

The Theory of Multiple Intelligences

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I am very honored to be here. I have long been an admirer of your organization and the man whom you commemorate in your name and in that of the lecture which I am delivering this morning.

I vividly remember three moments of introduction to Samuel Orton and to his work. I first heard of Samuel Torrey Orton when I was researching *The Shattered Mind* in the early 1970s. There were dozens of Europeans who were important in the early study of different kinds of brain disorders, and Samuel Orton was virtually the lone American on that list. He was really decades before his time. In searching for analogies in this field, one might think of him as the Walt Whitman of neuro-behavior, or perhaps the Charles Ives of education.

I also heard about the Society in reading an article which was crucial in my own education, an article by Sheldon White on the five-to-seven-year-old cognitive shift. This article was published in 1970 in the *Bulletin* of what was then called the Orton Society.

And, finally, I remember very fondly many favorable allusions to the work of Orton and the Society by my teacher, mentor, and friend, the late Norman Geschwind, who felt extremely close to the workings of the Society and whose students, Al Galaburda and Martha Denckla, will address you later during these sessions.

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Having underscored my sympathy with the work you are doing, I have to admit at the outset that I am in no way an expert on dyslexia or learning disabilities. I do work with brain-damaged adults and with normally gifted children. This has led some people to assume that I also know about children with various kinds of brain difficulties and deficits, but except for some scattered reading, this is not an area in which I can claim any kind of expertise.

I carry out my own work in neuropsychology by studying the acquired alexias, and I certainly believe that alexia has some relevance to developing dyslexia. And for better or for worse, I have had a chance to observe dyslexia first-hand with some close family members, so I have a feeling of what their problems are like and what can (and can't) be done.

What I want to focus on today are some new ideas about cognition and about development, ideas which my colleagues and I have developed, drawing on basic findings in cognitive science and neuroscience. I will describe the theory which we call the "theory of multiple intelligence," tell you something about how we arrived at this theory, what its basic claims are, what's new and different about it, what some of the problems with the theory are. I will then speak about the educational implications of the theory, including some reference to learning problems, and I shall conclude with a moral to my tale.

Let's leave Philadelphia and go to Paris around the turn of the century. At this time, some eighty years ago, the city fathers in Paris approached a psychologist named Alfred Binet and said to him, "We're having a lot of problems picking out which children may have trouble in school. Can you devise some kind of instrument to help us predict who will succeed, and who will fail, in the early grades of the Parisian public schools?" Binet, who was an ingenious fellow, decided to make up a set of items, to give them to youngsters, and to see which items would predict success or failure. He was successful in his efforts and ended up calling what he did an intelligence test. A measure called the "intelligence quotient" was devised to give, in short, an early indication of how smart someone is.

Now I don't want to diminish Binet's achievement. For its time, it was most remarkable, and many people think it was the greatest achievement psychology has ever realized.

Perhaps it is more important to try to figure out *why* it was considered so important. I think it has to do with the ideals of our own society, of Western society dating back hundreds, perhaps thousands of years, perhaps dating back to Greece, that what is truly important is human rationality. That's how we rate people—how rational they are, how well they can solve problems. We have a word called "smart." We talk about people as being smart or smarter, and, of course, we talk about people being dumb or dumber. Now the West is also very inter-

ested in quantities, and so we invented rulers which measure how tall somebody is, and we also have charts so that if we know how tall somebody is at three years of age, we can predict how tall he will be when he is grown up—just multiply toddler height by two.

Now, having been able to quantify physical growth, wouldn't it be great if one could quantify mental growth? One could give adults a set of items to tell everybody in the world how smart they are—you're 130, you're smart—you're 70, you're dumb. Wouldn't it be even greater if we could take a little kid half the size of me and give him something which would allow us to conclude: you're going to be very smart, you're not going to make it?

Many fashions from Paris make their way across the ocean. This was no exception. It made its way to California to Stanford where a test was devised, the Stanford/Binet, a well recognized name today. And the intelligence test really came into its own in the First World War with the so-called Army Alpha, used to assess recruits, and from that time on, it has been placed on a very high pedestal in American society and in other Western societies as well.

