CHAPTER ONE

THE EMOTIONAL DEMANDS OF INFORMATION ASSIMILATION

American literary critic and rhetorician Stanley Fish has argued that people are not significantly moved by the use of evidence in reasoning. A dramatic example is Fish's denial of the usefulness of evidence in proving the historical validity of the Holocaust. In a review of the April 2000 London court case between eminent Emory historian Deborah Lipstadt and "Holocaust denier" David Irving, Fish argued that it was incorrect of Lipstadt to "rest her case" upon an apparent distinction between "irrefutable evidence" and "myth, rationality, and bigotry" (Fish 2001, 500). Lipstadt was sued by Irving because she claimed that he had distorted historical evidence. Fish does not deny that Irving and his group belong to the "radical right and the lunatic left." He does deny that something like "irrefutable evidence" can exist and have force to influence thought.

For Fish, thought, in essence, is not an act of reason, but a repetition of belief. Evidence cannot change thought, because thought always begins repetitively as an interpretive bias toward evidence. "True belief does not emerge from reason's chain; rather true belief—and false belief too—configure reason's chain and determine in advance what will be seen as reasonable and what will be recognized as evidence" (Fish 2001, 501).

Gary Olson and Lynn Worsham represent Fish's argument by asserting that for Fish it is not the case that "seeing is believing." Instead the relation between evidence and reasoning works in reverse. We do not observe the world and then believe what we see. We have beliefs and we then observe or hallucinate the truth of our beliefs in our observation of the world. In this case "believing is seeing" (Olson and Worsham 2004, 149). We invest the world with properties it does not have in order to confirm our beliefs. The world may be full of information, but most

people ignore or dismiss whatever they find uncomfortable to think about. A strong reading of Fish would suggest that humans routinely falsify evidence through hallucination.

Fish's claims about evidence, reason, and the possibilities of education have been widely attacked, but also reluctantly acknowledged. An uncomfortably strong argument supporting Fish's claims regarding hallucinatory evidence can now be made by way of medical research. New tools for examining the brain's structure and biology offer us a picture of it being slow to recognize and accommodate new information. Information taken into memory may be stored in various areas of the brain without being made available to problem-solving centers. In this book I will I call this problem a "desire not to know." I will examine concrete examples that illustrate the truth of Fish's claim about evidence. My general argument, however, has two parts . First, I will give careful attention to how particular minds resist evidence. Second, I will suggest that failures in the use of evidence are not as hopeless as Fish contends. People can indeed be brought made to abandon hallucinations and make use of "irrefutable facts." This integration of evidence, however, is not through the work of reason, but through the "work" of emotion. This book will shift between neurological accounts of the mind and close observations of particular minds in order to support a case for the primacy of emotion in the development of an educated mind. My emphasis will be upon classroom teaching in the liberal arts and the role emotion plays in the processing of thought.

I begin my discussion with a remarkable set of experiments developed by V. S. Ramachandran, director of the Center for Brain and Cognition at the University of California, San Diego. Ramachandran has made major contributions to the study of phantom limb phenomenon, visual processes, and cognitive function. Trained as a medical doctor, he became interested in a medical condition termed anosognosia in which an individual is unable to

recognize that a part of their body is paralyzed. Anosognosia, he writes, "is an extraordinary syndrome about which almost nothing is known. The patient is obviously sane in most respects yet claims to see her lifeless limb springing into action" (Ramachandran 1999, 131). Ramachandran's patients, like the true believers of Fish's discourse communities, can make no use of "irrefutable information." Fish does not explain why this apparently psychotic behavior exists; Ramachandran does. Fish does not believe this apparently psychotic behavior can be remedied. Ramachandran demonstrates how it can.

In the chapters that follow I will pursue a very traditional theme, the problem of human rationality, but I hope to address this problem from a very new perspective. Like many I do not believe that rationality can be systematically defined. There are many different kinds of rationality for many different kinds of discourses and human communities. In this book, rationality is meaningful only in terms of a simple criterion. Can a mind, seeking to solve a problem, make use of information perceived as relevant to that problem? Patients suffering from anosognosia will, Ramachandran shows, reach out to grasp a tray with a glass of water, assume that both arms work, and watch perplexed as the tray and glass fall on the floor.

This book will show many examples of minds responding to pertinent information by first "witnessing" and then subsequently "forgetting" information. These minds (even the anosognosia patients, I will show) first take a step to "recognize" information, and then take a second step to "contain" this information, and yet in the next step of thought, these same minds—owing to fear, anxiety, or dissociation—will forget, dismiss, or deny the information that was initially accepted. This step-by-step response to possibilities for problem solving is described by Fish as "chains of reason" and by clinical literature as the "linking" of thought representations. My intent is not to police or enforce some particular definition of rationality, but

rather to observe and understand how minds fail to develop linked thoughts they themselves initiate to solve problems.

Since Plato the Western world has represented the mind as a spacious interiority capable of infinitely subtle and flexible formulations of rational thought and imagination. This heroic mind is the subject of Plato's *Phaedrus* and has been the human mind imagined by science since the dawn of The Enlightenment. This naturally empowered rational mind has the capacity to take human progress to unimagined ends and is impaired only by the polluting presence of emotion and passion.

A different understanding of the human mind is now emerging. Ramachandran's work, along with many other research studies in many fields, supports Stanley Fish's claim that "believing is seeing." People will invent evidence to support belief before they will adjust belief in response to evidence. Ramachandran describes how patients with anosognosia will "see" their paralyzed arms perform multiple and complex actions while these same arms are in fact lying lifeless at their sides. And they will maintain these claims even when the doctor is present to point to a useless limb and argue with their own improbable observations. These patients seem sane in every respect, but they apparently hallucinate the use of immobile arms. Ramachandran argues, surprisingly, that these patients are representative of the human capacity for denial.

There are two qualities in this narrative of hallucinating anosognosia patients that are particularly noteworthy for teachers. First, these people seem sane in every respect. You could talk to these people about many things, find them logical and thoughtful, and never suspect that in relation to one issue, one that is very important to their lives, they literally cannot see the hand in front of their nose. In respect to this one truth claim, they are utterly incapable of not only "reason" but also reporting the truth of perception itself. Second, within this one very restricted

field of vision that helps define, if not their belief system, at least their sense of emotional security, they will rely upon and defend the most unimaginable and "psychotic" verbal assertions with a fluent production of "thought" and ideation that they themselves seem to experience as absolutely persuasive.

Ramachandran was intrigued with these patients because he could not initially really believe what he saw. When Stanley Fish describes the beliefs of Holocaust deniers, or "true believers," we do not get a careful representation of a particular mind involved in an act of thinking. This failure of focus impedes our understanding. Ramachandran's work offers a more accurate account of Fish's most unsettling ideas. Minds do refute facts, but the ground of such refutation, while emotional, is also responsive to developmental integration.

Ramachandran's interest in the "unthinkable" denials of the clearly "irrefutable evidence" of paralysis led him to pursue a number of experiments. He sought to grasp the basic principles of the response. Is such denial biological or psychological? On the one hand, there was evidence to support the idea that the condition was the result of purely biological malfunctions in the brain. And yet, on the other hand, he found that these apparently "biological" instances of denial could be remedied by "psychological" procedures that did not repair any biological malfunction.

Over time Ramachandran came to feel that his work with these patients represented the universal drama of human denial: "Watching these patients is like observing human nature through a magnifying lens: I'm reminded of all aspects of human folly and of how prone to self-deception we all are" (Ramachandran 1999, 130). If Ramachandran is right that "we"--—students and teachers—exhibit these seemingly crazy instances of denial, what does this mean for education? What does it mean for democracy? Should teachers think differently about students "resistant" to fact and reason? These are the themes this book will explore.

Everyday Unimaginable Stupidity

I have come to believe that the denial we see in Ramachandran's anosognosia patients represents a huge, but generally dismissed dimension of everyday social life. We could call this practice "everyday unimaginable stupidity." This is stupidity on such an enormous scale that those of us who observe it are not fully able to comprehend it. We see it, and then, because it defeats our ability to make sense of it, cannot contain it. In the realm of law, medicine, education, politics, and personal relations, crucial information is routinely denied, forgotten, or dismissed. This fact by itself is disturbing, but even more disturbing is our general tendency to not recognize the consequences and the implications of the denials that take place.

If one is attentive to the kind of "thinking" formulated by patients with anosognosia, one soon begins to question the essential nature of what we think of as "the mind." In one particular example a woman with a paralyzed arm denies that the arm that is attached to her body is her own arm. The doctor grasps the woman's lifeless left arm and holds it in front of her eyes. "Whose arm is this?" he asks the woman. She claims it is her brother's arm.

What we observe in this encounter is an extended dialogic engagement with a "mind" that does not perform the way we expect it to. On the one hand, this mind is fully present to talk to the doctor. There is nothing to indicate anything mentally "wrong" with the speaker. On the other hand, this mind's ability to observe the world and talk about what it sees is severely compromised. At key points in the flow of "thought" the patient has no apparent awareness of logical language or simple rules of perception. What is this mind doing?

