Changing Minds

The Art and Science of Changing Our Own and Other People’s Minds

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Chapter 2

The Forms of the Mind

A Meeting that Changed My Mind

When I was a graduate student in psychology at Harvard in the late 1960's, behaviorism was still prevalent (Professor B F Skinner's office in William James Hall was a few floors below mine – somewhat more spacious, to be sure), but the cognitive approach was on the rise. As a “Young Turk,” I found myself sympathetic to the newly minded cognitive approach, favored by one of my mentors, Professor Jerome Bruner. Yet, one property characterized both of these warring camps: a lack of interest in the brain and the nervous system. Neither camp actually denied the importance of the brain; that would have been downright foolish. But the behaviorists were interested in modifying behavior; they felt that all-important goal could be accomplished by precisely calibrated manipulation of the environment. The remaining “black box” was to be left un-opened. For their part, cognitivists sought to explicate how various mental operations were represented and carried out. They believed that these operations could be analyzed in their own terms: It simply did not matter whether an operation like computing an 80/20 ratio happened to be carried out via paper and pencil, by a mainframe computer (the personal computer did not yet exist), or within a chunk of nervous tissue situated between the two ears.

Though I had enjoyed biology as an undergraduate, had considered attending medical school, and had audited a course on human physiology, I shared this psychologists’ prejudice; during graduate study, I rarely took the brain seriously. I had already embarked on an idiosyncratic research career – trying to understand the development of human cognitive capacities, with a particular focus on artistic skills and understandings (the arts were the idiosyncratic part). My ultimate (admittedly grand) goal was to unravel the mysteries of artistic creation. As far as I was concerned, there was little reason to become interested in the neurons and synapses that, at a microscopic level, were surely accomplishing cognitive feats like composing a melody or recognizing an artistic style. (At the time, no one I knew was thinking much about the genes that give rise to everything.)

One of the principal assertions of this book is that, after the early years, minds rarely change quickly. But I can pinpoint one major change of one mind – my own! – that coalesced one afternoon in the fall of 1969. As a graduate student, I had begun two years earlier to work at Harvard Project Zero. Founded by the eminent philosopher Nelson Goodman, Project Zero was a basic research group that was investigating human artistry and arts education.
Goodman and I had become intrigued by a finding that was just beginning to enter public consciousness: despite their mirror appearance, the two halves of the brain carry out distinct mental activities. Moreover, a principal difference between the left and the right hemispheres apparently mapped directly on a distinction that was occupying Goodman and me: the possibility that there exists two fundamentally different kinds of symbols and symbol systems. Brain research suggested that the left hemisphere deals with digital types of symbols – like numbers and words – while the right hemisphere deals with more holistic or analog types of symbols – like those embodied in painting, sculpture, dance, and other artistic realms.¹

It so happened that neurologist Norman Geschwind, a leading researcher in this field, taught at the Harvard Medical School across the Charles River and so we invited him to come and speak to our little group one afternoon. As audience members, we were mesmerized.

Geschwind spoke about the startling cognitive profiles that one sees from time to time in a neurological clinic: patients who can write words and name objects but lose the ability to read words (though they can still read numbers); patients who cannot remember ever having visited a setting but can still find their way with ease around that apparently unfamiliar setting; hearing patients who cannot understand what is being said but can speak fluently and can appreciate music. And he described for us the remarkable findings about the cortical representations of different abilities in the brains of normal people, the left-handed, and occasional geniuses or “freaks” of various sorts. Geschwind also mentioned certain artists who had become aphasic; for example, the composer Maurice Ravel, who lost the ability to speak or compose but could still perform certain of his own pieces and also point out flaws in the performances of others. He spoke of the French artist Andre Dérain, whose painting had been seriously compromised by brain damage; as well as of other visual artists whose work had remained competent, or even improved (or so it was said), following the loss of language.²

Though it was supposed to last only two hours, the meeting continued over dinner and until late in the evening. By the time this marathon encounter with Geschwind had concluded, I had experienced a change of mind that amounted to a pivotal career decision. I was going to seek postdoctoral funds to work on a neurological unit with Geschwind and his associates. At the very least, I would have the opportunity to interact with a fascinating mind and personality and learn about the human brain. At best, I would acquire an entirely new set of biological and clinical perspectives from which to examine issues of cognition and artistry.

Though postdoctoral study seemed a reasonable possibility, I had no idea at the time that I would end up spending two decades working at the Aphasia Research Center of the Boston Veterans Administration Medical Center and the Boston University School of Medicine (where I still hold an appointment). I learned a great deal about the operation of the brain (I used to quip that I would make a credible neurologist “from the neck up”), the ways in which various human abilities are represented in the “normal brain”, and how they are compromised by various forms of pathology. At the same time, I also continued my work in developmental psychology, coming to know children of different ages and talents, studying their developing mental abilities, even teaching in the public schools and giving private piano lessons.