As you no doubt have anticipated, I am not entirely satisfied with this state of affairs. And my dissatisfaction early took two forms in the sense that there are two particular viewpoints with which I wanted to argue. One was something called "QT" for quick test. Basically (I quote from memory), an ad for the QT says, "Would you like to be able to measure someone's intelligence in three to five minutes?" There are three forms which you can use. You can use one with the severely physically handicapped, even if they are paralyzed, so long as they can signal yes or no, presumably by winking or something. Perhaps the most unsettling thing of the advertisement for the QT is that it claims you can test both two-year-olds and superior adults, using the same yes-or-no format. And if you write right away to Psychological Test Specialists in Missoula, Montana, you can get the whole thing complete for sixteen bucks. Well, that's the QT. And I just think the notion that you can measure something as precious as a person's intellectual ability in three to five minutes is fatally flawed.

But there are people who even go the QT one step further. Arthur Jensen in California believes that if you simply look at the reaction time—you put on a series of lights and see how quickly someone reacts—you can tell how smart he is. No need for a signal "yes or no" in three to five minutes. Hans Eysenck looks to brain waves. Just stick some electrodes in the head, monitor the brain waves, and you can tell how smart somebody is. Now, how do people get away with this—reaction time and brain waves? Well, alas, the answer is that those things *do* correlate with intelligence tests like the QT. Now there are two conclusions you can draw from this. I prefer to draw the conclusion that the intelligence test notion is pretty silly and the things that correlate are

not very revealing either. You probably know by now (it just turned up in the news this week) that height correlates with intelligence. Does that mean that we just go around measuring height instead of administering IQ tests? I hope not, even though at six feet I would be better off than some of you.

Anyway, my second rhetorical antagonist is someone whom I hold otherwise in high regard, but not in this particular area, and that's the psychologist of the eighteenth century, Dr. Samuel Johnson. Dr. Johnson was asked, "What is genius?" And he responded, no doubt very quickly, since I venture that he would have done very well in the QT. Dr. Johnson said, "Well, genius is an individual of large general powers, accidentally deflected in one direction or another." Dr. Johnson lived nearly two hundred years before Charles Spearman, who coined the term "G" for General Intelligence. What this was was an early claim for general intelligence. If you had a lot of it, you could use it for anything. It was sort of polymorphous intellect. You could be a politician, a poet, a philosopher, or a pianist. Everything was open to you. If you haven't got a lot of it, forget it. You can't do anything significant.

Now how did I get to be so cynical about these points of view which, for twenty-five hundred years, have held a very honored place in Western society? Well, in fact, it grew out of my own studies. Initially, I didn't think very much about intelligence or intelligence tests. Like most everybody else, I assumed psychologists knew what they were talking about. Then I was trained by psychologists and I was assured that the current wisdom was correct. My own training was under the influence of Piaget. Now Piaget was not terribly interested in intelligence and intelligence tests himself, but, as you may know, he was actually trained in what had been Binet's laboratory, so Piaget's early training included the use of intelligence tests for children. He came to focus on children's wrong answers, and *why* they gave wrong answers, which was a very shrewd insight.

But even though Piaget didn't talk very much about intelligence tests, I guess we can say he did talk about intelligence because half of his books were called something like *The Development of Intelligence in a Child*. Where Piaget got off base was in believing that all aspects of intellect were connected. Remember, he talks about things like concrete operations. If you believe in concrete operations, you believe the following: if a person has concrete operations with one subject matter, he or she is going to exhibit concrete operations in all subject matters, so if you perform concrete operations with logical materials, you are going to use concrete operations with math, space, morality, language, social development. The theory falls apart if one achieves concrete operations with one content, and formal operations with another content, and

sensory operations with a third. So Piaget, like intelligence testers and like Samuel Johnson, did believe it all hangs together.

My own work, as has been alluded to, deals with two different populations. I work with brain-damaged adults at the Boston Veterans Administration Hospital Aphasia Research Center, and I work with normal and gifted children at a research project, called Project Zero, at Harvard. I have been doing that for the last fifteen years. What I became impressed with over and over again in this work was that individuals have very jagged cognitive profiles. You will find the children are very strong in music or in language, very strong in drawing or in dance. One strength simply does not relate to how they are going to be in other cognitive areas. The same irregularity characterizes the brain-damaged patient, somebody who has had a stroke or a tumor or some other kind of lesion. Now it could be the case that when you have had brain damage, everything drops down a little bit. You are used to performing at 240 volts and now you are performing at 180 volts. But it doesn't happen like that at all. On the contrary, what is typical of focal brain disease is that you lose some ability in part or entirely, but most of your other abilities remain pretty much the same. So, based on left-hemisphere injury, you can have a language disorder, difficulty in reading, difficulty in understanding, difficulty in speaking, but you can still find your way around in space, still sing a song, still remain the same person. On the other hand, if you suffer a stroke in an analagous region in the right hemisphere, your language can be ostensibly fine, but you can no longer carry a tune, can't find your way around, can't dress properly, can't make a drawing, and your personality undergoes breakdown as well. Once again, these kind of things cannot be accounted for by a unitary view of intellect.

