

Researchers uncover behavioral process anticipating the results of rapid eye movements

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A team of researchers has demonstrated that the brain predicts consequences of our eye movements on what we see next. The findings, which appear in the journal *Nature Neuroscience*, have implications for understanding human attention and applications to robotics.

The study was conducted by researchers at University Paris Descartes, New York University's Department of Psychology, and Ludwig-Maximilian University in Munich.

Our eyes jump rapidly about three times each second to capture new visual information, and with each jump a new view of the world falls onto the retina—a layer of visual receptors on the back of the eye. However, we do not experience this jerky sequence of images; rather, we see a stable world.

In the *Nature Neuroscience* study, the researchers examined how [visual attention](#) is redeployed just before the eye movement in order to keep track of targets and prepare for actions towards these target's locations following the eye movement.

In their experiments, the researchers asked human subjects to visually track a series of objects—six grey squares located in different areas of the subjects' field of vision—while they were making a sequence of rapid eye movements. To monitor the deployment of visual attention, the

researchers had the subjects detect a tilted slash among vertical slashes presented at only one of those six locations. The researchers gauged the subjects' ability to detect the orientation of the tilted slash as a way of monitoring which locations received more attention just before the eye movement.

Their results showed that just before the eyes move to a new location, attention is drawn to the targets of interest and also shifted to the locations that the targets will have once the eyes had moved. This process speeds up subsequent eye movements to those targets.

"Our results show that shifts of visual attention precede rapid eye movements, improving accuracy in identifying objects in the visual field and speeding our future actions to those objects," explained Martin Rolfs, one of the study's co-authors and a post-doctoral fellow in NYU's Department of Psychology.

Provided by New York University

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