

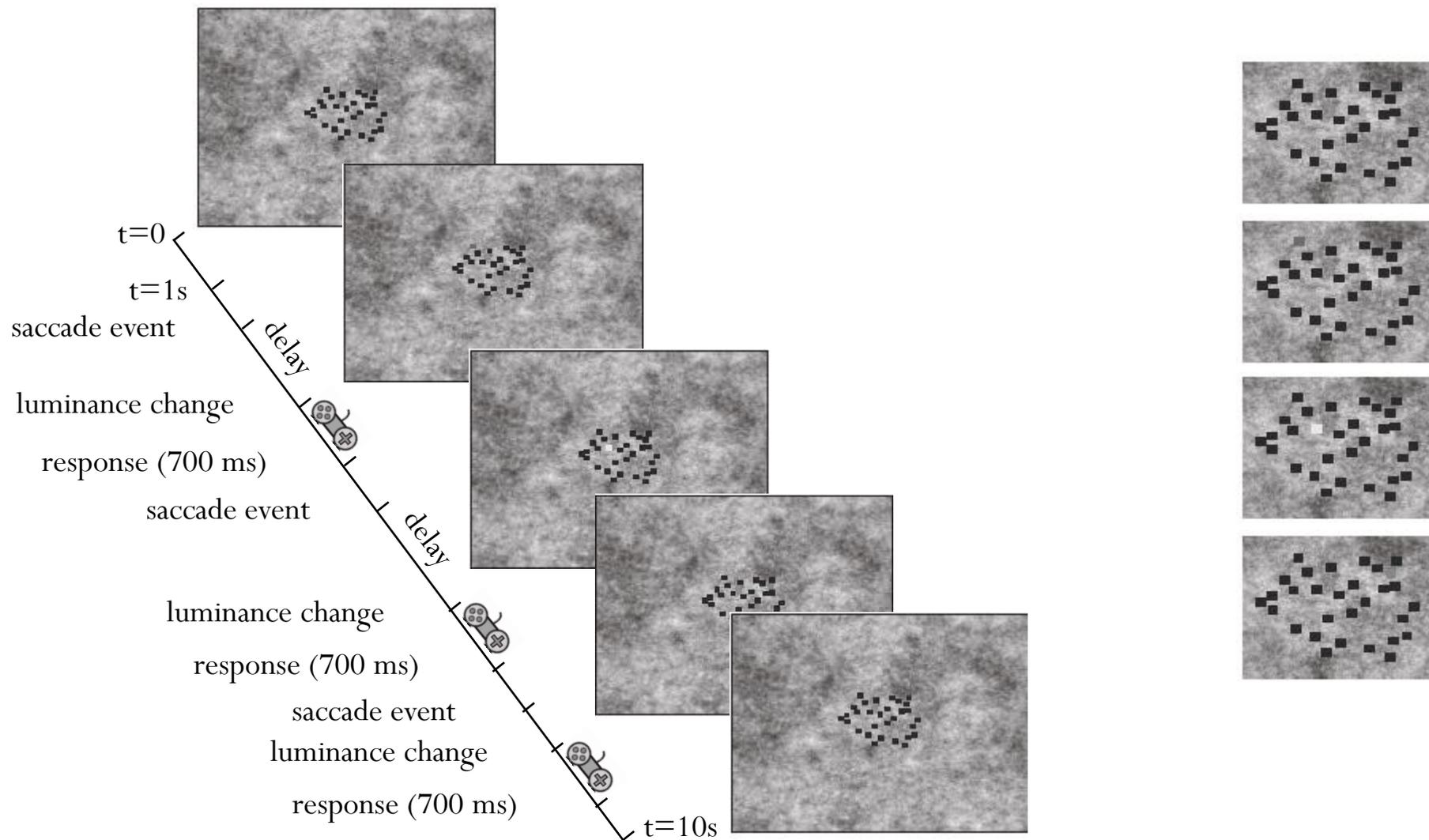
Peri-microsaccadic vision

4-30-15

Study objectives:

- Examine the Spatiotemporal profile of peri-microsaccadic detection thresholds.
- Examine the homogeneity of visual thresholds across the retina.
- Study the dynamics of saccadic suppression phenomena across the retina.

