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# Exploring the cognitive workload during a visual search task in Parkinson's Disease

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## Background

- ✓ Visual search impairments in patients with Parkinson's Disease (PD) may negatively affect daily life activities, such as driving<sup>1,2</sup>
- ✓ The index of cognitive activity (ICA) is a pupillary response that accurately estimates cognitive workload during various tasks in individuals with cognitive decline<sup>3,4,5</sup>

## Objective

- ✓ To investigate cognitive workload during a visual search task in patients with PD

## Methods

- ✓ 20 patients with PD (69 yrs-old  $\pm$  8; 16 Males) and 15 controls (61 yrs-old  $\pm$  11; 8 Males)

### VISUAL SEARCH TASK

- ✓ Participants were instructed to search for a target stimulus (road sign) among distractor stimuli (other road signs) (Figure 1)

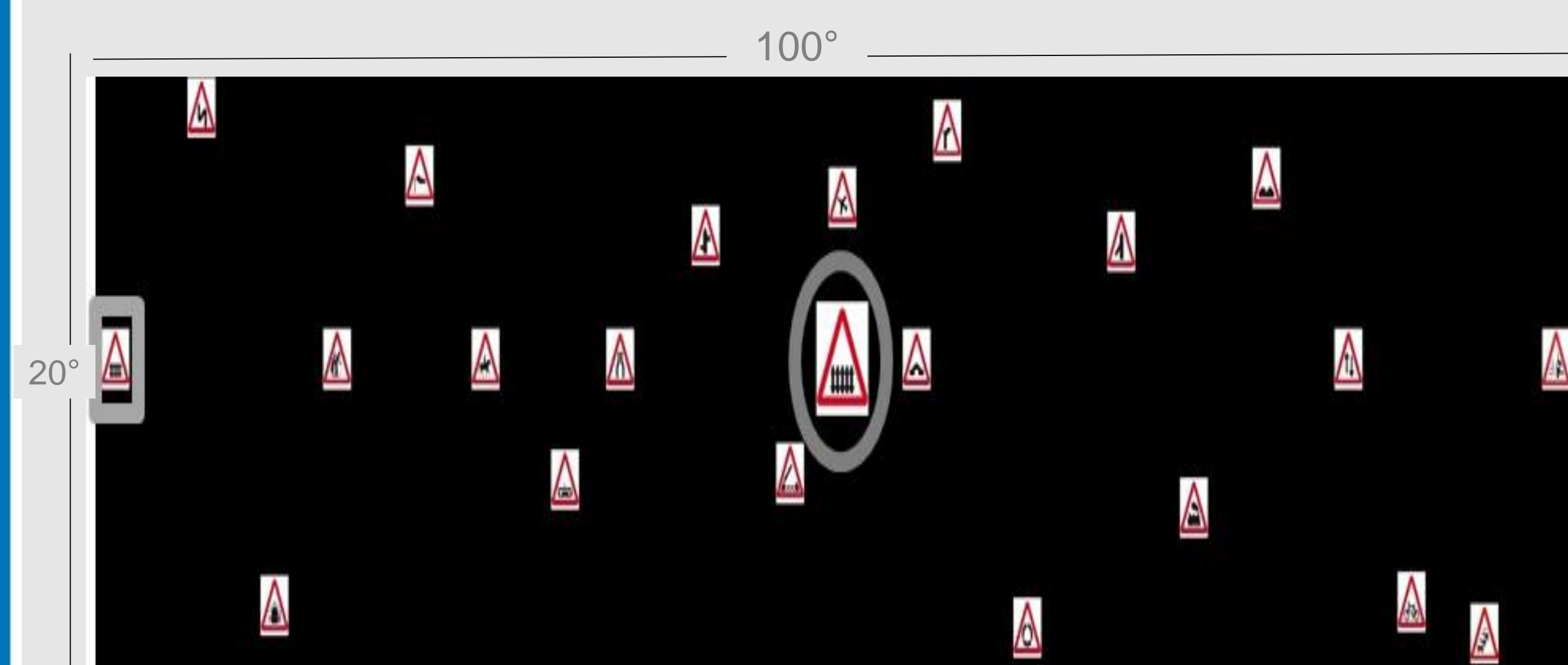


Figure 1. Example of a target-present trial. Gray circle represents the pre-identified target and the gray square represents the target.

