

Inside the CEO's Brain: Leadership, Management and Neuroscience

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ABSTRACT

Of late the role of the Chief Executive Officer or CEO has been subject to considerable scrutiny in both the popular press and in academia. In particular, there appears to be significant interest in how CEOs think. This paper uses some of the latest findings in neuroscience, psychology and management to peek inside the brain of the CEO. The focus is on what CEOs think about, how their brains are organized, and their styles of thinking. Additionally, this work will discuss the leadership-management dichotomy, look at how CEO brains might differ from those of others, and investigate available tools for obtaining a better understanding relating to how CEOs think. The paper will conclude with a look at the future and offer a set of conclusions.

Key Words Whole Brain, CEO, Leadership, Management, Neuroscience

1. Introduction

Given both the affect and the effect that organizational CEOs thinking has on individuals, institutions, and societies there is a great deal of interest in what may be going on inside of the CEOs brain. So, how do CEOs think of themselves? A recent INC. 500 CEO survey [1] found that most CEOs identify themselves as creative builders who admire highly successful contemporary entrepreneurs such as: Sir Richard Branson, Bill Gates, Warren Buffet, Jeff Bezos and Elon Musk. The survey results also show that CEOs are still primarily middle-aged Caucasian males, who create jobs, think the economy is growing, want more good people, and advocate less federal spending with lower taxes.

Additional information on what CEOs are currently thinking about comes from an extensive 2015 survey. Some 103 CEOs from a sample of over 1,300 globally were interviewed by the consulting firm of Price, Waterhouse, Cooper [2]. Summary

results indicate that CEOs are focused on how to move ahead in an environment that is ever more volatile and unpredictable. They are also concerned with how to extract value from possible opportunities they have not previously explored.

Since CEOs are individuals there probably is no average or typical CEO. Like other lower level managers and leaders they are a product of both their genetics and their environment. They do, however, share a common responsibility for influencing the fate of their organizations. This paper will explore the ways CEOs brains and minds might be different from other managers and leaders, look at the issue of whether CEOs are managers or leaders, provide a brief tour of the brain, reconnoiter different brain styles, suggest some tools for discovering how CEOs think, investigate what might be on the horizon for CEOs, and note some summary conclusions.

2. Brains and Minds: Are CEOs Different?

There is some evidence to support the notion that CEOs are different. Management researchers Scott Graffin, Steven Boivie, and Mason Carpenter [3] examined CEO succession and performance evaluation. They report, "There is a growing literature that suggests certain CEOs are singled out for their managerial acumen, where CEO acumen is treated as the primary causal agent of a firm's excellent performance, and therefore exalted by the media as 'star CEOs.'" Thus, some high performing CEOs appear to have a special kind of wisdom that may result from both their intelligence and their life's experiences.

In his influential book *The Mind of the CEO* Jeffrey Garten, the Dean of the Yale School of Management, conveyed the results of interviews with 40 current prominent CEOs. Garten [4] found that these CEOs minds were focused on three distinct types of organizational challenges: how to take advantage of the Internet and the global economy, leading and managing corporate giants, and fulfilling a role on

the world political, economic and social stage. A more recent 2014 survey of 1,000 CEOs conducted by the *Financial Times* [5] explored the question, “What’s on your CEO’s mind?” Five key areas emerged as CEO priorities: human capital, customer relationships, innovation, operational excellence, and corporate brand and reputation.

The job of the CEO seems to be particularly demanding of time, energy and focus. In coping with these demands successful CEOs also appear to keep a set of basic principles in mind. In looking at particularly resourceful organizational leaders professors Michael Dickman and Nancy Stanford-Blair [6] suggest that they operate according to four basic principles: attending to the potential of mindful practice, acquiring knowledge about the nature and nurture of intelligence, applying knowledge about intelligence to self, systems, and situations, and adjusting their leadership knowledge in response to experience.

Based on extensive instrument research Ned and Ann Herrmann [7] report that the CEO role tends to be whole brained or balanced in its brain preferences between analyzing, organizing, personalizing, and strategizing. They also report that CEOs now and into the future will likely require a whole brain job approach to be effective. According to their over 14 years of research with 9,300 CEOs, a preference for a balanced profile has remained stable over the entire period.