Experimental design

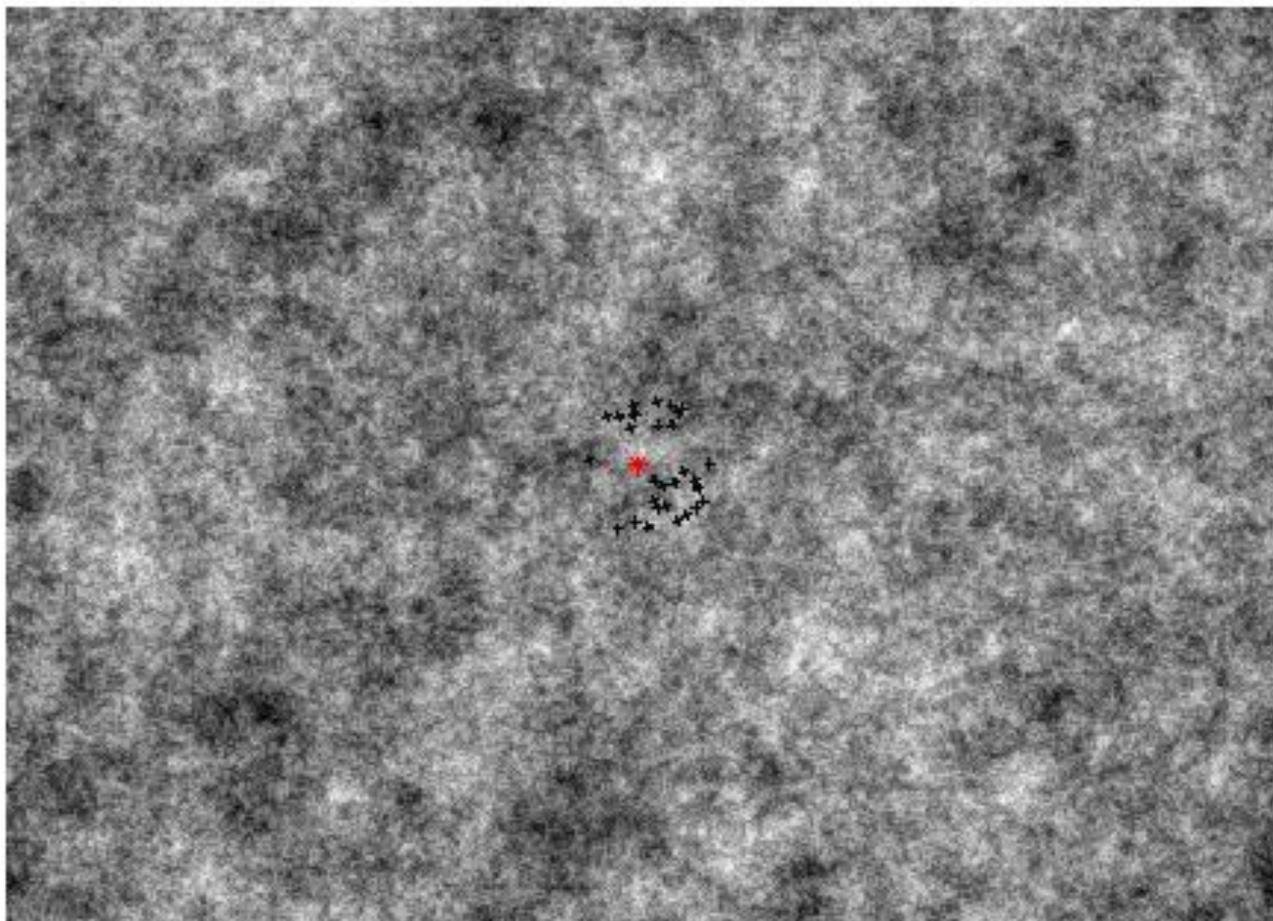


Experiment paradigm

- Each session consists of 4 blocks of 50 trials.
- 50 background images are produced and saved for each block. All subjects are exposed to the same backgrounds but in randomized order.
- Objects (squares) are uniformly distributed within 1 deg radius from the center of the screen.
- Trial starts when the eye enters a 2 deg window around the center.
- Upon occurrence of a microsaccade or small saccade (< 1 deg), a luminance change occurs after a delay.
- The change occurs at closest object to the center of gaze at the time of change.
- The delay varies between: 5, 20, 70, 100, 150, 250 and 400 ms.
- The duration of change is 10 ms.
- Observers have 700 ms to respond after each change.
- 8 contrast change levels are tested: 40, 45, 50, 55, 60, 65, 70, 75, 80.
- Upon detection of the change, observers have to press the X button as soon as possible.
- The minimum distance between each 2 objects is 5 arcmin.
- There is a calibration trial after each trial.

An example trial

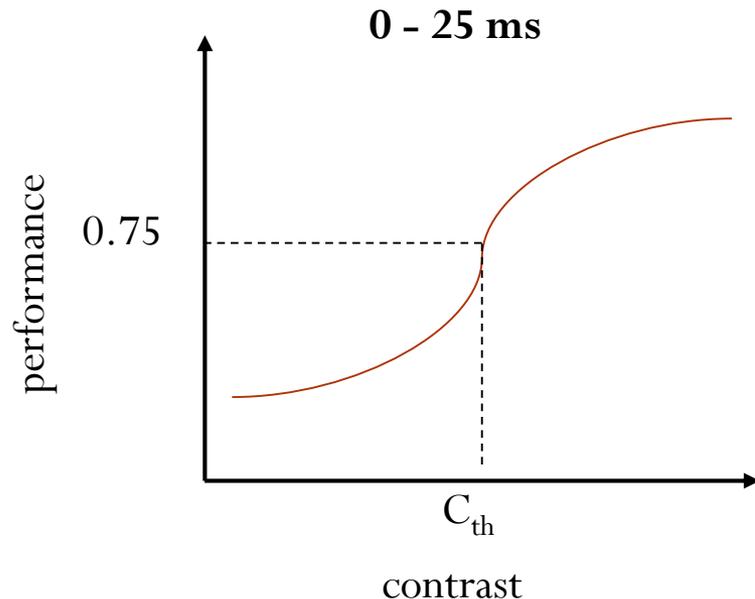
1 ms
Trial No.2



Study objectives:

Construct the map of visibility relative to saccade onset:

- Start by reducing one of the dimensions: eccentricity.
- Present the change at the center of gaze.

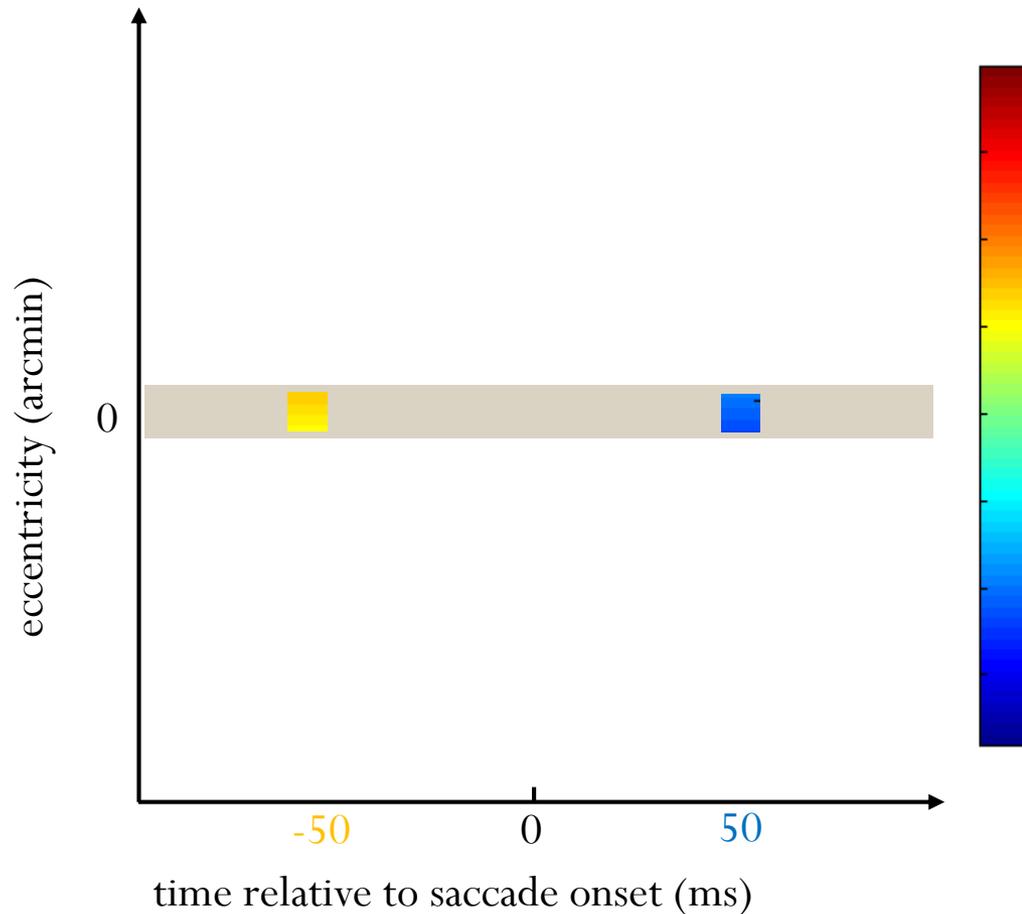


- -100 to -50 ms
- -50 to -25 ms
- -25 to 0 ms
- 0 to 25 ms
- 25 to 50 ms
- 50 to 100 ms

