

## **The Mind, Brain and Heart: A Paradigm for Predicting Outcomes<sup>1</sup>**

By Maury Seldin<sup>2</sup>

Understanding of the modern mind is enhanced by understanding the transition of the Enlightenment.

“With Newton’s synthesis, the Enlightenment began with an unprecedented confidence in human reason, and the new science’s success in explicating the natural world affected by philosophy in two ways: first, by locating the basis of human knowledge in the human mind and its encounter with the physical world; and, second, by directing philosophy’s attention to an analysis of the mind that was capable of such cognitive success.”

So writes Richard Tarnas in his *The Passion of the Western Mind: Understanding the Ideas That Have Shaped Our World View*. [Page 333.]

This confidence in human reason utilizes the mind’s interpretation of the world. Tarnas, also writes,

“For if the human mind was in some sense fundamentally distinct and different from the external world, and if the only reality that the human mind had direct access to was its own experience, the world apprehended by the mind was only the mind’s interpretation of the world.... everything that this mind could perceive and judge would be to some undefined extent determined by its own character, its own subjective structures.” [Page 417.]

Locke was at the watershed. In the words of Brownowski and Mazlish in *The Western Intellectual Tradition* [page200] “Thus Locke vindicated the empirical or natural road to all knowledge against the rationalistic<sup>1</sup> or supernatural approach.”

This is best seen in the context of the scientific revolution. Tarnas continues on page 421 with the following:

“The modern mind has demanded a specific type of interpretation of the world: its scientific method has required explanations of phenomena that are concretely

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<sup>1</sup> The context of this essay is the 2005 Seminar on Improving Decisions at the academy of senior Professionals at Eckerd (ASPEC), which, in turn, is in the context of the book in progress, , *Improving Decisions: Toward a New Age of Enlightenment*, available on the ASPEC Center for Scholarly Enterprise (ACSE) site, <http://www.spicequest.com/acse/index.htm> . Click on “Improving Strategic Decisions.” The first part of that book has been published by the Homer Hoyt Institute as a monograph, *The Challenge to Our Thought Leaders*. It is available on the Hoyt website, [www.hoyt.org](http://www.hoyt.org).

<sup>2</sup> Dr. Seldin, a chair professor emeritus from The American University, Washington, DC, is leading a seminar at ASPEC that relates to his work at the Homer Hoyt Advanced Studies in Real Estate and Land Economics, where he is President and Chairman of the Board of Directors. The previous footnote tells more about the context of the essay.

**predictive** [emphasis added], and therefore impersonal, mechanistic, structural. To fulfill their purposes, these explanations of the universe have been ‘cleansed’ of all spiritual and human qualities... Of course we cannot be certain that the world is what these explanations suggest. We can be certain that the world is to an indeterminate extent *susceptible* to this way of interpretation.”

In short, Western civilization in the age of the Enlightenment (also known as the Age of Reason), in contrast to ancient civilization, saw reason as a predictive tool useful in forecasting outcomes of different courses of action. The process relied on the use of the mind in the context of the structure by which science advanced knowledge.

The philosophers, having rejected the supernatural, debated the role of observation and interpretation of the observations. Then, in the early 20<sup>th</sup> century, Alfred North Whitehead, in *Science and the Modern World*, takes note that “

“However you disguise it [the occurrences of nature as apprehended by the mind but attributable to nature], ...is the practical outcome of the characteristic of scientific philosophy...

...we must note its astounding efficiency as a system of concepts for the organization of scientific research...Every university in the world organises itself in accordance with it...It is not only reigning, it is without rival.

And yet – it is quite unbelievable. This conception of the universe is surely framed in terms of high abstractions, and the paradox only arises because we have mistaken our abstractions for concrete realities.” [Pages 54-55.]

This use of the mind in the context of the structure by which science advanced knowledge set the pattern by which professionals viewed the world. The lawyers look for precedents, the physicians look for categorization, and engineers for the one and only true answer for surely there must be only one right answer.

