A. Theory

Chapter

13

Cognitive Theory

University of Oregon

Visual cognitive theory is an exciting, complex, and rapidly developing field of study that integrates work from a number of distinct disciplines including neurobiology, cognitive science, psychology, education, art, and communication. Because of its interdisciplinary nature, visual theory is approached from various perspectives by different scholars in different fields. The purpose of this chapter is twofold: first, to review significant theories that contribute to the understanding and intelligent use of visual cognition as a process of knowing; and, second, to integrate these diverse ideas into a unified system that is more easily understood and applied in the classroom and in the world beyond academia.

In order to organize and understand this ever-changing and diverse field, we must start with theories of cognition, or knowing, and then integrate and apply them to visual cognition. To accomplish this, I have integrated my own work with the research of scholars in related fields to develop a theory of cognitive balance I call *omniphasism*, which means "all in balance." This refers to the need to balance the development and use of the two primary cognitive processing systems and the multiple intelligences that human minds use to know, understand, and respond to the world and the self in relation to the world.

Omniphasism calls these two primary cognitive systems *rational* and *intuitive* and organizes their respective intelligences as either rational or intuitive on primary cognitive levels. Application of the theory helps develop techniques to teach and use intuitive and rational cognitive abilities as equally significant and complementary components of an integrated model of cognition in which visual cognition and learning are the basis of a primary intuitive intelligence.

I discuss omniphasism in detail after we review the various theories that will help the reader understand visual cognition. But I have already referred to several ideas that

are new to many readers and I want to explain these concepts before moving on to the review and integration of the other visual, cognitive theories that support the omniphasic organizational model.

For instance, cognition and intelligence are related but are not the same. Cognition refers to the mental processes of knowing or understanding. Intelligence is the ability to know and understand. Although all people have some ability to know or understand both intuitively and rationally, one individual might have a more highly developed linguistic intelligence while another has a more highly developed visual intelligence. One would use his or her linguistic intelligence to activate cognitive processes in the brain that allow one to read and to know or learn from reading.

Even though the concept of left and right brain is generally known in our educational system, the concepts of rational and intuitive cognitive modalities and of multiple intelligences (Gardner, 1993) are relatively new. The research that we review does show that the human mind uses two primary cognitive processing systems to know and understand and that these cognitive processes are supported by a number of distinct intelligences. One of these cognitive systems is analytical in nature and relies on reason as a means of knowing. I call this the *rational cognitive system* and it is the cognitive basis for mathematical and linguistic intelligences. The other cognitive system is synthesistic in nature and allows one to attain to knowledge directly without the need for reason. For instance, one sees and instantly knows. I call this the *intuitive cognitive system* and it is the cognitive basis for visual and musical intelligences, among others.

These distinct cognitive systems operate independently but also have the ability to work together. For instance, visual intelligence is intuitive at its cognitive base. We most often see, know, and respond to visual stimuli without applying rational cognitive processes. However, information gained from intuitive, visual cognition can subsequently be considered using rational processes to develop a reasonable response. In this way the independent intuitive and rational processes are integrated or balanced from an omniphasic perspective.

Another important theme that is central to all of the research that we review in this chapter is that there is a significant bias toward the development and use of rational intelligences and away from the teaching and use of intuitive intelligences in our culture. Since visual intelligence is the primary intuitive intelligence, this bias is significant to the study of visual cognition. This bias is also the basis for the omniphasic premise that there is a need to balance the use of rational and intuitive intelligences through development and integration of the two primary cognitive processing systems.

Visual knowing uses complex and multifaceted cognitive processes that draw on perception, memory, imagination, and logic. Visual knowing can involve both intuitive and rational intelligences that are processed by both the unconscious and the conscious mind. In fact, neuroscientists have proven that primary visual cognition happens on unconscious cognitive levels and guides behavior before the rational mind is aware that information has been received and processed.

The visual information that stimulates these processes can be generated by the physical eyes and by the imagination or the mind's eye. For instance, beyond seeing with the eyes, visual knowing can be stimulated by thought, music, words, memories, color, light and darkness, meditation, dreams, scent, and touch. We can see into the past as well as

the present. Some even claim to see the future. We can know visually as well with our eyes closed as we can with them open. It is believed that only about 10% of the processes of visual knowing actually occur in the eyes. The remainder is cognitive. So pervasive and profound are our visual intelligences that "I see" commonly means "I know." Historically language, both written and spoken, evolved from seeing and thus did logic and reason, which are language-based, rational cognitive processes. Even today the majority of information that our brains process every moment is visual. Ancient people's, as well as many cultures today, rely on visions and dreams to define reality and to guide their lives.

Similarly, I would suggest that the 3,000–4,000 mediated images that the average U.S. citizen sees every day are part of today's dreamscape. Much like the dreams and visions of ancient times, mediated visual images are cognitively processed by the same unconscious pathways and memory systems as nonmediated visual information. The unconsciousness mind does not distinguish between real and mediated images as it commits than to memory. Thus, they play profound roles in developing perceptions of reality and normalcy and thus in creating values and in guiding behavior. The success of mediated imagery as a tool of information and persuasion exemplifies the unique character of visual cognition to synthesize information in preconscious formats that transcend logic and that guide and generate behavior prior to the cognitive use of reason. Yet as significant as visual communication is to our personal and cultural identities and our behavior, few consumers of visual information understand even this most basic concept of visual cognition as intuitive intelligence.