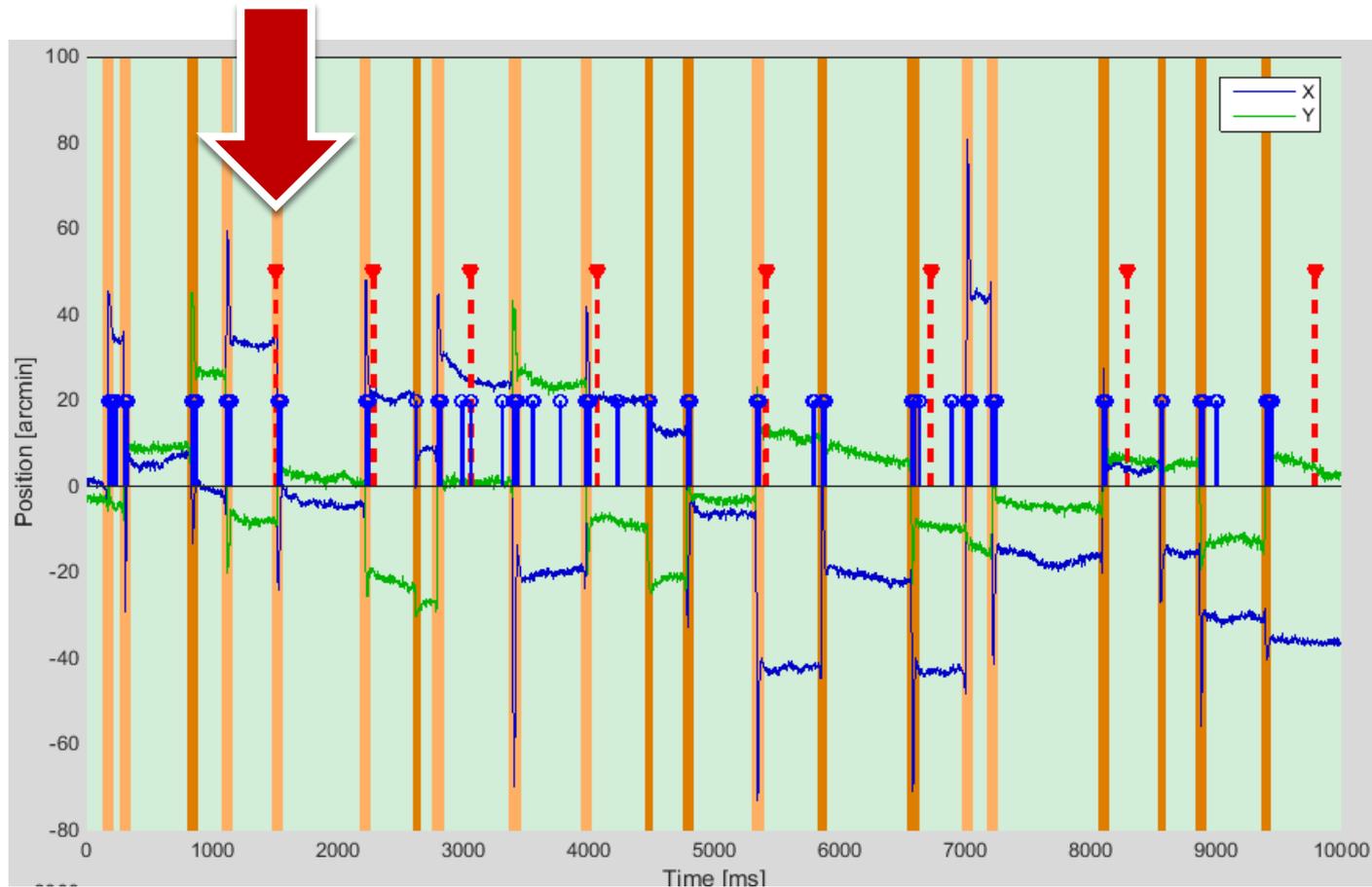
Study objectives:

Construct the map of visibility relative to saccade onset:

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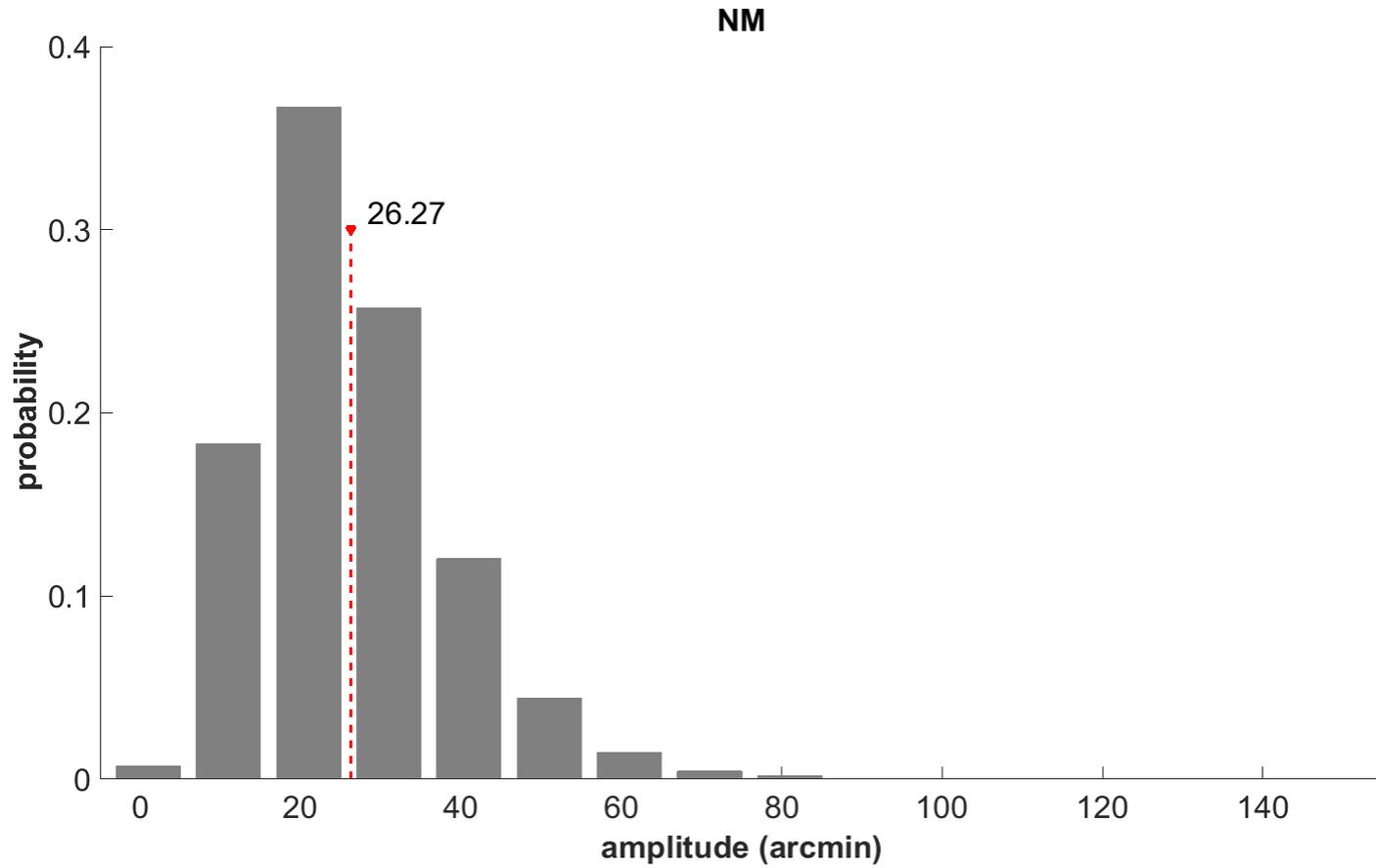


