# Supplementary Material: Human visual search does not maximize the post-saccadic probability of identifying targets.

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Figure S01 (below) shows the saccadic endpoints for one representative observer in experiment 1 for each token separation. Our experiment requires us to categorize the whether observers' eye movements were directed to the right, left or middle token. Figure S01 shows that after data filtering (see main article) the categorization of the saccade was unambiguous, the red ellipses indicate the 1° radius selection circle area (note that the horizontal and vertical scales of the plots are not always the same and that, as a consequence, some of the circular selection regions are drawn as ellipses).

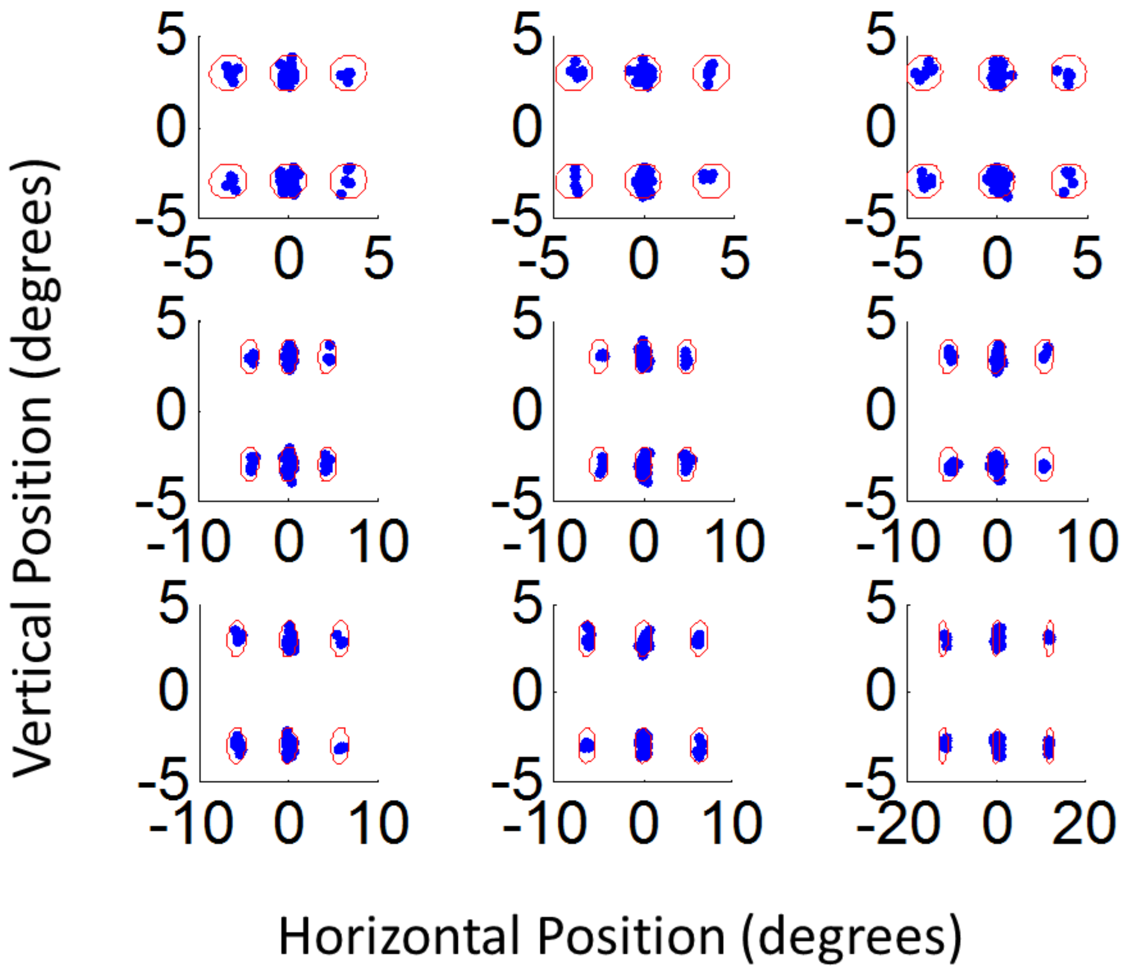


**Figure S01: Saccadic endpoints.** Distribution of the landing positions of the saccades for one representative observer (S04), for each separation in Experiment 1. The starting position of the eye was always along the line that crosses the screen's horizontal center (y = 0). Each cluster falls at the position where the objects were. Two conditions are represented for each graph: tokens presented above or below the fixation point.

