

“The Science of Love”
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May 4, 2014

I was originally trained as a scientist, and I find it interesting to look back even a few centuries and read about some of the beliefs and practices of scientists and physicians. Blood letting, for example. Didn't doctors notice that it was killing their patients? A lot of those ideas strike us today as absurd, or maybe quaint would be a nicer way of putting it.

The Greek philosopher Aristotle conducted the first known study of the human body back in the 4th century BCE. He identified the heart as the most important organ, the center of vitality. It was the seat of emotion, intelligence and sensation, he believed. Aristotle taught that the heart controlled all reason, emotion and thoughts.

Three centuries or so later the Roman physician, Galen of Pergamon. Galen theorized that the heart was where emotions took place, while rational thought took place in the brain, and passions originated in the liver.

Since then, obviously a lot of progress has been made in the study of the human body, and human thoughts and emotions. We're taught that our reason, our thoughts and feelings all come from the brain. It's in the brain that our essence seems to reside.

But what about the heart? Think for a moment of all the ways in which we use the word “heart.” A person can be good-hearted, kind-hearted, big-hearted. We may speak in a heartfelt way. If a loved one rejects us, we may feel heart-broken or heartsick. People can be cold-hearted or hard-hearted, like the Egyptian Pharaoh who “hardened his heart” every time the Israelites asked for their freedom. Most cultures around the world include references to the heart which reflect people's feelings.

Are the references in our own culture connecting hearts and feelings just left over from the days before modern science?

Well, I thought I was going to have a definitive answer to that question today, but it seems that the truth is not always as clear as we'd like it to be. There are some claims that research shows that our hearts are, in fact, very connected to our brains and our emotions.

Stephen Harrod Buhner is a writer and self-described "healer" who has ascribed qualities including thought and communication to the heart. What he writes in his book, The Secret Teachings of Plants: the Intelligence of the Heart in the Direct Perception of Nature, is fascinating, and seems to be based on scientific evidence. For example, he states that "between 60 and 65 percent of the cells in the heart are neural cells. These are the same kind as those in the brain and they function in exactly the same way."

At its most basic, he says, the heart is a pump, circulating blood. But he claims that it's much more than that. It's an electromagnetic generator, an endocrine gland, producing and releasing numerous hormones, and a part of the central nervous system.

The heart, according to Buhner, sends electric, magnetic and chemical messages to the brain and throughout the body. All of these have deep impacts on how we think and feel, including our feelings of love. He also says, "Analysis of information flow into the human body has shown that much of it impacts the heart first, flowing to the brain only after it has been perceived through the heart. What this means is that our *experience* of the world is routed first through the heart, which 'thinks' about the experience and then sends the data to the brain for further processing."

The problem I found was Buhner's extreme claims with little reference to actual research.

Steven P. Novella is an American clinical neurologist and assistant professor at Yale University School of Medicine. Novella is best known for his involvement in the skeptical movement –trying to separate "real" science from pseudoscience and poor science –and apparently he does it with great zeal. Commenting on statements similar to Buhner's, he says, "The primary misconception here is to confuse 'neuron' with 'brain cell,' followed by equating brain cells with mind. Neurons are specialized cells of the nervous

system,” he says. “Not all neurons are in the brain. Further, not all neurons contribute directly to the mind – conscious processes – or even subconscious processes beyond some basic sensory feedback to the brain.”

Novella doesn't deny that this feedback can affect our emotions – when something physical is happening to our body we can feel anxious or depressed, or calm and relaxed, or excited. But, love literally coming from the heart? I'm pretty sure Novella would say, “No way.”

Now, we know that standard medicine has its blind spots and limitations. We live in a very left-brained society. There are societies, generally peoples who live in close connection with the earth, in which the intuitive, right brain activity is much more highly developed. And there are people within these communities who say they can literally feel things with their hearts. And if that's their experience, I can't argue with that.

I believe that there are many things science has not yet uncovered, and so even though I have a scientific background, I'm open to possibilities. New things are being discovered every day. Barbara Fredrickson is a professor of psychology and director of the Positive Emotions and Psychotherapy Laboratory at the University of North Carolina in Chapel Hill. She and her research team recently discovered something about the brain and the heart that I think is important news.