Because of recent discoveries in cognitive neuroscience, this intuitive phenomenon can now be explained from a neurobiological perspective. Visual information, generated by the activities of the mind or by the perceptions of the physical eye, follows neurological pathways that initially bypass the neocortex, the cognitive center of logic and reason. It travels first to the thalamus and then to the amygdala and on to the prefrontal lobes, a primary repository of unconscious memory. In the prefrontal lobes visual information is synthesized with other unconscious cognitive information to form unconscious biases that guide and generate behavior before a second signal is sent to the neocortex where a rational response can be formulated (Wolfe, 1983; LeDoux, 1986; Goleman, 1995; Bechara, Damasio, Tranel, Damasio, 1997).

This suggests that we may not be the rationally motivated beings that we believe ourselves to be. In fact, it may suggest that our reason is a secondary response to our intuitive cognitive processes. It may also suggest that our behavior is driven, on primary cognitive levels, by unconscious cognitive processes and intuitive intelligences that are strongly visual.

With these provocative ideas and this brief overview of visual cognition as background, I want to move on to a deeper exploration of the theories that explain visual cognition and to the concept of Omniphasic cognitive balance.

UNDERSTANDING COGNITION AS INTUITIVE AND RATIONAL

The first step to understanding visual knowing and cognitive theory is to explore the concept of balancing independent but complementary rational and intuitive cognitive

systems from a historical context. This illustrates that modern culture is not the first to recognize the significance of verbal/analytical and visual/intuitive intelligences to human behavior. It will also show how rational thinking might have grown out of intuitive knowing in history and provide a historical context for the beginning of the rational bias in culture. The correlation between Julian Jaynes' ([1976], 1990) work on the bicameral mind of the ancient Greeks and the hemispheric specialization, or right and left brain theory,work by Joseph Bogen (1969, 1975) and Roger Sperry (1968, 1973) in the late 1960s and early 1970s provides a basis for historical support of a rational/intuitive cognitive model.

Then, I integrate this omniphasic concept of rational and intuitive cognitive balance into today's culture through modern science. This correlates contemporary research in several diverse areas of science with the historical research to support a modern model of cognition and visual knowing that is based on rational and intuitive intelligences. The integration of contemporary studies will include Howard Gardner's *Multiple Intelligences* (1993) work in education and psychology, the work of cognitive neuroscientists Joseph LeDoux (1986) and Bechara, Damasio et al. (1997) on the unconscious mind, and the works of other leading scholars in education, cognition, visual literacy, psychology, and physics.

Finally, I integrate the historical and contemporary cognitive theories with my own work to explain the omniphasic theory in greater detail. In doing so, I outline a cognitive organizational model for diverse visual theories in postulates 1–3 and propose new correlations and research ideas in postulates 4–6. I close the chapter by suggesting how the omniphasic theory might be used in visual education and in culture to balance the study and application of rational and intuitive cognition and intelligences.

I want to note that the omniphasic separation of cognitive processes and intelligences into intuitive and rational is a conceptual device to aid in the understanding of the independently functional, though integrated, primary cognitive systems. It is important to keep in mind that all are part of our one brain and that Omniphasism is about learning to use the integrated processes of the whole brain.

Visual Knowing from a Historical Perspective: Jaynes' Bicameral Mind and the Evolution of Reason

Evidence of the two major cognitive processing systems of the human brain, operating in tandem, but in separate and distinct ways, is recorded in written language as far back as 1000 bce, the approximate time of the first written version of the *Iliad*. According to psychologist Julian Jaynes, the Greeks of the *Iliad* operated from a cognitive arena where human nature was split in two and the mind of the Mycenaean was bicameral (Jaynes [1976], 1990).

The bicameral mind, meaning two legislatures, operated in a way so that one half was directly connected, through visions and hallucinatory voices, to the divine source (gods and goddesses in this instance) and served as the admonitory guide and director of all human activities. The other half was connected to the corporal world and directed activities to carry out the guidance of the admonitory (visual, divine) mind. Jaynes reasons that this left humankind without consciousness, or conscious decision-making abilities,

because the gods directed all decisions and there was no need or process for conscious introspection. Though Jaynes cites numerous early cultures throughout the early world that probably exhibited the same intuitive cognitive base as the Greeks, he focuses on Homer's *Ulysses* because it is the only written work from that time that is in a language that can be clearly interpreted.

Jaynes' other significant contribution that is relevant to our rational/intuitive concept is in his assertion that the evolution of the rational, reasoned, conscious mind, as evidenced in the writings developed just prior to the Greek Golden Age of Reason, led to the origin of consciousness in humankind and, subsequently, to the demise of the bicameral mind. Thus, when humankind began to apply the rational mind and reason to move toward introspection, self-determination, and consciousness, reason began to dominate the guidance of the visual, divine mind, initiating the development of a disabling bias against visual/synthesistic intelligences in society.

