

# How do our eyes stay focused on what we reach for? Researchers uncover how our gaze is 'anchored' in the brain

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Keeping our eyes focused on what we reach for, such as fielding a ground ball on the baseball field, may appear seamless. But, in fact, it is due to a complex neurological process involving intricate timing and coordination. In a newly published study, a team of researchers sheds additional light on the machinations that ensure we don't look away from where we are reaching. Pictured is NYU shortstop Zane Baker ('22). Credit: NYU Athletic Communications

Keeping our eyes focused on what we reach for, whether it be an item at the grocery store or a ground ball on the baseball field, may appear seamless, but, in fact, is due to a complex neurological process involving intricate timing and coordination. In a newly published study in the journal *Nature*, a team of researchers sheds additional light on the machinations that ensure we don't look away from where we are reaching.

The work centers on a form of coordinated looking and reach called "gaze anchoring"—the temporary stoppage of eye movements in order to coordinate reaches.

"Our results show that we anchor our gaze to the target of the reach movement, thereby looking at that target for longer periods," explains Bijan Pesaran, a professor at NYU's Center for Neural Science and one of the paper's authors. "This is what makes our reaches much more accurate. The big question has been: How does the [brain](#) orchestrate this kind of natural behavior?"

The study, conducted with Maureen Hagan, a neuroscientist at Australia's Monash University, explores the frequently studied but not well understood process of gaze anchoring—in particular, how different regions of the brain communicate with each other.

To examine this phenomenon, the scientists studied [brain activity](#) in the arm and eye movement regions of the brain at the same time as [non-human primates](#) performed a sequence of eye and arm movements. The first movement was a coordinated look-and-reach to a target. Then, as little as 10 milliseconds later, a second target was presented that subjects needed to look at as quickly as possible. This second eye movement revealed the gaze anchoring effect. These movements are similar to those made when changing the radio while driving and attending to a [traffic light](#)—if you quickly look away from the radio to the traffic light,

you might not select the right channel.

Their results showed that, during [gaze](#) anchoring, neurons in the part of the brain—the parietal reach region—used for reaching work to inhibit neuron activity in the part of the brain—the parietal saccade region—used for eye movements. This suppression of neuron firing serves to inhibit eye [movement](#), keeping our eyes centered on the target of our reach, which then enhances the accuracy of what we're grasping for. Importantly, the scientists note, the effects were tied to patterns of brain waves at 15-25 Hz, called beta waves, that organize neural firing across the different regions of the brain.

"Beta waves have been previously linked to attention and cognition, and this study reveals how beta activity may control inhibitory brain mechanisms to coordinate our natural behavior," explains Pesaran.

By further illuminating the neurological processes of coordinated looking and reaching, tying them to inhibitory beta waves, this study offers the potential to better understand afflictions of attention and executive control that orchestrate natural behaviors like coordinated looking and reaching.

**More information:** Bijan Pesaran, Modulation of inhibitory communication coordinates looking and reaching, *Nature* (2022). [DOI: 10.1038/s41586-022-04631-2](https://doi.org/10.1038/s41586-022-04631-2).  
[www.nature.com/articles/s41586-022-04631-2](https://www.nature.com/articles/s41586-022-04631-2)

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