Howard GARDNER

MULTIPLE INTELLIGENCES

THE LEARNING & MIND SERIES

Instructor's Package

About this Guide

This guide is intended to assist in the use of the DVD *Multiple Intelligences* for instructional purposes.

The following pages provide an organizational schema for the DVD along with general notes for each section, key quotes from the DVD, as well as suggested discussion questions relevant to the section.

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MULTIPLE INTELLIGENCES

Summary:

Howard Gardner introduces his theory of Multiple Intelligences; explores the theory's claims, implications, and common myths; and examines the question of assessment as well as how our thinking about intelligences may evolve.

Structure:

Part 1. Intelligence & Intelligences

Part 2. MI: The Analogy of 8 Computers

Part 3. Claims & Implications

Part 4. Myths & Reality

Part 5. Assessment

Part 6. Intelligences in the Future

Part 1. Intelligence & Intelligences

Traditional "Western" View

- Single intelligence ("g")
- Highly heritable
- Not much you can do about your "g"
- Psychometricians can tell you how smart you are (paper and pencil tests, brain waves or activity, perhaps gene complexes some day)
- Compare to Asian valuing of effort

Howard Gardner opens his presentation by describing the way most Westerners think about intelligence. He likens the idea to measuring weight or height—a discrete and somewhat indisputable number. But this notion of objective measurement, he continues, is relatively new, dating back to Parisian psychologist Alfred Binet who, at the turn of the twentieth century, was asked by the Parisian ministry of education to help predict how children would do in school. Binet asked many questions of many children, then discarded the questions that everyone got right or everyone got wrong. The questions that remained separated those who did well in school from those who had problems. Still, the most effective prediction of future school performance by far is school performance in the past.

A New Interdisciplinary View

- Based on evolutionary evidence, argument, as well as information about brain organization
- Examination of unusual populations (e.g. prodigies, autistic individual) with jagged cognitive profiles
- Recognition of different roles and "end-states" across cultures, historically and contemporaneously
- Deliberately inter-disciplinary (biology, anthropology etc), beyond psychometric testing and beyond sensory modalities
- Set of 8 specific criteria for what is/is not an intelligence

Binet's test reflected and bolstered the traditional Western view of a single intelligence—often referred to as "g," or "general intelligence"—a quantity that is highly heritable, relatively unchangeable, and measurable by psychometricians (whether through paper and pencil, electrophysiological measures, or [perhaps in the future] genetic markers). This, of course, is not the only way to conceptualize intelligence: Gardner notes that in East Asian Confucian societies, the general sentiment is that hard work—not native "intelligence"—is the most effective determinant of how "smart" one is. Gardner suggests that both genetics and hard work are contributors, but holds that overall, the East Asian view may be healthier, as it allows us to be agents in our own intellect.

Definition:

An intelligence is the biopsychological potential to process information in certain ways, in order to solve problems or fashion products that are valued in a culture or community. Think of several relatively independent computers, not a single all-purpose one.

Gardner moves on to honing and improving his theory of multiple intelligences, describing it as an interdisciplinary view that draws together psychology, evolution, anthropology and what we know about the brain. He recalls that even in the early days of his theorizing, when knowledge of the brain was a small fraction of what we know today, he was convinced of the independence of various types of intelligences by the ways they were localized in the nervous system: the location of an injury could predict which

cognitive systems would be undermined or spared. In addition to examining the brain and looking at spectrums of intelligence, Gardner studied various cultures at a range of historical periods to determine what abilities they valued and required for survival. This more universal view—achieved by Gardner's use of different disciplinary perspectives—made his theory distinctive, as did Gardner's insistence on a high bar for what could count as "intelligence."

In light of this research, Gardner redefines intelligence as a potential that is both biological and psychological—one that helps us solve problems and create things that are valued in at least one culture. To distinguish between ideas of intelligence, Gardner offers the metaphor of mind as computer system: Those who believe in intelligence as singular see the brain as a single computer; those who believe in multiple intelligences see several different computers in different parts of the brain, and no single computer's level of function predicts the functioning of others.

Intelligence vs Intelligences
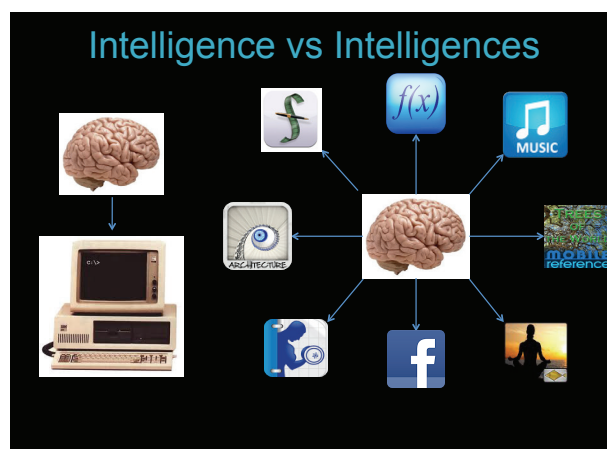
Points for discussion related to this section:

Discuss the common idea that intelligence is heritable, quantifiable, and reducible to a single measure. Why might we be motivated to embrace this idea? How might it be self-perpetuating?

Consider, in contrast to the notion of IQ, that we possess many types of intelligence. Why might this be a harder notion for a culture—and for educators and psychologists—to embrace? In what ways might it be threatening? In what ways might it be attractive?

As a researcher looking at many civilizations across many eras, Gardner came up with a complex set of criteria for defining any type of intelligence. What criteria might you pose as requirements for a certain set of skills and proclivities to be considered an intelligence? What do you imagine would be common criteria in our culture?

Part 2. MI: The Analogy of 8 Computers

Gardner first introduces us to his "current array" of eight types of intelligence and notes the types of experts who exemplify it:

Linguistic: writers, authors, and poets

Logical/mathematical: mathematicians, scientists, logicians

Musical: composers, conductors, performers, acute listeners

Spatial: astronauts, aviators, sailors, chess players

Bodily-kinesthetic: dancers, athletes, craftspeople, surgeons

Interpersonal: teachers, therapists, salespeople, politicians

Intrapersonal: those with a capacity to understand themselves, what they are trying to do and how best to accomplish it

Naturalist: Those who are skilled at making consequential distinctions in the world of nature (or, more recently, in the world of consumer brands)

Candidate New Intelligences

- Existential Intelligence– the Intelligence of Big Questions

- Pedagogical Intelligence– the Intelligence of Teaching

Gardner notes that here in the West, we privilege certain types of intelligence: When we say that someone is "smart," we typically mean that their linguistic and mathematical/logical intelligences are very strong.

Gardner adds to this list of intelligences the possibility for others, and offers two, in particular, to which he is giving further thought:

Existential: This is the intelligence of big questions—what is life? What is love? Why do we die? It is important in areas including art and religion.

Pedagogical: This is the intelligence of teaching. Gardner notes that as young as three and four, children are natural teachers, changing their style of explaining an apparatus (speed of their speech, number of examples they give, etc.) based on the age of the person they are instructing.

Points for discussion related to this section:

Looking at Gardner's array of intelligences, do any surprise you? Which ones and why?

Gardner notes that our typical ideas of "smart" indicate skill in language, logic, or both. What does this privileging of certain types of intelligences indicate about our larger ideas of intelligence and worth? How might this be influenced by Western values?

Discuss the possibility of "existential" intelligence and "pedagogical" intelligence. Do you agree that these are ways of thinking that are both sufficiently common and sufficiently significant to quality as "new" types of intelligence? How do you see each of them coming into play in daily life?

Part 3. Claims & Implications

> ## Two Scientific Claims
>
> 1) We all have these intelligences– they make us human, cognitively speaking
>
> 2) No two people– not even identical twins (or clones)– have exactly the same profile of intelligences

Gardner opens this section by laying out the two scientific claims of his theory of multiple intelligences: First, everyone has all of these intelligences—as a species, that array defines us as human—but no one has the same configuration of strengths and weaknesses as anyone else. Even identical twins differ in their intelligences, as they had different environments in utero, live different lives, and have been shown neurologically to solve problems in different ways.

> ## Two Educational Claims
>
> 1) We should individualize teaching, learning, and assessing as much as possible
>
> 2) Whenever possible, we should pluralize – presenting important ideas in several ways

The implications of this are profound. Throughout human history, educators have taught people (excluding the very rich, who have traditionally been tutored) in largely similar ways, trusting that their mental representations and comprehension would (or could) be the same. M.I. theory suggests that, because people have different types of minds, such a teaching approach may be ineffective. Rather, a more useful technique might include individualization and pluralization. With individualization, teaching

methods are matched to intellectual profiles—an approach that is increasingly possible for a wider group of people via technology—and people can be assessed in ways they are comfortable in being assessed. With pluralization, important lessons are taught in multiple ways in order to accommodate people's various natural learning styles; in the process, this technique demonstrates the type of interdisciplinary understanding that can be one aim of education.

> ## Important Point #1:
>
> Multiple Intelligences is not an educational end: it is most useful as an educational means to a publicly stated goal.

Gardner emphasizes that the use of multiple intelligences is not an educational end. Rather, it is an educational means to a publicly stated goal—whether that goal is disciplinary understanding, a democratic society, community service, creative thinking, arts education, or something else. Any research claim, Gardner continues, can lead to very different implications; his theory says only that there are many different ways of being smart.

> ## Important Point #2:
>
> You cannot legitimately go from scientific finding to an educational recommendation - any scientific claim (including MI theory) yields a large number of implications, even ones that may appear inconsistent with one another.

Points for discussion related to this section:

Discuss how individuation might change the way schools operate today. How would the contemporary classroom change in an educational system that individualizes learning? Who might such a system most benefit? Who might be left behind?

Discuss the difference between individualization and pluralization. How might each be applied to modern education?

Discuss how the use of pluralization might change typical ways of teaching—for instance, the teaching of World War II or the American Civil Rights Movement. How might this both complicate and enhance or expand the experience of learning? Imagine you are teaching one of these historical periods, and come up with one way of targeting each of Gardner's core types of intelligence in your chosen period—linguistic; logical/mathematical; music; spatial; bodily/kinesthetic; interpersonal; intrapersonal; naturalistic.

Discuss Gardner's contention that M.I. theory is a theory of how the mind works, and not a theory of what should be taught. How might theories of mind potentially affect teaching, yet not be the aim of it? What, in other words, is the difference between an educational means and an educational end?

Part 4. Myths & Realities

Myth #1

An intelligence is the same as a sensory system.

Myth #2

An intelligence is the same as a "learning style" or a "working style".

