Exploring Eye Movements in Glaucomatous Patients When Viewing Natural Photographs

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Purpose
To test the hypothesis that patients with bilateral glaucoma exhibit different eye movements and search behaviour when compared to normally sighted subjects viewing computer displayed photographs of ‘everyday’ scenes.

Subjects
- 13 Glaucoma patients
  - Average age: 65.2 (SD: 11.0)
  - Right MD: -9.18dB (SD: 5.7)
  - Left MD: -6.47dB (SD: 3.3)
- 17 Controls
  - Average Age: 70.5 (SD: 11.7)
  - Right MD: 0.24dB (SD: 1.3)
  - Left MD: 0.17dB (SD: 1.1)

Control Inclusion Criteria
- Must have no ocular defects.

Methods
Experiments involved subjects viewing photographic images of ‘everyday’ scenes and natural images displayed on a 22” monitor at a viewing distance of 60cm. All the images were taken with the same digital camera and were not modified in any way. Eye movements were simultaneously recorded on an SR Research Eyelink 2 running at 500Hz.

Experiment 1: ‘passive’ image viewing.
- 28 images displayed for 3 seconds each in random order (5 practice images first)
- Task: Subjects asked to view the images as they would when normally looking at a ‘slideshow’ of photographs.

Experiment 2: ‘real world’ search task
- 15 images shown in random order (3 practice images first)
- Task: Time taken to find a single specific item or location in the image. (Text based instruction before image shown)

Results
Search Task
Each symbol on the graph represents one image. If there is no difference between patients and controls the symbols would fall on the line of agreement. Average difference between the patients and controls (main factor) was statistically assessed using a Two Way ANOVA blocked by images.

Conclusions
- These results provide evidence that eye movement patterns and search behaviour in patients with bilateral glaucoma differ from normally sighted subjects when viewing photographs of everyday images.
- Future work will investigate the point of regard of glaucomatous patients when compared to controls, and to relate these eye movements to the visual field defect.

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