

# Multiple Intelligences: The Research Perspective

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## A Brief Overview of the Theory

The theory of multiple intelligences challenges the traditional view of intelligence as a unitary capacity that can be adequately measured by IQ tests.<sup>1</sup> Instead, Howard Gardner defines intelligence as an ability to solve problems or create products that are valued in at least one culture.

Drawing upon findings from evolutionary biology, anthropology, developmental and cognitive psychology, neuropsychology, and psychometrics, Gardner uses eight different criteria to judge whether a candidate ability can be counted as an intelligence: 1) Potential of isolation by brain damage; 2) existence of savants, prodigies, and other exceptional individuals; 3) an identifiable core operation or set of operations; 4) support from experimental psychological tasks; 5) support from psychometric findings; 6) a distinctive developmental history with a definable set of expert “end-state” performances; 7) evolutionary plausibility; 8) susceptibility to encoding in a symbol system.

When he introduced the theory in *Frames of Mind*, Howard Gardner suggested that each individual possesses at least seven such relatively independent mental abilities or intelligences. Core operations are among the eight criteria he uses to evaluate one or another candidate intelligence. According to his definition, a core operation is a basic information processing mechanism—basically, something (like a neural network) in the brain that takes a particular kind of input or information and processes it. Gardner asserted that each intelligence should have one or more core operations. Among the core operations Gardner specifies in *Frames of Mind* and his other more recent writings on the naturalist intelligence are:

Intelligence	Core Operations
Linguistic	syntax, phonology, semantics, pragmatics
Musical	pitch, rhythm, timbre
Logical-Mathematical	number, categorization, relations
Spatial	accurate mental visualization, mental transformation of images
Bodily-kinesthetic	control of one’s own body, control in handling objects
Interpersonal	awareness of others’ feelings, emotions, goals, motivations
Intrapersonal	awareness of one’s own feelings, emotions, goals, motivations
Naturalist	recognition and classification of objects in the environment <sup>2</sup>

In a recent article, “Are there additional intelligences?”<sup>3</sup> he examines two more candidate intelligences, naturalist and spiritual, but ends up rejecting spiritual—at least for now—because it does not meet the right criteria named earlier. He is still amassing evidence for other suggested intelligences. For example,

existential intelligence—manifest in somebody who is concerned with fundamental questions of existence—does not as yet seem to meet all criteria. If decisions about intelligences are to be taken seriously, they must depend upon examination of the available data.<sup>4</sup> So at this point one might joke that the existential intelligence is that “half” in 8-1/2 intelligences.

In this theory, the word intelligence is used in two senses. Intelligence can denote a species-specific characteristic; homo sapiens is that species that can exercise these eight intelligences. Intelligence can also denote an individual difference. While all humans possess the right intelligences, each person has his own particular blend or amalgam of the intelligences.

The definitions of the intelligences on the next page, adapted by White and Blythe from the originals presented in *Frames of Mind*, list occupations, professions, disciplines, areas and directions an intelligence can take.<sup>5</sup> But these are by no means the only examples; nor does any of these examples or end states represent the use of any one intelligence. Rather, all brain-unimpaired people possess all the intelligences, which they blend in various ways in the course of creating something that is meaningful or performing a meaningful role or task.

## The Spectrum Approach

Project Spectrum, a nine-year research and development project based on the theories of Howard Gardner and David Feldman of Tufts University, is one example of a way to meet this challenge. Described in detail in *The Project Spectrum Preschool Assessment Handbook*<sup>6</sup>, this approach emphasizes identifying children’s areas of strength and then using this information as the basis for individualized educational programs. The curricular and assessment materials developed during the course of the project tap a wider range of cognitive and stylistic strengths than typically had been addressed in traditional early childhood education programs. Teachers find that the Spectrum system for identifying individual strengths can supplement their current assessment strategies, helps them expand the range of activities available to students, and opens up new territory for their teaching.

Distinctive features of the Spectrum approach include: blurring the line between curriculum and assessment by assessing children as they play with rich materials; using “intelligence-fair” materials (e.g., having children work with real mechanical objects instead of answering questions about how the objects work); embedding assessments in meaningful, real-world activities; and attending to stylistic as well as cognitive dimensions of performance. Grounding assessment in real-world activities ensures that the areas addressed are likely to be meaningful to the child, the teacher, and the child’s family.<sup>7</sup>

**Blurring the line between curriculum and assessment:** Instead of the traditional intelligence test setting, a small room with an unfamiliar test-giver administering timed and standardized instruments, Spectrum assessments involve children in the classroom playing with rich materials. During the course of a treasure hunt, for example, a child might draw logical inferences and generate a rule connecting two sets of data while searching for “treasures” hidden under flags on a game board island. Teachers use observation sheets to record when a student figures out the rule governing where the treasures have been hidden or a pattern that can be used to predict where remaining objects are hidden.

**Using “intelligence-fair” materials:** Spectrum assessments tap into abilities directly, via the medium of a domain, rather than using language and logic assessment vehicles. One Spectrum activity asks children to sing the song “Happy Birthday.” The performance is then evaluated phrase by phrase, and scored on four measures of rhythm, pitch, and contour patterns. An assembly activity presents objects of increasing mechanical complexity—real gadgets, like a food grinder and small oil pump. Successful completion depends on a range of observational problem-solving skills, like noticing which pieces come off, learning how to reassemble the gadget, and inferring relationships based on sensitive observation.

