

# THE FOUR-QUADRANT BRAIN MODEL OF THINKING PREFERENCES

## WHAT YOU CAN LEARN FROM THIS CHAPTER:

- How the 4-quadrant model of thinking preferences was developed; the concept of dominance.
- The characteristics of analytical quadrant A thinking.
- The characteristics of sequential quadrant B thinking.
- The characteristics of interpersonal quadrant C thinking.
- The characteristics of imaginative quadrant D thinking.
- Relating whole-brain thinking to creative problem solving.
- Organizational implications of whole-brain thinking and learning; HBDI research results; comparison with the 4MAT system of learning styles.
- Further learning and insight: resources, exercises and activities, and summary.

As you compared mathematical and verbal thinking with visualization and sensory thinking in the last chapter, you may have noticed that the different mental languages required distinct and perhaps unfamiliar thinking abilities. Now we want to investigate differences in the way people think and process information in more detail. We will explore a model of thinking preferences that we have found useful for learning to become more effective thinkers and problem solvers.

## HOW THE FOUR-QUADRANT MODEL OF THINKING PREFERENCES WAS DEVELOPED

It is time to introduce to you a remarkable person with a fascinating history. Ned Herrmann is the father of brain dominance technology. Through his research, and life experiences, he came to recognize that the brain is specialized, not just physically, but in the way it functions—its specialized modes can be organized into four distinct quadrants, each with its own language, values, and ways of knowing.

Each person is a unique mix of these modes of thinking preferences, and these preferences result in different expressions of behavior. How Ned Herrmann came to these conclusions and insight is quite a story, as told in his book *The Creative Brain*. We are giving you here just the briefest of summaries so that you can glimpse the thinking behind his development of the four-quadrant model of brain dominance.

Already during his high school years, Ned Herrmann noticed that he had two separate sets of enjoyable friends, his math and science pals and his acting and singing buddies. His life became less balanced in college; through the family mindset he chose to major in chemical engineering. He soon found that he was "dumb" in chemistry. After military service during World War II, he returned to college and graduated in physics and music, both of which provided an enriching education. But for his professional life, he had to make a choice—a career in science or as an opera singer. He convinced General Electric Company to hire him because of the thinking skills he had learned through his studies in physics. Although he was treated as an engineer at first, he soon advanced through a variety of managerial positions in sales, marketing, employee relations, human resources, and management education. Then, when months of illness made it impossible for him to perform his musical hobbies, his wife brought home an oil-painting set. The results astonished him and his family—they launched his artistic and sculpting career. When he was asked to be on a panel to discuss creativity in 1976, he did a library search on the topic. He learned that creativity was related to a specific, physiological brain function and gained a sudden insight into his own behavior—who he really was and why he seemed to have a "divided" brain.

He began to investigate this area of left-brain, right-brain functioning, particularly the work of Dr. Roger W. Sperry and associates on split-brain research and testing (which earned Dr. Sperry a Nobel prize in 1981). The science of neuropsychology has found that for most people, mathematical and verbal thinking (formal speaking, reading, writing) are done primarily in the left hemisphere, while spatial, holistic, imaginative thinking is done in the right hemisphere. As briefly seen in Chapter 2, brain research now makes use of very sophisticated high-tech machines to chart brain function, and many new things are being learned about this most amazing and complex organ.

*Within the brain of a patient, there can exist a mental duality.*  
Hippocrates, 450 B.C.

*Humans exercise two modes of knowing: One through verbal argument,  
one through non-verbal experience.*  
Roger Bacon, 1286.

*One of the two half-brains in humans takes the lead and is the dominant hemisphere.*  
John Hughlings-Jackson, M.D., 1874.

*Why are some people so smart and dull at the same time?*  
Henry Mintzberg, professor of management, McGill University, 1976.

*All four of these quotes are from The Creative Brain.*

### The Concept of Brain Dominance

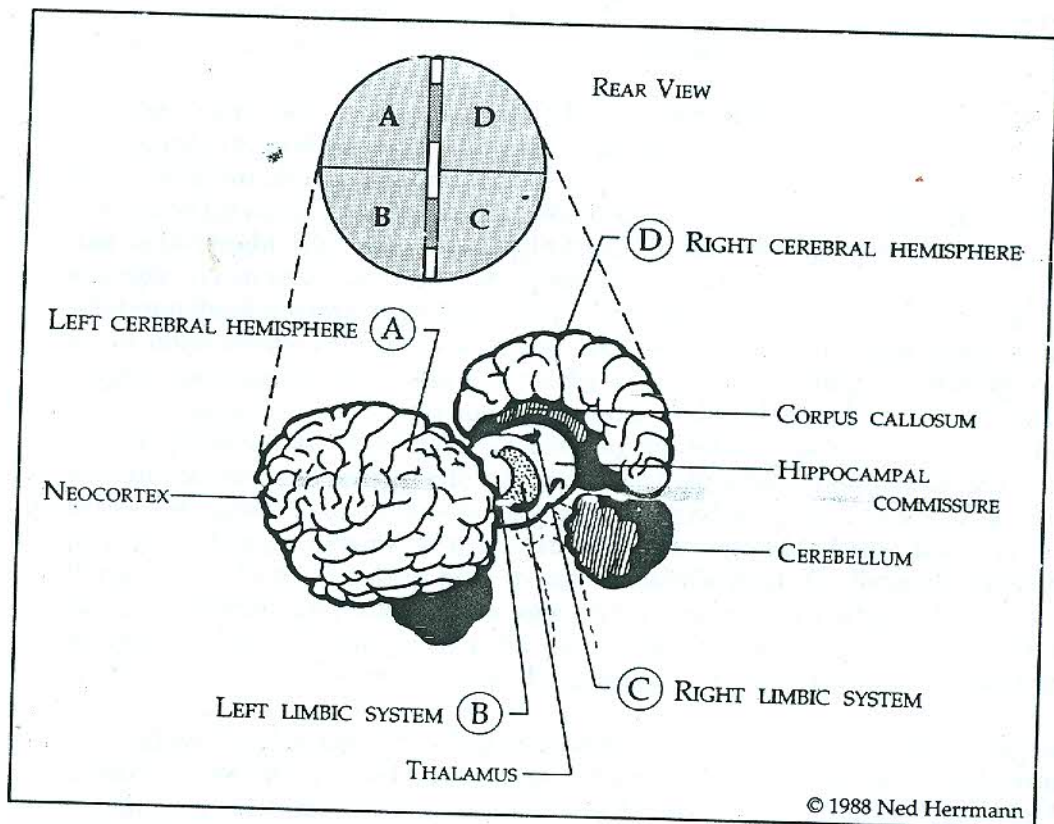
The next thing Ned Herrmann discovered during his search was the concept of dominance. The two halves of the brain are not used by people in the same way and with the same frequency. People develop dominances or—as Ned calls these cognitive (thinking) preferences—“preferred modes of knowing.” Dominance has advantages: quick response time and higher skill level. We use our dominant mode when we need to solve a problem or learn something new. For example, if you solve a problem analytically by looking at facts and numbers and then plug these into a logical formula or sequential procedure, you are using a left-brain approach. If you search for patterns and images involving sensory impressions to give you an intuitive understanding of the whole, you are using a right-brain approach. Left-brain students learn by reading about a subject, whereas right-brain students learn by watching demonstrations and doing hands-on activities. The more extreme our preference for one way of thinking, the stronger is our dislike or discomfort for the opposite mode. These “opposite” people will also have great difficulty communicating and understanding each other, because they use different vocabularies and see the world through very different “filters.” The question of course that comes up at this point is: “Which way is better?” Ned Herrmann found out that each brain mode is best—for those types of tasks that it was designed to perform.

