Supporting Information for

Superior colliculus encodes visual saliency during smooth pursuit eye movements

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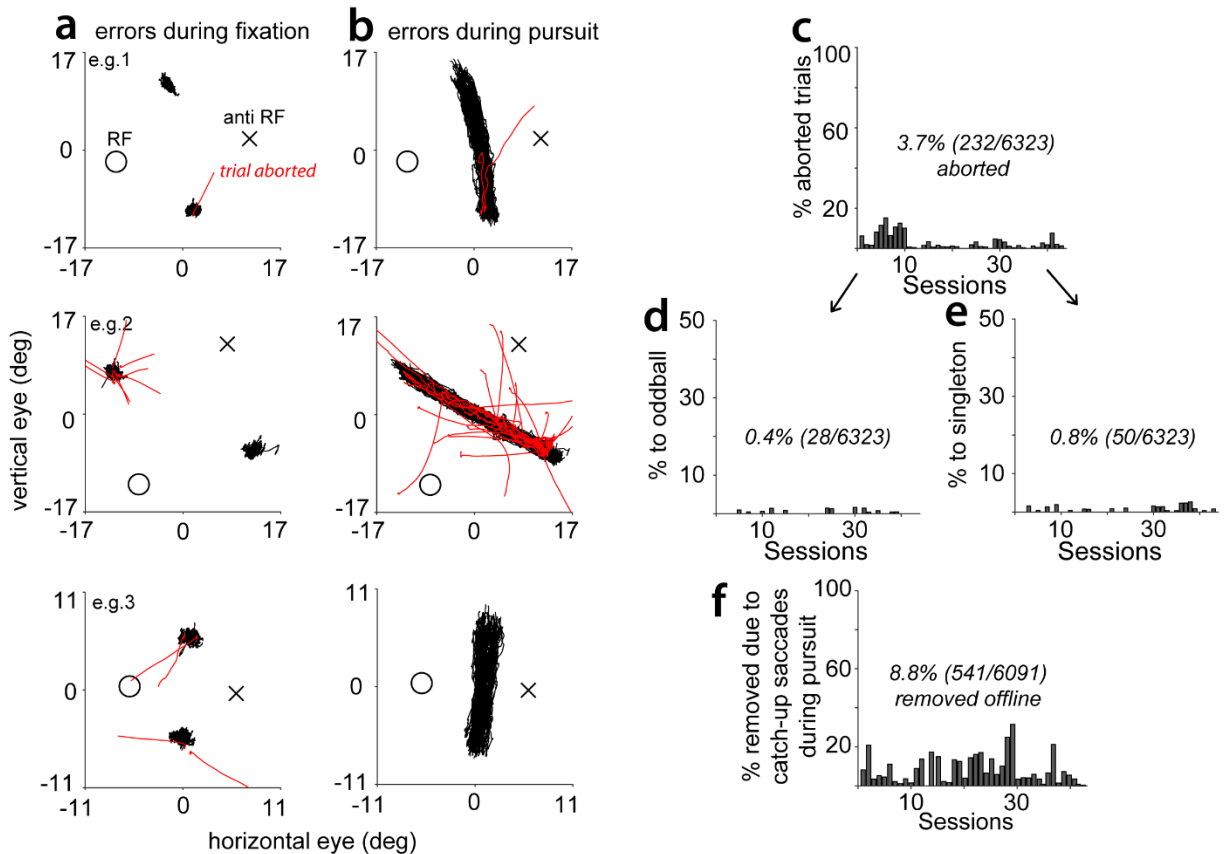
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Supplementary Figures S1 and S2

