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# Revealing Oculomotor Tension Between Inhibition and Capture During Free Viewing

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Exploring a visual scene is a fundamental human behavior that supports understanding and navigation. During this process, unexpected events may appear in the visual periphery, requiring rapid, coordinated responses. To support this, the visual and oculomotor systems operate in a continuous loop of perception and action —yet before attention and gaze can shift toward new stimuli, this loop is often momentarily interrupted. A central question is whether interruption or reorientation more readily gains control of the system. We tested this in two free-viewing experiments. In Experiment 1, participants searched for a small, low-salience purple dot within natural scenes. During the search, a sudden-onset black dot appeared randomly to the left or right of gaze. This transient reliably induced saccadic inhibition —indicating interruption—beginning approximately 100 ms after onset. Notably, saccades were biased toward the transient —indicating reorientation— during and shortly after the inhibition window, with a slight delay. In Experiment 2, the transient appeared along the vertical meridian, either above or below fixation. Again, we observed robust saccadic inhibition at ~100 ms post-onset, accompanied by a directional bias in saccades. Interestingly, transients above fixation elicited stronger capture effects than those below, aligning with known asymmetries in visuomotor sensitivity. These findings support the idea that interruption precedes reorientation: early sensory signals can transiently override and pause ongoing motor plans. We propose that subcortical or premotor oculomotor structures briefly dominate the competition between endogenous and exogenous control, biasing the system toward salient input even before full attentional shifts are complete.

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No

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