marry to what job to take.

2. *Managing emotions*. Handling feelings so they are appropriate is an ability that builds on self-awareness. Chapter 5 will examine the capacity to soothe oneself, to shake off rampant anxiety, gloom, or irritability—and the consequences of failure at this basic emotional skill. People who are poor in this ability are constantly battling feelings of distress, while those who excel in it can bounce back far

more quickly from life's setbacks and upsets.

3. *Motivating oneself*. As Chapter 6 will show, marshaling emotions in the service of a goal is essential for paying attention, for self-motivation and mastery, and for creativity. Emotional self-control—delaying gratification and stifling impulsiveness—underlies accomplishment of every sort. And being able to get into the "flow" state enables outstanding performance of all kinds. People who have this skill tend to be more highly productive and effective in whatever they undertake.

4. *Recognizing emotions in others*. Empathy, another ability that builds on emotional self-awareness, is the fundamental "people skill." Chapter 7 will investigate the roots of empathy, the social cost of being emotionally tone-deaf, and the reason empathy kindles altruism. People who are empathic are more attuned to the subtle social signals that indicate what others need or want. This makes them better at callings such as the caring professions, teaching, sales, and management.

5. *Handling relationships*. The art of relationships is, in large part, skill in managing emotions in others. Chapter 8 looks at social competence and incompetence, and the specific skills involved. These are the abilities that undergird popularity, leadership, and interpersonal effectiveness. People who excel in these skills do well at anything that relies on interacting smoothly with others; they are social stars.

Of course, people differ in their abilities in each of these domains; some of us may be quite adept at handling, say, our own anxiety, but relatively inept at soothing someone else's upsets. The underlying basis for our level of ability is, no doubt, neural, but as we will see, the brain is remarkably plastic, constantly learning. Lapses in emotional skills can be remedied: to a great extent each of these domains represents a body of habit and response that, with the right effort, can be improved on.

IQ AND EMOTIONAL INTELLIGENCE: PURE TYPES

IQ and emotional intelligence are not opposing competencies, but rather separate ones. We all mix intellect and emotional acuity; people with a high IQ but low emotional intelligence (or low IQ and

high emotional intelligence) are, despite the stereotypes, relatively rare. Indeed, there is a slight correlation between IQ and some aspects of emotional intelligence—though small enough to make clear these are largely independent entities.

Unlike the familiar tests for IQ, there is, as yet, no single paper-and-pencil test that yields an "emotional intelligence score" and there may never be one. Although there is ample research on each of its components, some of them, such as empathy, are best tested by sampling a person's actual ability at the task—for example, by having them read a person's feelings from a video of their facial expressions. Still, using a measure for what he calls "ego resilience" which is quite similar to emotional intelligence (it includes the main social and emotional competences), Jack Block, a psychologist at the University of California at Berkeley, has made a comparison of two theoretical pure types: people high in IQ versus people high in emotional aptitudes.[15] The differences are telling.

The high-IQ pure type (that is, setting aside emotional intelligence) is almost a caricature of the intellectual, adept in the realm of mind but inept in the personal world. The profiles differ slightly for men and women. The high-IQ male is typified—no surprise—by a wide range of intellectual interests and abilities. He is ambitious and productive, predictable and dogged, and untroubled by concerns about himself. He also tends to be critical and condescending, fastidious and inhibited, uneasy with sexuality and sensual experience, unexpressive and detached, and emotionally bland and cold.

By contrast, men who are high in emotional intelligence are socially poised, outgoing and cheerful, not prone to fearfulness or worried rumination. They have a notable capacity for commitment to people or causes, for taking responsibility, and for having an ethical outlook; they are sympathetic and caring in their relationships. Their emotional life is rich, but appropriate; they are comfortable with themselves, others, and the social universe they live in.

Purely high-IQ women have the expected intellectual confidence, are fluent in expressing their thoughts, value intellectual matters, and have a wide range of intellectual and aesthetic interests. They also tend to be introspective, prone to anxiety, rumination, and guilt, and hesitate to express their anger openly (though they do so indirectly).

Emotionally intelligent women, by contrast, tend to be assertive and express their feelings directly, and to feel positive about themselves;

life holds meaning for them. Like the men, they are outgoing and gregarious, and express their feelings appropriately (rather than, say, in outbursts they later regret); they adapt well to stress. Their social poise lets them easily reach out to new people; they are comfortable enough with themselves to be playful, spontaneous, and open to sensual experience. Unlike the women purely high in IQ, they rarely feel anxious or guilty, or sink into rumination.

These portraits, of course, are extremes—all of us mix IQ and emotional intelligence in varying degrees. But they offer an instructive look at what each of these dimensions adds separately to a person's qualities. To the degree a person has both cognitive and emotional intelligence, these pictures merge. Still, of the two, emotional intelligence adds far more of the qualities that make us more fully human.

4

Know Thyself

A belligerent samurai, an old Japanese tale goes, once challenged a Zen master to explain the concept of heaven and hell. But the monk replied with scorn, “You’re nothing but a lout—I can’t waste my time with the likes of you!”

His very honor attacked, the samurai flew into a rage and, pulling his sword from its scabbard, yelled, “I could kill you for your impertinence.” “That,” the monk calmly replied, “is hell.”

Startled at seeing the truth in what the master pointed out about the fury that had him in its grip, the samurai calmed down, sheathed his sword, and bowed, thanking the monk for the insight.

“And that,” said the monk, “is heaven.”

The sudden awakening of the samurai to his own agitated state illustrates the crucial difference between being caught up in a feeling and becoming aware that you are being swept away by it. Socrates’s injunction “Know thyself” speaks to this keystone of emotional intelligence: awareness of one’s own feelings as they occur.

It might seem at first glance that our feelings are obvious; more thoughtful reflection reminds us of times we have been all too oblivious to what we really felt about something, or awoke to these feelings late in the game. Psychologists use the rather ponderous term *metacognition* to refer to an awareness of thought process, and *metamood* to mean awareness of one’s own emotions. I prefer the term *self-awareness*, in the sense of an ongoing attention to one’s internal states.[1] In this self-reflexive awareness mind observes and investigates experience itself, including the emotions.[2]

This quality of awareness is akin to what Freud described as an “evenly hovering attention,” and which he commended to those who would do psychoanalysis. Such attention takes in whatever passes through awareness with impartiality, as an interested yet unreactive witness. Some psychoanalysts call it the “observing ego,” the capacity of self-awareness that allows the analyst to monitor his own reactions to what the patient is saying, and which the process of free

association nurtures in the patient.[3]

Such self-awareness would seem to require an activated neocortex, particularly the language areas, attuned to identify and name the emotions being aroused. Self-awareness is not an attention that gets carried away by emotions, overreacting and amplifying what is perceived. Rather, it is a neutral mode that maintains self-reflectiveness even amidst turbulent emotions. William Styron seems to be describing something like this faculty of mind in writing of his deep depression, telling of a sense "of being accompanied by a second self—a wraithlike observer who, not sharing the dementia of his double, is able to watch with dispassionate curiosity as his companion struggles."[4]

At its best, self-observation allows just such an equanimous awareness of passionate or turbulent feelings. At a minimum, it manifests itself simply as a slight stepping-back from experience, a parallel stream of consciousness that is "meta": hovering above or beside the main flow, aware of what is happening rather than being immersed and lost in it. It is the difference between, for example, being murderously enraged at someone and having the self-reflexive thought "This is anger I'm feeling" even as you are enraged. In terms of the neural mechanics of awareness, this subtle shift in mental activity presumably signals that neocortical circuits are actively monitoring the emotion, a first step in gaining some control. This awareness of emotions is the fundamental emotional competence on which others, such as emotional self-control, build.

Self-awareness, in short, means being "aware of both our mood and our thoughts about that mood," in the words of John Mayer, a University of New Hampshire psychologist who, with Yale's Peter Salovey, is a coformulator of the theory of emotional intelligence.[5] Self-awareness can be a nonreactive, nonjudgmental attention to inner states. But Mayer finds that this sensibility also can be less equanimous; typical thoughts bespeaking emotional self-awareness include "I shouldn't feel this way," "I'm thinking good things to cheer up," and, for a more restricted self-awareness, the fleeting thought "Don't think about it" in reaction to something highly upsetting.

Although there is a logical distinction between being aware of feelings and acting to change them, Mayer finds that for all practical purposes the two usually go hand-in-hand: to recognize a foul mood is to want to get out of it. This recognition, however, is distinct from the efforts we make to keep from acting on an emotional impulse. When

we say “Stop that!” to a child whose anger has led him to hit a playmate, we may stop the hitting, but the anger still simmers. The child’s thoughts are still fixated on the trigger for the anger—“But he stole my toy!”—and the anger continues unabated. Self-awareness has a more powerful effect on strong, aversive feelings: the realization “This is anger I’m feeling” offers a greater degree of freedom—not just the option not to act on it, but the added option to try to let go of it.

Mayer finds that people tend to fall into distinctive styles for attending to and dealing with their emotions:[6]

• *Self-aware*. Aware of their moods as they are having them, these people understandably have some sophistication about their emotional lives. Their clarity about emotions may undergird other personality traits: they are autonomous and sure of their own boundaries, are in good psychological health, and tend to have a positive outlook on life. When they get into a bad mood, they don’t ruminate and obsess about it, and are able to get out of it sooner. In short, their mindfulness helps them manage their emotions.

• *Engulfed*. These are people who often feel swamped by their emotions and helpless to escape them, as though their moods have taken charge. They are mercurial and not very aware of their feelings, so that they are lost in them rather than having some perspective. As a result, they do little to try to escape bad moods, feeling that they have no control over their emotional life. They often feel overwhelmed and emotionally out of control.

• *Accepting*. While these people are often clear about what they are feeling, they also tend to be accepting of their moods, and so don’t try to change them. There seem to be two branches of the accepting type: those who are usually in good moods and so have little motivation to change them, and people who, despite their clarity about their moods, are susceptible to bad ones but accept them with a laissez-faire attitude, doing nothing to change them despite their distress—a pattern found among, say, depressed people who are resigned to their despair.

THE PASSIONATE AND THE INDIFFERENT

Imagine for a moment that you’re on an airplane flying from New York to San Francisco. It’s been a smooth flight, but as you approach

the Rockies the pilot's voice comes over the plane intercom. "Ladies and gentlemen, there's some turbulence ahead. Please return to your seats and fasten your seatbelts." And then the plane hits the turbulence, which is rougher than you've ever endured—the airplane is tossed up and down and side to side like a beach ball in the waves.

The question is, what do you do? Are you the kind of person who buries yourself in your book or magazine, or continues watching the movie, tuning out the turbulence? Or are you likely to take out the emergency card and review the precautions, or watch the flight attendants to see if they show signs of panic, or strain to hear the engines to see if there's anything worrisome?

Which of these responses comes more naturally to us is a sign of our favored attentional stance under duress. The airplane scenario itself is an item from a psychological test developed by Suzanne Miller, a psychologist at Temple University, to assess whether people tend to be vigilant, attending carefully to every detail of a distressing predicament, or, in contrast, deal with such anxious moments by trying to distract themselves. These two attentional stances toward distress have very different consequences for how people experience their own emotional reactions. Those who tune in under duress can, by the very act of attending so carefully, unwittingly amplify the magnitude of their own reactions—especially if their tuning in is devoid of the equanimity of self-awareness. The result is that their emotions seem all the more intense. Those who tune out, who distract themselves, notice less about their own reactions, and so minimize the experience of their emotional response, if not the size of the response itself.