The Herrmanns also report that female CEOs typically select intuitive as the strongest descriptor of themselves. Women CEOs also score, on average, somewhat higher than their male counterparts in brain areas associated with human relationships and future focus than do their male counterparts. Additionally, male CEOs appear to have a slightly higher preference for the brain area associated with analysis than do female CEOs.

3. Are CEOs Managers or Leaders?

It appears that for many CEOs the academic distinctions between leadership and management are mostly arbitrary and artificial. Their day-to-day experience in the job does not usually lend itself to simple categorizations. Author and former CEO Craig Hickman [8] suggests that successful executives need the skills of both management and leadership: the practical, orderly, analytical mind of the manager

and the experimental, visionary, creative soul of a leader.

In a current study of senior executives, leading management thinker Henry Mintzberg, uncovered important similarities in their work that seemed to integrate traditional management-leadership distinctions. The nature of their work influenced the content of their thinking. Mintzberg [9] found that his subject executives: worked at an unrelenting pace, faced much briefness in their activities, dealt with significant fragmentation and discontinuity in the job, had an orientation to action, and held a bias toward informal and oral forms of communications. These executives also discovered an important relationships side to their jobs that involved relating to colleagues and associates and they employed more covert than overt job control.

Of late, electronic technology is increasingly being used to examine executive brains. One finding is that emotion is a significant factor in much executive decision making. Loss of the emotional centers of the brain often results in an inability to make choices. In a recent research study [10] employing brain imaging using a functional magnetic resonance imaging scanner, it was reported that greater profits were made by CEOs companies that were statistically related to arousal in one of the brain’s emotional centers (the amygdala).

3. A Brief Introduction to Your Brain

Besides the brain at the top of the central nervous system there is also significant neural tissue in the gut (the Enteric nervous system) and the heart. Although not widely researched or discussed, it is likely that the neurons in the gut and the heart do influence thinking. It appears that the brains of typical human beings, including CEOs, create a very large number of daily thoughts. Neuroscience author David Sousa [11] reports, “A few years ago, the National Science Foundation estimated that the average human brain generates between 12,000 and 50,000 thoughts per day, depending on how deep a thinker the person is.”

Sometimes referred to as the most complex structure in the universe with about 84 billion neurons and 1,000 trillion connections, the human brain has evolved over the course of several million years of evolution. In its earliest form it was anatomically similar to that a reptile (the brain stem). The human

brain next became similar to that of a mammal (the limbic system). Finally, several hundred thousand years ago it evolved to its current form (the cerebral cortex). Each successive newer portion of the brain has kept and surrounded the earlier portions. The cortex of human brains is further divided into four areas each semi-specialized for particular functions.

At the back of the skull is the occipital lobe which is primarily concerned with vision. Next, moving forward, at the top of the brain is the parietal lobe which is concerned with the spatial sense including taste, temperature, and touch as well as enabling navigation. At the front of the brain is the frontal lobe which plans and executes motor actions as well as thinks, plans, remembers, problem-solves and learns. At the sides of the brain are the temporal lobes with a principal focus on hearing and selective listening. The temporal brain area is also involved with deriving meanings for the retention of visual memories, language comprehension, and emotional associations. At the very rear of the brain, connected to the brain stem, is an ancient structure called the cerebellum which facilitates fine motor movement.

Current research on brain organization places executive function in the frontal lobes of the cerebral cortex which is divided into two halves or hemispheres. Analogously, this particular area might be considered the CEO of the brain. In particular, the prefrontal region within the frontal lobes acts as a primary agent of control for the whole central nervous system. Eminent neuropsychologist and cognitive neuroscience researcher Elkhonon Goldberg [12] proposes that, in general, the right hemisphere of the brain has a principal focus on the new and novel and the left hemisphere with the routine and consistent.

Psychiatrist and neuroscientist Srinivasan Pillay [13] states that the human brain is primarily wired to protect us from danger. He also indicates that the deep brain structure called the amygdala (within the limbic system) becomes active when we come across something fearful, that fear can be both conscious and unconscious, that fear affects thinking and decision making, that fear can also disrupt logical thinking processes, and that the amygdala is also an emotional relevance detector. Further, Rock [14] reports that “many studies now show that the brain equates social needs with survival; for example, being hungry and being ostracized activate similar neural responses.”