In the most recent revision of *The Origin of Consciousness in the Breakdown of the Bicameral Mind* (1990), Jaynes asserted that the results of research in asymmetrical hemispheric function, "even conservatively treated, are in agreement with what we might expect to find in the right hemisphere on the basis of the bicameral hypothesis" (pp. 455–456). He pointed out that the superior ability of the right (visual) hemisphere to process information in a synthesistic manner and in a way that uses visual intelligence to add clarity to cognition is, indeed, the same synthesistic process that provided the visions and admonitory voices perceived as the divine voice of the gods to provide clarity of direction in the early bicameral mind. Jaynes further suggested a relationship between asymmetrical hemispheric function and the bicameral mind, stating that hemispheric specialization of the brain is the contemporary neurological model of the bicameral mind.

I want to suggest a correlation between Jaynes' explanation of the reason-generated demise of the visual/synthesistic dominance in the 10th century BCE bicameral mind and the subjugation of the synthesistic, right-hemisphere processes to the logical, lefthemisphere processes of the human mind described in the 20th-century research of neuropsychologist Roger Sperry (1968, 1973) and neurosurgeon Joseph Bogen (1969, 1975). This correlation provides historical context for the visual/synthesistic and verbal/rational cognitive model and places the beginning of the development of a cultural bias in favor of reason around 1000 bce with the advent of the Greek Golden Age of Reason.

The Right and Left Brain: Bogen and Sperry and Distinct Cognitive Systems

I believe it is important to note that, although some current research challenges parts of the hemispheric specialization theory, it does not challenge the critical idea of the distinct visual/synthesistic and verbal/analytical cognitive processes described by Bogen and Sperry. Though the hemispheric specialization theory predates Bogen and Sperry and is controversial, with respected researchers on either side of the argument, the Bogen and Sperry works do provide empirical evidence of different and independent cognitive systems. This evidence has kindled the explosion of more than 45,000 publications on the subject since 1970 (Ornstein, 1997). Further, it is the *character* and *function* of the processes, *not their locations* in the brain, that are significant to omniphasic theory (Barry, 1997;

Bechara, Damasio, Tranel, & Damasio, 1997; Ornstein, 1997; Gardner, 1993; Edwards, 1989; Erdmann & Stover, 1991; Springer & Deutsch, 1989). In order to maintain the integrity of the original research and theory, in this section only, I use the terms *divine* (Jaynes), *visual, synthesistic, global, right hemisphere* and *r-mode* (Bogen & Sperry) to refer to the cognitive processes and intelligences that I have renamed intuitive/synthesistic. Similarly, I use the terms *verbal, logical, analytical*, *left hemisphere,* and *l-mode* (Bogen & Sperry) to indicate the processes that I characterize as rational/analytical. Beyond this section, right- and left-hemisphere references should be understood as metaphors for intuitive/synthesistic processes and rational/analytical processes, respectively.

In order to understand the significance of the Bogen and Sperry research to this study, it is necessary to be familiar with only the very basic structure of the human brain as being physically divided into two major halves, the right and left hemispheres, that are connected by the corpus callosum. When Bogen and Sperry began their research in the early 1960s, it was generally hypothesized that the left hemisphere processed verbal information and the right hemisphere processed visual information. The two hemispheres are connected by the corpus callosum, which serves as an integrative communication device between them.

Until the late 1960s and early 1970s, the left hemisphere, the seat of language that we link to logical thinking and reasoning, was considered to be the dominant or major hemisphere. The right hemisphere was thought to be the subordinate or minor hemisphere, both in terms of complexity and function.

In the 1960s, neurosurgeon Bogen performed a series of innovative neurosurgical procedures at The University of California at Los Angeles to sever the corpus callosum, the communication connector between the two hemispheres, in a number of individuals. This procedure relieved patients suffering from incapacitating chronic epileptic seizures and allowed them to live a basically normal life by all appearances. Because, after the operation, these patient's hemispheres operated independently and were no longer integrated by the corpus callosum, they were the perfect "split-brain" subjects for Dr. Roger Sperry and his student, Jerre Levy, to use in studies of hemispheric specialization at California Institute of Technology (Bogen, 1969).

By administering a series of tests to these patients in the 1970s, Dr. Sperry and his colleagues were able to determine that each hemisphere experiences reality in its own way and each has its own way of experiencing and processing information. He also discovered that the processes of the right hemisphere were as complex as the processes of the left hemisphere (Sperry, 1968). Dr. Sperry was awarded the Nobel Prize for his groundbreaking work.

Most significant to our omniphasic concept of rational and intuitive cognitive systems is the Bogen and Sperry characterization of the processes of the left brain as verbal, analytical, logical, linear, and the processes of the right brain as visual, synthesistic, global, perceptual, and metaphorical (Sperry, 1973).

