

Look Before You Leap: Effects of delaying visual search on learning of scene context



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At-A-Glance

Question –

How does memory retrieval contribute to eye guidance while building experience in familiar environments?

Method –

Visual search of familiar scenes with an *enforced-delay* (300 or 1300 ms) before initiating eye movements

Result –

Enhancing memory retrieval *prior* to initiating search results in faster learning and more efficient eye movements.

Experiment Description

Visual Search Task

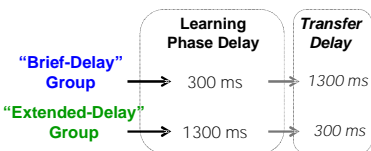
“Look for a person in the scene”



- 100% Target Prevalence
- Fixate the target to end trial



Enforced-Delay Manipulation



Scene Learning Manipulation

- Each search block is comprised of –
- => Familiar scenes (22 of 36 scenes are *repeated*)
- => Novel scenes (14 of 36 scenes are *new*)

Eye Movement Search Results

I. Learning Phase

How does accumulating scene *identity* information affect eye guidance in familiar scenes?

Evaluate how observers learn given –

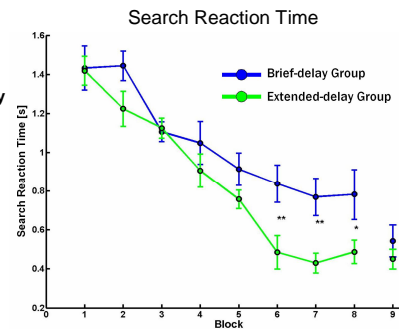
- ± A Brief-delay (300 ms) at central fixation
- ± An Extended-delay (1300 ms) at central fixation

Schematized Block Structure

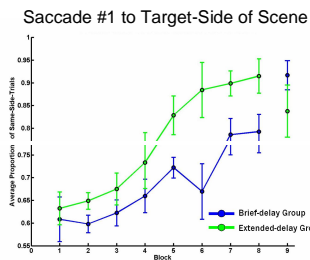
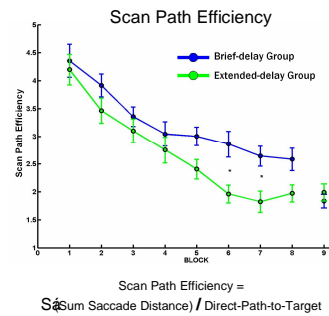
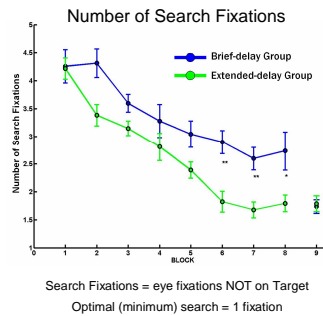


Familiar Scenes

- Early in Learning:** Both groups performed search with similar efficiency



- Late in Learning:** the Extended-Delay group diverged with faster search RT, fewer fixations, more direct scan path



- Earliest eye guidance:** the Extended-delay biased the first saccade towards Target-side

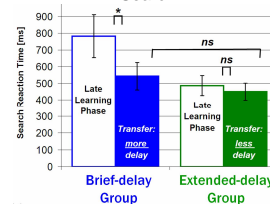
II. Transfer Probe:

Does changing the search delay facilitate or disrupt eye guidance in familiar scenes?

Probe what observers learned when delay is –

- ± *Lengthened* to 1300 ms for “Brief-delay” group
- ± *Shortened* to 300 ms for “Extended-delay” group

Transfer of Learning: Search RT



- “Brief-delay group”:** significantly improved search performance with a *lengthened* delay duration

- “Extended-delay group”:** maintained very efficient search despite *shortening* delay duration

Scan Paths over Learning

Where is the person in the scene?



Summary

Learning Phase:

- When scene familiarity is building, increasing retrieval from memory *prior* to searching yields very efficient eye guidance (i.e. Extended-delay group, blocks 6-8).

Transfer Phase: (influence of training-type)

- Reducing the delay-duration *did not* disrupt efficient search performance for “Extended-delay” observers (Robust learning)
- Increasing the delay-duration *facilitated* efficient search performance for the “Brief-delay” observers (Latent learning)

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