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A Louis Moment

We take great pleasure in “getting it.” We love to see patterns emerging from seeming chaos, whether in doing a crossword puzzle or doing science.

—Calvin (2004, p. 93)

Similar to the import of Louis Pasteur’s historic revelation about the nature of contagious disease, current revelations about the nature of the brain represent a momentous breakthrough in knowledge. As observed by Restak (2001, p. xvi), “only recently—with the development of powerful technologies—have we been successful in delving into the secrets of the Brain.” The opening of the black box of brain-enabled intelligence further qualifies as a *Louis moment* of discovery because as the nature of this defining capacity is better understood, aligned shifts in behavior will evolve across human affairs.

LOUIS’S MOMENT

In 1857, Louis M. Pasteur and his associates were investigating the problem of wine spoilage and related food preservation and health issues. In conducting his inquiry, Pasteur devised a simple experiment that proved the biogenesis of life (i.e., life comes from life), thereby establishing an empirical base for the theory of the spread of contagious disease by microorganisms. That scientific insight was a dramatic revelation of how a previously unknown universe acted on the human condition. Moreover, the ultimate impact of the breakthrough in knowledge was subsequently

demonstrated through significant changes in diverse human behaviors. As people constructed understanding of the concept of disease spread by microorganic hosts (i.e., germs), they began to change their personal hygiene, food preparation, and environmental sanitation practices. Food producers and processors implemented new practices consistent with their perception of an unseen world of potentially harmful bacteria. The medical field developed hygienic protocols for cleansing hands, covering faces, and sterilizing instruments. Scientists embarked on ongoing investigations that produced vaccines, antibiotics, and other contributions to improved human health.

It must be noted that Pasteur's confirmation of microscopic disease agents did not come as a complete surprise. Louis's inquiry provided both revelation and verification. It revealed information that had not previously been known. It also verified intuitive conclusions about the spread and prevention of disease (e.g., more than 2,000 years earlier, Aristotle suspected microscopic "seeds" as the transmitters of illness). In this sense, the results of Louis's experiments reinforced hygienic and sanitary practices already in effect by virtue of individual or cultural intuition. Regardless of whether minds were opened to a new reality or intuitions confirmed, however, Pasteur's revelations ultimately advanced how people understood their world and, subsequently, how they acted in it.

BREAKTHROUGH HAPPENS

Louis Pasteur's scientific discovery is representative of the phenomenon of momentous breakthroughs in knowledge. Such breakthroughs are demonstrated across history, from resolving the management of fire to mapping the human genome. It is a phenomenon that results from our disposition to raise questions and pursue answers.

Born of the evolution of conscious thought in ancestors who first questioned matters of life and death and the moon, sun, and stars, it is our nature to question: *What is this? How does it work? What just happened? Why did it happen? Who are we? Why are we? Where are we? Where are we going? What if . . .?* This inquisitiveness is matched by a strong disposition to solve the problem, complete the puzzle—to figure it out. Indeed, we are defined by a prodigious ability to analyze and create our way to the resolution of that which perplexes. We naturally compare, deduce, induce, plan, and invent as we go about our daily business. It is a basic capacity for reasoning that is reflexively engaged.

Notably, our capacity for reflective reasoning is exercised at more advanced levels when committed to the resolution of complex problems. We become more formal and systematic when pursuing a course of study, the cure for a disease, or a voyage to Mars. This formal mode of inquiry is

more consciously focused on organizing knowledge for specific purpose. It is at this level that we ultimately experience momentous breakthroughs in knowledge—and subsequent changes in behavior.

SHIFT FOLLOWS

Advances in human understanding are most spectacular and far ranging when critical breakthroughs occur. Such moments are comparable to discovering a key to a lock. Possession of such a key opens a door to a wealth of new knowledge that in turn produces a surge in the generation of more knowledge. The signature of such a dramatic advance in knowledge is a shift in how people perceive the world and, subsequently, how they act in accordance with the new worldview. Louis Pasteur's discovery is but one example of the phenomenon. The dramatic breakthroughs in our understanding of nature associated with Copernicus, Newton, Curie, and Watson and Crick are other examples.

The point to be emphasized here is that, given a precipitating event that causes pieces of a puzzle to fall into place after a long period of searching, an inevitable shift in thinking and action results from meaningful breakthroughs in knowledge. New information shifts perception that shifts behavior.