Reality #1

Intelligences do not depend on a single sensory system. Rather, they refer to processes that can take place, no matter what sensory system inputs the data. For example, linguistic intelligence can operate on auditory, visual, tactile information, etc.

Reality #2

An intelligence refers to a mental computer that works more or less well. A style implies an approach that applies equally to all contents. So-called styles may or may not obtain across multiple intelligences or domains; this matter needs to be established by empirical study.

Gardner begins this section by debunking a common myth about multiple intelligences, emphasizing that they are not yoked to sensory systems. In other words, intelligences work on information *no matter how that information reaches the brain.* The brain might receive information that has been taken in kinesthetically or aurally—but its various intelligences can use that information in various ways. The "language machine," for example, can operate on information taken in through many different modalities.

Gardner next takes on what he describes as the most common myth about multiple intelligences—that an intelligence is the same as a "learning style" or "working style." He emphasizes that in talking about an intelligence, he is talking about the functioning of a "computer" in the mind/brain: If that works well, the intelligence is strong; if it's clunky, the intelligence is less agile (but can grow more skilled through discipline). To talk of a "style," in contrast, suggests that one approaches all things in the same way—for instance, with a playful style or an obsessive style.

Myth #3

There is an official, approved "MI" approach to education and to schools.

Myth #4

Intelligences are God-given talents that can't be changed.

Reality #3

MI theory is certainly relevant to education, and it calls for attention to individual intellectual profiles. However, a whole variety of educational approaches can follow from MI theory and there are no <u>official</u> "MI" or "Gardner" schools.

Reality #4

Intelligences certainly have a heritable component. But they are quite flexible and their development is strongly dependent on adequate resources, including effective modeling and teaching, and a belief that one can <u>become</u> more intelligent.

Gardner then debunks the myth of the existence of an official "M.I. seal" for education and schools. Many approaches grow out of multiple-intelligences theory, and Gardner refuses to give out "badges" or "demerits."

Finally, Gardner dismantles the myth that intelligences are innate and unchangeable qualities. Although intelligences do have a heritable component, they are flexible, and their development depends on adequate resources (including teaching, modeling, and motivation). In this emphasis on potential, the theory of multiple intelligences may be a more hopeful approach than the IQ test.

Points for discussion related to this section:

Gardner emphasizes that intelligences are not tied to any particular sensory systems—that is, even a blind person can have strong spatial intelligence, even a deaf person can master spoken language. What can you imagine might be an example of such crossover, in which the match-up of experience and type of intelligence is non-intuitive or unexpected?

Consider the notion that one might have a very strong intelligence of a certain type that is rarely stimulated by his or her environment. How might education be designed in a way to tap into types of intelligence that are otherwise neglected by a child's micro-environment?

Gardner notes that there is no single educational approach created or endorsed by his M.I. movement. If you were to design an approach based on these ideas, what might it look like? What might be the importance of there *not* being a prescribed approach to capitalize on multiple intelligences?

Part 5. Assessment

In this section, Gardner delvers into the question of how to assess multiple intelligences.

His first example is the preschools of Reggio Emilia in Northern Italy, which rest on the idea of "the one hundred languages of children." These schools are richly endowed and choreographed, with materials that appeal to children's various senses and intelligences, from artistic materials to science supplies and animals, calling on children's openness to and enthusiasm for a wide range of demonstrations. The teaching at these schools is likewise unique: Gardner notes that teachers talk each day about what happened with various materials, and that their conversations determine what happens the following day. To nurture children's intelligences early, says Gardner, educators must be reflective about what they see and how they will respond.

Gardner next describes what he sees as his most serious foray into assessment: Project Spectrum. This experiment, conducted with colleagues late in the twentieth century, aimed to create a children's environment that was rich and experiential in the ways of a good children's museum. There were toys the children could take apart and put back together; tools to make music and make up stories; a naturalist's corner; and board games (effective at tapping not only mathematical and logical

intelligences, but interpersonal intelligence). Halfway through the year, teachers asked students to recreate the classroom in miniature (demonstrating spatial intelligence) and also describe the room's social dynamics (demonstrating interpersonal intelligence). The children's response to the environment showed that even as early as ages four and five, children have different configurations of intellect—and educators face the question of how to approach those differences.
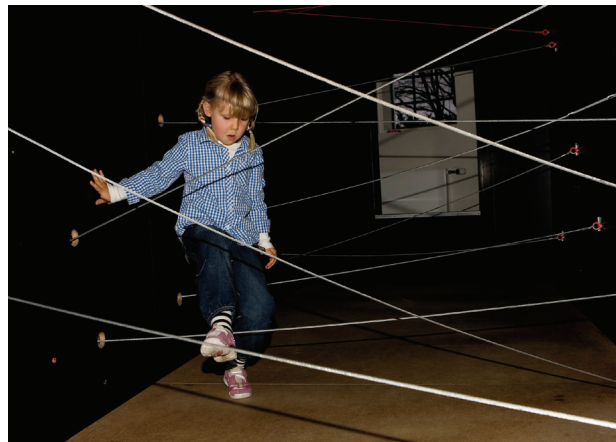
Finally, Gardner relates the story of his trip to DanfossUniverse in Southwestern Denmark—in particular the Explorama, where the creators had implemented many of Gardner's ideas. There, Gardner found between forty and fifty different games and exercises suited for everyone from children to middle-aged business groups. There were experiments with weights and blocks, a physical challenge in which one tried to move through space without triggering unpleasant sounds, a sound spectrograph that showed one's success at recreating another language, and a range of other activities. Gardner's contribution during his trip was a test of intrapersonal intelligence (a dimension that had stumped the DanfossUniverse creators)—a hand-held device on which visitors can predict how they will do in the various activities.

Points for discussion related to this section:

How do you think that the Reggio Emilia preschools compare to American preschools? If you are unfamiliar with American preschools, how do the Reggio Emilia preschools compare to American education more generally? Discuss the similarities and differences.

Discuss the emphasis on reflection at the Reggio Emilia preschools. How might this enhance both the students' experience and the effectiveness of the educators' processes? Are there ways that American schools might incorporate such an approach without greatly increased resources?

Imagine you are a teacher at a school along the lines of those in Reggio Emilia. What type of intelligence or activities do you think it would be most difficult to find equipment or ideas for? Would you allocate equal time and materials to each intelligence?

Consider Gardner's exploration of the Explorama in Denmark. Describe one display or activity you might organize for each type of intelligence—linguistic, logical/mathematical, music, spatial, bodily/kinesthetic, interpersonal, intrapersonal, naturalistic.

Part 6. Intelligences in the Future

In looking towards the future of education and of multiple intelligences, Gardner asks several core questions: How broad should the concept of intelligence be? Where should assessment lie on the spectrum of "pure" vs. "contextual"? What may happen to intelligences in the digital area? How might we cope with the "graying of intelligences"? And how can we use our knowledge of multiple intelligences in education and culture?

Examining first the question—how to conceptualize intelligence—Gardner takes note of the broadening of our ideas of intelligence, principally in Daniel Goleman's work on "emotional intelligence" and Robert Coles's work on "moral intelligence. He also considers the proliferation of writing on concepts such as financial intelligence. Although Gardner appreciates the broadening of notions of intelligence beyond the scholastic definition, he cautions that thoughtful and rigorous criteria are essential. He also warns against "conflating the strength of the 'computer' [the type of intelligence] with whether we like the way it's being used"—in other words, classifying an intelligence as strong only when it does things we appreciate.

Gardner next distinguishes between "searchlight" and "laser" minds—in other words, an intelligence that moves around broadly (Gardner offers Bill and Hillary Clinton as examples) vs. one that can focus on a single topic or field for long periods of time (here, he uses the example of Mozart). IQ tests are likely to be more effective at identifying "searchlight" intellects—particularly if the tests do not tap into the area on which "laser" intellects are focused.

On the spectrum of "pure" vs. "contextual" assessment, Gardner falls squarely on the side of context. He challenges the common belief that if we ask the right set of questions (as in a short-answer exam), we will get an accurate and meaningful measure of intelligence; he advocates instead for the creation of rich environments in which we can watch people navigate opportunities for engagement … and see both what they do and what they improve at—giving what he calls a "rough and ready" measure of intelligence.


Students interacting with SMALLab

Reflecting on the future of education, Gardner adds to school-centered learning the possibility of "free-form" learning, chiefly with digital media—which, he says, offers opportunities for children to create their own knowledge, works of art, science projects, and so on. Two examples of this are "SMALLab" at Arizona State University and "Scratch" (developed by the Media Lab at MIT). Small Lab, which practices the idea of "embodiment," offers a play space in which children can move around and play with real

or virtual objects, exploring important disciplinary concepts such as momentum and gravity. Scratch helps children to learn a simple programming language, tapping into different types of intelligence as it enables children to create and animate symbols, then post and share their creations.


A screenshot of the Scratch application. The Jots pane is in the lower left corner
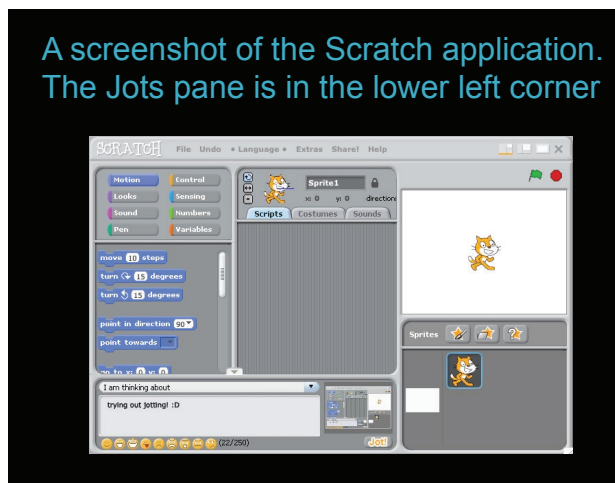
Turning from childhood to the "graying of intelligence," Gardner offers his theory that intelligences "go underground" as we age: As we use them more internally (as mental representations and ways to make sense of things), learning and thinking grow more idiosyncratic. These days, he says, with so many information platforms and programs available, we will likely grow better able to accommodate the ever-wider range of thought processes that come about as people age, helping people to make use of the types of intelligence that are most helpful to their thinking and action.