With the benefit of the hindsight that has led me to write this book, I now realize that such “lightning changes of mind,” as I felt I’d experienced after Geschwind’s talk, do not occur like a thunderbolt – no matter how much they may feel that way. After all, I had a long-standing interest in biology. I loved to learn new things and had been thinking about what kind of a postdoctoral fellowship might rescue me from embarking on a standard teaching trajectory that held little appeal. I have always been attracted to scintillating thinkers – and Geschwind was one of a kind.

But here’s the most important reason for my own mind-changing experience: I had become stymied in pursuing my own research agenda. (Indeed, a feeling of “hitting a dead end” often primes one for a change of mind.) I felt that I needed to understand how skills are organized in the extremely fluent mature artist. But I’d found out two disturbing things: (1) such exquisitely developed abilities proved extremely difficult to dissect, and (2) the most creative artists do not welcome probing by a psychological researcher who is still wet behind the ears. Through his delineation of how fluent skills break down under various forms of brain damage, Geschwind presented a “royal road” to the elucidation of artistic skills. Thus, while the decision to work with Geschwind erupted almost instantly into consciousness, this “change of mind” had long been in the works in the subterranean recesses of my mind.

In terms of the seven factors or levers of mind change, I could see at work several factors that induced me to take the study of the brain much more seriously. There was reason: this novel scientific perspective could answer
questions in which I was interested. There was relevant research: Neurological findings were enriching our understanding of numerous facets of the human mind. There were real world factors: brain research was becoming much more important (and much better funded, the resources were ample!). There was resonance: working with Geschwind on issues about the mind felt right to me, and I identified with this respected, luminous role model. Perhaps most important, the resistances did not amount to much. While studying neurology seemed like a detour to my more career-minded peers, I did not much want to enter the ranks of the professoriat at this point in my life.

But I indulge in this autobiographical reflection for one more reason. When I began my research in psychology almost forty years ago, I had no scholarly interest in the issues of human intelligence. Like most individuals raised in the Western intellectual and pedagogical tradition, I assumed that there was a single kind of intelligence, that it developed (or emerged) over the course of childhood, and that it could be compromised by senescence or trauma. Exposure to Geschwind’s line of thinking, in conjunction with my own studies of children, gradually undermined my belief in this orthodoxy. If intellect were truly of a piece, did it really make sense that one kind of brain damage would impair faculty A, while a second or third kind of damage would impair faculties B or C (leaving faculty A intact)? And if intellect were of a piece, how could one explain the child who is prodigious in one area, yet perfectly ordinary in another? Or the occasional savant or autistic child who displays a stunning island of preserved expertise surrounded by a sea of grossly abnormal performances? Without being conscious of it, I was beginning to think about the idea of multiple intelligences. To borrow the imagery of Nicholson Baker: A Geschwindian breakthrough moment – like a tossing of the shoe out the window – was masking a more gradual change in intellectual allegiance – like loss of ardor for a contemplated exotic seating arrangement in an apartment.

All of this raises the issue of forms of thought – in particular, the question: When a mind change occurs, how is that shift expressed in the unique languages of the mind?

THE FORMS OF THOUGHT: MULTIPLE INTELLIGENCES

One position in psychology holds that there is just a single language of the mind – this language even has a name, mentalese. Proponents of mentalese believe that all thought, all mental computation, takes place in this singular language, which is somewhat like natural language. Were this characterization correct, all of our thinking would take place in a format that is, roughly speaking, like the language being used here. To put this in the terms of science fiction: if we could somehow spy on how thought occurs in the brain, we’d find neurons chatting with one another in a language like English, French, or Swahili.

The most obvious challenge to the mentalese hypothesis comes from the existence of imagery, particularly visual imagery. Most of us report a generous supply of visual mental imagery, and many of us, including such estimable thinkers as Albert Einstein, report that vital thinking occurs in imagery: in Einstein’s phrase, “of the visual, muscular, and body type.” I happen to lack visual imagery but compensate by having considerable auditory imagery. To be sure, I am not quite up to the level of the late pianist Arthur Rubinstein, who reportedly could listen to a gramophone record in his imagination and even hear the periodic scratches! But I have little trouble conjuring up a tune or even a rather full orchestral sound in my own mind. If you are capable of mental imagery, you probably spied those neurons in conversation at the end of the preceding paragraph.

