Science, Religion and Philosophy

Intelligence: Is It In The Brain Or The Heart?

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Contrary to what we know now, the "organ of intellect" was not always known to be the brain. In fact, before the matter was settled, there were two competing views regarding where the intellect is in the body: the brain or the heart. The most famous of those on one side was Aristotle who was pushing for a cardiocentric (heart-centered) model, which argued that the heart is in fact the organ of intelligence (Frampton, 1991). In his observations, Aristotle noticed that poking the brain of an injured person did not induce pain. He therefore reasoned that the brain is not engaged in perception of any kind. Had he known about pain receptors, I'm sure he would've done a few more tests.

In addition, Aristotle noticed that the body grows cold when the heart stops beating, which led him to assume that the heart produces the body's heat. To protect the heart from overheating, Aristotle assigned the function of cooling the unremitting heart to the brain. Furthermore, by Aristotle's time it was known that human voice is supplied by air exhaled from the lungs. Hence, he reasoned that the heart supplies words and they come out together with voice as they roll out of the chest cavity.

The cardiocentric model of Aristotle's went against the encephalocentric (brain-centered) model of his teacher, Plato, who said that the "eyes, ears, tongue, hands, and feet act in accordance with the discernment of the brain". Although Aristotle's cardiocentric model survived well into the Middle Ages, it eventually gave way to the encephalocentric model when Galen (the father of experimental physiology) showed experimentally the vital role of the brain. For example, cutting through the medulla, which is right above the spinal cord in the brain, can stop respiration. Those words coming from the chest as proposed by Aristotle were shown by Galen to require an intact brain to be able to be produced (Wilson, 2003).

This cardiocentric vs. encephalocentric historical narrative is how it is typically presented in the first chapter of a typical college neuroscience textbook. The professor will discuss this matter in class in a way that usually elicits a few laughs and raised eyebrows from the students as they wonder how ridiculous Aristotle was to think that the heart was the organ of intelligence and how silly his reasons for pushing a cardiocentric model were. What's more surprising is how powerful Aristotle's influence was, given that medical students were taught until the 16th century that nerves, like all veins and arteries, originate from the heart.

After everyone has their laugh at poor old Aristotle, the lecture will proceed to build upon the encephalocentric model and address different models of brain function and how the brain is studied. The heart will be relegated to the human physiology class and discarded as just a muscle pump that gets the blood everywhere in the body, never to be considered again as having anything to do with the mind.

Surprisingly, Aristotle may not have been completely wrong in his belief that the heart is an organ of intelligence. While it most certainly is true that the brain is the major relay center for cognitive function, it seems that the heart is not just a muscle pump, as many believe it to be.

Your heart has its own nervous system that is composed of approximately 40,000 neurons. These neurons are connected differently and more elaborately than elsewhere in the body and while they're capable of detecting circulating chemicals sent from the brain and other organs, they operate independently in their own right. Having its own "mini-brain" is the reason why heart transplants work, given the fact that severed nerve connections do not reconnect in a different body. Furthermore, this elaborate nervous centre in the heart has more functions than simply regulating the electrical activities of the heart to keep it pumping.

Dr. J. Andrew Armour is a neurocardiologist who has shown some fascinating facts about the heart's nervous system. You can review his book "Neurocardiology: Anatomical & Functional Principles" if you're interested in the technical details. For example, while the heart can be influenced by messages

sent from the brain, it doesn't necessarily obey it all the time. Furthermore, the heart's "mini-brain" can send its own signals to the brain and exercise its influence on it. To give one illustration: oxytocin, which is typically referred to as the "love hormone", has been shown to be released not only from the brain, but also from the heart. Oxytocin is not only important for love and bonding, especially for pregnant and lactating mothers, but it also has roles in social behavior, wound healing, learning, memory, and empathy. In short, it is one hormone that affects a very wide variety of important functions.

Now it's time to hold on to your seat and try not to fall over, because if you thought these facts about the heart are surprising, the following will probably make your eyebrows fly off your face. It's generally assumed that learning and memory are a central nervous system function. Meaning, this is a function for that organ inside our heads. However, due to some bizarre, controversial and anomalous observations, there is a growing push towards a systemic memory mechanism. In other words, not to limit intelligence functions to the brain. This came from observations in organ transplant patients – more specifically, heart-transplant recipients.

In a study from 2002, researchers from the University of Arizona and University of Hawaii collaborated to publish a paper titled "Changes in Heart Transplant Recipients that Parallel the Personalities of their Donors". Ten recipients who received heart or heart-lung transplants underwent evaluation through a series of open-ended interviews. These interviews involved the transplant recipients, recipient families or friends, and donor families or friends, in hospitals in various parts of the US. Several parallels were being investigated including, changes in food, music, art, sexual, recreational, and career preferences, as well as specific instances of perceptions of names and sensory experiences related to the donors.

The interview transcripts are beyond astounding to read. There was a case of a straight vegetarian health-consious donor that turned a militant gay McDonalds-loving recipient into a straight vegetarian health food seeking person after the transplant. Another case was of a young donor who was a violin musician that made the older classical-music-hating recipient all of a sudden want to listen to hours of it after surgery. A third case was of a young woman who was a "hell-raiser" all of a sudden picking up her donor's love for music and poetry. She was even able to finish the words to his songs, which she never heard before. A funny one was the 47-year-old man receiving the heart of a 14-year-old girl injured in a gymnastics accident. His wife commented at how he changed after surgery, "Gus is a teenager. No doubt about that. He's a kid – or at least he thinks he's a kid. Even when we're bowling, he yells and jumps around like a fool. He's got this weird laugh now. It's a girl's laugh and we tell him that. He doesn't care."

This study is only an example of many others. Overall, the researchers here found that on average, the recipients picked up two to five parallels per case from the ones they investigated. This is a very high transfer of personality traits that immunosuppressant drugs, stress of surgery, and statistical coincidence cannot explain.

All of us at one point or another have experienced situations where we mentally worked it out, and despite the calculations that show it to be a good thing to be involved in, something was off and it just didn't feel right. Most of the time we realize that our "strange feelings" feeling, or "gut-instinct" was confirmed.

The human body is much more mysterious than reductionist science would like us to believe. While Aristotle's cardiocentric view lost the battle, it hasn't necessarily lost the war. Despite the importance of the brain, the heart seems to be serving as an organ of intelligence in its own right. There is an interesting difference in definition that seems appropriate to point out here. Intelligence is defined as the capacity for learning, reasoning, understanding, and having the aptitude in grasping truths and meanings. It comes from the Latin meaning "faculty of understanding, comprehension, and discerning". Cognition on the other hand is the act or process of knowing and perception, and it comes from the Latin meaning, "a getting to know; acquaintance; and knowledge". The definition implies that intelligence is a higher faculty than cognition, and the question that poses itself in turn becomes:

Is the heart our organ of intelligence, while the brain is our organ of cognition?

P.S. Although the study quoted above does include biases from the researchers involved, this is the nature of science as a whole. Every study has biases that speak of the researchers' inclinations, and therefore when it comes to those studies dealing with something as subjective as personality and motivations, etc., the persistence of that element of subjectivity will guide how the objective results are interpreted. This article is not intended to completely negate or even reduce the importance of the brain. It's just about looking at things from a different perspective. So if you're a brain lover, breathe easy and remember how relatively young the field of neuroscience really is.