Now it's funny how it is when you're a scholar and you are busy running around. Often your own findings will call earlier views into question, but if you have learned things as a student and you have written about them, you tend to have a certain attachment to outworn views.

For a long time, I was a Piagetian and argued favorably for a unitary view of intellect, even though my own findings were calling that position into question. But then I had a very special opportunity. At the Graduate School of Education of Harvard, with which I am affiliated, a Dutch foundation, called the Van Leer Foundation, gave us a very large sum of money. There was only one string attached to this sum of money. It was an interesting string. The string said we should use it to tell what is known about the nature and realization of human potential. Now that is a big, even a grandiose topic. If I were to send in a grant application saying I wanted to study human potential, I would be surprised if I got back an acknowledgment on a post card. It is just

too big a topic. It's more West Coast than East Coast. But even though Harvard can be supercilious, when it comes to taking lots of money, it manages to hold its conscience in abeyance.

So we set up the Project on Human Potential and I got a very interesting assignment. My assignment was to summarize what had been established about human cognition and human cognitive potential, based on what has been found out in the cognitive sciences and neurosciences in the past decades. I then decided to use this challenge as an opportunity to put together my own findings about children and brain-damaged adults and findings from other researchers to see if I could come up with a concept of cognition which I thought would do justice to the data. And I knew intuitively I was going to argue that the mind is capable of different kinds of things. In fact, over ten years ago, I actually sketched out a book called, *Kinds of Minds*, which never got anywhere, but buried in my unconscious was the notion to do this. But I wanted to do it right.

I then made a fateful decision. I decided to call the different kinds of minds *intelligences*. This was a feisty thing to do. If I had called them talents, people would have said, "Oh, yes, yes, people have many talents," and then would have just gone on about their business, and particularly psychometricians whose stock-in-trade is to study intelligence. They own it. If I called what I was doing *intelligences*, this would be a direct challenge to people who think they know what it is, they know how to study it, test it, etc. So I decided to call what I was studying *intelligences*, and my prediction was successful. I have a whole sheaf of negative reviews saying I don't know what I'm talking about when I talk about intelligence. And, of course, what this really means is, you're trying a different way and it takes away from what we psychometricians are trying to do, which is to measure reaction time or recall of digits backward.

To give you a feeling of what I mean by intelligence, let me describe to you three different end-states. These are roles that people can occupy in different cultures, roles which, if they had a word for intelligence in those cultures, would capture these abilities, but which I claim cannot be captured by our standard tests of intelligence.

The first one is a sailor in the South Seas, one who finds his way around hundreds and even thousands of islands, looking simply at the configuration of the stars and the sky, feeling the flow of the water, and occasionally locating a landmark on an island. How does a person do this? It is very difficult. If they had a word for smart in the Puluwat Island of the Caroline Chain, that would have to capture this particular ability. There is no reason in the world to think that the person who is a good sailor in the Puluwat Islands can tell you who wrote the Iliad or what the difference between praise and punishment is, two favorite items of the intelligence quiz. That's end-state number one.

Number two was again chosen to be contentious. (You may discover a cognitive style at work here.) This is a student in an Islamic culture, studying to be a religious leader. He has to memorize the Koran. That is a big task, several hundred pages in a language he doesn't know. Then he has to learn how to argue about the Koran, and then he goes to the Holy City, studies the Koran a little more, and if he's successful, he then becomes a religious leader himself. Again, if they had a word for *smart* in a religious literate culture, it would be for somebody who could do this sort of thing because that is valued in a place like Iran.

The third end-state is a more contemporary one. It is a Parisian adolescent who composes music on her microcomputer. She programs computers to compose music. Once again, a word like *smart* might capture that particular ability, but there is no reason to think you can pick out a talented composer using standard intelligence tests which never incorporate music.