Some observers planned their saccades rapidly while others spent more time in planning. We examined whether the speed with which observers planned their saccade was correlated with their probability of correct discrimination, plotting the probability of a correct choice of saccade as a function of latency. As shown in Figure S02 the quickness of the decision does not seem to affect whether this decision closer to or further from optimal.

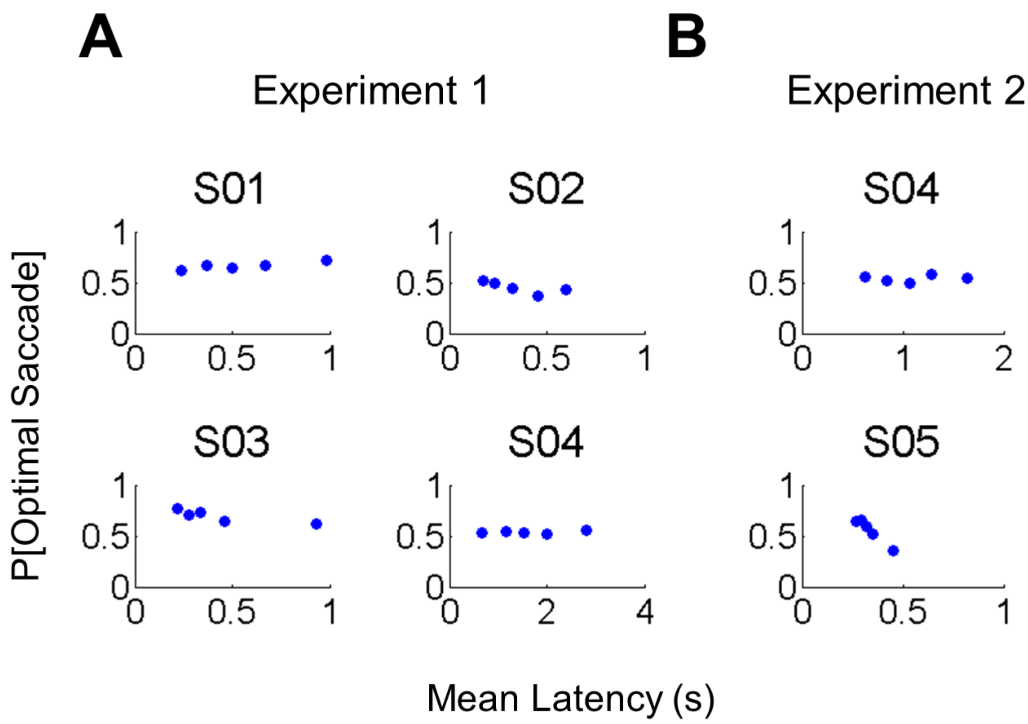


**Figure S02: Latency.** The probability of an optimal saccade maximizing expected gain as function of saccade latency.

Each subjects' retinal sensitivity function was derived from the mapping phase, this function was then used to predict the subjects' performance in the decision phase. But in fact, the subjects' performance in the decision and the verification phase could also be used to map the subjects retinal sensitivity function. Even if the acuity of each subject remains the same across the experiment and the different phase, their visual performance could fluctuate due to various modulation of their cognitive state (attention, fatigue…). We therefore expect some variation in the acuity functions. Also, importantly, whereas only one token was presented in the mapping phase, we presented two in the decision and the verification phases. We therefore needed to verify that this addition of a token did not modify significantly their visual performance. In the following Figure S03, we present the optimal switch points defined by the three phases. As can be seen, the optimal switch points calculated from the different phases are very similar and confirm our conclusion that humans do not switch strategy optimally in this task.

