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Barrow researchers unravel illusion

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Barrow Neurological Institute researchers Jorge Otero-Millan, Stephen Macknik, and Susana Martinez-Conde share the recent cover of the *Journal of Neuroscience* in a compelling study into why illusions trick our brains. Barrow is part of St. Joseph's Hospital and Medical Center in Phoenix.

The study, led by Martinez-Conde's laboratory, explores the neural bases of illusory motion in Akiyoshi Kitaoka's striking visual illusion, known as the "Rotating Snakes." Kitaoka is a Japanese psychology professor who specializes in visual illusions of geometric shapes and motion illusions.

The study shows that tiny eye movements and blinking can make a geometric drawing of "snakes" appear to dance. The results help explain the mystery of how the Rotating Snakes illusion tricks the brain.

"Visual illusions demonstrate the ways in which the brain creates a mental representation that differs from the physical world," says Martinez-Conde. "By studying illusions, we can learn the mechanisms by which the brain constructs our conscious experience of the world."

Earlier studies of the "Rotating Snakes" indicated the perception of motion was triggered by the eyes moving slowly across the illusion. But by tracking eye movements in eight volunteers, the vision neuroscientists found a different explanation: fast eye movements called "saccades," some of which are microscopic and undetectable by the viewer, drive the illusory motion.

Participants lifted a button when the snakes seemed to swirl and pressed down the button when the snakes appeared still. Right before the snakes appeared to move, participants tended to produce blinks, saccades and/or microsaccades, and right before the snakes stopped, participants' eyes tended to remain stable, Otero-Millan, Macknik, and Martinez-Conde report in the April 25th Journal of Neuroscience cover story.

"Studying the mismatch between perception and reality may lead to a deeper understanding of the mind," says Martinez-Conde. "The findings from our recent study may help us to understand the neural bases of motion perception, both in the normal brain, and in patients with brain lesions that affect the perception of motion. This research could aid in the design of neural prosthetics for patients with brain damage."

Provided by St. Joseph's Hospital and Medical Center

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