There are, of course, a number of purely rational problems associated with the patient claiming that the arm attached to her shoulder belongs to her brother. First, we are told that her

brother lives in Texas and she is in a hospital in Oxford, England. Second, this arm is attached to her own body.

A mind should be responsive to the clear and "irrefutable evidence" of sense logic, and verbal continuity. A mind should take responsibility for this evidence: If you are carrying an arm attached to your shoulder, it is logically your own arm. Such apparently abstract and ineffectual rational claims, however, have no influence on the patient's thought. Whatever evidence the doctor formulates to convince her that her arm is her own, she dismisses easily. This evidence has no effect on the confidence of her reasoning. Ramachandran asks her how she knows it is her brother's arm. She has a completely convincing answer: "Because it is big and hairy."

Ramachandran observes: "To listen to a patient deny ownership of her arm and yet, in the same breath, admit that it is attached to her shoulder is one of the most perplexing phenemonena that one can encounter as a neurologist" (1999, 132–133).

Such denial is indeed perplexing, but it is not so uncommon. Similar (though not quite so dramatic) examples of outright denial of observed "real world" evidence occur frequently. Psychologist Daniel Goleman argues that we deflect psychological pain by keeping uncomfortable thoughts out of our minds. "The brain's basic design," he argues, "offers a prototype of how we handle pain of all sorts, including psychological distress and social anxieties" (Goleman 1985, 29).

Some examples of information repudiation, however, seem difficult to explain in terms of the threat of pain. In the 1980s two researchers tested how well students in a first year college physics course learned basic concepts (Halloun and Hestenes 1985. They postulated that "common sense" understandings of motion were very different from Newtonian understandings of motion; and they wanted to see how well introductory courses in college physics changed

these students' common sense understandings. What they found was that students often do not learn what they are taught—even when they pass tests that demonstrate that they have learned it. Not only did students not change how they thought as the result of a course they spent a semester thinking about and passing, but they also did not change how they thought even when immediate evidence logically required a change. When they were called in to witness a physics experiment demonstrating the falsehood of their beliefs, they continued to insist upon the validity of their false beliefs. Ken Bain, a scholar of education, summarizes their findings thus:

> The students performed all kinds of mental gymnastics to avoid confronting and revising the fundamental underlying principles that guided their understanding . . . some of these students had received high grades in the class. (2004, 23)

In this example we do not see people failing to observe the shared physical world. We do see minds observe the world, consider this "evidence," and yet in a third act of thought, dismiss the observed evidence.

Like Ramachandran investigating the mind of the anosognosia patient, these researchers observed the minds of everyday students. Ken Bain, who reports on this experiment, describes the reaction of the researchers to their experiment: "What they observed astonished them"(2004, 23). Students observed clear physical experiments that disproved their ideas about motion; nonetheless, they refused to change their initial beliefs

Bain and Ramachandran offer us glimpses into a world of the inner workings of thought that is both all too common and generally neglected. If we begin to look, these examples of the mind not taking in evidence are everywhere. Some of these events are relatively harmless and even humorous. Bill Bryson, writing about his hike along the Appalachian Trail, records his conversation with another hiker about a tent. This woman looks at his tent and comments: "You

should have got a three season tent." He responds: "It is a three season tent." The conversation continues:

> "Pardon me saying so, but it is like seriously dumb to come out here in March with a three season tent."?
>
> "It is a three season tent."
>
> "Your lucky you haven't frozen yet . . ."
>
> "Believe me it is a three season tent."
>
> "That' s a three season tent." (The woman points to another tent.)
>
> "That's exactly the same tent."
>
> She glanced at it again. "Whatever. How many miles did you do today?" (Bryson 1998, 74)

Bryson's dialogue is something we might recognize as familiar. A conversation between two people begins with a simple factual observation. One person makes a simple factual claim and the other person attempts to correct the facts of the claim. The conversation should be able to explore the various kinds of evidence in support of the differing truth claims. Instead the conversation becomes only a series of assertions without any thoughtful attempt to focus on a claim and evaluate evidence.

In this example, there are repeated attempts to prompt another person to consider—at least as a provisional thought— – relatively simple information. The information introduced is repeatedly dismissed. At the point where evidence is convincing, the person who introduced the topic changes the subject as if no previous conversation existed. In this example, the apparent

obstinate failure to take in information is funny. But failures of information are not always funny. Failures to take in information occur in corporate boardrooms, in university classes, in personal relations, and in political decision making. They are everyday occurrences, they are everywhere, and often they are catastrophic.

Rick Shenkman, historian and author of *Just How Stupid Are We? Facing the Truth about the American Voter*, points out in a September 7, 2008, article in the *Washington Post*:

> Just before the 2003 invasion of Iraq, after months of unsubtle hinting from Bush administration officials, some 60 percent of Americans had come to believe that Iraq was behind the Sept. 11, 2001, terrorist attacks, despite the absence of evidence for the claim, according to a series of surveys taken by the PIPA/Knowledge Networks poll. A year later, after the bipartisan, independent 9/11 Commission reported that Saddam Hussein had had nothing to do with al-Qaeda's assaults on the World Trade Center and the Pentagon, 50 percent of Americans still insisted that he did. In other words, the public was bluntly given the data by a group of officials generally believed to be credible—and it still didn't absorb the most basic facts about the most important event of their time.

These are everyday facts; their failures of recognition have costly effects in terms of financial expense and loss of life. These events are the political equivalents of Hurricane Katrina and the Gulf War. And yet their occurrence is only briefly noticed. Their disastrous consequences become almost invisible.

Resistance to new information is both ubiquitous and largely untheorized.[1] Research in political science indicates that many people with bias do not correct their ideas when given creditable information. Bain's work on education proposes that much teaching routinely fails to deliver the cognitive change that is its purpose. I will cite examples from medicine, law, politics,

and education to suggest that evidence is routinely usually dismissed, precisely at a point where it is needed. Increasingly politicians stage debates in which the truth of the various claims is essentially irrelevant. There have been many appeals that we must work harder to make this truth available to people. I suggest that we should not invest great hope in the effectiveness of simply making "truth" available. We must present evidence, but we must equally seek to understand how and in what conditions people make use of truth. We must develop a comprehensive, abiding, and systematic understanding of the failure of information assimilation.

Ramachandran observes this failure of information integration and asks how the mind can be so insistent in its denial of information that is plainly visible? Clearly not all information in memory is available for thought at all times. What makes information assimilation possible at times and impossible at other times? Researchers in many fields have begun to address this problem. Keith Stenning has worked in the field of cognitive science to understand the emotional processes of thought. He argues that "information consumption" is not a straightforward procedure. Not all information can be taken in. "The process of internalization has to connect with what is already there," he says (Stenning 2002, 5). Ramachandran and Stenning demonstrate a general principle. It is foolish to assume that people can easily take in information—even when it is crucial to their well-being. The mind is not a computer that instantly makes use of information. The mind is often more like a thirsty mule, unwilling to drink even when it has been brought to the water. It would be in the "best interest" of anosognosia patients to understand their bodily limits. But this need for knowledge is defeated by what seems to be an attachment to established beliefs.

It is crucial for educators to understand the various patterns and styles of denial. But we will learn more from Ramachandran than from Fish. Fish is memorable for his alarming

generalizations: Minds are not responsive to evidence. Ramachandran is most compelling in terms of the irrefutable evidence of his findings. He demonstrates, on the one hand, a degree of denial that most of us would not have thought possible, the hallucination of evidence. And, on the other hand, he gives examples of people overcoming their denial and accepting evidence through a process no one would have dreamed effective, the overcoming of denial through rapid eye movement (REM), the kind of brain activity we typically see in dreaming. It is as if we dream our way into responsible thinking.

Unconscious Integrated and Unintegrated Knowledge

Ramachandran's anosognosia patients demonstrate a crucial feature of the resistance to "irrefutable facts" not recognized by Fish. Some of the information refuted by resistant thinkers is in fact in their minds. It is just that it is not yet integrated with their reason. It is present unconsciously, but it has not been "assimilated" by processes that allow a conscious mind to make use of information present in short term memory.

Ramachandran found his patients would recognize their paralysis if he triggered REM by injecting cold water into their ear canal. After he has administered the water, he asks one patient if she can use both arms. At this moment she changes her response and replies, "No my left arm is paralyzed." Ramachandran observes:

> This is an extraordinary remark, for it implies that even though she had been denying her paralysis each time I had seen her over these last few weeks, the memories of her failed attempts had been registering somewhere in her brain, yet access to them had been blocked. (1999, 146)

After the eye movement has had an effect on brain function, the woman does not even need to see the inability of her arm to act. She remembers it; she had in reality "seen" it all along. This information is stored in the woman's mind, in her "memory," but her conscious thinking mind cannot make use of the memory until the cold water triggers REM, integrates memory, and changes how her mind functions.

Ramachadran speculates that the waking REM, similar to the REM of dreams, "internalizes" information stored in memory but not used by memory. These minds already "know" this information, but these same minds, while they "have information," are unable to consciously and verbally testify to it.