How do people develop these preferences? Are we born that way and “stuck” with these preferred thinking modes? Ned Herrmann thinks that each person is born with a given genetic set of cognitive capabilities, with strengths and weaknesses. As we interact with the world, we learn to respond with our stronger abilities, because they lead to more frequent success and reward. As we have seen, the use of the brain in certain ways of thinking strengthens those structures. Ned Herrmann says that the performance-praise-preference feedback loop can turn a small difference in hemispheric specialization into a powerful preference for one cognitive mode over another. And this is not only true for individuals, it also works for entire cultures. The Industrial Revolution shifted success heavily toward analytical thinking, whereas historically in the native American culture and in agrarian societies, survival depends more on holistic, intuitive skills such as understanding animal behavior (for hunting and husbandry), understanding the ecology of the environment, the healing arts, the weather, and social interdependence. Because our school systems concentrate so heavily on sequential reasoning skills, more creative abilities have been completely overshadowed and are often actively discouraged, not only by teachers but also by well-meaning parents, family members, employers, and managers. What is needed is a better balance and an appreciation for all thinking abilities; we need to learn how to use and integrate these abilities for whole-brain thinking and problem solving.

To understand how Ned Herrmann invented the four-quadrant brain dominance model, we need to visualize the physical brain. Most people are familiar with the main hemispherical division into left-brain and right-brain. Strictly speaking, these are the cerebral hemispheres and contain about 80 percent of the brain. Primary mental processes in these hemispheres include: vision, hearing, body

sensation, intentional motor control, reasoning, conscious thinking and decision making, language and nonverbal visualization, imagination, and idea synthesis. Each cerebral hemisphere has a separate structure nestled into it—one-half of the limbic system. The limbic system is a vital control center that regulates hunger, thirst, sleeping, waking, body temperature, chemical balances, heart rate, blood pressure, hormones, and emotions (pleasure, punishment, aggression, and rage). It plays a powerful role in learning since it is crucial in transferring incoming information to memory. A diagram of the brain together with its relationship to Ned Herrmann's four-quadrant concept is given in Figure 3-1.

The hemispheres are connected with fibers that carry communications within and between the hemispheres. Association fibers form a complex network connecting the different specialized areas within each hemisphere. The limbic system was long considered to be a single entity, but is now recognized as two halves or lobes linked through the hippocampal commissure. The two cerebral hemispheres are connected by the corpus callosum which contains between 200 to 300 million axonic fibers. When one part of the brain is actively thinking, the other parts are in "idle" mode in order not to interfere with the specialized thinking task. However, when solving a complex problem or doing an intricate task, more than one thinking skill is involved. The brain has the ability to switch signals back and forth very



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Figure 3-1 How the four-quadrant model relates to the physical brain.

rapidly between different specialized areas within and across the hemispheres through the fiber networks. Switching thinking modes within the left hemisphere or within the right hemisphere is quite easy. Switching between the two lower (limbic) or upper (cerebral) quadrants is somewhat more difficult. Switching diagonally is very difficult and stressful because no direct fiber connections exist between the diagonally opposed quadrants of the brain, and thoughts have to be translated or processed via one of the connecting quadrants.

As discussed in *The Creative Brain*, researchers have discovered a physical difference between sexes where the corpus callosum is concerned. Females on the average have 10 percent more fibers, and impulses travel 10 percent faster than in males. Thus many females can move ideas back and forth between hemispheres faster than the average male. Also, their corpus callosum matures as much as three years earlier. According to Ned Herrmann, young females have an advantage in learning to be comfortable with right-brain processing—which is due to biological as well as cultural influences. He found that women are potentially more interhemispheric in their mental processing, more whole-brain oriented, more intuitive, more open to new ideas, and more people-oriented than thing-oriented. They perceive their surroundings more sensitively, manage the innovation process more comfortably, and respond faster to changing circumstances. Thus, an organization that can cooperatively integrate male and female capabilities—in essence become whole-brained—will increase its competitive advantage.

Ned Herrmann, as the next step in his research about the brain and creativity, now wanted to find out more information about people's brain dominances. How does the brain choose which specialized part to engage? This question related directly to his job as a teacher and trainer, because he found that left-brain thinkers had to be taught differently from right-brain thinkers for optimum learning. For example, when asked to answer the question, "What is wrong with education?" a left-brain thinker would typically reply, "Get back to the basics and discipline—get rid of unnecessary frills like sports and art." A right-brain thinker would rather suggest cooperative, hands-on educational activities, including integrating social and creative aspects into the whole of education. Ned Herrmann noted a frequent lack of appreciation for the different thinking modes and their contributions: how learning to be more sensitive to people could help a left-brain person get along better with coworkers, or how having set goals and keeping to a schedule could help a right-brain person be more efficient. He concluded that both types of thinkers benefit by knowing how to use the whole brain for learning, working, solving problems, and communicating with each other. Thus early in this work, he recognized this important insight: No part of the brain works as fully or creatively on its own as it does when stimulated or supported by input from the other parts.

When Ned Herrmann looked around for a questionnaire or way to diagnose thinking preferences based on brain specialization, he was surprised that he could not find any existing tools that were suitable for his purposes. So he developed his own, now known as the Herrmann Brain Dominance Instrument (HBDI). The Myers-Briggs Type Indicator by comparison is based on psychological concepts,

not specialization, and thus yields different (though correlating) information. As Ned Herrmann began to teach workshops, he collected much data with early versions of his questionnaire. The data seemed to fall into four clusters, not into two cerebral hemispherical divisions. Then, one day as he was driving along in his car, the mental image of the divided brain rotated to where he realized that the limbic system was also divided into two hemispheres, in essence giving a brain divided into four quadrants, as indicated schematically in Figure 3-1. This enabled him to organize his data into the four-quadrant whole-brain model as a “descriptive metaphor.” Now that we are familiar with this model, the division seems logical and obvious—it is difficult to realize that this understanding is quite recent.

Figure 3-2 shows the metaphorical model of the four-quadrant brain of thinking preferences. The brain is visualized as a circle divided into four quadrants. To emphasize the metaphorical status of the model, Ned Herrmann named the quadrants alphabetically to de-emphasize their connection with the cerebral-limbic brain. The upper left (cerebral) quadrant is designated A, followed by B, C, and D in a counterclockwise direction. Each quadrant has very distinct clusters of thinking abilities or ways of learning and knowing. The following sections in this chapter will discuss and illustrate the characteristics of each of the quadrants from the viewpoint of how people learn in these thinking modes and how they can strengthen these abilities. Keep in mind that each person is a unique “coalition” of thinking preferences and learning styles, as emphasized by Ned Herrmann. You might be interested to know that he and his coworkers, as well as independent researchers, have done a tremendous amount of work in validating the HBDI with hundreds of studies over more than a decade. Ned Herrmann now has a database exceeding 500,000 individual and organizational profiles; the HBDI survey forms

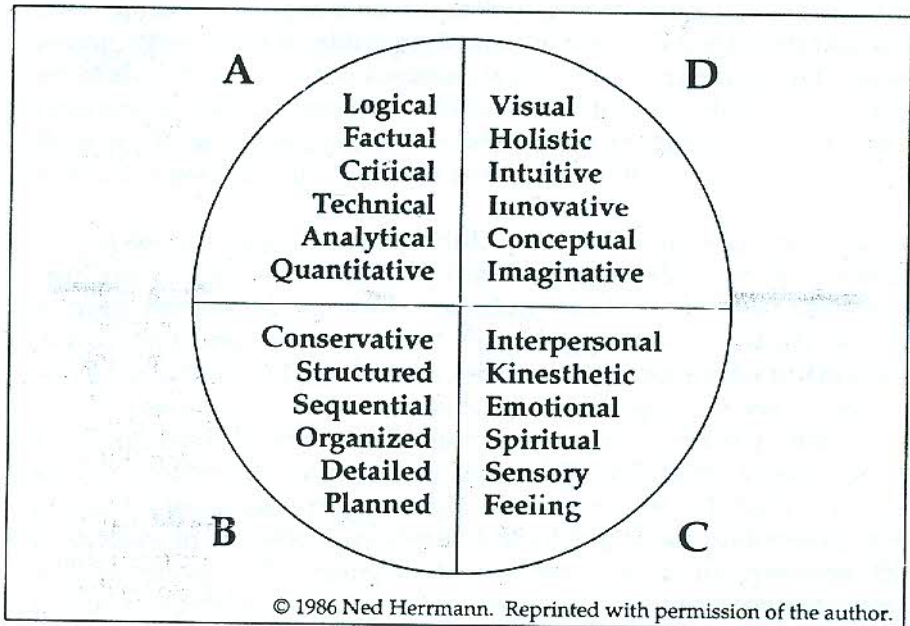


Figure 3-2 The four-quadrant Herrmann model of thinking preferences.

are scored by a computer at his headquarters, and he personally trains and certifies people in the interpretation and evaluation of the instrument to ensure the quality and reliability of the results.