For decades, studies have shown that people who are more socially connected tend to live longer and healthier lives. But just how a person's social life affects their health has been a great mystery. Fredrickson recently published a book on the connections between love and science, and she says it can be hard to talk about love in a scientific context because of peoples' pre-existing ideas about love.

“Love is not romance,” she says. It's not desire or even the special bond you feel with your family or significant others. All the research that Fredrickson and her group have done boils down to this: “Love, as your body experiences it, is a micro-moment of connection shared with another.” (repeat)

Fredrickson and her team randomly assigned one group of people to learn ways to create more micro-moments of love in daily life. They then tested the function

of the nerve in each person which connects the brain to the heart, called the vagus nerve. They found that the function of that vagus nerve was lastingly improved.

Fredrickson says that “This discovery provides a new window into how micro-moments of love serve as nutrients for your health.” Basically, love fortifies the connection between the brain and the heart, and that makes us healthier.

But there’s more. It turns out that our micro-moments of love not only make us healthier, but our improved health and well-being build our capacity for love. “Little by little, love begets love by improving your health. And health begets health by improving your capacity for love,” says Fredrickson.

We tend to think of love as something we feel toward our loved ones. In reality, we can experience micro-moments of connection with anyone –whether that person is our soul mate or a total stranger.

In those moments of connection, Fredrickson says that there’s a synchrony that emerges between two people. If we really click with someone, our gestures and expressions begin to mirror each other. And inside, our biochemistries and even our neural firings are doing the same thing, resonating in measurable patterns. And what is driving this emergent synchrony? It’s the eyes. Through the meeting of the eyes, we pick up on each other’s feelings –those moments that Fredrickson refers to as “positivity resonance.” Love, then, is a biological wave of good feeling and mutual care.

Does that good feeling mean we always have to be happy? Well, when we think about it, we know that can’t be true. Because we can experience moments of love even as we sit with someone who is suffering. Love can be caring and compassion. Love doesn’t require us to ignore sadness or difficulty, or other life challenges. No matter what’s happening in our lives, we can create a compassionate connection through some element of kindness, empathy or appreciation.

Understanding love as micro-moments of connection between two people is powerful. For one thing, we have the power to offer love everywhere we go. I know it may sound corny, but if you’ve never tried it, try it. Think of something

kind or complimentary to say to the cashier at the grocery store, the customer service person on the phone, and whomever else you encounter.

I once found myself on the phone with a young woman working at some customer service center somewhere in the world. She had a foreign accent and I have no idea where she was from. But, I try to remember how difficult English is to learn as a second language. In this conversation, I was thinking of this, and I said to her, “You speak English very well.” I’ll never forget the emotion in her voice when she replied, “Thank you! You just made my day!” Five little words, spoken sincerely, and I made her day! I mean, how great is that, to be able to share a small compliment and to make someone’s day?

Secondly, we have the power to make potentially dramatic changes in our relationships with the people we love. When two people are in a loving relationship, after awhile, it’s common for one or both of them to take their love for granted, to assume that the constant steady force of their love will always endure. This is a mistake. Love needs to be actively cultivated every day. Imagine saying to the person you care most about, every time they do something that’s helpful, “Thank you. I really appreciate that!” Imagine going out of your way, every single day, to compliment your partner, or to do something kind for your partner.

The same idea holds true with our family members. Making those micro-moment connections with our parents, our children, our siblings and other relatives also has the potential to dramatically change our relationships with them.

The science of love may be complicated, it may be controversial, but the practice of love is fairly simple. It takes attention, it takes imagination, and I think it takes courage, at least at first. But as we create moment after moment after moment of connection with the other human beings around us, we can make huge changes in our own lives as well as in the lives of others.

When St. Exupéry wrote, “One sees clearly only with the heart,” no one can say for sure, but he may have been using the heart as a metaphor for love: we only see clearly when we feel love and compassion. And, “The essential is invisible to the eyes”: love is the essential and is ultimately beyond scrutiny, scientific or otherwise.