The specialization is a useful way to advance the knowledge in a particular discipline, but it may overlook the holistic perspective that considers the relationships to other disciplines. Whitehead wrote of the dangers of the narrow education of professionals. To quote Whitehead,

“It produces minds in a groove. Each profession makes progress, but it is progress in its own groove...But there is no groove of abstractions which is adequate for the comprehension of human life. Thus in the modern world, the celibacy of the medieval learned class has been replaced by the celibacy of the intellect which is divorced from the concrete contemplation of complete facts...

The dangers arising from this aspect of professionalism are great, particularly in our democratic societies. The directive force of reason is weakened. The leading intellects lack balance. They see this set of circumstances, or that set; but not both sets together...” [Page 197.]

With this in mind, let us turn to the operation of the mind.

## Habits of the Mind

The Brain. The mind is the brain at work. The brain operates as a network of connections among cells so as to be a processing system for information of various sorts. [Consider page 74, Dennet and Wilson.] It is an information system built upon the sensory systems of the body that integrates the information into thought and emotional processes.

A paragraph from Wilson's book, *On Human Nature*, sheds a lot of light. It is as follows:

“...A schema is a configuration within the brain, either inborn or learned, against which the input of nerve cells is compared. The matching of the real and expected patterns can have one or the other of several effects. The schema can contribute to a person's mental “set,” the screening out of certain details in favor of others, so that the conscious mind perceives a certain part of the environment more vividly than others and is likely to favor one kind of decision over another. It can fill in details that are missing from the actual sensory input and create a pattern in the mind that is not entirely present in reality. In this way the gestalt of objects – the impression they give of being a square, a face, a tree, or whatever – is aided by the taxonomic powers of the schemata.” [Page 75.]

Paradigms. The framework for the integration of information within the mind is the paradigm within which one interprets the observation. The perspective imbedded in the paradigm influences the forecast of outcomes. People see things differently depending upon the culture in which they developed, among other factors.

The ability to see things is, in some measure, dependent upon how well the neural connections have been developed. Just as languages are easier to learn at earlier ages than at maturity, so dealing with abstractions early on will facilitate grasping more abstract concepts at a later stage of development.

Judgment. There are some general tendencies to errors of judgment in the decision making process imbedded in the minds operation. One commonly known to astute investors goes by the name of the “gambler's fallacy.” This error, is a misinterpretation of the law of large numbers. It is in the category of reasoning from a population to an instance. The classic example is the tossing of a coin that has resulted in a long series of heads or tails and the erroneous inference that the next toss has a high probability of being the opposite of what it was in the long series. [See *Cognition: Exploring the Science of the Mind*, by Daniel Reisberg, Chapter 11.]

The statistical problem in this category of reasoning from a population to an instance is a misapplication of the law of large numbers in that it assumes that the law applies in the case of small numbers. The smaller the sample size the greater the variability as compared to the larger sample. Thus, judgments from a small sample, if based upon reasoning that the next event will move the enlarged sample closer to what one expects under the law of large numbers is erroneous. If the coin is a fair coin, each flip is a 50/50 chance without regard to the preceding sequence.

Another type of common error is reasoning from a single case to the entire population. Reisberg reports on a study by Hamill, Wilson, and Nisbett. In that study, subjects were questioned on their view of the criminal justice system after having been shown videotapes of prison guards. Two different tapes were shown; one of a sympathetic guard and the other of a contemptuous guard. Some subjects were told that the guard they saw was typical while others were told that the same guard was atypical. Some others were given no information about the representativeness of the guard that they saw. Different subjects saw films of different guards. The result was that information as to the representativeness of the guard made no difference to the attitude of the subjects. The conclusion in Reisberg's words, "These data and other laboratory findings ... make it clear that subjects are quite willing to draw conclusions from a single case, even when they have been explicitly warned that the case is not representative."

These two judgmental errors fall into Reisberg's classification of representiveness. Additional classifications by Reisberg include errors associated with availability of information, detecting co-variation, and the influence of base rates. An example of judgment error associated with availability of information is the pattern of media coverage. People are influenced as to their reasoning about the events as a result of the way in which media reports the events and selects language.

