Accumulation of visual information across multiple fixations

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Abstract:

Humans often redirect their gaze to the same objects within a scene, even without being consciously aware of it. Here, we investigated what type of visual information is accumulated across recurrent fixations on the same object. On each trial, subjects viewed an array comprised of several objects and were subsequently asked to report on various visual aspects of a randomly chosen target object from that array. Memory performance decreased as more fixations were directed to other objects, following the last fixation on the target object (i.e. post-target fixations). In contrast, performance was enhanced with increasing number of fixations on the target object. However, since the number of post-target fixations and the number of target fixations are usually anti-correlated, memory gain may simply reflect fewer post-target fixations, rather than true accumulation of information. To rule this out, we conducted a second experiment, in which the stimulus disappeared immediately after performing a predefined number of target fixations. Additional fixations on the target object resulted in improved memory performance even under these strict conditions. We conclude that, under the present conditions, various aspects of memory monotonically improve with repeated sampling of the same object.

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