Current thinking among neuroscientists is that the mind arises from the functioning of the brain. A team of three international applied scientists Argang Ghadire, Andreas Habermacher, and Theo Peters [15] suggest that specialized brain circuits develop in response to four core human urges. These vitalities are drives that the authors call: pleasure, orientation and control, attachment and self-esteem. Positive responses to these motivational drives help build trust and bonding, elicit a sense of personal control over the environment, promote feelings of reward, and enable developing as a person.

Work by Nobel Laureate Daniel Kahneman proposes the brain has two main thinking systems metaphorically called System 1 and System 2. Collectively the two systems combine to produce fast thinking (System 1) and slow thinking (System 2). System 1 is primarily unconscious, operates quickly and automatically, and constructs a continuous coherent interpretation of experience. System 2 operates slowly and consciously, is concerned with logic and reason, and monitors and controls inputs from System 1. CEOs appear to call on both the intuitive and deliberate systems to inform their thinking. Kahneman [16] also suggests that as a consequence of their thinking, “A very generous estimate of the correlation between the success of the firm and the quality of its CEO might be as high as .30 indicating 30% overlap.”

5. Brain Styles and Thinking Preferences

Significant research exists on relating brain area preferences with thinking styles. These models offer a convenient means to analyze and interpret CEO thinking. Herrmann [17], Azmatullah [18], Hazeldine [19], Nardi [20] and Benziger [21] have all developed models that purport to relate certain brain locations with particular thinking characteristics.

5.1 Whole Brain Model

Herrmann's Whole Brain model employs four quadrants linked to the left and right cerebral hemispheres of the brain and the left and right halves of the mid-brain limbic system. The upper left or A quadrant thinking favors facts, realism, analysis, criticism, quantification and logic. The lower right or B quadrant emphasizes form, sequence, procedures, prevention, reliability, organization, timeliness, plans, and getting things done. The lower left or C quadrant likes thinking related to emotion, talking, touching, being supportive, interpersonal sensitivity, teaching

others and intuition about people. The upper right or D quadrant stresses thinking concerned with imagination, intuition about things, future focus, speculation, curiosity, risk taking, rule-breaking, being playful and surprises.

5.2 Brain Mosaic

Neuropharmacologist Syed Azmatullah's brain styles mosaic centers on four quadrants of the cerebral cortex. Each quadrant is concerned with a particular basic organizational function: task leadership, administration, relationships, and innovation. Additionally, he has noted five areas of the neocortex associated with particular business roles.

The CEO, located in the upper left portion of the cortex, is associated with charisma, strategic initiatives, strategy analysis, and decision-making. In the lower left cerebral cortex is the COO or Chief Operating Officer who is connected with project management, charting progress, communications, knowledge and procedures. The lower right cerebral cortex houses the Human Relations Director concerned with strategy synthesis, change management, the envisioned future, and concord and discord. The upper right of the cortex locates the Creative Director focusing on self-development, ethics and values, portfolio development, and design. At the center of the cerebral cortex Azmatullah positions the Chairman. The Chairman is concerned with providing internal awareness, calmness, insight and external awareness.

5.3 PRISM

Hazeldine's brain preference model also consists of four quadrants and is called PRISM. The four quadrants are based on the organization of the brain's cerebral cortex as well as with predominant neurotransmitters and hormones. Neurotransmitters are brain chemicals that pass information between neurons and hormones are chemicals released by a cell or gland that sends out messages that effect cells in other body parts.

The front left quadrant is color-coded as Gold and its most important neurotransmitter is serotonin. Serotonin has an effect on mood and behavior, seeking conformity, anxiety level and sleep. This brain sector is associated with thinking about conscientiousness, conventionality, exercising caution, being detail oriented, persistence, order, consistency, precision, planning and calmness.

The rear left quadrant is colored Red and its primary hormone is testosterone. Testosterone is a steroid that plays a role in male sexual development and promotes the growth of muscle, bone mass and body hair. It is also associated with health and well-being and the prevention of osteoporosis. This quadrant's thinking emphasis is on competitiveness, independence, practicality, forthrightness, aggressiveness, directness, tough-mindedness, daring, and focus.