So I had those three end-states in mind. I thought about other ones, too, the kinds of role which are valued across different societies: dancers, choreographers, athletes, politicians, chiefs, psychoanalysts, sorcerers, shamen, hunters, fishermen, and so on. In different societies, these kinds of things are valued, and if you had tests for young kids, you know as well as I do that intelligence tests would not necessarily pick up kids who had these particular talents. So that was the intuition behind my enterprise.

I next needed a definition of an intelligence. I was not going to presuppose whether there was just one or more than one. *An intelligence is an ability to solve a problem or to fashion a product which is valued in one or more cultural settings.* Now how does that resemble other definitions and how does it differ? It says nothing about whether it is inborn or acquired. It says nothing about whether you can test it in a minute or an hour, using a no-or-yes format or brain waves. It talks about solving problems which intelligence tests also do, and it also talks about fashioning products, doing things like writing a symphony or a poem or making a painting or creating scientific theories. Creating a scientific theory is not problem-solving. It is really problem-finding. It is doing something new and there is nothing in the intelligence test which relates to this. How can you in an hour tell if somebody is going to develop something into a scientific theory. It just wouldn't work.

Finally, I talk about abilities which are valued in a cultural setting. My definition is culturally relative. This bothers psychologists. Psychologists want to study intelligence as if it is a pristine quality which somehow exists, can be pinned down, and perhaps localized. I think that's a forlorn endeavor. I think intelligence needs to be viewed in a cultural context. Probably everybody in this room can do something better than anybody else in the world. Maybe it's counting the crumbs

on this rug. Do you want to call that intelligence? Unless it is valuable, in whatever cultural setting, I find it foolish to consider it intelligence. This is obviously the controversial part of my theory, but I will be happy to defend it on your time, though not on mine.

That's my definition. I didn't even have a criterion or a set of criteria. What counts as intelligence? What doesn't? Here lies the science in my enterprise, such as it is. What I did with my colleagues was to survey several literatures to look for evidence of intelligences, and when the several literatures all pointed to something as a candidate intelligence, it made my final list. If, on the other hand, as was often the case, a candidate showed up on one list but not on another, would be counterindicated by a third, or reorganized by a fourth, then it lost credibility as intelligence.

Let me tell you what those criteria are. I have already mentioned the first few. I looked at the development of different abilities in children. How do things like moral development, social development, and so on take place? What is the correlation between one form of development and another? Second, I looked at the breakdown of abilities under conditions of brain damage. What sort of things break down, what they break down with, and what sort of things are separate from one another? As probably everyone in this room knows (partly because I said it just a minute ago), things don't operate all together, and when you look at the decoupling of different cognitive abilities, there's very powerful evidence that they are different intelligences.

It is also very convincing. We're all kind of materialists in a philosophical sense, and we like to think we can tie things to particular structures of the brain. And if I can say *this* structure seems to subserve *this* function, and *that* structure seems to subserve *that* function, it is convincing. It is convincing to people who read the Sunday supplements. It is also convincing to scientists. So evidence from brain damage was an important source.

I then looked at what I call *exceptional populations*, which is getting very close to home of The Orton Society. There are the prodigies, children who are extremely gifted in one area but who are ordinary in other areas. Most prodigies are very smart in math or music or chess and perfectly ordinary in other areas. You can read about this in an excellent study of prodigies, *Nature's Gambit*, by my colleague, David Feldman.

I looked at autistic kids who had exhibited a very jagged cognitive profile, children with learning disabilities, who again showed very jagged cognitive profiles, and this evidence from exceptional populations provided a third line of thinking about different intelligences.

Let me mention other sources very briefly. What do we know about the evolution of cognition over the millennia? What do we know about cognition of different species? What do we know about cognition

of different cultures, like the Puluwat Islanders? And finally, two sources of evidence from psychology. One is correlations among different tests, performing factor analysis: which tests correlate, which tests don't? And finally, we looked at the results of tests of generalization and transfer. To train somebody in area A does not necessarily improve his performance in area B. Now one of the big findings in psychology over the past years is that transfer is very, very difficult to get. It is hard to train somebody in area A and get pay-off in area B. We have known this since Edward Thorndike looked to see if he taught somebody Latin, it would make him better in geometry. It wouldn't make him better in Greek. In fact, it was a happy day if it made him better in Latin! Transfer is very difficult to get.