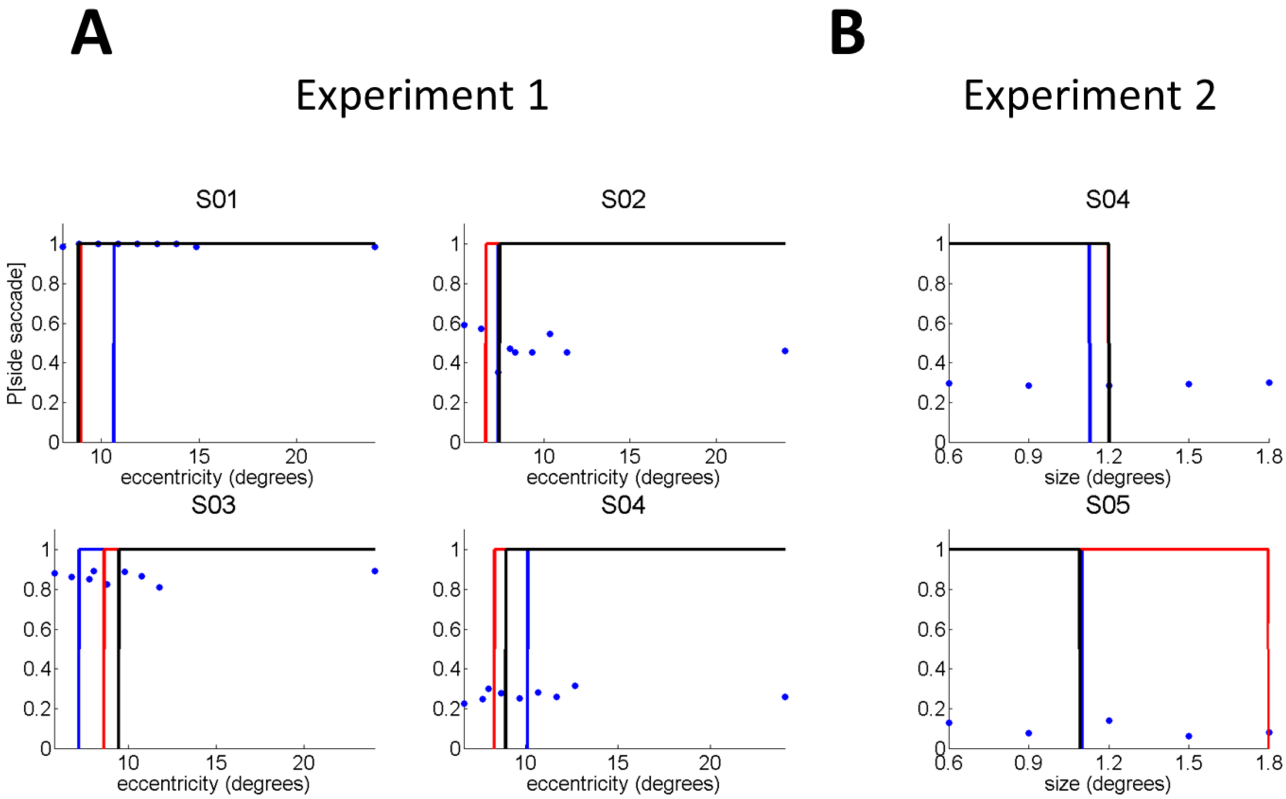


**Figure S03: Strategy choice. A. Experiment 1.** For each observer we plot the proportion of time they picked either the side strategy as a function of eccentricity of the side locations markers. The proportions predicted by an ideal observer maximizing probability of correct response are shown as solid blue curves. They are step functions, going from 0 to 1 at the optimal switch point for the observer. These predictions are based on each observer's retinal sensitivity function derived from the mapping phase (in blue), the decision phase (in red) or the verification phase (in black). Observers failed to shift strategy with changes in eccentricity. **B. Experiment 2.** For each observer we plot the proportion of time they picked either side strategy as a function of size of the targets.