Defenders of the mentalese theory do not deny the existence of imagery: indeed, they would sound foolish if they were to deny the evidence of their own introspections, not to say the introspections of the rest of humanity. Their response is to claim that these images exist but are epiphenomenal – they do not really entail thinking; at most they are the outer garb that cloaks an underlying singular mentalistic thought process. It may well be that certain problems that appear to be solved through imagery in fact rely on underlying logical operations. But as an individual with a deep involvement in the arts, I cannot take this “imagery as epiphenomenon” position seriously. To claim that Wolfgang Amadeus Mozart with his 626 Koechel-listed compositions, Martha Graham with her dozens of dances, or Pablo Picasso with his thousands of paintings and drawings are carrying out the same set of logical operations as a physicist or mathematician strains credulity. And if a defender of mentalese were to claim that, “well, these artists aren’t really thinking,” I would rejoin that this philistine had no understanding of the artistic process.
If mentalese is not the answer, then what are the forms of thought? One clue is to think in terms of the various sensory modalities. Indeed, we take in information through our eyes, our ears, our hands, our nostrils, our mouths, and speaking loosely, we can speak of visual or tactile or gustatory information. However, I believe that actual thinking takes place in a number of different formats that rely “for delivery” on the sensory organs but that transcend the specific in important ways.

How did this idea come about for me? And how did this – a new set of concepts, and, ultimately, a new theory – affect how I now perceive changes of mind? My extraordinary first encounter with Geschwind, a subsequent three-year postdoctoral fellowship with him and his colleagues, and the ensuing years of research gradually undermined my belief in a singular view of the mind, cognition, human intelligence. In a line of analysis carried out chiefly in the late 1970s and early 1980s, I developed a perspective called the theory of multiple intelligences. The theory was in effect a critique of the standard “bell curve” view of intelligence, which asserts the following:

1. Intelligence is a single entity.
2. People are born with a certain amount of intelligence.
3. It is difficult to alter the amount of our intelligence – it’s “in our genes” so to speak.
4. Psychologists can tell you how smart you are by administering IQ tests or similar kinds of instruments.

For a number of reasons, this account was no longer convincing to me. I had studied various kinds of individuals, under varying conditions; I had also taught individuals ranging from kindergarten to college, in subjects ranging from anthropology to piano. Spurning an excessive dependence on psychometric instruments, I instead developed a view of intelligence that was deliberately multidisciplinary. I considered evidence from anthropology – which abilities have been valued and fostered in various cultures during various eras; evolution – how traits have evolved over the millennia in different species; and the study of “individual differences” – particularly evidence from unusual populations such as autistic individuals, prodigies, and youngsters with specific learning disabilities. Perhaps most crucially, I collated evidence from brain study; what we know about the development and breakdown of the brain and the ways in which different regions of the cortex effect different mental computations.

As a result of this interdisciplinary investigation, I arrived at a definition of intelligence and a provisional list of intelligences. I define an intelligence as a biopsychological potential to process specific forms of information in certain kinds of ways. Human beings have evolved diverse information-processing capacities – I term these “intelligences” – that allow them to solve problems or to fashion products. To be considered “intelligent,” these products and solutions must be valued in at least one culture or community.

The last assertion of “being valued” is important. Rather than claiming that intelligence is the same in all times and places, I recognize that human beings value different skills and capacities at various times and under varying circumstances. Indeed inventions like the printing press or the computer can alter, quite radically, the abilities that are deemed of importance (or no longer of importance) in a culture. And so individuals are not equally “smart” or “dumb” under all circumstances; rather they have different intelligences that may be variously cherished or disregarded under different circumstances. In terms of the argument put forth here, each intelligence represents a distinct form of mental representation.

So much for formal definitions. Informally, we can think of each person – or his mind/brain – as a set of computers. When the computer is fed information in a proper format, it does its work, and that work is the exercising of a particular intelligence.

How are multiple intelligences relevant to mind changing? On the most basic level, a change of mind involves a change of mental representation. If I change your idea of intelligence, I am altering the images, concepts, and theories by which you were accustomed to thinking of intelligence. Accordingly, the more of an individual’s intelligences you can appeal to when making an argument, the more likely you are to change a person’s mind, and the more minds you are likely to change.

Though I wasn’t aware of it at the time, by developing the concept of multiple intelligences, I was engaged in the most ambitious form of mind changing that I have ever undertaken. In a word, I was trying to change the mind of my fellow psychologists – and, ultimately, of members of the general public – about the nature of intelligence. I was arguing that (1) intelligence is pluralistic; it includes fashioning products as well as solving problems, and (2) it is defined neither on an a priori basis, nor on test performances, but rather
on the basis of what happens to be valued at a particular historical time in a particular cultural context. While I am pleased that my theory has had some impact, I can also say that I have assembled a massive amount of data about how difficult it is to change people’s minds about what intelligence is (a concept), how it operates (a theory), and how to assess it (a skill). I could even tell you stories about the multiple resistances to mind changing!