Jerre Levy, one of Sperry's doctoral students who worked and published with Sperry on the experiments, discovered that the mode of processing used by the right brain is rapid, complex, whole pattern, spatial, and perceptual and is comparable in complexity to the left brain's verbal, analytical mode. Levy, in fact, suggested that the language of the left, logical hemisphere was inadequate for the rapid complex synthesis achieved by

the right hemisphere. Levy described the left hemisphere as analyzing over time and the right hemisphere as synthesizing over space (Levy, 1968, 1974).
In addition to these findings, Sperry's own comments on his research indicated that he clearly recognized both a societal and an educational bias against right-hemisphere processes. These biases are significant to our understanding of contemporary assumptions that reason dominates our cognitive processes and the subsequent visual illiteracy of our culture. Sperry wrote:

> The main theme to emerge . . . is that there appear to be two modes of thinking, verbal and nonverbal, represented rather separately in left and right hemispheres, respectively, and that our educational system, as well as science in general, tends to neglect the nonverbal form of intellect. What it comes down to is that modern society discriminates against the right hemisphere. (1973, pp. 209–229)

Contemporary brain research has focused on locating the site of specific cognitive processes within each hemisphere and has challenged Sperry's assertion of strictly left/right hemispherical specialization (Bechara, Damasio, Tranel, & Damasio, 1997; Edwards, 1989). However, as noted earlier, this challenge does not alter the concept of distinct cognitive processes, a concept that has been extensively corroborated since Sperry's original work (Ornstein, 1997). Our omniphasic model is concerned with the distinct processing systems and not with the location of each cognitive process.

Thus, it is the very early recognition of a dual brain—half visual/synthesistic, half verbal/analytical—and the dominance of the visusal/synthesistic brain prior to the Greek Golden Age of Reason that is of interest in Jaynes' work. And it is the Bogen and Sperry descriptions of a local versus global, verbal/analytical versus visual/synthesistic perspective in cognitive processes, each functioning with equal intelligence and significance to inform the whole individual, that forms the correlation and provides the basis for an omniphasic perspective of rational and intuitive cognitive systems.

Further, Jaynes' recognition of the beginning of the demise of the visual/synthesistic in favor of the verbal/analytical during the Age of Reason, and Sperry's recognition of a societal bias against the visual/synthesistic that supports the need to balance the teaching and application of our cognitive modalities.

Cognition and Intelligence in Contemporary Science: Parallel/Dualistic Organizational Models and Gardner's Multiple Intelligences

In some ways, a parallel/dualistic system such as verbal and visual, rational and intuitive is too simplistic to define the complex cognitive patterns of the human mind. Certainly, in terms of identifying specific locations of the numerous processes in the brain, or of mapping the interaction of verbal and visual processes and intelligences, a dualistic system of this nature cannot tell the whole story. However, some kind of organizing framework is necessary to our discussion. Defining the nature of the two primary cognitive systems as rational and intuitive organizes their respective processes as predominantly analytical (rational) or synthesistic (intuitive). In otherwords, intuitive and rational cognitive processes that work independently but are integrated support the idea of complementary intuitive

and rational intelligences such as visual and verbal in a way that correlates with Jaynes' bicameral mind and Bogen's and Sperry's right/left hemisphere work. As we shall see, this organization also provides a framework or model that integrates Howard Gardner's (1993) multiple intelligence theory into the rational/intuitive paradigm.

Gardner's theory of multiple intelligences (MI) suggested that all humans use a variety of intelligences such as verbal, mathematical, visual, and musical instead of one primary intelligence. Gardner said that, "except for abnormal individuals, intelligences always work in concert, and any sophisticated adult role will involve a melding of several of them" (1993, pp. 15, 17). Remember that cognition refers to the mental processes that create knowing or understanding. Intelligence is the ability to understand. One uses specific intelligences, such as visual or verbal, to activate cognitive processes related to seeing or speaking. The greater one's visual intelligence, the greater his or her ability to use the processes of cognition to understand and respond to what he or she sees.

Gardner used a parallel/dualistic organizational model to amplify and simplify a complex, integrated system for the purpose of discussion and analysis. He listed and described eight independent intelligences and separated them into two distinct categories, those that are testable by logical, linguistic tests such as the SAT and those that are not testable by these methods. The two intelligences Gardner listed as logically/linguistically testable are similar to those cited by Jaynes and Sperry as verbal/analytical cognitive processes, and those he designated as nonlogically/linguistically testable appear to correlate with their designation of visual/systheistic cognitive processes. Gardner's noting of strong cultural/educational biases against the development of those intelligences that are not testable by logical, linguistic instruments also parallels the bias cited by Jaynes, Bogen, and Sperry against systhesistic cognitive processes.

