The Science Behind Emotional Intelligence

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The Case for an Emotional Brain

Emotions are not just a matter of the heart. Recent advances in research have shown that they are also a result of brain biochemistry. These conclusions come from neuroscience, evolution, medicine, psychology, and management. Emotional signals in the brain are felt throughout the body—in the gut, in the heart, in the head, in the neck, and so on. These sensations are important signals: if we learn to read them, they will help us make decisions and initiate action.

Most scientists believe that the control center of emotions in the brain is the limbic system, consisting of the amygdala, the hippocampus, and other structures in the mid-brain. The limbic system stores every experience we have from the first moments of life: impressions are stored in these areas long before we acquire the verbal or higher thinking abilities to put them into words. It is this vast warehouse of feelings and impressions that provides a context or meaning for those memories.

Messages are transmitted to the brain by neurons, traveling through an electrical transmission system. In the 1970s, however, scientists discovered that our bodies also contain a chemical system for transmitting messages. This system is based on chemicals called peptides, which have receptors in every cell of our bodies. These highly sensitive information substances are thought to be the chemical substrates of emotion, triggering impression memories throughout our lives. Our brains are linked to all our body systems, and it is these peptides that are responsible for the emotions we "feel" in various parts of our bodies.

This chemical transmission system just described is far, far older in evolutionary history than the electrical brain. In fact, many of the same information substances found in humans are found in one-celled animals. Their presence in the most basic as well as the most complex forms of life is a clear indication of their importance.

The Three Layers of the Brain

Evolution of the Brain: Three Functional Layers

Very, very early in evolutionary history, simple "beings" had brainstems that regulated autonomic function and kept them alive. Human beings still have a brainstem, located just above the spinal cord, which tells our lungs to breathe and our hearts to beat. Similar in architecture to the brainstem of reptiles, the human brainstem is sometimes called the reflex brain or the first brain. We can summon it to conscious awareness, although it usually functions automatically.

The limbic system or emotional brain is thought to have developed out of the first brain. It helps us store and remember past experiences and learn from them. The limbic system in humans is located in the approximate center of the brain; when information enters the limbic system, we experience bodily sensations, transmitted by the peptides or chemical information substances, in the form of a "reaction" to the stimulus with much more awareness of what is happening than at the level of the first brain.

Out of this limbic system came the rational (thinking) brain or thin cortex. The cortex enables us to comprehend sensory information and plan accordingly. The very thin outermost layer of the cortex called the neocortex is responsible for higher order thinking and symbolic communication, art and ideas, and long-term planning. The millions or billions of connections between the limbic brain and the thinking brain allow for the free-flow of information between these layers.

What the Three Brain Layers Do

The first brain (brain stem) is the seat of autonomic or automatic response, as well as the seat of habits. It connects us to our external world through our skin, our pores, and our nerves. It controls what impulses get recognized and passed along to the two higher levels. This brain learns through imitation, avoidance, and repetition until something becomes habitual. Information usually enters at this point without our conscious awareness. We can make much of this information conscious and use it to our benefit, as biofeedback and hypnosis have shown us.

The emotional brain (limbic system) helps us know what things to approach and what to avoid by guiding our preferences. As we move through life and have more experiences, we have stronger intuitions, hunches, and gut reactions because more things are stored in the limbic warehouse. We have "learned" from experience. Intuition is emotional learning gained over many years; a 14 year old has little intuition because he or she has not experienced enough life to make connections between experiences. As we mature, we accumulate more reliable emotional data that can offer us valuable clues

and guide our behavior, providing we become aware of its existence and learn how to interpret it. Unfortunately, many adults have been taught to ignore this type of information.

The rational brain (neocortex) assists us with functions related to thinking and language: planning, questioning, making decisions, solving problems, and generating new ideas. This layer is connected to the emotional brain with millions of connections, allowing the emotional and the thinking brains to influence one another in a myriad of ways and providing rich data on which to draw conclusions and initiate action.

Our emotions have helped us immeasurably over the course of human evolution. Emotional responses are milliseconds faster than cognitive (thinking) responses; the lightning-fast reactions that bypass the rational brain centers were often survival responses for our distant ancestors. The limbic brain sends us the warning of a crisis before the rational brain can even process the incoming signal: the body has been alerted and is ready to act on our behalf.