But all this—for what? Gardner asks why our various intelligences matter, asserting that both intelligence and creativity are inherently amoral; both can be used to do either wonderful or terrible things. Here, he brings up his 2002 book Good Work: When Excellence and Ethics Meet—an encapsulation of

research he will treat in detail later in this series of presentations. For now, Gardner offers the synopsis that, drawing from their study of workers in various fields, he and his colleagues defined "good work" as work that is technically excellent, engaging, and carried out in an ethical way (the three "E"s: excellence, engaging, and ethical). He offers as a metaphor a "triple helix" in which the three "strands" of good work form a metaphorical chemical he playfully calls "ENA."
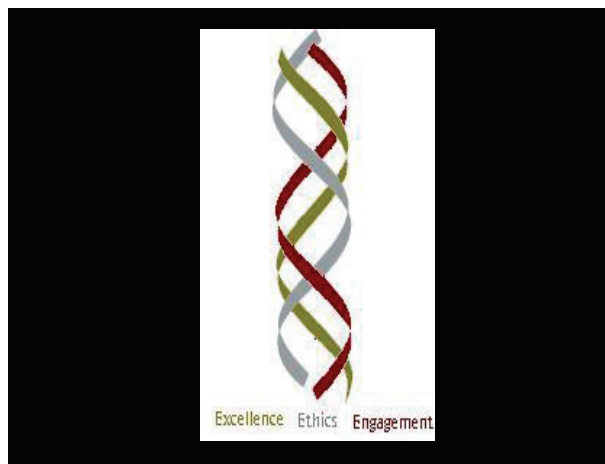
Continuing this theme of "good work," Gardner offers as a cautionary tale the story of a group of respected intellects in former president John F. Kennedy's administration who moved the nation towards and into the calamitous Vietnam War—a story related in David Halberstam's 1972 book The Best and the Brightest. It is not enough to simply have intelligence, Gardner says in recalling this period in history; what is most important is how we *use* that intelligence, and making sure we employ it in an ethical way.

Gardner reinforces this idea as he closes with a quote from philosopher Ralph Waldo Emerson: "Character is more important than intellect."

Points for discussion related to this section:

Gardner points to the ways that both "searchlight" and "laser" intelligences make society strong. How might these types of minds be complementary?

Why might Wolfgang Mozart qualify as a "laser" mind while Bill and Hillary Clinton might be "searchlight" minds, and how has each type of thinking been evident in each person's work?

Gardner notes that our intelligences become more personalized and more idiosyncratic as we age. What might this mean? Accordingly, what challenges might aging intelligences present in terms of measurement?

Discuss Gardner's contention that both intelligence and creativity are inherently amoral. Do you agree? What contributes to our more typical valuation of each in our culture?

In a Nutshell by Howard Gardner

The original scene: Paris, 1900—La Belle Epoque. The city fathers approached a talented psychologist named Alfred Binet with an unusual request. Many families were flocking to the capital city, and a good many of their children were having trouble with their schoolwork. Could Binet devise some kind of a measure that would predict which youngsters would succeed and which would fail in the primary grades of Paris schools?

As almost everybody knows, Binet succeeded. In short order, his discovery came to be called the "intelligence test"; his measure, the "IQ." Like other Parisian fashions, the IQ soon made its way to the United States, where it enjoyed a modest success until World War I. At that time, it was used to test over one million American recruits, and—with America's victory in the conflict—Binet's invention had truly arrived. From that day on, the IQ test has looked like psychology's biggest success—a genuinely useful scientific tool.

What is the vision that led to the excitement about IQ? At least in the West, people had always relied on intuitive assessments of how smart other people were. Now intelligence seemed to be quantifiable. You could measure someone's actual or potential height, and now, it seemed, you could also measure someone's actual or potential intelligence. We had one dimension of mental ability along which we could array everyone.

The search for the perfect measure of intelligence has proceeded apace. Here, for example, are some quotations from an ad for one such test:

> Need an individual test which quickly provides a stable and reliable estimate of intelligence in four or five minutes per form? Has three forms? Does not depend on verbal production or subjective scoring? Can be used with the severely physically handicapped (even paralyzed) if they can signal yes or no? Handles two-year-olds and superior adults with the same short series of items and the same format? Only $16.00 complete.

Now, that's quite a claim. The American psychologist Arthur Jensen suggests that we could look at reaction time to assess intelligence: a set of lights go on; how quickly can the subject react? The British psychologist Hans Eysenck recommends that investigators of intelligence look directly at brain waves. And with the advent of the gene chip, many look forward to the day when we can glance at the proper gene locus on the proper chromosome, read off someone's IQ, and confidently predict his or her live chances.

There are also, of course, more sophisticated versions of the IQ test. One of them is called the SAT. Its name originally meant the Scholastic Aptitude Test. With the passage of time, the meaning of the acronym has been changed—it became the Scholastic Assessment Test, and, more recently, it has been reduced to the plain old SAT—just the initials. The SAT purports to be a similar kind of measure, and if you add up a person's verbal and math scores, as is often done, you can rate him or her along a single intellectual dimension. (As of 2005, a writing component has been added.) Programs for the gifted, for example, often use that kind of measure; if your IQ is in excess of 130, you're admitted to the program—if 129, "Sorry, no cigar!"

Along with this one-dimensional view of how to assess people's minds comes a corresponding view of school, which I will call the "uniform view." A uniform school features a core curriculum, a set of facts that everybody should know, and very few electives. The better students, perhaps those with higher IQs, are allowed to take courses that call upon critical reading, calculation, and thinking skills. In the "uniform school," there are regular assessments, using paper and pencil instruments, of the IQ or SAT variety. These assessments yield reliable rankings of people;

the best and the brightest get into the better colleges, and perhaps—but only perhaps—they will also get better rankings in life. There is no question but that this approach works well for certain people—schools such as Harvard and Stanford are eloquent testimony to that. Since this measurement and selection system is clearly meritocratic in certain respects, it has something to recommend it.

The uniform school sounds fair—after all, everyone is treated in the same away. But some years ago it occurred to me that this supposed rationale was completely unfair. The uniform school picks out and is addressed to a certain kind of mind—we might call it provisionally the IQ or SAT mind. I sometimes call it "the mind of the future law professor." The more that your mind resembles that of the legendary law professor, Dr. Charles W. Kingsfield, Jr., played on-screen by John Houseman in *The Paper Chase*, the better that you will do in school and the more readily you will handle IQ-SAT type measures. But to the extent that your mind works differently—and not that many of us are cut out to be law professors—school is certainly not fair to you.

There is an alternative vision that I would like to present—one based on a radically different view of the mind, and one that yields a very different view of school. It is a pluralistic view of mind, recognizing many different and discrete facets of cognition, acknowledging that people have different cognitive strengths and contrasting cognitive styles. I introduce the concept of an "individual-centered school" that takes this multifaceted view of intelligence seriously. This model for a school is based in part on findings from sciences that did not even exist in Binet's time: cognitive science (the study of the mind) and neuroscience (the study of the brain). One such approach I have called "the theory of multiple intelligences." Let me tell you something about its sources and claims, and lay the ground work for the educational discussions in the chapters that follow.

To introduce this new point of view, let us undertake the following "thought experiment." Suspend the usual judgment of what constitutes intelligence, and

let your thoughts run freely over the capabilities of humans—perhaps those that would be picked out by the proverbial visitor from Mars. In this exercise, you are drawn to the brilliant chess player, the world-class violinist, and the champion athlete; such outstanding performers deserve special consideration. Following through on this experiment, a quite different view of intelligence emerges. Are the chess player, violinist, and athlete "intelligent" in these pursuits? If they are, then why do our tests of "intelligence" fail to identify them? If they are not "intelligent," what allows them to achieve such astounding feats? In general, why does the contemporary construct "intelligence" fail to take into account large areas of human endeavor?

To approach these questions I introduced the theory of multiple intelligences (MI) in the early 1980s. As the name indicates, I believe that human cognitive competence is better described in terms of a set of abilities, talents, or mental skills, which I call "intelligences." All normal individuals possess each of these skills to some extent; individuals differ in the degree of skill and in the nature of their combination. I believe this theory of intelligence may be more humane and more veridical than alternative views of intelligence and that it more adequately reflects the data of human "intelligent" behavior. Such a theory has important educational implications.

What Constitutes an Intelligence?

The question of the optimal definition of intelligence looms large in this inquiry. And it is here that the theory of multiple intelligences begins to diverge from traditional points of view. In the classic psychometric view, intelligence is defined operationally as the ability to answer items on tests of intelligence. The inference from the test scores to some underlying ability is supported by statistical techniques. These techniques compare responses of subjects at different ages; the apparent correlation of these test scores across ages and across different tests corroborates the notion that the general faculty of intelligence, called g in short, does not change much with age, training, or experience. It is an inborn attribute or faculty of the individual.

Multiple intelligences theory, on the other hand, pluralizes the traditional concept. An intelligence is a computational capacity—a capacity to process a certain kind of information—that is founded on human biology and human psychology. Humans have certain kinds of intelligences, whereas rats, birds, and computers foreground other kinds of computational capacities. An intelligence entails the ability to solve problems or fashion products that are of consequence in a particular cultural setting or community. The problem-solving skill allows one to approach a situation in which a goal is to be obtained and to locate the appropriate route to that goal. The creation of a cultural product allows one to capture and transmit knowledge or to express one's conclusions, beliefs, or feelings. The problems to be solved range from creating an end for a story to anticipating a mating move in chess to repairing a quilt. Products range from scientific theories to musical compositions to successful political campaigns.

MI theory is framed in light of the biological origins of each problem-solving skill. Only those skills that are universal to the human species are considered (again, we differ from rats, birds, or computers). Even so, the biological proclivity to participate in a particular form of problem solving must also be coupled with the cultural nurturing of that domain. For example, language, a universal skill, may manifest itself particularly as writing in one culture, as oratory in another culture, and as the secret language composed of anagrams in a third.

Given the desire of selecting intelligences that are rooted in biology, and that are valued in one or more cultural settings, how does one actually identify an "intelligence"? In coming up with the list, I reviewed evidence from several different sources: knowledge about normal development and development in gifted individuals; information about the breakdown of cognitive skills under conditions of brain damage; studies of exceptional populations, including prodigies, idiots savants, and autistic children; data about the evolution of cognition over the millennia;

cross-cultural accounts of cognition; psychometric studies, including examinations of correlations among tests; and psychological training studies, particularly measures of transfer and generalization across tasks. Only those candidate intelligences that satisfied all or a healthy majority of the criteria were selected as bona fide intelligences. A more complete discussion of each of these criteria for an "intelligence," and the intelligences that were initially identified, is found in *Frames of Mind* (1983b), especially chapter 4. In this foundational book I also consider how the theory might be disproven and compare it to competing theories of intelligence. An update of some of these discussions is found in *Intelligence Reframed* (1999a), and in the chapters that follow.

In addition to satisfying the aforementioned criteria, each intelligence must have an identifiable core operation or set of operations. As a neurally based computational system, each intelligence is activated or "triggered" by certain kinds of internally or externally presented information. For example, one core of musical intelligence is the sensitivity to pitch relations, whereas one core of linguistic intelligence is the sensitivity to phonological features.