These similarities form the basis of a model of visual communication that reflects the omniphasic principle of complementary and balanced cognitive modalities organized under rational and intuitive cognitive systems. This suggests that, if an intelligence that one uses to understand what one sees is based in cognitive processes that are intuitive and synthesistic rather than rational and analytical, then one can infer that the basic ability or intelligence to understand what one sees is also intuitive and synthesistic. Because of the integrated aspects of our cognitive systems, a primary intuitive intelligence, like visual intelligence, can subsequently be integrated with rational intelligences, such as verbal or mathematical intelligences, and provide information for rational analysis and response. It might also integrate only with other intuitive intelligences, such as music or bodily kinesthetic intelligence, and never be rationally considered in a conscious' cognitive format.

Though I cannot definitively assign all of the intelligences Gardner defines as predominantly rationally/analytically or intuitively/synthesistically based on primary cognitive levels, his own definitions support the type of omniphasic cognitive organizational model suggested in Table 13.1. Gardner's mathematical/logical and linguistic intelligences fit the concept of rational/analytical intelligences. Gardner's visual, musical, bodily kinesthetic, and intra/interpersonal intelligences fit the concept of intuitive/synthesistic intelligences. Though Gardner's spatial intelligence does not fully incorporate the concept of visual intelligence as I have suggested in Table 13.1, recent studies of visual intelligence (Barry,1997; Hoffman, 1997; Williams, 1999; Newton, 2000) suggest that it is an appropriate

TABLE 13.1
Multiple Intelligences and Omniphasic Orgnizational Model

Omniphasic Model	*Rational Intelligences*	*Intuitive Intelligences*
Gardner's MI Model	*Logically Testable Int.*	*Nonlogically Testable Int.*
	Mathematical/Logical	Spatial/Visual*
	Linguistic	Musical
		Bodily Kinesthetic
		Intrapersonal
		Interpersonal
		Naturalistic

and critical addition though it need not always be linked with spatial (see Table 13.1). Gardner has added Naturalistic, which seems to relate most closely to the processes of synthesis.

This omniphasic model provides a basic format that places the concept of independent but integrated cognitive modalities within a historical framework of dualistic, rational/ intuitive cognitive processes. It also correlates that organizational model to Gardner's contemporary MI theory and provides groups of specific intelligences that support the omniphasic cognitive organization. The remaining step needed to support the rational/ intuitive model as a holistic cognitive system involves an exploration of how the actual cognitive modalities work within the brain. Does contemporary neuroscience, with its ability to map mental processes, support the omniphasic, rational/intuitive model, and what role does visual cognition play in this paradigm? How does visual cognition lead to understanding and how does it effect behavior?

Visual Cognition, the Unconscious Mind, and Behavior: LeDoux, Damasio, Barry, Goleman, Ornstein, Capra

Working from a neurobiological perspective in his book *Decartes' Error* (1994), Antonio Damasio pairs emotion and reason as complementary aspects of cognition. Damasio asserted that, "even after reasoning strategies become established in the formative years, their effective deployment probably depends, to a considerable extent, on a continued ability to experience feelings . . . certain aspects of the process of emotion and feelings are indispensable for rationality" (1994, pp. xii and xiii).

In later research (Bechara, Damasio et. al., 1997; Damasio, 1999), Damasio and his team suggested that the prefrontal lobes of our brains are the repository for a memory system that is developed and used unconsciously, synthesistically, to develop unconscious biases that guide advantageous, rational behavior. Further, they suggested that it is possible that rational behavior is dependent upon access to unconscious biases.

Bechara's and Damasio's work supports the proposition that synthesistic intelligences attain to direct knowledge before reason and without evidence of reason and operate in complementary, parallel processes to both guide and support rational decisions. Though Damasio's experiment did not isolate visual cognition, Wolfe suggested a similar scenario for visual processes as early as 1983 (Wolfe, 1983, pp. 94–98).

Later, LeDoux (1986) described this complex visual process from a cognitive perspective that suggests a similarity between Damasio's unconscious biases and preconscious visual processes.

> The newer research contradicts earlier thought and reveals how sensory signals from the eye travel first to the thalamus and then, in a kind of short circuit, to the amygdala before a second signal is sent to the neocortex. (pp. 237–248)

Simply put, the eyes see and, from a preconscious mode using the amygdala in concert with the prefrontal lobes, motivate behavior before the rational mind is activated. By integrating the work of LeDoux and Damasio, we discover a potential correlation between the synthesistic, neurobiological processes between the eye and the brain and the type of cognitive processes that characterize the unconscious memory of our prefrontal lobes, Both processes operate on preconscious cognitive levels to process information into knowledge and to motivate behavior before the conscious, analytical processes of the neocortex receive the information.

If this is true, visual communication, including the messages of persuasion imbedded in visual media imagery, operate both spontaneously as preconscious motivators of behavior and subsequently as they become part of the unconscious memory that forms the biases that later guide our decisions and our behavior. This supports the postulate suggested in the introduction of this chapter that visual intelligence operates as a highly synthesistic process that motivates behavior both before and beyond reason.

