Practice Improves Peri-saccadic Shape Judgment but does not Diminish Target Mislocalization.

By esc_admin
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By esc_admin November 24, 2016


Abstract:

Visual sensitivity is markedly reduced during an eye movement. Peri-saccadic vision is also characterized by a mislocalization of the briefly presented stimulus closer to the saccadic target. These features are commonly viewed as obligatory elements of peri-saccadic vision. However, practice improves performance in many perceptual tasks performed at threshold conditions. We wondered if this could also be the case with peri-saccadic perception. To test this, we used a paradigm in which subjects reported the orientation (or location) of an ellipse briefly presented during a saccade. Practice on peri-saccadic orientation discrimination led to long-lasting gains in that task but did not alter the classical mislocalization of the visual stimulus. Shape discrimination gains were largely generalized to other untrained conditions when the same stimuli were used (discrimination during a saccade in the opposite direction or at a different stimulus location than previously trained). However, performance dropped to baseline level when participants shifted to a novel Vernier discrimination task under identical saccade conditions. Furthermore, practice on the location task did not induce better stimulus localization or discrimination. These results suggest that the limited visual information available during a saccade may be better used with practice, possibly by focusing attention on the specific target features or a better readout of the available information. Saccadic mislocalization, by contrast, is robust and resistant to top-down modulations, suggesting that it involves an automatic process triggered by the upcoming execution of a saccade (e.g., an efference copy signal).

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