This suggests that intellect is modular. Our minds and our brains are composed of different modules, and it is difficult to get transfer from one module to another. This flies very much in the face of most concepts of intelligence, from which psychologists have not drawn the proper conclusions. Anyway, to follow up this information, I performed what I call a *subjective factor analysis*. An objective factor analysis, as I have said, is a mathematical operation performed on the scores. We couldn't do this with my data. The data didn't exist in that form. So subjective factor analysis was done by a more personal computer. The only thing that kept it from being *completely* subjective is that in my book, *Frames of Mind*, I do review the evidence on each of the intelligences. So you can really see what I say about musical intelligence, linguistic intelligence, and the others, and you can differ if you like.

So I had my definition. I had my criteria. I had my personal computer and my interpersonal computer. And I then came up with a list of seven intelligences. Now there's nothing sacred about the number seven, despite George Miller, and I do not claim that I have necessarily identified the right seven intelligences. Of course, I think that I have. What I am trying to argue is that intelligence is basically a pluralistic concept. Humans have evolved over thousands or millions of years into different kinds of problem solvers and problem finders as well, and you have to understand that process if you want to figure out how people learn and how they develop and what they can and can't do. So the seven intelligences are really for illustrative purposes, and I will illustrate each by giving one or two examples of individuals who have high development in those particular intelligences.

Linguistic intelligence. Poets have lots of linguistic intelligence. I once took a course with Robert Lowell, and he would read a student's poem and he would comment very penetratingly about the poem. He would pick out a particular word in the poem and he would do something that absolutely astounded me. He would take that word and tell you how every major poet in the English language had used that word

over the centuries. His mind was organized in that way. I venture to say that if everyone in this room, for the rest of his life, tried to organize his mind in this way, he would not be able to succeed. It would be very hard anyway.

Logical mathematical intelligence. Logicians, mathematicians, and scientists obviously have this form. Piaget thought he was studying all intelligence, but I believe he was basically studying logical mathematical intelligence, one kind of intelligence.

I mentioned linguistic and logical mathematical intelligence first, not because I think they are the most important—I don't think *any* intelligence is inherently more or less important than others. In fact, which ones are important changes over time. But in our society, the linguistic and logical mathematical are considered to be the most important, and the intelligences you ought to have if you just have one or two intelligences.

If you look at standardized testing, IQ testing, SATs, they test the linguistic and logical mathematical intelligences. If you are lucky enough to be good in both of those intelligences, you'll do well in tests, you'll do well in school, you'll probably get well-placed professionally. It doesn't necessarily predict that you will do well once you get out of school. The correlations are not impressive. But if you stay in school forever, as professors do, you'll probably continue to do well. Professors, like everybody else, like to create tests in their own image.

I mentioned five other intelligences. *Musical intelligence*—Leonard Bernstein has lots, Mozart had even more. *Spatial intelligence*—the ability to form a representation of the world. In your mind you operate on that representation of the spatial world. Painters, sculptors, architects, engineers, geometers, surgeons, sailors in the South Seas exhibit lots of spatial intelligence.

You will notice that I mentioned artists. I also mentioned engineers. That is important because having a certain kind of intelligence doesn't predict whether you're going to be an artist or a scientist. But it *does* predict the *kind* of art you are likely to do or the *kind* of science you are likely to do.

I see some heads nodding. Those of you who work with dyslexic children know that they often have language problems, but they are very good at spatial tasks. And that's why you can look at artists and architects, and certain kinds of physicians and engineers, and find individuals who are dyslexic but are using their spatial intelligence to great effect.

The same case obtains with *bodily kinesthetic intelligence*, the ability to use your whole body, or part of your body like your hand or your mouth, to solve a problem or fashion a product. Bodily intelligence is used by dancers, choreographers, athletes, mimes, surgeons again,

craftspeople, people who use their hands and bodies in a problem-solving kind of way.

I also distinguish two personal intelligences. It is difficult to understand and to measure these forms but they are tremendously important. I think, at least nowadays, a personal intelligence is probably as or more important than the others, but we don't really know how to study it properly.

Interpersonal intelligence is the ability to understand other people, what motivates them, how they work, how to work practically with them. Salesmen, politicians, teachers, religious leaders, are individuals who have, or should have, high degrees of interpersonal intelligence. Ronald Reagan may fail in some of the other intelligences, but he has lots of personal intelligence and it is very useful. (Note: These words were uttered in November 1986, before the Iran-Contra scandal broke.) Jimmy Carter probably has thirty more IQ points than Ronald Reagan, but is not thought of as equally successful. *Intrapersonal intelligence* is the correlative ability turned inward: an effective working model of oneself and the ability to use that model effectively in light of your desires, needs, wishes, fears, and skills. Intrapersonal intelligence includes knowledge of our other intelligences and that is tremendously important.