In *Visual Intelligence* (1997), Ann Marie Barry addresses LeDoux'swork and this preconscious visual phenomenon, suggesting that visual processes, not rational, are the primary motivators of behavior. Barry explained:

> The implication of this is that we begin to respond emotionally to situations before we can think them through. The ramifications of this fact are significant, suggesting that we are not the fully rational beings we might like to think we are. What this second emotional route signals, in fact, is the likelihood that much of cognition is merely rationalization to make unconscious emotional response acceptable to the conscious mind. (p. 18)

Both Damasio and Barry suggested that emotions are the primary cognitive complement to reason. Goleman (1995) offered compelling evidence that emotional intelligence is more significant to decision making and behavior than rational intelligences. Goleman also correlates emotional intelligence with Gardner's personal intelligences (1995, pp. 40–43). From the perspective proposed in this chapter, this correlation and the preconscious character of emotion place emotional intelligence within the framework of intra/interpersonal synthesistic intelligences.

Further, drawing on the work of LeDoux and Damasio, Goleman describes a relationship between the amygdala and prefrontal lobes suggesting that they work together to mediate and guide preconscious behavioral motivations. He explained that the amygdala provides the more spontaneous, rudimentary response and the prefrontal lobes the more sophisticated, synthesistic response, both in preconscious formats (Goleman, 1995, pp. 17–21). This develops the correlation between LeDoux's preconscious motivations from the amygdala and Damasio's unconscious biases and supports the concept that visual intelligence is a primary synthesistic intelligence that guides and motivates behavior prior to reasoned considerations.

Robert Ornstein (1997), approaching the subject from a psychological background, reviewed the major literature of the hemispheric specialization debate from the 1970s to the present in*The Right Mind: Making Sense of the Hemispheres*.He concluded his exhaustive survey of psychological, psychiatric, and biological literature on cerebral asymmetry, encountering more than 45,000 publications, with a statement similar to, though perhaps more metaphorical than, Damasio's:

> I'd say that there exists in the right side a capacity that updates the different possibilities for action at any time. It's necessary, for the brain to guide us through this complex world, for the different centers of the brain to be put on-line when it is time to analyze sounds, update memory, or decode a new dish of food. So one aspect of the right side's overall or higher view of events is that it may well have a measure of influence over which mental module gets activated. Context, in our life, trumps text, not the other way around. "Higher consciousness" is another way of putting it. (1997, p. 159)

In another realm of science, physicist Fritjof Capra (1991), in *The Tao of Physics*, uses a dualistic model of parallel perspectives to address the need to develop a more holistic scientific worldview. His work supports the concept that visual/synthesistic cognitive processes are as critical to science as verbal/analytical cognitive processes are. Capra cited such scientific luminaries as Neils Bohr andWerner Heisenberg in quantum physics as he described a contemporary, ongoing paradigm shift in scientific vision that leads away from the concepts and values of an outdated rational, technological worldview (Capra, 1991, p. 325). Capra's paradigm embraces an organic, holistic view of the world, recognizes the limitations of all rational approaches to reality, and accepts intuition as a valid way of knowledge (Capra, 1991, p. 325). Capra's "ecological worldview" is dualistic in that it recognizes two guiding principles, rational and intuitive thought, and is parallel in that it recognizes the interdependence of the two principles.

The dualistic approach embraced in this chapter draws from centuries of cross-cultural traditions that have explored and defined aspects of everything from human psychology (conscious/unconscious), neuropsychology (left/right brain), and mythology (masculine/feminine archetypes) to academia (qualitative/quantitative), philosophy (yin/yang), and physiology (male/female). To emphasize this dualistic, interdisciplinary perspective, I want to close this part of the discussion of visual cognitive theory with a comparison of ancient and contemporary parallel ways of knowing. This comparison visually and analytically illustrates the basic premise that underlies all of the theories and ideas that I have presented. Thus, Table 13.2 compares Bogen's *ParallelWays of Knowing*

Table 13.2
Parallel Ways of Knowing

Parallel		*Duality*	
L-Mode **(Rational)**	R-Mode **(Intuitive)**	L-Mode **(Rational)**	R-Mode **(Intuitive)**
intellect	intuition	yang	yin
convergent	divergent	masculine	feminine
digital	analogic	positive	negative
secondary	primary	sun	moon
abstract	concrete	light	darkness
propositional	imaginative	right side	left side
analytic	relational	cold	warm
lineal	nonlineal	spring	autumn
rational	intuitive	summer	winter
sequential	multiple	conscious	unconscious
analytic	holistic	left brain	right brain
objective	subjective	reason	emotion

Source: Bogen, 1975, pp. 24–32.
(Based on *I Ching*, ancient Chinese Taoist work.)

(1975) with the ancient Chinese model of duality from the *I Ching* (1950). This graphically and conceptually illustrates the concept of complementary, parallel dualities, in both historical and contemporary formats. I have added the bold headings to show the relationship between these earlier ideas and the omniphasic concepts of rational and intuitive cognitive systems.