This book will be about a subjective state I have decided to describe as "the desire not to know." I am borrowing this phrase from the work of British psychiatrist Wilfred Bion who theorized that some responses of the mind to information involve an act of avoidance. He represented this movement of mind in shorthand as "-K" (Bion 1959). I am uncomfortable with Ramachandran's term "denial." Though Freud coined the term to mean an unconscious act, it generally implies in everyday usage a willful, conscious act. People "in denial" often seem to express a stubborn willfulness. Rather than use the term "denial," I will cautiously employ a more awkward term, "the desire not to know." This is not a perfect phrase as it may imply a conscious experience of desire. In most cases I do not think there is conscious awareness of a desire to "not know." Nonetheless the term does imply an emotional motive for denial rather than a response guided by will or reason. If we can recognize the desire not to know as emotional, we may be more inclined to respond according to an emotional rather than a cognitive logic.

The examples of the desire not to know that I am taking from the work of V. S. Ramachandran illustrate both the unimaginable reach of this principle and the possible solution to the problem. The cold water experiment proves that information can be unconsciously "taken in" by a mind but not fully assimilated into conscious thinking. Concerted attempts to "point" to the evidence of immediate perception seem to have no effect in integrating evidence with reason. But other practices that address not the evidence but the workings memory and emotion in the mind, do integrate the evidence.

Western universities are very adept at the production of information. We seem to have almost no understanding of the "consumption" or "assimilation of information." We often assume, as Ken Bain points out, that if we teach information, we will produce students who can use information. We find countless examples that contradict this assumption. But by and large we continue to test for skills and neglect the crucial issues of the mind's development and assimilation of information as a problem-solving process.

Universities devote enormous resources to the production of information but almost no resources to the assimilation of information. We know that such disregard is enormously costly. But faced with the evidence of the desire not to know, we act as if humans are rational. When we observe evidence to the contrary we are, like Ramachandran and the education researchers, "astonished." We are astonished over and over again without apparently learning anything. Our astonishment testifies to our desire not to know how minds characteristically fail to incorporate uncomfortable information.

Our astonishment shuts down our own thinking about minds. We see evidence of what we do not want to believe, but our disbelief undoes our thinking at exactly the point where we need to be more thoughtful and active.

The rejection of evidence is perhaps the most costly cause of human folly.. We must, first, understand the enormity of the problem, and, second, understand that we can remedy the problem. Peter Kline and Bernard Saunders point out that "training and education can be so conducted that no learning takes place" (2010, 63). Schools usually "test" students' learning by asking them to pass tests demonstrating what they have learned. The work of Halloun and Hestenes shows that students can pass tests that "prove" that they have been trained even though they have not learned anything. American education, I would argue, seldom grasps the difference between training and learning. And as long as educational systems test for training as opposed to learning, we spend vast sums of money to justify our own "everyday unimaginable stupidity."

Information, Memory, and the Neuroscience of the Unconscious

To understand how information is used by brains, we must understand how information is stored in memory. We must understand, in addition, how memory is used (and not used) by brains to solve problems.

Training gets information into a mind. Simple tests can determine if minds "contain" or 2012.remember information. But if education only puts information into minds, it does noting to insure that people can develop the emotional flexibility to solve problems with information. Ramachandran, along with neurobiologists Joseph LeDoux, and Antonio Damasio inform us of complex relations among information, emotion, memory, and problem solving (Damasio 1995,1999, 2003, 2012; LeDoux; Ramachandran 1999, 2012) . People can have conscious awareness of information that they make no use of and people can, in an inverse manner, make use of information that they have no conscious awareness of.

Educators must do more to develop, not the verbal logical mind, but the nonverbal, emotional, and unconscious mind. The production of information without the assimilation of

information is a foolish and fruitless endeavor. Universities must take responsibility for understanding the processes of assimilation of information. We must explore teaching practices, similar to the REMs that can contribute to better information assimilation.

We must promote an educational experiential equivalent of dreaming—educational practices that facilitate emotional and memorial reorganization. When Ramachandran uses REMs to integrate information within the brain of his patient, he is contributing to something I am calling the "emotional assimilation of thought." I will use this term in each chapter and I will describe the social, psychological, and emotional activities that contribute to and impede these processes. I will use research in the sciences to support my more controversial claims. I will use examples from the classroom and from scholarly interaction to illustrate my ideas.[2]

The unconscious has recently become an important concept in the neurosciences. Antonio Damasio explains, "The unconscious, in the narrow meaning in which the word has been etched in our culture, is only part of the vast amount of processes and contents that remain nonconscious" (Damasio 1999, 228). I would advise any reader not comfortable with the term (belief can always be an obstacle to understanding) to examine the considerable research that now greatly clarifies the workings of the unconscious and the nonconscious.

Ramachandran's account of various forms of biological blindness is particularly impressive. One patient, Diane, wakes up from a coma completely blind. She was, we are told, "blind in every traditional sense of the word" (Ramachandran 1999, 64). In working with Dr. David Milner, a neuropsychologist at the University of St. Andrews, however, Diane shows an "astonishing" ability to orient her hands and body perfectly in relation to objects that she cannot see. She is able to "deftly" take a pencil from Dr. Milner's hand, and she is able to adroitly rotate a letter with perfect precision in relation to a mail slot that she cannot see it. There is a brain

inside Diane working with information from her visual field, Ramachandran tell us. It is simply that Diane has no conscious awareness of how her unconscious brain is working. She acts, the information is "processed," but it is never consciously recognized. Daine, like most people, but much more dramatically than most people makes use of unconscious knowledge to act in the world.

Antonio Damasio lists five kinds of information that are fully operative but not consciously perceived. This information can be internal images or sensations that are present in the brain but not present to consciousness. It can be remembered emotional states that are present but not active in consciousness. I will give emphasis to four of these information types:

> 1. all the fully formed images to which we do not attend; 2. all the neural patterns that never become images; 3 all the dispositions which were acquired through experience, lie dormant, and may never become a neural pattern; 4. all the quiet remodeling of such dispositions and their quiet networking—that never may become explicitly known. (Damasio 1999, 228)

We might posit that the anosognosia patient who fails to see the paralysis in her arm owns an unconscious containing "neural patterns that never become images" and "fully formed images to which" she does not attend. To know the information about her paralysis, her brain has to do "work" on her unconscious. This work would require what Damasio terms "the quiet remodeling of such dispositions" that impede awareness of uncomfortable information.

Political commentator David Brooks sums up a vast amount of current research that testifies to the importance of the unconscious in human thought:

> We are living in the middle of a revolution in consciousness. Over the past few years, geneticists, neuroscientists, psychologists, sociologists, economists, anthropologists, and others have made great strides in understanding the building blocks of human flourishing. And a core finding of their work is that we are not primarily the products of our conscious thinking. We are primarily the products of thinking that happens below the level of awareness. (Damasio 1999, viii)

A key principle for educators is the fact that minds are not machines that effortlessly run the logic of verbal consciousness. Damasio offers a careful observation of the difference between linguistic consciousness and mind:

> On several occasions when I was in medical school and in neurology training, I remember asking some of the wisest people around me how we produced the conscious mind. Curiously, I always got the same answer: language did it. I was told that creatures without language were limited to their uncognizant existence but not we fortunate humans because language made us know. Consciousness was a verbal interpretation of ongoing mental processes. (Damasio 1999, 107)

This last claim is important in relation to Ramachandran's patient who denies that the arm attached to her body is her own arm. We imagine the mind to be a "verbal interpretation of ongoing mental processes"; we expect this woman to be "centered" in a mind that is itself "centered" in the secure ground of responsible verbal reasoning and awareness of a shared visible world. The doctor points to a shared world, "this arm is attached to your body," and he invites a logical verbal response linked to his own reasoning and observation. The patient's response to the doctor should be, "Of course this is my arm." But although the doctor can situate the reference "this arm" in a variety of verbal contexts that would seem to "lead" inevitably to a

recognition of “this arm” as a meaning made real by “ongoing mental processes,” the linguistic sentence “this is my arm” and its accompanying thought is never formulated. The woman insists that the arm attached to her body is not her arm.

Her mind, clearly, is doing something else. Her mind does not reflect the relationship to visual perception, language, and intersubjective interaction we expect. Her mind is not a “verbal interpretation of ongoing mental process” as we normally understand those processes. Her mind is a reflection of unconscious processes comfortably in denial of perception, logic, and their impact of truth claims.

We respond to a person’s mind as “present” because of how it responds to language. This patient is talking to the doctor. She shows she understands the meaning of words. She seems sane in every respect but one. Her use of language in relation to the doctor demonstrates the presence of a “sound” mind. But at a particular point in her use of language, her mind apparently “fails” to operate.

Most of us, when we encounter someone who denies what seems obvious, attempt to reason the person to the conclusions we find obvious. Equally often, though, we continue to reason with this person past a point where we feel utility in our reasoning. Our reasonableness then turns to irritation. We seem to experience a moral shortcoming in this person, a “bullheadedness” that seems determined to do something wrong or harmful. Some people, perhaps, feel that anger can be a cause for increasing the capacities for rationality in another. To be angry with such a mind is like kicking a car for not starting. You may experience satisfaction by releasing your frustration, but you do nothing to improve the mechanical condition of the car.