An intelligence must also be susceptible to encoding in a symbol system—a culturally contrived system of meaning, which captures and conveys important forms of information. Language, picturing, and mathematics are but three nearly worldwide symbol systems that are necessary for human survival and productivity. The relationship of a candidate intelligence to a human symbol system is no accident. In fact, the existence of a core computational capacity anticipates the actual or potential creation of a symbol system that exploits that capacity. While it may be possible for an intelligence to develop without an accompanying symbol system, a primary characteristic of human intelligence may well be its gravitation toward such an embodiment.

The Original Set of Intelligences

Having sketched the characteristics and criteria of an intelligence, I turn now to a brief consideration of each of the intelligences that were proposed in the early 1980s. I begin each sketch with a thumbnail biography of a person who demonstrates an unusual facility with that intelligence. (These biographies were developed chiefly by my long-time colleague Joseph Walters.) The biographies illustrate some of the abilities that are central to the fluent operation of a given intelligence. Although each biography illustrates a particular intelligence, I do not wish to imply that in adulthood intelligences operate in isolation. Indeed, except for abnormal individuals, intelligences always work in concert, and any sophisticated adult role will involve a melding of several of them. Following each biography I survey the various sources of data that support each candidate as an "intelligence."

Musical Intelligence. When he was three years old, Yehudi Menuhin was smuggled into the San Francisco Orchestra concerts by his parents. The sound of Louis Persinger's violin so entranced the youngster that he insisted on a violin for his birthday and Louis Persinger as his teacher. He got both. By the time he was ten years old, Menuhin was an international performer (Menuhin, 1977).

Violinist Yehudi Menuhin's musical intelligence manifested itself even before he had touched a violin or received any musical training. His powerful reaction to that particular sound and his rapid progress on the instrument suggest that he was biologically prepared in some way for that endeavor. In this way evidence from child prodigies supports the claim that there is a biological link to a particular intelligence. Other special populations, such as autistic children who can play a musical instrument beautifully but who cannot otherwise communicate, underscore the independence of musical intelligence.

A brief consideration of the evidence suggests that musical skill passes the other tests for an intelligence. For example, certain parts of the brain play important

roles in perception and production of music. These areas are characteristically located in the right hemisphere, although musical skill is not as clearly "localized," or located in a specifiable area, as natural language. Although the particular susceptibility of musical ability to brain damage depends on the degree of training and other individual differences, there is clear evidence for "amusia," or loss of musical ability.

Music apparently played an important unifying role in Stone Age (Paleolithic) societies. Birdsong provides a link to other species. Evidence from various cultures supports the notion that music is a universal faculty. Studies of infant development suggest that there is a "raw" computational ability in early childhood. Finally, musical notation provides an accessible and versatile symbol system. In short, evidence to support the interpretation of musical ability as an "intelligence" comes from many different sources. Even though musical skill is not typically considered an intellectual skill like mathematics, it qualifies under our criteria. By definition it deserves consideration; and in view of the data, its inclusion is empirically justified.

Bodily-Kinesthetic Intelligence. Fifteen-year-old Babe Ruth was playing catcher one game when his team was taking a "terrific beating." Ruth "burst out laughing" and criticized the pitcher loudly. Brother Mathias, the coach, called out, "All right, George, YOU pitch!" Ruth was stunned and nervous: "I never pitched in my life…I can't pitch." The moment was transformative, as Ruth recalls in his autobiography: "Yet, as I took the position, I felt a strange relationship between myself and that pitcher's mound. I felt, somehow, as if I had been born out there and that this was a kind of home for me." As sports history shows, he went on to become a great major league pitcher (and, of course, attained legendary status as a hitter) (Ruth, 1948, p. 17).

Like Menuhin, Babe Ruth was a prodigy who recognized his "instrument" immediately upon his first exposure to it. This recognition occurred in advance of formal training.

Control of bodily movement is, of course, localized in the motor cortex, with each hemisphere dominant or controlling bodily movements on the contralateral side. In right-handers, the dominance for such movement is ordinarily found in the left hemisphere. The ability to perform movements when directed to do so can be impaired even in individuals who can perform the same movements reflexively or on a non-voluntary basis. The existence of specific apraxia constitutes one line of evidence for a bodily-kinesthetic intelligence.

The evolution of specialized body movements is of obvious advantage to the species, and in humans this adaptation is extended through the use of tools. Body movement undergoes a clearly defined developmental schedule in children; there is little question of its universality across cultures. Thus it appears that bodily-kinesthetic "knowledge" satisfies many of the criteria for an intelligence.

The consideration of bodily-kinesthetic knowledge as "problem solving" may be less intuitive. Certainly carrying out a mime sequence or hitting a tennis ball is not solving a mathematical equation. And yet, the ability to use one's body to express an emotion (as in a dance), to play a game (as in a sport), or to create a new product (as in devising an invention) is evidence of the cognitive features of body usage. The specific computations required to solve a particular bodily-kinesthetic problem, hitting a tennis ball, are summarized by Tim Gallwey:

> In order to anticipate how and where to move the feet and whether to take the racket back on the forehand or backhand side, the brain must calculate within a fraction of a second the moment the ball leaves the server's racket approximately where it is going to land, and where the racket will intercept it. Into this calculation must be computed the initial velocity of the ball, combined with an input for the progressive decrease in velocity and the effect of wind and of spin, to say nothing of the complicated trajectories involved. Then, each of these factors must be recalculated after the bounce

of the ball to anticipate the point where contact will be made by the racket. Simultaneously, muscle orders must be given—not just once, but constantly refined on updated information. Finally, the muscles have to respond in cooperation with one another... Contact is made at a precise point that depends on whether the order was given to hit down the line or cross-court, an order not given until after a split-second analysis of the movement and balance of the opponent....Even if you are returning the serve of an average player, you will have only about one second. Just to hit the ball is clearly a remarkable feat; to return it with consistency and accuracy is a mind-boggling achievement. Yet it is not uncommon. The truth is that everyone who inhabits a human body possesses a remarkable instrument (Gallwey, 1976, pp. 33-34).

Logical-Mathematical Intelligence. In 1983 Barbara McClintock won the Nobel Prize in Medicine or Physiology for her work in microbiology. Her intellectual powers of deduction and observation illustrate one form of logical-mathematical intelligence that is often labeled "scientific thinking." One incident is particularly illuminating. While a researcher at Cornell in the 1920s, McClintock was faced one day with a problem: while theory predicted 50 percent pollen sterility in corn, her research assistant (in the "field") was finding plants that were only 25 to 30 percent sterile. Disturbed by this discrepancy, McClintock left the cornfield and returned to her office where she sat for half an hour, thinking:

> Suddenly I jumped up and ran back to the (corn) field. At the top of the field (the others were still at the bottom) I shouted, "Eureka, I have it! I know what the 30% sterility is!" ...They asked me to prove it. I sat down with a paper bag and a pencil and I started from scratch, which I had not done at all in my laboratory. It had all been done so fast; the answer came and I ran. Now I worked it out step by step—it was an intricate series of steps—and I came out with [the same result]. [They] looked at the material and it was exactly as I'd said it was; it

worked out exactly as I had diagrammed it. Now, why did I know, without having done it on paper? Why was I so sure? (Keller, 1983, p. 104).

This anecdote illustrates two essential facts of the logical-mathematical intelligence. First, in the gifted individual, the process of problem solving is often remarkably rapid—the successful scientist copes with many variables at once and creates numerous hypotheses that are each evaluated and then accepted or rejected in turn. The anecdote also underscores the nonverbal nature of the intelligence. A solution to a problem can be constructed before it is articulated. In fact, the solution process may be totally invisible, even to the problem solver. This phenomenon need not imply, however, that discoveries of this sort—the familiar "aha!"—are mysterious, intuitive, or unpredictable. The fact that it happens more frequently to some people (e.g. Nobel Prize winners) suggests the opposite. We interpret this as the work of the logical-mathematical intelligence.

Along with the companion skill of language, logical-mathematical reasoning provides the principal basis for IQ tests. This form of intelligence has been thoroughly investigated by traditional psychologists, and it is the archetype of "raw intelligence" or the problem-solving faculty that purportedly cuts across domains. It is perhaps ironic, then, that the actual mechanism by which one arrives at a solution to a logical-mathematical problem is not as yet completely understood—and the processes involved in leaps like those described by McClintock remain mysterious.

Logical-mathematical intelligence is supported as well by empirical criteria. Certain areas of the brain are more prominent in mathematical calculation than others; indeed recent evidence suggests that the linguistic areas in the frontotemporal lobes are more important for logical deduction, the visuospatial areas in bilateral parietofrontal lobes for numerical calculation (Houde & Tzourio-Mazoyer, 2003). There are savants who perform great feats of calculation even though they remain tragically deficient in most

other areas. Child prodigies in mathematics abound. The development of this intelligence in children has been carefully documented by Jean Piaget and other psychologists.

Linguistic Intelligence. At the age of ten, T. S. Eliot created a magazine called *Fireside* to which he was the sole contributor. In a three-day period during his winter vacation, he created eight complete issues. Each one included poems, adventure stories, a gossip column, and humor. Some of this material survives, and it displays the talent of the poet (see Soldo, 1982).

As with the logical intelligence, calling linguistic skill an "intelligence" is consistent with the stance of traditional psychology. Linguistic intelligence also passes our empirical tests. For instance, a specific area of the brain, called Broca's Area, is responsible for the production of grammatical sentences. A person with damage to this area can understand words and sentences quite well but has difficulty putting words together in anything other than the simplest of sentences. At the same time, other thought processes may be entirely unaffected.

The gift of language is universal, and its rapid and unproblematic development in most children is strikingly constant across cultures. Even in deaf populations where a manual sign language is not explicitly taught, children will often "invent" their own manual language and use it surreptitiously! We thus see how an intelligence may operate independently of a specific input modality or output channel.

Spatial Intelligence. Navigation around the Caroline Islands in the South Seas is accomplished by native sailors without instruments. The position of the stars, as viewed from various islands, the weather patterns, and water color are the principal sign posts. Each journey is broken into a series of segments; and the navigator learns the position of the stars within each of these segments. During the actual trip the navigator must envision mentally a reference island as it passes under a particular star. From that he computes the number of segments completed, the proportion of the

trip remaining, and any corrections in heading that are required. The navigator cannot see the islands as he sails along; instead he maps their locations in his mental "picture" of the journey (see Gladwin, 1970).

Spatial problem solving is required for navigation and in the use of the notational system of maps. Other kinds of spatial problem solving are brought to bear in visualizing an object seen from a different angle and in playing chess. The visual arts also employ this intelligence in the use of space.