At the extremes, this means that for some people emotional awareness is overwhelming, while for others it barely exists. Consider the college student who, one evening, spotted a fire that had broken out in his dorm, went to get a fire extinguisher, and put the fire out. Nothing unusual—except that on his way to get the extinguisher and then on the way back to the fire, he walked instead of running. The reason? He didn't feel there was any urgency.

This story was told to me by Edward Diener, a University of Illinois at Urbana psychologist who has been studying the *intensity* with which people experience their emotions.[7] The college student stood out in his collection of case studies as one of the least intense Diener had ever encountered. He was, essentially, a man without passions, someone who goes through life feeling little or nothing, even about an

emergency like a fire.

By contrast, consider a woman at the opposite end of Diener's spectrum. When she once lost her favorite pen, she was distraught for days. Another time she was so thrilled on seeing an ad for a big sale on women's shoes at an expensive store that she dropped what she was doing, hopped in her car, and drove three hours to the store in Chicago.

Diener finds that women, in general, feel both positive and negative emotions more strongly than do men. And, sex differences aside, emotional life is richer for those who notice more. For one thing, this enhanced emotional sensitivity means that for such people the least provocation unleashes emotional storms, whether heavenly or hellish, while those at the other extreme barely experience any feeling even under the most dire circumstances.

THE MAN WITHOUT FEELINGS

Gary infuriated his fiancée, Ellen, because even though he was intelligent, thoughtful, and a successful surgeon, Gary was emotionally flat, completely unresponsive to any and all shows of feeling. While Gary could speak brilliantly of science and art, when it came to his feelings—even for Ellen—he fell silent. Try as she might to elicit some passion from him, Gary was impassive, oblivious. "I don't naturally express my feelings," Gary told the therapist he saw at Ellen's insistence. When it came to emotional life, he added, "I don't know what to talk about; I have no strong feelings, either positive or negative."

Ellen was not alone in being frustrated by Gary's aloofness; as he confided to his therapist, he was unable to speak openly about his feelings with anyone in his life. The reason: He did not know what he felt in the first place. So far as he could tell, he had no angers, no sadnesses, no joys.[8]

As his own therapist observes, this emotional blankness makes Gary and others like him colorless, bland: "They bore everybody. That's why their wives send them into treatment." Gary's emotional flatness exemplifies what psychiatrists call *alexithymia*, from the Greek *a*-for "lack," *lexis for* "word," and *thymos for* "emotion." Such people lack words for their feelings. Indeed, they seem to lack feelings altogether, although this may actually be because of their inability to *express*

emotion rather than from an absence of emotion altogether. Such people were first noticed by psychoanalysts puzzled by a class of patients who were untreatable by that method because they reported no feelings, no fantasies, and colorless dreams—in short, no inner emotional life to talk about at all.[9] The clinical features that mark alexithymics include having difficulty describing feelings—their own or anyone else's—and a sharply limited emotional vocabulary.[10] What's more, they have trouble discriminating among emotions as well as between emotion and bodily sensation, so that they might tell of having butterflies in the stomach, palpitations, sweating, and dizziness—but they would not know they are feeling anxious.

"They give the impression of being different, alien beings, having come from an entirely different world, living in the midst of a society which is dominated by feelings," is the description given by Dr. Peter Sifneos, the Harvard psychiatrist who in 1972 coined the term *alexithymia*.[11] Alexithymics rarely cry, for example, but if they do their tears are copious. Still, they are bewildered if asked what the tears are all about. One patient with alexithymia was so upset after seeing a movie about a woman with eight children who was dying of cancer that she cried herself to sleep. When her therapist suggested that perhaps she was upset because the movie reminded her of her own mother, who was in actuality dying of cancer, the woman sat motionless, bewildered and silent. When her therapist then asked her how she felt at that moment, she said she felt "awful," but couldn't clarify her feelings beyond that. And, she added, from time to time she found herself crying, but never knew exactly what she was crying about.[12]

And that is the nub of the problem. It is not that alexithymics never feel, but that they are unable to know—and especially unable to put into words—precisely what their feelings are. They are utterly lacking in the fundamental skill of emotional intelligence, self-awareness—knowing what we are feeling as emotions roil within us. Alexithymics belie the common-sense notion that it is perfectly self-evident what we are feeling: they haven't a clue. When something—or more likely, someone—does move them to feeling, they find the experience baffling and overwhelming, something to avoid at all costs. Feelings come to them, when they come at all, as a befuddling bundle of distress; as the patient who cried at the movie put it, they feel "awful," but can't say exactly which *kind* of awful it is they feel.

This basic confusion about feelings often seems to lead them to

complain of vague medical problems when they are actually experiencing emotional distress—a phenomenon known in psychiatry as *somaticizing*, mistaking an emotional ache for a physical one (and different from a psychosomatic disease, in which emotional problems cause genuine medical ones). Indeed, much of the psychiatric interest in alexithymics is in weeding them out from among those who come to doctors seeking help, for they are prone to lengthy—and fruitless—pursuit of a medical diagnosis and treatment for what is actually an emotional problem.

While no one can as yet say for sure what causes alexithymia, Dr. Sifneos proposes a disconnection between the limbic system and the neocortex, particularly its verbal centers, which fits well with what we are learning about the emotional brain. Patients with severe seizures who had that connection surgically severed to relieve their symptoms, notes Sifneos, became emotionally flat, like people with alexithymia, unable to put their feelings into words and suddenly devoid of fantasy life. In short, though the circuits of the emotional brain may react with feelings, the neocortex is not able to sort out these feelings and add the nuance of language to them. As Henry Roth observed in his novel *Call It Sleep* about this power of language, "If you could put words to what you felt, it was yours." The corollary, of course, is the alexithymic's dilemma: having no words for feelings means not making the feelings your own.

IN PRAISE OF GUT FEELING

Elliot's tumor, growing just behind his forehead, was the size of a small orange; surgery removed it completely. Although the surgery was declared a success, afterward people who knew him well said that Elliot was no longer Elliot—he had undergone a drastic personality change. Once a successful corporate lawyer, Elliot could no longer hold a job. His wife left him. Squandering his savings in fruitless investments, he was reduced to living in a spare bedroom at his brother's home.

There was a puzzling pattern to Elliot's problem. Intellectually he was as bright as ever, but he used his time terribly, getting lost in minor details; he seemed to have lost all sense of priority. Reprimands made no difference; he was fired from a succession of legal jobs. Though extensive intellectual tests found nothing wrong with Elliot's

mental faculties, he went to see a neurologist anyway, hoping that discovery of a neurological problem might get him the disability benefits to which he felt he was entitled. Otherwise the conclusion seemed to be that he was just a malingerer.

Antonio Damasio, the neurologist Elliot consulted, was struck by one element missing from Elliot's mental repertoire: though nothing was wrong with his logic, memory, attention, or any other cognitive ability, Elliot was virtually oblivious to his feelings about what had happened to him.[13] Most strikingly, Elliot could narrate the tragic events of his life with complete dispassion, as though he were an onlooker to the losses and failures of his past—without a note of regret or sadness, frustration or anger at life's unfairness. His own tragedy brought him no pain; Damasio felt more upset by Elliot's story than did Elliot himself.

The source of this emotional unawareness, Damasio concluded, was the removal, along with the brain tumor, of part of Elliot's prefrontal lobes. In effect, the surgery had severed ties between the lower centers of the emotional brain, especially the amygdala and related circuits, and the thinking abilities of the neocortex. Elliot's thinking had become computerlike, able to make every step in the calculus of a decision, but unable to assign *values* to differing possibilities. Every option was neutral. And that overly dispassionate reasoning, suspected Damasio, was the core of Elliot's problem: too little awareness of his own feelings about things made Elliot's reasoning faulty.

The handicap showed up even in mundane decisions. When Damasio tried to choose a time and date for the next appointment with Elliot, the result was a muddle of indecisiveness: Elliot could find arguments for and against every date and time that Damasio proposed, but could not choose among them. At the rational level, there were perfectly good reasons for objecting to or accepting virtually every possible time for the appointment. But Elliot lacked any sense of how *he felt* about any of the times. Lacking that awareness of his own feelings, he had no preferences at all.

One lesson from Elliot's indecisiveness is the crucial role of feeling in navigating the endless stream of life's personal decisions. While strong feelings can create havoc in reasoning, the *lack* of awareness of feeling can also be ruinous, especially in weighing the decisions on which our destiny largely depends: what career to pursue, whether to stay with a secure job or switch to one that is riskier but more

interesting, whom to date or marry, where to live, which apartment to rent or house to buy—and on and on through life. Such decisions cannot be made well through sheer rationality; they require gut feeling, and the emotional wisdom garnered through past experiences. Formal logic alone can never work as the basis for deciding whom to marry or trust or even what job to take; these are realms where reason without feeling is blind.

The intuitive signals that guide us in these moments come in the form of limbic-driven surges from the viscera that Damasio calls "somatic markers"—literally, gut feelings. The somatic marker is a kind of automatic alarm, typically calling attention to a potential danger from a given course of action. More often than not these markers steer us *away* from some choice that experience warns us against, though they can also alert us to a golden opportunity. We usually do not, at that moment, recall what specific experiences formed this negative feeling; all we need is the signal that a given potential course of action could be disastrous. Whenever such a gut feeling rises up, we can immediately drop or pursue that avenue of consideration with greater confidence, and so pare down our array of choices to a more manageable decision matrix. The key to sounder personal decision-making, in short: being attuned to our feelings.

PLUMBING THE UNCONSCIOUS

Elliot's emotional vacuity suggests that there may be a spectrum of people's ability to sense their emotions as they have them. By the logic of neuroscience, if the absence of a neural circuit leads to a deficit in an ability, then the relative strength or weakness of that same circuit in people whose brains are intact should lead to comparable levels of competence in that same ability. In terms of the role of prefrontal circuits in emotional attunement, this suggests that for neurological reasons some of us may more easily detect the stirring of fear or joy than do others, and so be more emotionally self-aware.

It may be that a talent for psychological introspection hinges on this same circuitry. Some of us are naturally more attuned to the emotional mind's special symbolic modes: metaphor and simile, along with poetry, song, and fable, are all cast in the language of the heart. So too are dreams and myths, in which loose associations determine

the flow of narrative, abiding by the logic of the emotional mind. Those who have a natural attunement to their own heart's voice—the language of emotion—are sure to be more adept at articulating its messages, whether as a novelist, songwriter, or psychotherapist. This inner attunement should make them more gifted in giving voice to the "wisdom of the unconscious"—the felt meanings of our dreams and fantasies, the symbols that embody our deepest wishes.

Self-awareness is fundamental to psychological insight; this is the faculty that much of psychotherapy means to strengthen. Indeed, Howard Gardner's model for intrapsychic intelligence is Sigmund Freud, the great mapper of the psyche's secret dynamics. As Freud made clear, much of emotional life is unconscious; feelings that stir within us do not always cross the threshold into awareness. Empirical verification of this psychological axiom comes, for instance, from experiments on unconscious emotions, such as the remarkable finding that people form definite likings for things they do not even realize they have seen before. Any emotion can be—and often is—unconscious.