The emotional brain was conserved for a purpose. Today, physical survival is less of a threat than it was to primitive man, but data from the emotional brain still gives us important clues to our surroundings and the actions we need to take. Ignoring this data on purpose or because we aren't aware of it leaves us with only partial information. One of the purposes of this book is to show how emotions can be used to maximum effect without getting out of control.

Research on Emotional Intelligence

Here are some additional conclusions from evolutionary science:

- Our emotional brain and its responses have been shaped and preserved over millions of years of evolution. Humanity is "hard-wired" for emotional response!
- The facial expressions for basic emotions such as fear, sadness, disgust, anger, and pleasure are identical across cultures, indicating some inborn genetic mechanism common to the human race.

Neuroscience Research

New maps of brain circuitry tell us that the brain is affected by our emotions in two ways: first, signals travel from the first brain to the rational brain and then back to the emotional brain whenever we mull something over for a while and become increasingly angry, determined, or hurt. The "mulling over" allows us to receive more precise data, and this leads to good decision making and more effective actions.

The second pathway is the route the signal takes as it travels to the emotional brain before going to the rational brain. This occurs when there is an immediate and powerful recognition of a specific experience as the emotional brain makes an association with some past event; we react strongly to something without really knowing why.

The brain seems to have one memory system for ordinary facts and another for emotionally charged events. Emotional events appear to open additional neural pathways that make them stronger in our minds, which may explain why we never forget significant events. Occasionally we are propelled into action on the basis of these few rough signals before we get confirmation from the thinking brain. We have a rational brain that keeps us from being overpowered by strong emotional reactions, but the emotional brain should not be completely overshadowed by the rational one. The key is balance.

Additional conclusions from neuroscience:

- Chemical information substances, or peptides, regulate blood flow. Blood carries glucose, the brain's fuel that is necessary for the brain to function. Blocking of emotions through trauma or denial can slow down this process, depriving the brain of nourishment and leaving it less able to think, plan, and make decisions.
- Electrical stimulation of the limbic area of the brain results in powerful emotional displays accompanied by bodily movement such as laughter or weeping; these displays of emotion are based on stored memories.
- Our brains are composed of a huge number of neural pathways and connections, making possible many subtleties of emotion and response. Emotions all have a purpose, even anger, grief, and anxiety. Denying these emotions sets up detectable molecular blockages that cause actual changes in cells: this can result in widespread physical and emotional damage over time. The peptides or chemical information substances flow more freely when we allow ourselves to express emotions such as joy or hope.
- Research in psychoneuroimmunology has shown conclusively that there is a direct link between what we think and feel and what is actually going on in our physical bodies. Our emotional and cognitive responses to events in life affect our health and our energy level—essential factors in working up to capacity.
- The term "gut reaction" can be taken literally: our digestive tracts are particularly dense with chemical information molecules and receptors. Chemical activity is triggered by—you guessed it—strong emotions.

Medical Research

The medical laboratory also provides us with clues about how emotions operate in our brains and bodies. Consider these examples:

- Some years ago the accepted "cure" for mental illness was to do a prefrontal lobotomy (removal of a section of the brain that connects the emotional and cognitive brains). The procedure worked in that severe emotional distress was indeed relieved, but the severing of the circuitry destroyed the patient's emotional life as well. With no ability to feel or express emotion, these patients appeared dull and lifeless.
- If the limbic brain is injured or surgically removed due to disease, the individual will lose emotional memory and lose all feelings. He or she will have no capacity for relationships and, in fact, will not be able to remember friends and relatives. The individual won't be able to make even simple decisions because he or she will no longer have any memory of likes and dislikes.
- The removal of the amygdala in animals causes them to lose fear, rage, and the urge to cooperate or to compete. This is a strong indication that the amygdala, a part of the emotional brain, controls our passions.
- Biofeedback is effective in controlling certain chronic diseases. This merging of the first brain, the limbic brain, and the thinking brain results in measurable changes at the cellular level and improves the functions of bodily systems.