Having provided some background, I’m now ready to unveil the intelligence. Those who have read my previous works will, of course, already be familiar with the various intelligences and with the various evolutionary, neurological, psychological, and anthropological criteria by which I identified and confirmed candidate intelligences. But for those who are not, I’ll list them briefly here along with examples of how each is employed in a particular realm – that of business. I should add that instances can be drawn from the whole gamut of human pursuits.

The Intelligences of the Symbol Analyst
When I tick off the intelligences, I typically begin with two intelligences alluded to above: linguistic and logical-mathematical. These intelligences are particularly important for learning in the kinds of schools that we have today – ones that feature listening to lectures, reading, writing, and calculating – and they are crucial for success on those tests that purport to assess human intellect and cognitive potential – tests that ask us to complete analogies or pick the right solution to an algebraic problem from a set of four equations.

LINGUISTIC INTELLIGENCE

Broadly speaking, linguistic intelligence entails facility in the use of spoken and written language. As with all of the intelligences, there are several “subtypes,” or varieties, of linguistic intelligence: the intelligence of the individual who is good at learning foreign languages, for example, or the intelligence of the skilled writer, who succeeds in conveying complex ideas in appropriately crafted prose. Within the world of business, two facets of linguistic intelligence are at a premium. One is found in the conversationalist who is able to secure useful information by skilled questioning and discussion with others; the other in the rhetorician who is able to convince others of a course of action through the use of stories, speeches, or exhortations. When an amalgam of linguistic abilities is combined in the same individual, one beholds a person who is likely to succeed in several avenues of business – perhaps “without even trying.”

LOGICAL-MATHEMATICAL INTELLIGENCE

Consider now the complementary intelligence, logical-mathematical. As the name implies, this form of intelligence breaks down readily into two classes of capacities. Clearly, logical intelligence is crucial for any manager whose responsibility includes determining what has happened, and what may happen, under various scenarios. (When circumstances are nebulous, perhaps one needs to revert to “modal” or “fuzzy logic” – or to 80/20 style estimates!) Related but separable is the capacity to move comfortably in the world of numbers: to calculate financial or monetary considerations, to estimate profit or losses, to decide how best to invest an unexpected windfall, and so on.

Certain businessmen have stood out in terms of their logical or logical-mathematical capacities. Consider two well-known examples from the automobile industry. Alfred P. Sloan took over a sprawling but limp General Motors in the early 1920s and was instrumental in making it the most successful corporation in the world. His “logical” feat? He created an organization with precise lines of authority throughout its extensive operations, coordinated various branches of the operation, and yet allowed each division to retain the operational efficiencies of its earlier incarnation.

A generation later, in the 1950s, Robert McNamara assembled at Ford Motor Company a group of “whiz kids”; this team created a management system and an array of products that allowed Ford to recapture a large share of the U.S. automobile market. McNamara’s triumph involved a powerful combination of logical analysis and numerical computation. Consistent with the “general intelligence” perspective critiqued above, it was assumed that McNamara’s genius would translate readily into the operation of another huge bureaucracy that needed to be rationalized and mobilized – the U.S. Department of Defense.
As secretary of defense under Presidents Kennedy and Johnson, McNamara did indeed succeed in streamlining and regulating a massive organization. However, his logical-mathematical genius proved ill-matched to the quite different cultural, historical, and strategic issues posed by the emerging war in Indochina. (Journalist David Halberstam characterized this mentality in ironic fashion when he entitled his study of the McNamara crowd “The Best and the Brightest.”) To his credit, McNamara gradually changed his mind about this “IQ” approach to foreign policy; he has spent much of his time in recent years attempting to atone for the “logical-mathematical” hubris displayed by him and his colleagues during the early, “buildup” years of the Vietnam War.

I draw the following lesson. Even when one focuses simply on these two intelligences (the “bell curve” amalgam) that have been widely recognized as such, one can identify a plethora of more specialized capacities. No doubt a few individuals stand out as both linguistic and logical-mathematical geniuses – such as J. Robert Oppenheimer, the physicist who led the Manhattan Project during World War II, or John Maynard Keynes, the brilliant economist and essayist. But it is far more common for an individual to be relatively stronger in language (the prototypical poet or orator) or in mathematical (the skilled hedge fund manager) or in logical (the expert planner) skills. The story comes to mind of the woman stationed at the “12 Items or Less” checkout counter at the Star Market in Cambridge, Massachusetts. Noting that a student is trying to slip by with dozens of products, she quips, “So, is it that you go to MIT and you can’t read – or that you go to Harvard and you can’t count?”