The physiological beginnings of an emotion typically occur before a person is consciously aware of the feeling itself. For example, when people who fear snakes are shown pictures of snakes, sensors on their skin will detect sweat breaking out, a sign of anxiety, though they say they do not feel any fear. The sweat shows up in such people even when the picture of a snake is presented so rapidly that they have no conscious idea of what, exactly, they just saw, let alone that they are beginning to get anxious. As such preconscious emotional stirrings continue to build, they eventually become strong enough to break into awareness. Thus there are two levels of emotion, conscious and unconscious. The moment of an emotion coming into awareness marks its registering as such in the frontal cortex.[14]

Emotions that simmer beneath the threshold of awareness can have a powerful impact on how we perceive and react, even though we have no idea they are at work. Take someone who is annoyed by a rude encounter early in the day, and then is peevish for hours afterward, taking affront where none is intended and snapping at people for no real reason. He may well be oblivious to his continuing irritability and will be surprised if someone calls attention to it, though it stews just out of his awareness and dictates his curt replies. But once that reaction is brought into awareness—once it registers in the cortex—he can evaluate things anew, decide to shrug off the

5

Passion's Slaves

Thou hast been …
A man that Fortune's buffets and rewards
Has taken with equal thanks … . Give me that man
That is not passion's slave, and I will wear him
In my heart's core, aye, in my heart of hearts
As I do thee.…

—HAMLET TO HIS FRIEND HORATIO

A sense of self-mastery, of being able to withstand the emotional storms that the buffeting of Fortune brings rather than being "passion's slave," has been praised as a virtue since the time of Plato. The ancient Greek word for it was *sophrosyne*, "care and intelligence in conducting one's life; a tempered balance and wisdom," as Page DuBois, a Greek scholar, translates it. The Romans and the early Christian church called it *temperantia*, temperance, the restraining of emotional excess. The goal is balance, not emotional suppression: every feeling has its value and significance. A life without passion would be a dull wasteland of neutrality, cut off and isolated from the richness of life itself. But, as Aristotle observed, what is wanted is *appropriate* emotion, feeling proportionate to circumstance. When emotions are too muted they create dullness and distance; when out of control, too extreme and persistent, they become pathological, as in immobilizing depression, overwhelming anxiety, raging anger, manic agitation.

Indeed, keeping our distressing emotions in check is the key to emotional well-being; extremes—emotions that wax too intensely or for too long-undermine our stability. Of course, it is not that we should feel only one kind of emotion; being happy all the time somehow suggests the blandness of those smiley-face badges that had a faddish moment in the 1970s. There is much to be said for the constructive contribution of suffering to creative and spiritual life; suffering can temper the soul.

Downs as well as ups spice life, but need to be in balance. In the calculus of the heart it is the ratio of positive to negative emotions that determines the sense of well-being—at least that is the verdict from studies of mood in which hundreds of men and women have carried beepers that reminded them at random times to record their emotions at that moment.[1] It is not that people need to avoid unpleasant feelings to feel content, but rather that stormy feelings not go unchecked, displacing all pleasant moods. People who have strong episodes of anger or depression can still feel a sense of well-being if they have a countervailing set of equally joyous or happy times. These studies also affirm the independence of emotional from academic intelligence, finding little or no relationship between grades or IQ and people's emotional well-being.

Just as there is a steady murmur of background thoughts in the mind, there is a constant emotional hum; beep someone at six A.M. or seven P.M. and he will always be in some mood or other. Of course, on any two mornings someone can have very different moods; but when people's moods are averaged over weeks or months, they tend to reflect that person's overall sense of well-being. It turns out that for most people, extremely intense feelings are relatively rare; most of us fall into the gray middle range, with mild bumps in our emotional roller coaster.

Still, managing our emotions is something of a full-time job: much of what we do—especially in our free time—is an attempt to manage mood. Everything from reading a novel or watching television to the activities and companions we choose can be a way to make ourselves feel better. The art of soothing ourselves is a fundamental life skill; some psychoanalytic thinkers, such as John Bowlby and D. W. Winnicott, see this as one of the most essential of all psychic tools. The theory holds that emotionally sound infants learn to soothe themselves by treating themselves as their caretakers have treated them, leaving them less vulnerable to the upheavals of the emotional brain.

As we have seen, the design of the brain means that we very often have little or no control over *when* we are swept by emotion, nor over *what* emotion it will be. But we can have some say in *how long* an emotion will last. The issue arises not with garden-variety sadness, worry, or anger; normally such moods pass with time and patience. But when these emotions are of great intensity and linger past an

appropriate point, they shade over into their distressing extremes—chronic anxiety, uncontrollable rage, depression. And, at their most severe and intractable, medication, psychotherapy, or both may be needed to lift them.

In these times, one sign of the capacity for emotional self-regulation may be recognizing when chronic agitation of the emotional brain is too strong to be overcome without pharmacologic help. For example, two thirds of those who suffer from manic-depression have never been treated for the disorder. But lithium or newer medications can thwart the characteristic cycle of paralyzing depression alternating with manic episodes that mix chaotic elation and grandiosity with irritation and rage. One problem with manic-depression is that while people are in the throes of mania they often feel so overly confident that they see no need for help of any kind despite the disastrous decisions they are making. In such severe emotional disorders psychiatric medication offers a tool for managing life better.

But when it comes to vanquishing the more usual range of bad moods, we are left to our own devices. Unfortunately, those devices are not always effective—at least such is the conclusion reached by Diane Tice, a psychologist at Case Western Reserve University, who asked more than four hundred men and women about the strategies they used to escape foul moods, and how successful those tactics were for them.[2]

Not everyone agrees with the philosophical premise that bad moods should be changed; there are, Tice found, "mood purists," the 5 percent or so of people who said they never try to change a mood since, in their view, all emotions are "natural" and should be experienced just as they present themselves, no matter how dispiriting. And then there were those who regularly sought to get into unpleasant moods for pragmatic reasons: physicians who needed to be somber to give patients bad news; social activists who nurtured their outrage at injustice so as to be more effective in battling it; even a young man who told of working up his anger to help his little brother with playground bullies. And some people were positively Machiavellian about manipulating moods—witness the bill collectors who purposely worked themselves into a rage in order to be all the firmer with deadbeats.[3] But these rare purposive cultivations of unpleasantness aside, most everyone complained of being at the mercy of their moods. People's track records at shaking bad moods were decidedly mixed.

THE ANATOMY OF RAGE

Say someone in another car cuts dangerously close to you as you are driving on the freeway. If your reflexive thought is "That son of a bitch!" it matters immensely for the trajectory of rage whether that thought is followed by more thoughts of outrage and revenge: "He could have hit me! That bastard—I can't let him get away with that!" Your knuckles whiten as you tighten your hold on the steering wheel, a surrogate for strangling his throat. Your body mobilizes to fight, not run—leaving you trembling, beads of sweat on your forehead, your heart pounding, the muscles in your face locked in a scowl. You want to kill the guy. Then, should a car behind you honk because you have slowed down after the close call, you are apt to explode in rage at that driver too. Such is the stuff of hypertension, reckless driving, even freeway shootings.

Contrast that sequence of building rage with a more charitable line of thought toward the driver who cut you off: "Maybe he didn't see me, or maybe he had some good reason for driving so carelessly, such as a medical emergency." That line of possibility tempers anger with mercy, or at least an open mind, short-circuiting the buildup of rage. The problem, as Aristotle's challenge to have only *appropriate* anger reminds us, is that more often than not our anger surges out of control. Benjamin Franklin put it well: "Anger is never without a reason, but seldom a good one."

There are, of course, different kinds of anger. The amygdala may well be a main source of the sudden spark of rage we feel at the driver whose carelessness endangers us. But the other end of the emotional circuitry, the neocortex, most likely foments more calculated angers, such as cool-headed revenge or outrage at unfairness or injustice. Such thoughtful angers are those most likely, as Franklin put it, to "have good reasons" or seem to.

Of all the moods that people want to escape, rage seems to be the most intransigent; Tice found anger is the mood people are worst at controlling. Indeed, anger is the most seductive of the negative emotions; the self-righteous inner monologue that propels it along fills the mind with the most convincing arguments for venting rage. Unlike sadness, anger is energizing, even exhilarating. Anger's seductive, persuasive power may in itself explain why some views about it are so common: that anger is uncontrollable, or that, at any rate, it *should not* be controlled, and that venting anger in "catharsis" is all to the

good. A contrasting view, perhaps a reaction against the bleak picture of these other two, holds that anger can be prevented entirely. But a careful reading of research findings suggests that all these common attitudes toward anger are misguided, if not outright myths.[4]

The train of angry thoughts that stokes anger is also potentially the key to one of the most powerful ways to defuse anger: undermining the convictions that are fueling the anger in the first place. The longer we ruminate about what has made us angry, the more "good reasons" and self-justifications for being angry we can invent. Brooding fuels anger's flames. But seeing things differently douses those flames. Tice found that reframing a situation more positively was one of the most potent ways to put anger to rest.

The Rage "Rush"

That finding squares well with the conclusions of University of Alabama psychologist Dolf Zillmann, who, in a lengthy series of careful experiments, has taken precise measure of anger and the anatomy of rage.[5] Given the roots of anger in the fight wing of the fight-or-flight response, it is no surprise that Zillmann finds that a universal trigger for anger is the sense of being endangered. Endangerment can be signaled not just by an outright physical threat but also, as is more often the case, by a symbolic threat to self-esteem or dignity: being treated unjustly or rudely, being insulted or demeaned, being frustrated in pursuing an important goal. These perceptions act as the instigating trigger for a limbic surge that has a dual effect on the brain. One part of that surge is a release of catecholamines, which generate a quick, episodic rush of energy, enough for "one course of vigorous action," as Zillmann puts it, "such as in fight or flight." This energy surge lasts for minutes, during which it readies the body for a good fight or a quick flight, depending on how the emotional brain sizes up the opposition.

Meanwhile, another amygdala-driven ripple through the adrenocortical branch of the nervous system creates a general tonic background of action readiness, which lasts much longer than the catecholamine energy surge. This generalized adrenal and cortical excitation can last for hours and even days, keeping the emotional brain in special readiness for arousal, and becoming a foundation on which subsequent reactions can build with particular quickness. In general, the hair-trigger condition created by adrenocortical arousal

explains why people are so much more prone to anger if they have already been provoked or slightly irritated by something else. Stress of all sorts creates adrenocortical arousal, lowering the threshold for what provokes anger. Thus someone who has had a hard day at work is especially vulnerable to becoming enraged later at home by something—the kids being too noisy or messy, say—that under other circumstances would not be powerful enough to trigger an emotional hijacking.

Zillmann comes to these insights on anger through careful experimentation. In a typical study, for example, he had a confederate provoke men and women who had volunteered by making snide remarks about them. The volunteers then watched a pleasant or upsetting film. Later the volunteers were given the chance to retaliate against the confederate by giving an evaluation they thought would be used in a decision whether or not to hire him. The intensity of their retaliation was directly proportional to how aroused they had gotten from the film they had just watched; they were angrier after seeing the unpleasant film, and gave the worst ratings.