An example trial

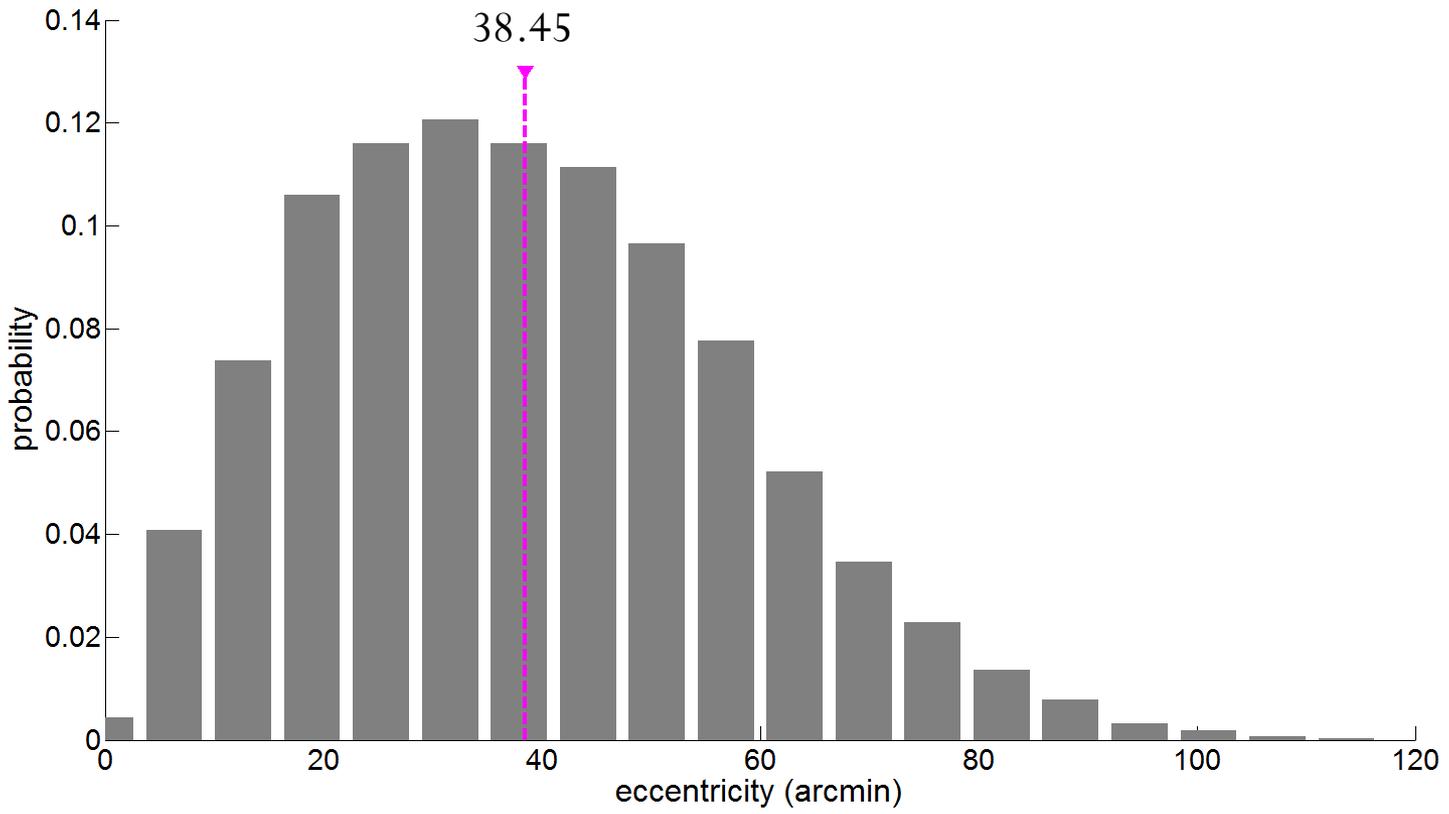


At $t=1073$ ms we have a saccade of 48.33 arcmin (3rd saccade). The trigger becomes 1 at 1103 ms. The delay of 400 ms is initiated at this point and the change in luminance occurs at $t=1505.7$ ms.