We may think of reason as an essential power of the mind expressed in language. The clarity of language gives us access to an apparent “force” of reason. But minds are not machines

run on reason. Minds are housed in brains that operate according to altogether different principles. Damasio's work with brain damaged patients demonstrates that people who lose the capacity for language do not lose a highly precise ability to think. There is a "mental relation" to the world in these brain damaged patients, but this relation is not grounded in the system and logic of language. Damasio explains,

> As I studied case after case of patients with severe language disorders caused by neurological diseases, I realized that no matter how much impairment of language there was, the patient's thought processes remained intact in their essentials. (1999, 108)

Processes of human thought can work independent of language. People who lose the ability to use language still have the ability to reason. Damasio points out: "In every instance I know . . . People function with full 'presence of mind' and understanding of the world. So what is going on if not the use of language?" (1999, 109). If people are not grounded in the world through language, we should not expect an insistence on language to sharpen their understanding of the world. Repeating the logic of a certain verbal understanding of the world does not deliver that understanding to the inner world of the person addressed.

Feelings as Organizers and Predispositions for Knowledge

The core of mind, Damasio proposes, operates as feeling. Feelings can be made present to consciousness in terms of what he terms "images." The brain is run by emotion, not by consciousness. This means that even when we believe that we determine our lives consciously, we are unconscious of emotional experiences that orchestrate what becomes conscious. He observes:

> The fabric of our minds and of our behavior is woven around continuous cycles of emotions followed by feelings that become known and beget new emotions, a running polyphony that underscores and punctuates specific thoughts in our minds and actions in our behavior. (Damasio 1999, 43)

Minds are, at the core, "continuous cycles of emotions followed by feelings that become known." We inevitably see our minds from the outside, in terms of the feelings that become known. What we do not see is the "running polyphony" that bring inner feelings into verbal testimony and recognition.

Damasio proposes that the complex "extended consciousness" we see as mind reflects a deeper emotionally organized experience of self he terms "core consciousness":

> Core consciousness includes an inner sense based on images . . . The particular images are those of a feeling. That inner sense conveys a powerful nonverbal message regarding the relationship between the organism and the object. (1999, 125)

Relationships between "the organism" and "the object are subject to filters determined by networks of feeling. New information can be made available to consciousness, but not all new information is integrated within the biology of the brain so that conscious thought has free use of pertinent information. In the case of Ramachandran's anosognosia patients, the mind maintains the self as consistent and unchanged—even when the body has been changed.

Ramachandran proposes that the two halves of the brain play different roles in responding to new information. The left brain remembers and maintains a stable sense of self and body. The right brain makes changes to this schema of self and body when such changes are necessary. This ongoing process of mind is biologically complex: "At any given moment in our

waking lives, our brains are flooded with a bewildering array of sensory inputs, all of which must be incorporated into a coherent perspective that's based on what our stored memories already tell us is true about ourselves and the world" (Ramachandran 1999, 134). As the basic principle of mind requires the reproduction of the sense of self and new adjustments to the sense of self, there are occasions of conflict between the past self, seeking to continue as it is, and present information that would alter established assumptions.

Ramachandran suggests that

> the coping strategies of the two hemispheres are fundamentally different. The left hemisphere's job is to create a belief system or model and to fold new experiences into that belief system. If confronted with some new information that doesn't fit the model, it relies on Freudian defense mechanisms to deny, repress or confabulate—anything to preserve the status quo. (1999, 136)

This adjusting of self to world takes place, first of all, "unconsciously," that is to say outside our conscious awareness, and second, on the basis of "feeling." Information from the outer world need not be compelling. For most of us, the mind works on the principle of "autopilot" and unconsciously filters out much new information. Timothy Wilson explains:

> The mind operates most efficiently by relegating a good deal of high-level, sophisticated thinking to the unconscious, just as a modern jumbo jetliner is able to fly on automatic pilot with little or no input from the human, "conscious" pilot. The adaptive unconscious does an excellent job of sizing up the world, warning people of danger, setting goals, and initiating action in a sophisticated and efficient manner. (2002, 97–99)

All this research suggests that much of the content of our life is organized unconsciously along emotional principles. New information that introduces significant conflict within an existing emotional/feeling system is not integrated with the reasoning resources of the brain.

Current research in neurobiology suggests that the assimilation of new information requires emotional integration and readjustment. We can promote reason only when we understand how to "dream" our way into emotional integration. In making this very paradoxical argument I will be synthesizing the implications of Ramachandran's experiments with much scientific research on minds, brains, and consciousness. Before I discuss the "emotional assimilation of knowledge," though, I want to address a persistent problem researchers encounter in talking about this problem of denial.

The Disbelief of Denial: How We Continue to Believe in Reason

My argument about the human failure to take in information has two parts. The first part of the argument calls attention to the many kinds of evidence that come from medicine, politics, education, clinical practice, and everyday life. We have many examples of people failing to take in information. The second part of my argument, however, is concerned with our own inability to take in information **about** our inability to take in information. We see the event, we are momentarily stunned, but we then continue to think very much as we had before. We see unreason and then insist that people can and should be reasonable.

Ramachandran says, "Talking to denial patients can be an uncanny experience. They bring us face to face with some of the most fundamental questions one can ask as a conscious human being." If we think of consciousness as inherently an awareness of the world and other people, Ramachandran's patients force us to revise our understanding of consciousness. When he

describes his encounter with denial as an experience of the "uncanny," he expresses very precisely a common response that both recognizes and dismisses the problem at the same time .

The uncanny is an experience that shakes us to the core. Japanese engineers working with life like robots have developed the concept of an "uncanny valley" to describe gradations in the characteristic human response to lifelike figures (Saygin 2011). Freud used the German word "uncanny" (roughly translated as "unhomelike") to describe an experience revealing something threatening in the visage of something familiar (homelike). Ramachandran sees a mind. Our minds are our homes. To see an uncanny mind, then, is to see a "homelike" mind as very disturbing.

In reporting his "disbelief," Ramachandran points out that even though he directly sees what is happening, he cannot believe it. But at precisely this point Ramachandran's own mind operates like his patient's mind. Just as the denial patient cannot believe that her arm is paralyzed, so also Ramachandran cannot believe that a mind can be so paralyzed. Just as the patient is "in denial" about the powers of her arm, Ramachandran is "in denial" about the power of the human mind. Ramachandran's "disbelief" reenacts, within his own mind, the inability to take in the objective truth that he observes in the other mind.

I will be referring repeatedly to this subjective experience of the recognition of the mind's refutation of "irrefutable evidence" in the present book. People see an example of a mind in an action of "denial"—and they are "astonished." They are just not prepared to assimilate what they see. It is as if we hold an assumption about the mind's rationality, we then see an example of thinking that contradicts out assumption, and yet we maintain our disproved assumption. We see evidence of the mind's ability to refute "irrefutable evidence," but then, rather than change our assumptions about rationality, we continue to believe in the force of

reason. We continue to be "astonished" over and over again as we repeatedly see instances of denial. We are like Fish's "true believers" in our attachment to a false understanding of the mind. We can't take in the evidence of our senses.

Ramachandran, unlike many researchers, took his disbelief seriously. He decided to explore what this event might mean. He attempted a few tests to see how denial worked. Initially he decided to test his own disbelief. Perhaps what he saw was not a failure of mind, but a shrewd cunning. Perhaps these patients really could see their arms' paralysis, but for various reasons pretended not to. He tested this possibility with an ingenious experiment. He placed a glass of water on a tray directly opposite the paralyzed arm. He reasoned that if the patient really knew that his arm was paralyzed he would do one of two things on being presented with the tray. Either he would hold the tray in the middle with his one good hand in order to avoid spilling the water, or he would make an excuse for why he could not take the tray. Instead of these responses, Ramachandran found that these patients held out their (one) good arm, and then, because only one arm was holding the tray, the tray tilted and the water spilled on the floor. Confronted with the spilled water, they continue to deny their paralysis. They always fabricated an explanation, "My hand slipped." They did not recognize their paralyzed arm. Ramachandran was astonished.

When I teach Ramachandran to my graduate students, they too are astonished. Astonishment is an interesting emotional response to this simple factual event. Why do we experience a profound emotional disturbance in this event? We are presented with a simple observation. People exhibit behavior that purports to be "thought" but is obviously not thought. "Thought" in this case represents precisely an inability to think. We have an apparently sane woman claim her arms works, or point to her own arm and claim that it is her brother's arm. And

yet this fact, this act of witnessing that we are presented with, is something we ourselves cannot take in as information. Our emotional response betrays our inability to fully pursue the implications.

Just as the woman cannot acknowledge the loss of her arm, we cannot acknowledge the woman's loss of reason. Our response is similar to Ramachandran's first response. When Ramachandran's first witnesses the event, he feels disbelief. Just as the woman denies the disability of her arm, Ramachandran denies (in that moment of face-to-face talk) the disability of the human mind. He says he "cannot believe" what she is saying. The mind's essential disability, though factually visible, cannot be assimilated as thought.