There would have been little point in embarking on a theory of multiple intelligences simply to peer more closely at the already acknowledged intelligences. The challenge – and the fun – of theorizing about multiple intelligences has been the identification of relatively neglected intelligences – in our terms, other forms of mental representation.

“Noncanonical” Intelligences
I believe that human beings possess at least six or seven other identifiable intelligences; that is, a half-dozen or more additional forms of mental representation. Like linguistic and logical-mathematical intelligence, each can also be broken down into subtypes. Not surprisingly, certain of the “noncanonical” intelligences prove more relevant than others in the realms of business. Yet each deserves at least a moment in the cognitive limelight.

**MUSICAL INTELLIGENCE**

_Musical Intelligence_ – facility in the perception and production of music – is in many ways analogous to linguistic intelligence. Among the identifiable subtypes are the appreciation of melody and harmony; sensitivity to rhythm; the ability to recognize variations in timbre and tonality; and, speaking more holistically, the capacity to apprehend the structure of works of music (ranging from the loose interplay characteristic of jazz riffs to the highly specified architectonics of the classical sonata form). Of course individuals involved in the worlds of art and entertainment give pride of place to musical (and, so to speak, other artistic) intelligences. It is less frequently appreciated that musical intelligence figures prominently in almost any kind of public presentation, ranging from television commercials to full-length movies to organized conferences, athletic events, and religious services.

Elements of musical craft underlie many productions that ostensibly foreground other symbol systems. I write books, using words and occasional graphic images, but the way in which I assemble these linguistic and graphic forms draws on principles of organization that, at least in my case, have their apparent origin in musical structure. Perhaps that is because music is the least overtly semantic of the major symbol systems: It does not convey discrete meanings. Instead music deals, on the one hand, in the pure architectonics (or syntax) of organization and presents, on the other, the forms and shapes of our feeling life. As the nineteenth-century British essayist Walter Pater memorably put it, “all art constantly aspires to the condition of music.”

Recently, in collaboration with Rosamund Stone Zander, conductor Benjamin Zander has pointed out an intriguing affinity between business and music. In his view, the management and motivation of a large organization draws on principles involved in presiding over a symphony orchestra. We should remain alert to the musicality inherent in effective business planning, organization, and communication.
SPATIAL INTELLIGENCE

A fourth form of mental representation is spatial intelligence: the capacity to form spatial representations or images in one’s mind, and to operate upon them variously. One species of spatial intelligence involves wide spaces – the operations needed by the airplane pilot, the rocket scientist, the sailor. A complementary form involves more circumscribed spaces – the operations deployed by the chess player, the sculptor, the painter, the designer of tools, toys, or television sets. As with musical intelligence, the appreciation of spatial relations may also come into play at a metaphoric level; many individuals who create performances or products conceive of and work on their chosen entities in a spatial format.

Indeed, each form of intelligence can be brought to bear on a variety of materials. One can approach almost any kind of content by “spatializing it.” Thus one can think of a play, a song, a sales plan, a management chart as embodied in spatial (or graphic) form; further, one can create a spatialized set of marks to designate the aforementioned play, song, or plan. (I think, for example, of my colleagues in psychology who map out an experiment as if it were a new geological terrain.) Once one has created a spatial representation of an entity – say, an organizational chart that portrays the lines of authority that govern two recently merged companies – it is possible for the creator (as well as others) to work on this new representation, transform it, and confer on its various meanings. One now has a “semantics” captured in spatial format.

With respect to the world of business, we can observe spatial intelligence at work both literally and by extension. To begin with, we can identify those individuals involved in occupations that directly treat the spatial world – for instance, aerospace, architecture, design, perhaps cyberspace as well. In addition, we can identify aspects of planning or creation that employ the principles of spatial organization in realms that – strictly (and metaphorically!) speaking – seem remote from the spatial firmament. While some planners “think” in logical analysis or musical forms, the majority may well attempt to express (i.e., make public to themselves and/or to others) the content of their mental representations in tangible spatial forms. The “Mac” (as opposed to the “PC”) mind, a mind that focuses on the illustrations (as opposed to the text) in the Scientific American, reveals its preference for spatial forms of representation.

BODILY-KINESTHETIC INTELLIGENCE

In some ways analogous to spatial intelligence is bodily-kinesthetic intelligence: the capacity to solve problems or to create products using your whole body, or parts of your body, like your hand or your mouth. There is little doubt that this form of intelligence was crucial in human prehistory, where it has sometimes been described as “tool” or “technological” intelligence. To survive as hunters, fishermen, gatherers, or farmers, to be able to make clothing, build shelters, prepare food, and defend themselves against enemies, our predecessors relied on skilled use of body.