**Embedding assessment in meaningful, real-world activities:** The Spectrum activities involve the application of skills in a meaningful context. A child’s ability to tell a story, for example, is observed via an activity that provides a concrete but open-ended framework in which children can produce invented tales. After listening to examples of storytelling, children are asked to tell a story using a “storyboard” made from a

board or box top outfitted with figures and a setting. Each child's story shows much about how he or she ties together successive events, or further elaborates on characters, places, or objects.

**Attending to stylistic dimensions of performance:** Spectrum's assessment procedures attend to stylistic as well as cognitive dimensions of performance. These dimensions or "working styles" describe a child's interaction with the tasks and materials from various content areas. They reflect a process dimension of a child's work or play—indices of affect, motivation, and interaction with materials, as well as more standard stylistic features like tempo of work and orientation toward auditory, visual, or kinesthetic cues.

It is important to note that intelligence is not the same thing as style. Intelligences are keyed to contents in the world; styles are claims about how an individual approached the full array of contents. It is an empirical matter whether styles actually obtain "across the board" or prove to be specific to particular intellectual contents.

## The Multiple Intelligences

**Linguistic Intelligence** allows individuals to communicate and make sense of the world through language. Poets exemplify this intelligence in its mature form. Students who enjoy playing with rhymes, who pun, who always have a story to tell, who quickly acquire other languages—including sign language—all exhibit linguistic intelligence.

**Logical-Mathematical Intelligence** enables individuals to use and appreciate abstract relations. Scientists, mathematicians, and philosophers all rely on this intelligence. So do the students who "live" baseball statistics or who carefully analyze the components of problems—either personal or school-related—before systematically testing solutions.

**Musical Intelligence** allows people to create, communicate, and understand meanings made out of sound. While composers and instrumentalists clearly exhibit this intelligence, so the students who seem particularly attracted by the birds singing outside the classroom window or who constantly tap out intricate rhythms on the desk with their pencils.

**Spatial Intelligence** makes it possible for people to perceive visual or spatial information, to transform this information, and to recreate visual images from memory. Well-developed spatial capacities are needed for the work of architects, sculptors, and engineers. The students who turn first to the graphs, charts, and pictures in their textbook, who like to "web" their ideas before writing a paper, and who fill the blank space around their notes with intricate patterns are also using their spatial intelligence. While usually tied to the visual modality, spatial intelligence can also be exercised to a high level by individuals who are visually impaired.

**Bodily-Kinesthetic Intelligence** allows individuals to use all or part of the body to create products or solve problems. Athletes, surgeons, dancers, choreographers, and crafts people all use bodily-kinesthetic intelligence. The capacity is also evident in students who relish gym class and school dances, who prefer to carry out school projects by making models rather than writing reports, and who toss crumpled paper with frequency and accuracy into wastebaskets across the room.

**Intrapersonal Intelligence** helps individuals to distinguish among their own feelings, to build accurate mental models of themselves, and to draw on these models to make decisions about their lives. Although it is most difficult to assess who has this capacity and to what degree, evidence can be sought in students' uses of other intelligences—how well they seem to be capitalizing on their strengths, how cognizant they are of their weaknesses, and how thoughtful they are about the decisions and choice they make.

**Interpersonal Intelligence** enables individuals to recognize and make distinctions about others' feelings and intentions. Teachers, parents, politicians, psychologists, and salespeople rely on interpersonal intelligence. Students exhibit this intelligence when they thrive on small-group work, when they notice and react to the moods of their friends and classmates, and when they tactfully convince the teacher of their need for extra time to complete the homework assignment.

**Naturalist Intelligence** allows people to distinguish among, classify, and use features of the environment. Farmers, gardeners, botanists, geologists, florists, and archaeologists all exhibit this intelligence, as do students who can name and describe the features of every make of car around them.

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- 1 Gardner, H. (1983/1993). *Frames of mind*, p. 8-9.
- 2 Kornhaber, M. (1996). *The Parking Lot Press*, Volume 1, No. 1. A publication for the MI strand of Project Zero's Summer Institute, July, 1996. p. 1.
- 3 Gardner, H. (in press). Are there additional intelligences? The case for naturalist, spiritual, and existential intelligences. To appear in J. Kane (Ed.), *Education, information and transformation*. Englewood Cliffs, NJ: Prentice Hall.
- 4 Garner, H. (in press), p.19.
- 5 White, N. & Blythe, T. (1992). Multiple intelligences theory: Creating the thoughtful classroom. In A. Costa, J. Bellanca, & R. Fogarty (Eds.), *If minds matter: A foreword to the future*. Palatine, IL: Skylight Publishing, Inc., p. 128.
- 6 Krechevsky, M., with contributions from Adams, M., Chen, J., Goldman, J., Hatch, T., Leibowitz, L., Malkus, U. Ramos-Ford, V. Stork, J., Viens J. & Wexler-Sherman, C. (1994). *Project Spectrum: preschool assessment handbook*. Cambridge, MA: Harvard Project Zero.
- 7 Krechevsky, M. (1991, February). *Project Spectrum: An innovative assessment alternative*, *Educational Leadership*, 48(5), 45.

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