Energized by Breakthroughs

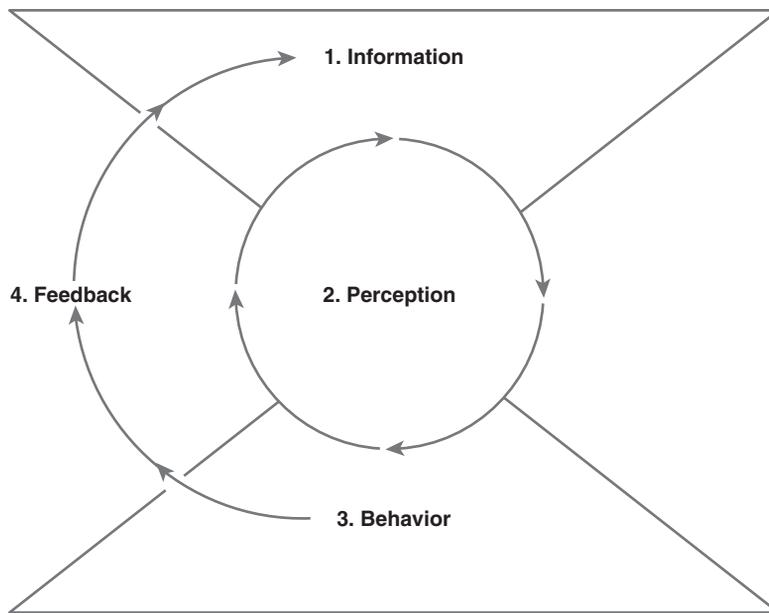
The impact of Louis Pasteur's scientific discovery exemplifies the dynamic of information influencing perception that influences behavior that, in turn, influences information (Figure 1.1). It is a dynamic and ongoing relationship (between information, perception, and behavior) that is energized by advances in knowledge.

In Louis's case, significant new information (i.e., the revelation that microscopic agents transmit disease between organisms) refined perception (i.e., improved the understanding of disease as spread by germs rather than by a curse, changes in weather, or bathing too frequently) that, in turn, directed modification of behavior (i.e., improved personal hygiene, medical practice, sanitation systems, and food processing). In other words, after the scientific revelation of information about the existence and nature of germs, there was no going back; there was no other option but to adopt behavior that was compatible with the resulting perceptual shift in understanding about the nature of disease.

Essence Is Legacy

The legacy of Pasteur's scientific breakthrough is much greater than that briefly outlined here. His discovery, combined with the scientific

Figure 1.1 The Dynamic of Influence Between Information, Perception, and Behavior



1. A body of information within a field of knowledge is engaged and processed by the brain.
2. The processing of information influences the formation of perception (i.e., essential understanding).
3. Perception influences choice of behavior within all possible options.
4. Behavior experience provides feedback that influences (i.e., further expands) information that influences perception.

research and development it spurred, ultimately resulted in enhanced health and life expectancy for much of humankind—an extraordinary return from rather simple experiments that empirically proved the biogenesis of disease-bearing microorganisms.

In recognizing his scientific contributions, however, we also necessarily note that most people alive today do not possess much knowledge of Louis Pasteur or his work unless they have a personal or professional interest in the history of biological science. It might be that most adults are able to retrieve some textbook memory of Monsieur Pasteur, a French scientist associated in some manner with an important scientific discovery. But if they were to be completely honest, they would also admit that they

survive rather well with limited knowledge of Louis Pasteur himself. However, it would be difficult to locate anyone, from young children on, who do not have a grasp of the essential knowledge derived from Pasteur's experiment and did not act in accordance with that understanding. Thus we have an example of people distilling the *gist* (i.e., the essential points or general sense) of an important body of knowledge. They have distilled essential knowledge—what is important to know in a fundamental fashion—from a quantity of available knowledge. They have grasped the *big idea*.

A MINDFUL MOMENT

A Breakthrough in Knowledge

In terms of quantity, degree, and speed of change, it is not unreasonable to judge the early twenty-first century as rivaling any prior time period. An informed resident of the planet today could hardly be unaware of the current unfolding of seismic movements in social, economic, political, environmental, scientific, and technological realms.

Of course, it is easier to recognize a convergence of significant developments from a historic distance. For example, it is easy to observe the convergence of a wide range of advances in technology and humanistic thinking during the Renaissance. It is more difficult to fully appreciate the uniqueness or magnitude of meaningful developments occurring in the present. Preoccupied with the demands of the moment, we must make a conscious effort to perceive the collective effect and direction of change that is happening concurrently—that is, to see the forest for the trees. However, the difficulty one might experience in appreciating significant events in the moment does not relieve one of the need to see and understand their import.

A particularly momentous development within the big picture of contemporary events is recent breakthroughs in knowledge in neuroscience and related fields of brain research and theory. This surge in understanding about the human brain and the intelligence it enables is comparable to Louis Pasteur's dramatic breakthrough in understanding of microorganic contagion in the nineteenth century. Contemporary scientific progress in revealing the nature of intelligence is a *Louis moment* of discovery—discovery that is facilitated by converging advancements in technology and diverse scientific inquiries at the dawn of the twenty-first century. Furthermore, similar to the impact of Louis's revelations about the nature of disease, as the black box of intelligence is opened and its nature revealed, there can be no going back to less informed and aligned behavior in the conduct of human affairs.