OMNIPHASISM: BALANCING VISUAL KNOWING AND COGNITIVE THEORY

A Visual Theory of Cognitive Balance

The omniphasic theory integrates and organizes the work already described in this chapter with the author's original work. The first postulate of omniphasism suggests that *human intuitive and rational intelligences complement one another as equal and parallel cognitive processes that operate independently, but are integrated*. This concept is grounded in the historical framework of Jaynes' bicameral theory and Bogen and Sperry's hemispheric specialization research. It suggests that the human mind utilizes two primary cognitive processing systems. The theory transcends the semantic and neurotechnical problems associated with historical right- and left-hemisphere research by focusing on function rather than location and by redefining the cognitive modalities as functionally rational and intuitive. Rational intelligence is the ability to attain to knowledge through cognition

based on reason. Intuitive intelligence is the ability to attain to knowledge directly, through cognition, without evidence of reason.

Further, the theory draws support from contemporary researchers in communication, education, art, neuroscience, psychology, visual studies, and physics to suggest, in postulate 2, that the *intuitive and rational systems are equally complex and equally significant to balanced, whole-brain functions of a human being.* The theory also notes, in postulate 3, that *a significant bias exists against the development and maintenance of intuitive intelligences throughout our scientific, economic, educational, and cultural systems.*

In addition to the historical perspective, these postulates are grounded in an interdisciplinary synthesis of contemporary work that specifically includes the multiple intelligence theory of Howard Gardner; Antonio Demasio's theory of unconscious biases;

TABLE 13.3
Key Postulates of the Omniphasic Theory

Postulate 1
- Human intuitive and rational intelligences complement one another as equal and parallel cognitive processes that operate independently but are integrated.

Postulate 2
- Rational and intuitive intelligences are equally complex and equally significant to the balanced, whole-brain functions of a human being.

Postulate 3
- A significant bias exists against the development and maintenance of intuitive intelligences throughout our scientific, economic, educational, and cultural systems.

Postulate 4
- This bias has created an experiential and psychological *intuitive intelligence void* in our culture that promotes *intuitive illiteracy* and leaves us cognitively unbalanced, lacking and longing for completion as whole beings.

Postulate 5
- This intuitive illiteracy has opened the door for the media to be used as the educational/exploitation system for intuitive intelligences. The power of the media to persuade and shape lives and cultures lies in their ability to develop intuitive communication processes that effectively fill this intuitive void.

Postulate 6
- The development of a holistic educational model that embraces a balanced curriculum, developing both intuitive and rational intelligences as equivalent and complementary, has the potential to prepare a more balanced, fully educated, self-determining individual, less susceptible to manipulative media influences and better prepared to apply classroom experiences to life experiences in ways that generate balance within the individual and thus within the cultural systems subsequently developed.

TABLE 13.4
Summary of Theories Relevant to Omniphasism

Omniphasism	*Rational Intelligence*	*Intuitive Intelligence*
Williams	The ability to learn or understand through a process relating to, based on, or agreeable to reason.	The ability to learn or understand through a process based on the power or faculty to attain to direct knowledge or cognition without evident rational thought or inference.
Bicameral Mind Julian Jaynes	*Corporeal Function Brain* Conceptual	*Admonitory Brain* Perceptual
Hemispheric Spec. Bogen/Sperry/Edwards	*Left Brain/L-Mode* Rational, verbal, logical, analytical	*Right Brain/R-Mode* Intuitive, visual, synthesistic, gestalt
Multiple Intelligence Gardner/Walters	*Logical Intelligences* Logical/Mathematical Linguistic	*Nonlogical Intelligence* Spatial/Visual Musical Personal Interior Personal Exterior Bodily Kinesthetic Naturalistic/Patterning
Unconscious Memory Damasio	*Logical Intelligence* Reason	*Synthesistic Intelligence* Unconscious Bias
Visual Intelligence Ann Marie Barry	*Associative Logic* Visual Mosaic Logic	*Unconscious Memory* Perception
The Right Mind Ornstein	*Left Hemisphere* Text	*Right Hemisphere* Context
Science/Paradigm Shift Fritjof Capra	*Technology/Mechanical* Rational Knowledge	*Ecological/World View* Intuitive Knowledge

Joseph LeDoux's research on visual cognition; Carl Jung's theory of the unconscious mind; Ann Marie Barry's theory of visual intelligence; Daniel Goleman's theory of emotional intelligence; Robert Ornstein's concept of text and context; and Fritjof Capra's theory of an ecological worldview.

The omniphasic integration of the work of the scholars presented in this chapter with the author's original work also suggests that most, if not all, intelligences and cognitive processes have strong visual components. For instance, the written formats of both math and linguistics are visual. Many mathematical concepts, such as fractals, have significant visual expressions in both the digital and biological worlds. Literature, voice, and music use visual notation and generate mind's-eye visual imagery that draw on conscious and unconscious imaginative and psychological intelligences. Intrapersonal and interpersonal intelligences rely heavily on both physical seeing and on mind's-eye visions in dreams and meditations.

These interdisciplinary visual components suggest that the study of visual cognition and visual literacy provide a unified format for the study of certain areas of both intelligence and cognition.