Although the four-quadrant model started with the divisions in the physical brain, it is now a metaphorical model based on people's behavior because:

1. With new brain research, it is getting more and more difficult to determine exactly which part of the brain is involved in specific thinking tasks—the brain is simply too complex, subtle, and versatile.

2. Knowledge about the limbic system at that time was less clear, which made correlation with the data less precise. Yet Ned Herrmann strongly felt that this organization could clarify the way we think about modes of knowing.

3. The database kept confirming that the four-quadrant model was consistent and much more useful than the left-brain, right-brain classification. The four-quadrant model also allowed for multidominance.

### *The Brain Dominance Profile*

When thinking preferences are assessed with the HBDI, the output is a brain dominance profile. When the relative dominances are marked on axes bisecting the four quadrants, with the four scores connected by lines, the result is a four-sided figure or profile. The scale or intensity of dominance is indicated by circles dividing the quadrants into areas of preferences. The innermost circle is designated as Region 3 as shown in Figure 3-3. When given a choice, people scoring in this region for a particular quadrant will avoid thinking in this mode, but this does not mean that they cannot think in this manner. Students can even earn top grades in subjects that require thinking in modes that they tend to avoid, if they are willing to make a strong effort, since thinking preference is not correlated with I.Q. Conversely, as we shall see in Chapter 4, someone with a strong thinking preference or high I.Q. does not necessarily know how to be a good thinker. Brain scans have shown that thinking in an unfamiliar mode takes more energy and will make you feel exhausted if you have to do it over any length of time.

A score in Region 2 on the HBDI profile denotes a secondary preference—the person is comfortable with using this thinking mode. A score in Region 1 indicates a strong preference. A profile extending into the outermost band bounded by the dotted circle indicates an extremely strong preference which can usually be observed in behavior. For example, someone who uses a ruler to draw lines across the blank spaces on a check or receipt would likely score very high in B-quadrant thinking. Ned Herrmann has found that people in certain professions tend to have similar profiles. As an example, Figure 3-3 exhibits the average brain dominance profile for the engineering faculty at the University of Toledo in 1990 with a strong preference in analytical, quadrant A thinking, lesser preferences in structured as well as conceptual thinking, and least preference in interpersonal thinking. This profile is typical for engineers. However, we have seen many profiles that are very different from this typical profile, yet these individuals have been successful engineering students, faculty members, and practicing engineers.

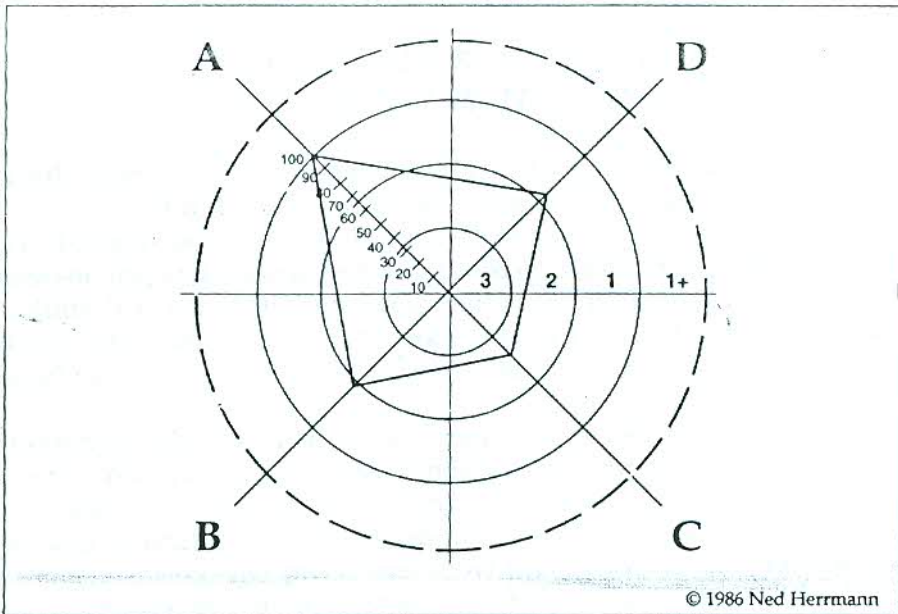


Figure 3-3 Averaged Herrmann brain dominance profile for engineering faculty.

HBDI profiles are frequently expressed in the numerical code related to the strength of preference or dominance. This code designates a *generic* profile. With this code, the profile in Figure 3-3 would be expressed as 1-1-2-1. For the academic years from 1990 to 1992, the three most frequent profiles for engineering students at the University of Toledo were (where *N* is the number of profiles)

|           |               |               |               |                |
|-----------|---------------|---------------|---------------|----------------|
| Freshmen: | 1-1-2-2 (21%) | 1-2-2-1 (13%) | 1-1-2-1 (12%) | <i>N</i> = 713 |
| Seniors:  | 1-1-2-2 (22%) | 1-1-2-1 (20%) | 1-1-3-2 (18%) | <i>N</i> = 135 |

The averaged profile for the seniors matches that of the faculty very closely. In 1990, we initiated a research project to determine if innovation in the curriculum, such as teaching creative problem solving, would change the brain dominance profiles of students individually and collectively, and if this would help retain gifted and talented students in engineering who felt “different” and uncomfortable in the traditional classroom. We will discuss some of our early results and findings toward the end of this chapter.



### THREE-MINUTE ACTIVITY 3-1: QUADRANT C CLASSROOM

In groups of three, briefly discuss the differences in a classroom where the majority of the students have quadrant C preferences, as compared to an environment where students and professors avoid quadrant C thinking modes. In general, would these differences be more important to male or female students? What changes in the classroom climate should be made to attract more female students to engineering? Hint: In the data given above, the 1-1-3-2 generic profiles were all from male students—subsequent studies confirmed that female engineering students very rarely score a 3 in quadrant C.



## CHARACTERISTICS OF ANALYTICAL QUADRANT A THINKING

**Definition:** Quadrant A thinking is factual, analytical, quantitative, technical, logical, rational, and critical. It deals with data analysis, risk assessment, statistics, financial budgets, and computation, as well as with technical hardware, analytical problem solving, and making decisions based on logic and reasoning. An A-quadrant culture is materialistic, academic, and authoritarian. It is achievement-oriented and performance-driven. An example of a quadrant A thinker is *Star Trek's* Mr. Spock; another is George Gallup, the pollster.

**Preferred subjects and careers:** People who prefer quadrant A thinking also have preferences for certain subjects in school and for certain careers. Preferred subject areas would be arithmetic, algebra, calculus, and accounting, as well as science and technology. Lawyers, engineers, computer scientists, analysts and technicians, bankers, and physicians show preferences in quadrant A thinking. People with quadrant A thinking talk about "the bottom line" or "getting the facts" or "critical analysis." They are talked about as "number crunchers" or "human machines" or "eggheads."