An Opportunity for Shift

Breakthrough advances in knowledge about the fundamental nature of brain-enabled intelligence encourages reflection about many aspects of human behavior, including leadership. Leaders are well advised to explore the headwaters of intelligence: the 3-pound physiological mass cradled in the cranium. The leadership connection to the brain is always assumed, given the brain's mediating role in all interactions between people. However, emerging knowledge about the nature of intelligence presents an opportunity to better understand and tighten the connection—an opportunity for leaders to become more mindful of how they engage the intelligence of self and others.

It is also important to recognize that breakthroughs in understanding and thinking of the magnitude that we are talking about here happen, but they seldom just happen. They usually evolve at the prodding of proactive and persistent inquiry. Perkins (2000) speaks to this in his description of a fivefold structure that characterizes the process of breakthrough thinking.

- Breakthrough thinking characteristically entails a long period of searching.
- A typical breakthrough arrives after little or no apparent progress.
- The typical breakthrough begins with a precipitating event.
- When a breakthrough happens, it happens as a cognitive snap: Things fall into place rapidly, with not much time separating the precipitating event from the solution.
- The breakthrough transforms one's mental or physical world in a generative way, changing both thinking and action.

Perkins's characterization of the process of breakthrough thinking is helpful in interpreting the opportunity at hand for a better understanding of leadership. Humankind highly values leadership and has consciously sought to understand its critical attributes for many centuries (i.e., a breakthrough characteristically entails a long period of searching). But although many models and theories of leadership have evolved from this long search, it is fair to say that common perception and unifying theory remain elusive (i.e., a typical breakthrough arrives after little or no apparent progress). However, the current convergence of extensive and diverse scientific inquiry with applications of advanced microtechnologies has generated a surge of new knowledge about the nature of brain-enabled intelligence (i.e., the typical breakthrough begins with a precipitating event). Given the breakthrough in knowledge about brain-enabled intelligence, a transformation in leadership understanding of the nature of human capacity may be at hand (i.e., when a breakthrough happens, it happens with a

cognitive snap, and things fall into place). Subsequently, a breakthrough in understanding about the nature of capacity encourages a breakthrough in leadership thinking about compatible behavior that nurtures that capacity, both in self and in others (i.e., breakthroughs transform in a generative way, changing both thinking and action).

In short, current breakthroughs in understanding about what underlies human capacity for learning and achievement present a critical opportunity for a parallel breakthrough in understanding of the nature of leadership.

A Necessary Shift

Reflection about the nature of leadership is an ongoing need, given that leadership is contextually influenced. The magnitude of interwoven social, economic, political, environmental, and technical challenges facing humankind at the beginning of the twenty-first century certainly argues for reflection about how leadership might be rendered more effective. Developments transpiring during your time on the planet raise daunting problems to be resolved in the areas of computer technology, genetic engineering, civil rights, democratic government, sustainable environments, space exploration, and social and economic globalization. It is indeed an interesting time to be alive and part of such a dramatic convergence of change and challenge. Moreover, it is a time in history that places a high premium on engaging human capacity to solve problems—“to figure it out.”

The good news is that breakthroughs in knowledge about human capacity both press for and enable a breakthrough in understanding of effective leadership. Emerging knowledge about how people learn and achieve as individuals and in groups can no more be ignored than knowledge about the sun as the center of the solar system or germs as agents of contagion. Unprecedented insight about the *physiological, social, emotional, constructive, reflective, and dispositional* dimensions of intelligence (as examined in Chapters 5–11) presents an extraordinary opportunity to construct a more informed sense of human nature. It is also an opportunity for leaders to construct a more informed sense of their influence on the collective capacity of a group toward achievement of purpose.

SUMMARY OBSERVATIONS

- It is human nature to ask questions and strive mightily to figure things out.
- Periodically, human inquiry strikes a vein of significant new knowledge.

- Breakthroughs in knowledge influence perceptual shifts that, in turn, influence change in behavior; that is, significant new knowledge provokes change in how people understand their world and, subsequently, how they behave in it.
- You need not know everything for change in your perception and behavior to happen; essential understanding is the key.
- Current breakthroughs in knowledge about the human brain and the intelligence it enables are converging with other advances in knowledge and technology at the beginning of the twenty-first century.
- Leadership attention to breakthrough knowledge about brain-enabled intelligence is opportune and necessary. To better understand and engage intelligence in self and others is to more effectively influence responses to twenty-first-century challenges.
- Breakthroughs in knowledge about brain-enabled intelligence hold promise for aligned breakthroughs in leadership theory and practice.

READER REFLECTION

- How does information influence perception?
- How does perception influence behavior?
- What would be another example (other than that of Louis Pasteur) of a breakthrough in knowledge leading to a significant shift in human understanding and behavior?
- Can you recall an instance in which new information led to a significant shift in your perception and behavior?
- Why might a leader be interested in learning more about brain-enabled intelligence?