Within each of the classifications there are various types of errors. One that ties back to the opening of the discussion on the brain is an example of co-variation. Referring to a particular study, Reisberg writes, "Their data reminds us that professional training does not make you immune to illusions, that professionals, just like everyone else, are fully capable of 'projecting' their beliefs onto the evidence and perceiving patterns that are not there." So, what we see is related to the schema referred to in the quote from Wilson in the opening of this section on the mind.

Rational and Irrational. Rational and irrational refer to the use of reason. Among the dictionary definitions of reason is, "the mental powers concerned with forming conclusions, judgments or inferences." [Webster's Encyclopedic Unabridged] When considering rational or irrational thinking, one might look at the concept as a process that is a matter of degree, rather than as a discrete absolute.

### Habits of the Heart

The Way We Live. The way we live depends, in some measure, on the habits of the heart. These are the mores of our society, including the "consciousness, culture, and daily practices of life." The preface to the first edition of Bellah's et. al. book titled, *Habits of the Heart*, starts off with, "How ought we to live? How do we think about how to live? Who are we, as Americans? What is our character?"

The American tradition is rooted in the individual and equality. Alexis de Tocqueville, in 1835, in his *Democracy in America*, wrote of what he called individualism. In his Chapter II, he wrote, "Individualism is a mature and calm feeling, which disposes each member of the community to sever himself from the mass of his fellows and to draw

apart with his family and friends, so that after he has thus formed a little circle of his own, he willingly leaves society at large to itself. Selfishness originates in blind instinct; individualism proceeds from erroneous judgment more than from depraved feelings; it originates as much in deficiencies of mind as in perversity of heart.” In his Chapter IV, he wrote, “That the Americans Combat the Effects of Individualism by Free Institutions,” he points out that the infusion of political life at levels close to the people enables one to see that their gaining support for their interests often leads them to co-operation. This use of free institutions enables man to pursue his individual interests as part of a community. [See discussion of “The Way Our Culture Works” in Chapter 3 on the monograph.]

The free institutions are now habits of the heart for Americans. But, they have, in part, arisen because of habits of the mind. This is best understood in the context of the development of the culture and society. However, an intellectual history of America does shed some light.

Lewis Perry, in the preface to his book, *Intellectual Life in America: A History*, writes, “The glory of America was, not economic advance, but the spread of refinement and idealism.” Economic advance may not have been the glory, but it provided substantial enhancements to the quality of life of a great many Americans as well as the power to defend ourselves. The fact is, however, without “refinement and idealism” that power is undermined and the quality of life also suffers.

Perry in that preface also writes, “We shall trace the great reversal by which the emotions, once regarded as subversive of orderly thinking, achieved respectability and even dominance in the most common views of morality. There emerged an American orthodoxy that accorded “the heart” precedence over “the head.”

The Way Our Culture Works. The way our culture works has been changing. We are steeped in the rigor of scientific method, and we operate in a paradigm that seeks to predict the outcomes of policy actions predicated on the economic man. It is our way of thinking.

From a historical perspective, consider the following quote about 18<sup>th</sup> century America,

“...there was a common set of religious and moral understandings rooted in a conception of divine order under a Christian, or at least a deist, God. The basic moral norms that were seen as deriving from that divine order were liberty, justice, and charity, understood in a context of theological and moral discourse which led to a concept of personal virtue as the essential basis of a good society.” [Robert N. Bellah, 1975]

The quote is from the preface. The opening paragraph of the book follows:

“Once in each of the last three centuries America has faced a time of trial, a time of testing so severe that not only the form but even the existence of our nation have been called in question. Born out of the revolutionary

crisis of the Atlantic world in the late 18<sup>th</sup> century, America's first time of trial was our struggle for independence and the institution of liberty. The second time of trial came not long before the end of the nation's first hundred years. At stake was the preservation of the union and the extension of equal protection of the laws to all members of society. We live at present in a third time of trial at least as severe as those of the Revolution and Civil War. **It is a test of whether our inherited institutions can be creatively adapted** [emphasis added] to meet the 20<sup>th</sup> century crisis of justice and order at home and in the world. It is a test of whether republican liberty established in a remote agrarian backwater of the world in the 18<sup>th</sup> century shall prove able or willing to confront successfully the age of mass society and international revolution. It is a test of whether we can control the very economic and technical forces, which are our greatest achievement, before they destroy us." [Bellah, Robert N. *The Broken Covenant*, Chicago, The University of Chicago Press, 1975, p. 1]

