Scientists Say Everyone Can Read Minds

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Empathy allows us to feel the emotions of others, to identify and understand their feelings and motives and see things from their perspective. How we generate empathy remains a subject of intense debate in cognitive science.

Some scientists now believe they may have finally discovered its root. We're all essentially mind readers, they say.

The idea has been slow to gain acceptance, but evidence is mounting.

Mirror Neurons

In 1996, three neuroscientists were probing the brain of a macaque monkey when they stumbled across a curious cluster of cells in the premotor cortex, an area of the brain responsible for planning movements. The cluster of cells fired not only when the monkey performed an action, but likewise when the monkey saw the same action performed by someone else. The cells responded the same way whether the monkey reached out to grasp a peanut, or merely watched in envy as another monkey or a human did.

Because the cells reflected the actions that the monkey observed in others, the neuroscientists named them "mirror neurons."

Later experiments confirmed the existence of mirror neurons in humans and revealed another surprise. In addition to mirroring actions, the cells reflected sensations and emotions.

"Mirror neurons suggest that we pretend to be in another person's mental shoes," says Marco Iacoboni, a neuroscientist at the University of California, Los Angeles School of Medicine. "In fact, with mirror neurons we do not have to pretend, we practically are in another person's mind."

Since their discovery, mirror neurons have been implicated in a broad range of phenomena, including certain mental disorders. Mirror neurons may help cognitive scientists explain how children develop a theory of mind (ToM), which is a child's understanding that others have minds similar to their own. Doing so may help shed light on autism, in which this type of understanding is often missing.

Theory Theory

Over the years, cognitive scientists have come up with a number of theories to explain how ToM develops. The "theory theory" and "simulation theory" are currently two of the most popular.

Theory theory describes children as budding social scientists. The idea is that children collect evidence -- in the form of gestures and expressions -- and use their everyday understanding of people to develop theories that explain and predict the mental state of people they come in contact with.

Vittorio Gallese, a neuroscientist at the University of Parma in Italy and one of original discovers of mirror neurons, has another name for this theory: he calls it the "Vulcan Approach," in honor of the Star Trek protagonist Spock, who belonged to an alien race called the Vulcans who suppressed their emotions in favor of logic. Spock was often unable to understand the emotions that underlie human behavior.

Gallese himself prefers simulation theory over this Vulcan approach.

Natural Mind Readers

Simulation theory states that we are natural mind readers. We place ourselves in another person's "mental shoes," and use our own mind as a model for theirs.

Gallese contends that when we interact with someone, we do more than just observe the other person's behavior. He believes we create internal representations of their actions, sensations and emotions within ourselves, as if we are the ones that are moving, sensing and feeling.

Many scientists believe that mirror neurons embody the predictions of simulation theory. "We share with others not only the way they normally act or subjectively experience emotions and sensations, but also the neural circuits enabling those same actions, emotions and sensations: the mirror neuron systems," Gallese told LiveScience.

Gallese points out, however, that the two theories are not mutually exclusive. If the mirror neuron system is defective or damaged, and our ability to empathize is lost, the observe-and-guess method of theory theory may be the only option left. Some scientists suspect this is what happens in autistic people, whose mental disorder prevents them from understanding the intentions and motives of others.

Tests Underway

The idea is that the mirror neuron systems of autistic individuals are somehow impaired or deficient, and that the resulting "mind-blindness" prevents them from simulating the experiences of others. For autistic individuals, experience is more observed than lived, and the emotional undercurrents that govern so much of our human behavior are inaccessible. They guess the mental states of others through explicit theorizing, but the end result is a list -- mechanical and impersonal -- of actions, gestures and expressions void of motive, intent, or emotion.

Several labs are now testing the hypothesis that autistic individuals have a mirror neuron deficit and cannot simulate the mental states of others.

One recent experiment by Hugo Theoret and colleagues at the University of Montreal showed that mirror neurons normally active during the observation of hand movements in non-autistic individuals are silent in those who have autism.

"You either simulate with mirror neurons, or the mental states of others are completely precluded to you," said Iacoboni.

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