Anger Builds on Anger

Zillmann's studies seem to explain the dynamic at work in a familiar domestic drama I witnessed one day while shopping. Down the supermarket aisle drifted the emphatic, measured tones of a young mother to her son, about three: "Put … it … back!"

"But I *want* it!" he whined, clinging more tightly to a Ninja Turtles cereal box.

"Put it back!" Louder, her anger taking over.

At that moment the baby in her shopping cart seat dropped the jar of jelly she had been mouthing. When it shattered on the floor the mother yelled, "That's it!" and, in a fury, slapped the baby, grabbed the three-year-old's box and slammed it onto the nearest shelf, scooped him up by the waist, and rushed down the aisle, the shopping cart careening perilously in front, the baby now crying, her son, his legs dangling, protesting, "Put me *down*, put me *down*!"

Zillmann has found that when the body is already in a state of edginess, like the mother's, and something triggers an emotional hijacking, the subsequent emotion, whether anger or anxiety, is of especially great intensity. This dynamic is at work when someone becomes enraged. Zillmann sees escalating anger as "a sequence of

provocations, each triggering an excitatory reaction that dissipates slowly." In this sequence every successive anger-provoking thought or perception becomes a minitrigger for amygdala-driven surges of catecholamines, each building on the hormonal momentum of those that went before. A second comes before the first has subsided, and a third on top of those, and so on; each wave rides the tails of those before, quickly escalating the body's level of physiological arousal. A thought that comes later in this buildup triggers a far greater intensity of anger than one that comes at the beginning. Anger builds on anger; the emotional brain heats up. By then rage, unhampered by reason, easily erupts in violence.

At this point people are unforgiving and beyond being reasoned with; their thoughts revolve around revenge and reprisal, oblivious to what the consequences may be. This high level of excitation, Zillmann says, "fosters an illusion of power and invulnerability that may inspire and facilitate aggression" as the enraged person, "failing cognitive guidance," falls back on the most primitive of responses. The limbic urge is ascendant; the rawest lessons of life's brutality become guides to action.

Balm for Anger

Given this analysis of the anatomy of rage, Zillmann sees two main ways of intervening. One way of defusing anger is to seize on and challenge the thoughts that trigger the surges of anger, since it is the original appraisal of an interaction that confirms and encourages the first burst of anger, and the subsequent reappraisals that fan the flames. Timing matters; the earlier in the anger cycle the more effective. Indeed, anger can be completely short-circuited if the mitigating information comes before the anger is acted on.

The power of understanding to deflate anger is clear from another of Zillmann's experiments, in which a rude assistant (a confederate) insulted and provoked volunteers who were riding an exercise bike. When the volunteers were given the chance to retaliate against the rude experimenter (again, by giving a bad evaluation they thought would be used in weighing his candidacy for a job) they did so with an angry glee. But in one version of the experiment another confederate entered after the volunteers had been provoked, and just before the chance to retaliate; she told the provocative experimenter he had a phone call down the hall. As he left he made a snide remark

to her too. But she took it in good spirits, explaining after he left that he was under terrible pressures, upset about his upcoming graduate orals. After that the irate volunteers, when offered the chance to retaliate against the rude fellow, chose not to; instead they expressed compassion for his plight.

Such mitigating information allows a reappraisal of the anger-provoking events. But there is a specific window of opportunity for this de-escalation. Zillmann finds it works well at moderate levels of anger; at high levels of rage it makes no difference because of what he calls "cognitive incapacitation"—in other words, people can no longer think straight. When people were already highly enraged, they dismissed the mitigating information with "That's just too bad!" or "the strongest vulgarities the English language has to offer," as Zillmann put it with delicacy.

Cooling Down

> Once when I was about 13, in an angry fit, I walked out of the house vowing I would never return. It was a beautiful summer day, and I walked far along lovely lanes, till gradually the stillness and beauty calmed and soothed me, and after some hours I returned repentant and almost melted. Since then when I am angry, I do this if I can, and find it the best cure.

The account is by a subject in one of the very first scientific studies of anger, done in 1899.[6] It still stands as a model of the second way of de-escalating anger: cooling off physiologically by waiting out the adrenal surge in a setting where there are not likely to be further triggers for rage. In an argument, for instance, that means getting away from the other person for the time being. During the cooling-off period, the angered person can put the brakes on the cycle of escalating hostile thought by seeking out distractions. Distraction, Zillmann finds, is a highly powerful mood-altering device, for a simple reason: It's hard to stay angry when we're having a pleasant time. The trick, of course, is to get anger to cool to the point where someone can *have* a pleasant time in the first place.

Zillmann's analysis of the ways anger escalates and de-escalates explains many of Diane Tice's findings about the strategies people commonly say they use to ease anger. One such fairly effective strategy is going off to be alone while cooling down. A large proportion of men translate this into going for a drive—a finding that

gives one pause when driving (and, Tice told me, inspired her to drive more defensively). Perhaps a safer alternative is going for a long walk; active exercise also helps with anger. So do relaxation methods such as deep breathing and muscle relaxation, perhaps because they change the body's physiology from the high arousal of anger to a low-arousal state, and perhaps too because they distract from whatever triggered the anger. Active exercise may cool anger for something of the same reason: after high levels of physiological activation during the exercise, the body rebounds to a low level once it stops.

But a cooling-down period will not work if that time is used to pursue the train of anger-inducing thought, since each such thought is in itself a minor trigger for more cascades of anger. The power of distraction is that it stops that angry train of thought. In her survey of people's strategies for handling anger, Tice found that distractions by and large help calm anger: TV, movies, reading, and the like all interfere with the angry thoughts that stoke rage. But, Tice found, indulging in treats such as shopping for oneself and eating do not have much effect; it is all too easy to continue with an indignant train of thought while cruising a shopping mall or devouring a piece of chocolate cake.

To these strategies add those developed by Redford Williams, a psychiatrist at Duke University who sought to help hostile people, who are at higher risk for heart disease, to control their irritability.[7] One of his recommendations is to use self-awareness to catch cynical or hostile thoughts as they arise, and write them down. Once angry thoughts are captured this way, they can be challenged and reappraised, though, as Zillmann found, this approach works better before anger has escalated to rage.

The Ventilation Fallacy

As I settle into a New York City cab, a young man crossing the street stops in front of the cab to wait for traffic to clear. The driver, impatient to start, honks, motioning for the young man to move out of the way. The reply is a scowl and an obscene gesture.

"You son of a bitch!" the driver yells, making threatening lunges with the cab by hitting the accelerator and brake at the same time. At this lethal threat, the young man sullenly moves aside, barely, and smacks his fist against the cab as it inches by into traffic. At this, the driver shouts a foul litany of expletives at the man.

As we move along the driver, still visibly agitated, tells me, “You can’t take any shit from anyone. You gotta yell back—at least it makes you feel better!”

Catharsis—giving vent to rage—is sometimes extolled as a way of handling anger. The popular theory holds that “it makes you feel better.” But, as Zillmann’s findings suggest, there is an argument against catharsis. It has been made since the 1950s, when psychologists started to test the effects of catharsis experimentally and, time after time, found that giving vent to anger did little or nothing to dispel it (though, because of the seductive nature of anger, it may *feel* satisfying).[8] There may be some specific conditions under which lashing out in anger does work: when it is expressed directly to the person who is its target, when it restores a sense of control or rights an injustice, or when it inflicts “appropriate harm” on the other person and gets him to change some grievous activity without retaliating. But because of the incendiary nature of anger, this may be easier to say than to do.[9]

Tice found that ventilating anger is one of the worst ways to cool down: outbursts of rage typically pump up the emotional brain’s arousal, leaving people feeling more angry, not less. Tice found that when people told of times they had taken their rage out on the person who provoked it, the net effect was to prolong the mood rather than end it. Far more effective was when people first cooled down, and then, in a more constructive or assertive manner, confronted the person to settle their dispute. As I once heard Chogyam Trungpa, a Tibetan teacher, reply when asked how best to handle anger: “Don’t suppress it. But don’t act on it.”

SOOTHING ANXIETY: WHAT, ME WORRY?

> Oh, no! The muffler sounds bad.… What if I have to take it to the shop?… I can’t afford the expense.… I’d have to draw the money from Jamie’s college fund.… What if I can’t afford his tuition?… That bad school report last week.… What if his grades go down and he can’t get into college?… Muffler sounds bad.…

And so the worrying mind spins on in an endless loop of low-grade melodrama, one set of concerns leading on to the next and back again. The above specimen is offered by Lizabeth Roemer and Thomas Borkovec, Pennsylvania State University psychologists, whose

research on worrying—the heart of all anxiety—has raised the topic from neurotic's art to science.[10] There is, of course, no hitch when worry works; by mulling over a problem—that is, employing constructive reflection, which can look like worrying—a solution can appear. Indeed, the reaction that underlies worry is the vigilance for potential danger that has, no doubt, been essential for survival over the course of evolution. When fear triggers the emotional brain, part of the resulting anxiety fixates attention on the threat at hand, forcing the mind to obsess about how to handle it and ignore anything else for the time being. Worry is, in a sense, a rehearsal of what might go wrong and how to deal with it; the task of worrying is to come up with positive solutions for life's perils by anticipating dangers before they arise.

The difficulty is with chronic, repetitive worries, the kind that recycle on and on and never get any nearer a positive solution. A close analysis of chronic worry suggests that it has all the attributes of a low-grade emotional hijacking: the worries seem to come from nowhere, are uncontrollable, generate a steady hum of anxiety, are impervious to reason, and lock the worrier into a single, inflexible view of the worrisome topic. When this same cycle of worry intensifies and persists, it shades over the line into full-blown neural hijackings, the anxiety disorders: phobias, obsessions and compulsions, panic attacks. In each of these disorders worry fixates in a distinct fashion; for the phobic, anxieties rivet on the feared situation; for the obsessive, they fixate on preventing some feared calamity; in panic attacks, the worries can focus on a fear of dying or on the prospect of having the attack itself.

In all these conditions the common denominator is worry run amok. For example, a woman being treated for obsessive-compulsive disorder had a series of rituals that took most of her waking hours: forty-five-minute showers several times daily, washing her hands for five minutes twenty or more times a day. She would not sit down unless she first swabbed the seat with rubbing alcohol to sterilize it. Nor would she touch a child or an animal—both were "too dirty." All these compulsions were stirred by her underlying morbid fear of germs; she worried constantly that without her washing and sterilizing she would catch a disease and die.[11]

A woman being treated for "generalized anxiety disorder"—the psychiatric nomenclature for being a constant worrier—responded to the request to worry aloud for one minute this way:

> I might not do this right. This may be so artificial that it won't be an indication of the real thing and we need to get at the real thing.… Because if we don't get at the real thing, I won't get well. And if I don't get well I'll never be happy.[12]

In this virtuoso display of worrying about worrying, the very request to worry for one minute had, within a few short seconds, escalated to contemplation of a lifelong catastrophe: "I'll never be happy." Worries typically follow such lines, a narrative to oneself that jumps from concern to concern and more often than not includes catastrophizing, imagining some terrible tragedy. Worries are almost always expressed in the mind's ear, not its eye—that is, in words, not images—a fact that has significance for controlling worry.