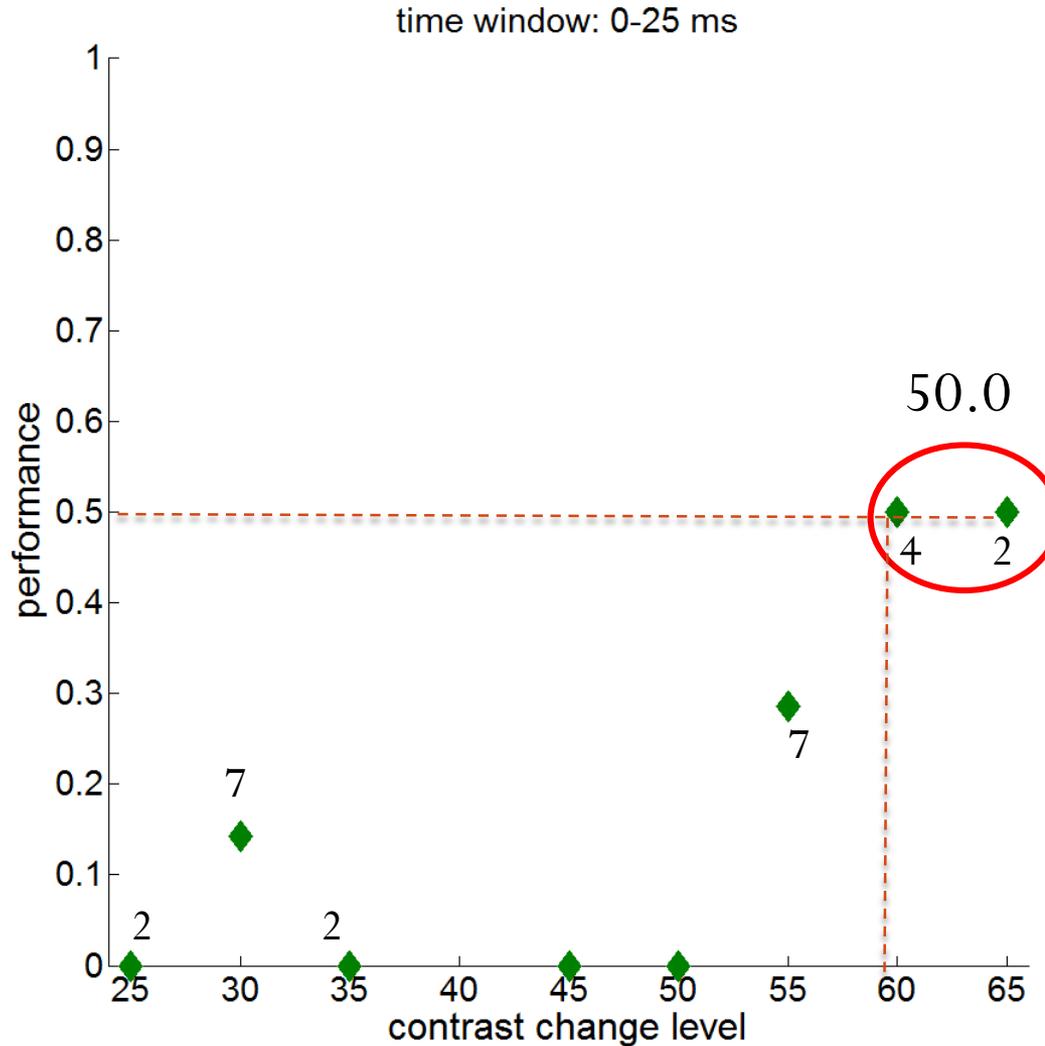
Distribution of saccade amplitudes



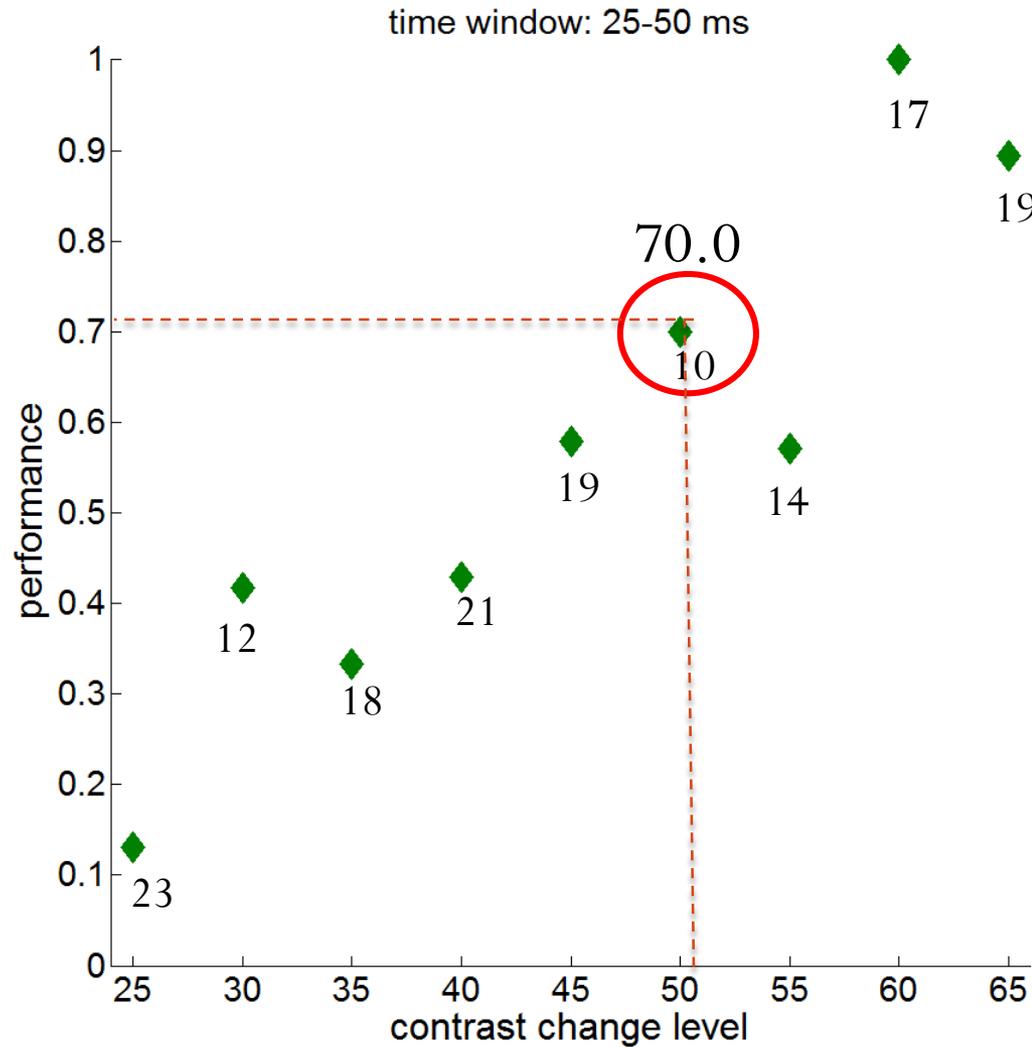
Distribution of eccentricity



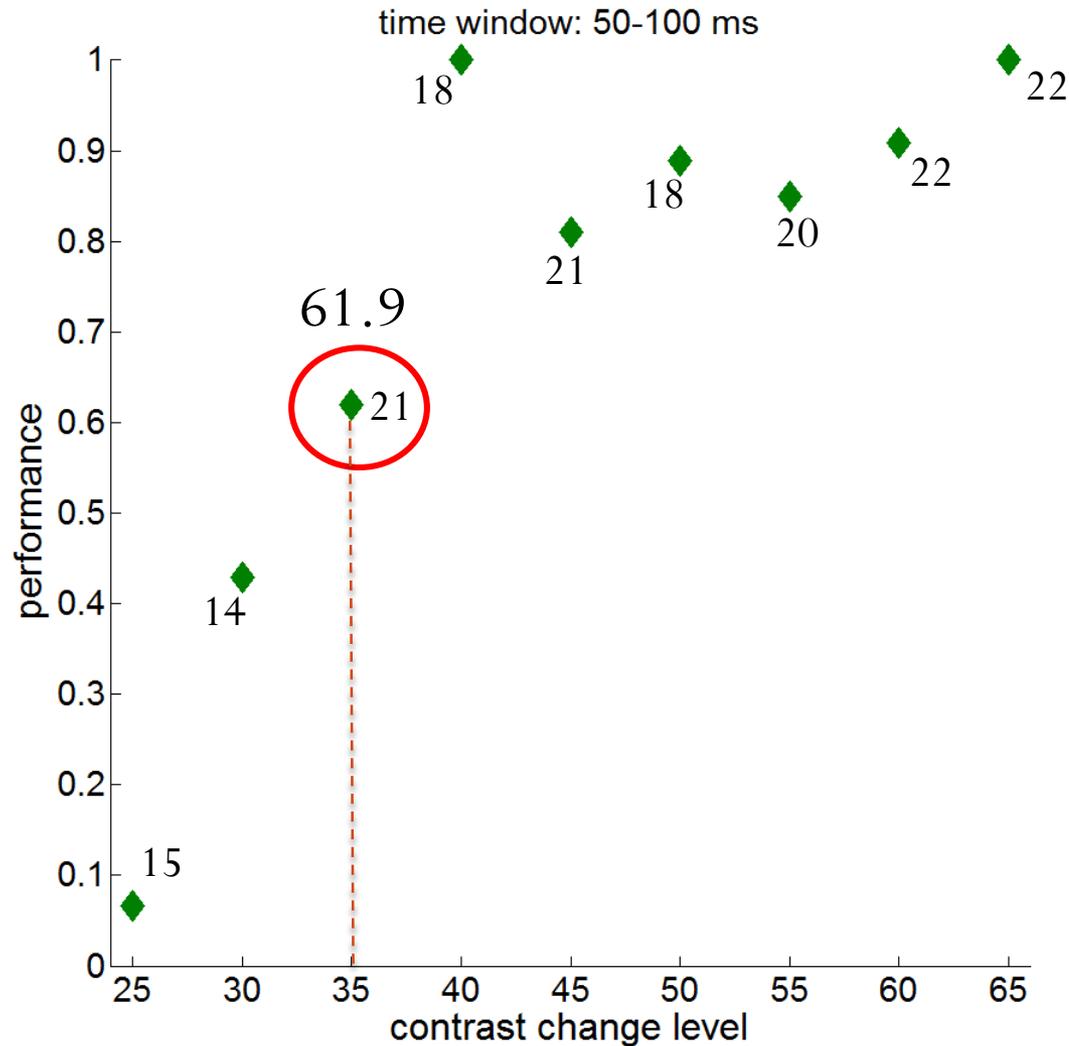
Performance for changes presented at the fovea:
(0-30 arcmin) **26 samples.**