*What I want is Facts. Teach these boys and girls nothing but Facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. Mr. Gradgrind in Charles Dickens, Hard Times, 1854.*

**Preferred learning activities:** If you are an A-quadrant thinker, you prefer to learn and behave in this way:

- Collecting data and information.
- Organizing information logically in a framework, not to the last detail.
- Listening to informational lectures.
- Reading textbooks (most textbooks are written for quadrant A thinkers).
- Studying example problems and solutions.
- Thinking through ideas.
- Doing library searches.
- Doing research using the scientific method.
- Making up a hypothesis, then testing it to find out if it is true.
- Judging ideas based on facts, criteria, and logical reasoning.
- Doing technical case studies.
- Doing financial case studies.
- Dealing with hardware and things, rather than people.
- Dealing with reality and the present, rather than with future possibilities.
- Traveling to other cultures to study technological artifacts.



### ONE-MINUTE ACTIVITY 3-2: QUADRANT A LEARNING

Circle the dots in the list of learning activities above for those items that are easy for you and that you enjoy doing.

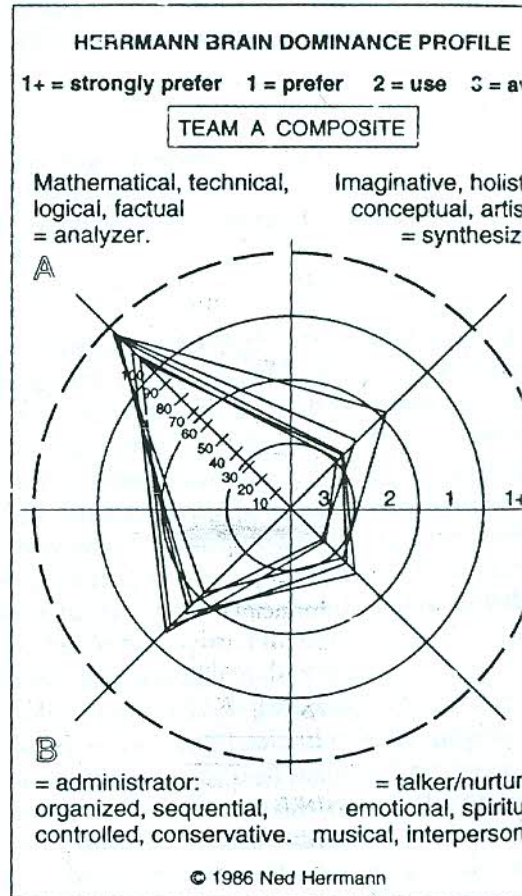
Behavior: Thinking preferences are expressed in behaviors. To demonstrate this, we used a brief exercise in one of our classes with first-year engineering students. We grouped students according to their thinking preferences (determined from an experimental brief assessment). We wanted to have a team with strong A-thinkers, a team with strong B-thinkers, a team with strong C-thinkers, a team with strong D-thinkers, and one team with multidominant thinkers, where the team members together constituted a whole brain. Each team had five members. The students at the time of this exercise did not yet know their own brain dominance profiles nor anything about the four-quadrant model of thinking preferences. The thinking profiles shown with the team results in this chapter are the actual HBDI profiles of the participating students.

The assignment was to write a definition of "What is an engineer?" in two minutes, with the answer to be written on a flip chart. The result for the A-team is shown in Figure 3-4. Generically, this team had a 1+-1-2-2 average profile. It is interesting to note A-quadrant words and phrases such as "technical, understanding how things work, factual information, and making big bucks." This group wrote down facts; they were not concerned with the details of correct grammar.

Engineers:

ARE  
Not Necessarily a Train Drivers.  
ARE  
Creative Person in a Technical Way.  
See and understand how things work.  
Use factual info to solve problems.  
Make big bucks.

Figure 3-4  
Result of quadrant A thinking: definition of an engineer (flip chart facsimile and team HBDI profile).



Exercises to strengthen quadrant A thinking: What can you do if you are not a quadrant A thinker and would like to develop this ability? Mathematics and science courses (and their homework problems) develop quadrant A thinking skills. Exercises in this book in Chapter 5 (using the detective's analytical mindset) and Chapter 7 (using the judge's mindset) will help you practice quadrant A thinking. Table 3-1 lists a variety of activities that do not specifically involve math. Many of these exercises—here as well as for the later quadrants—have been recommended by Ned Herrmann; others we have added to the list.

**Table 3-1**  
**Activities for Practicing Quadrant A Thinking**

- ◆ *Collect data and information about a particular subject or problem.*
- ◆ *Organize the collected information logically into categories.*
- ◆ *Develop graphs, flowcharts, and outlines from data and information.*
- ◆ *Do a library search or patent search on a special topic of interest.*
- ◆ *Find out how a frequently used machine actually works by reading about it.*
- ◆ *Take a broken small appliance apart: find out about the function of each part.*
- ◆ *Take a current problem situation and analyze it into its main parts.*
- ◆ *Review a recent impulse decision and identify its rational, logical aspects.*
- ◆ *Analyze some politicians running for office—where do they stand on the issues?*
- ◆ *Join an investment club.*
- ◆ *Do logic puzzles or games.*
- ◆ *Play chess.*
- ◆ *Learn how to use an analytical software package or program on your computer.*
- ◆ *Play "devil's advocate" in a group decision process.*
- ◆ *Write a critical review based on logical reasoning of your favorite TV program, movie, essay, poem, book, or work of art.*

**When to use quadrant A thinking in problem solving:** As you will learn, the analytical aspects of quadrant A thinking are needed in the creative problem-solving process during the stage when we are trying to determine what the *real* problem is. The detective's mindset typifies quadrant A thinking (although detectives also use quadrant B procedures for problem identification). The critical aspects of quadrant A thinking are needed during the stage when we are trying to determine the best solutions, although they will be combined with creative, positive thinking that seeks to overcome the flaws that are being identified. Analytical thinking is a useful paradigm when solving routine problems that do not justify the extra investment in time and effort needed for creative problem solving. In Bloom's taxonomy, the two lowest thinking skills—knowledge and comprehension—as well as the fourth level—analysis—involve quadrant A thinking. Quadrant A thinking is also involved at the highest level—in evaluation and critical judgment—here it must be integrated with right-brain thinking for best results. The description of technological devices used in brain research given in Chapter 2, the factual discussion and the logic behind the four-quadrant brain model, as well as the statistical data about the HBDI profile included in this chapter are typical quadrant A "languages" of teaching and conveying information.

## CHARACTERISTICS OF SEQUENTIAL QUADRANT B THINKING

**Definition:** Quadrant B thinking is organized, sequential, controlled, planned, conservative, structured, detailed, disciplined, and persistent. It deals with administration, tactical planning, organizational form, safekeeping, solution implementation, maintaining the status quo, and the "tried-and-true." The culture is traditional, bureaucratic, and reliable. It is production-oriented and task-driven. Edgar Hoover, former Director of the FBI (Federal Bureau of Investigation), and Prince Otto von Bismarck, Prussian Chancellor of Germany (1871-1890), exemplify quadrant B thinkers.

**Preferred subjects and careers:** People who prefer quadrant B thinking like their subjects in school to be very structured and sequentially organized. Planners, bureaucrats, administrators, and bookkeepers exhibit preferences for quadrant B thinking. People with quadrant B preferences talk about "we have always done it this way" or "law and order" or "self-discipline" or "play it safe." They are talked about as "pedants" or "picky" or "nose to the grindstone."

*Order and simplification are the first steps toward the mastery of a subject  
—the actual enemy is the unknown*

*Thomas Mann, The Magic Mountain, 1924*

**Preferred learning activities:** If you are a B-quadrant thinker, you prefer to learn and act in this way:

- Following directions instead of trying to do something in a different way.
- Doing repetitive, detailed homework problems.
- Testing theories and procedures to find out what is wrong with them.
- Doing lab work, step by step.
- Writing a sequential report on the results of experiments.
- Using programmed learning and tutoring.
- Finding practical uses for knowledge learned—theory is not enough.
- Planning projects; doing schedules, then executing according to plan.
- Listening to detailed lectures.
- Taking detailed notes.
- Making time management schedules—the schedule is important, not people.
- Making up a detailed budget.
- Practicing new skills through frequent repetition.
- Taking a field trip to learn about organizations and procedures.
- Writing a "how-to" manual about a project.



