

Los Angeles Times

Hurt Feelings? Your Brain feels Your Pain.
Pain and heartache are bound together in our brains.

March 29, 2011

Like a jab in the arm with a red-hot poker, social rejection hurts. Literally. A new study finds that our brains make little distinction between the sting of being rebuffed by peers -- or by a lover, boss or family member -- and the physical pain that arises from disease or injury. The new findings are published this week in the Proceedings of the National Academy of Sciences.

Researchers from the University of Michigan, Columbia University and the University of Colorado put 40 individuals who were brokenhearted by a recent breakup into a brain scanner and watched as each dumpee gazed upon a photo of his or her dumper and pondered the hurt he or she felt at having been spurned. In separate scanning sessions, the subjects had the laboratory equivalent of a hot poker held to the forearm (an 8 on a 10-point pain scale).

The functional magnetic resonance imaging (fMRI) scanned the subjects and showed their brains responding both to emotional hurt and physical pain with increased blood flow to a wide range of common regions -- a clear sign of "neural overlap" in the way we process and experience social and physical pain.

Included among the areas that showed heightened activity as subjects contemplated their emotional pain were two brain areas that neuroscientists had heretofore associated almost exclusively with physical pain. (For the neuro-minded, those areas of overlap are OP-1, the tail end of the parietal lobe's operculo-insular region above and behind your ears, and the dorsal posterior insula, just above your ears.)

Columbia professor of psychology Edward Smith said the team of researchers "couldn't get over how beautiful the results were." In the two new brain regions where they discerned overlap during the physical and emotional pain conditions, the intensity of activation in those areas virtually mirrored each other, he said.

The study is the latest in a still-new body of research (the subject of an article to run in an April

4, 2011 special issue of the Los Angeles Times' Health section on pain). A handful of studies has

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03.29.2011

established an increasingly close relationship between our experience of physical pain and the painful emotions that come with feeling socially rejected.

But several of those studies suggested that the "neural overlap" extended only to areas where humans process the emotional experience of pain--that getting poked with a stick in the eye naturally makes us feel sad, mad and emotionally distressed. The latest study shows there's more to the story than that: that getting dumped, disrespected or excluded feels--literally--like pain, but a kind of pain whose physical source is not so evident.

Naomi Eisenberger called the study "nice," adding that its findings extend our understanding of overlapping social and physical pain circuits in the brain by putting the same subjects through both and watching the result. That may help to explain why so many studies are finding that people who feel a rich sense of social connection are live longer and healthier lives than those who are lonely or socially isolated, said Eisenberger.