One should distinguish two varieties of bodily-kinestic intelligence. There are artisans, craftsmen, artists, surgeons, and athletes who still depend directly on their bodies in order to carry out their work. In complementary fashion, there are those who make use of bodily imagery and metaphors in their conceptualization of sundry topics. The ranks of entrepreneurs and salespeople are filled with individuals who were at one time competitive athletes. Noted basketball player and former U.S. Senator Bill Bradley has reportedly said, “If I spend an hour playing basketball with a person, I know all I need to know about him.” Corporations analogize themselves to athletic teams; they conceptualize their relations to one another, and to rivals, in terms borrowed from the basketball court or the soccer field. Their innovations – for example, the intuitive uses of a computer “mouse” or the paraphernalia of virtual reality – may draw heavily on bodily imagery. Nor is bodily intelligence absent from frankly intellectual pursuits. As mentioned earlier, no less an authority than Albert Einstein denied that his thinking proceeded in words: instead, he claimed, “the psychical entities which seem to serve as elements in thought are certain signs and more or less clear images which can be voluntarily reproduced and combined…. the above mentioned elements are, in my case, of visual and some of muscular type.”

Strictly speaking, every intelligence entails the development of skills. However, just as we think about language when it comes to stories, and logic when it comes to theories, we properly invoke bodily-kinesthetic intelligence when we conceive of those mental representations called skills. And that is because skills invariably involve the use of the body, even though the body’s role in mastering a dance is more overt than the body’s role in, say, speaking, writing, or solving equations. Studies of practitioners in many domains have documented the extent to which expertise entails the acquisition of ever greater skills in the use and integration of information. When they retain a
tangible physical component (as is the case with athletes or artists), these skills are readily observed; but quite often, they become automated and internalized. Thus, while a novice musician can only learn a piece by playing it on an instrument, skilled musicians can accomplish much by simply reading a score or “playing it” in their minds. Over time bodily-kinesthetic intelligence retreats from view.

**NATURALIST INTELLIGENCE**

Only after publishing my original theory did I become cognizant of a sixth form that I have dubbed the “naturalist intelligence.” Naturalist intelligence entails the capacities to make consequential discriminations in the natural world: between one plant and another; between one animal and another; among varieties of clouds, rock formations, tidal configurations, and the like. As with bodily-kinesthetic intelligence, this form was absolutely pivotal in our hominid past. Our ancestors would not have survived if they could not tell a poisonous from a nutritious plant, an animal that was good to eat from an animal that one had best flee from instantly, inviting from treacherous land, water, or mountain formations. Nowadays, there are still regions of the globe in which one’s survival depends on the constant activation of naturalist intelligence. And even in our own postindustrial world, those involved with the preparation of foods, the construction of dwellings, the protection of our environment, or the mining of precious ores, must draw on their naturalist capacities.

What may be less evident, but even more consequential, is the extent to which our consumer society is also built on naturalist intelligence. The ability to distinguish one sneaker or sweater from another, to discriminate among brands of automobiles, airplanes, bicycles, scooters, and the like, draws on pattern-detecting capacities that in earlier eras were used to distinguish varieties of lizards, bushes, or rocks from one another.

Here lurks an important insight about the human intelligences. Each intelligence evolved over long periods of time to allow individuals to survive and reproduce in particular ecological niches – most notably, the savannas of sub-Saharan Africa where hominids developed over the last few million years. A particular intelligence may well remain undeveloped if there is little use for that intelligence in contemporary settings. However, being opportunistic creatures, urban dwellers who have never glimpsed a farm or a forest may well draw on, even exploit, their naturalistic intelligence in their capacities as vendors, purchasers, or “window” or “video” shoppers.

Fixing the boundaries between intelligences is not easy; admittedly, this delineation constitutes to some extent an aesthetic rather than a scientific judgment. Let me share my own thinking. On the one hand, naturalist intelligence may seem to involve simply the exercise of our sensory organs: keen eyes, ears, hands, and the like. This observation is no doubt true, but it is also insufficient; even if one is bereft of one or more sensory organs, like the distinguished blind naturalist Geermt Vermij, one may still be able to make consequential distinctions. In this sense, naturalist intelligence – like the other intelligences – is “supersensory.” On the other hand, naturalist intelligence can appear as just an exercise of our logical-mathematical intelligence – the capacity to categorize. But this reductive analysis does not quite work either. The discrimination between two entities is prior to their classification, and, indeed, any biological classification scheme is always secondary to some set of perceived criteria. As a rule of thumb, we might invoke this sequence: first, one perceives objects through one or more sense modalities; next, one makes consequential distinctions through the use of naturalistic intelligence; ultimately one classifies (and perhaps reclassifies) according to specific logical criteria. This sequence may even have been at work as I – making use of my naturalist intelligence – developed the theory of multiple intelligences a few decades ago.