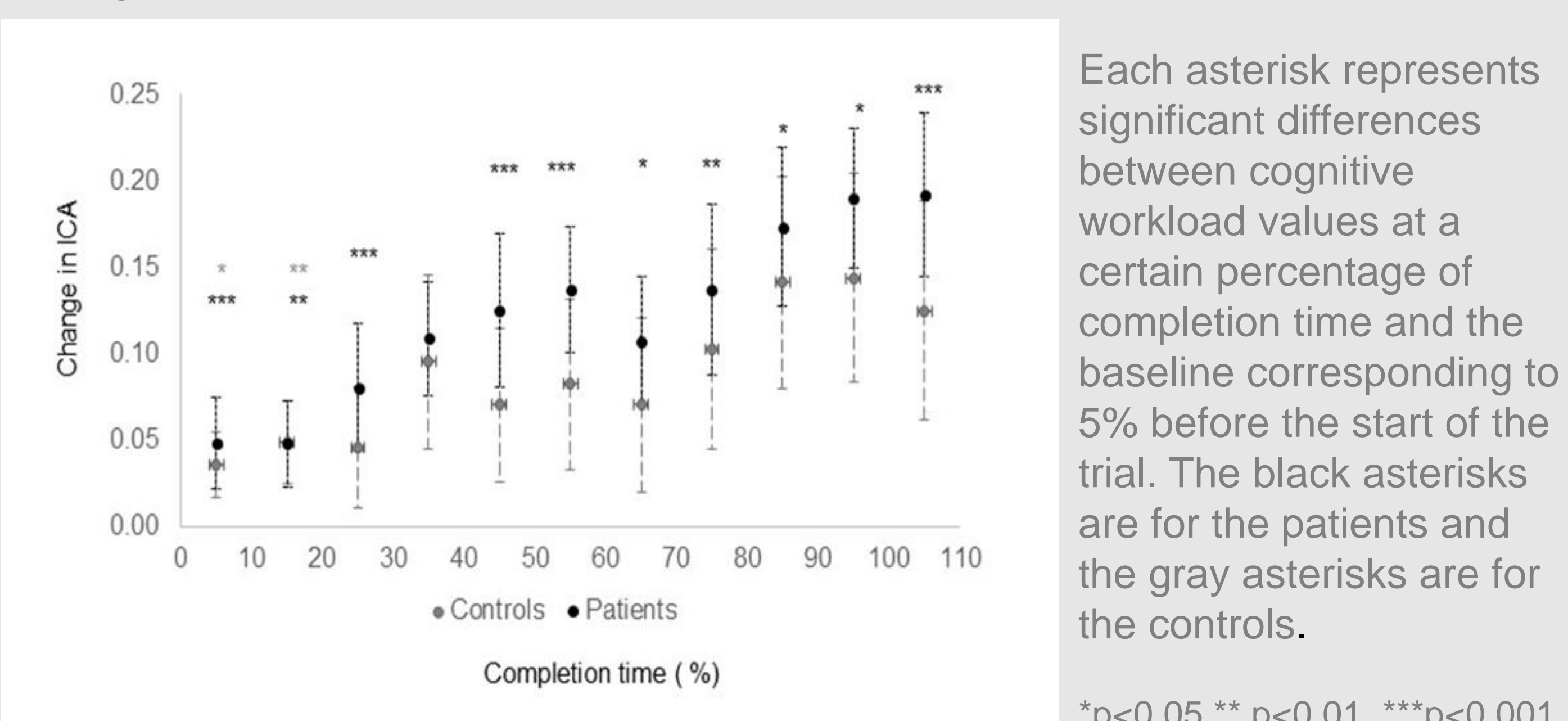
- ✓ The task included 42 trials (half of them had the target present)
- ✓ ICA was recorded by two synchronized, remote eye trackers (FOVIO, SeeingMachines Inc, Canberra, Australia) at 60 Hz. Values ranged between 0 and 1
- ✓ Cognitive workload (ICA) over the course of the visual search task was explored

## References

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## Results

- ✓ PD patients were slower than controls to detect correctly the target (7s.  $\pm$  2 vs 5 s.  $\pm$  1,  $p = 0.004$ ) and missed more targets than controls ( $p = 0.04$ )



\* $p < 0.05$  \*\*  $p < 0.01$ , \*\*\* $p < 0.001$

Figure 2. Change in ICA from baseline to completion of the visual search of all target-present trials for the left eye

- ✓ PD patients had increased values in cognitive workload throughout the entire duration of the task when compared to baseline ( $p < 0.05$ ). By contrast, few significant differences were observed in controls (at 5% and 15%).

## Conclusion

- ✓ PD patients required increased and longer effort to correctly perform the visual search task compared with baseline cognitive workload
- ✓ The use of ICA in patients with PD while performing a static visual search task provides new information into the effort (cognitive workload) required by patients on a moment-to-moment basis

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