The rear right quadrant carries the color Blue and is connected with the hormone estrogen. Estrogen is the primary female sex hormone and is important in the reproductive cycle. The thinking focus for this quadrant is on being caring, nurturing, sympathetic, idealistic, agreeable, supportive, tolerant and unassuming.

The right front quadrant is identified with the color Green and the neurotransmitters noradrenaline and dopamine. Noradrenaline is associated with physical and mental arousal and heightened mood. Dopamine is associated with pleasure and happiness and the anticipation of reward. It is also released by the experience of novelty as well as by the new and unexpected. The thinking in this quadrant is related to being unconventional, uninhibited, flexible, spontaneous, creative, impulsive, curious, opportunistic, and reckless.

5.4 Nardi's Model

UCLA professor Nardi's thinking styles model is based on the Myers-Briggs Type Indicator personality assessment. It was constructed from electroencephalographic studies that measured brain waves and identified 16 specific areas of the neocortex as associated with cognitive skill sets. These particular brain regions were noted as the workhorses of the mind. The first eight regions include: Chief Judge, Imaginative Mimic, Deductive Analyzer, Precise Speaker, Factual Storekeeper, Sensitive Mediator, Tactical Navigator, and Visual Engineer. The second set of eight contains the: Process Manager, Grounded Believer, Expert Classifier, Intuitive Listener, Flowing Artist, Purposeful Futurist, Strategic Gamer, and Abstract Impressionist.

5.5 Benziger Thinking Styles

Psychologist Katherine Benziger has labelled her four-quadrant, all-cerebral, brain dominance-oriented,

thinking model, “The Benziger Thinking Styles Assessment.” The Frontal Left quadrant is concerned with abstract mathematics, structural analysis, and logical reasoning. The Left Posterior Convexity focuses on order and habit, ordered procedures, and sequential routines. The Right Posterior Convexity accentuates rhythm, feelings, emotional memories and spiritual experiences. The Frontal Right quadrant emphasizes internal imaging, expressiveness, imagination, and metaphor.

6. Tools for Understanding How CEOs Think

Author Dudley Lynch [22], former editor of *Brain & Strategy*, suggests a number of strategies for understanding the business brain. These processes include: training to defer judgment, use of paradoxical intention, changing leadership style, acting to free creativity, and mastering the brain’s natural protocols for learning new materials.

Neuroleadership practitioner and executive coach, Suzanne Kryder emphasizes mindfulness as a tool for making CEOs thinking more effective. Kryder [23] recommends developing a calm leader mindset through the use of mindfulness practices such as mediation, controlled breathing, selective noticing, and staying in the present.

One of the founders of the field of Neuroleadership, David Rock, has written extensively about practical tools for making the thinking brain more effective in the workplace. In his book *Your Brain at Work*, Rock [24] suggests the use of a cognitive device, rooted in the areas of human social experience, that the brain uses to enhance its own survival. Rock calls it the SCARF model with each letter in the acronym related to a basic survival domain. The “S” stands for Status. The “C” relates to Certainty. The “A” is for Autonomy. The “R” conveys Relatedness. And, finally, the “F” is associated with Fairness

Another vehicle for understanding the CEO thought process is suggested by applied psychologist Connie Henson and neuropsychologist Pieter Rossouw [25] is called PATE. PATE is both a metaphor for the human head, brain or mind as well as an acronym for: Perceive broadly, Analyze and experiment, Take action, and Evaluate and communicate. It is a guided process for individuals that attempts to gain a full understanding of situations and how to influence them, identifies and analyzes all relevant information, takes thoughtful action, and objectively evaluates outcomes.

Psychometrician and management consultant Michael Kirton has devised a simple instrument called the *Kirton Innovation Adaption Inventory* or *KAI* that measures approaches to thinking related to problem solving and creativity. Kirton advocates that one’s style of problem solving is independent of one’s capacity to problem solve. He suggests [26] there is a continuum of problem solving that ranges from being highly Adaptive to being highly Innovative.