### ONE-MINUTE ACTIVITY 3-3: QUADRANT B LEARNING

Circle the dots in the list of learning activities above for those items that are easy for you and that you enjoy doing.

**Behavior:** B-quadrant behavior is one of the easiest to notice in the area of time—B-thinkers stick to schedules, and they get very annoyed when others do not have the same kind of discipline! Since many D-quadrant thinkers have no sense of time, the potential for conflict exists between strong B-quadrant people and strong D-quadrant people. Strong B-quadrant thinking can be a barrier to strengthening other thinking skills, because quadrant B thinkers can be quite inflexible.

The result for the B-team in the exercise with engineering students is shown in Figure 3-5. The generic profile is 1-1-2-2. Note the obvious structure and consistency, including the punctuation. This group was the only one who elected a leader and a scribe. This team reviewed their work and indicated a change in the sequence. The team members were careful with grammar and spelling because quadrant B thinkers pay attention to detail. Here, the interesting words are "breaking the rules" and "leader"—yes, quadrant B thinkers notice when people do not follow procedures, and they are aware of proper leadership roles. The team results exhibit clear B-characteristics, even though this team had an equally strong preference for A-thinking. For these students, quadrant B behavior took precedence over quadrant A behavior in this unfamiliar problem-solving situation.

A WHOLE-BRAINED THINKER;  
 A COMMUNICATOR;  
 A CREATIVE PROBLEM SOLVER;  
 A DESIGNER & INVENTOR OF  
 NEW & INNOVATIVE THINGS;  
 A PERSON WITH GOOD JUDGMENT;  
 A PERSON WHO BREAKS THE RULES;  
 A LEADER;  
 A CORRELATOR OF ABSTRACT IDEAS.

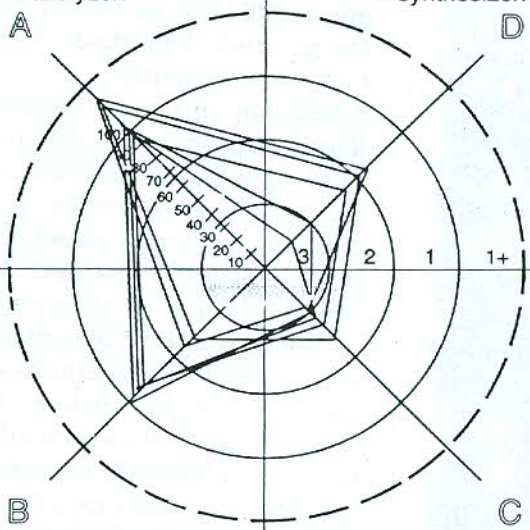
#### HERRMANN BRAIN DOMINANCE PROFILE

1+ = strongly prefer 1 = prefer 2 = use 3 = avoid

#### TEAM B COMPOSITE

Mathematical, technical,  
 logical, factual  
 = analyzer.

Imaginative, holistic,  
 conceptual, artistic  
 = synthesizer.



B = administrator:

organized, sequential,  
 controlled, conservative.

= talker/nurturer:

emotional, spiritual,  
 musical, interpersonal.

Figure 3-5  
 Result of quadrant B thinking: definition of an engineer  
 (flip chart facsimile and team HBDI profile).

Exercises to strengthen quadrant B thinking: What can you do if you are not a quadrant B thinker and would like to develop this ability? A course in bookkeeping would be good training for quadrant B thinking. Exercises in Chapter 8 later in this book (using the producer's mindset for tactical planning) will sharpen quadrant B thinking skills. Table 3-2 lists additional activities.

Table 3-2  
Activities for Practicing Quadrant B Thinking

- ◆ *Learn a new habit through planning and self-discipline.*
- ◆ *Cook a new dish by following the instructions in a complicated recipe.*
- ◆ *Use a "programmed learning" software package to learn something new.*
- ◆ *Plan a project by writing down each step in detail; then do it.*
- ◆ *Assemble a model kit by instruction (or a piece of modular furniture).*
- ◆ *Develop a personal budget, then keep it for two weeks.*
- ◆ *Prepare a personal property list; then put it into a safe-deposit box.*
- ◆ *Set up a filing system for your paperwork and correspondence.*
- ◆ *Organize your desk drawer or clothes closet.*
- ◆ *Organize your records, disks, books, photographs, or collection.*
- ◆ *Prepare a family tree, or play Scrabble.*
- ◆ *Find a mistake in your bank statement or monthly bills.*
- ◆ *Be exactly on time all day.*
- ◆ *Visit a hands-on science museum; follow the directions for all the activities.*
- ◆ *Learn time management skills—read a self-help book and then do what it says.*

**When to use quadrant B thinking:** As you will learn, the organizational aspects of quadrant B thinking are needed in the creative problem-solving process when we are planning how to put an idea into action and when we actually execute the prepared work plan. The fault-finding aspects of quadrant B thinking are needed by the judge ahead of implementation, in order to prevent errors and minimize risk. The organizational, sequential, disciplined aspects of quadrant B thinking will make the implementation possible. In Bloom's taxonomy, quadrant B thinking is not mentioned explicitly; it is used when students do routine practice problems, and it is a preferred teaching style. Highly talented people who lack quadrant B thinking skills may not be successful simply because they are unable to get their good ideas to the implementation stage. Artists who learn how to be organized in their business dealings (and in scheduling their time) find that this enhances their creativity because they are no longer distracted by dunning notices for unpaid bills and irate customers complaining about missed deadlines. Thus developing a comfortable level of quadrant B thinking—and the judgmental ability of choosing when to apply it most profitably—can enhance the effectiveness of all the other thinking quadrants. Some quadrant B thinking is essential in order to have a balanced life. But if it is used exclusively, it can be a strong barrier to creative thinking. In this chapter, you can see a quadrant B approach in the sequential description of the development of the four-quadrant brain model, in the parallel structure of the chapter sections describing each quadrant, as well as in the detailed "lists of things to do" to practice a particular thinking mode.

## CHARACTERISTICS OF INTERPERSONAL QUADRANT C THINKING

**Definition:** Quadrant C thinking is sensory, kinesthetic, emotional, interpersonal (people-oriented), and symbolic. It deals with awareness of feelings, body sensations, values, music, and communications; it is needed for teaching and training. A quadrant C culture is humanistic, cooperative, and spiritual. It is value-driven and feelings-oriented. Mahatma Gandhi, the Hindu social reformer, typifies a strong quadrant C person.

**Preferred subjects and careers:** People who prefer quadrant C thinking have preferences for certain subjects in school, such as social sciences, music, dance, drama, and highly-skilled sports, and they participate in group activities rather than work alone. Teachers, nurses, social workers, and musicians have strong preferences for quadrant C thinking, although musicians and composers involve quadrant A thinking when they analyze musical scores or evaluate a performance. People with quadrant C thinking talk about "the family" or "teamwork" or "personal growth" and "values." Stereotypically, they are viewed as "bleeding hearts" or "soft touch" or "talk, talk, talk."

*With the sense of sight, the idea communicates the emotion, whereas, with sound the emotion communicates the idea, which is more direct and therefore more powerful*  
Alfred North Whitehead, 1943

**Preferred learning activities:** If you are a C-quadrant thinker, you prefer to learn and act in this way:

- Listening to and sharing ideas.
- Motivating yourself by asking "why"—looking for personal meaning.
- Experiencing sensory input—moving, feeling, touching, smelling, tasting.
- Using group-study opportunities and group discussions.
- Keeping a journal to record feelings and spiritual values, not details.
- Doing dramatics—the physical acting out is important, not imagination.
- Taking people-oriented field trips.
- Traveling to other cultures to meet people; hosting a foreign student.
- Studying with classical background music; making up rap songs.
- Using people-oriented case studies.
- Respecting others' rights and views; people are important, not things.
- Learning by teaching others.
- Learning by touching, feeling, and using a tool, object, or machinery.
- Reading the preface of a book to get clues on the author's purpose.
- Preferring video to audio to make use of body language clues.