A supportive view of institutional adaptation is provided by Reich, in his *The Greening of America*. He wrote,

"What is the machinery that we rely upon to turn our wishes into realities? In the private sphere, the market system. In the public sphere, the public version of the market system: voter democracy, or democratic pluralism. In both spheres, a system of administration and law, resting ultimately on the Constitution. Could it be that the American crisis results from a structure that is obsolete? All of the other machinery we use becomes obsolete in a short time. A social institution, which is, after all, only another type of machinery, is not necessarily immune from the same laws of obsolescence. The ideals or principles of a society might remain valid, but the means for applying the principles could lose their effectiveness." [Reich, Charles A. *The Greening of America*, New York, Bantam Books, Inc., 1971, page 10.]

Our American society has moved from the historic individuality, which had substantial control, into an intensely complex political-economic structure, international in character, and with a scale so large that the decision-making is based upon a plurality of philosophical views and/or analyses which need to transcend the scientific paradigm in order to enhance the collective quality of life.

The issue is control of our institutions. Do we understand the emerging system well enough to manage it? And, in attempting to manage it, how do we think about the issues?

Motivation as a Factor. Motivation is a critical factor in decisions. According to Calne, in *Within Reason: Rationality and Human Behavior*, "Motivation is the drive to find mental rewards and to escape mental punishment... This concept of motivation can be illustrated by examples. We feel pleasure when we instinctively escape from danger, or when we emotionally

reciprocate affection, or when we achieve a cultural goal such as winning an Oscar. In contrast, reason lacks the capacity to motivate because it cannot make us feel anything. Its nature does not include any direct link to mental rewards. Although it is, of course, always available to be applied to a task that entails a reward.” [Page 27.]

The motivation of the Jacobins is what did Condorcet in, not reason. Motivation has also caused people to sacrifice themselves when cultures impose their irrational wills. The examples provided by Calne in his fourth chapter, “Social Behavior,” include a World War I battle mounted near the Rive Somme in which there were 419,654 British casualties during a four month period with Calne noting “Nothing significant was gained in return for the appalling British losses on the first day on the Somme, but the policy to continue the attack did not falter.” It showed the bravery of the soldiers consistent with 600,000 volunteers added to the British army shortly after the start of the war when the call was for 100,000 volunteers. In Calne’s words, “Most men fought because they saw it as their duty. Most had no thoughts about the politics or purposes of the war, and they had no concerns about the competence or intention of their leaders.” [Page 73.]

The other example in the same chapter was of the bravery displayed by the kamikaze pilots of the Japanese in World War II. The chapter quotes the “Hymn of the Dead,” a *haiku* the young pilots sent home to their mothers. It is as follows:

“If I go away to sea  
I shall return a corpse awash.  
If duty calls me to the mountain,  
a verdant sword will be my pall;  
For the sake of the Emperor I will not die  
peacefully at home.”

We see the same motivations in the so-called suicide bombers, more accurately described as homicide bombers. They are responding to a culture that expects them to sacrifice, and in some cases provides cash incentives to the families.

Faith in reason has been associated with faith in science. Calne writes that faith in reason reached its zenith toward the end of the nineteenth century when it was seen that reason “worked.” But the hopes were not fulfilled in the twentieth century. The opposition to reasoning is coalescing and may be seen in that “The growing strength of cults, religious fundamentalism, and political extremism reflects this disenchantment.”

Emotion is sometimes considered as an alternative to reason. But emotion may in fact be part of reasoning itself. To quote from the introduction of Martha C. Nussbaum’s *Upheavals of Thought: The Intelligence of Emotions*,

“A lot is at stake to view emotions in this way, as intelligent responses to the perception of value. If emotions are suffused with intelligence and discernment, and if they contain in themselves an awareness of value and importance, they cannot, for example, easily be sidelined in accounts of ethical judgment, as so often they have been in the history of philosophy. Instead of viewing morality as a system of principles to be grasped by the detached intellect, and emotions as

motivations that either support or subvert our choice to act according to principle, we will have to consider emotion as part and parcel of the system of ethical reasoning.”