High adaptors are characterized by: accepting problems as defined, generating a few good solutions targeted at doing things better, and liking structured situations. High Innovators, on the other hand, are described as rejecting the generally perceived definition of a problem, producing numerous ideas aimed at doing things differently, and have a preference for less structured situations. Kirton advises that the effective leader-CEO should concentrate his or her mind on the perception of new opportunities, enabling subordinate motivation to exploit the identified opportunities, and determining how to best use organizational diversities of both style and capacity to realize them.

Additionally, since one of the principal functions of a CEO is influencing others thinking, the practical research of psychologist Robert Cialdini may be particularly relevant. Cialdini [27] has identified six principles of influence that can be employed by the CEO to create connections of trust and community. These principles include: reciprocity, commitment and consistency, social proof, authority, liking and scarcity.

Reciprocity relates to the idea that people tend to return a favor no matter how small the initial offering. Commitment and consistency refers to the notion that if individuals commit to an idea or goal orally or in writing they are much more likely to carry it out because of cultural expectations. Social proof means that people will do things they see others doing even though they might be morally opposed to the action. Authority conveys the idea that people tend to obey authority figures even when they are asked to perform objectionable activities. Liking refers to the principle that people are more easily persuaded by people they like and admire. And, scarcity concerns the value that people place on items which are perceived as scarce or rare.

7. What's Next?

Human resource and organization development specialist Erica Garms [28] proposes that the major challenges of the future workplace will involve confronting upheavals in management, finding new and different employee motivators, and dealing with diversity. In a similar vein, mind researcher and Harvard professor Howard Gardner [29] has noted six future trends that executive minds will need to confront. These trends concern: the potential for global destruction, instant communications, the absence of privacy, the residue of entities that transcend national boundaries, nationalistic and fundamentalist reactions, and ever more technical expertise.

In confronting this slate of challenges, psychologists and brain researchers Madeline Van Hecke, Lisa Callahan, Brad Kolar, and Ken Paller [30] suggest a possible way forward. This means the mind of the executive might be better served if it attends to: how to better manage and respond to his or her employees, learning how to stay calmer, helping people to understand the difference between actual and perceived hazards, and recognizing that they themselves pose a threat to others just by the nature of their own status.

A more radical and innovative response to the challenge of the future is to change the basic nature of the CEO role. In order to make the role of the chief executive more in tune with the modern workforce Maria Giudice and Christopher Ireland recommend replacing it entirely. Giudice and Ireland suggest that many organizations have moved beyond the industrial and information ages. For them, a new type of executive is required to best operate in today's world. They call this new role a Design Executive Officer or DEO. Giudice and Ireland [31] assert that DEOs exhibit six defining characteristics, they are: change agents, risk takers, systems thinkers, intuitive, socially intelligent, and get things done. This is in opposition to CEOs to whom they attribute preferences for: being authoritative, linear thinking, focusing on stability and order, commanding respect, expectations of accuracy, one-way communications, fear of failure, sensitivity to threats, and delegation of action.

8. Conclusions

There seems to be no one-size-fits-all when it comes to the minds of CEOs. Nature and nurture both

appear to have a part. Greater emphasis on the utilization of principles from the neuroleadership field looks to hold significant potential for further insight into the mind of the CEO. Evain Gordon, the Founding Director of the Brain Dynamics Center at the University of Sydney [32], has enumerated some of the benefits of employing these tenets including: "improvements in thinking and learning; making more effective decisions; overcoming negative biases; finding more creative solutions; increasing the capacity for attention to key tasks and goals; dealing more effectively with stress; and having a more positive attitude, optimal motivation, engagement; and outcome focus in the workplace."

In summary, it appears that the mind of the CEO tends to be drawn toward effectively operating in particular types of situational environments. Suojanen [33] has identified three such generic situations: crises-oriented, routine-oriented, and knowledge-oriented. Certainly some CEOs think best when under crisis pressure, others when the situation is calm and predictable, and yet others when it is important to learn in order to survive and thrive. Although they may characteristically prefer and perform better in some situations, it is highly probable that almost all CEOs will confront each of the trio of situational environments during their tenure.

Finally, in reflecting on the human mind, television personality and theoretical physicist Michio Kaku [34], concludes, "More than two thousand years ago Socrates said, 'To know thyself is the beginning of wisdom.' We are on a long journey to complete his wishes." Successful CEOs can do no less.

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