Turning briefly again to the world of business, I suggest that anyone involved with the tangible products of any sort is necessarily using naturalist intelligence. Our discriminating capacities are essential if we are not merely to lump together all automobiles or, indeed, all vehicles. The naturalist intelligence is needed whether one purchases the raw materials, extracts them from the earth, mounts a campaign to advertise them, or uses them in one’s daily work, household chores, or play. While our world has recently become inundated with “clicks,” that does not mean that we can totally avoid “bricks” or “sticks.” Shorn of our naturalist intelligence, we become completely dependent on someone else’s capacity to discern patterns in the world.

**The Personal Intelligences**

So far, each of the intelligences that I have described falls, roughly speaking, into one of two categories. Either it is engaged primarily with material objects, as is the case with spatial, bodily, and naturalist intelligence. Or it works
primarily with symbols and strings of symbols, as occurs with linguistic, musical, and logical-mathematical intelligence. Both categories involve concepts, stories, theories, and skills. We associate the former, “object-based” category more with skills and the latter, “symbol-based” category more with concepts, stories, and theories.

A third group of intelligences, of much interest lately, involves knowing human beings. One uses one’s interpersonal intelligence to discriminate among persons, figure out their motivations, work effectively with them, and, if necessary, manipulate them. Intrapersonal intelligence, its complement, is directed inward. The intrapersonally intelligent person possesses a good working model of herself, can identify personal feelings, goals, fears, strengths, and weaknesses; and can, in the happiest circumstance, use that model to make judicious decisions in her life.

Writing in the early twenty-first century, I hardly need to insist on the importance of interpersonal intelligence. Nearly all business involves working with other persons, and those individuals who have effective knowledge of people – generically and specifically – are at a singular advantage. Whether one is in marketing, sales, or public relations, leading a team or serving as a member, sensitivity to others emerges as a crucial asset. The enormous popularity of Daniel Goleman’s concept of emotional intelligence is a tribute to the newly acknowledged importance of such sensitivity to others.18

That sensitivity is not a single holistic capacity, however. Among the separable facets of interpersonal intelligence are sensitivity to temperament or personality, ability to anticipate the reactions of others, the skills of leading or following effectively, and the capacity to mediate. Indeed, the deeper that the personal intelligences are probed, the more facets emerge. One now reads of six varieties of leadership,15 four approaches to negotiation,16 and thirty-four personality types that the shrewd practitioner of human resources should discern.17

Complementing knowledge of others is knowledge of oneself: We come to know ourselves by making use of the distinctions involved in coming to know others; by the same token, discriminations that we make in the course of self-reflection help us penetrate the psyches of others. Still, the core of intrapersonal intelligence is distinctive from the capacity to understand and interact with other human beings. Central is the capacity to distinguish one’s own feelings, needs, anxieties, and idiosyncratic profiles of abilities and to assemble them in a way that makes sense and is useful in achieving various personal goals. While the remaining intelligences lend themselves to particular roles and sectors in business, intrapersonal intelligence is a dimension on which one can evaluate individuals “across the board.” Some U.S. presidents, for example, such as Abraham Lincoln, seem to have had a great deal of self-knowledge, while others, such as Ronald Reagan, gave few signs of introspective tendencies. Once can also distinguish executives, entrepreneurs, or investors in terms of the extent to which “knowledge of self” seems developed, stunted, or atrophied and the extent to which they draw on such knowledge to create compatible working environments for themselves and others.18

It is not easy to assess intrapersonal intelligence. Why not? First, people differ from one another (that’s the reason we need the personal intelligences) and so the metric for one person cannot simply be applied to others. Second, intrapersonal intelligence is a quintessentially subjective matter; we do not broadcast or demonstrate to others how much we know about ourselves, nor how accurate is that self-knowledge.

But in terms of our topic of how minds get changed, it would be a grave mistake to minimize the importance of intrapersonal intelligence. Nowadays, nearly all of us in the industrial and postindustrial worlds make our own decisions about where to live, what jobs to pursue, what to do when one becomes dissatisfied, downsized, or just plain dismissed. Those with keen understanding of their strengths and needs are in much better position than those with limited or faulty self-knowledge. In such circumstances, I would hazard, accurate self-knowledge is worth at least 15 to 25 IQ points – and that’s a lot!