If emotion is part of reasoning, which we have identified as a tool, then emotion is also a tool. But, we have earlier quoted Calne, in the opening of the discussion of the role of reason, noting that emotion is a motivation. Can it be that emotion is both a motivator and a tool?

Apparently Nussbaum would answer yes, if I read the following quote correctly; “Emotions are not just the fuel that powers the psychological mechanism of a reasoning creature, they are parts, highly complex and messy parts, of this creatures reasoning itself.” She continues with an explanation of her views with the position that “emotions are appraisals or value judgments.”

In order to better understand the processes, let us now turn to a discussion of the mind and the brain.

The Essence of the Process. The essence of the process of choice is that the mind, by using the brain, processes selective information in the ways it has learned through biological development and culture (nature and nurture). This process is in a paradigm that is based on values, also learned through biological development and culture (nature and nurture). However one chooses to classify emotions as related to reason, the intelligence of the mind deals with both the forces of tightly or loosely reasoned logic melded with emotional force that is significantly affected by culture. The blends may be different for different people and for different circumstances, and errors in reasoning do occur, but reason alone is not as good an indicator for understanding or forecasting behavior as is a combination of reason and emotion. But, both reason and emotion are rooted in the values. Thus, the big issue is to identify the values and the way in which the individuals or groups deal with the information. The subject of values is discussed in the next essay in this series. We now turn to group behavior.

### Habits of the Collective Hearts and Minds

Science of Networks. Now we need to consider that predicting behavior of groups of people is not the same as aggregating predictions of individual behavior. This is so because the interaction of individuals may result in a different behavior than would occur without interaction.

Duncan J. Watts, in his book, *Six Degrees: The Science of a Connected Age*, identifies the question of how individual behavior aggregates to collective behavior as “one of the most fundamental and pervasive questions in all science.” [Page 24.] Some quotes in the box that follows elaborate on the question.

<p>“...A human brain, for example, is in one sense a trillion neurons connected together in a big electrochemical lump. But to all of us who have one, a brain is clearly much more, exhibiting</p>
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properties like consciousness, memory, and personality, whose nature cannot be explained simply in the aggregations of neurons.

“As Nobel laureate Philip Anderson explained in his famous 1971 paper. ‘More is Different,’ physics has been reasonably successful in classifying the fundamental particles, and in describing their individual behavior and interactions, up to the scale of single atoms. But throw a bunch of atoms together, and suddenly the story is entirely different. That’s why chemistry is a science of its own, not just a branch of physics. [Page 25.]

“What makes the problem hard, and what makes complex systems complex, is that the parts making up the whole don’t sum up in any simple fashion. Rather they interact with each other, and in interacting, even quite simple components can generate bewildering behavior. [Pages 25-26.]

He writes,

“Fortunately, as capricious, confusing, and unpredictable as individual humans are, when many of them get together, it is sometimes the case that we can understand the basic organizing principles while ignoring many of the complicated details. This is the flip side of complex systems. While knowing the rules that govern the behavior of individuals does not necessarily help us predict the behavior of the mob, we *may* be able to predict the very same mob behavior without knowing very much at all about the unique personalities and characteristics of the individuals that make it up.” [Page 26.]

One way of viewing the interactions of people is in the context of their connections as in a network. It is important to consider that the people in the network are doing something. Thus, there is interaction. Furthermore, the network itself may evolve with changes that make it different at different points in time. It is this dynamic character that is of principle concern because once a change has started to evolve it may die out or it may cascade with the result of a dramatic change from the way things were.