Now, it is a little difficult to say who has a high degree of interpersonal intelligence. Secretly, we all think we do, but we couldn't all be right—just ask our spouses! However, I think psychotherapy is relevant here: A person who is a successful product of psychotherapy usually has an enhanced and more accurate notion of his or her own self.

So those are the seven intelligences. I think of them as seven computational devices in the head which we possess as a species and are able to use when certain kinds of information or contents come in. Being strong in one intelligence has no particular implication about strength in other intelligences.

In any ordinary form of human activity you have numbers of intelligences working together, but they work together in unpredictable ways. Only in a freak do you see a single intelligence operating alone. It is messier in the rest of us. However, if you look at us all carefully, you will find very few of us have exactly the same level or configuration of intelligences.

So I have given you a definition, a set of criteria, and a list of candidate intelligences. What can I say about my theory with reference to other theories? Most of you know that I by no means am the first person to promote a pluralistic view of intellect. Thurstone talked about the seven factors of the mind, which have some resemblance to mine. Guilford talks about 150 different types of components, so he has 143 more than I do.

Why, then, is Gardner's theory any different from the others'? I think it is important for me to say something about that. First of all, the theory is biologically based. I am making a claim about how the brain has evolved and how it is organized. I am making a claim, so to speak, about the "natural kinds" of minds. If you could open up the skull and figure out what it is organized to do, it turns out to be organized to do basically seven things well. All other intelligence theories, to my knowledge, draw on the results of tests. My theory is not based upon a mere empirical correlation among tests, but rather upon a biological analysis.

There is also a developmental facet to my theory. Each intelligence has its own developmental trajectory. It begins at a certain point. It has crystallizing moments where it flourishes and sensitive periods where small factors exert major effects. It achieves a peak and a decline which can be rather precipitous or much more gradual. A whole science remains to be invented on the developmental trajectories of each of the intelligences and the subintelligences. I have no doubt that capacities like logical thinking develop in a very different way than capacities like personal intelligence. That is why it is ridiculous to claim that one can test two-year-olds and superior adults using the same short yes-or-no test. Such a claim shows developmental insensitivity. I must say that every intelligence test that I know of is developmentally blind. That does not mean that testers use exactly the same items for two-year-olds as they do for adults. Basically, they use the same *kinds* of elements all the way through, which shows as nondevelopmental bias.

How else is my theory different from all other theories? Consider my focus on cultural roles. I care about how intelligences are realized in different types of cultures and settings. So, for example, if you take my three different end-states, they each call for a different kind of intelligence. If I couldn't find an intellectual capability that was of value in a cultural setting, it would cease to be of interest to me. It is quite possible somebody could break the books on an IQ test, and score 287, but wouldn't have any ability that is useful in the culture. And that's why I think often IQ tests are useless. In fact, Norman Geschwind used to point out that you could remove somebody's frontal lobes, and that individual would still have an IQ of 140. But, alas, such people sit around like vegetables and never initiate any activity. What sense does it make to call someone like that a genius?

Another way in which my theory is different is that I speak in terms of vertical rather than horizontal organizations of mental faculties. If you look at any psychology textbook, you will find chapters on perception and learning, on memory and attention. The assumption is that there are basic "horizontal" laws of learning and they cut across all kinds of content. So, too, for perception, memory, and the like.

A vertical theory of faculties holds that the best way to cut the cog-

nitive pie is vertically, in terms of content. If you take away one point from this lecture, let it be that *the mind is organized in terms of content*. It matters whether you are dealing with language, music, space, other people or yourself, or your body. Moreover, laws of learning, memory, perception, and the like are organized around those contents. There are laws for learning language which are not necessarily the same as those for learning about other people or about bodily space. Each content, each vertical faculty has its own principles of learning, memory, perception. This is very radical and it hasn't been proved yet, but there are some interesting lines of evidence that point that way, particularly in neurological studies.