Borkovec and his colleagues began to study worrying per se when they were trying to come up with a treatment for insomnia. Anxiety, other researchers have observed, comes in two forms: *cognitive*, or worrisome thoughts, and *somatic*, the physiological symptoms of anxiety, such as sweating, a racing heart, or muscle tension. The main trouble with insomniacs, Borkovec found, was not the somatic arousal. What kept them up were intrusive thoughts. They were chronic worriers, and could not stop worrying, no matter how sleepy they were. The one thing that worked in helping them get to sleep was getting their minds off their worries, focusing instead on the sensations produced by a relaxation method. In short, the worries could be stopped by shifting attention away.

Most worriers, however, can't seem to do this. The reason, Borkovec believes, has to do with a partial payoff from worrying that is highly reinforcing to the habit. There is, it seems, something positive in worries: worries are ways to deal with potential threats, with dangers that may come one's way. The work of worrying—when it succeeds—is to rehearse what those dangers are, and to reflect on ways to deal with them. But worry doesn't work all that well. New solutions and fresh ways of seeing a problem do not typically come from worrying, especially chronic worry. Instead of coming up with solutions to these potential problems, worriers typically simply ruminate on the danger itself, immersing themselves in a low-key way in the dread associated with it while staying in the same rut of thought. Chronic worriers worry about a wide range of things, most of which have almost no chance of happening; they read dangers into life's journey that others never notice.

Yet chronic worriers tell Borkovec that worrying helps them, and

that their worries are self-perpetuating, an endless loop of angst-ridden thought. Why should worry become what seems to amount to a mental addiction? Oddly, as Borkovec points out, the worry habit is reinforcing in the same sense that superstitions are. Since people worry about many things that have a very low probability of actually occurring—a loved one dying in a plane crash, going bankrupt, and the like—there is, to the primitive limbic brain at least, something magical about it. Like an amulet that wards off some anticipated evil, the worry psychologically gets the credit for preventing the danger it obsesses about.

The Work of Worrying

> She had moved to Los Angeles from the Midwest, lured by a job with a publisher. But the publisher was bought by another soon after, and she was left without a job. Turning to freelance writing, an erratic marketplace, she found herself either swamped with work or unable to pay her rent. She often had to ration phone calls, and for the first time was without health insurance. This lack of coverage was particularly distressing: she found herself catastrophizing about her health, sure every headache signaled a brain tumor, picturing herself in an accident whenever she had to drive somewhere. She often found herself lost in a long reverie of worry, a medley of distress. But, she said, she found her worries almost addictive.

Borkovec discovered another unexpected benefit to worrying. While people are immersed in their worried thoughts, they do not seem to notice the subjective sensations of the anxiety those worries stir—the speedy heartbeat, the beads of sweat, the shakiness—and as the worry proceeds it actually seems to suppress some of that anxiety, at least as reflected in heart rate. The sequence presumably goes something like this: The worrier notices something that triggers the image of some potential threat or danger; that imagined catastrophe in turn triggers a mild attack of anxiety. The worrier then plunges into a long series of distressed thoughts, each of which primes yet another topic for worry; as attention continues to be carried along by this train of worry, focusing on these very thoughts takes the mind off the original catastrophic image that triggered the anxiety. Images, Borkovec found, are more powerful triggers for physiological anxiety than are thoughts, so immersion in thoughts, to the exclusion of catastrophic images, partially alleviates the experience of being anxious. And, to that extent, the worry is also reinforced, as a halfway antidote to the

very anxiety it evoked.

But chronic worries are self-defeating too in that they take the form of stereotyped, rigid ideas, not creative breakthroughs that actually move toward solving the problem. This rigidity shows up not just in the manifest content of worried thought, which simply repeats more or less the same ideas over and over. But at a neurological level there seems to be a cortical rigidity, a deficit in the emotional brain's ability to respond flexibly to changing circumstance. In short, chronic worry works in some ways, but not in other, more consequential ones: it eases some anxiety, but never solves the problem.

The one thing that chronic worriers cannot do is follow the advice they are most often given: "Just stop worrying" (or, worse, "Don't worry—be happy"). Since chronic worries seem to be low-grade amygdala episodes, they come unbidden. And, by their very nature, they persist once they arise in the mind. But after much experimentation, Borkovec discovered some simple steps that can help even the most chronic worrier control the habit.

The first step is self-awareness, catching the worrisome episodes as near their beginning as possible—ideally, as soon as or just after the fleeting catastrophic image triggers the worry-anxiety cycle. Borkovec trains people in this approach by first teaching them to monitor cues for anxiety, especially learning to identify situations that trigger worry, or the fleeting thoughts and images that initiate the worry, as well as the accompanying sensations of anxiety in the body. With practice, people can identify the worries at an earlier and earlier point in the anxiety spiral. People also learn relaxation methods that they can apply at the moment they recognize the worry beginning, and practice the relaxation method daily so they will be able to use it on the spot, when they need it the most.

The relaxation method, though, is not enough in itself. Worriers also need to actively challenge the worrisome thoughts; failing this, the worry spiral will keep coming back. So the next step is to take a critical stance toward their assumptions: Is it very probable that the dreaded event will occur? Is it necessarily the case that there is only one or no alternative to letting it happen? Are there constructive steps to be taken? Does it really help to run through these same anxious thoughts over and over?

This combination of mindfulness and healthy skepticism would, presumably, act as a brake on the neural activation that underlies low-grade anxiety. Actively generating such thoughts may prime the

circuitry that can inhibit the limbic driving of worry; at the same time, actively inducing a relaxed state counters the signals for anxiety the emotional brain is sending throughout the body.

Indeed, Borkovec points out, these strategies establish a train of mental activity that is incompatible with worry. When a worry is allowed to repeat over and over unchallenged, it gains in persuasive power; challenging it by contemplating a range of equally plausible points of view keeps the one worried thought from being naively taken as true. Even some people whose worrying is serious enough to qualify for a psychiatric diagnosis have been relieved of the worrying habit this way.

On the other hand, for people with worries so severe they have flowered into phobia, obsessive-compulsive disorder, or panic disorder, it may be prudent—indeed, a sign of self-awareness—to turn to medication to interrupt the cycle. A retraining of the emotional circuitry through therapy is still called for, however, in order to lessen the likelihood that anxiety disorders will recur when medication is stopped.[13]

MANAGING MELANCHOLY

The single mood people generally put most effort into shaking is sadness; Diane Tice found that people are most inventive when it comes to trying to escape the blues. Of course, not all sadness should be escaped; melancholy, like every other mood, has its benefits. The sadness that a loss brings has certain invariable effects: it closes down our interest in diversions and pleasures, fixes attention on what has been lost, and saps our energy for starting new endeavors—at least for the time being. In short, it enforces a kind of reflective retreat from life's busy pursuits, and leaves us in a suspended state to mourn the loss, mull over its meaning, and, finally, make the psychological adjustments and new plans that will allow our lives to continue.

Bereavement is useful; full-blown depression is not. William Styron renders an eloquent description of "the many dreadful manifestations of the disease," among them self-hatred, a sense of worthlessness, a "dank joylessness" with "gloom crowding in on me, a sense of dread and alienation and, above all, a stifling anxiety."[14] Then there are the intellectual marks: "confusion, failure of mental focus and lapse of memories," and, at a later stage, his mind "dominated by anarchic

distortions," and "a sense that my thought processes were engulfed by a toxic and unnameable tide that obliterated any enjoyable response to the living world." There are the physical effects: sleeplessness, feeling as listless as a zombie, "a kind of numbness, an enervation, but more particularly an odd fragility," along with a "fidgety restlessness." Then there is the loss of pleasure: "Food, like everything else within the scope of sensation, was utterly without savor." Finally, there was the vanishing of hope as the "gray drizzle of horror" took on a despair so palpable it was like physical pain, a pain so unendurable that suicide seemed a solution.

In such major depression, life is paralyzed; no new beginnings emerge. The very symptoms of depression bespeak a life on hold. For Styron, no medication or therapy helped; it was the passing of time and the refuge of a hospital that finally cleared away the despondency. But for most people, especially those with less severe cases, psychotherapy can help, as can medication—Prozac is the treatment of the hour, but there are more than a dozen other compounds offering some help, especially for major depression.

My focus here is the far more common sadness that at its upper limits becomes, technically speaking, a "subclinical depression"—that is, ordinary melancholy. This is a range of despondency that people can handle on their own, if they have the internal resources. Unfortunately, some of the strategies most often resorted to can backfire, leaving people feeling worse than before. One such strategy is simply staying alone, which is often appealing when people are feeling down; more often than not, however, it only adds a sense of loneliness and isolation to the sadness. That may partly explain why Tice found the most popular tactic for battling depression is socializing—going out to eat, to a ballgame or movie; in short, doing something with friends or family. That works well if the net effect is to get the person's mind off his sadness. But it simply prolongs the mood if he uses the occasion just to mull over what put him in the funk.

Indeed, one of the main determinants of whether a depressed mood will persist or lift is the degree to which people ruminate. Worrying about what's depressing us, it seems, makes the depression all the more intense and prolonged. In depression, worry takes several forms, all focusing on some aspect of the depression itself—how tired we feel, how little energy or motivation we have, for instance, or how little work we're getting done. Typically none of this reflection is

accompanied by any concrete course of action that might alleviate the problem. Other common worries include “isolating yourself and thinking about how terrible you feel, worrying that your spouse might reject you because you are depressed, and wondering whether you are going to have another sleepless night,” says Stanford psychologist Susan Nolen-Hoeksma, who has studied rumination in depressed people.[15]

Depressed people sometimes justify this kind of rumination by saying they are trying to “understand themselves better”; in fact, they are priming the feelings of sadness without taking any steps that might actually lift their mood. Thus in therapy it might be perfectly helpful to reflect deeply on the causes of a depression, if that leads to insights or actions that will change the conditions that cause it. But a passive immersion in the sadness simply makes it worse.

Rumination can also make the depression stronger by creating conditions that are, well, more depressing. Nolen-Hoeksma gives the example of a saleswoman who gets depressed and spends so many hours worrying about it that she doesn’t get around to important sales calls. Her sales then decline, making her feel like a failure, which feeds her depression. But if she reacted to depression by trying to distract herself, she might well plunge into the sales calls as a way to get her mind off the sadness. Sales would be less likely to decline, and the very experience of making a sale might bolster her self-confidence, lessening the depression somewhat.

Women, Nolen-Hoeksma finds, are far more prone to ruminate when they are depressed than are men. This, she proposes, may at least partly explain the fact that women are diagnosed with depression twice as often as are men. Of course, other factors may come into play, such as women being more open to disclosing their distress or having more in their lives to be depressed about. And men may drown their depression in alcoholism, for which their rate is about twice that of women.

Cognitive therapy aimed at changing these thought patterns has been found in some studies to be on a par with medication for treating mild clinical depression, and superior to medication in preventing the return of mild depression. Two strategies are particularly effective in the battle.[16] One is to learn to challenge the thoughts at the center of rumination—to question their validity and think of more positive alternatives. The other is to purposely schedule pleasant, distracting events.