**Existential Intelligence**

Recently, I have pondered whether there may be a ninth, or existential, intelligence. This endeavor began because many contemporaries had speculated that there was a “religious” or “spiritual intelligence” and not a few had stated, erroneously, that “Howard Gardner believes in the existence of such a supernatural intelligence.” After examining various accounts of spirituality, I concluded that it did not meet the criteria of a specific intelligence.10 But a component of spirituality – existential thinking – may well do so. **Existential intelligence** entails the human capacity to pose and ponder the biggest questions: “Who are we? Why are we here? What is going to happen to us? Why do we die? What is it all about, in the end?” All over the
world, children and adults pose these questions, and many religious, artistic, philosophical, and mythic “symbol systems” have arisen in an effort to provide satisfying answers to (or at least compelling formulations of) these questions.

Such an intelligence fits the psychological and biological criteria (see note 19) for an intelligence reasonably well. For example, there is a developmental course to existential intelligence; various symbol systems have evolved across the planet to capture salient existential questions and concerns; and certain individuals stand out at an early age in terms of preoccupation with such big questions. My chief hesitation in claiming a full-fledged “ninth intelligence” is that we do not yet have convincing evidence that “existential thinking” draws on special dedicated neural or brain centers or has a distinctive evolutionary history (though commentators have offered intriguing speculations about a “God spot” underneath the temporal lobe of the brain20). And so the most recent candidate for “intelligence status” remains in a holding pattern; recalling a classic film of Federico Fellini’s, I allude nowadays to “8 1/2” intelligences.

The place of a candidate existential intelligence within business is intriguing. Typically, we think of business as being mundane, practical, everyday; themes of existence, religion, and spirit remain in abeyance until the arrival of the appropriate Sabbath. Yet many business products, either primarily or secondarily, speak to broader issues of existence, identity, faith. I need only allude to the numerous books, compact discs, movies, and television programs that deal with the realms of the spirit – from angels to devils; or to the numerous organizations, institutions, and experiences (including theme parks!) that are devoted to tending the human spirit; or to the realm of religion, be it organized or marginal, traditional or cultish. “Existence” is big business.

However, existence is not just a product. It is also an underacknowledged facet of the workplace; if people do not find meaning in their work lives, they are destined to be dissatisfied and – perhaps even worse – unproductive. Certainly, finding meaning in one’s work is not simply a challenge in business; it is a strongly felt need in every profession and craft.21 By the same token, I believe that one can find evidence for a range of intelligences in nearly every occupation. A musician, for example, may exercise her musical intelligence constantly, but if she is to be able to perform effectively in public, she must draw as well on bodily intelligence, spatial intelligence, the personal intelligences, and – perhaps especially – the existential intelligence. It is also worth noting that individuals may succeed at the same cultural role using different intelligences. Mathematician and physicist Stephen Wolfram comments on the different possible approaches to mathematical thinking:

Of the limited set of people exposed to higher mathematics, different ones often seem to think in bizarrely different ways. Some think symbolically, presumably applying linguistic capabilities to algebraic or other representations. Some think more visually, using mechanical experience or visual memory. Others seem to think in terms of abstract patterns, perhaps sometimes with implicit analogies to musical harmony. And still others – including some of the purest mathematicians – seem to think distinctly in terms of constraints, perhaps using some kind of abstraction of everyday geometrical reasoning.22
End Notes Chapter 2


11. I have been unable to verify this quote, but for comparable sentiments see Bill Bradley, Life on the Run (New York: Quadrangle, 1976), 87, 170.


13. Howard Gardner, Intelligence Reframed.


19. See Howard Gardner, Intelligence Reframed, chapter 4 and 5, for the reasons that led to this conclusion. The eight criteria, elaborated on in Howard Gardner, Frames of Mind, chapter 4, are these: (1) Existence of a discrete symbol system; (2) evidence for specialized representation in the brain; (3) a distinctive evolutionary history; (4) a distinctive developmental pattern; (5) identifiable core psychological operations; (6) existence of special populations that highlight or lack a capacity; (7) patterns of results on psychometric measures of intelligence; and (8) patterns of transfer or lack of transfer across tasks that putatively involve a specific intelligence. An additional criterion, sometimes cited, is the existence of roles that foreground the intelligences in different cultures.


23. For see for example, Paul Lawrence and Nitin Nohria, Driven: How Human Nature Shapes Our Choices (San Francisco: Jossey Bass, 2002); Nigel Nicholson, Executive Instinct (New York: Crown, 2000).

24. For a historical-cultural approach to the growing industrial might of East Asia, see Charles Hampden-Turner and Fons Trompenaars, Mastering the Infinite Game (Oxford: Capstone, 1997).