Evidence from brain research is clear and persuasive. Just as the middle regions of the left cerebral cortex have, over the course of evolution, been selected as the site of linguistic processing in right-handed persons, the posterior regions of the right cerebral cortex prove most crucial for spatial processing. Damage to these regions causes impairment of the ability to find one's way around a site, to recognize faces or scenes, or to notice fine details.

Blind populations provide an illustration of the distinction between the spatial intelligence and visual perception. A blind person can recognize shapes by an indirect method: running a hand along the object translates into length of time of movement, which in turn is translated into the size of the object. For the blind person, the perceptual system of the tactile modality parallels the visual modality in the seeing person. The analogy between the spatial reasoning of the blind and the linguistic reasoning of the deaf is notable.

There are few child prodigies among visual artists, but there are savants like Nadia (Selfe, 1977). Despite a condition of severe autism, this preschool child made drawings of the most remarkable representational accuracy and finesse.

Interpersonal Intelligence. With little formal training in special education and nearly blind herself, Anne Sullivan began the intimidating task of instructing a blind and deaf seven-year-old, Helen Keller. Sullivan's efforts at communication were complicated by the child's emotional struggle with the world around her.

At their first meal together, this scene occurred:

> Annie did not allow Helen to put her hand into Annie's plate and take what she wanted, as she had been accustomed to do with her family. It became a test of wills—hand thrust into plate, hand firmly put aside. The family, much upset, left the dining room. Annie locked the door and proceeded to eat her breakfast while Helen lay on the floor kicking and screaming, pushing and pulling at Annie's chair. [After half an hour] Helen went around the table looking for her family. She discovered no one else was there and that bewildered her. Finally, she sat down and began to eat her breakfast, but with her hands. Annie gave her a spoon. Down on the floor it clattered, and the contest of wills began anew (Lash, 1980, p. 52).

Anne Sullivan sensitively responded to the child's behavior. She wrote home: "The greatest problem I shall have to solve is how to discipline and control her without breaking her spirit. I shall go rather slowly at first and try to win her love." In fact, the first "miracle" occurred two weeks later, well before the famous incident at the pump house. Annie had taken Helen to a small cottage near the family's house, where they could live alone. After seven days together, Helen's personality suddenly underwent a change— the therapy had worked: "My heart is singing with joy this morning. A miracle has happened! The wild little creature of two weeks ago has been transformed into a gentle child" (Lash, 1980, p. 54).

It was just two weeks after this that the first breakthrough in Helen's grasp of language occurred; and from that point on, she progressed with incredible speed. The key to the miracle of language was Anne Sullivan's insight into the person of Helen Keller.

Interpersonal intelligence builds on a core capacity to notice distinctions among others—in particular, contrasts in their moods, temperaments, motivations, and intentions. In more advanced forms, this intelligence permits a skilled adult to

read the intentions and desires of others, even when they have been hidden. This skill appears in a highly sophisticated form in religious or political leaders, salespersons, marketers, teachers, therapists, and parents. The Helen Keller-Anne Sullivan story suggests that this interpersonal intelligence does not depend on language. All indices in brain research suggest that the frontal lobes play a prominent role in interpersonal knowledge. Damage in this area can cause profound personality changes while leaving other forms of problem solving unharmed— after such an injury, a person is often not the "same person."

Alzheimer's disease, a form of presenile dementia, appears to attack posterior brain zones with a special ferocity, leaving spatial, logical, and linguistic computations severely impaired. Yet, Alzheimer's patients will often remain well groomed, socially proper, and continually apologetic for their errors. In contrast, Pick's disease, another variety of presenile dementia that is localized in more frontal regions of the cortex, entails a rapid loss of social graces.

Biological evidence for interpersonal intelligence encompasses two additional factors often cited as unique to humans. One factor is the prolonged childhood of primates, including the close attachment to the mother. In those cases where the mother (or a substitute figure) is not available and engaged, normal interpersonal development is in serious jeopardy. The second factor is the relative importance in humans of social interaction. Skills such as hunting, tracking, and killing in prehistoric societies required participation and cooperation of large numbers of people. The need for group cohesion, leadership, organization, and solidarity follows naturally from this.

Intrapersonal Intelligence. In an essay called "A Sketch of the Past," written almost as a diary entry, Virginia Woolf discusses the "cotton wool of existence"—the various mundane events of life. She contrasts this "cotton wool" with three specific and poignant memories from her childhood: a fight with her brother, seeing a particular flower in the garden, and hearing of the suicide of a past visitor:

These are three instances of exceptional moments. I often tell them over, or rather they come to the surface unexpectedly. But now for the first time I have written them down, and I realize something that I have never realized before. Two of these moments ended in a state of despair. The other ended, on the contrary, in a state of satisfaction.

The sense of horror (in hearing of the suicide) held me powerless. But in the case of the flower, I found a reason; and was thus able to deal with the sensation. I was not powerless.

Though I still have the peculiarity that I receive these sudden shocks, they are now always welcome; after the first surprise, I always feel instantly that they are particularly valuable. And so I go on to suppose that the shock-receiving capacity is what makes me a writer. I hazard the explanation that a shock is at once in my case followed by the desire to explain it. I feel that I have had a blow; but it is not, as I thought as a child, simply a blow from an enemy hidden behind the cotton wool of daily life; it is or will become a revelation of some order; it is a token of some real thing behind appearances; and I make it real by putting it into words (Woolf, 1976, pp. 69-70).

This quotation vividly illustrates the intrapersonal intelligence—knowledge of the internal aspects of a person: access to one's own feeling life, one's range of emotions, the capacity to effect discriminations among these emotions and eventually to label them and to draw upon them as a means of understanding and guiding one's own behavior. A person with good intrapersonal intelligence has a viable and effective model of himself or herself—one that would be consistent with a description constructed by careful observers who know that person intimately. Since this intelligence is the most private, it requires evidence from language, music, or some other more expressive form of intelligence if the observer is to detect it at work. In the above quotation, for example, linguistic intelligence serves as a medium in which to observe intrapersonal knowledge in operation.

We see the familiar criteria at work in the intrapersonal intelligence. As with the interpersonal intelligence, the frontal lobes play a central role in personality change. Injury to the lower area of the frontal lobes is likely to produce irritability or euphoria; while injury to the higher regions is more likely to produce indifference, listlessness, slowness, and apathy—a kind of depressive personality. In such "frontal-lobe" individuals, the other cognitive functions often remain preserved. In contrast, among aphasics who have recovered sufficiently to describe their experiences, we find consistent testimony: while there may have been a diminution of general alertness and considerable depression about the condition, the individual in no way felt himself to be a different person. He recognized his own needs, wants, and desires and tried as best he could to achieve them.

The autistic child is a prototypical example of an individual with impaired intrapersonal intelligence; indeed, the child may not even be able to refer to himself. At the same time, such children may exhibit remarkable abilities in the musical, computational, spatial, mechanical and other non-personal realms.

Evolutionary evidence for an intrapersonal faculty is more difficult to come by, but we might speculate that the capacity to transcend the satisfaction of instinctual drives is relevant. This potential becomes increasingly important in a species not perennially involved in the struggle for survival. The neural structures that permit consciousness probably form the basis on which self-consciousness is constructed.

In sum, then, both interpersonal and intrapersonal faculties pass the tests of an intelligence. They both feature problem-solving capacities with significance for the individual and the species. Interpersonal intelligence allows one to understand and work with others. Intrapersonal intelligence allows one to understand and work with oneself. In the individual's sense of self, one encounters a melding of interpersonal and intrapersonal components. Indeed, the sense of self emerges as one of the most marvelous of human inventions—a symbol that represents all kinds of information about a person and that is at the same time an invention that all individuals construct for themselves.

Newly Identified Intelligences

For the first ten years after I proposed the theory of multiple intelligences, I resisted any temptation to alter the theory. Many individuals proposed candidate intelligences—humor intelligence, cooking intelligence, sexual intelligence. One of my students quipped that I would never recognize those intelligences, because I lacked them myself.

Two events impelled me to consider additional intelligences. Once I spoke about the theory to a group of historian of scientists. After the conclusion of my talk, a short, elderly man approached and said, "You will never explain Charles Darwin with the set of intelligences that you proposed." The commentator was none other than Ernst Mayr, probably Darwin's successor as the most important 20th century authority on evolution.

The other event was the frequent assertion that there was a spiritual intelligence, and the occasional assertion that I had identified a spiritual intelligence. In fact, neither statement was true. But these experiences motivated me to consider whether there is evidence for either a naturalist or a spiritual intelligence.

This inquiry led to very different conclusions. In the first case, the evidence for the existence of a naturalist intelligence is surprisingly persuasive. Human beings like biologists Charles Darwin or E. O. Wilson and ornithologists like John James Audubon or Roger Tory Peterson excel at the capacity to identify one species from another. An individual with a high degree of naturalist intelligence is keenly aware of how to distinguish from one another the diverse, plants, animals, mountains, and cloud configurations in her ecological niche. While we tend to think of these capacities as visual, the recognition of birdsong or whale calls entails auditory perception. The Dutch naturalist Geermat Vermij, who is blind, depends on his sense of touch.

On the eight criteria of an intelligence, the naturalist intelligence scores well. There are the core capacities to recognize instances as members of a species; the evolutionary history where survival often depends on recognizing conspecifics and on avoiding predators; young children easily make distinctions in the naturalist world—indeed, some five-year-olds are better at distinguishing among dinosaur species than are their parents or grandparents.

When one assumes the cultural or brain lenses, interesting phenomena emerge. Nowadays, few persons in the developed world are directly dependent on naturalist intelligence. We simply go to the grocery store or order groceries on the phone or via the Internet. And yet I suggest that our entire consumer culture is based on the naturalist intelligence. Those are the capacities on which we draw when we are drawn to one car rather than another, or when we select for purchase one pair of sneakers or gloves rather than another.

The study of brain damage provides intriguing evidence of individuals who are able to recognize and name inanimate objects but who lose the capacity to identify living things; less often, one encounters the opposite pattern, where individuals are able to recognize and name animate entities but fail with artificial (man-made) objects. It is probably the case that these capacities entail different perceptual mechanisms (Euclidean geometry operates in the world of artifacts but not in the world of nature) and different experiential bases (we operate on inanimate objects and tools in ways quite different from the ways that we interact with living beings).

My review of the evidence on spirituality proved less straightforward. Individuals have very strong views on religion and spirituality, particularly in the contemporary United States. For many people, experiences of the spirit are the most important ones; they assume that a spiritual intelligence not only exists but represents the highest achievement of human beings. Still others, and particularly those of a scientific bent, cannot take seriously any discussion of the spirit or the soul; it smacks of mysticism.

