

People watching: Different brain pathways responsible for person, movement recognition

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Credit: Wikimedia Commons

Each time you see a person that you know, your brain seemingly effortlessly and immediately recognizes that person by his or her face and body. Just as easily, your brain understands a person's movements, allowing you to perform critical skills such as interpreting social cues,

detecting threats and determining the difference between skipping and jumping.

Researchers from UCL (University College London), Carnegie Mellon University and the University of California, San Diego have found that the ability to understand different movements, such as walking, skipping and jumping, engages different brain mechanisms from those that recognize who is initiating the action. Published in the Jan. 12 issue of the *Proceedings of the National Academy of Sciences (PNAS)*, the study illustrates for the first time how individuals with prosopagnosia, or face blindness, are still able to recognize other people's movements.

"We know from earlier studies that the processing route in the brain that leads to person recognition is also involved in recognizing a person's movements, but it was not clear whether this involvement was really critical for the understanding of the movement," said Sharon Gilaie-Dotan, a neuroscientist from the UCL Institute of Cognitive Neuroscience and the study's lead author. "Our study shows that it is not. The findings show that when we see a person moving, our brain extracts the information about the person's identity and the person's movements into two different routes. For those with [brain damage](#) to the 'identity' route, they are still able to use the kinematic information to understand the movements. And, patients with damage to the 'movement' route have difficulty with understanding movements."

For the study, six patients with brain damage that prevents them from recognizing people by their faces were tested with sensitive point-light displays made out of dots that move, similar to stick figures, against three different control groups. Even the patients who were significantly impaired at facial recognition were easily able to recognize the [human movements](#) in the dot experiments, performing as well as the normal participants.

Marlene Behrmann, the George A. and Helen Dunham Cowan Professor of Cognitive Neuroscience at Carnegie Mellon and co-director of the Center for the Neural Basis of Cognition, said discovering that there is a neural process for comprehending actions independent of the actor also explains how it is possible to understand what people are doing from very far away without recognizing who they are due to the distance.

"Such investigations of individuals with brain damage provide a window into [brain function](#) and enable us to determine what brain areas play a central role in behavior," Behrmann said. "They also allow us to challenge some of the existing findings and clarify the correspondences between [brain](#) function and behavior."

More information: Ventral aspect of the visual form pathway is not critical for the perception of biological motion , *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1414974112

Provided by Carnegie Mellon University

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