

Background

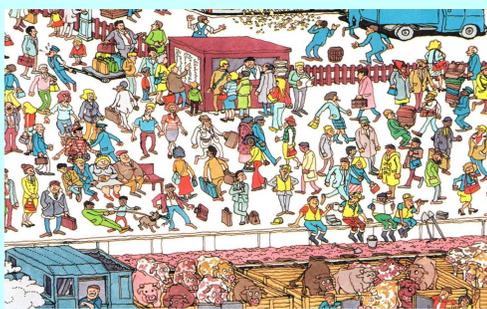
Spatial neglect is a common consequence of stroke. Neglect behaviour is typically exacerbated by increased task demands. It was thus anticipated that the addition of a secondary task requiring general attention (walking) would worsen performance on tests of spatial neglect. Here, however, we report a patient in whom neglect was considerably reduced when performing a visual search task while walking.

Method

Subject: 55-year old male with a haemorrhagic stroke in the right parietal lobe, who displayed marked signs of left-sided neglect in paper-and-pencil measures.

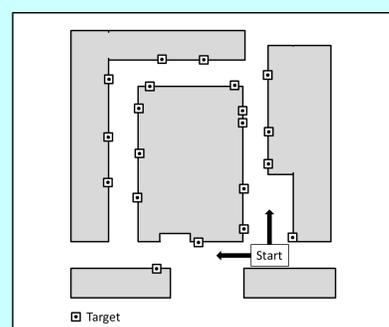
Procedure: SMI Eye Tracking Glasses were employed to track the eye movements in 2 conditions:

(1) Computerized search task (single-task)



- “Where’s Wally?”¹
- five different scenes
- displayed in original and mirror-reversed orientations
- maximum of 60 seconds to locate Wally within each scene

(2) Search task while walking (dual-task)



- standardized course within the ward corridors
- 10 left and 10 right-sided yellow targets (100 mm × 100 mm)
- course is walked in clockwise and anti-clockwise directions

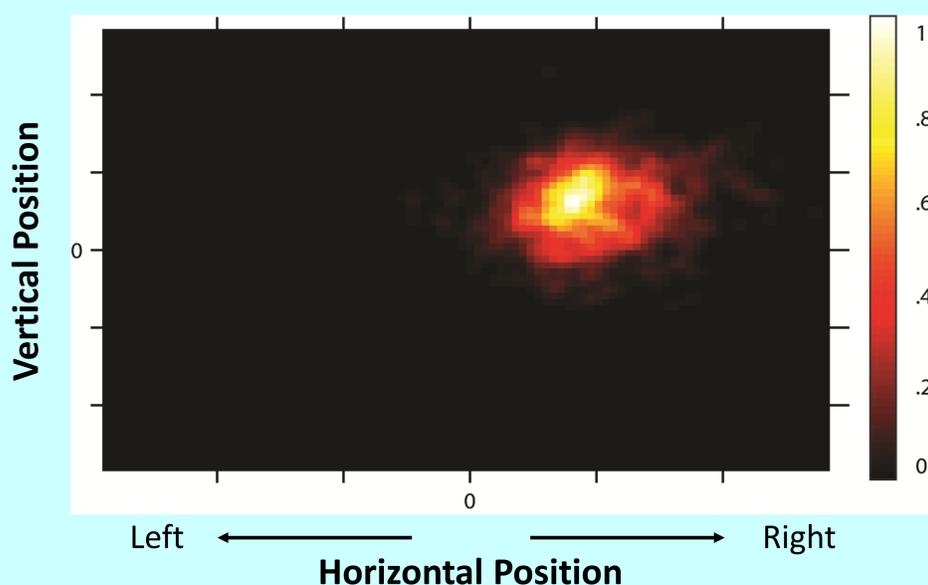
Analysis: In order to assess neglect behaviour, an exploratory quotient was calculated by dividing the number of saccades into the right visual field by the number of saccades into the left visual field. Values > 1 indicate more saccades towards the right side, whereas values of 1 suggest a symmetric exploration of the left and right sides of space.

Results

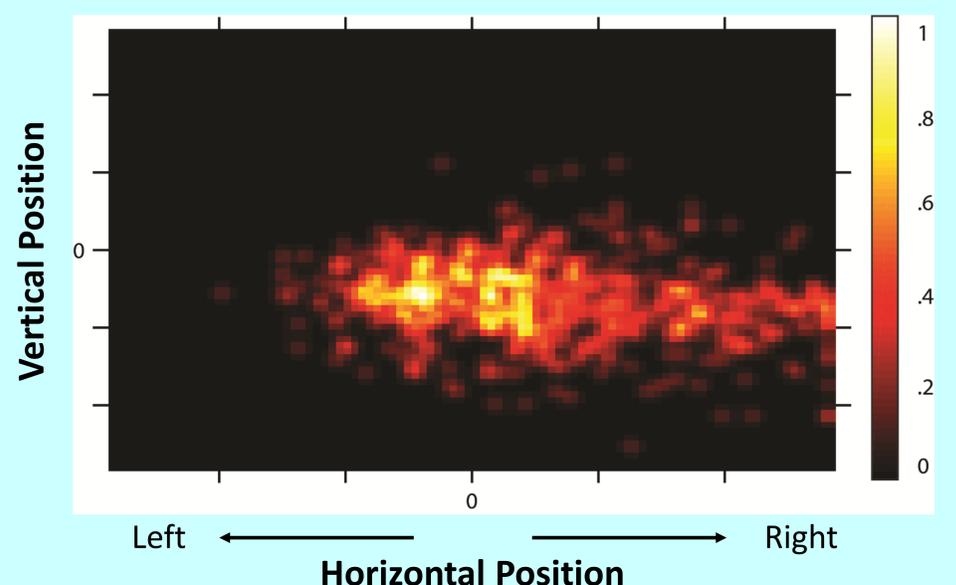
The exploratory quotients for the computer and walking visual search tasks were 123.4 and 2.1, respectively. The walking quotient was thus more than 60 times smaller than the computer quotient. The significant reduction of neglect behaviour in the dual-task relative to the stationary visual search task is also evident in heatmaps depicting the exploration of the left and right visual field.

Normalized frequencies of saccade endpoints in the left and right visual field

(1) Computerized search task (single-task)



(2) Search task while walking (dual-task)



Conclusions

Walking reduced symptoms of spatial neglect in this patient. This finding was unexpected, as neglect symptoms are typically marked during dual-task conditions and in attentionally demanding real-world environments.² Several explanations for this surprising finding are conceivable. For example, this patient may have suffered from left spatial neglect for near but not far space.³ It is also possible that walking increased the patient’s level of alertness/arousal which in turn ameliorated neglect.⁴ While the reason for our results remain elusive, they highlight the heterogeneity of neglect manifestations across different tasks.

References

1 Handford M (1997), *Where’s Wally now?* London: Walker Books; **2** Barrett A et al. (2006), *JOCN*, 18(7), 1223-1236; **3** Halligan P & Marshall J (1991), *Nature*, 350, 498–500; **4** Robertson I et al. (1998), *Nature* 395, 169–172.