

Attentional modulation of eye torsion responses.

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Eye movements generally have both reflexive and voluntary aspects, but torsional eye movements are usually thought of as a reflexive response to image rotation around the line of sight (torsional OKN) or to head roll (torsional VOR). In this study we asked whether torsional responses could be modulated by attention in a case where two stimuli rotated independently, and whether attention would influence the latency of responses. The display consisted of rear-projected radial “pinwheel” gratings, with an inner annulus segment extending from the center to 22 degrees eccentricity, and an outer annulus segment extending from 22 degrees out to 45 degrees eccentricity. The two segments rotated around the center in independent random walks, stepping randomly 4 degrees clockwise or counterclockwise at 60 Hz. Subjects were asked to attend to one or the other while keeping fixation steady at the center of the display. To encourage attention on one or the other segment of the display, subjects were asked to move a joystick in synchrony with the back and forth rotations of one part of the image while ignoring the other. Eye torsion was recorded with the scleral search coil technique, sampled at 500 Hz. All four subjects showed roughly 50% stronger torsion responses to the attended compared to unattended segments. Latency varied from 100 to 150 msec across subjects and was unchanged by attention. These findings suggest that attention can influence eye movement responses that are not typically under voluntary control.