Figure S1. Percentage aborted and removed trials. (**a-b**) Eye position traces from three example sessions (**a**) during the fixation period after array/singleton onset but before the pursuit stimulus began to move, and (**b**) during smooth pursuit. The 'o' and 'x' symbols represent the RF and anti RF locations for each session, and are the locations of the potential task irrelevant singleton (no array) or oddball (array) on a given trial. The dark cluster of eye positions shows the traces of all the rewarded trials for a given session (i.e., where the animal's eye position did not fall out of the imaginary computer controlled window). The red traces represent aborted trials in which the eye position fell outside the control window. Note, all stimuli disappeared within 50ms of the eye exiting the control window. (**c**) The total percentage of aborted trials due to a break from the imaginary control window. (**d, e**) Percentage of saccades directed towards the oddball (**d**) or singleton (**e**). (**f**) Percentage of trials removed from the remaining rewarded trials (those that did not fall outside the control window) due to the presence of catch-up saccades during the test epoch (±200ms from the time the pursuit stimulus crossed the center of the screen/array).
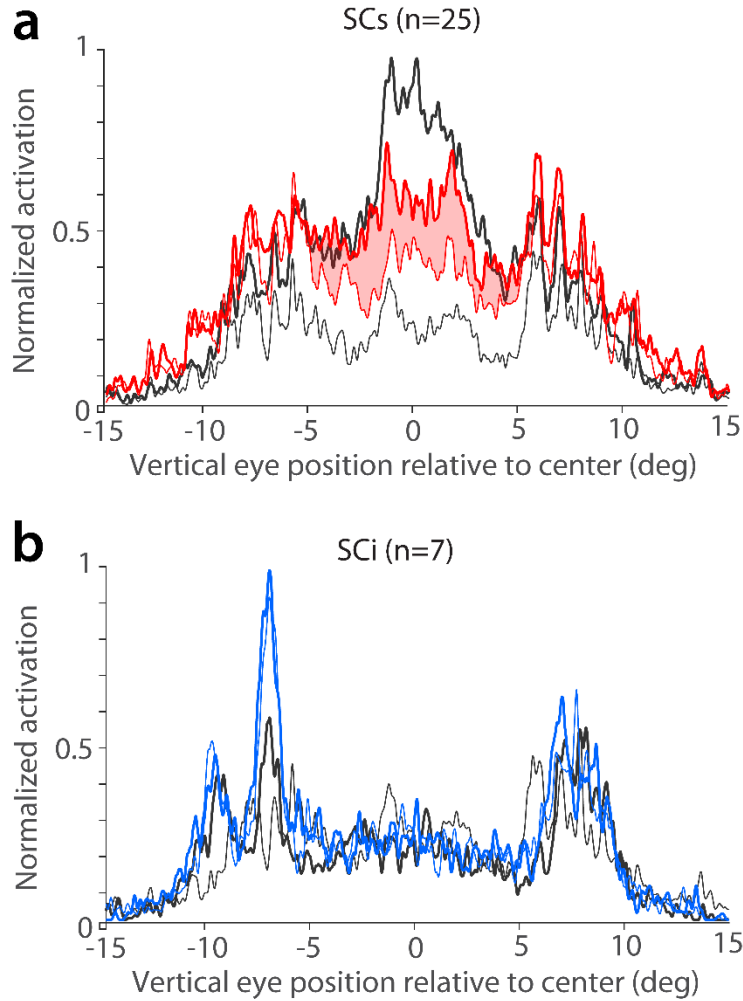
Figure S2. Population spike density functions aligned on vertical eye position. Average normalized spike density functions for the main conditions for a sample of (**a**) n=25 SCs visual neurons and (**b**) n=7 SCi visuomotor neurons. Note, this is a subsample of the total neuron count that only includes neurons in which the pursuit direction was mostly vertical (>45º pursuit trajectory). Colored traces denote the oddball/array conditions, and black traces denote the singleton conditions, with thicker traces representing the conditions in which the oddball/singleton was brought into the RF via the smooth pursuit eye movement. These traces were created by computing the spiking rate for each neuron as a function of vertical eye position relative to center. The traces were then normalized to the peak firing and then averaged across the sample of SCs and SCi neurons. The elevated activity at the more eccentric positions for SCi neurons in the array condition is from a few neurons whose RF boundary overlapped with the edge of the array during its abrupt disappearance at the end of the pursuit movement. Similar to the main result, while these SCi neurons (b) clearly showed visually evoked activity, they did not show any oddball preference like SCs neurons (a).

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