And they may be deeply skeptical about God and religion—especially so in the academy. Asked why I did not instantly endorse a spiritual or religious intelligence, I once quipped, "If I did so, it would please my friends—but it would please my enemies even more!"

Quips are no substitute for scholarship. I devoted the better part of a year to reviewing the evidence for and against a spiritual intelligence. I concluded that at least two facets of spirituality were quite remote from my conception of an intelligence. First, I do not believe that an intelligence should be confounded with an individual's phenomenological experience. For most observers, spirituality entails a certain set of visceral reactions—for example, a feeling that one is in touch with a higher being or "at one" with the world. Such feelings may be fine, but I do not see them as valid indicators of an intelligence. A person with a high degree of mathematical intelligence may undergo feelings of "flow" when she solves a difficult problem. But she is equally mathematically intelligent even if she reports no such phenomenological reaction.

Second, for many individuals, spirituality is indissociable from a belief in religion/God generally, or even from allegiance to a particular faith or sect. "Only a real Jew/Catholic/Muslim/Protestant is a spiritual being" is the explicit or implicit message. This requirement makes me uncomfortable and takes us far from the initial set of criteria for an intelligence.

But if a spiritual intelligence does not qualify on my criteria, one facet of spirituality seems a promising candidate. I call it the existential intelligence— sometimes described as "the intelligence of big questions." This candidate intelligence is based on the human proclivity to ponder the most fundamental questions of existence. Why do we live? Why do we die? Where do we come from? What is going to happen to us? What is love? Why do we make war? I sometimes say that these are questions that transcend perception; they concern issues that are too big or too small to be perceived by our five principal sensory systems.

Somewhat surprisingly, the existential intelligence does reasonably well in terms of our criteria. Certainly, there are individuals—philosophers, religious leaders, the most impressive statesman— who come to mind as high-end embodiments of existential intelligence. Existential issues arise in every culture—in religion, philosophy, art, and the more mundane stories, gossip, and media presentations of everyday life. Certainly, in any society where questioning is tolerated, children raise these existential questions from an early age—though they do not always listen acutely to the answers! Moreover, the myths and fairy tales that they gobble up speak to their fascination with existential questions.

My hesitation in declaring a full-blown existential intelligence comes from the dearth, so far, of evidence that parts of the brain are concerned particularly with these deep issues of existence. It could be that there are regions—for example, in the inferotemporal lobe—that are particularly crucial for dealing with the Big Questions. However, it is also possible that existential questions are just part of a broader philosophical mind—or that they are simply the more emotionally laden of the questions that individuals routinely pose. In the latter instances, my conservative nature dictates caution in giving the ninth place of honor to existential intelligence. I do mention this candidate intelligence in passing, but, in homage to a famous film by Federico Fellini, I shall continue for the time being to speak of "8 ½ Intelligences."

The Unique Contributions of the Theory

As human beings, we all have a repertoire of skills for solving different kinds of problems. My investigation began, therefore, with a consideration of these problems, the contexts in which they are found, and the culturally significant products that are the outcome. I did not approach "intelligence" as a reified human faculty that is brought to bear in literally any problem setting; rather, I began with the problems that humans solve and the products that they cherish. In a sense I then worked back to the "intelligences" that must be responsible.

Evidence from brain research, human development, evolution, and cross-cultural comparisons was brought to bear in our search for the relevant human intelligences: a candidate was included only if reasonable evidence to support its membership was found across these diverse fields. Again, this tack differs from the traditional one: since no candidate faculty is necessarily an intelligence, I could choose on a motivated basis. In the traditional approach to "intelligence," there is no opportunity for this type of empirical decision.

My belief is that these multiple human faculties, the intelligences, are to a significant extent independent of one another. Research with brain-damaged adults repeatedly demonstrates that particular faculties can be lost while others are spared. This independence of intelligences implies that a particularly high level of ability in one intelligence, say mathematics, does not require a similarly high level in another intelligence, like language or music. This independence of intelligences contrasts sharply with traditional measures of IQ that find high correlations among test scores. I speculate that the usual correlations among subtests of IQ tests come about because all of these tasks in fact measure the ability to respond rapidly to items of a logical-mathematical or linguistic sort; these correlations might be substantially reduced if one were to survey in a contextually appropriate way—what I call "intelligence-fair assessment"—the full range of human problem-solving skills.

Until now, I may appear to have suggested that adult roles depend largely on the flowering of a single intelligence. In fact, however, nearly every cultural role of any degree of sophistication requires a combination of intelligences. Thus, even an apparently straightforward role, like playing the violin, transcends a reliance on musical intelligence. To become a successful violinist requires bodily-kinesthetic dexterity and the interpersonal skills of relating to an audience and, in a different way, choosing a manager; quite possibly it involves an intrapersonal intelligence as well. Dance requires skills in bodily-kinesthetic, musical, interpersonal,

and spatial intelligences in varying degrees. Politics requires an interpersonal skill, a linguistic facility, and perhaps some logical aptitude.

Inasmuch as nearly every cultural role requires several intelligences, it becomes important to consider individuals as a collection of aptitudes rather than as having a singular problem-solving faculty that can be measured directly through pencil-and-paper tests. Even given a relatively small number of such intelligences, the diversity of human ability is created through the differences in these profiles. In fact, it may well be that the "total is greater than the sum of the parts." An individual may not be particularly gifted in any intelligence; and yet, because of a particular combination or blend of skills, he or she may be able to fill some niche uniquely well. Thus it is of paramount importance to assess the particular combination of skills that may earmark an individual for a certain vocational or avocational niche.

In brief, MI theory leads to three conclusions:

1. All of us have the full range of intelligences; that is what makes us human beings, cognitively speaking.

2. No two individuals—not even identical twins— have exactly the same intellectual profile. That is because, even when the genetic material is identical, individuals have different experiences; and those who are identical twins are often highly motivated to distinguish themselves from one another.

3. Having a strong intelligence does not mean that one necessarily acts intelligently. A person with high mathematical intelligence might use her abilities to carry out important experiments in physics or create powerful new geometric proofs; but she might waste these abilities in playing the lottery all day or multiplying ten-digit numbers in her head.

All of these statements are about the psychology of human intelligence—to which MI theory seeks to make a contribution. But of course, they raise powerful educational, political, and cultural questions. Those questions will engage us in later parts of the book.

Conclusion

I believe that in our society we suffer from three biases, which I have nicknamed "Westist," "Testist," and "Bestist." "Westist" involves putting certain Western cultural values, which date back to Socrates, on a pedestal. Logical thinking, for example, is important; rationality is important; but they are not the only virtues. "Testist" suggests a bias towards focusing upon those human abilities or approaches that are readily testable. If it can't be tested, it sometimes seems, it is not worth paying attention to. My feeling is that assessment can be much broader, much more humane than it is now, and that psychologists should spend less time ranking people and more time trying to help them.

"Bestist" is a not very veiled reference to a book by David Halberstam (1972) called *The Best and the Brightest*. Halberstam referred ironically to figures, such as Harvard faculty members, who were brought to Washington to help President John F. Kennedy and in the process launched the Vietnam War. I think that any belief that all the answers to a given problem lie in one certain approach, such as logical-mathematical thinking, can be very dangerous. Current views of intellect need to be leavened with other more comprehensive points of view.

It is of the utmost importance that we recognize and nurture all of the varied human intelligences, and all of the combinations of intelligences. We are all so different largely because we all have different combinations of intelligences. If we recognize this, I think we will have at least a better chance of dealing appropriately with the many problems that we face in the world. If we can mobilize the spectrum of human abilities, not only will people feel better about themselves and more competent; it is even possible that they will also feel more engaged and better able to join the rest of the world community in working for the broader good. Perhaps if we can mobilize the full range of human intelligences and ally them to an ethical sense, we can help to increase the likelihood of our survival on this planet, and perhaps even contribute to our thriving.

The Theory of Multiple Intelligences:
As Psychology, As Education, As Social Science by Howard Gardner

I have no trouble reconstructing the steps that led to my promulgation of the theory of multiple intelligences (MI theory). At least in retrospect, those seem clear. At the same time, I have <u>no</u> recollection of what may be the most crucial question: how or why I decided to cast my discussion in terms of 'intelligences' rather than some less inflammatory characterization. In my remarks today, I will call how the theory came into being, and then discuss it from the perspective of three different disciplinary areas: As Psychology, as Education, and as Social Science.

Autobiographical Notes

If I had only a few moments to give my personal biography, it would run like this. Born in Scranton, Pennsylvania in 1943; son of German Jewish immigrants, who succeeded in coming to America just before they would likely have been rounded up by the Nazis and killed; growing up in that small coal-mining city, as a studious, inquiring, and musical youth; excited intellectually by the atmosphere of Harvard College in the 1960s; married early, with three children; divorced and remarried with an additional child; have remained at Harvard and in Cambridge, Massachusetts for half a century.

If I had only a few moments for an intellectual autobiography, it would run like this. Always attracted more to language, history, the arts and the humanities, than to mathematics or the sciences. Yet, paradoxically, tended to do better in math and science standardized tests than in the humanities. As the proverbial Jewish boy who hated the sight of blood, was destined to become a lawyer. In college,

mesmerized and seduced by the life of the mind. Started to study history but then switched to 'social relations', an unusual and now largely forgotten academic amalgam of sociology, anthropology, and psychology. Was first entranced by the psychological and historical writings of Erik Erikson, himself a student of Sigmund and Anna Freud. But then met and was equally inspired by the cognitive-psychological orientation of Jerome Bruner, himself a student of Jean Piaget and, more distantly, of Lev Vygotsky. In 1971, finished doctoral studies in developmental psychology. Worked on three books while a doctoral student. Did full time research for fifteen years thereafter, before joining the faculty at Harvard, at present the Hobbs Professor of Cognition and Education.

Once we focus on my research as a postdoctoral fellow, the origins of MI theory begin to emerge. As a doctoral student, I had become interested in the development in children of the capacity to use various kinds of symbols, and particularly those in the arts. I was intrigued by how young people become able to appreciate the arts and why some of them become artistic creators. In 1967, I began to work at a newly launched research center called Project Zero, where we seriously examined the nature of artistic thinking. One day we decided to invite a speaker named Norman Geschwind, a neurologist who had been studying the breakdown in individuals of various symbol using capacities, including those in the arts. As I heard Geschwind speak about the effects of brain damage on artists, writers, and musicians, I had a sudden "A-ha" experience: Perhaps, in the study of the organization, development, and breakdown of the nervous system, I might find important clues to the nature and organization of human artistry.