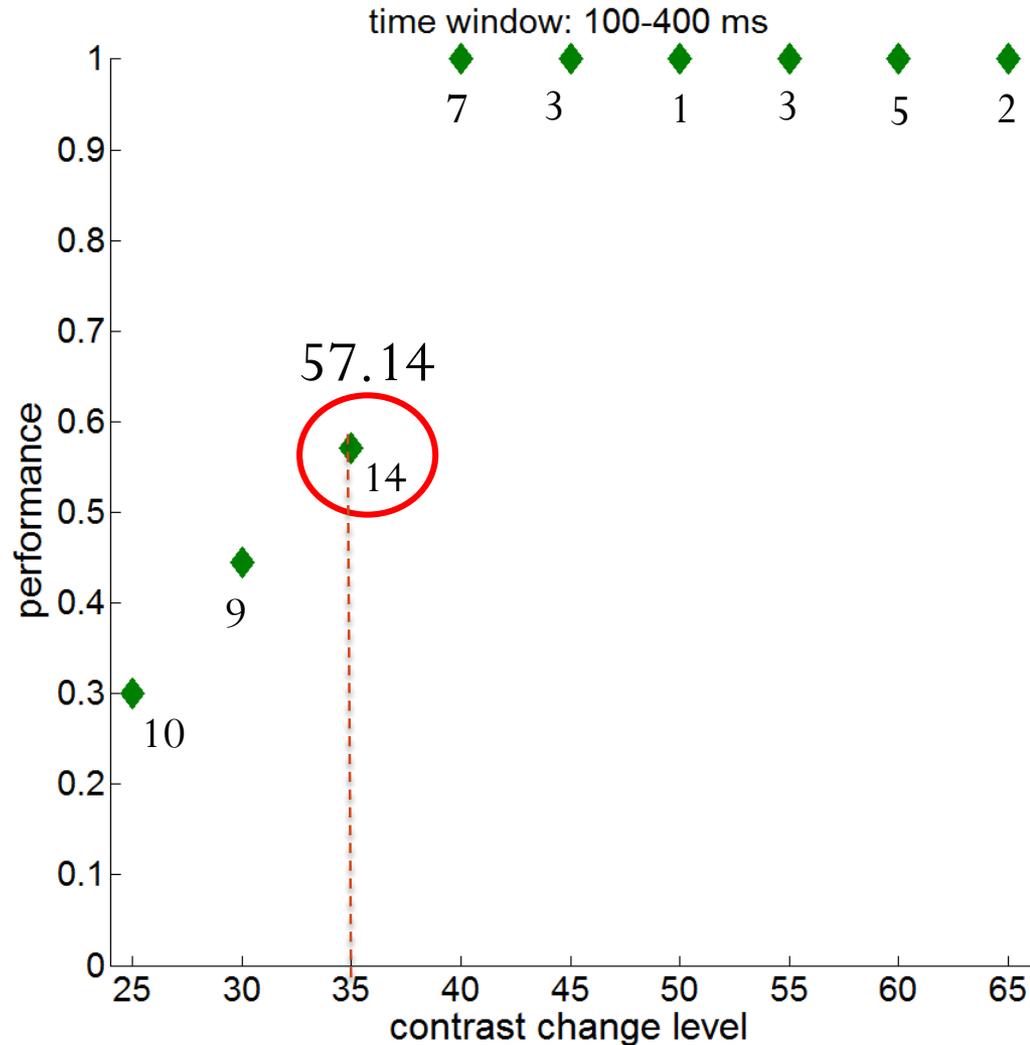
Performance for changes presented at the fovea:
(0-30 arcmin) 153 samples.



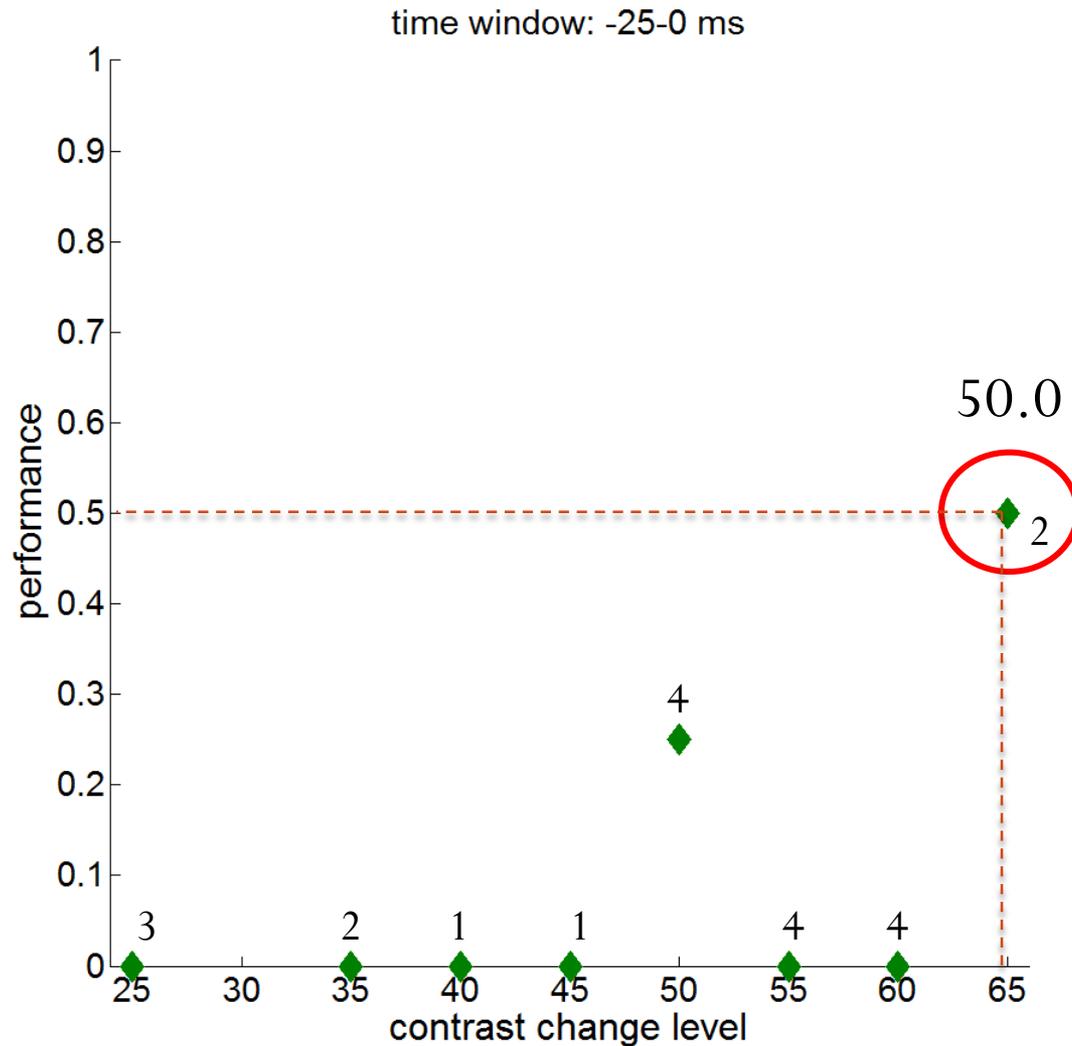
Performance for changes presented at the fovea:
(0-30 arcmin) **171 samples.**