One reason distraction works is that depressing thoughts are automatic, intruding on one's state of mind unbidden. Even when depressed people try to suppress their depressing thoughts, they often cannot come up with better alternatives; once the depressive tide of thought has started, it has a powerful magnetic effect on the train of association. For example, when depressed people were asked to unscramble jumbled six-word sentences, they were much better at figuring out the depressing messages ("The future looks very dismal") than the upbeat ones ("The future looks very bright").[17]

The tendency for depression to perpetuate itself shades even the kinds of distractions people choose. When depressed people were given a list of upbeat or ponderous ways to get their minds off something sad, such as the funeral of a friend, they picked more of the melancholy activities. Richard Wenzlaff, the University of Texas psychologist who did these studies, concludes that people who are already depressed need to make a special effort to get their attention on something that is completely upbeat, being careful not to inadvertently choose something—a tearjerker movie, a tragic novel—that will drag their mood down again.

Mood-lifters

> Imagine that you're driving on an unfamiliar, steep, and winding road through fog. Suddenly a car pulls out of a driveway only a few feet in front of you, too close for you to stop in time. Your foot slams the brake to the floor and you go into a skid, your car sliding into the side of the other one. You see that the car is full of youngsters, a carpool on the way to preschool—just before the explosion of glass shattering and metal bending into metal. Then, out of the sudden silence after the collision, you hear a chorus of crying. You manage to run to the other car, and see that one of the children is lying motionless. You are flooded with remorse and sadness over this tragedy....

Such heart-wrenching scenarios were used to get volunteers upset in one of Wenzlaff's experiments. The volunteers then tried to keep the scene out of their minds while they jotted notes about the stream of their thoughts for nine minutes. Each time the thought of the disturbing scene intruded into their minds, they made a check mark as they wrote. While most people thought about the upsetting scene less and less as time went on, those volunteers who were more depressed actually showed a pronounced *increase* in intruding thoughts of the

scene as time passed, and even made oblique references to it in the thoughts that were supposed to be distractions from it.

What's more, the depression-prone volunteers used other distressing thoughts to distract themselves. As Wenzlaff told me, "Thoughts are associated in the mind not just by content, but by mood. People have what amounts to a set of bad-mood thoughts that come to mind more readily when they are feeling down. People who get depressed easily tend to create very strong networks of association between these thoughts, so that it is harder to suppress them once some kind of bad mood is evoked. Ironically, depressed people seem to use one depressing topic to get their minds off another, which only stirs more negative emotions."

Crying, one theory holds, may be nature's way of lowering levels of the brain chemicals that prime distress. While crying can sometimes break a spell of sadness, it can also leave the person still obsessing about the reasons for despair. The idea of a "good cry" is misleading: crying that reinforces rumination only prolongs the misery. Distractions break the chain of sadness-maintaining thinking; one of the leading theories of why electroconvulsive therapy is effective for the most severe depressions is that it causes a loss of short-term memory—patients feel better because they can't remember why they were so sad. At any rate, to shake garden-variety sadness, Diane Tice found, many people reported turning to distractions such as reading, TV and movies, video games and puzzles, sleeping, and daydreams such as planning a fantasy vacation. Wenzlaff would add that the most effective distractions are ones that will shift your mood—an exciting sporting event, a funny movie, an uplifting book. (A note of caution here: Some distractors in themselves can perpetuate depression. Studies of heavy TV watchers have found that, after watching TV, they are generally more depressed than before they started!)

Aerobic exercise, Tice found, is one of the more effective tactics for lifting mild depression, as well as other bad moods. But the caveat here is that the mood-lifting benefits of exercise work best for the lazy, those who usually do not work out very much. For those with a daily exercise routine, whatever mood-changing benefits it offers were probably strongest when they first took up the exercise habit. In fact, for habitual exercisers there is a reverse effect on mood: they start to feel bad on those days when they skip their workout. Exercise seems to work well because it changes the physiological state the mood evokes: depression is a low-arousal state, and aerobics pitches the

body into high arousal. By the same token, relaxation techniques, which put the body into a low-arousal state, work well for anxiety, a high-arousal state, but not so well for depression. Each of these approaches seems to work to break the cycle of depression or anxiety because it pitches the brain into a level of activity incompatible with the emotional state that has had it in its grip.

Cheering oneself up through treats and sensual pleasures was another fairly popular antidote to the blues. Common ways people soothed themselves when depressed ranged from taking hot baths or eating favorite foods, to listening to music or having sex. Buying oneself a gift or treat to get out of a bad mood was particularly popular among women, as was shopping in general, even if only window-shopping. Among those in college, Tice found that eating was three times as common a strategy for soothing sadness among women than men; men, on the other hand, were five times as likely to turn to drinking or drugs when they felt down. The trouble with overeating or alcohol as antidotes, of course, is that they can easily backfire: eating to excess brings regret; alcohol is a central nervous system depressant, and so only adds to the effects of depression itself.

A more constructive approach to mood-lifting, Tice reports, is engineering a small triumph or easy success: tackling some long-delayed chore around the house or getting to some other duty they've been wanting to clear up. By the same token, lifts to self-image also were cheering, even if only in the form of getting dressed up or putting on makeup.

One of the most potent—and, outside therapy, little used—antidotes to depression is seeing things differently, or *cognitive refraining*. It is natural to bemoan the end of a relationship and to wallow in self-pitying thoughts such as the conviction that "this means I'll always be alone," but it's sure to thicken the sense of despair. However, stepping back and thinking about the ways the relationship wasn't so great, and ways you and your partner were mismatched—in other words, seeing the loss differently, in a more positive light—is an antidote to the sadness. By the same token, cancer patients, no matter how serious their condition, were in better moods if they were able to bring to mind another patient who was in even worse shape ("I'm not so bad off—at least I can walk"); those who compared themselves to healthy people were the most depressed.[18] Such downward comparisons are surprisingly cheering: suddenly what had seemed quite dispiriting doesn't look all that bad.

Another effective depression-lifter is helping others in need. Since depression feeds on ruminations and preoccupations with the self, helping others lifts us out of those preoccupations as we empathize with people in pain of their own. Throwing oneself into volunteer work—coaching Little League, being a Big Brother, feeding the homeless—was one of the most powerful mood-changers in Tice's study. But it was also one of the rarest.

Finally, at least some people are able to find relief from their melancholy in turning to a transcendent power. Tice told me, "Praying, if you're very religious, works for all moods, especially depression."

REPRESSORS: UPBEAT DENIAL

"He kicked his roommate in the stomach …" the sentence begins. It ends, "… but he meant to turn on the light."

That transformation of an act of aggression into an innocent, if slightly implausible, mistake is repression captured *in vivo*. It was composed by a college student who had volunteered for a study of *repressors*, people who habitually and automatically seem to blot emotional disturbance from their awareness. The beginning fragment "He kicked his roommate in the stomach …" was given to this student as part of a sentence-completion test. Other tests showed that this small act of mental avoidance was part of a larger pattern in his life, a pattern of tuning out most emotional upset.[19] While at first researchers saw repressors as a prime example of the inability to feel emotion—cousins of alexithymics, perhaps—current thinking sees them as quite proficient in regulating emotion. They have become so adept at buffering themselves against negative feelings, it seems, that they are not even aware of the negativity. Rather than calling them repressors, as has been the custom among researchers, a more apt term might be *unflappables*.

Much of this research, done principally by Daniel Weinberger, a psychologist now at Case Western Reserve University, shows that while such people may seem calm and imperturbable, they can sometimes seethe with physiological upsets they are oblivious to. During the sentence-completion test, volunteers were also being monitored for their level of physiological arousal. The repressors' veneer of calm was belied by the agitation of their bodies: when faced

with the sentence about the violent roommate and others like it, they gave all the signs of anxiety, such as a racing heart, sweating, and climbing blood pressure. Yet when asked, they said they felt perfectly calm.

This continual tuning-out of emotions such as anger and anxiety is not uncommon: about one person in six shows the pattern, according to Weinberger. In theory, children might learn to become unflappable in any of several ways. One might be as a strategy for surviving a troubling situation such as having an alcoholic parent in a family where the problem itself is denied. Another might be having a parent or parents who are themselves repressors and so pass on the example of perennial cheerfulness or a stiff upper lip in the face of disturbing feelings. Or the trait may simply be inherited temperament. While no one can say as yet just how such a pattern begins in life, by the time repressors reach adulthood they are cool and collected under duress.

The question remains, of course, as to just how calm and cool they actually are. Can they really be unaware of the physical signs of distressing emotions, or are they simply feigning calm? The answer to that has come from clever research by Richard Davidson, a University of Wisconsin psychologist and an early collaborator with Weinberger. Davidson had people with the unflappable pattern free-associate to a list of words, most neutral, but several with hostile or sexual meanings that stir anxiety in almost everyone. And, as their bodily reactions revealed, they had all the physiological signs of distress in response to the loaded words, even though the words they associated to almost always showed an attempt to sanitize the upsetting words by linking them to an innocent one. If the first word was “hate,” the response might be “love.”

Davidson’s study took advantage of the fact that (in right-handed people) a key center for processing negative emotion is in the right half of the brain, while the center for speaking is in the left. Once the right hemisphere recognizes that a word is upsetting, it transmits that information across the corpus callosum, the great divide between the brain’s halves, to the speech center, and a word is spoken in response. Using an intricate arrangement of lenses, Davidson was able to display a word so that it was seen in only half of the visual field. Because of the neural wiring of the visual system, if the display was to the left half of the visual field, it was recognized first by the right half of the brain, with its sensitivity to distress. If the display was to the right half of the visual field, the signal went to the left side of the brain

without being assessed for upset.

When the words were presented to the right hemisphere, there was a lag in the time it took the unflappables to utter a response—but only if the word they were responding to was one of the upsetting ones. They had *no* time lag in the speed of their associations to *neutral* words. The lag showed up *only* when the words were presented to the right hemisphere, not to the left. In short, their unflappableness seems due to a neural mechanism that slows or interferes with the transfer of upsetting information. The implication is that they are *not* faking their lack of awareness about how upset they are; their brain is keeping that information from them. More precisely, the layer of mellow feeling that covers over such disturbing perceptions may well be due to the workings of the left prefrontal lobe. To his surprise, when Davidson measured activity levels in their prefrontal lobes, they had a decided predominance of activity on the left—the center for good feeling—and less on the right, the center for negativity.

These people "present themselves in a positive light, with an upbeat mood," Davidson told me. "They deny that stress is upsetting them and show a pattern of left frontal activation while just sitting at rest that is associated with positive feelings. This brain activity may be the key to their positive claims, despite the underlying physiological arousal that looks like distress." Davidson's theory is that, in terms of brain activity, it is energy-demanding work to experience distressing realities in a positive light. The increased physiological arousal may be due to the sustained attempt by the neural circuitry to maintain positive feelings or to suppress or inhibit any negative ones.

In short, unflappableness is a kind of upbeat denial, a positive dissociation—and, possibly, a clue to neural mechanisms at play in the more severe dissociative states that can occur in, say, post-traumatic stress disorder. When it is simply involved in equanimity, says Davidson, "it seems to be a successful strategy for emotional self-regulation" though with an unknown cost to self-awareness.

