

# Study suggests regulation of empathy for pain is grounded in same brain mechanism as real pain

29 September 2015, by Bob Yirka



Nurse gives injection to woman, New Orleans, 1941. Credit: Wikipedia.

(Medical Xpress)—A team of European researchers has found evidence that supports a theory that suggests the mechanism in the brain that controls empathy for others experiencing pain is grounded in the same mechanism that responds to actual pain. In their paper published in *Proceedings of the National Academy of Sciences*, the group describes the study they carried out with volunteers and why they believe their findings add credence to the theory.

Prior research has found that similar parts of the [brain](#) become active when someone is experiencing [pain](#) as when they are witnessing it in others. In this new study, the team wanted to find out if they could show that the same neural pathways are used for both experiences. To do so, they enlisted the assistance of 100 people willing to allow themselves to be subjected to a small

amount of pain while having their brains studied with an fMRI machine. The researchers split the volunteers into two groups; one group was given a pill they thought was a painkiller, but was actually a [placebo](#) while the other group received no pill at all. The idea of using the placebo was to cause the brain to function in the same way it does when there is an opioid present, without there actually being any drugs present to skew the results.

Both groups of volunteers were asked to give a number as a means of rating the degree of pain they felt from a small electric shock and also to offer a similar number for people getting the same shock in another room without the pain pill. Not surprisingly, those that received the placebo reported experiencing less pain than the control group, but they also rated the degree of pain for the people in the other room as feeling less pain as well. The fMRI's revealed less pain activation in brain areas for those given a placebo for both their own real pain and for the empathy they felt for others.

The team followed the first experiment with a second that was the same as the first except that some of the volunteers also received the drug naltrexone—it blocks the pain damping effects in the neural network, including the placebo effect. Those given this drug reported feeling more pain and felt that the others in another room felt more pain as well.

Taken together, the results of the experiments suggest that the two pain processes are driven by the same mechanism in the brain, the team claims.

**More information:** "Placebo analgesia and its opioidergic regulation suggest that empathy for pain is grounded in self pain." *PNAS* 2015 ; published ahead of print September 28, 2015, [DOI:](#)

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### **Abstract**

Empathy for pain activates brain areas partially overlapping with those underpinning the first-hand experience of pain. It remains unclear, however, whether such shared activations imply that pain empathy engages similar neural functions as first-hand pain experiences. To overcome the limitations of previous neuroimaging research, we pursued a conceptually novel approach: we used the phenomenon of placebo analgesia to experimentally reduce the first-hand experience of pain, and assessed whether this results in a concomitant reduction of empathy for pain. We first carried out a functional MRI experiment (n = 102) that yielded results in the expected direction: participants experiencing placebo analgesia also reported decreased empathy for pain, and this was associated with reduced engagement of anterior insular and midcingulate cortex: that is, areas previously associated with shared activations in pain and empathy for pain. In a second step, we used a psychopharmacological manipulation (n = 50) to determine whether these effects can be blocked via an opioid antagonist. The administration of the opioid antagonist naltrexone blocked placebo analgesia and also resulted in a corresponding "normalization" of empathy for pain. Taken together, these findings suggest that pain empathy may be associated with neural responses and neurotransmitter activity engaged during first-hand pain, and thus might indeed be grounded in our own pain experiences.

[Press release](#)

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