You too are implicated in this story. What Ramachandran demonstrates is an insult to cherished ideas we have about the mind's powers. All of us, like Ramachandran, want to refuse to deny, dismiss, or forget the story this knowledge tells us about our minds. We insist upon seeing our minds as heroic witnesses to truth, when in fact they are characteristically paralyzed and disabled by ideals and beliefs that are emotionally uncomfortable.

In recent years research in political science reflects a similar astonishment regarding the minds of American voters. Joe Keohane represents these finding in an aptly titled article, "How Facts Backfire, Researchers Discover a Surprising Threat to Democracy: Our Brains." Writing for the *Boston Globe*, on July 11, 2010, Keohane summarizes a number of research findings that indicate that not only are American voters surprisingly ignorant of key facts in world and national affairs, but attempts to correct them frequently lead to a "backfire affect." Instead of taking in the facts and changing their beliefs, they insist all the more strongly on what they believe to be true. The "force" placed on their minds by reasonable evidence is denied by a resistant force from within them. When given creditable evidence about the world, they desire

not to know it. They continue to believe what they want more vigorously when the preponderance of the evidence suggests that such information is false.

The desire to support a belief contrary to evidence and reason has not been ignored by historians, philosophers, and rhetoricians. Political scientist Drew Westen argues in *The Political Brain*:

> The notion that people can unconsciously protect themselves against threatening information has a venerable history . . . philosophers (not to mention playwrights and poets) have known about this quality of the human mind for centuries. It was central to Freud's thinking over a century ago. In more recent years, researchers have documented self-serving "reasoning" in a range of domains, including politics. (2007, 100)

Barbara Herrnstein Smith, in *Belief and Resistance*, points out that even strong material disincentives to belief do not release individuals from tenacious commitments to established belief:

> Human history indicates that people will maintain their beliefs not only in the face of apparently contrary evidence but even when those beliefs have severely disagreeable and disadvantageous consequences for them—not to mention for many other people. (1997, 51)

We have known about this quality of human denial for a long time, but most of us act just like people informed of their mistakes. We notice peoples' inability to take information, and but we keep faith in the transformative value of information itself.

In response to encounters with the denial of facts, people do not come to understand that human do not take in facts. Instead they seek to more urgently produce and publish facts. We see

people not taking in facts, and our response is simply to insist more emphatically upon the facts. The Annenberg Public Policy Center maintains FactCheck.org. *The Washington Post* runs a Fact Checker column. George Washington University has sponsored a project "Face the Facts" with the purpose "to help American's debunk myths, hold better conversations, get involved, and make choices as smarter citizens" (http://www.facethefactsusa.org). We seem unable to face the facts about our inability to take in facts.

Part of the problem of thinking about the problem is an inability to imagine a solution. Possible solutions to the problem seem absurd or outlandish. Ramachandran's experiments suggest that REM activity integrates memory and overcomes emotional resistance to thought. How can we think about this? How can this "work" be imagined as an educational process?

On the Emotional Assimilation of Knowledge

New and uncomfortable information cannot be integrated without what I term the "emotional assimilation" of such information. Uncomfortable information cannot be taken in easily because it requires changes in the organization of the emotional body of the self. Existing feeling states and memories create conditions such that uncomfortable information cannot be stored in memory effectively. New but unpleasant information is doomed to remain stranded in unavailable memory unless work is done on what LeDoux calls the "emotional implications" of memory.

Research in many disciplines now emphasizes a necessary interrelationship between reason and emotion. Reason can incorporate uncomfortable information. But this process does not take place in an instant of rational thought and it does not take place by a process of rational thought. Integration is accomplished through the processing of emotional experience. Cognitive scientist Kenneth Stenning argues:

> Affective structure is instrumental in determining what we learn, and how we subsequently deploy it . . .It is instrumental in determining what we learn both as a precondition for learning and because it is what comes to implement the new capacities which constitute our learning. (2002, 258)

Emotion gives meaning to meaning. Ideas have value in relation to affective consequences. Thoughts "strike us" with affective resonance. We anticipate a world informed by feeling states organized by past memories. New information cannot shape habits of mind until it is integrated within a preexisting affective network. Meanings not yet affectively integrated have no real purchase on thought.

Damasio explains how his understanding of reason changed through his study of the brain damaged, nineteenth-century railroad worker Phineas Gage. An accident transformed Gage from a man fully responsible and reasonable, before his accident, to a man unable to manage life tasks afterward. Damasio reasoned that the accident damaged brain centers that allowed emotion to be processed. He came to revise his fundamental understanding about reason. He states, "I had been advised early in life that sound decisions came from a cool head, that reason and emotion did not mix any more than oil and water" (Damasio 1995 xii). He learned from Gage that thought without emotion cannot be rational in any practical sense. Gage could calculate the sum of numbers very effectively, but he could not make rational life decisions.

Stenning summarizes Damasio with the observation: "Real-world reasoning, as distinct from the solution of laboratory puzzles, needs affect for effective control" (2002, 261). Damasio (1995, 1999) argues that thought affecting human action is always grounded in networks of emotion—hope, fear, suspicion, pride, shame, enthusiasm. John Cacioppo, in *Foundations in Social Neuroscience*, sums up much research in neuroscience when he points out that "affect

directs attention, guides decision making, stimulates learning and triggers behavior" (Cacioppo et al. 2002, 494). Emotional bias may be bad for rationality. But bias is bad not because of emotion; it is bad because it misrepresents necessary relations between emotion and thought. Bias reflects limited emotional contexts that are too quickly brought to bear on the implication of thought. Reason reflects thought that has explored meaning in relation to multiple but real emotional contexts.

In the case of Ramachandran's patients with anosognosia, the missing information about injury can be recognized by the mind under three conditions that change the its emotional context but do not change its biological condition.

One condition for taking in the information was very simple. Ramachandran found he could "gently prod" some patients into "eventually admitting" that an arm was "weak" or "not working" or, in the best of cases, "paralyzed." He points out that doctors normally do not want to do this because patients become very upset. He risks this response, however, and talks to a particular woman over a long period of time, insisting that what she believes is in fact not true. In the case reported, the woman admits to the recognition and then has what medical doctors call a "catastrophic" response: She cries for ten minutes. She then admits that she knows her arm is paralyzed. We might imagine, in this context, that what is at stake for this woman is not knowledge, but pain and loss. We can well imagine that pain and loss make some thoughts unthinkable.

We would hope the gentle prodding achieves results. But Ramachandran reports that this recognition is temporary. When he leaves the room and returns ten minutes later, this woman has no memory of her recognition of paralysis. Under pressure, she was pushed to bring the recognition to consciousness. But she very soon forgets any such event. I am writing this book

because a very similar event happened to me in the classroom. My class, through my gentle and clever prodding, accepted a general claim one day and then had no memory of their own thinking in the subsequent class meeting. This story is chapter two of the present book. I was so astonished by the event that I have spent ten years trying to make sense of it.

Ramachandran considered denial as having a psychological motivation. It may be a response to threat. He formulated a strategy to test psychological conditions under which the right brain can take in information about the paralysis of the body. He reasons: "What if we could somehow make this 'unpleasant' fact more acceptable—more nonthreatening to a patient's belief system? Would he then be willing to accept that his left arm is paralyzed? In other words, can you 'cure' his denial by simply tampering with the structure of his beliefs?" (Ramachandran 1999, 151). In order to test this "what if" hypothesis, Ramachandran selects patients in denial and tells them that he will inject an anesthetic in their left arm. Under these temporary conditions, their arm will not be able to function. In reality, he injects, not an anesthetic, but a harmless saline solution. The patient now "believes" that their left arm is "temporarily" paralyzed. He then asks them if they can move their arm. They attempt to move their arm and perceive that it will not move. They then report that indeed their left arm is paralyzed. Information denial caused purportedly by tissue damage is now accepted without healing or repair.

In a case such as this, it would seem that what is at stake for the mind is not the paralysis of the arm, but what it means emotionally for the arm to be paralyzed. The individual "cannot accept" a permanent condition of paralysis. Thus whatever it is they have to believe for the purposes of denial, they confirm by acts of "seeing," even if evidence in the real world

contradicts what they want to see. They will argue vehemently with people who see the world "objectively."

Ramachandran decides to test for a possible "hypnotic" effect of his presence. He tries the same test on the patient's right arm, which in fact operates effectively. In this case the patient is told their right arm will be left temporarily paralyzed by the experiment. After the injection the patient is asked if they can move their right arm. They discover that, although they expected their right arm to be paralyzed, it is not. They are not moved by suggestions to confirm whatever their doctor tells them. Ramachandran rules out the "hypnotic suggestion" explanation of the cure. By providing a change in the emotional implications of a fact, Ramachandran shows how a previously unassimilated fact can become assimilated. This example supports Damasio's claim that reason relies upon emotion to determine what kinds of "representations" can be entertained and worked with.

Ramachandran's most interesting remedy for the denial of paralysis remains the work done by REM. This was a remedy that survived subsequent re-denials and did not require lying. It is both the most interesting remedy and the most difficult to understand. Ramachandran notes that his use of cold water to recover knowledge of disability was something long known to medical doctors, but largely neglected. The results of the experiment had extraordinary implications, but no one seemed to grasp the implications. He says:

> Here was a neurological syndrome produced by a right parietal lesion that had been reversed by the simple act of squirting water into the ear. Why hadn't this amazing experiment made headlines in the New York Times? Indeed I discovered that most of my professional colleagues had not even heard of the experiment. (Ramachandran 1999, 144)

Why weren't people more interesting in "thinking" about this discovery? Thinking about this would seem to be important, and yet people seem unable to imagine what is at stake in understanding. Perhaps once again, we see a human tendency to not want to know how the mind works.