In Table 13.3 I listed, in addition to the three postulates that are directly supported by the theories and scientific data explored in this chapter, three additional postulates that I suggest can be projected from that data. Postulates 4, 5, and 6 draw on original experiments in visual and media literacy that I have developed over the last 14 years. They also suggest why and how the omniphasic theory might be used to integrate visual learning, intuitive intelligence and cognitive balance into the educational system. Table 13.4 provides a summary that organizes all of the theories and data discussed in this chapter under the classifications of rational and intuitive intelligences and cognitive processes.

CONCLUSION

I believe that the sound quantitative data and science that support the first three postulates lead naturally to the theory proposed by the last three postulates. Together they generate a number of significant ideas and research questions for further study in terms of advancing omniphasic visual communication education and practices toward balanced visual and intuitive cognition. Some of the questions include the following:

- If the visual/synthesistic and verbal/analytical processes of the brain are equally complex and significant in their cognitive abilities to informand establish the whole individual, and if there is an economic, educational, and scientific bias against the visual/synthesistic processes, then what is the effect of this bias on the individual and on society?

- If the effect is significantly negative, why do we continue to support it?
- What can be done to rectify the problems generated by this bias?

It appears that, as individuals, we are equipped with minds that, as a society, we are half-educating at best.We are leaving a major portion of our cognitive abilities out of the equation of cognition and education.We have created a society that wonders (with our verbal/analytical half-mind):

- Why is society so out of balance and out of control in terms of ecology, violence, war, starvation, distribution of wealth and goods, poverty, equality of gender and race, economies, greed, and peace?
- Why do so many seem to struggle to resolve such personal and public problems—often with the aid of a rapidly growing, quick-fix, self-help industry—as if toward some reasoned solution that remains just out of grasp.

I want to suggest that perhaps the emptiness and longing that so many feel in their lives is directly derived, at least partially, from our half-headed educational and cultural systems that ignore the growth toward individual and cultural wholeness that educating the whole

mind, all of our cognitive abilities, could provide. Perhaps the void that many individuals experience and express, as well as unsolved answers to many personal and cultural problems, resides, to a significant degree, in the empty spaces of the untapped potential that balancing the use of our visual/synthesistic and rational/analytical intelligences and cognitive abilities would realize.

Omniphasism supports the idea that mass-communication media are rapidly becoming less verbally dominant and increasingly visually dominant. Because visual intelligence is a primary intuitive intelligence, visual and intuitive cognitive and communication skills then become requisite of this and future generations of citizens of visual cultures as well as communication professionals and scholars. Because of this, and because of the visual components of most intelligences, visual education provides a particularly significant arena for the study of the questions asked earlier and of the broader applications of intuitive intelligence and the application of the omniphasic theory. This paradigm shift toward an omniphasic cognitive and intelligence learning model is critical because visualization and other synthesistic cognitive abilities are supported by primary intuitive intelligences that, historically, have been studied predominantly from a rationally biased, educational perspective (Williams, 1999).

Omniphasism explores the rational biases of traditional visual education and suggests ways that we can build on the foundation of those approaches and expand them to embrace an omniphasic curriculum based on visual and media literacy (Williams, 2003;Ryan, 2004). I suggest that these rational biases contribute *to visual and intuitive illiteracy* and thus to the effective proliferation of persuasive, intuitive, media-generated communication. Thus, the rational bias perpetuates the power of the media to exploit intuitive illiteracy by using intuitive persuasion techniques to create perceptions of reality that, through conscious and preconscious cognitive processes, guide our behavior, including our personal and corporate development, on virtually all levels toward a consumer-consumed culture (Williams, 2000a).

In traditional theory development, a theory must be testable. Although the very nature of omniphasism rejects societal insistence on linear data support. I nevertheless have offered both historical and contemporary interdisciplinary, quantitative, and theoretical evidence to support my ideas by building on neurobiological, educational, communication, and psychological experiments on cognitive processing. I also offer qualitative evidence obtained through application of omniphasic techniques in the classroom over 14 semesters.

The omniphasic theory draws on the results of an omniphasic visual literacy class that I have taught to nearly 500 students each semester for 14 semesters. For this class I have developed 14 creative and cognitive exercises that use visual cognition to help students develop both intuitive and rational intelligences and cognitive processes. From this very successful experiment and experience I suggest, in other publications, (Williams, 2003), how one might begin to develop a new educational model that initiates the teaching of rational and intuitive intelligences as equal and complementary cognitive processes through omniphasic visual literacy. I also explore, from that base, how the development of intuitive intelligence can be integrated into other areas of our educational system (Williams, 2000b).

This holistic omniphasic approach to visual cognition and intelligence has the potential to teach students to use their whole minds to replace invasive and oppressive intuitive media experiences with self-directed intuitive experiences. The subsequent development of whole-mind processes fosters greater creativity, more powerful problem-solving abilities and balance between the desire for quantity and the nurturing quality of relationships and integrated life experiences. A more fully educated, self-determining individual who is less susceptible to manipulative media influences is also better prepared to apply classroom experiences to life experiences in ways that generate balance within the individual and thus within the cultural, economic, educational, and scientific systems subsequently developed.

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