Also, your own intuition supports this. Think about somebody you know who has a good memory. Now ask yourself the following questions about that person. How does that person remember a song he heard on the radio yesterday? How does he remember a dance step that he was taught some months ago? How does he remember a group of people who came to a dinner party last year? The answer is you don't know. That is because, when you talk about good memory, you are really talking about good verbal memory, somebody who can remember all those date of major battles in the 18th century. We use the word good memory in this way, and we don't pay attention to other kinds of memory. But clearly, memory is a faculty which may not work the same way with different kinds of material. We know that someone's verbal memory has zero predictive powers about his visual-spatial or musical capabilities.

The final way in which my theory differs from other theories is that it makes some clear-cut claims about gifts and about creativity. Let me say a word about this, since I know you are interested in unusual talents. Gifts are domain-specific. People may be highly gifted in one area and it doesn't give any clue about how gifted they are in other areas. Talk about people being gifted means that, exposed to the same amount of material as other people, these individuals develop much more quickly. The opposite side of the coin, the deficit, means you're "at risk." If a person at risk is given the same kind of information, the same kind of material, he will not progress as quickly as other people. Gifted programs in schools which admit people with an IQ over 130 but don't admit people with an IQ of 129 are predicated on the notion that gifts are general, or that there is a simple academic gift, which is a more modest claim, but I don't think either of those are true. Gifts are much more domain-specific and so is creativity. I don't believe for a second that if Mozart had been born in Einstein's home and Einstein had been raised in Mozart's home, Mozart would have been the greatest physicist of the eighteenth century, and that Einstein would have been the greatest musician of the past century or vice versa. They would not have been able to deal with the radically different situations.

Creativity, doing something new in a field, is also domain-specific. The notion of creativity tests, which can tell you in half an hour how creative you will be, is as insipid as the idea of intelligence tests which, in a half hour or an hour, can tell you how smart you are.

I want to turn now to some educational implications of the theory. I think we can use multiple intelligence theory as a way of analyzing educational encounters. An educational encounter is any situation in which a person is learning something, or is trying to, in school, watching television, reading a book, walking around Constitution Hall. We can analyze this encounter in terms of intelligences. What's the content? Are you learning a language? Are you learning logic? What's the means? Does it involve using language, using logic, using space?

Different educational powers call for different intelligences. The Puluwat sailor was using spatial intelligence. The Koran student was using linguistic intelligence largely, logical intelligence to some extent. Also crucial for the Koranic student are personal intelligences. If you can't form a relationship with a religious leader, you're not going to make it. Interpersonal intelligence is not as important to our society as it is in the traditional society until you get to graduate school. There, if you can't form a relationship with your mentor, forget it.

In traditional schools, educators put language on a pedestal. Logic and interpersonal skills are also important. In the modern secular school, the school of today, language is still important, logic is more important, interpersonal is not particularly valued. But intrapersonal intelligence becomes crucial. You really have to know your own skills, particularly if you live in a pluralistic society. I also think that in the society of the future, logic will become even more important.

The configuration of valued intelligences changes over the millennia. In preliterate cultures, people who today have reading problems had no trouble at all. If, in a hundred years, we move away from literacy, The Orton Society may have to disband! Speaking more generally, if one takes into account the existence of different intelligences, one can analyze why learning occurs in one situation, and not in another, on the basis of the intelligences which are needed, and the ones which are actually used.

So far, I have been speaking mostly on a theoretical level. I want, in conclusion, to talk about some of the work that we have been doing in the schools. We have two applied projects in the community, one working with preschoolers and one with adolescents. In Project Spectrum, we are devising new means of assessing the intelligences of young children. We do this by setting up a very richly-equipped classroom, and by observing the activities in which children participate spontaneously. We observe interest, depth of exploration, change over the course of a year. At the end of the year, we produce a Spectrum report, a portrait of the child, delineating his major intelligences and his areas

of weakness, and we wed this to concrete suggestions about what the child (and his family) might do in the future. This practice is consistent with my notion that we psychologists should spend less time ranking people and more time making concrete suggestions which may be of help.

In Arts Propel, a project being carried out at the junior and high school level, we are attempting to assess students' strength in the arts and humanities. We favor here a portfolio method, where students assemble not only their finished products, but their notes, sketches, goals, self-criticisms, and comments. The portfolio is designed to function as a kind of cognitive record of the student's intellectual growth over a period of time. We hope that, if successful, such portfolio methods might be used as well in other areas of the curriculum which sample the full range of human intelligences. And, perhaps some day, student portfolios, properly evaluated, will serve as an adjunct to, or perhaps even a replacement for, standardized test scores in a college admissions packet.

