

The accuracy of saccadic and perceptual decisions in visual search.

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Purpose: Saccadic eye movements during search for a target embedded in noise are suboptimally guided by information about target location (Eckstein et al., ARVO 1997). Our goal is to compare the spatial information used to guide the saccades with that used for the perceptual decision.

Methods: Three observers were asked to determine the location of a bright disk (diameter = 21 min) in white noise (signal-to-noise ratio = 4.2) from among 10 possible locations evenly spaced at 5.9 deg eccentricity. In the first of four conditions, observers used natural eye movements. In the three remaining conditions, observers fixated a central cross at all times. The fixation conditions consisted of three different presentation times (100, 200, 300 msec), each followed by a mask. Eye-position data were collected with a resolution of ~0.2 deg. In the natural viewing condition, we measured the accuracy with respect to the target and the latency of the first saccade. In the fixation conditions, we discarded trials in which observers broke fixation. Perceptual performance was computed for all conditions.

Results: Averaged across observers, the first saccade was correct (closest to the target location) for 56 ± 7 (SD) % of trials (chance = 10 %) and occurred after a latency of 313 ± 56 msec. Perceptual performance averaged 53 ± 4 , 63 ± 4 , 65 ± 2 % correct at 100, 200, and 300 msec, respectively.

Conclusions: For the signal-to-noise ratio used, at the time of initiation of the first saccade, there is little difference between the amount of information about target location available to the perceptual and saccadic systems.

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