### ONE-MINUTE ACTIVITY 3-4: QUADRANT C LEARNING

Circle the dots in the list of learning activities above for those items that are easy for you and that you enjoy doing.

**Behavior:** Quadrant C thinkers are nurturing and reach out to others; they are interested in teamwork, sharing ideas, feelings, and cooperation, not competition. Faith, values, and religious beliefs can have a strong influence on this thinking. Nurses, social workers, teachers, and trainers usually exhibit profiles with strong C-quadrant preferences.

The result for the C-team in the exercise with the engineering students is shown in Figure 3-6; the generic profile is 1-2-1-1. This was the only team that used such personal, emotionally-loaded terms as "overworked, underpaid, underappreciated." Their focus was on people—social interaction was important. This team did a lot of talking and consequently had little time to actually write down ideas. Despite a strong preference for D-quadrant thinking by some of the team members, the C-behavioral characteristics dominated, possibly due to strong interpersonal skills present, as well as the mutual reinforcement the C-thinkers found in working together—students with strong C-dominance are rare in engineering. Even though this was definitely a right-brain thinking team, the presence of a strong double dominance in B and C is seen in the nice presentation and grammatical symmetry of the team's results on the page.

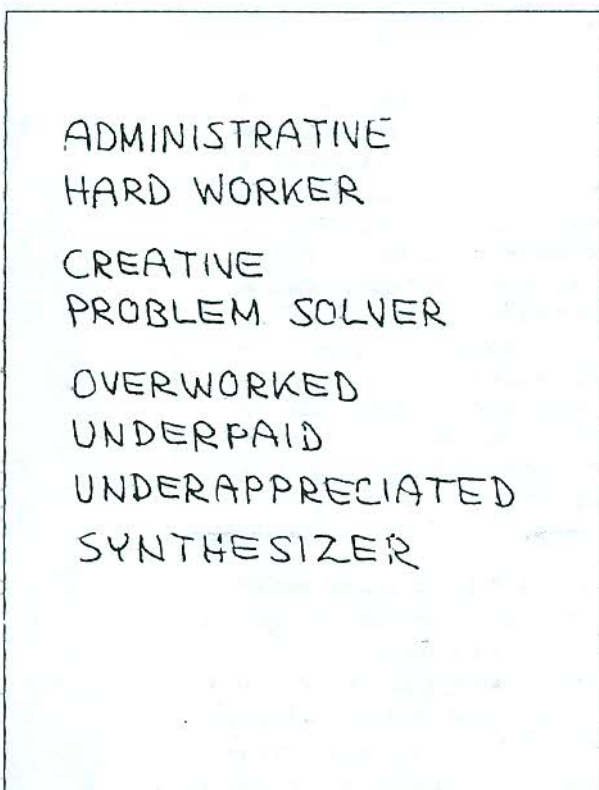
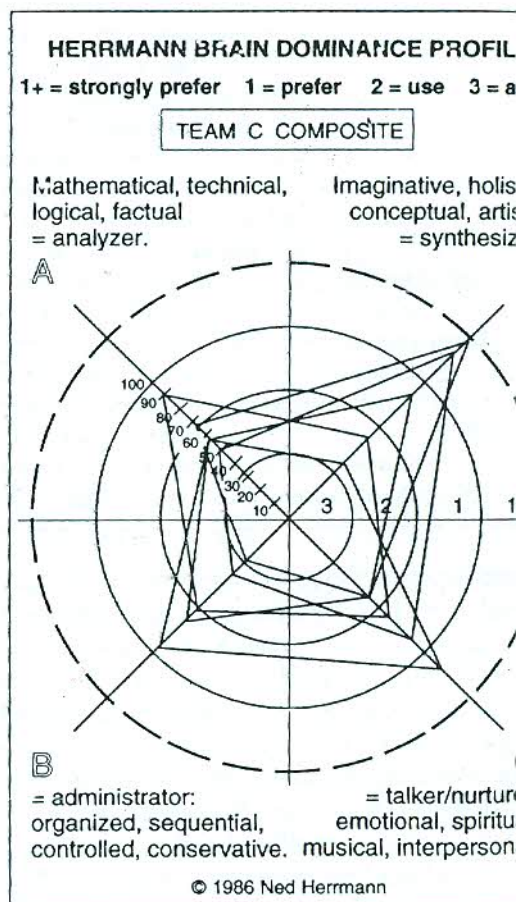


Figure 3-6  
Result of quadrant C thinking: definition of an engineer  
(flip chart facsimile and team HBDI profile).





Exercises to strengthen quadrant C thinking: What can you do if you are a quadrant C thinker and would like to develop this ability? Teaching, nursing, and child care all require quadrant C thinking and attitudes. Problem 2-5 in the following chapter is an example of a situation that needs quadrant C thinking. Activities that enhance good communications as well as all the team activities in the book give training in quadrant C thinking skills. Table 3-3 lists additional ideas.

Table 3-3  
Activities for Practicing Quadrant C Thinking

- ◆ Get together with a friend; share your feelings about a topic or issue.
- ◆ When in a conversation, spend most of the time listening to the other person.
- ◆ Study in a group, or do a group project.
- ◆ Get involved in a play or musical, or do charades at a party.
- ◆ Compose a song, then get someone to sing it.
- ◆ Get involved in a new sport or exercise activity.
- ◆ Play with a small child the way he or she wants to play.
- ◆ Adopt a pet from the local animal shelter.
- ◆ Allow tears to come to your eyes without feeling shame or guilt.
- ◆ Think about what other people have done for you and find a way to thank them.
- ◆ Become a volunteer in your community on an environmental issue.
- ◆ Get involved in a program that teaches adults to read.
- ◆ Get involved in a Big Brother/Big Sister program or in scouting.
- ◆ "Adopt" an elderly person, or help with "Meals on Wheels."
- ◆ Become a tutor or mentor to a disadvantaged child or a fellow student.
- ◆ Get to know your neighbors—get together and have a block party.
- ◆ Explore your spirituality. Read the religious documents of the major faiths.
- ◆ Join a church choir, a barbershop quartet, a square dancing club.
- ◆ Savor a vegetable or fruit that you have never tasted before; grow and use herbs.
- ◆ Grow flowers; make artistic bouquets and cheer up someone who is lonely.
- ◆ Enjoy a walk in nature: pay attention to sounds, smells, and other sensory input.
- ◆ Use artwork, colors, and accessories to create a specific "mood" in a room.
- ◆ Take a seminar on how to communicate or express your feelings better.
- ◆ Find a pen pal from another country or a different culture.
- ◆ Make time for family meals—think up a reason to have a special celebration.
- ◆ Play a musical instrument "playfully"; learn to enjoy a different style of music.

**When to use quadrant C thinking:** The interpersonal aspects of quadrant C thinking are needed in creative problem-solving for teamwork, when collecting data on the "customer's voice," and for meeting the needs of the customer required during implementation when you are trying to build support for new ideas and at any time when good communication with others is required. Bloom's taxonomy does not explicitly include quadrant C thinking. We believe that quadrant C discussions can help in acquiring knowledge, in comprehension, application, analysis, and synthesis. An awareness of values and bias will improve judgment. Quadrant C thinking can improve learning at each level of Bloom's taxonomy. As quotes throughout the book, the periodic group discussions, and explanations of "why" are quadrant C ways of getting you to interact with the ideas being

## CHARACTERISTICS OF IMAGINATIVE QUADRANT D THINKING

**Definition:** Quadrant D thinking is visual, holistic, innovative, metaphorical, creative, imaginative, conceptual, spacial, flexible, and intuitive. It deals with futures, possibilities, synthesis, play, dreams, vision, strategic planning, the broader context, entrepreneurship, change, and innovation. A D-quadrant culture is explorative, entrepreneurial, inventive, and future-oriented; it is playful, risk-driven, and independent. Pablo Picasso, the modern painter, and Leonardo da Vinci, the Renaissance painter, sculptor, architect, and scientist, had strong quadrant D thinking preferences.