And so, ignoring the advice of almost everyone

(family, friends, mentors), I decided to work in a veterans hospital as a researcher at an Aphasia ward, a floor of a hospital composed of individuals who suffered strokes or other kinds of damage to the brain. There I observed close up the variety of syndromes which result from damage to the cerebral cortex. Each day I was also continuing my research at Harvard, examining the development in young people of different symbol using capacities, no longer restricted to the arts.

Observations Preceding MI Theory

Without this daily commute between research sites, involving young learners and older victims of brain disease, I would never have come up with MI theory. But each day, I would observe unusual configurations of strengths and difficulties. A child might be good (or bad) in musical comprehension but this skill level was not predictive of his or her skills with language, math, spatial orientation, or understanding of other people. A patient might suffer significant aphasia (loss of language) but this did not predict his or her skills in finding the way around the hospital or understanding a cartoon or even learning a new melody.

In effect, I was observing the limitations of the standard view of intellect. If you believe literally the classical view of intelligence, once you know how well a person performs in one sphere, you should be able to predict that person's performance in other spheres. Smart in one thing, smart across the board; limited in one sphere, limited in all.

Now examined more closely, almost no one takes this view of intellect literally. Teachers, to be sure, but almost anyone who is reflective, realizes that just because a person is good or bad in learning languages, we can't know whether that person will be able to learn a dance step with ease or his way around a new locus. And nearly everyone is willing to speak of different talents. And yet, in the psychological literature around 1980, there was little explicit confirmation of this point.

The Distinctivesness of MI Theory

Since different human faculties had long been recognized, both within and outside of standard psychology, what make MI theory distinctive? With the benefit of hindsight, I would point to two factors.

First of all, in approaching the area of intellect, I deliberately averted the usual move to examining scores on tests. Instead, I put on the lenses of the proverbial visitor from another planet who was trying to understand the human mind. And I asked which factors such an 'anthropologist from Mars" might attend to. Far from restricting myself to experimental psychology, I looked through many lenses: that of the anthropologist, visiting many cultures; that of the vocational counselor, considering many careers; that of the expert in "learning differences", examining the various areas of prodigiousness or isolated difficulties which young people can exhibit; and so forth. Probably most important, I looked at the accumulating evidence about the development and differentiation of the cerebral cortex: which areas of human skill and competence were localized in which areas of the brain.

Having created a working definition of intelligence and assembled different sources of information, I then delineated eight factors of what counts as intelligence and what does not. I reviewed many sample candidates and, after considerable weighing of evidence, delineated seven candidate intelligences. I now believe that the total number of intelligences is somewhat larger, but would be surprised if it came to more than 10 or 12. The original seven were linguistic, logical-mathematical, musical, spatial, bodily kinesthetic, interpersonal and intrapersonal. Some years ago I added an eighth or naturalist intelligence. And I now thing that sooner or later there might be an existential intelligence—the intelligence that leads human beings to pose big 'existential questions' and a pedagogical intelligence, the intelligence

that enables human beings to convey knowledge and skills to other human beings who have varying degrees of knowledge. Those, then, are the multiple intelligences, circa 2011.

The other factor proved to be fascinating. Somewhere down the line, I decided to identify these factors as 'intelligences'. That decision turned out to be fateful, in a positive sense. Had I delineated the same faculties, with the same evidence, and called them abilities or faculties or skills, I doubt that I would be standing here today. It was the lexical gamble—of taking the prestigious term intelligence, pluralizing it, and then applying it to the set of competences, that caught the attention of many audiences in many parts of the world. As for my definition: an intelligence is a biopsychological potential to process information in certain kinds of ways, in order to solve problems or create products that are valued in one or more cultural settings.

So much for the origins and the bare bones outlines of MI theory. For the remainder of the talk, I want to reflect on the significance of this theory from three different perspectives—that of psychology, education, and social science. And in the end I'll try to draw a few general conclusions.

MI as Psychology

Until I published Frames of Mind in 1983, my professional identity was quite secure. I was a psychologist—specifically a developmental psychologist, a cognitive psychologist, a neuropsychologist. My day job was to carry out empirical research with these populations and to write them up in reports for peer reviewed journals. Indeed, this is what I did for twenty years. After hours and on weekends, I wrote books. These books were situated on the boundary between academic and popular volumes—and they were authored at a time when so-called 'midlist' books were a significant part of the American market. (That era has ended in the U.S. though it is still quite active elsewhere, including Spain).

My articles and books got respectful attention but it would be misleading to suggest that either my work or my name were well known. That situation changed with the publication of Frames of Mind. Both the book and the idea became sufficiently well known that I soon realized that—for better or worse—I would forever be known as "the MI man."

But contrary to my expectation at the time of publication, the work has never garnered much support within traditional psychology. I think I now understand why, though it took me many years to figure it out.

Until 1983, my experimental work was in traditional bins of psychology—and so, like the proverbial scientist, I was inserting bricks of various sizes into the edifice of cognitive, developmental, or neuro-psychology. And my books—with titles like The Quest for Mind, The Shattered Mind, Art Mind and Brain were largely syntheses of work that had already been done by others or, on occasion, by my colleagues and me.

Frames of Mind was also a synthesis but it was a far more original one. First of all, I surveyed a large set of literatures—empirical and observational—that had not been surveyed en bloc before. To anticipate a later point, I was not just wearing the hat of the psychologist. Rather, harkening back to my training in the field of Social Relations, I was drawing on other areas of social science. And, because of my immersion in aphasia and other cortical disorders, I was also invading the area of the natural sciences—tying varieties of intellect to parts of the brain and even speculating about their evolutionary and genetic components. This territory was not familiar to me or to other psychologists.

Also, unlike my earlier books, I was not simply summarizing the work of others in a relatively traditional manner. Instead, I was putting forth a rather bold new theory—namely, that intellect was distinctly pluralistic—and arguing that the

singular word 'intelligence' and the term "IQ" were fundamentally limited and misleading.

Nor surprisingly, given that I was invading their turf, psychometricians—those charged with measuring intelligence—were offended. When they did not ignore my work, they attacked it. This was hardly surprising. Economist Paul Samuelson famously quipped that in the academy, change occurs one funeral at a time. For close to a century, test makers had defined what intelligence is—indeed, E G Boring, the leading American historian of psychology, had simply stated 'intelligence <u>is</u> what the tests test' as if to close discussion forever after. Sensing this, I published in <u>The Atlantic Monthly</u>, a popular magazine, an article entitled "Who Owns Intelligence?" And in this article I argued that intelligence was too important to leave to the psychometricians; it was time to bring other experts and other lines of evidence to bear on this highly valued (and highly contested) phenomenon.

(I should add that the resistance to MI theory among psychologists has not been echoed in the reactions of scholars from other disciplines. Researchers in biology find the approach and the claims much more congenial, though typically they focus on much finer-grained distinctions within each particular intelligence. Mathematicians resist the theory because from their perspective, there is only one use of mind and that is exemplified by the pure mathematician, with his or her logical-mathematical reason. Interestingly, this conceit disappears almost immediately in the event that the mathematician has a child with a learning disability!)

But to be a bit fair to the psychologists, they did have a valid point. If I were putting forth a new theory of intelligence, it was up to me to 'operationalize it'—to figure out how to test for the various intelligences, and to determine, empirically, whether there was substance to my claim that these intelligences were 'relatively independent'—a hedging phrase that I actually have used for many years. This hedged characterization was quite deliberate. I had no way

of knowing whether the several intelligences were truly independent of one another—or, to use a term favored by psychologists, whether there was a 'positive manifold' among them. What I was confident of, and remain confident of, is that, with respect to any individual, one cannot know the strength of weakness of a particular intelligence, just because one knows the strength or weakness of another intelligence. And I have stated from the beginning that I am agnostic about the <u>reasons</u> for this relatively independence: it could be based primarily on biological reasons (brain development, genes), on cultural reasons (what is valued in particular settings), on motivational reasons (how much a person wants to develop an intelligence), on resources (how much help there is in developing an intelligence), or, in all probability, on a complex of these and perhaps other factors.

In a word, with one major exception called Project Spectrum, I have not devoted energies myself to the development of tests for the individual intelligences. There are many reasons that I have declined to do this, ranging from the expense involved in developing and trying out new tests to my reluctance to create a new kind of strait jacket ("Johnny is musically smart but spatially dumb"). That said, I have written extensively about how the intelligences might be assessed and am innocent of the charge of ignoring the importance of assessment.

MI as Education

Just as I had not expected the resistance and even hostility of my colleagues in psychology, I had not anticipated the extensive interest in the theory on the part of educators—initially in the United States, ultimately in many parts of the world. In 2009, my colleagues and I published a book called <u>Multiple Intelligences Around the World</u>. In this collection, 42 scholars and practitioners, from 15 countries on five continents, described the ways in which they have used multiple intelligences ideas for various age groups (from preschool to university), in various educational settings (schools, museums, theme parks,

after school activities) and with various populations (language learners, gifted students, students with learning or emotional difficulties). Needless to say, in 1983, I could hardly have anticipated this state of affairs.

Why did MI theory catch on in education, in a way that it has never been picked up in psychology? Educators are much less wedded to disciplinary standards of evidence and acceptability. If an idea seems plausible and has at least a trace of support within the academy that suffices. MI passes that test almost everywhere.

MI theory also had the benefit of being a Rorschach test—that is, like a subject interpreting an inkblot, educators could use the claim of several intelligences to support almost any pet educational idea that they had. My original book had very few educational suggestions—after all, I was the psychologist, casting only a sideways glance into the classroom. For that very reason, the theory provided ample running room for practitioners to suggest approaches to curriculum, pedagogy, assessment, learning differences, use of computers, place of the arts—indeed, almost any issue in which educators are interested. And since I had not precluded any educational use of the theory, practitioners in many places felt liberated to make use of the theory in whatever way they liked.

For the most part, this promiscuous use was fine with me. After all, as I maintained from the beginning, I am the scholar, not the educator, and it is up to educators to decide how to use the theory. I did not want to be a traffic cop or a rating agency! Also when educators approached me for help in devising curricula or even whole schools, I declined to be a full fledged member of their team. At most, I agreed to provide feedback when I could. And that explains my long term involvement with two schools in the American Midwest: The Key Learning Community in Indianapolis and the New City School in St Louis. Happily, those schools, with their long term practitioners, have shared their ideas and practices

with visitors from dozens of countries.

Only once did I openly condemn an application of the theory. In the early 1990s, I learned from a colleague about an MI-inspired educational approach in Australia. No doubt well motivated, this approach went way too far and violated both scientific and ethical boundaries. For me, the 'smoking gun' was the claim that different racial and ethnic groups in Australia each exhibited a characteristic intellectual profile. I thought that this was nonsense; I went on a television program and said so; happily, this ill-conceived educational intervention was soon cancelled.

