Neuroscientists find greater complexity in how we perceive motion

5 December 2011

How we perceive motion is a significantly more complex process than previously thought, researchers at New York University's Center for Neural Science, Stanford University and the University of Washington have found. Their results, which appear in the journal *Current Biology*, show that the relationship between the brain and visual perception varies, depending on the type of motion we are viewing.

Neuroscientists have posited that our perception of motion is derived from a relatively simple process-that is, it relies on a single cortical area in the brain. This region, MT, has a well-established role in processing information about moving visual objects. However, less clear is the scope of its influence-does it dictate our ability to detect all types of motion or is its function more limited or, perhaps, more nuanced?

With this in mind, the NYU-led team examined how the visual system processes two types of motion: local motion, which involves tracking signals that fall within a small retinal area, and global motion, in which several movements are integrated over larger areas. Specifically, they monitored activity in MT to determine if its neurons were active in response to both types of motion.

In normal scenes, local and global motion are normally in agreement. Here, the researchers conducted experiments in which macaque monkey and human subjects watched specially crafted patterns in which the local and global motion information were in competition. The researchers made physiological and perceptual measurements of brain activity.

Their results showed notable differences in how the visual system functions in processing local and global motion. They found that neuronal activity in MT was controlled by the local motion in the stimulus and unaffected by global motion. Under the same conditions, though, humans' perceptual responses were dominated by global motion, which means that their responses were determined by a second brain mechanism that encodes global motion, whose nature is currently unknown.

J. Anthony Movshon, director of the Center for Neural Science and the paper's senior author, says that the work opens a window for further study: "While comprehending the specifics of this process requires more work, it's clear that motion perception does not depend on a single cortical brain area, but, rather, reflects the action and interaction of multiple mechanisms. We now have new tools to help us identify and study brain systems that are currently unknown."

Provided by New York University

APA citation: Neuroscientists find greater complexity in how we perceive motion (2011, December 5) retrieved 18 May 2021 from https://medicalxpress.com/news/2011-12-neuroscientists-greater-complexity-motion.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.