Our rational minds give us information about people and things, yet preferences and why we have them are based on the limbic brain's storage of emotions. Without access to that information, we are unable to make even the simplest of decisions because all choices are equal. Emotions are always present in our lives, whether we recognize them or not.

Research in Psychology

Evidence for the importance of emotions comes from the field of psychology, too. Here are some important findings:

- Stress activates a certain gene that attaches to brain DNA, causing abnormalities that lead to depression as well as other emotional difficulties. The first bad experience feels negative and sets up a pathway in the brain. The second experience feels worse, and after repeated experiences, the memory trace has become a superhighway for depression.
- When we are calmly energized (good stress), the brain secretes catecholamines, adrenaline, and noradrenaline. This kind of "stress" is beneficial because we can perform at our best.
- When stress is severe, the brain secretes cortisol, which intensifies sensory awareness but dulls rational thinking. When levels of this substance are high, our memory does not work well, and we make more mistakes. Cortisol levels rise when we are bored, frustrated, or highly anxious, or when we have other strong negative emotions.

- Prolonged stress in laboratory animals has been shown to actually destroy neurons, shrinking the brain's memory center.
- Experiments were performed in which people were shown shapes at a rate too quick for the shapes to register with the thinking brain. But subjects developed a preference for those shapes, even though they had no conscious awareness that they had seen them. The limbic brain perceives things more quickly and even decides if it likes those things before the thinking brain can be engaged.
- When we look at angry or happy faces, our facial muscles change very subtly in the direction of what was viewed. These subtle changes, while not visible to our eyes, can be measured with electronic sensors.
- People showing little emotion when they first sit down to face an individual who shows a lot of emotion invariably pick up on the mood of the expressive partner. We subtly re-create in ourselves the mood of another, and may, in fact, be programmed to do so.
- Animal studies show that primates experience empathy, just as humans do. When an animal sees another of its species in distress, the primate brain has specialized neurons in the visual cortex and in the amygdala that fire only in response to particular facial expressions that convey fear, threat, or submission. This might indicate that humans also have such specialized "empathy" neurons, and that empathy is programmed into our brains.

These findings are particularly relevant in the workplace, where stress can affect the environment as well as performance. Humans are complex "wholes," programmed to respond emotionally. No one can perform their jobs apart from their emotions, but excess stress is particularly disruptive to smooth functioning, and it makes concentrated, rational thinking very difficult. "Emotionally intelligent" individuals harness these emotions and use them appropriately.

<u>Management Science and Leadership Studies</u>

Much evidence of Emotional Intelligence comes out of organizations: studies of leadership, management, and performance have, like laboratory research, produced much exciting new information. Here are some interesting findings:

- Studies of "think tanks," where everyone is highly intelligent, reveal that even there, some people outperform others. They are more willing to take on responsibility, are more adaptable, and more easily establish rapport with coworkers. These qualities are considered Emotional-Intelligence qualities that have little to do with IQ or technical competency.
- Research on sales managers indicates that those who are unable to handle stress oversee departments that perform poorly, while those managers who perform better under stress have high sales volume.

- CEOs judged most successful by their peers in some studies were not those rated highest in technical competency but were instead those who scored the highest in a different area: the ability to establish relationships with and inspire others.
- Men and women seem, generally, not to differ in their overall level of Emotional Intelligence. However, research often finds women to be better at empathy and social skills and men stronger in self-confidence and self-control. (These facets of EQ are the subjects of upcoming chapters.)
- Education, gender, hours worked, and geographic area did not predict sales success for those in sales. However, Emotional-Intelligence qualities of empathy, optimism, assertiveness, and self-awareness were highly predictive of sales success. Optimistic salespeople, in fact, sold 37% more insurance and were twice as likely to stick with the job as those who had pessimistic outlooks on life and work.

We make better decisions when we act on information from our feelings, our instincts, and our intuition, as well as on information coming from our rational intellect. It is our emotional brains, after all, that allows us to access memory and assign weight or preference to the choices we face at work and in our personal lives. It is our Emotional Intelligence that guides us in controlling or accessing emotions when we must adapt to change, get along with others, or deal with stress. Performance and leadership in any organizational setting are both influenced by EQ.