I think the school of the future could be organized around these ideas. There could be *assessment specialists* whose job it is to figure out the multiple combinations of intelligences (or subintelligences) which each child has. We could then have *student-curriculum brokers* who connect students not only with the kind of curricula they should be pursuing, but also with the *ways* in which those curricula should be presented. One of the positive features of modern technology is that we make available a much larger set of ways of teaching. We may as well try to match children and their learning style with a curriculum that they are going to take, either electively or to fulfill requirements.

Finally, we talk about *school-community brokers*. These individuals find vocational options and avocational options in the wider community. They then direct youngsters to these community opportunities, which presumably match more closely to the child's own intellectual configuration.

One may ask about the need for integrating students with the wider community. Now I am not concerned about those students who excel in language or in logic. They will do well in traditional school, will get into good undergraduate and graduate programs, and may well shine later "in the real world." I am worried chiefly about those students who don't shine in language or logic, but who possess other kinds of gifts and talents. These students will be well served by an educational system which brings to their attention those opportunities in the wider community which make particular use of their combination of intelligence.

You may feel my list of different experts sounds utopian. Can we really have all of these specialists? I feel that the problem is not a lack of resources, either human or technological, but rather a lack of will.

Nowadays, there is tremendous pressure to treat everyone in the same way, to give them the same curricula and to subject them all to the same quick tests. It is this way of thinking and evaluating and not the resources themselves, which needs to be changed by a universal act of will if we are to have a more humane and individual-centered school of the future.

Let me now say something about how all this relates to the education of students with learning problems. Special education has often been disparaged by the wider society, but this is one area where I think that the special educators will be the revolutionaries. That is because special educators and learning-disability experts have long known that individuals learn in different ways and that education is most effective when these individual differences are taken into account or even placed at the fore.

A second and related implication has to do with the ways in which we actually teach individual children. We need to ask much finer grained questions about the nature of the subject matter and the kinds of particular abilities and deficits possessed by each child—normal, supernormal, disabled, or impaired in one or another respect. Once again, I think that special educators have the edge here because they have long been looking for the extra leverage, personal, curricular, or technological, which can support an individual child and can convert an unsatisfactory performance into an adequate or even a superior one.

We must confront the possibility that there may be certain subjects or concepts which will prove very difficult for students with certain kinds of deficits. We must have a strong effort to teach these materials, but there may come a point where it is simply a poor use of time to continue to knock one's head (and the student's head) against the same stone wall. Part of the burden of the theory of multiple intelligences is to spell out alternative ways of communicating a concept but also to indicate when such a concept may be very difficult to convey using alternative means.

A happier part of this tale is that often deficits go hand in hand with strengths. This unexpected coupling occurs for at least two reasons. First of all, it seems to be the case that disabilities of certain sorts correlate with strengths of other sorts, at least in certain cases. Thus children who are dyslexic often show enhanced facility at visual and/or spatial tasks. The second reason stems from dealing with adversity. No one needs to recommend adversity and there is all too much of it in the world. It turns out, however, that the experience of dealing with, and conquering a disability, is often a great ally in dealing with subsequent challenges.

I am waxing fairly moralistically at this point and so it is time for me to turn officially to the morals which I promised you. I have accused our society of being "Westist, Testist, and Bestist."

Westist—in the sense of valuing too highly a certain combination of language and logic which has been advantageous in our history but which may not be all things to all people.

Testist—in the sense that we try to make a test for everything and that we lose interest in those abilities which we cannot quantify. We too often let the testing tail wag the educational dog.

Bestist—in the sense used by David Halberstam in his book, *The Best and the Brightest*. You will recall that Halberstam spoke ironically of the college professors and “bright” individuals who got our country into the Vietnam mess and could not then extricate us.

We need to be able to draw on a much wider set of talents. There should be recognition of, and serious attempts to make full use of, all combinations of human intelligences. If we succeed in doing this, individuals will feel better about themselves. With enhanced self-esteem, they may be more inclined to contribute to the general welfare of the community. And they may also be able to help us solve some of the intractable problems which have certainly eluded the best and the brightest. Recognition of the range of human intelligences may not guarantee our survival, but I think that it enhances the probability that we will be able to live together in some semblance of harmony in a world which is less troubled than ours today.