Ramachandran's cold water experiment repeated work done in 1987 by Italian neurologist Edoardo Bisiach. Bisiach discovered that if he irrigated (squirted water from a syringe) a denial person's ear canal with cold water, the denial symptoms would disappear. The cold water affects the ear canal and prompts the brain to experience movement in the head. This imagined perception of movement in the head generates REMs. Under this condition the patient can perceive what they had earlier denied.

Ramachandran offers a speculative explanation of this remedy: "I suggest that the vestibular stimulation caused by the cold water partially activates the same circuitry that generates REM sleep. This allows the patient to uncover unpleasant, disturbing facts about herself—including her paralysis—that are usually repressed when she is awake" (1999, 147). Ramachandran links REM activity to memory consolidation in dreams. It is now possible to compare his results with the results obtained currently by the use of EMDR (eye movement desensitization and reprocessing) trauma therapy. EMDR began as an accidental discovery that eye movement could be stimulated and used effectively in trauma therapy for the synthesis of dissociated memory. Although the procedure sounds implausible, the results have proven highly beneficial (Seidler and Wagner 2006). In both EMDR therapy and Ramachandran's water irrigation technique, left and right eye movement seems to integrate memory.

Research suggests REM sleep is responsible for the consolidation of new learning into long-term memory (Cartwright 2004). Daniel Siegel describes REM activity in sleep as

significantly altering relations existing among memory and emotion.. REM sleep rearranges or "consolidates" relations among various elements' stored memory: "Consolidation appears to involve the reorganization of existing memory traces" (Siegel 1999, 37). Reorganization changes both the content and internal relations of memory. There are new links between elements already in memory but not linked, and there is modification of existing memory content as the result of new links. Siegel explains that "consolidation may make new associational linkages, condense elements of memory into new clusters of representation, and incorporate previously unintegrated elements into a functional whole."

Dreams are often experienced as bizarrely associated images and feelings. Neurological research describes dreaming as a brain activity that integrates new psychic material within established and also newly evolving pathways of neural links and relations (Cartwright 2004; Payne and Nadel 2004; Revonsuo 2000; Foulkes 1999; Solms 1995, 1997). Dreams help us make sense of a new experience by reviving an old experience, but they also do the reverse—they make sense of an old experience by connecting it to a new experience. The meaning of the past changes so that this remembered past, which is the condition of our emotional anticipation or interpretive "bias" toward the future, becomes modified. Changes in the meanings of our past change our ability to imagine a future.

Dreams integrate a new experience to established memories and facilitate experimental associative patterns. Often dream content suggests meanings just outside of currently coherent verbal summary. Siegel proposes that we can think of these experiences as the "work" of the "dream" to "make sense of recent experience" (1999, 37). Ramachandran's patient makes sense of her own recent experience of body loss through REM activity. Her REM has allowed her, as Siegel says to "incorporate previously unintegrated elements into a functional whole." She can,

in effect, reason with her whole mind, making use of the "irrefutable information" she had earlier refuted.

Observing Minds That Desire Not to Know

Minds may take in information, only to store it in memory locations where it is not utilized. Understanding the brain's biology allows us more insight into the mind's behavior. If we turn our gaze from the biology of the brain to the narrative of the mind, Wilfred Bion offers helpful observations and concepts for understanding these events. Bion describes the desire not to know from the perspective of a therapist who observes the step-by-step process of thought and denial in a therapy patient. Bion noted how a certain developing process of logical thought would veer away from an effective problem-solving logic because of a variety of disabling emotions such as anxiety, fear, anger, or shame. If a mind thinks of new information, and in that moment experiences anxiety, fear, anger, or shame, that new information may not be effectively integrated.

Established networks of feeling impede the assimilation of information. New information that would cause severe emotional pain or would drastically reorganize an established system of thought is turned from integration.

Bion's empirical observations of a mind involved in a series of linking events we describe as "thought" helps us to understand from the inside what Ramachandran sees in his anosognosia patients on the outside. If we look at this like Bion, we are not scientists considering how the biological brain impedes information assimilation. We are trained observers looking at the sequential steps of a thought process in a particular mind. Both perspectives are objective observations of empirical behavior. Both perspectives can help teachers understand how students deny information.

Part of Bion's argument about the work of the mind is that "links" in thought are determined by emotion. People who feel a great deal of hate about a subject are not easily able to make a "thoughtful" link to information that requires an opposite emotional feeling about that same subject. Emotion, not logic, drives patterns of linked thoughts. In chapter two I will discuss in more detail Bion's account of minds functioning in terms of "logics" of hate or love, the primary emotions that restrict what is attended to, organize what is perceived, and interpret what is thought. If Bion had been a rhetorician he might have phrased the problem much like Fish: "True belief does not emerge from reason's chain; rather true belief—and false belief too—configure reason's chain" (Fish 2001, 501). Instead of talking about chains of reason and discourse communities, Bion focused sharply on the emotional ground and motive for "reason's chains." Links in thought are formed into "chains" driven by our loves and our hates.

My own primary training in psychology, literature, philosophy, and psychoanalysis has been focused on the processes of mind, not on the biological processes of the brain. I find Bion's vocabulary and style of observation compatible with my own. I have come to believe, however, that it is important to have an understanding of the biology of the brain. If we better understand the biology of thought, we can better understand why the mind behaves as it does. The mind is limited in its a functioning by the brain's biology. Integrated thought requires integration of many aspects of memory, emotion, and problem solving. Emotional states powerfully influence memory retrieval (Damasio 1999). Prefrontal lobe thought is not possible under conditions of acute fear. Anxiety can generate "defensive responses" that preclude access to particular memories. Associations that trigger the primitive neural structures of the brain, such as the amygdala, cannot be contained by processes we call "reason." Information with varying degrees of emotional intensity and context is stored in different brain areas and it can be "retrieved" only

under particular conditions. Computers may instantly compute information. Brains and minds do not.

Information that makes us emotionally uncomfortable is never taken in easily. Uncomfortable information is experienced first not as information, but as a desire not to know. The desire not to know ranges from very dramatic cases, as in the situation of patients with anosognosia, to everyday unrealistic idealizations as described by Katherine Anne Porter's narrator in "Old Morality." A father in the story tells his daughters, "There were never any fat women in the family, thank God." Porter's narrator reports the daughters' thought: "Well, Great-Aunt Keziah was famous for her heft, and wasn't she in the family? But something seemed to happen to their father's memory when he thought of the girls he had known in the family of his youth, and he declared steadfastly they had all been without exception as slim as reeds and as graceful as sylphs" (Porter [1936] 1962, 11). The refutation of evidence here seems very slight, perhaps even admirable. But one can imagine that if this tendency to idealization shifts from the family to one's political party, then the implications become more serious.

One particular feature in this fictional account of the desire not to know has useful implications. Why does the father "think" that all the women in the family had been "without exception" slim? Why isn't it enough to simply say, "They had all been slim." This need to give emphasis precisely to the point where the denial is a lie represents an important marker of the desire not to know. One of Ramachandran's patients with anosognosia insists that he enjoys "two-fisted" drinking. Ramachandran wonders why he wants to talk about drinking as involving "two fists." Why is there this insistence on a level of detail, "without exception" and "two-fisted," that adds no information to a communication except to emphasize a denial? In one case a patient says, "I tied my shoelaces with both my hands" (Ramachandran 1999, 143). We don't

normally say this. Usually a person would say, "I tied my shoelaces." It is only in a condition of denial that a person adds detail to emphasizes the insistence on the lie—"I tied my shoelaces with both my hands." Situations of denial are often marked by expressions of oddly emphatic insistence. Here, as elsewhere, gaps in thought that might be determined by logic are replaced by links in thought determined by emotion.

Novelist J. G. Farrell observes a mind that recognizes its own fear of information as having the potential to disrupt an internal emotional organization. He describes the thinking of a Japanese soldier during the World War II invasion of Singapore thus.

> Kikuchi was astonished and awed by Lieutenant Matsusita. Every time he met those burning eyes it was as if he received an electric shock. The intensity of feeling in Matsusita, his utter devotion to the emperor and to his country . . . Yet there was something that Kikuchi found rather frightening about him at the same time . . . Sometimes it almost seemed as if he wanted to get not only himself but everyone else killed too.
>
> The thought had crossed Kikuchi's mind—indeed it had to be frogmarched across his mind under heavy guard and swiftly, like a deserter who must not be allowed to contaminate his fellows) that all things in human affairs, even battlefield glory, can be taken a bit too far. (Farrell 1973, 371)

Farrell reveals an emerging thought that violates an existing network of strong emotional attachments. This soldier finds himself in a new but highly emotional context. He is in danger of being killed. This powerful new emotional context—the immediate threat of death – demands revisionary thought. Why is he in this condition? What might he do to solve his problem? He has

a thought that might save his life. But this thought would have logical implications. It would modify the enthusiasm of his loyalty to his leader.