6

The Master Aptitude

> Just once in my life have I been paralyzed by fear. The occasion was a calculus exam during my freshman year in college for which I somehow had managed not to study. I still remember the room I marched to that spring morning with feelings of doom and foreboding heavy in my heart. I had been in that lecture hall for many classes. This morning, though, I noticed nothing through the windows and did not see the hall at all. My gaze shrank to the patch of floor directly in front of me as I made my way to a seat near the door. As I opened the blue cover of my exam book, there was the thump in my ears of heartbeat, there was the taste of anxiety in the pit of my stomach.
>
> I looked at the exam questions once, quickly. Hopeless. For an hour I stared at that page, my mind racing over the consequences I would suffer. The same thoughts repeated themselves over and over, a tape loop of fear and trembling. I sat motionless, like an animal frozen in mid-move by curare. What strikes me most about that dreadful moment was how constricted my mind became. I did not spend the hour in a desperate attempt to patch together some semblance of answers to the test. I did not daydream. I simply sat fixated on my terror, waiting for the ordeal to finish.[1]

That narrative of an ordeal by terror is my own; it is to this day for me the most convincing evidence of the devastating impact of emotional distress on mental clarity. I now see that my ordeal was most likely a testament to the power of the emotional brain to overpower, even paralyze, the thinking brain.

The extent to which emotional upsets can interfere with mental life is no news to teachers. Students who are anxious, angry, or depressed don't learn; people who are caught in these states do not take in information efficiently or deal with it well. As we saw in Chapter 5, powerful negative emotions twist attention toward their own preoccupations, interfering with the attempt to focus elsewhere. Indeed, one of the signs that feelings have veered over the line into the pathological is that they are so intrusive they overwhelm all other thought, continually sabotaging attempts to pay attention to whatever other task is at hand. For the person going through an upsetting divorce—or the child whose parents are—the mind does not stay long

on the comparatively trivial routines of the work or school day; for the clinically depressed, thoughts of self-pity and despair, hopelessness and helplessness, override all others.

When emotions overwhelm concentration, what is being swamped is the mental capacity cognitive scientists call “working memory,” the ability to hold in mind all information relevant to the task at hand. What occupies working memory can be as mundane as the digits that compose a telephone number or as complicated as the intricate plot lines a novelist is trying to weave together. Working memory is an executive function par excellence in mental life, making possible all other intellectual efforts, from speaking a sentence to tackling a knotty logical proposition.[2] The prefrontal cortex executes working memory—and, remember, is where feelings and emotions meet.[3] When the limbic circuitry that converges on the prefrontal cortex is in the thrall of emotional distress, one cost is in the effectiveness of working memory: we can’t think straight, as I discovered during that dread calculus exam.

On the other hand, consider the role of positive motivation—the marshaling of feelings like enthusiasm and confidence to enhance achievement. Studies of Olympic athletes, world-class musicians, and chess grand masters find their unifying trait is the ability to motivate themselves to pursue relentless training routines.[4] And, with a steady rise in the degree of excellence required to be a world-class performer, these rigorous training routines now increasingly must begin in childhood. At the 1992 Olympics, twelve-year-old members of the Chinese diving team had put in as many total lifetime practice dives as had members of the American team in their early twenties—the Chinese divers started their rigorous training at age four. Likewise, the best violin virtuosos of the twentieth century began studying their instrument at around age five; international chess champions started on the game at an average age of seven, while those who rose only to national prominence started at ten. Starting earlier offers a lifetime edge: the top violin students at the best music academy in Berlin, all in their early twenties, had put in ten thousand total hours’ lifetime practice, while the second-tier students averaged around seventy-five hundred hours.

What seems to set apart those at the very top of competitive pursuits from others of roughly equal ability is the degree to which, beginning early in life, they can pursue an arduous practice routine for years and years. And that doggedness depends on emotional traits

—enthusiasm and persistence in the face of setbacks—above all else.

The added payoff for life success from motivation, apart from other innate abilities, can be seen in the remarkable performance of Asian students in American schools and professions. One thorough review of the evidence suggests that Asian-American children may have an average IQ advantage over whites of just two or three points.[5] Yet on the basis of the professions, such as law and medicine, that many Asian-Americans end up in, as a group they behave as though their IQ were much higher—the equivalent of an IQ of 110 for Japanese-Americans and of 120 for Chinese-Americans.[6] The reason seems to be that from the earliest years of school, Asian children work harder than whites. Sanford Dorenbusch, a Stanford sociologist who studied more than ten thousand high-school students, found that Asian-Americans spent 40 percent more time doing homework than did other students. "While most American parents are willing to accept a child's weak areas and emphasize the strengths, for Asians, the attitude is that if you're not doing well, the answer is to study later at night, and if you still don't do well, to get up and study earlier in the morning. They believe that anyone can do well in school with the right effort." In short, a strong cultural work ethic translates into higher motivation, zeal, and persistence—an emotional edge.

To the degree that our emotions get in the way of or enhance our ability to think and plan, to pursue training for a distant goal, to solve problems and the like, they define the limits of our capacity to use our innate mental abilities, and so determine how we do in life. And to the degree to which we are motivated by feelings of enthusiasm and pleasure in what we do—or even by an optimal degree of anxiety—they propel us to accomplishment. It is in this sense that emotional intelligence is a master aptitude, a capacity that profoundly affects all other abilities, either facilitating or interfering with them.

IMPULSE CONTROL: THE MARSHMALLOW TEST

Just imagine you're four years old, and someone makes the following proposal: If you'll wait until after he runs an errand, you can have two marshmallows for a treat. If you can't wait until then, you can have only one—but you can have it right now. It is a challenge sure to try the soul of any four-year-old, a microcosm of the eternal battle between impulse and restraint, id and ego, desire and self-control,

gratification and delay. Which of these choices a child makes is a telling test; it offers a quick reading not just of character, but of the trajectory that child will probably take through life.

There is perhaps no psychological skill more fundamental than resisting impulse. It is the root of all emotional self-control, since all emotions, by their very nature, lead to one or another impulse to act. The root meaning of the word *emotion*, remember, is "to move." The capacity to resist that impulse to act, to squelch the incipient movement, most likely translates at the level of brain function into inhibition of limbic signals to the motor cortex, though such an interpretation must remain speculative for now.

At any rate, a remarkable study in which the marshmallow challenge was posed to four-year-olds shows just how fundamental is the ability to restrain the emotions and so delay impulse. Begun by psychologist Walter Mischel during the 1960s at a preschool on the Stanford University campus and involving mainly children of Stanford faculty, graduate students, and other employees, the study tracked down the four-year-olds as they were graduating from high school.[7]

Some four-year-olds were able to wait what must surely have seemed an endless fifteen to twenty minutes for the experimenter to return. To sustain themselves in their struggle they covered their eyes so they wouldn't have to stare at temptation, or rested their heads in their arms, talked to themselves, sang, played games with their hands and feet, even tried to go to sleep. These plucky preschoolers got the two-marshmallow reward. But others, more impulsive, grabbed the one marshmallow, almost always within seconds of the experimenter's leaving the room on his "errand."

The diagnostic power of how this moment of impulse was handled became clear some twelve to fourteen years later, when these same children were tracked down as adolescents. The emotional and social difference between the grab-the-marshmallow preschoolers and their gratification-delaying peers was dramatic. Those who had resisted temptation at four were now, as adolescents, more socially competent: personally effective, self-assertive, and better able to cope with the frustrations of life. They were less likely to go to pieces, freeze, or regress under stress, or become rattled and disorganized when pressured; they embraced challenges and pursued them instead of giving up even in the face of difficulties; they were self-reliant and confident, trustworthy and dependable; and they took initiative and plunged into projects. And, more than a decade later, they were still

able to delay gratification in pursuit of their goals.

The third or so who grabbed for the marshmallow, however, tended to have fewer of these qualities, and shared instead a relatively more troubled psychological portrait. In adolescence they were more likely to be seen as shying away from social contacts; to be stubborn and indecisive; to be easily upset by frustrations; to think of themselves as "bad" or unworthy; to regress or become immobilized by stress; to be mistrustful and resentful about not "getting enough"; to be prone to jealousy and envy; to overreact to irritations with a sharp temper, so provoking arguments and fights. And, after all those years, they still were unable to put off gratification.

What shows up in a small way early in life blossoms into a wide range of social and emotional competences as life goes on. The capacity to impose a delay on impulse is at the root of a plethora of efforts, from staying on a diet to pursuing a medical degree. Some children, even at four, had mastered the basics: they were able to read the social situation as one where delay was beneficial, to pry their attention from focusing on the temptation at hand, and to distract themselves while maintaining the necessary perseverance toward their goal—the two marshmallows.

Even more surprising, when the tested children were evaluated again as they were finishing high school, those who had waited patiently at four were far superior *as students* to those who had acted on whim. According to their parents' evaluations, they were more academically competent: better able to put their ideas into words, to use and respond to reason, to concentrate, to make plans and follow through on them, and more eager to learn. Most astonishingly, they had dramatically higher scores on their SAT tests. The third of children who at four grabbed for the marshmallow most eagerly had an average verbal score of 524 and quantitative (or "math") score of 528; the third who waited longest had average scores of 610 and 652, respectively—a 210-point difference in total score.[8]

At age four, how children do on this test of delay of gratification is twice as powerful a predictor of what their SAT scores will be as is IQ at age four; IQ becomes a stronger predictor of SAT only after children learn to read.[9] This suggests that the ability to delay gratification contributes powerfully to intellectual potential quite apart from IQ itself. (Poor impulse control in childhood is also a powerful predictor of later delinquency, again more so than IQ.[10]) As we shall see in Part Five, while some argue that IQ cannot be changed

and so represents an unbendable limitation on a child's life potential, there is ample evidence that emotional skills such as impulse control and accurately reading a social situation *can* be learned.

What Walter Mischel, who did the study, describes with the rather infelicitous phrase "goal-directed self-imposed delay of gratification" is perhaps the essence of emotional self-regulation: the ability to deny impulse in the service of a goal, whether it be building a business, solving an algebraic equation, or pursuing the Stanley Cup. His finding underscores the role of emotional intelligence as a meta-ability, determining how well or how poorly people are able to use their other mental capacities.

FOUL MOODS, FOULED THINKING

> I worry about my son. He just started playing on the varsity football team, so he's bound to get an injury sometime. It's so nerve-wracking to watch him play that I've stopped going to his games. I'm sure my son must be disappointed that I'm not watching him play, but it's simply too much for me to take.

The speaker is in therapy for anxiety; she realizes that her worry is interfering with leading the kind of life she would like.[11] But when it comes time to make a simple decision, such as whether to watch her son play football, her mind floods with thoughts of disaster. She is not free to choose; her worries overwhelm her reason.

As we have seen, worry is the nub of anxiety's damaging effect on mental performance of all kind. Worry, of course, is in one sense a useful response gone awry—an overly zealous mental preparation for an anticipated threat. But such mental rehearsal is disastrous cognitive static when it becomes trapped in a stale routine that captures attention, intruding on all other attempts to focus elsewhere.