**Preferred subjects and careers:** People who prefer quadrant D thinking prefer subjects such as the arts (painting, sculpture), as well as geometry, design, poetry, and architecture. Entrepreneurs, explorers, artists, and playwrights have strong preferences for quadrant D thinking, as do scientists involved in research and development (R&D) in medicine, physics, and engineering. People with quadrant D thinking talk about "playing with an idea" or "the big picture" or "the cutting edge" and "innovation." They are talked about as "having their heads in the clouds" or as being "undisciplined" or "unrealistic dreamers."

*As a rule, indeed, grown-up people are fairly correct on matters  
it is in the higher gift of imagination that they are so sadly  
Kenneth Grahame, The Golden Age*

*Without this playing with fantasy no creative work has ever yet come  
The debt we owe to the play of imagination is incalculable  
Carl Gustav Jung, Psychological Typology*

**Preferred learning activities:** If you are a D-quadrant thinker, you prefer to learn and act in this way:

- Looking for the big picture and context, not the details, of a new topic.
- Taking the initiative—getting actively involved.
- Doing simulations—asking what-if questions.
- Making use of the visual aids in lectures.
- Doing problems with many possible answers.
- Appreciating the beauty in the problem (and in the solution).
- Leading a brainstorming session—wild ideas, not the team, are important.
- Experimenting; playing with ideas.
- Exploring hidden possibilities.
- Thinking about trends.
- Thinking about the future.
- Relying on intuition, not facts or logic.
- Synthesizing ideas and information to come up with something new.
- Using future-oriented case discussions.
- Trying a different way of doing something just for the fun of it.

**ONE-MINUTE ACTIVITY 3-5: QUADRANT D LEARNING**

Circle the dots in the list of learning activities on the preceding page for those items that are easy for you and that you enjoy doing.

**Behavior:** Students with strong quadrant D thinking preferences have persisted despite everything the educational system may have done to discourage them. These students may feel like outsiders—different, odd, weird, or even crazy. In self-defense, they may have developed a chip-on-the-shoulder attitude. On the other hand, they may have learned to enjoy independence; they are self-motivated; they truly march to a different drummer. A strong quadrant D person may not be able to understand the language and “tribal” bonding between members of a left-brain-dominant group. But since the world and society need the intuitive insight and innovative ideas of the creative quadrant D mind, we must develop more nurturing environments for quadrant D thinking that can be expressed in many acceptable ways—quadrant D behavior can be more successful if balanced with self-discipline, caring, and logic.

AN ENGINEER IS ~~IS~~ SOMEONE THAT

solve problems      generates ideas  
 find solutions      synthesizes  
 implement solutions      defines problems  
 translates solutions  
 synthesizes ideas  
 new + unique ideas  
 makes a lot of money  
 works hard, sometimes  
 destroys bridges  
 is creative

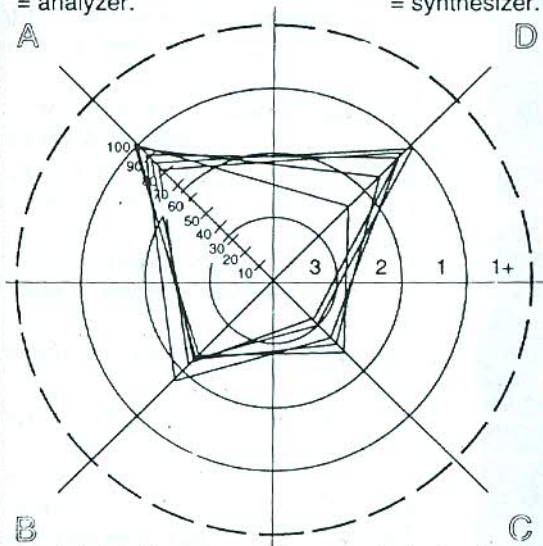
**HERRMANN BRAIN DOMINANCE PROFILE**

1+ = strongly prefer    1 = prefer    2 = use    3 = avoid

**TEAM D COMPOSITE**

Mathematical, technical, logical, factual  
 = analyzer.

Imaginative, holistic, conceptual, artistic  
 = synthesizer.



**B** = administrator:

organized, sequential, controlled, conservative.

**C** = talker/nurturer:

emotional, spiritual, musical, interpersonal.

Figure 3-7  
 Result of quadrant D thinking: definition of an engineer (flip chart facsimile and team HBDI profile).

The result for the D-team in the exercise with the engineering students is shown in Figure 3-7. Typical of quadrant D thinkers, this team had little sense of timing—the students continued working long after the set time had elapsed; they had to be reminded several times to stop and rejoin the class. The group profile of this group was 1-2-2-1. Even a quick glance at their page shows that the team operated very differently. They had many ideas all over the page; they changed their mind, they made connections with arrows; they underlined; they had to give an explanation of what they had written, because it did not make sense to their classmates—the “sometimes” did not belong to “working hard” or “destroying bridges.” In brief, this team brainstormed ideas without thought about any organization or structure—thus they too had problems with grammar. They had probably the most unusual idea: “An engineer sometimes destroys bridges.” This is a part of creativity—we know intuitively that sometimes we have to break something or some “rule” before we can put ideas or parts together in a new way. The influence of the joint dominance with A is shown by the phrase “make big bucks.” The informal exercise format and setting enabled this group to exercise their D-quadrant thinking instead of their A-quadrant thinking preference.

**Exercises to strengthen quadrant D thinking:** What can you do if you are a quadrant D thinker and would like to develop this ability? Exercises in Part 5, Chapter 5 (explorer's mindset), Chapter 6, and Chapter 7 (engineer's mindset) give you training in quadrant D thinking. Table 3-4 lists additional activities.

**Table 3-4**  
**Activities for Practicing Quadrant D Thinking**

- ◆ *Look at the big picture, not the details, of a problem or issue.*
- ◆ *Make a study of a trend; then predict at least three different future developments.*
- ◆ *Ask what-if questions and come up with a lot of different answers.*
- ◆ *Allow yourself to daydream.*
- ◆ *Make sketches to help you memorize material that you are learning. Create a log.*
- ◆ *When solving problems, find two or three different ways to do them.*
- ◆ *Do problems that require brainstorming; find at least ten possible answers.*
- ◆ *Appreciate the “beauty” of a design: building, appliance, object.*
- ◆ *Play with Tinkertoys, Skill Sticks, Legos.*
- ◆ *Learn to paint, sketch, draw; play with modeling clay. Take an art class.*
- ◆ *Attend a “story-telling” session; read a book of folktales or myths; participate in role-playing games.*
- ◆ *Design and build a kite. Fly the kite the way it is meant to be flown.*
- ◆ *Invent a gourmet dish and then prepare it.*
- ◆ *What time of day are you the most creative—when first waking up, exercising, or taking a shower? Use this time to think up and jot down ideas, then take the next afternoon off to further explore one of these creative ideas.*
- ◆ *Take a drive (or walk) to nowhere in particular without feeling guilty.*
- ◆ *Take 200 photographs without worrying about cost; try unusual shots.*
- ◆ *Imagine yourself in the year 2000, 2020, 2040.*
- ◆ *Investigate how a particular subject can be connected to other things you know.*
- ◆ *Use analogies and metaphors in writing or when explaining a concept or idea.*

When to use quadrant D thinking: The imaginative, wishful aspects of quadrant D thinking are needed in the creative problem-solving process during the brainstorming phase. Exploratory, holistic, contextual thinking is also needed for problem definition. Innovative thinking is needed when you are trying to find the best way to implement the solution. Even during evaluation and judgment, creative thinking is needed to overcome flaws and difficulties. And creative thinking is required when dealing with difficult people, when dealing with change, when making plans and developing goals for the future. In Bloom's taxonomy, creative thinking is involved in the process of idea synthesis—yet quadrant D thinking, just like quadrant C thinking, can improve each of the other levels of thinking and learning. Figure 2-5 and the mindmaps with sketches illustrate D-quadrant ways of presenting material.