Thoughts such as this can emerge in consciousness. But they are not "easy" thoughts to think. They are thoughts that disturb other thoughts. Such thought must be carefully controlled. Farrell's soldier fears that this emergent thought may "contaminate" other thoughts—that is, organize them into a logical network of thought that threatens established patterns of feeling and behavior. In this example, the thought might lead the soldier to distrust Matsusita, his commanding officer. If this thought were to emerge fully acknowledged, it might lead logically to another thought—that it is in fact foolish to follow Matsusita unquestioningly. But this next step in logic is carefully forestalled.

We would want Kikuchi to follow up on his thinking, to actively question his blind obedience. But if Kikuchi is to think further, he must take up a complex and painful emotional task. He must experience a network of emotions and particular sites of memory that give meaning to his understanding of loyalty, honor, and self-identity. He must reflect on the conflict between his fear of death and his desire for honor. He fears death, but he also fears thinking about his fear of death. Perhaps he would take up such thoughts if there were someone like-minded in his outfit to offer emotional support for such thinking.

In this example, emotion does not threaten human rationality; it is the only possibility for engaging human rationality. It is emotion, the fear of death, that generates a thought never before entertained. In order to continue with this thought, Kikuchi must have the courage to feel. And this, apparently, is something he cannot do. Courage makes reason possible. To have courage, however, entails reorganizing a network of feelings. What a "nightmare" this would be. Kikuchi protects his initial thought from its reasonable implications. Its link to other thoughts must be

contained by having it "frogmarched under heavy guard" across his mind. Here Farrell, like Bion, observes a point where a potential rational sequence of thoughts is forestalled by anxiety. Kikuchi illustrates an everyday example of the desire not to know.

Kikuchi could save his life if he could think. He could save his own life if he could follow up on the logical possibilities of his initial thought. But he lacks the emotional resources needed to allow this thought to unfold. Kenneth Dodge argues that "all information processing is emotional, in that emotion is the energy that drives, organizes, amplifies, and attenuates cognitive activity and in turn is the experience and expression of this activity" (1991, 159).

Charlotte Gilman Perkins describes how the desire not to know may reflect severely limiting, but widespread, cultural assumptions. In Gilman's short story "The Yellow Wallpaper," the heroine has been forced by her physician husband to confine herself in her room to "rest." While confined she thinks:

> If a physician of high standing, and one's own husband, assures friends and relatives that there is really nothing the matter with one but temporary nervous depression—a slight hysterical tendency—what is one to do? (Gilman [1892] 2002, 3)

These thoughts ask a question that suggests further possibilities for thought. What is one to do?

In this example we can see Gilman, the writer, observing the mind of her character much as Wilfred Bion observes the mind of her patients. The woman of the story is thinking about a problem. He husband claims there is "really nothing" the matter with her. And she struggles with this thought. She feels very much that something is wrong. She asks a question that opens up various possibilities for an answer. She asks, "What can one do?"

As many readers of Gilman now understand, there are many things you can do. You can question the premise of your husband's authority. Is one's husband, though a "physician of high standing," in fact, fully knowledgeable of the situation? When Gilman's character asked this question at the time of the story's publication, very few women could take such a step "forward."

Gilman's character initiates a series of thoughts that lead in a direction of questioning an authority, but it does not develop further thoughts for this heroine. Some force acts like a lid to control, deny, and suppress the productive activity of thinking. This force I am calling the desire not to know." At the time, Gilman's story was an immense puzzle for many readers who could think no further than the story's heroine. Now, though, it is easy to see how Gilman's short story, as a literary artifact, encouraged exactly the kind of thinking that the character is unable to do. The story now serves as a rallying cry for feminists who feel a need to question the authority of men. Gilman, as an early feminist, developed a discourse that made it easier for women to have the courage and capacity for honest self-reflection. When groups of women gathered together to give each other emotional support for the courage to think, the world changed for women.

The desire not to know reflects the workings of emotion. But the solution to the desire not to know is not to banish emotion from the context of thought but to explore and reflect upon the various demands of emotion in relation to any context of thought. The exploration of emotion can work as a reorganization of emotion, and this reorganization allows the core self to broaden its conscious awareness and thus more effectively assimilate information for problem-solving purposes.

Reason, Emotion and Experience in the Liberal Arts Classroom

Human action requires a smart assessment of objects, people, and goals. Aristotle observed that those who are "angry with the right person, to the right degree, at the right time, for the right

purpose, and the right way are at an advantage" (*Nicomachean Ethics Book IV, 5*). Emotions define the logic for action. The work of finding the proper relation between our emotions and the condition of the world is a work of emotional development.

Liberal arts education has as its subject, records of human experience that communicate the emotional and affective quality of life. Novels, music, painting, dance express affective experience and courses in these fields invite students to take in these experiences and reflect upon and respond to them. The information of these affective records is often emotionally uncomfortable. But both the formal nature of art and the conditions of its study allow this information to be assimilated. Martha Nussbaum argues that liberal arts education can connect "experiences of vulnerability and surprise to curiosity and wonder, rather than to anxiety" (2010, 101).

There has been a persistent belief in Western culture that emotional experiences—and particularly formal practices that reflect upon emotional experience and integrate disparate and conflicting feeling states—have a unique capacity to "grow" a mind. These experiences have been traditionally associated with artistic expression and reception and with the liberal arts training in the humanities.

Ramachandran suggests that a good dose of cold water injected at the right time in human ears might solve many problems. This is not practical, but there are practical responses to denial that do not involve injections of cold water. I will propose a spectrum of practices that work as pedagogical equivalents to Ramachandran's adjusting contextual beliefs and REM triggering.

A literal understanding of this research suggests that human beings can "dream" their way into new relations with new information. I am not in a position to claim that students who take courses reading authors such as Toni Morrison and William Faulkner take in new,

uncomfortable information and then dream their way into the integration of such information. I suspect that this may indeed happen. Certainly it would be useful to research such a possibility. Dreaming may indeed be the path to what Seigel terms the "reorganization of existing memory traces."

We do not have basic information on the role of dreaming in learning. Prior to the new work in neuroscience, no one would fund such research. We do, however, know something about the role of processes very similar to dreaming in their work upon emotional reorganization and information assimilation. The newly emerging field of neuroaesthetics suggests that aesthetic experience contributes to memory consolidation, and more importantly, to more flexible styles of information exploration (Kafka 2012.

Liberal arts courses typically examine human experience, ask questions about its meaning, explore affective experience, encourage interpersonal discussion, allow for sustained affect examination, and often revise existing feelings. Liberal arts courses typically engage the emotional lives of their students and seek to actively promote an emotional synthesis of thought.

Reflection has emerged as a useful concept for understanding emotional reorganizations in the assimilation of information. Reflection defines a practice where conscious thought doubles back on itself to consider its own content. The effect of such a practice can be to redefine frameworks that, initially frozen and controlling, become suspect or modified as the mind achieves agency over an otherwise passive event. Reflection is particularly important for the arts. Beth Thomas describes "meaning making" as a practice of "conscious reflection" (2012, 334). Reflection often has an unacknowledged emotional component. Through reflection, emotions not yet fully entertained can be brought into active contemplation. Through active contemplation, new feelings are produced by contemplating old feelings in a new context. These new feelings

can be then be brought to bear upon understanding. New feelings toward information thus allow the assimilation of information. This dimension of reflection requires time, and time becomes another key factor in the emotional assimilation of thought. The brain will fully experience different emotional contexts only in different moments in time.

Ken Bain's highly influential book on teaching *What the Best College Teachers Do*, observes that good teaching has a personal quality that adjusts to the immediacy of the student's emotional life. "Teaching is not acting," he says:

> "Good teachers do expect to affect their audience when they talk: to capture their attention, to inspire, to provoke thoughts and questions." Good teachers learn how to adjust to their learning of needs of their students. They "define" and "mold" "their ambitions," Bain says, "in a process that is both rational and emotional. This practice has all the power of careful analysis, but it also entails the energy of feelings and attitudes that no induction and deduction can achieve. (Bain 2004, 121)

Good teaching helps students take in new information. It uses reason, but it also responds to emotional cues of student responses. It adjusts the impact of the message to the emotional and nervous system of the learner. Bain points out:

> Most of the teachers we studied frequently used rhetorical questions, even if it was no more than to ask, "Does his make sense?" They watched their students' reactions, read their eyes and other body language, and adjusted what they said to the enlightened, confused, bewildered, or even bored looks they saw in the classroom. (Bain 2004, 118)

As educators, we should not simply hope that such processes take place. We can more directly promote processes of emotional integration.

Classroom silence is one quality of student engagement that good teachers learn to read. Inexperienced teachers are often uncomfortable with silence. Silence often means that the teacher does not know what students are thinking. Silence can sometimes be hostile. But some forms of silence express deep reflection. Teachers can teach students to honor such moments and value what products arise from reflective thought.