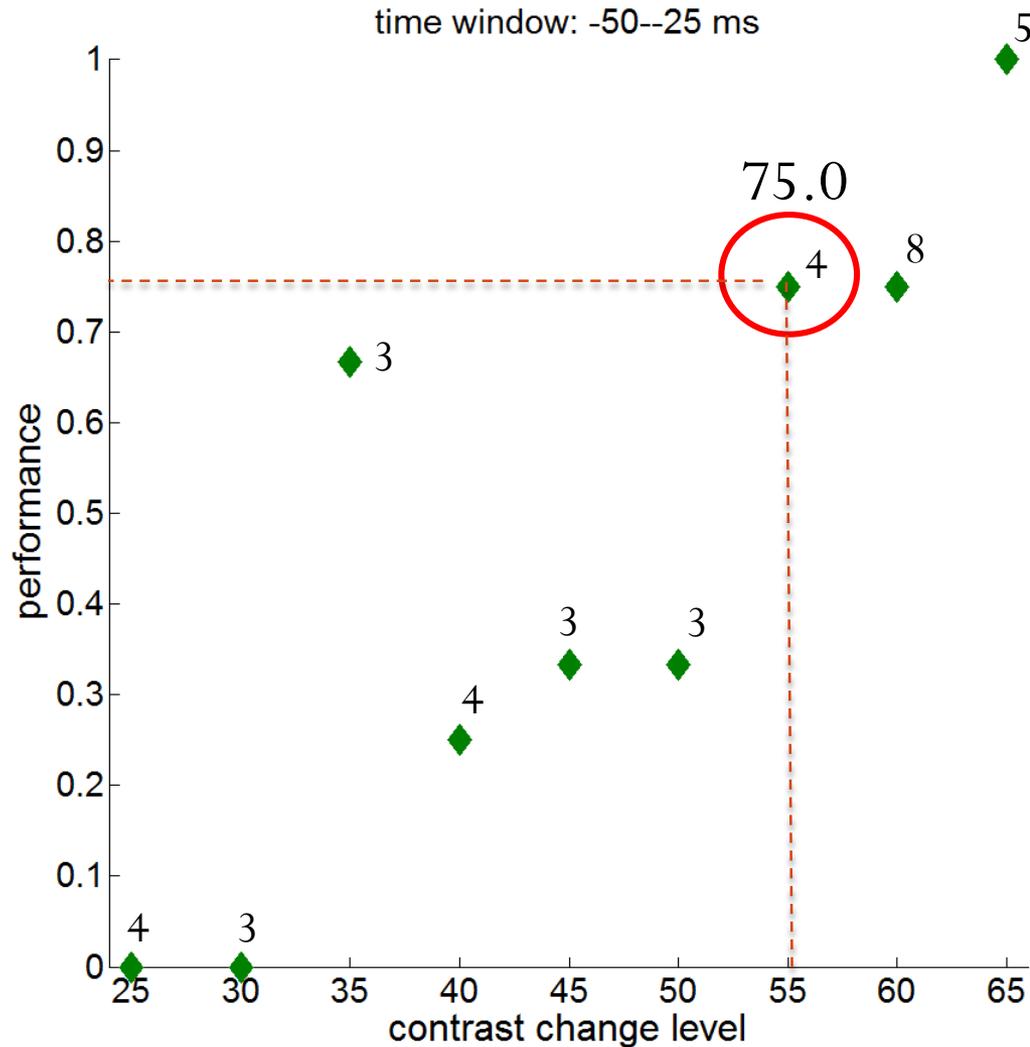
Performance for changes presented at the fovea:
(0-30 arcmin) 54 samples.



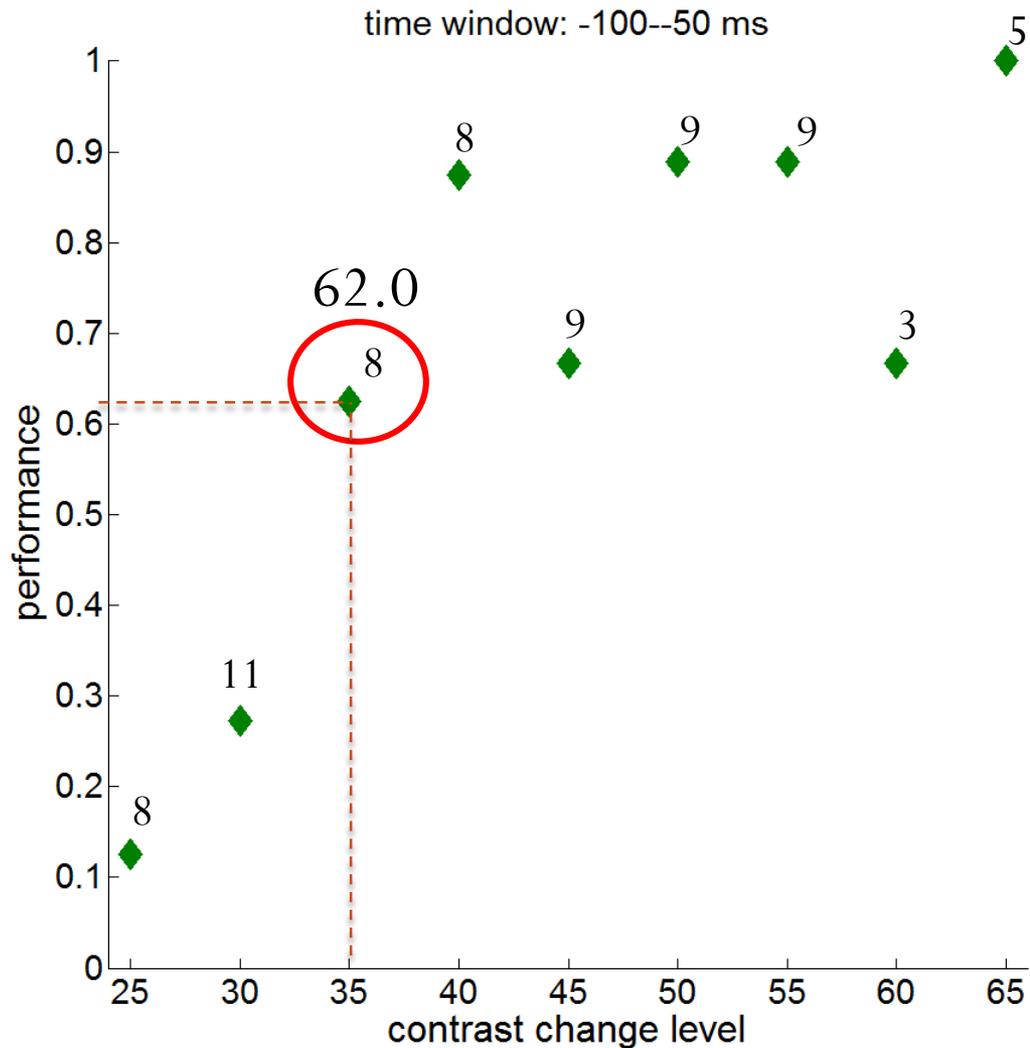
Performance for changes presented at the fovea:
(0-30 arcmin) **21 samples.**