Anxiety undermines the intellect. In a complex, intellectually demanding, and high-pressure task such as that of air traffic controllers, for example, having chronically high anxiety is an almost sure predictor that a person will eventually fail in training or in the field. The anxious are more likely to fail even given superior scores on intelligence tests, as a study of 1,790 students in training for air traffic control posts discovered.[12] Anxiety also sabotages academic performance of all kinds: 126 different studies of more than 36,000 people found that the more prone to worries a person is, the poorer

their academic performance, no matter how measured—grades on tests, grade-point average, or achievement tests.[13]

When people who are prone to worry are asked to perform a cognitive task such as sorting ambiguous objects into one of two categories, and narrate what is going through their mind as they do so, it is the negative thoughts—"I won't be able to do this," "I'm just no good at this kind of test," and the like—that are found to most directly disrupt their decision-making. Indeed, when a comparison group of nonworriers was asked to worry on purpose for fifteen minutes, their ability to do the same task deteriorated sharply. And when the worriers were given a fifteen-minute relaxation session—which reduced their level of worrying—before trying the task, they had no problem with it.[14]

Test anxiety was first studied scientifically in the 1960s by Richard Alpert, who confessed to me that his interest was piqued because as a student his nerves often made him do poorly on tests, while his colleague, Ralph Haber, found that the pressure before an exam actually helped him to do better.[15] Their research, among other studies, showed that there are two kinds of anxious students: those whose anxiety undoes their academic performance, and those who are able to do well despite the stress—or, perhaps, because of it.[16] The irony of test anxiety is that the very apprehension about doing well on the test that, ideally, can motivate students like Haber to study hard in preparation and so do well can sabotage success in others. For people who are too anxious, like Alpert, the pretest apprehension interferes with the clear thinking and memory necessary to study effectively, while during the test it disrupts the mental clarity essential for doing well.

The number of worries that people report while taking a test directly predicts how poorly they will do on it.[17] The mental resources expended on one cognitive task—the worrying—simply detract from the resources available for processing other information; if we are preoccupied by worries that we're going to flunk the test we're taking, we have that much less attention to expend on figuring out the answers. Our worries become self-fulfilling prophecies, propelling us toward the very disaster they predict.

People who are adept at harnessing their emotions, on the other hand, can use anticipatory anxiety—about an upcoming speech or test, say—to motivate themselves to prepare well for it, thereby doing well. The classical literature in psychology describes the relationship

between anxiety and performance, including mental performance, in terms of an upside-down U. At the peak of the inverted U is the optimal relationship between anxiety and performance, with a modicum of nerves propelling outstanding achievement. But too little anxiety—the first side of the U—brings about apathy or too little motivation to try hard enough to do well, while too much anxiety—the other side of the U—sabotages any attempt to do well.

A mildly elated state—*hypomania*, as it is technically called—seems optimal for writers and others in creative callings that demand fluidity and imaginative diversity of thought; it is somewhere toward the peak of that inverted U. But let that euphoria get out of control to become outright mania, as in the mood swings of manic-depressives, and the agitation undermines the ability to think cohesively enough to write well, even though ideas flow freely—indeed, much too freely to pursue any one of them far enough to produce a finished product.

Good moods, while they last, enhance the ability to think flexibly and with more complexity, thus making it easier to find solutions to problems, whether intellectual or interpersonal. This suggests that one way to help someone think through a problem is to tell them a joke. Laughing, like elation, seems to help people think more broadly and associate more freely, noticing relationships that might have eluded them otherwise—a mental skill important not just in creativity, but in recognizing complex relationships and foreseeing the consequences of a given decision.

The intellectual benefits of a good laugh are most striking when it comes to solving a problem that demands a creative solution. One study found that people who had just watched a video of television bloopers were better at solving a puzzle long used by psychologists to test creative thinking.[18] In the test people are given a candle, matches, and a box of tacks and asked to attach the candle to a corkboard wall so it will burn without dripping wax on the floor. Most people given this problem fall into "functional fixedness," thinking about using the objects in the most conventional ways. But those who had just watched the funny film, compared to others who had watched a film on math or who exercised, were more likely to see an alternative use for the box holding the tacks, and so come up with the creative solution: tack the box to the wall and use it as a candleholder.

Even mild mood changes can sway thinking. In making plans or decisions people in good moods have a perceptual bias that leads them to be more expansive and positive in their thinking. This is

partly because memory is state-specific, so that while in a good mood we remember more positive events; as we think over the pros and cons of a course of action while feeling pleasant, memory biases our weighing of evidence in a positive direction, making us more likely to do something slightly adventurous or risky, for example.

By the same token, being in a foul mood biases memory in a negative direction, making us more likely to contract into a fearful, overly cautious decision. Emotions out of control impede the intellect. But, as we saw in Chapter 5, we can bring out-of-control emotions back into line; this emotional competence is the master aptitude, facilitating all other kinds of intelligence. Consider some cases in point: the benefits of hope and optimism, and those soaring moments when people outdo themselves.

PANDORA'S BOX AND POLLYANNA: THE POWER OF POSITIVE THINKING

College students were posed the following hypothetical situation:

> Although you set your goal of getting a B, when your first exam score, worth 30% of your final grade is returned, you have received a D. It is now one week after you have learned about the D grade. What do you do?[19]

Hope made all the difference. The response by students with high levels of hope was to work harder and think of a range of things they might try that could bolster their final grade. Students with moderate levels of hope thought of several ways they might up their grade, but had far less determination to pursue them. And, understandably, students with low levels of hope gave up on both counts, demoralized.

The question is not just theoretical, however. When C. R. Snyder, the University of Kansas psychologist who did this study, compared the actual academic achievement of freshman students high and low on hope, he discovered that hope was a better predictor of their first-semester grades than were their scores on the SAT, a test supposedly able to predict how students will fare in college (and highly correlated with IQ). Again, given roughly the same range of intellectual abilities, emotional aptitudes make the critical difference.

Snyder's explanation: "Students with high hope set themselves higher goals and know how to work hard to attain them. When you

compare students of equivalent intellectual aptitude on their academic achievements, what sets them apart is hope."[20]

As the familiar legend has it, Pandora, a princess of ancient Greece, was given a gift, a mysterious box, by gods jealous of her beauty. She was told she must never open the gift. But one day, overcome by curiosity and temptation, Pandora lifted the lid to peek in, letting loose in the world the grand afflictions—disease, malaise, madness. But a compassionate god let her close the box just in time to capture the one antidote that makes life's misery bearable: hope.

Hope, modern researchers are finding, does more than offer a bit of solace amid affliction; it plays a surprisingly potent role in life, offering an advantage in realms as diverse as school achievement and bearing up in onerous jobs. Hope, in a technical sense, is more than the sunny view that everything will turn out all right. Snyder defines it with more specificity as "believing you have both the will and the way to accomplish your goals, whatever they may be."

People tend to differ in the general degree to which they have hope in this sense. Some typically think of themselves as able to get out of a jam or find ways to solve problems, while others simply do not see themselves as having the energy, ability, or means to accomplish their goals. People with high levels of hope, Snyder finds, share certain traits, among them being able to motivate themselves, feeling resourceful enough to find ways to accomplish their objectives, reassuring themselves when in a tight spot that things will get better, being flexible enough to find different ways to get to their goals or to switch goals if one becomes impossible, and having the sense to break down a formidable task into smaller, manageable pieces.

From the perspective of emotional intelligence, having hope means that one will not give in to overwhelming anxiety, a defeatist attitude, or depression in the face of difficult challenges or setbacks. Indeed, people who are hopeful evidence less depression than others as they maneuver through life in pursuit of their goals, are less anxious in general, and have fewer emotional distresses.

OPTIMISM: THE GREAT MOTIVATOR

Americans who follow swimming had high hopes for Matt Biondi, a member of the U.S. Olympic Team in 1988. Some sportswriters were touting Biondi as likely to match Mark Spitz's 1972 feat of taking

seven gold medals. But Biondi finished a heartbreaking third in his first event, the 200-meter freestyle. In his next event, the 100-meter butterfly, Biondi was inched out for the gold by another swimmer who made a greater effort in the last meter.

Sportscasters speculated that the defeats would dispirit Biondi in his successive events. But Biondi rebounded from defeat and took a gold medal in his next five events. One viewer who was not surprised by Biondi's comeback was Martin Seligman, a psychologist at the University of Pennsylvania, who had tested Biondi for optimism earlier that year. In an experiment done with Seligman, the swimming coach told Biondi during a special event meant to showcase Biondi's best performance that he had a worse time than was actually the case. Despite the downbeat feedback, when Biondi was asked to rest and try again, his performance—actually already very good—was even better. But when other team members who were given a false bad time—and whose test scores showed they were pessimistic—tried again, they did even worse the second time.[21]

Optimism, like hope, means having a strong expectation that, in general, things will turn out all right in life, despite setbacks and frustrations. From the standpoint of emotional intelligence, optimism is an attitude that buffers people against falling into apathy, hopelessness, or depression in the face of tough going. And, as with hope, its near cousin, optimism pays dividends in life (providing, of course, it is a realistic optimism; a too-naive optimism can be disastrous).[22]

Seligman defines optimism in terms of how people explain to themselves their successes and failures. People who are optimistic see a failure as due to something that can be changed so that they can succeed next time around, while pessimists take the blame for failure, ascribing it to some lasting characteristic they are helpless to change. These differing explanations have profound implications for how people respond to life. For example, in reaction to a disappointment such as being turned down for a job, optimists tend to respond actively and hopefully, by formulating a plan of action, say, or seeking out help and advice; they see the setback as something that can be remedied. Pessimists, by contrast, react to such setbacks by assuming there is nothing they can do to make things go better the next time, and so do nothing about the problem; they see the setback as due to some personal deficit that will always plague them.

As with hope, optimism predicts academic success. In a study of five

office immediately.

Apart from the hurtfulness of the oncologist's coldness, did it matter medically that he would not deal with his patient's constant sadness? By the time a disease has become so virulent, it would be unlikely that any emotion would have an appreciable effect on its progress. While the woman's depression most certainly dimmed the quality of her final months, the medical evidence that melancholy might affect the course of cancer is as yet mixed.[29] But cancer aside, a smattering of studies suggest a role for depression in many other medical conditions, especially in worsening a sickness once it has begun. The evidence is mounting that for patients with serious disease who are depressed, it would pay medically to treat their depression too.

One complication in treating depression in medical patients is that its symptoms, including loss of appetite and lethargy, are easily mistaken for signs of other diseases, particularly by physicians with little training in psychiatric diagnosis. That inability to diagnose depression may itself add to the problem, since it means that a patient's depression—like that of the weepy breast-cancer patient—goes unnoticed and untreated. And that failure to diagnose and treat may add to the risk of death in severe disease.

For instance, of 100 patients who received bone marrow transplants, 12 of the 13 who had been depressed died within the first year of the transplant, while 34 of the remaining 87 were still alive two years later.[30] And in patients with chronic kidney failure who were receiving dialysis, those who were diagnosed with major depression were most likely to die within the following two years; depression was a stronger predictor of death than any medical sign.[31] Here the route connecting emotion to medical status was not biological but attitudinal: The depressed patients were much worse about complying with their medical regimens—cheating on their diets, for example, which put them at higher risk.

Heart disease too seems to be exacerbated by depression. In a study of 2,832 middle-aged men and women tracked for twelve years, those who felt a sense of nagging despair and hopelessness had a heightened rate of death from heart disease.[32] And for the 3 percent or so who were most severely depressed, the death rate from heart disease, compared to the rate for those with no feelings of depression, was four times greater.

Depression seems to pose a particularly grave medical risk for heart