Reverie is perhaps more powerful than reflection in the dream work of learning. Reverie is different from reflection insofar as the conscious mind fades back from center stage to allow memories and daydreams to become involuntarily entertained. In reverie, as in dreaming, emotions that cannot be retrieved at will or by reflection can emerge spontaneously for reflective consideration. Eric Kandel, a Nobel Prize winner known for his work on the biology of memory, now pioneers a field termed "neuroasethetics" that seeks to document the importance of art and reverie for human development. Alexander Kafka, writing for the *Chronicle of Higher Education*, represents his work thus:

> Art isn't, as Kandel paraphrases a concept from the late philosopher of art Denis Dutton, "a byproduct of evolution, but rather an evolutionary adaptation—an instinctual trait—that helps us survive because it is crucial to our well-being." The arts encode information, stories, and perspectives that allow us to appraise courses of action and the feelings and motives of others in a palatable, low-risk way. Sometimes instinctively, sometimes more consciously, artists play with perception's variables in keen acknowledgment of the viewer's active role.

Reverie is not discussed extensively in educational literature. But it is an experienced dimension of human engagement. Good teachers instinctively know how to promote reflection and reverie. Good teachers know the importance of these processes and sense these activities in the silences

that attend classroom discussions. Ken Bain describes the actions of the good teachers he researched:

> Robert Divine knows how to ask a good question in the seminar and then how to wait patiently, even through several minutes of silence, while his students thought about their answers. Sometimes highly effective lecturers will pause ever so slightly following a key point and stand perfectly still; their body language will suggest suspended animation as they work to keep their students attention focused on the point and to give them time to contemplate it. They know how to make silence loud. (2004, 120)

As universities shift more and more to online learning and large classrooms, teaching of the kind done by Robert Divine is less available. Practices that make effective use of reflection and reverie are replaced by practices that distribute facts and use impersonal lectures to impart impersonal knowledge.

What we lose is not just particular instances of effective teaching, but a finely crafted social practice that has been honed by years of direct classroom experience. Good teaching teaches students not just how to make use of some information; it teaches students attitudes for learning information. They develop skills from Divine's courses that they can bring to bear on other tasks. As the problems of information assimilation become more dramatically clear, we should become more aware of our responsibilities as educators.

Summary

The argument of this book is first that college and universities must not only produce information but also help students assimilate information. The assimilation of information I describe requires an engagement with the emotional lives of students. This emotional attention is

not in any form a "therapy," but it does require attention to emotional experience. Traditional teaching in the liberal arts offers this practice. Many successful teachers already follow the suggestions I recommend in this book. Many administrators, however, see no value in these practices. The understanding of reason and emotion offered to us by many researchers in neuroscience may persuade administrators of the importance of emotion to thought. In addition, careful attention to the relations between reason and emotion can make all teachers better teachers.

In the four chapters that follow I will offer selected examples of the desire not to know as I have observed it and offer some initial principles for the emotional assimilation of knowledge. Chapter two offers a closely observed, particular example of classroom experience. Chapter three offers a broad outline of the emotional dialectics of thought, a dynamic that shifts between highly rigid and highly permeable moments of human interaction and information assimilation. Chapter four argues that traditional academic training, particularly training in the liberal arts, does not prepare professors for the skills they need to be effective in recognizing the emotional ground of thought. Chapter five examines the current state of academia where online courses increasingly replace face-to-face courses. This form of education, highly popular among administrators, may threaten, but perhaps enhance, many of the most useful practices of the liberal arts classroom.

Just as Bion's psychoanalytic practice placed emphasis on doing emotional work to recover freedom for the possibilities of thought, my book describes a practice of teaching that gives attention to the negotiations of emotional context that often go unacknowledged in academic discussions. Laughter and humor is a particularly important component in classroom discussions. Just as speakers may seek to "loosen up" their audience with a joke, so also teachers can respond to anxiety in the classroom with a joke, or more subtly, respond to laughter in the

classroom with an observation that generates anxiety. The emotional give and take of classroom interaction is in fact the generative ground of thought. Teachers who try to force thoughts upon students through sheer insistence, demand, and intimidation most often generate merely more anxiety to generate more complex and effective defensive thoughts. Laugher, humor, anxiety, and interest have been given plentiful scholarly attention, but this attention lacks the subtle discriminations that can systematically evaluate how these emotions contribute to or hinder the assimilation of uncomfortable thought.

Because teachers, by talking face to face with their students, can engage their emotions and explore the emotional contexts of discussion across a wide range of themes when they detect anxiety and opposition, teaching can shift a desire-not-to-know into a curiosity-to-know. This working with the emotional context of thought resembles in some respects the work done with emotions in therapy, but this classroom work is not therapy. It is not a form of group therapy and it does not ask students to reveal their personal lives. Students are not asked to change their values nor look into their libidinal histories. Instead both students and teachers are asked to observe how memory and the linking relations of developing of thought can be deflected by anxiety, shame, or pride. Students and teachers are asked to look at how patterns of anxiety or laughter developing in the classroom may direct or dismiss the generation of thought.

In a classroom, thought emerges dramatically from the emotional interactions among students and teachers. Most often this interaction is an accident of unconscious forces that clash and merge in interpersonal interaction. By thoughtful attention this drama of interaction can be made more, rather than less, productive for integrative thought. Psychiatrist Daniel Siegel argues that "educators can benefit from insights into how emotion and interpersonal relationships are fundamental motivational aspects of learning and memory" (1999, xii). This book outlines

principles for the emotional assimilation of knowledge. Such a practice grows the mind's capacity to be thoughtful, reflective, and adaptive to new information.

When we see resistance or defensiveness in other people, we often "recognize" it as a kind of moral failure. It is more useful to think of it as bumping up against the biological limits of thought. If we are really serious about working with information assimilation, we must recognize the real biological limits of thought and work with the processes of thought that are effective for brain functions. While it may be true that different people exhibit different degrees of limitation, it will be helpful to not blame people for their limits. These limits are not chosen, they are effects of a history the individual had little capacity to control.

<Notes>

[1] The concept "resistance" can imply a Marxist framework describing ideological rigidity. The term can also be used in a psychoanalytic framework that gestures toward concepts such as denial, disavowal, and projective defense. These frames are commonly used by scholars in the humanities. A great deal of work has been done in the humanities on the concept of resistance in the classroom. Much current literature in educational theory describes the difficulties in learning new information in political terms. The concept of "resistance," for example, is often employed to describe students' failure to take in repudiated knowledge. Students thus are resistant because they have political attachments. Henry Giroux's *Theory and Resistance in Education*, for example, endorses a radical pedagogy that emphasizes the "reifications of daily life." Giroux's goal is to bring students to understand how all knowledge is a "product of social relations." Giroux's analysis, like the work done by composition scholar James Berlin, gives central attention to political ideological structures that are dominant in everyday discourse. This work is a useful theoretical account of knowledge and social relations. But more work needs to be done to understand how social relations have emotional dimensions, grounded in body experiences of shame, contempt, anxiety, and fear. Shoshana Felman (1989<AU: The year is 1987 in Works Cited. Please confirm the correct year.>) discusses resistance in psychoanalytic terms making use of Lacan's phrase, "passion for ignorance." This is a helpful addition

to political accounts of resistance that derive primarily from theories of ideology. But Lacan's insistence on our "passion for ignorance" does not help us understand how to work with this passion when we encounter it in the classroom. Lynn Worsham's 1998 article "Going Postal: Pedagogic Violence and the Schooling of Emotion" is often credited as an important beginning for a more serious consideration of emotion in the classroom, contributing to something that has been called **"**Critical Emotion Studies." Affect and emotion, Worsham argued, determine how the world of language, the symbolic, takes hold and binds the subject to a set of feelings, thoughts, and relations. Three particularly useful books have recently been published in this field: *Doing Emotion: Rhetoric, Writing, Teaching* by Laura Micciche<AU: Book title and author's name corrected as per information available on the Amazon website. Okay?>, *A Way to Move: Rhetorics of Emotion & Composition Studies* by Dale Jacobs and Laura Micciche<AU: Book title and author's name corrected as per information available on the Amazon website. Okay?>, and *Teaching the Rhetoric of Resistance: The Popular Holocaust and Social Change in a Post 9/11 World* <AU: Subtitle added as per information available on the Amazon website. Okay?>by Robert Samuels.
My book is most compatible with the work of my friend, Robert Samuels. I am seeking in my manuscript, on the one hand, to avoid Samuel's psychoanalytic vocabulary and use work in neuroscience and simple description to support claims made by Samuels, Bracher and myself in earlier work. On the other hand, I hope to offer a more sharply honed focus on the process that has been termed "resistance." My focus suggests that it not helpful to imagine resistance as an apparently bullheaded student. We simply become bullheaded teachers. It is more helpful to understand and work with the emotional processes that allow information processes to be effective.

[2] This book will shift two perspectives upon the failure to take in information. One perspective is that provided by contemporary neuroscience. The other perspective is one offered by clinical work that takes an empirical view of thought processes. Both of these views are incomplete. Careful work in sciences does not afford the easy generalizations that I am formulating in this book. I am using science for what I hope is intelligently informed stories about mental processes. I am taking the risk to speculate because I have come to believe there is a story to be told in this material.