Neuroscientist Matthew Lieberman says love really does hurt

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The term ‘love hurts’ is real, says the father of neuroscience, Matthew Lieberman. Source: Getty Images

I remember my first break-up with a man I had been deeply in love with and who, after three years, couldn’t return that love.

It was as if I’d been hit by an oncoming bus; and the bus had driven over my head back and forth. I would wake up in the morning with a horrid feeling in the pit of my stomach as I came back into awareness and remembered who I was and what had happened.

For millennia songs have been written about heartbreak. Crooners sobbing and emoting into the microphone is the staple diet of the music world. It all seems hyper-dramatic, but in recent times neuroscientists have made a startling discovery. According to former Harvard and now UCLA professor and neuroscientist Matthew Lieberman, considered to be the “father of social neuroscience”, the same areas of the brain that govern physical pain fire up during emotional pain.

Neuroscientists around the world have observed volunteers during induced emotional and then physical pain. What triggers in the brain when a volunteer sees an ex who has betrayed them? Loss or social rejection of any kind is comparable to physical damage.

Lieberman, when he was visiting Australia a few years ago, told audiences, “The term ‘love hurts’ is not just a metaphor. It’s real.” Like a broken leg, it can derail us for weeks on end. He observed that students dealing with emotional pain are debilitated and incapable of learning for months.

Lieberman went even further, controversially claiming that social rejection is equivalent in damage to our health to smoking two packets of cigarettes a day.

He has been involved in studies using neuroimaging brain scanners to show that brain regions involved in processing physical pain are also involved in emotional pain and social anguish.

Lieberman and a team of researchers headed by Naomi Eisenberger of the University of California observed the areas of the brain that become active during physical pain: the anterior cingulate cortex, which serves as an alarm for distress, and the right ventral prefrontal cortex, which regulates it. Then they created social pain to see how the brains of subjects responded.

In one experiment volunteers were told to play Cyberball — a virtual reality game of catch — while under a scanner. Participants were told that two other people would be playing as well (which was not true, it was just a computer program). At first the ball was thrown to them, but then they were forced to watch as the other two “players” went on and on tossing the virtual ball to each other, but excluding them.

When the researchers analysed the data, the team found “a pattern of activations very similar to those found in studies of physical pain”. Social exclusion and emotional distress made both ACC and RVPFC activity increase.

The researchers claimed in academic journals that this was a breakthrough in why it hurt so much to lose love. Taking this research further, a group of psychological researchers, led by C. Nathan DeWall of the University of Kentucky, tested whether acetaminophen — the main ingredient in over-the-counter pain reliever Tylenol — could relieve emotional pain.

To put the research very simplistically, in one test when participants were excluded from Cyberball, those in the acetaminophen group showed significantly lower activity in their ACC than those in the placebo group. The authors concluded in a 2010 issue of Psychological Science that the painkiller at least temporarily mitigated social-pain-related distress. However, researchers are adamant that no one should attempt this outside of controlled lab tests, as further verification is needed.
Research into this sphere began in the late 1970s. Association for Psychological Science fellow Jaak Panksepp, an animal researcher, found infant dogs cried when they were separated from their mothers, but the distress calls of the puppies — and other species later used in experiments — were much less intense in those that had been given a low dose of opiates (morphine), as reported in the peer-reviewed academic journal *Biological Psychiatry*.

But we have nature’s own internal painkillers too, which can be induced in our bodies in times of pain or distress. Recent experiments showed that women holding the hand of their loved ones, or looking at a photo, suffered less physical pain.

All this research goes a long way to help us to understand why certain people drink, take drugs or engage in sexual addiction to relieve the ache of a broken heart. We are self-medicating, anaesthetising ourselves, from a very real form of physical pain through various opiates: drowning our sorrows.

There are also natural chemicals involved in the pleasure process, and the drying up of nature’s opiates (dopamine, serotonin, endocannabinoids dubbed “the bliss molecule”) can lead to withdrawal that prompts some to go looking for a new fix.

Lieberman says the reason for emotional pain may look like a biological mishap, but it is evolutionary commonsense. Nature is on our side in helping to preserve the species. In primitive times humans needed social bonds to survive predators, obtain food, and nurse children. Friends and community were essential. We evolved to be linked to the social support system that protects us and each other by experiencing separation or rejection as a wound.

Thus the brain adapted over time, conditioning us to avoid the shock of separation — like training Pavlov’s dog.

Lieberman says mammals especially need social connection because we rear our offspring. “This little person is utterly incapable of looking after itself. The child survives because every time it cries there is someone who has a strong urge to move towards it, not away, despite the smell and loud noise.”

True enough. As a new mother, I remember feeling powerful physical pain when I wasn’t close to my baby. Similarly, says Lieberman, the child is also programmed to cry and feel pain when separated from the caregiver.

He says emotional pain helps us stay bonded as a cohesive social group. Which is why there are so many humans helping others in the teaching and caring industries, or philanthropy, trying to improve the lives of others. “We are wired to care for others, and be cared for.”

Another take on it comes from psychiatrist and researcher Stuart Brown, author of *Play*. According to Brown, primitive humans lived or died on the basis of social networks. But rather than analysing social evolution on the basis of the aversion to pain, he takes a look at the positive effect that pleasure has on the species.

With the support of the National Geographic Society he has observed animal-play in the wild, and deduced play is an evolved behaviour important for the wellbeing and survival of animals, especially those of higher intelligence.

Emotionally joyful social experiences such as being in love, games, rough-housing, flirtation, and laughing are crucial to the creation of synaptic connections in the brain that induce physical pleasure from social contact.
This makes it desirable to stay part of the tribe. In the chemical soup that is our brain, science is proving one important point: if it can be broken, it can also be fixed.