Supplementary Materials

The goal of the first set of Monte Carlo simulations was to determine the number of consecutive fixations that would be expected if an ideal observer selected each saccade target according to the probability that the target would be a given color, with each fixation determined independently of the prior fixations. In the 80/20 condition (Experiment 1), it was used to determine the initial run length that would be expected if the observer simply selected each item with an 80% probability of one color and a 20% probability of the other color. In the 50/50 condition (Experiment 1), it was used to determine the initial run length that would be expected if the observer selected each item with a 50% probability of red and a 50% probability of blue. Ten thousand trials were simulated for each condition. For the sake of simplicity, the ideal observer was given perfect memory (i.e., gaze never returned to a previously fixated item on a given trial).

The hypothetical observer data for the 50/50 condition was also used to simulate the initial run length when the observer searched two colors simultaneously in Experiment 2. That is, it was used to estimate the expected initial run length if the observer randomly shifted back and forth between the two cued colors. However, to account for the fact that real observers directed approximately 10% of their fixations to one of two uncued colors in this experiment, the Monte Carlo simulation also incorporated a 10% probability that a fixation was directed to an uncued color.

The goal of the second set of Monte Carlo simulations was to determine the run length that would result in the fewest number of objects selected before locating the target item. These simulations were used to calculate the initial run length that would be expected if the observer was searching most efficiently (least number of eye movements). We ran a series of simulations

(one thousand trials each) in which run length varied from one to twelve. Again, the hypothetical observer was given perfect memory, and run length was the same for each of the two colors (e.g., a run length of five would mean that the first five items selected were from one color, the second five from the other color, and so on).