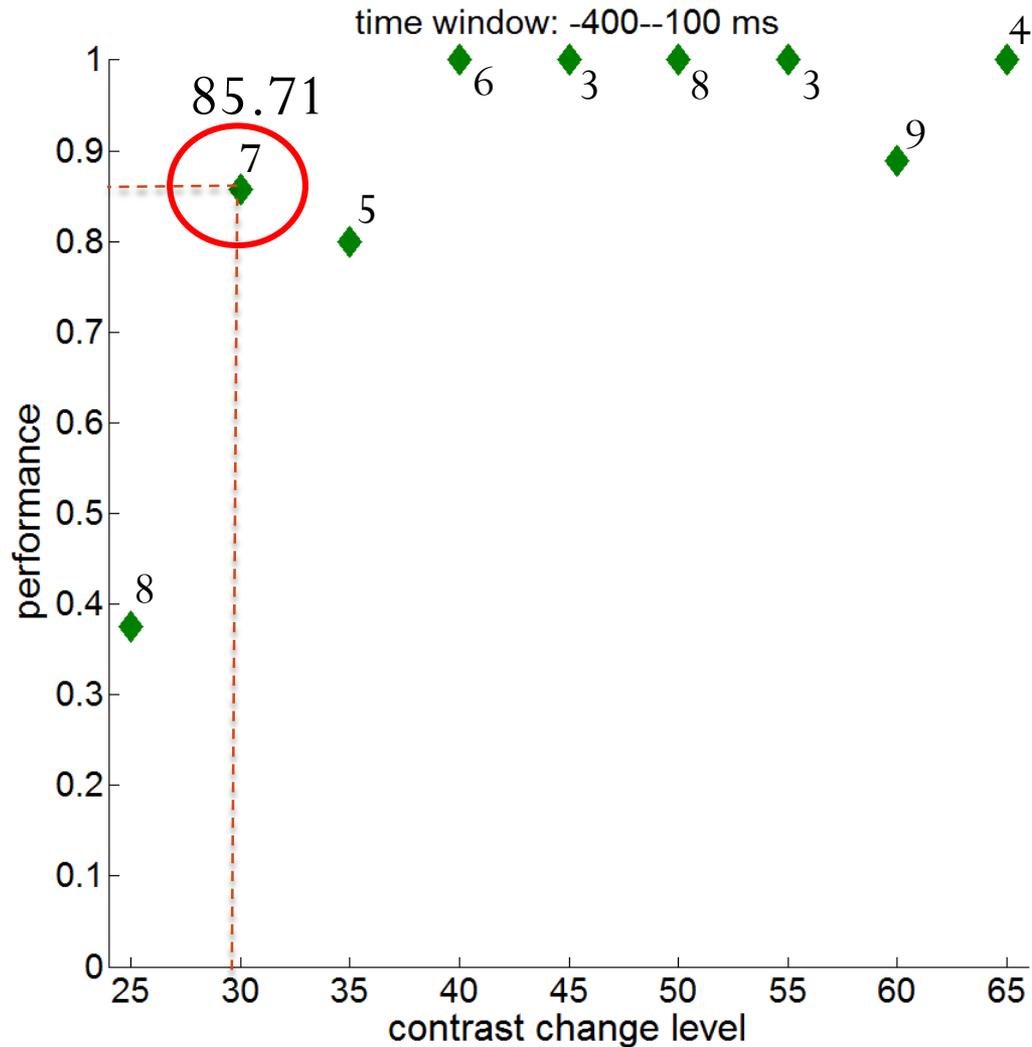
Performance for changes presented at the fovea:
(0-30 arcmin) 37 samples.



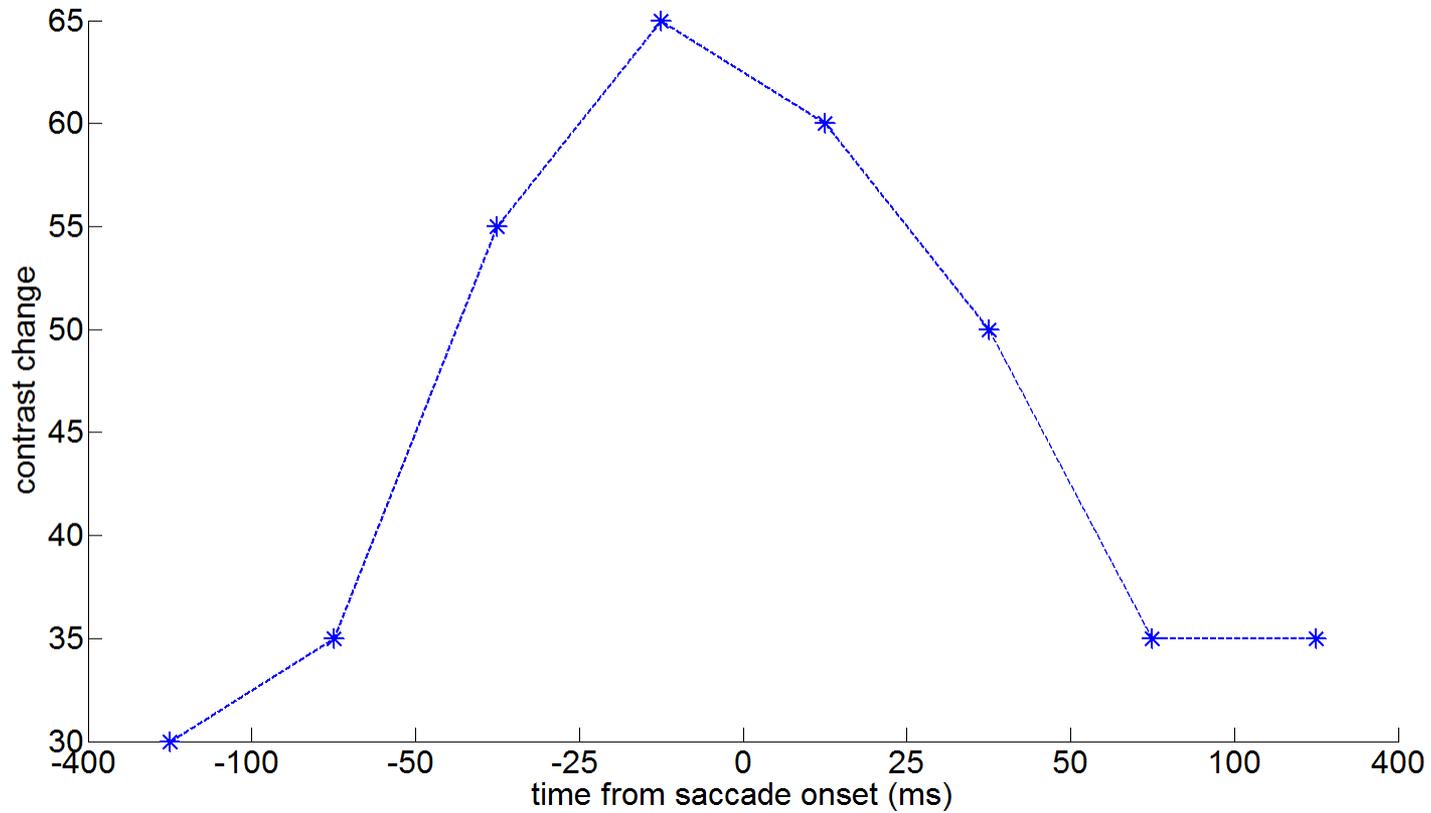
Performance for changes presented at the fovea:
(0-30 arcmin) **70 samples.**



Performance for changes presented at the fovea:
(0-30 arcmin) 53 samples.



Performance for changes presented at the fovea:
(0-30 arcmin).



Future steps

- Collect data from 2-3 subjects with changes presented at the fovea to maximize the number of trials.
- Study the time course of sensitivity in the parafoveal regions.
- Construct the full spatiotemporal map of contrast sensitivity relative to occurrence of microsaccades.