*No matter how different you are, there are other normal people like you  
somewhere in the world. Celebrate your uniqueness!*  
Ned Herrmann.

### WHOLE-BRAIN THINKING AND CREATIVE PROBLEM SOLVING

**Whole-brain thinking:** In the exercise with the teams of engineering students, we have one more result to consider—the definition from the multi-dominant team. It is shown in Figure 3-8 with the individual profiles of the five students in the team. The generic profile of their composite is 1-1-2-1, with almost equally strong dominances in the A, B, and D quadrants and the preference in C only slightly smaller. This team wrote a definition that presents a more complete appearance than the work of the other teams: it has whole sentences; it is well-balanced on the page; it gives two options, and it even includes a sketch (and a stab at D-quadrant humor). The team's lack of quadrant C thinking shows in the terminology of "guy" and "individual." As you compare these five team results, keep in mind that this was a very brief exercise where the teams did not have time to revise their first draft. None of these students had any previous training in teamwork. But the results with these inexperienced teams do show that differences in thinking are expressed in different languages and problem-solving outcomes.


In assessing over half a million people, Ned Herrmann has found that 7 percent have a single dominance; 60 percent have a double dominance; 30 percent have a triple dominance, and only 3 percent have a quadruple (1-1-1-1) dominance. He has also determined the thinking preference (pro-forma) profiles of many famous people by analyzing their writings and life work. These people are distributed all across the four quadrants—no single profile is more prominent or more valuable than any of the others. People are happier and usually will do well when their activities and job requirements match their thinking preferences. Evaluating the HBDI questionnaire is not a routine, analytical task; it requires in-depth training, a thorough understanding of the characteristics of each mode, as well as intuitive judgment based on the information provided. Even though two people

AN ENGINEER IS:

1. A GUY WHO DRIVES TRAINS...

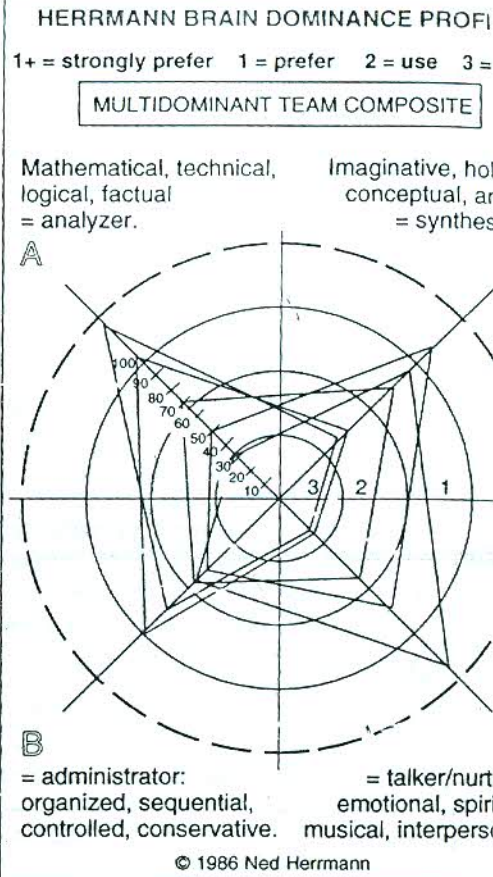
-OR-

2. AN INDIVIDUAL WHO USES EXISTING KNOWLEDGE CREATIVELY TO SOLVE CURRENT PROBLEMS.



FOR THOSE WHO DON'T COMPREHEND THIS IS A STRIPED HAT.

Figure 3-8  
Result from a whole-brain team: definition of an engineer (flip chart facsimile and team HBDI profile).



can have almost identical profiles, they will be "different" thinkers with differing abilities and competencies, since they will have different clusters of preferences within each quadrant. However, they will most likely find it easier to communicate and understand each other than people who have opposite profiles.

Brain preference does not equal competence. Competency is achieved through training, motivation, and practice—we can learn to use our primary and secondary preferred modes more effectively. Ned Herrmann says that operating in a less preferred mode is akin to traveling to a foreign country and experiencing culture shock. We might struggle initially with the language and the customs, but we can become comfortable with the culture *if we are motivated and if we practice*. This is true particularly for the quadrant C and D modes which are not encouraged in our educational system. If you have a strong thinking preference in these modes, but your daily life and work are devoid of opportunities to express these modes, you can change and learn to "claim your space." If you have an avoidance in one of the quadrants, our advice is to make a career choice that will not require you to have to function in this mode on a day-to-day basis—the frustration and energy level required would be too great.

All four thinking quadrants are involved in learning, as shown in Figure 3-9. We have what is called *external* learning taught from authority through lectures and textbooks → quadrant A learning. Then we have creative thinking, which is *internal* learning through a flash, an insight, a visualization, an idea synthesis, or a sudden understanding of a concept holistically and intuitively → quadrant D learning. Then we have *interactive* learning through discussions and hands-on, sensory-based experiments where we try, fail, try again with an opportunity for verbal feedback and encouragement → quadrant C learning. And finally, we have *procedural* learning through a methodical, step-by-step testing of what is being taught, as well as practice and repetition to improve skills → quadrant B learning. Effective teachers have discovered ways of incorporating each one of these learning modes into their teaching strategies. This goal is not always easy to achieve when the instructor may have strong thinking preferences in only one or two quadrants.

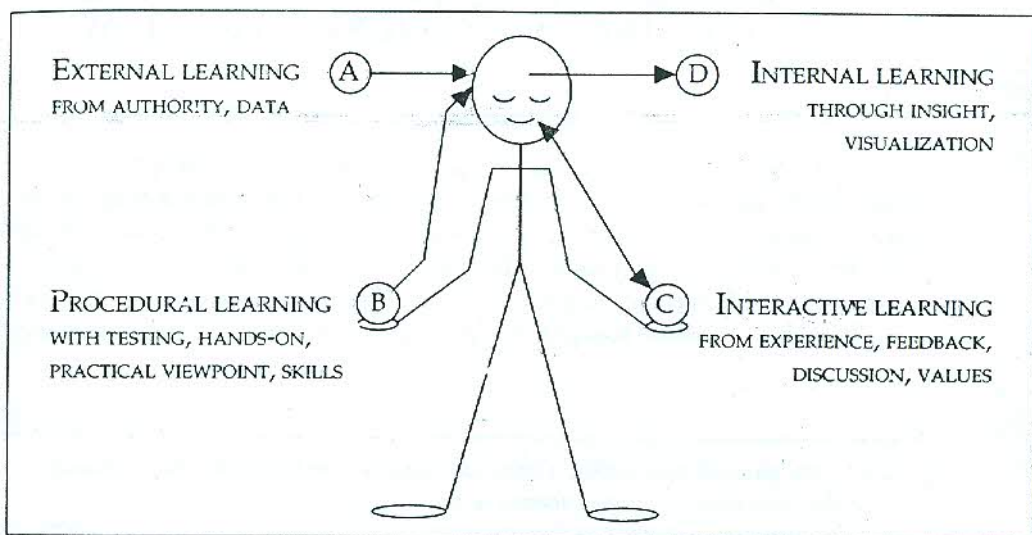


Figure 3-9 Four modes of how students learn.

### 🕒 THREE-MINUTE TEAM ACTIVITY 3-6: WHOLE-BRAIN TEACHING

*in groups of four people, select a concept in some subject (science, mathematics, politics, economics, the arts, etc.), then make up examples of how to teach the concept in the quadrant A, quadrant B, quadrant C, and quadrant D thinking modes. Share your ideas with a larger group, or develop additional examples for several different fields.*

*A balanced view between wholeness and specialization is the key: The brain is designed to be whole, but at the same time we can and must learn to appreciate our brain's uniqueness and that of others.*

*Ned Herrmann.*

*Marriage is something you have to give your whole mind to.*  
*Chinese fortune cookie.*