

How you feel what another body feels

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Empathy's surprising roots in the sense of touch

When a friend hits her thumb with a hammer, you don't have to put much effort into imagining how this feels. You know it immediately. You will probably tense up, your "Ouch!" may arise even quicker than your friend's, and chances are that you will feel a little pain yourself. Of course, you will then thoughtfully offer consolation and bandages, but your initial reaction seems just about automatic. Why?



Do you feel "touched" by the plight of another? Image: iStock/Valua Vitaly

Neuroscience now offers you an answer: A recent line of research has demonstrated that seeing other people being touched activates primary sensory areas of your brain, much like experiencing the same touch yourself would do. What these findings suggest is beautiful in its simplicity—that you literally "feel with" others.

There is no denying that the exceptional interpersonal understanding we humans show is by and large a product of our emotional responsiveness. We are automatically affected by other people's feelings, even without explicit communication. Our involvement is sometimes so powerful that we have to flee it, turning our heads away when we see someone get hurt in a movie. Researchers hold that this capacity emerged long before humans evolved. However, only quite recently has it been given a name: A mere hundred years ago, the word "Empathy"—a combination of the Greek "in" (em-) and "feeling" (pathos)—was coined by the British psychologist E. B. Titchener during his endeavor to translate the German *Einfühlungsvermögen* ("the ability to feel into").

Despite the lack of a universally agreed-upon definition of empathy, the mechanisms of sharing and understanding another's experience have always been of scientific and public interest—and particularly so since the introduction of "mirror neurons." This important discovery was made two decades ago by Giacomo Rizzolatti and his co-workers at the University of Parma, who were studying motor neuron properties in macaque monkeys. To compensate for the tedious electrophysiological recordings required, the monkey was occasionally given food rewards. During these incidental actions something unexpected happened: When the monkey, remaining perfectly still, saw the food being grasped by an experimenter in a specific way, some of its motor neurons discharged. Remarkably, these neurons normally fired when the monkey itself grasped the food in this way. It was as if the monkey's brain was directly mirroring the actions it observed. This "neural resonance," which was later also demonstrated in humans, suggested the existence of a special type of "mirror" neurons that help us understand other people's actions.

Do you find yourself wondering, now, whether a similar mirror mechanism could have caused your pungent empathic reaction to your friend maltreating herself with a hammer? A group of scientists led by Christian Keysers believed so. The researchers had their participants watch short movie clips of people being touched, while using functional magnetic resonance imaging (fMRI) to record their brain activity. The brain scans revealed that the somatosensory cortex, a complex of brain regions processing touch information, was highly active during the movie presentations—although participants were not being touched at all. As was later confirmed by other studies, this activity strongly resembled the somatosensory response participants showed when they were actually touched in the same way. A recent study by Esther Kuehn and colleagues even found that, during the observation of a human hand being touched, parts of the somatosensory cortex were particularly active when (judging by perspective) the hand clearly belonged to another person.

These facts about the brain are fascinating, but may seem a bit removed from the way we think about empathy. But consider a study published earlier this year, which provides evidence that this sensory mirroring is in fact linked to our self-reported ability to empathize with others. Michael Schaefer and his colleagues also scanned their participants' brains while they were watching movie clips of touches applied to human hands. Consistent with earlier results, participants' primary somatosensory cortex (the brain's representation of the body surface) responded vicariously to the observation of touch. However, participants also completed the Interpersonal Reactivity Index (IRI), a paper-and-pencil test measuring four specific dimensions of our ability to empathize with others. And guess what? The higher participants scored on the "Perspective taking" subscale of the IRI, the stronger their primary somatosensory cortex reacted to observed touch. These data suggest that the brain's mirroring responses are in fact associated with personal empathic ability. How much you empathize with other people seems to reflect how strongly your brain—your primary somatosensory cortex—"feels with" them when you see them being touched.

Of course, all these claims require further investigation. And, of course, empathy is a complex phenomenon. But exploration of the individual processes working in the background of our empathic reactions is likely to give us new and exciting insights into this wonderful capability. So the next time bad luck strikes, and you see a friend experiencing an injury, remember, with genuine appreciation, that both of your brains respond in remarkable harmony. If this is not true empathy, I don't know what is.

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