As a result of this experience and of my general observations, I took two steps. First of all, I wrote a paper called "Reflections on Multiple Intelligences: Myths and Messages." In that essay, probably my most widely specimen of reprinted writing, I delineated seven common misunderstandings of the theory. These misunderstandings ranged from the terminology (MI is not a statement about learning styles) to the educational (there are no official MI or Gardner schools). I cannot say that this publication stopped all misunderstandings of the theory. But it catalyzed a change in me—namely, that I needed to take some responsibility for the interpretations of my theory. And in fact, my subsequent involvement in the study and promotion of "GoodWork" arose most directly from my own battle scars with reference to the misuse of MI ideas.

The second step was to state explicitly the most important educational implications of MI theory. They can be captured in two words: Individuation and Pluralization. Human beings differ from one another and there is absolutely no reason to teach and assess all individuals in the identical way. Rather, in the future, good practice should particularize the modes of presentation as well as the manner of assessment as much as feasible; and that individuation should be based on our understanding of the intellectual

profiles of individual learners.

Interestingly, such individual education has always been possible for one group—the affluent. These individuals hire tutors and the tutor's job is to make sure that Pablo and Paloma learn what they need to know, and to use whatever pedagogical approaches work. We are fortunate enough to live in an era where individualized education is no longer an option only for the wealthy. Computers make it possible to provide individualized teaching and assessment options for every person.

Pluralization can be undertaken in any era and with classes of any size. It simply means that important ideas, topics, theories and skills ought to be taught in more than one way, indeed in several ways—and these several ways should activate the multiple intelligences. When one pluralizes an educational approach, two wonderful things happen. First of all, one reaches more individuals—since some individuals learn better through stories, others through work of art, or hands on activities or group work—and by argument, each of these approaches activates a distinctive set of intelligences. Second of all, pluralized education exemplifies what it means to understand something well. Because if you understand an entity well—be it a school subject, an avocation, your own home, your own family—you can think of it in many ways. Conversely, if you can only represent this entity in a single way, using a single intelligence, then your own mastery is probably tenuous.

Note that neither of these educational implications—individuation, pluralization—depends explicitly on MI theory. Indeed, dating back to the ancient Greeks and Romans, I am certain that you could find recommendations for approaches based on the same underlying ideas. MI Theory provided some scientific and empirical evidence for these approaches. And, perhaps more importantly, because of the list of 7-10 intelligences, it gave names for, and made suggestions about how to individualize and how to pluralize. As

my colleague Mindy Kornhaber once quipped "MI theory is a closet organizer. It helps teachers organize their practices and see what is missing."

MI as Social Science

I have typically called MI theory a psychobiological theory: psychological because it is a theory of mind, biological because it privileges information about the brain, the nervous system, and ultimately, I believe, the human genome. To be sure, in its attention to abilities and skills valued across different cultures and historical eras, it draw on anthropological evidence; and in its attention to the development of intelligences, it encompasses different institutions, ranging from family to schools to the media.

In speaking of MI as social science, however, I am not speaking explicitly about the selection of evidence from fields other than traditional psychology. Rather, I seek to characterize my overall approach to the study of mind and, more broadly, to other human phenomena.

I do not believe that there can ever be a social science that directly parallels the natural sciences—physics, chemistry, biology, even astronomy or geology. (Physics envy can only get one so far!) That is because human beings and their inventions are both the scholars of the disciplines and the objects of the disciplines. Put succinctly, we are studying ourselves. That means we do not and cannot have the distance from human beings that we have from chemicals or inorganic materials or subsystems like the visual system or the circulatory system. Also, and more importantly, the very phenomena that we isolate through the social sciences eventually become part of the knowledge base of the subsequent cohort of human beings. And that knowledge—be it troubling or reassuring—can and sometimes does make us perform differently in the future.

To use just one, admittedly dramatic example. Around 1960, social psychologist Stanley Milgran asked

psychiatrists to predict the percentage of human beings who would administer shocks to the danger level to another person involved in a psychological experiment. The modal response was 1 to 2%. In fact, in what became known as the Milgram effect, typically 60-70% of subjects administered shock to the maximum or dangerous level—a shocking level, so to speak! Undoubtedly the Milgram experiment—which would not be allowed today in most places—provided an unpleasant indication of why subordinates in the Nazi era would engage in cruel activities. But the very popularization, the very notoriety of the Milgram effect holds out hope. Perhaps if human beings know of this species proclivity, they (we) can guard against it and not blindly follow orders, even if (or especially if) they are administered by someone who seems to be authoritative.

But just because social science is not identical to natural or physcial science, is hardly a reason not to pursue it as effectively as possible. When the field of Social Relations started at Harvard in the immediate post-World War II era (and there were similar initiatives in the United States at Yale, Johns Hopkins, the University of Chicago), this institutional move was made on the basis of a strong conviction: our understanding of human beings is most likely to be enhanced if we bring to bear the tools and insights drawn from several fields—which could include political science, economics, history and the arts. The experiment of Social Relations failed—but I think it did so principally for reasons of institutions and personalities, not because the idea in itself is wrong. And I would go so far as to maintain that those of us who were weaned on the field of social relations—(and I could name names!)—often had a broader and more perspicacious view of human kind than those whose training occurred primarily or even exclusively within a single social scientific discipline.

And indeed—and here is my most personal remark-—I save my deepest skepticism for those theories of human kind that attempt to explain all human

phenomena in terms of a single model. When I was a student in the 1960s, the chief 'overarching theories' were psychoanalysis and behaviorism. Both had their areas of appropriate focus—individual treatment of middle class patients for psychoanalytic treatment, the study of animal learning and behavior for behaviorism. But when they purported to offer far broader explanations—psychoanalysis of all human behaviors, individual as well as group—behaviorism for all mental activities (including human language) and for the behaviors of broader institutions and overall societies—they became misleading caricatures.

Today, psychoanalysis and behaviorism have returned (or been redirected) to their proper areas of applicability. But as I argue in <u>Truth, Beauty and Goodness Reframed</u> (2011), we are today faced with similar hegemonic explanatory claims from two quite different 'pretenders to the throne': <u>evolutionary psychology</u>, which seeks to explain all human behaviors on the basis of purported evolutionary factors, and <u>rational choice economics</u> which, in one guise, posits that all human economic behavior is based on reason, and which, in another guise, posits the self- adjustment of markets as the optimal route to economic prosperity for all. In this recently published book I indicate the limits of these two lenses on human behaviors. At the same time, I call attention to the roles of broad historical factors, accidents of fortune, and individual human agency. Should anyone doubt the importance of human individual agency, let them think of the history of the 20th century without Hitler, Stalin or Mao, on the one hand, or Mandela, King, or Gandhi on the other.

Just after my new book was published, I heard the wonderful news that I had received the 2011 Prince of Asturias Award in Social Science. I knew enough about the Award to be aware of its importance; and I was tremendously honored to learn the names and identities of my predecessors. But almost as soon as learning that I had received the Award, I realized that I wanted to pay tribute to the kind of social

science in which I was trained and to give urge the continuation of that kind of work. In my first public remarks I said

> "I am thrilled and humbled to receive this prestigious award. While my training is primarily in psychology, I have always considered myself a social scientist, and I feel that much of the best work about human nature and human society draws on a range of social scientific disciplines. Also, at this time the accent in Anglo-American social science falls almost entirely on quantitative work. I am pleased that this award can recognize the strand of social science which involves qualitative analyses and broad syntheses of knowledge."

Let me amplify this brief remark. I certainly value rigorous experiments in psychology, and it is great if one can create randomized controlled studies; I certainly value large scale surveys where one is able to achieve representative samples from the population in question. But I think it a grave mistake for social scientists to restrict themselves to a single standard, even one that is today considered to be a 'gold standard.' When it comes to human spheres, detailed observations of individual cases, careful interviewing, deep probing of individual subjects, well-designed focus groups, can provide information that is equally valuable. Jean Piaget studied only his own three infants in detail, and yet our understanding of infancy was enormously enhanced by these case studies; moreover, Piaget's major observations have held up amazingly well. Whatever the limitations, the case studies carried out by Bronislaw Malinowski in the Trobriand Islands and by Clifford Geertz in Bali helped to define the understandings of remote societies; and indeed, since traditional societies have largely disappeared, there is no way ever to replace them. Erik Erikson's observations of patients at the Austen Riggs Clinic, along with case studies of Amerindian tribes, made lasting contributions to our understanding of the formation of human identity. The optimal social science is not one with a singled

prescribed theory or metatheory or empirical method; rather it is one catholic enough to draw on findings from these various theoretical bases and data sources and then, through a human act of synthesis, to weave them together into a compelling narrative. I had such synthesis in mind in creating MI Theory: whether or not I succeeded is for others to judge.

Concluding Remarks

Though I focus here on the theory of multiple intelligences, my major scholarly interest in the past decade and a half has been on the nature of 'good work'—work in the professions that is at once technically excellent, personally engaging, and carried out in an ethical manner. In this work I have been privileged to have as senior colleagues Mihaly Csikszentmihalyi and William Damon, two eminent psychologists who also exemplify the broad and synthesizing view of social science that I have embraced here. Telling the story of the 'good work project' is a task for another day. And yet I feel it important to mention that the project was conceived of at the California Center for Advanced Study in the Behavioral Sciences, and that I am writing these very words at the same center, 16 years later.

The GoodWork Project is a textbook instance of social science, as described here. It has involved as researchers individuals across the range of social sciences; it has developed concepts and models that are social-scientific rather than drawn from a singular discipline; our major works are broad syntheses; much of our work has been educational in nature; and, most important, we have used a range of methods, from individual case studies, to detailed interviews of cohorts of workers, to, most recently, broad based surveys involving hundreds of even thousand subjects. And because our original sample consisted of over 1200 subjects, we are able to perform statistical tests, and put forth possible causal explanations, on many questions of interest. As mentioned before, applications of MI theory were for the most part benign but a few examples were

deeply troubling. Misuse of MI theory was a major impetus for the study of good work: my colleagues and I came to the conclusion that as scholars, we had a responsibility not only to put forth ideas but also to monitor how they were used and, when necessary, to speak up about their misuse. This line of thinking led us most directly to undertake the GoodWork project. I have no regrets about my decision to study intelligence and multiple intelligences; it has been tremendously rewarding. And yet at the end of the day, we do not need more people of high intelligence or of multiple intelligences, however measured or labeled; we need individuals who will use their intelligences for positive ends. I anticipate that this goal will guide me for the rest of my days.

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