Understanding interactions is important in predicting outcomes. Another source on the science of networks is Albert-Laszlo Barabasi, who in his introductory chapter of his book *Linked: The New Science of Networks*, writes “This book has a simple aim: to get you to think networks. It is about how networks emerge, what they look like, and how they evolve.” [Page 7.] Preceding the statement Barabasi explains that there is a strict architecture in complex systems found in various disciplines and that the events that occur are connected in ways described in the science of networks which is discovering the laws of self organization. He concludes the introductory chapter with the following; “Networks are present everywhere... You will come to appreciate how the Internet, often viewed as an entirely human creation, has become more akin to an organism or an ecosystem, demonstrating the power of the basic laws that govern all networks. You will see how the emergence of terrorism is also ruled by the laws of network formation and how these deadly webs take advantage of the fundamental robustness of nature’s webs. You’ll wonder at the amazing similarities among such diverse systems as the economy, the cell, the Internet, using one to grasp the other. This will be an eye opening trip across disciplines that I hope will challenge you to step out of the box of reductionism and explore, link by link, the next scientific revolution: the new science of networks.”

A critical aspect of networks is that they are dynamic rather than static. This requires viewing the process of change as a force in developing the structure in which nodes are linked to become a network. Linkages are critical in the production of income by real estate and the forces affecting that income production are subject to the vicissitudes of the economy and ecology, and the political environment as well as subject matter of a wide variety of other disciplines.

Emergence. Emergence is a concept of bottom up action by a group, acting without directions from a leader. It is a self organizing system. Steven Johnson writes in his book, *Emergence: The Connected Lives of Ants, Brains, Cities, and Software*, the following;

“...they [emergent systems] get their smarts from below. In a more technical language, they are complex adaptive systems that display emergent behavior. In these systems, agents residing on one scale start producing behavior that lies one scale above them: ants create colonies; urbanites create neighborhoods; simple pattern-recognition software learns how to recommend new books. The movement from low-level rules to higher to higher-level sophistication is what we call emergence.” [Page 18.]

Johnson discusses the idea of thinking of brains as “...a device for processing and storing information, like the clustered neighborhoods...and being a collective enterprise.” Then using ants as an analogy, he continues “The ‘colony’ brain is the sum of thousands and thousands of simple decisions executed by individual ants. The individual ants don’t have anything like a personality, but the colonies do.” [Page 115.]

If we extend this analogy and concept of emergent to group behavior we have another system of collective hearts and minds.

Predicting Outcomes. If we say with the paradigm of science as it developed since the Enlightenment, the Age of Reason, we would predict outcomes of courses of action based upon reason, we have errors beyond the “bounded rationality.”

Joachim Winter, on the web, writes the following:

“The term *bounded rationality* is used to designate rational choice that takes into account the cognitive limitations of both knowledge and cognitive capacity. Bounded rationality is a central theme in behavioral economics. It is concerned with the ways in which the actual decision-making process influences decisions. Theories of bounded rationality relax one or more assumptions of standard expected utility theory.”

Our understanding is that people may try to be rational to some degree but fall short, this is described by Duncan Watts in his book, *Six Degrees of Freedom*, as follows;

“In the 1950’s, Herbert Simon...pointed out that as mathematically attractive as it might be, rational utility maximization is ultimately a made-up theory, and so can only be considered a good description of human behavior to the extent that it

actually works, if empirical evidence, not to mention common sense, suggests that people do not behave rationally, then why not make up a theory that is more plausible? Replacing mathematical convenience with intuition, Simon proposed that people *try* to behave rationally, but their capacity to do so is bounded by cognitive constraints and limited access to information. In short, they exhibit what he called *bounded rationality*. [Page 211.]

Add to this the errors in reasoning as discussed earlier, the role of emotion and we see that the habits of the heart and mind make forecasting outcomes more difficult than if it were all governed by reason.

On top of this is the group behavior which may be generated from bottom up responses as in emergence and group behavior as a result of network cascading, and the complexity is compounded.

The complexity adds an additional uncertainty to forecasting outcomes. This especially calls for a strategic approach. That is the subject of the book in progress.

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<sup>1</sup> Alfred North Whitehead, in *Science and the Modern World*, defines rationalism as "...the belief that the avenue to truth was predominately through a metaphysical analysis of the nature of things, which would thereby determine how things acted and functioned. [Page 39.] He continues, "The historical revolt was the definite abandonment of this method in favor of the study of the empirical facts of antecedents and consequences....in science it meant the appeal to the experiment and the inductive method of reasoning.